MANAGEMENT OF THE

CALIFORNIA STATE WATER PROJECT

BULLETIN 132-2018 | JANUARY 2021

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Secretary for Natural Resources
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Cover photo shows an aerial view of the Lake Oroville spillways recovery site after the lower chute and sections of the upper chute of the flood control spillway were replaced and roller-compacted concrete was placed in the erosion area.

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Covers Calendar Year 2017 Activities

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State of California

Wade Crowfoot *Secretary for Natural Resources*
California Natural Resources Agency

Karla A. Nemeth *Director*
Department of Water Resources

Foreword

Bulletin 132-18, Management of the California State Water Project, continues the Bulletin 132 annual series begun in 1963. Bulletin 132-18 reports water supply planning, construction, financing, management, and operation activities of the State Water Project (SWP). It also discusses water supply and delivery, Delta resources and environmental issues, local assistance programs, power resources, recreation, and financial analysis of the SWP.

Appendix B of Bulletin 132 contains data and computations used by the State of California to determine the SWP water contractors' Statements of Charges. 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, 2017, through December 31, 2017. Appendix B includes data used to document the redetermination of water charges to be paid by SWP water contractors during calendar year 2019; the information is based on established data about the SWP, both known and projected, as of June 2018.

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 information than was 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.

Karla A. Nemeth
Director

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Appendix B Data and Computations Used to Determine 2019 Water Charges (included in this bulletin)

Appendix C The California State Water Project Summary (discontinued)

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

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

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

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California Water Commission

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

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

The commission's SWP-specific responsibilities are to

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

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

Teresa Alvarado, Chair

Matthew Swanson, Vice-Chair

Samantha Arthur

Daniel Curtin

Alexandre Makler

Acronyms and Abbreviations

Symbols

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

A

af acre-foot/acre-feet
Antioch City of Antioch
AWMP Agricultural Water Management Plan

B

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

C

CAISO California Independent System Operator
California State Parks California Department of Parks and Recreation
C.A.S.T. Catch A Special Thrill
CDPH California Department of Public Health
Central Valley Water Board Central Valley Regional Water Quality Control Board
CEQA California Environmental Quality Act
CESA California Endangered Species Act
cfs cubic feet per second
CIMIS California Irrigation Management Information System
CVP Central Valley Project
CWC California Water Code
CWF California WaterFix

D

D-1641 State Water Resources Control Board, Water Right Decision 1641
Delta Sacramento-San Joaquin Delta
DFW Department of Fish and Wildlife
DMCP Delta Mercury Control Program
DO dissolved oxygen
DOE Department of Engineering
DSB Dam Safety Branch
DSC Delta Stewardship Council

DSM2 Delta Simulation Model 2
DSOD Division of Safety of Dams
DSRB Director's Safety Review Board
DWR Department of Water Resources

E

EC electrical conductivity, specific conductance, or specific conductivity
EIR Environmental Impact Report environmental impact report
EPA Environmental Protection Agency
ESA federal Endangered Species Act

F

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

G

GHG greenhouse gas

H

HEA Habitat Expansion Agreement
HEP Habitat Expansion Plan

I

IRP Integrated Resource Plan
IRWM Integrated Regional Water Management

L

LADWP Los Angeles Department of Water and Power
LiDAR Light Detection and Ranging

M

maf million acre-feet
MeHg methylmercury
mg/L milligrams per liter
MIB 2-methylisoborneol
MIDS Morrow Island Distribution System
mS/cm millisiemens per centimeter
MW megawatt
MWh megawatt hour
MWQI Municipal Water Quality Investigations

N

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

O

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

P

PAO Public Affairs Office
PG&E Pacific Gas & Electric Company

R

Reclamation Bureau of Reclamation
RFWE recreation and fish and wildlife enhancement
RM River Mile

S

Sacramento Valley 40-30-30 Index Sacramento Valley Water Year Hydrologic Classification
SBA South Bay Aqueduct
SCE Southern California Edison
SDIP South Delta Improvements Program
SFCWA State and Federal Contractors Water Agency
SJR San Joaquin 4 Rivers
SMPA Suisun Marsh Preservation Agreement
SMSCG Suisun Marsh Salinity Control Gates
SRR Sacramento River Region
State Water Board State Water Resources Control Board
SWP State Water Project

T

the Board California WaterFix State Water Board
TLR Tulare Lake Region

U

USFWS U.S. Fish and Wildlife Service

W

WECC Western Electricity Coordinating Council
WQCP water quality control plan
WSPP Western Systems Power Pool

State Water Project Water Contractors

The State Water Project water 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 Gorgonio Pass Water Agency	San Gorgonio
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

Oroville spillway with damage.

The annual Bulletin 132 series began in 1963 and reported the first deliveries of water by the new State Water Project (SWP). Bulletin 132-18, Management of the California State Water Project, continues this series as the fifty-sixth edition. It reports on SWP planning, construction, finance, management, and operations during calendar year 2017. 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.

Oroville Dam Spillways Incident

In February 2017, Lake Oroville experienced increased reservoir levels as a result of record rainfall and runoff in the Feather River watershed. On February 7, 2017, the Oroville Dam service spillway chute failed. Flows were temporarily halted to inspect and assess the spillway damage. Releases resumed on a limited basis on February 8, 2017.

On February 11, 2017, water flowed down the Oroville Dam emergency spillway for the first time in the life of the structure when Lake Oroville levels surpassed 901 feet, reaching a record high elevation 902.6 feet on February 12, 2017. The releases over the emergency spillway resulted in erosive downstream damage. Emergency repairs began immediately and were ongoing throughout 2017. Reconstruction and repairs for the service spillway chute and emergency spillway are expected to be completed by November 2018.

SWP Allocations

On October 1, 2016, SWP water contractors submitted initial requests for 2017 totaling 4.17 maf. DWR approved delivery of 0.83 maf on December 1, 2016, resulting in initial Table A amounts of 20 percent of SWP water contractor requests. DWR increased the 2017 Table A amounts to 3.6 maf, for a final allocation of 85 percent, on April 14, 2017.

Water Conservation

On April 7, 2017, the Governor issued Executive Order B-40-17, lifting the drought emergency in all California counties except Fresno, Kings, Tulare, and Tuolumne. Executive Order B-40-17 builds on actions in Executive Order B-37-16 to establish long-term water conservation measures. On the same day Executive Order B-40-17 was issued, *Making Water Conservation a California Way of Life* was published.

Yearly Activities Summary

2017 Precipitation and Water Storage

Precipitation and Mountain Snowpack in Water Year 2016–2017

Water year 2016–2017 turned out to be an above average year for precipitation and mountain snowpack. It marked a welcome increase after five consecutive years of below average mountain snowpack. The state received precipitation at 157 percent of average in water year 2016–2017 compared to 104, 74, and 56 percent of average in water years 2015–2016, 2014–2015, and

2013–2014, respectively. Overall, annual precipitation, snow, and runoff followed a decreasing gradient from north to south. The Northern Sierra 8-Station Precipitation Index had 94.7 inches of precipitation, which represents 189 percent of the index average. Rainfall in the months of December, January, and February represented 44 percent of this total. The San Joaquin 5-Station Precipitation and Tulare Basin 6-Station Precipitation indices totaled 72.7 inches (178 percent of average) and 46.9 inches (160 percent of average), respectively. The statewide mountain snowpack on April 1 was 163 percent of average, but peaked a few weeks later on April 17 at 170 percent (47.8 inches of snow water equivalent) of the April 1 average.

River Runoff

Statewide river runoff totaled 217 percent of average in the 2016–2017 water year. The monthly runoff totals for the Sacramento River Region, the San Joaquin 4 Rivers, the Tulare Lake Region, and the Feather River are shown in Table 8-4. As shown, the water year runoff totals for these areas ranged from 212 to almost 254 percent of average.

Water Supply Indices

The Sacramento Valley 40-30-30 Index and the San Joaquin Valley 60-20-20 Index were "wet," based on observed data for water year 2016–2017.

Water Year 2016–2017 Statewide Storage Totals

Monthly storage totals for the major Sierra Nevada reservoirs began at 82 percent of average reservoir storage. The storage increased but remained below average until January 2017. Thereafter, the percent of average remained in the range of 111 to 122 percent for the remaining months of the water year and finished at 120 percent of average at the end of September.

2017 Storage Totals in Major SWP Reservoirs

End-of-year storage on December 31, 2017, in major SWP reservoirs and the State's share of joint-use reservoirs was 2.5 million acre-feet or 48 percent of maximum storage, compared to 3.24 maf or 61 percent of maximum storage at the end of 2016. The average end-of-month total storage in major SWP reservoirs for 2017 was 3.6 maf.

Diversions from the Delta

In 2017, the SWP diverted 3,419,171 acre-feet (af) at Banks Pumping Plant. There was no water pumped for the Cross Valley Canal, and 14,900 af was wheeled for the Central Valley Project at Banks Pumping Plant by DWR during 2017.

Maximum daily Sacramento-San Joaquin Delta (Delta) exports occurred on February 2 at 29,136 af. Combined SWP and CVP monthly Delta exports in 2017 varied from a low of 286,131 af in March, to a high of 718,279 af in January. Delta exports totaled approximately 6.3 maf in 2017.

For more information, see Chapter 8, Water Supply.

2017 Water Deliveries

A total of 4,786,635 af of SWP and non-SWP water was delivered to 29 SWP water contractors and 21 non-SWP agencies. The SWP portion totaled 3,711,702 af, and the non-SWP portion totaled 1,074,932 af.

SWP

The 3,711,702 af delivered to SWP water contractors was categorized as follows:

- 2,247,352 af Table A water
- 367,946 af of transfers and exchanges of Table A water among SWP water contractors
- 13,443 af Turn-Back Water Pool Program and Multiyear Water Pool Program water

- 462,083 af of 2017 carryover water
- 296,677 af of Article 21 water
- 78,553 af of water bank recovery
- 42,467 af of backup water delivery
- 6,857 af of settlement water
- 25,822 af of local water
- 6,218 af of permit water
- 164,284 af of other non-SWP programs

Non-SWP

The 1,074,932 af portion delivered to 21 non-SWP agencies was categorized accordingly:

- 13,191 af of SWP contracted supply
- 982,524 af of regulated delivery of local supply
- 341 af for parks and recreation
- 780 af for fish and wildlife
- 48,125 af for Cross Valley Canal Contractors
- 29,021 af for Kern National Wildlife Refuge
- 950 af for annual contracts

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

Power Resources

Energy used at the 29 SWP pumping and generating plants totaled 9.65 million megawatt hours (MWh). To meet SWP energy needs, DWR purchased 2.87 million MWh of energy at a cost of $81.06 million. This included: (1) 1.16 million MWh of short-term energy from five energy marketers at a cost of $43.52 million, including California Independent System Operator energy costs (CAISO); (2) 0.44 million MWh from four renewable energy electric utilities at a cost of $16.97 million; and (3) 1.27 million MWh of long-term energy at a cost of $20.56 million. Additional associated energy costs totaled $309.69 million, including transmission costs. The total cost of energy-related costs for 2017 was $390.75 million.

Greenhouse Gas Management

In 2017, DWR reported its calendar year 2016 pump load, generation, and sulfur hexafluoride emissions to the California Air Resources Board. DWR's sulfur hexafluoride emissions were below the maximum allowable limit; however, because the allowable limit will be lower in future years, DWR will continue to implement plans to further reduce its sulfur hexafluoride emissions. DWR also reported its 2016 greenhouse gas emissions to The Climate Registry.

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

Hydropower License Planning and Compliance

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

South SWP Hydropower

On February 8, 2017, DWR and Los Angeles Department of Water and Power (LADWP) held a study plan meeting with various stakeholders to discuss the proposed study plan for South SWP Hydropower. In March 2017, DWR and LADWP held additional meetings to discuss the proposed study plan and resolve study needs. On June 14, 2017, FERC approved the revised study plan for South SWP Hydropower. Additionally, DWR initiated various environmental and other studies needed to support the relicensing process.

State Water Project Power Generation and Consumption in 2017

Power Generation and Consumption	Megawatt Hours
Energy generation by SWP facilities	4,519,141
Energy sources and firm purchases under agreements and exchanges	5,378,979
Total Energy Available to the SWP	9,898,120
Energy sales	(243,590)
Net SWP Power Consumption[1]	9,654,529

[1] Totals may not sum as expected due to rounding.

Upon completion of the relicensing effort, FERC will issue one new license to DWR and LADWP as co-licensees for the Warne and Castaic Powerplants, which will retain the name and number South SWP Hydropower, Project No. 2426, and one new license to DWR for the Devil Canyon Powerplant, to be assigned the name and number Devil Canyon Project, FERC Project No. 14797.

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

Long-term Purchase Agreements

DWR contracts for the energy output of five hydroelectric plants totaling 30 MW owned and operated by The Metropolitan Water District of Southern California. Effective November 1, 2017, through the contract termination date of September 30, 2019, DWR receives renewable energy credits bundled with energy from four of the five hydroelectric plants.

On October 1, 2017, DWR began to receive zero-emission energy from the Boulder Canyon Project (Hoover Dam), located near Boulder City, Nevada. DWR entered into a 50-year contract with the United States' Western Area Power Administration (Desert South West Region) and the Bureau of Reclamation for up to 6,500 MWh of annual generation.

Financial Analysis

In 2017, DWR continued to pay bondholders as scheduled. The SWP was financially viable and was indirectly paid for by the approximately 27 million water users served by the project. Direct payment was through the 29 long-term water contractors. In 2017, the SWP handled approximately $1.20 billion in revenues and $1.20 billion in expenses. The 2017 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 2017, engineering, construction, and real estate work continued to enhance, expand, repair, and protect the SWP and other facilities within the State. Significant projects included the seismic remediation of Perris Dam, the East Branch Extension Phase II projects, emergency and recovery efforts of Oroville service and emergency spillways, and habitat restoration projects.

DWR worked on 65 construction contracts in various SWP construction divisions in 2017. Contract projects included pipeline repair, control system upgrades, fire systems modernization, equipment refurbishments and upgrades, seismic upgrades of bridges, maintenance facility improvements at dam and reservoir sites, and the addition of new pumping units.

DWR processed a net total of $3.2 million in payments in 2017 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.

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

Delta Resources and Environmental Issues

Sturgeon Studies

The Oroville Dam, its associated facilities, and the basin experienced high precipitation during winter and spring. It appears that sturgeon did well in these conditions. This is the first time sturgeon larvae have been sampled in the lower Feather River. In addition, it is the first time sturgeon spawning has been documented in the low-flow channel. It is also the highest abundance of sturgeon estimated in the Feather River system to date.

Invasive Species

During 2017, DWR removed all the red sesbania plants (*Sesbania punicea*) along the Thermalito Power Canal, Thermalito Forebay, and Thermalito Diversion Pool as part of an annual maintenance effort, which started in 2007. These areas are the upstream extent of the red sesbania population on the Feather River and are considered a high priority management area.

In December 2016, quagga mussels (*Dreissena rostriformis*) were discovered in the West Branch of the SWP. The mussels were initially discovered in the Angeles Tunnel, which moves water between Pyramid Lake and Elderberry Forebay. Department of Fish and Wildlife classified Pyramid Lake and Elderberry Forebay as "infested" with quagga mussels and Castaic Lake as "presumed infested" because it is downstream of Pyramid Lake and Elderberry Forebay.

Monitoring for adult and veliger mussels continued in Pyramid and Castaic lakes throughout 2017 to delineate the mussel population and determine if a viable population was present in Pyramid Lake, and to determine if any mussels were present in Castaic Lake. Veliger samples were collected twice monthly and analyzed by two separate labs. No veligers were detected in either lake during 2017.

DWR resumed normal operations at Lake Davis, following 17 years of decreased water levels related to containment efforts to prevent the spread of Northern Pike. Higher lake levels will improve conditions for boating, fishing, and other water-related activities.

2017 Income Statement for the State Water Project

Revenues	Thousands of Dollars
Water Contract Payments	1,269,483
Revenue Bond Cover Adjustments	(55,239)
Rate Management Adjustments	(40,471)
Other Revenues	33,816
Total Operating Revenues	**1,207,589**
Expenses	
Project Operations, Maintenance, Power, and Replacement	809,010
Deposits to Reserves	116,897
Water Bond Principal	175,238
Water Bond Interest	106,444
Total Operating Expenses and Debt Service	**1,207,589**
Net System Revenues	**0**

California WaterFix

Biological opinions (BiOps) were issued for California WaterFix from the National Marine Fisheries Service on June 16 and from the U.S. Fish and Wildlife Service on June 23. With each BiOp giving a determination of not likely to jeopardize listed species or destroy or adversely modify designated critical habitat, DWR achieved a critical milestone in the project planning process.

In July, DWR certified the final environmental impact report/environmental impact statement for California WaterFix and filed the notice of determination with the Governor's Office of Planning and Research.

California EcoRestore

DWR's EcoRestore Program functions as DWR's main connection point to California EcoRestore, and the two programs provide mutual support to one another. The program provided DWR with centralized coordination, communication, and integration of all habitat restoration planning and implementation efforts.

Both EcoRestore efforts, working closely with DWR's restoration programs, have been instrumental in addressing many of the challenges constraining restoration project implementation. The initiative includes 29 habitat restoration and fish passage projects, including two projects

under construction in 2017, the Wallace Weir modification and fish rescue facility in the northern Yolo Bypass, and the Tule Red tidal restoration project in the Suisun Marsh. Planning, design, and permitting work continues on the remaining efforts, including multiple projects scheduled to break ground in 2018.

Spillways Incident Fish Stranding

As a result of the Oroville Dam spillways incident, there were four periods of rapid flow reduction on the lower Feather River. The rapid flow reductions, authorized by the U.S. Army Corps of Engineers, occurred on February 27, March 27, May 1, and May 19, 2017, and raised concern about the possibility of stranding special status fish species.

In pools that remained wet, mortality was low and subsequent flows reconnected many of these habitats with the main river channel.

A large proportion of juvenile fall- and spring-run Chinook salmon had likely already migrated out of the area but some juvenile and yearling steelhead would have been actively rearing in the river. No green sturgeon were observed or detected with eDNA sampling or using conventional methods (e.g., beach seining or electrofishing) during stranding surveys.

Fish Restoration Program

Pursuant to the U.S. Fish and Wildlife Service and National Marine Fisheries Servcice BiOps and Department of Fish and Wildlife longfin smelt incidental take permit, the Fish Restoration Program continued to make progress towards fulfilling its restoration requirements. Planning, permitting, and acquisition activities moved forward on the program's restoration projects, including Prospect Island, Decker Island, Bradmoor Island, and Winter Island. Construction started on the initial restoration activities on the Suisun Marsh project.

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

San Joaquin River Restoration Program

For the first time in more than 60 years, spring-run Chinook salmon were found breeding in the river, a major milestone for the San Joaquin River Restoration Program. Biologists caught over 400 juvenile spring-run Chinook salmon, the offspring of 115 adult spring-run Chinook salmon released in the river months earlier. The adult salmon had been reared in tanks for 4 years at the Salmon Conservation and Research Facility along the river in Friant, California. The adults were released in the river where they successfully constructed 13 redds in the upper reaches of the San Joaquin River below Friant Dam.

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

Recreation

The Oroville Dam spillways incident affected recreation use in the Lake Oroville State Recreation Area. To compensate for the loss of some recreation facilities, DWR improved other recreation facilities.

In 2017, SWP facilities supported an estimated 4.5 million recreation days of use (Table 13-1), up seven percent from 2016's 4.2 million recreation days. Most of the SWP recreation use was concentrated at the major reservoirs, with approximately 40 percent of the recreation attendance occurring in the Oroville Field Division and 37 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 the Bureau of Reclamation and other federal and State agencies.

SWP Milestones through the Decades

50 Years Ago—1967

Oroville Dam, the key conservation feature of the State Water Project, was completed in October. Storage of water began in November.

SWP water rights applications were approved in May 1967.

40 Years Ago—1977

The SWP experienced the worst drought year in the State's history. Available water supplies were critically low.

30 Years Ago—1987

In March 1987, DWR, the U.S. Bureau of Reclamation, the Department of Fish and Game, and the Suisun Resource Conservation District signed the Suisun Marsh Preservation Agreement, which defines marsh water quality standards and provides details for implementing the plan of protection.

After years of controversy, environmental impact analyses, and negotiations, construction work toward installation of the remaining four pump units of the Harvey 0. Banks Delta Pumping Plant began in August 1987. Only seven units were installed when the plant was constructed in the 1960s.

20 Years Ago—1997

On June 18, 1997, State and local leaders celebrated the completion fo the Coastal Branch, Phase II water project. The Coastal Branch delivers SWP water to San Luis Obispo and Santa Barbara counties.

In early 1997, major floods hit California.

The 1997 flood caused 48 of California's 58 counties to be declared disaster areas and nearly $2 billion in damages. Oroville Dam released a record 160,000 cfs through the spillway.

10 Years Ago—2007

The original 50-year term FERC Project Number 2100 hydropower license for operation of the Oroville Facilities expired January 31, 2007. The project continued to operate under an annual license issued by FERC on February 1, 2007.

May 2007 saw the first voluntary shutdown of the SWP pumps in the Delta to protect fish. Limited pumping resumed 10 days later, and 5 days after that, pumping was increased to resume water deliveries.

Chapter 1
The State Water Project

A view looking north from the California Aqueduct Vista Point, an exit off southbound Interstate 5 near Exit 423 Stuhr Road in Stanislaus County.

This chapter primarily provides background on the State Water Project (SWP), including brief descriptions of SWP facilities, planning, construction, power operations, financing, contracting agencies, water deliveries, and the project's many uses and functions. It also provides a glimpse of California history, with a look at the processes and decisions that went into the creation of the largest State-built water project in the country.

Chapters 2 through 15 provide more detail on significant events and specific topics related to the management of the SWP in calendar year 2017. At the end of the bulletin, Appendix B presents data and computations used to determine the SWP water contractors' Statements of Charges for 2019, which is based on established data about the SWP, both known and projected, as of June 2018.

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 the 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 SWP water contractors 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 27 million of California's estimated 39 million residents benefit from SWP water.

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 amounts of precipitation and snowpack, as well as the rate and amount of water from rainfall and snowmelt runoff, are used to 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.

Project Facilities

The SWP depends on a complex system of dams, reservoirs, power plants, pumping plants, canals, pipelines, 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), 21 reservoirs, 30 pumping and generating plants, and

approximately 700 miles of aqueducts and pipelines. Figure 1-1 shows the names and locations of primary SWP storage and water delivery facilities.

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 and San Joaquin rivers flow into the Sacramento-San Joaquin River Delta (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, 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. DWR's share of gross storage in the reservoir is 1,062,183 af. Generally, water is pumped into San Luis 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 Central Valley Project 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 the Bureau of Reclamation.

As the water flows through the San Joaquin Valley, numerous turnouts convey it to farmlands within the service areas of the SWP and Central Valley Project. Along its journey, this water is lifted more than 1,000 feet by four pumping plants–Dos Amigos, Buena Vista, Teerink, and

Figure 1-1 Names and Locations of Primary SWP Storage and Water Delivery Facilities, December 31, 2017

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 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 Gorgonio 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, which was completed in 2017, expands deliveries in these service areas and includes two new SWP facilities, Citrus Reservoir and Citrus Pump Station.

Water in the West Branch flows through Oso Pumping Plant, Quail Lake, Peace Valley Pipeline, and 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 present statistical information about primary storage facilities, primary dams, pumping plants, power plants, and aqueducts.

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 operation, maintenance, power, and replacement costs associated with water supply, are paid by the 29 SWP water contractors that have contracts with DWR for the delivery of SWP water.

For more information on financing, see Chapter 14, Financial Analysis.

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 Diversion Pool	13,400	320	10
Thermalito Forebay	11,800	630	10
Thermalito Afterbay	57,000	4,300	26
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[1]	2,027,800	12,520	65
O'Neill Forebay[2]	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
Crafton Hills Reservoir	307	13	0
Citrus Reservoir	560	17	0

[1] DWR's share of storage in San Luis Reservoir, jointly owned with the Bureau of Reclamation, is 1,062,183 acre-feet.
[2] DWR's share of storage in O'Neill Forebay is 29,500 acre-feet.

SWP Water Contractors

From 1963 through 1967, 32 agencies or districts signed 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 water supply contract. Therefore, only 29 SWP water contractors have contracts with DWR as of December 31, 2017.

The contracts are in effect for the longest of the following periods:

- the project repayment period, which extends to December 31, 2035;
- 75 years from the effective 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.

The contracts initially provided for a combined maximum annual Table A amount of 4,230,000 af of the 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).

Table 1-2 Physical Characteristics of Primary Dams

Facility	Crest Elevation (feet)	Structural Height (feet)	Crest Length (feet)	Structural Volume (thousand cubic yards)
Antelope	5,025	120	1,320	380
Frenchman	5,607	139	720	537
Grizzly Valley	5,785	132	800	253
Oroville	922	770	6,920	80,000
Thermalito Diversion	233	143	1,300	154
Thermalito Forebay	231	91	15,900	1,840
Thermalito Afterbay	142	39	42,000	5,020
Clifton Court Forebay	14	30	36,500	2,440
Bethany	250	121	3,940	1,400
Del Valle	773	235	880	4,150
Sisk	544	385	18,600	77,664
O'Neill Forebay	233	88	14,300	2,877
Los Banos Detention	384	167	1,370	2,100
Little Panoche Detention	676	152	1,440	1,210
Pyramid	2,606	400	1,090	6,860
Elderberry Forebay	1,550	200	1,990	6,000
Castaic	1,535	425	4,900	46,000
Cedar Springs	3,378	249	2,230	7,600
Perris	1,600	128	11,600	20,000
Crafton Hills Dam	2,932	95	500	144
Crafton Hills Reservoir Enlargement Dam	2,932	95	565	152

Figure 1-2 (located at the end of the chapter) shows the name and location of each SWP water contractor and the first year of SWP delivery service for each. Table 1-6 (also at the end of the chapter) presents information about each SWP water contractor.

For more information about existing SWP water supply contracts and annual water deliveries, see Chapter 9, Water Contracts and Deliveries.

Future Planning and Construction

The planning, design, and construction of SWP facilities were based on studies and analyses that projected SWP water contractors' 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.

Demands for SWP water are expected to increase and change as California's population continues to grow and as the effects of climate change affect the State's water resources. Increasingly, issues such as escalating costs, environmental concerns, and increased non-SWP demand for limited water supplies have become

Table 1-3 Pumping Plant Characteristics

Facility	Number of Units	Normal Static Head (feet)	Total Flow at Design Head (cubic feet per second)	Total Motor Rating (horsepower)
Hyatt	3 (p-g)[1]	500–625	5,610	519,000
Robie Thermalito	3 (p-g)[1]	85–102	9,120	120,000
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)[1]	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[2]	6	521	134	10,500
Bluestone[2]	6	484	134	10,500
Polonio Pass[2]	6	533	134	10,500
Buena Vista[2]	10	205	5,405	144,500
Teerink[2]	9	233	5,445	150,000
Chrisman[2]	9	518	4,995	330,000
Edmonston[2]	14	1,926	4,480	1,120,000
Oso	8	231	3,252	93,800
Pearblossom	9	540	2,575	203,200
Greenspot	5	382	70	5,400
Citrus	8	665	160	18,000
Crafton Hills	7	613	135	13,500
Cherry Valley	4	75	52	1,000

[1] The term p-g indicates pumping-generating units.
[2] These plants have one unit in reserve.

important factors affecting the planning and construction of new facilities.

In response to changes brought about by population growth, environmental concerns, climate change, differences in local water use, local water conservation programs, conjunctive-use programs, and other factors, DWR continues to plan, design, and construct transportation and power-producing facilities for the SWP.

Because of 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

Table 1-4 Power Plant Characteristics, by Facility

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

[1] The term p-g indicates pumping-generating units.
[2] 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
Subtotal	*1.8*	*12.6*	*65.5*	*1.7*	*81.6*
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
Subtotal	*12.6*	*381.4*	*37.6*	*11.8*	*443.4*
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
Subtotal	*9.7*	*23.4*	*137.1*	*9.8*	*180.0*
Total	**24.1**	**417.4**	**240.2**	**23.3**	**705.0**

activities can be found in previous issues of Bulletin 132.

Climate Change

Climate change will have potentially serious effects on water resources. Temperature increases 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; the volume and timing of runoff; the water quality in the Delta due to sea-level rise; and the amount of irrigation water needed due to modified evapotranspiration rates.

The ability of the SWP and Central Valley Project 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.

To address these concerns, DWR and the Bureau of 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. This multiagency coordination effort will also update decision makers on climate change impacts, the ability of existing facilities to accommodate these impacts, and available mitigation measures.

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

Figure 1-2 **Names, Locations, and First Year of Service of SWP Water Contractors, December 31, 2017**

Table 1-6 SWP Water Contractors, by Area, as of December 31, 2017

Contractor	Cumulative Deliveries (acre-feet)[1]	Annual Table A (acre-feet)	Payments (in dollars)[3]	Gross Area (acres)	Assessed Valuation (in dollars)[2]	Estimated Population
Upper Feather River Area						
City of Yuba City	51,253	9,600	9,336,352	10,133	4,713,051,974	71,070
County of Butte	113,036	27,500	13,241,908	1,049,280	18,070,400,000	204,000
Plumas County Flood Control and WCD	12,987	2,700	2,880,030	1,676,056[a]	2,060,744,342	21,200
Subtotal	*177,276*	*39,800*	*25,458,290*	*2,735,469*	*24,844,196,316*	*296,270*
North Bay Area						
Napa County Flood Control and WCD	358,743	29,025	149,627,982	510,010	37,426,336,858	139,099
Solano County Water Agency	913,541	47,756	201,249,195	581,760	49,444,335,360	440,207
Subtotal	*1,272,284*	*76,781*	*350,877,177*	*1,091,770*	*86,870,672,218*	*579,306*
South Bay Area						
Alameda County Flood Control and WCD–Zone 7	1,757,360	80,619	414,442,317	275,900	49,415,658,709	238,600
Alameda County Water District	1,395,075	42,000	164,751,485	66,943	61,533,000,000	350,500
Santa Clara Valley Water District	4,449,053	100,000	504,446,673	835,098	450,190,625,516	1,945,465
Subtotal	*7,601,488*	*222,619*	*1,083,640,475*	*1,177,941*	*561,139,284,225*	*2,534,565*
San Joaquin Valley Area						
County of Kings	170,980	9,305	13,269,577	893,300	9,125,193,927	149,942
Castaic Lake Water Agency	409,606			8,700[c]	4,532,936	
Dudley Ridge Water District	2,492,283	45,350	114,367,741	37,600	54,549,134	36
Empire West Side Irrigation District	126,979	3,000	5,778,287	7,500	[b]	12
Kern County Water Agency	39,420,820	982,730	2,570,363,367	5,224,000	91,300,000,000	884,788
Oak Flat Water District	218,913	5,700	9,567,732	4,500	[b]	10
Tulare Lake Basin Water Storage District	5,044,966	87,471	219,002,273	189,519	194,000,000	23
Subtotal	*47,884,547*	*1,133,556*	*2,932,348,977*	*6,365,119*	*100,678,275,997*	*1,034,811*
Central Coastal Area						
San Luis Obispo County Flood Control and WCD	89,014	25,000	116,875,854	2,122,240	45,457,307,011	279,083
Santa Barbara County Flood Control and WCD	447,805	45,486	785,987,790	193,391	34,371,568,684	373,906
Subtotal	*536,819*	*70,486*	*902,863,644*	*2,315,631*	*79,828,875,695*	*652,989*
Southern California Area						
Antelope Valley-East Kern Water Agency	2,268,408	144,844	666,557,462	1,525,120	26,661,474,279	397,634
Castaic Lake Water Agency	1,218,648	95,200	437,883,137	125,057[c]	39,848,125,912	278,885
Coachella Valley Water District	1,577,357	138,350	684,426,245	639,857	59,034,977,922	290,000
Crestline-Lake Arrowhead Water Agency	66,568	5,800	34,627,393	54,900	2,755,274,108	29,000
Desert Water Agency	1,335,699	55,750	370,489,009	209,760	13,969,282,800	81,569
Littlerock Creek Irrigation District	20,261	2,300	8,549,312	10,000	388,056,000	2,900
The Metropolitan WD of Southern California	39,306,945	1,911,500	13,102,921,105	3,315,374[d]	2,724,952,923,281	19,019,000
Mojave Water Agency	481,201	85,800	377,974,950	3,136,000	33,985,137,849	480,941
Palmdale Water District	297,792	21,300	106,252,986	119,680	1,414,494,581	114,533
San Bernardino Valley Municipal Water District	1,117,396	102,600	827,275,358	225,577	48,717,699,229	661,546
San Gabriel Valley Municipal Water District	471,505	28,800	202,963,364	18,297	16,850,589,307	197,636
San Gorgonio Pass Water Agency	89,249	17,300	226,368,934	140,800	7,737,994,438	90,000
Ventura County Watershed Protection District	87,156	20,000	81,588,813	308,252	50,463,927,012	472,776
Subtotal	*48,338,185*	*2,629,544*	*17,127,878,068*	*9,828,674[c]*	*3,026,779,956,718*	*22,116,420*
Total	**105,810,599**	**4,172,786**	**22,423,066,631**	**23,514,604[e]**	**3,880,141,261,169**	**27,214,361**

[1] All water delivered to SWP water contractors, including carryover, Article 21, surplus, unscheduled, exchange, permit, purchased, local, and non-SWP water.

[2] Statutes of 1978, Chapter 1207, added Section 135 to the Revenue and Taxation Code, requiring assessment at 100 percent of full value for the 1981–1982 fiscal year and fiscal years thereafter.

[3] 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.

[a] Total of all Plumas County Flood Control and Water Conservation District, including Last Chance Creek Water District.

[b] Assessed valuation not available on an agency area breakdown.

[c] Castaic Lake Water Agency (Southern California Area) includes land in the San Joaquin Valley Area formerly known as Devil's Den Water District.

[d] Acreage for Metropolitan includes Calleguas Municipal Water District, which is common to Metropolitan and Ventura County Watershed Protection District.

[e] Includes duplicate values. Portions of some contractors' gross acreage fall within two contractors' geographic areas and are included in each contractor's total.

WD = Water District; WCD = Water Conservation District

Dudley, Empire, Oak Flat, and Tulare are agricultural contractors. Kern is an agricultural and a municipal and industrial contractor.

Chapter 2
Delta Resources

*Cattail (*Typha*), a common Delta plant.*

Significant Events in 2017

In late 2017, contractors installed the final plantings along the berms surrounding Unit 2 of the Whale's Mouth site, which is the designated habitat enhancement area of the Sherman Scour Pond Habitat Enhancement Project.

The remaining two of five Twitchell Habitat Enhancement Project sites were planted in late 2017 and included the adjacent Canal Mitigation Site and Meadow Habitat Enhancement Site.

Information for this chapter was contributed by the Division of Integrated Regional Water Management, the Bay-Delta Office, and the Division of Flood Management.

The Sacramento-San Joaquin Delta (Delta) and Suisun Marsh encompass about 840,000 acres of tidal influenced land at the confluence of the Sacramento and San Joaquin rivers (see Figure 2-1). Collectively, the Delta and Suisun Marsh are part of the largest estuary on the West Coast of the United States. The Delta is 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. These include the California WaterFix and California EcoRestore, the Delta Stewardship Council's (DSC) *Delta Plan*, the State Water Resources Control Board's water rights decisions, and federal biological opinions (BiOps).

California WaterFix

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

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

Delta Plan

The *Delta Plan,* adopted by the DSC in May 2013 in compliance with the Delta Reform Act of 2009, is a comprehensive, long-term management plan for the Delta. It became effective with legally enforceable regulations in September 2013. (For more information, see the sidebar, Delta Stewardship Council.) The plan was amended in September 2016.

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

State Water Project Delta Compliance Program

The State Water Project (SWP) and Central Valley Project (CVP) obtained take authorization for the federal Endangered Species Act and California Endangered Species Act listed fish species for coordinated operations in the Delta through a U.S. Fish and Wildlife Service 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 immediately, while others needed development of studies and projects before being implemented.

Figure 2-1 The Sacramento-San Joaquin Delta

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 plan was amended in September 2016.

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

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

The Delta Science Program will develop scientific information and synthesis on issues critical to managing the Bay-Delta system. That body of knowledge must be unbiased, relevant, authoritative, integrated across State and federal agencies, and communicated to Bay-Delta decision makers, agency managers, stakeholders, the scientific community, and the public. The *Delta Science Plan,* released by the DSC in December 2013 and updated in 2016, provides a guide for organizing, conducting, and integrating science in the Delta. A Science Action Agenda will be a key component of implementing the *Delta Science Plan.*

The Delta ISB is a standing board of nationally and internationally prominent scientists with appropriate expertise to evaluate the broad range of scientific programs that support adaptive management of the Delta. The Delta ISB will provide oversight of the scientific research, monitoring, and assessment programs that support adaptive management of the Delta through periodic review 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.

In 2017, efforts continued under the SWP Delta Compliance Program to develop and implement studies and construct projects to address regulatory requirements under the NOAA Fisheries and U.S. Fish and Wildlife Service BiOps and the Department of Fish and Wildlife incidental take permit.

Predation, Release, and Efficiency Program

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

- reducing prescreen loss of federal Endangered Species Act-protected salmon and steelhead in the forebay to no more than 40 percent (Prescreen loss is the loss of fish as they move across the forebay that results from predation by fish and birds.);
- reducing predation by 50 percent at the fish release sites;
- implementing fish release site studies to develop methods to reduce predation following release of salvaged fish; and
- identifying salvage deficiencies and recommending actions to improve salvage efficiency in order to meet a required efficiency goal of 75 percent for salmonids.

Fish Science Building

The addition of the Fish Science Building at the Skinner Fish Facility was essential to improve DWR's ability to conduct fish studies to meet regulatory requirements for operation of the SWP. The existing collection, handling, transport, and release building was too small and lacked the necessary equipment to hold and rear fish to carry out various studies and projects. The new building includes a small laboratory, fish rearing tanks, an office, and an area to store study gear and equipment. In 2017, the Fish Science Building continued to provide critical support for numerous fishery studies related to the BiOps.

Fish Salvage Release Sites

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

Construction of the major components of the Curtis Landing fish release site was completed in 2014, and the facility became fully operational in 2015. Design of the two new Sherman Island sites (Little Baja and Manzo Ranch) was completed in 2014, all permits were obtained, and construction was initiated in fall 2015. Construction continued in 2017. A cost sharing agreement with DWR's Delta Levees Program for the two new sites was also implemented for the levee construction portion of this project.

Based on observed deficiencies in the earthworks at the site, DWR requested a forensic analysis of the design and construction of recent levee improvements. A draft forensic analysis report was prepared, and remedial actions were implemented at the site.

Clifton Court Forebay Predation Reduction Studies

The predation reduction strategy for Clifton Court Forebay was to increase public fishing opportunities in the forebay to reduce the

number of predatory fish and the prescreen loss of federal Endangered Species Act-protected salmon and steelhead. This strategy involved constructing a fishing pier to provide improved access to anglers.

Due to changes made to Bay Delta Conservation Plan Conservation Measure 1 in 2014, the proposed fishing pier project was indefinitely suspended. The related predator study continued in 2017. The study is designed to provide critical information on the behavior and population demographics of predatory fish and birds, as well as salmonid survival. Full-scale predator sampling and acoustic tagging and releases of marked salmon were conducted.

Predator Reduction Alternatives

Subsequent to the suspension of the fishing pier project, DWR, in close coordination with NOAA Fisheries, analyzed other predator reduction alternatives in 2015. NOAA Fisheries identified six preferred alternatives and provided a ranking of these alternatives. The result of this effort was agreement to study several possible options for predator reduction in the forebay. In addition, NOAA Fisheries approved an extension for compliance with the BiOp requirement conditioned on DWR implementing four interim measures to reduce predation in the forebay. In 2017, DWR continued work on the four interim measures, three of which were unmodified from 2016:

(1) electrofishing the forebay
(2) controlling aquatic weeds
(3) implementing operational changes to limit take

The fourth interim measure, originally establishing a fishing incentive program, was replaced with conducting a predatory fish relocation study.

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

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

Skinner Fish Facility

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

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

During 2017, the technical team continued to evaluate and recommend revisions to the SWP and CVP fish loss equations used at the respective facilities. In addition, DWR worked with the University of California, Davis, to conduct a study of juvenile green sturgeon (*Acipenser medirostris*) behavior near louvers to develop management practices which will improve sturgeon survival at the Skinner Fish Facility. The study will also examine the risk of predation on juvenile green sturgeon by common predatory species in the Delta.

Fish Screen Evaluations

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

(1) fish screen cleanliness
(2) fish screen hydraulics
(3) fish entrainment

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

During 2017, draft final reports were prepared for all three sites. In addition, post-dredging evaluations were conducted at the Roaring River Slough Distribution System forebay, which had been dredged in 2016, and the post-dredging data was evaluated and included in the draft final report for that site.

Salmon Survival Engineering Solutions Program

The salmon survival engineering solutions program includes completed work required by the 2009 NOAA Fisheries BiOp. To comply with Reasonable and Prudent Alternative Action IV.1.3, DWR and the Bureau of Reclamation (Reclamation) are required to consider engineering solutions to further reduce the diversion of emigrating juvenile salmonids to the interior and southern Delta and reduce their exposure to CVP and SWP export facilities.

Georgiana Slough Floating Fish Guidance Structure Study

In the spring of 2014, a physical barrier called a floating fish guidance structure designed to reduce entrainment into Georgiana Slough was constructed and operated just upstream of the Georgiana Slough divergence from the Sacramento River.

In an effort to develop and refine quantitative barrier design and evaluation methodologies for future barriers, an investigation of the correlation between salmon behavior and river turbulence was initiated with Cornell University. Subsequent work in 2017 included two field studies—one near Isleton Bridge and one at Sutter Slough near the town of Courtland—that were completed using an infrared camera and a set of methods to process the images of flow to extract water surface velocities. The results compared reasonably well to other existing velocity measuring technologies implemented during the same time. Compared to traditional methods, the advantage of the infrared camera technology is its ability to cover larger spatial areas for longer periods of time, in addition to requiring no contact with the water.

Salmon Protection Technology Study

Ongoing work under this program for planning and design for a multiyear barrier implementation program in the Sacramento River was on hold in 2017 while a cost share agreement with Reclamation was pursued. The intended purpose of the project is to boost salmonid populations, maintain ongoing compliance with Reasonable and Prudent Alternative Action IV.1.3, and provide SWP water supply reliability. The Salmon Protection Technology Study project concept includes construction and operation of barriers at Delta junctions with known lower survival salmonid migratory pathways.

The project concept is based on the best available science. It may consist of a 5-year salmon diversion and salmon protection technology implementation program and evaluation in the Sacramento River using a bioacoustic fish fence, floating fish guidance structure, or infrasound fish fence at locations that will provide the largest resource benefit. Locations under consideration include Georgiana Slough, Steamboat Slough, Sutter Slough and the Delta Cross Channel. This project will provide the basis for DWR to recommend future actions beyond Salmon Protection Technology Study intended to continue to improve salmon populations and water supply reliability for SWP operations.

South Delta Improvements Program

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

South Delta Improvements Program (SDIP) elements in the CALFED Bay-Delta Program record of decision included increasing diversions through Clifton Court Forebay (first to 8,500 cubic feet per second and then to 10,300 cubic feet per second), 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 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)
- 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 cubic feet per second (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
- extending up to 24 agricultural diversion intake facilities to improve their function

The SDIP final environmental impact report/environmental impact statement (2006) evaluated alternatives and proposed continuing with SDIP Stage 1 as the preferred alternative.

Reclamation and DWR's 2008 biological assessment for the CVP and SWP 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.

Program Status

DWR and Reclamation continued to suspend most SDIP planning and permitting activities during 2017. In particular, to address requirements identified in Action IV.6 of the 2009 NOAA Fisheries BiOp for the CVP and SWP long-term operations criteria and plan, DWR suspended major components of the program related to replacing the temporary barriers with permanent operable gates. Instead, DWR continued with reporting work of a three-year study to analyze the fishery impacts of the temporary barriers. After the analyses are complete, DWR will provide a recommendation for continuation with SDIP, or elements of it determined to be consistent with some of the original objectives. Additionally, DWR continued elements of the South Delta sediment transport, scour, water quality, flow, and seepage monitoring activities.

Temporary Barriers Project Facilities

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

(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

(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 and steelhead 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 improving dissolved oxygen levels and increasing attraction flows for returning adult San Joaquin River salmon and steelhead.

In 2017, only one out of the three flow-control agricultural barriers was installed in August, at the Middle River near Victoria Canal site.

On the San Joaquin River, 2017 started as a high water year with flood conditions. High flows continued through July, yet water level issues on Middle River and at the Tom Paine Slough siphons required action. The Middle River barrier was installed and closed on August 15, 2017, to protect agricultural diversions on Middle River upstream of the barrier. In order to improve water levels at the Tom Paine Slough siphons without the protection afforded by the Old River near Tracy flow control barrier, portable pumps were installed to fill Tom Paine Slough and provide the equivalent water supply that would have been available if the Old River near Tracy and Grant Line Canal barriers had been installed. The Middle River was not

raised by 1 foot as it was done in previous years, and the barrier was notched on September 15, 2017, to allow passage of up-migrating adult salmon.

Due to high flows on the San Joaquin River, the spring Head of Old River barrier was not installed. The fall Head of Old River barrier was installed and operated at the request of the Department of Fish and Wildlife. The six slide gates of the culverts remained in the open position for the duration of the barrier operation. The installation of the barrier started on September 26, 2017, was closed on October 13, 2017, and remained in operation until November 13, 2017, when it was breached, and completely removed on November 27, 2017.

In 2017, the Head of Old River Predator Manipulation Study was completed and a final report was released. Numerous peer-reviewed journal articles about the study were published by the investigators. The study was conducted by NOAA Fisheries and provided scientifically defensible information on the abundance and behavior of predatory fish species in the San Joaquin River between the Head of Old River and the Port of Stockton. NOAA Fisheries used genetic analysis to determine predator diet and tested the hypothesis that salmon smolt survival can be improved in one reach of the San Joaquin River by removing and relocating predatory fish to another reach. The hypothesis was proven to not be true as predatory fish quickly repopulated areas where they were removed, and there was no statistically significant difference in salmon smolt survival between reaches where predatory fish were removed and the control reaches.

Figure 2-2 Temporary Barrier Locations in the South Delta

Delta Flood Control

Levees in the Delta protect valuable wildlife habitat, farms, homes, urban areas, recreational developments, highways, railroads, natural gas infrastructure, utility lines, a major aqueduct, and other public developments. Delta levees influence and protect critical water quality parameters in Delta waterways. Some levees also protect water quality for approximately 27 million Californians who receive a portion of their water from the Delta. The State Legislature recognized the importance of the Delta and enacted the Delta Flood Protection Act of 1988, declaring that ". . . the Delta is endowed with many invaluable and unique resources and that these resources are of major statewide significance" (California Water Code Sections 12300 et seq.).

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

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

In 1996, Assembly Bill 360 (Hannigan; Chapter 601, Statutes of 1996) expanded the area covered by the Delta Levees Program to include the remainder of the legal Delta and northern Suisun Bay.

Additional funding sources for the Delta Levees Program are listed below:

- 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
- 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 main components of the program are the Delta Flood Emergency Management Plan, local agency coordination and support, and emergency response facilities.

In 2017, improvement projects were completed at the Emergency Materials Transfer Facilities in Rio Vista and Stockton. In Rio Vista, site and security improvements were made at the existing rock stockpile location. In Stockton, rock stockpiled at the Port of Stockton was moved to the new facility on West Weber Avenue. The site also includes a flood fight materials warehouse and support facilities. In addition, a contract for work on the northern parcel at West Weber Avenue began in July 2017. The northern portion of the site will include a refurbished warehouse and rock conveyors.

Delta Levees Maintenance Subventions Program

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

The Subventions Program provides reimbursement funding to local levee-maintaining agencies for improving, maintaining, and enhancing nearly 700 miles of project and non-project levees. Since its inception in 1973, the Subventions Program has provided more than $180 million of State funding to more than 70 islands in the Delta. In fiscal year 2017–2018, the program expects to reimburse up to $12 million to local agencies for eligible levee maintenance and rehabilitation work and to cover any remaining emergency response and levee repairs for storms that started late in 2016 and continued into 2017. (In fiscal year 2016–2017, the program reimbursed $9.5 million.) The local levee-maintaining agencies' activities help minimize the risk of Delta levee failure, which in turn protects the Delta's ecosystem, communities, and agriculture; State and private infrastructure; and the State's water supply.

Delta Levees Special Flood Control Projects Program

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

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

While DWR seeks cost sharing for all program projects, in some cases, DWR may provide up to 100 percent of the cost. Districts receiving these funds are required to participate in a habitat improvement program to ensure net long-term habitat enhancement.

Levee restoration projects, habitat projects, and other special projects were conducted on various Delta islands and tracts in fiscal year 2017–2018. The program plans to release a multi-benefit projects solicitation package in 2018 for $60 million in Proposition 1E funds.

The Twitchell Habitat Enhancement Project is a directed action enhancement project funded by the Delta Levees Program and managed by the Delta Ecosystem Enhancement Section in partnership with Reclamation District 1601. In late 2017, contractors planted the last two of five sites that had been delayed in 2016 due to high water. The project will be monitored and maintained through 2021.

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 North Delta where the Mokelumne River, Cosumnes River, Dry Creek, and Morrison Creek converge. 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 (Alternative1-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. The project is consistent with the objectives put forth in the *California Water Action Plan*, the *Delta Plan*, and the California EcoRestore Initiative.

Two project elements are proposed for implementation: MWT and Grizzly Slough.

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

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. The Grizzly Slough Floodplain Restoration Project will restore both seasonal wetland and riparian habitat and provide wildlife-friendly agriculture. The Project will restore natural flooding to the site by breaching a levee on Grizzly Slough and excavating a channel network from the breach. A new setback levee with one-way drainage culverts will maintain equivalent flood protection for farmlands to the south. An agricultural zone (157 acres) will be established on higher elevation and enhanced to allow cultivation of irrigated crops (corn) to benefit sandhill cranes (*Antigone canadensis*).

Project Status

In early 2017, flooding of both MWT and Grizzly Slough illustrated the flood-prone nature of these sites, confirming the importance of pursuing the North Delta Project.

The Nature Conservancy convened a group of stakeholders to determine how to prepare MWT for flooding. It was decided to pre-notch the MWT west levee near the Delta Cross Channel to reduce the probability of uncontrolled flooding and the surge that in previous years caused downstream levees to fail. A breach occurred on MWT along the Mokelumne River near New Hope, resulting in the MWT taking on water. However, the pre-notched area resulted in only a small break in MWT's south levee and consequently less pressure on downstream levees. After the MWT flood event, stakeholders requested that the breach along the Mokelumne River and the notched areas remain at an elevation of ten feet National Geodetic Vertical Datum of 1929 (the vertical datum is a collection of specific points on the Earth with known heights either above or below mean sea level). MWT was drained, but the breach site remained low as requested. Phase A protective tower levee construction was delayed a year due to the 2017 flood event.

Grizzly Slough flooded for several months because the existing levee impeded natural site drainage. Fish were trapped onsite and the prolonged standing water caused water-intolerant native plants to die. This event confirmed the need to establish natural floodplain processes on the site. A Proposition 1 (Water Quality, Supply, and Infrastructure Improvement Act of 2014) grant was submitted to the Delta Conservancy and conditionally awarded. Flooding caused delays in surveys to support the permitting process.

Dutch Slough Tidal Marsh Restoration Project

The Dutch Slough Tidal Marsh Restoration Project will restore natural Delta habitats to a 1,187-acre site in the western Delta city of Oakley. The project's location in the western Delta offers the opportunity, soil types, and lack of subsidence to create a large area of tidal marsh and complex intertidal channels favored by native Delta species. The project site consists of three leveed parcels that will be restored to tidal marsh, riparian woodland, open water, managed marsh, and upland habitats. Formerly slated for urban development, the site will become critically needed habitat for native fish and wildlife species.

The project is being implemented by the Delta Levees Program as part of its legislative mandate to provide net habitat improvement in the Delta. In addition to habitat restoration, the project will provide recreation and educational opportunities to benefit residents of the Delta, as well as adaptive management components to inform future Delta restorations.

Two of the three parcels (Emerson and Gilbert) will be be restored first. Construction will consist of earthmoving to create the proper elevations for gradually sloping marsh plain, other project features such as channel berms, and the rehabilitation of existing levees and construction of new flood control levees.

Project Status

In 2017, preparation activities began for the restoration project on the Emerson and Gilbert parcels. These activities included vegetation management and rehabilitation of existing levees. Levee repairs took place in advance of the restoration project for increased levee stability during construction and to ensure the scheduled breaches to restore tidal action will be in the proper locations.

West Delta Program

DWR currently owns approximately 13,000 acres on Sherman and Twitchell islands, located in the western Delta. The West Delta Program is tasked with land management on Sherman and Twitchell

islands to achieve DWR's goals and objectives, such as mitigation of subsidence through various wetland restoration projects. Program objectives are supported by active research and application of land management activities used for subsidence reversal, carbon sequestration, and habitat development.

Since 2008, DWR has constructed approximately 1,700 acres of subsidence mitigation projects on Sherman and Twitchell islands and constructed approximately 6,000 lineal feet of "fish friendly" habitat setback levees (see Figure 2-3).

In 2016, work continued in partnership with the Sherman Island Reclamation District (Reclamation District 341) under a $10.5 million grant from the California Department of Fish and Wildlife's fiscal year 2014–2015 Wetlands Restoration for Greenhouse Gas Reduction Program. The grant provided funding for the construction and maintenance of the Sherman Island Whale's Mouth Wetland Restoration Project, and in 2016, provided funding for initial planning and engineering activities associated with the Belly Wetland Restoration Project, an approximately 1,000 acre wetland proposed for the lowest spots of Sherman Island. Matching funds from both DWR and the University of California, Berkeley, will provide for additional greenhouse gas monitoring throughout the Delta, resulting in a data set from a more robust variation of conditions.

In 2016, additional maintenance was completed and flood-up began on the 650-acre wetland on the lower southwestern side of Sherman Island. The flood-up of the Whale's Mouth project will promote vegetation growth and restore hundreds of acres of permanent palustrine emergent

Figure 2-3 Selected West Delta Program Projects

wetlands. The Scour Pond Habitat Enhancement Project, a portion of the Whale's Mouth wetland restoration project, was funded by the Delta Levees Special Flood Control Projects Program's Habitat Proposal Solicitation Package 2009–2010 and managed by the Delta Ecosystem Enhancement Section in partnership with Twitchell Island Reclamation District (Reclamation District 1601). It created 62 net acres of wetlands and uplands on a portion of the Whale's Mouth Site and filled a scour pond adjacent to the San Joaquin River levee. The Delta Levees and West Delta programs merged the two adjacent projects to provide a substantial cost savings. Unit 2 of the Whale's Mouth site was planted in 2016, and the berms of the entire site were planted in late 2017. The greater Whale's Mouth site will be monitored and maintained through 2021.

The West Delta Program continued a partnership with the University of California, Berkeley, to collect greenhouse gas data on both newly constructed wetland sites as well as typical Delta farmed crops such as corn, alfalfa, and irrigated pasture. Data collected since 2010 has shown that there is a net greenhouse gas benefit of approximately 10 metric tons of carbon dioxide equivalent by planting wetland crops on previously farmed Delta peatland soils. In 2016, data collected in the West Delta contributed to the ongoing multi-agency effort to develop a draft greenhouse gas protocol that will allow for quantification of a wetland project's net increase in carbon sequestration. This draft carbon protocol was under consideration for adoption by the California Air Resources Board in 2017.

The West Delta Program continued working with the Twitchell Island Reclamation District (Reclamation District 1601) to develop construction plans and environmental permits for the Twitchell Island San Joaquin River Setback Levee Restoration Project. This project will construct approximately 25,000 lineal feet of setback levee along the San Joaquin River, allowing for habitat features to be developed on the water side.

Photo: Ryan Martin

Chapter 3
Environmental Programs

Western pond turtle.

Significant Events in 2017

Sturgeon spawning and sturgeon larvae were documented in the lower Feather River for the first time in May and June. The Department of Water Resource's (DWR) Feather River Program sturgeon studies determined the highest abundance of sturgeon in the lower Feather River to date.

Biological opinions (BiOps) were issued for California WaterFix from the National Marine Fisheries Service (NOAA Fisheries) on June 16 and from the U.S. Fish and Wildlife Service (USFWS) on June 23. With each BiOp giving a determination of not likely to jeopardize listed species or destroy or adversely modify designated critical habitat, DWR achieved a critical milestone in the project planning process.

In July, DWR certified the final environmental impact report/environmental impact statement for California WaterFix and filed the notice of determination with the Governor's Office of Planning and Research.

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 mitigate adverse environmental impacts resulting from construction and operation of State Water Project (SWP) facilities. DWR has also established other environmental programs and partnered with other agencies to restore and enhance the natural environment.

Operations for Species of Concern

A primary consideration in the operation of the SWP is avoiding, minimizing, and/or mitigating 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.

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.

Restoration flows were interrupted for over six months due to flood releases that began on January 4 and continued until July 20, 2017. During this period, Friant Dam releases were managed for flood control and no restoration flows were released. Restoration flows resumed on July 21, 2017, and continued through the end of the year. The 2017 water year was classified as wet; however, restoration flow releases continued to account for flow restrictions due to seepage limitations in the river. Over 318,000 acre-feet of unreleased restoration flows were sold or exchanged in 2017 due to flow limitations in the river.

DWR and the Bureau of Reclamation (Reclamation) released a joint initial study and environmental assessment for the Eastside Bypass Improvements Project. The proposed project would improve levee stability and thereby increase restoration flow capacity in the Eastside Bypass—a critical and needed improvement, as the Eastside Bypass between Sand Slough and the Mariposa Bypass is identified as the most limiting channel reach with regards to levee stability. The proposed project also calls for modifications to existing structures to facilitate fish passage for federal and State-listed salmonids and other native fish. Project completion is expected by the end of 2020.

For the first time in more than 60 years, spring-run Chinook salmon were found breeding in the river, a major milestone for the San Joaquin River Restoration Program. Biologists caught over 400 juvenile spring-run Chinook salmon, the offspring of 115 adult spring-run Chinook salmon released in the river months earlier. The adult salmon had been reared in tanks for

4 years at the Salmon Conservation and Research Facility along the river in Friant, California. The adults were released in the river where they successfully constructed 13 redds in the upper reaches of the San Joaquin River below Friant Dam.

The San Joaquin River Restoration Program released more than 90,000 juvenile spring-run Chinook salmon into Reach 5 of the San Joaquin River, which is upstream of the Merced River confluence but downstream of the major physical passage impediments. Most of the juveniles (52,000) were produced at the Salmon Conservation and Research Facility and the balance were sourced from the Feather River Fish Hatchery (FRFH).

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

Lower Yuba River Accord

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

In 2017, the Sacramento Valley Water Year Hydrologic Classification (Sacramento Valley 40-30-30 Index) was wet and the Delta was in excess conditions throughout most of the transfer season. Thus, there was no Component 1, 2, or 3 water, and no Component 4 water was purchased by the participating SWP and CVP contractors. A shortfall of 869 acre-feet of prepaid Component 1 water from 2015 remains (see Bulletin 132-16, Chapter 3, Environmental Programs) and must be repaid by Yuba in the next water year that is not classified as dry or critical.

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

Oroville Facilities

Existing Federal Energy Regulatory Commission License Activities for 2017

Invasive Plant Management

During 2017, 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, which started in 2007. These areas are the upstream extent of the red sesbania population on the Feather River and are considered a high priority management area.

Feather River Fish Hatchery

Fall-run Chinook Salmon. A total of 4,864,630 juvenile fall-run Chinook salmon were released into the Feather River, San Francisco Bay, and San Pablo Bay.

Spring-run Chinook Salmon. A total of 1,693,954 spring-run Chinook salmon were released in the Feather River (between Gridley and Boyd's Pump Boat Launch).

Steelhead. A total of 71,675 steelhead were planted.

Feather River Gravel Supplementation Project

Roughly 5,000 cubic yards of rock were placed into the Feather River, creating approximately 2.14 acres of new spawning habitat. In addition, approximately 3,000 cubic yards of material were excavated from Moe's Side Channel to restore

spawning and rearing habitat lost due to high river flows in 2017. This side channel now averages 20 feet wide and 2 feet deep when the river flow is 800 cubic feet per second (cfs). Yearly redd monitoring will be conducted in the fall to help determine the effectiveness of this project.

Lake Oroville and Thermalito Afterbay

In 2017, a total of 21,600 Chinook salmon were planted in Lake Oroville at the Bidwell Boat Ramp.

Habitat improvement activities continued in 2017 in the fluctuation zone of the lake and the afterbay. Approximately 1,640 Christmas trees were recycled with the help of the Boy Scouts and the California Conservation Corps. The recycled trees were constructed into structures for juvenile fish habitat at the Bidwell Canyon Boat Launch area and Thermalito Afterbay.

Lake Oroville Elevation

Lake surface elevation can affect the following aspects of Oroville Facilities:

- 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
- streamflow requirements (downstream of the lake)

The 2017 low point for the Lake Oroville reservoir surface elevation was reached on November 15 at 689.46 feet, and the high point of 902.59 feet was reached on February 12. The full pool elevation of Lake Oroville is approximately 900 feet.

Federal Energy Regulatory Commission Relicensing Activities

USFWS Biological Opinion for the Oroville Facilities Relicensing

Various conservation measures for the species identified in the U.S. Fish and Wildlife Service (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 the Department of Fish and Wildlife (DFW). These activities include providing nest and forage habitat for waterfowl and upland bird species, monitoring and maintaining Thermalito Afterbay brood pond water surface elevations, and protecting and conserving giant garter snake (*Thamnophis gigas*) habitat. An annual compliance report for 2017 was compiled by DWR and submitted to USFWS.

Habitat Expansion Agreement and Habitat Expansion Plan

In November 2007, DWR and the Pacific Gas & Electric Company (PG&E) entered into the Habitat Expansion Agreement (HEA) with the National Marine Fisheries Service (NOAA Fisheries) and several other agencies and stakeholders. Under the HEA, DWR and PG&E agreed to expand habitat for spring-run Chinook salmon and Central Valley steelhead in lieu of providing fish passage around the Oroville Facilities and PG&E hydropower facilities on the North Fork Feather River. DWR and PG&E are required to submit annual reports describing

the milestones reached and progress achieved in implementing the HEA. DWR and PG&E submitted an annual report to NOAA Fisheries on July 21, 2017.

In 2010, DWR and PG&E submitted a final Habitat Expansion Plan (HEP) to NOAA Fisheries for review and approval. NOAA Fisheries has not approved the HEP, contending that the HEP does not meet all the approval criteria outlined in the HEA. DWR and PG&E have been coordinating with NOAA Fisheries and providing technical information and analysis in an effort to secure NOAA Fisheries' approval of the HEP.

On June 7, 2017, NOAA Fisheries issued a letter stating that DWR and PG&E have not provided any new technical information that would materially change NOAA Fisheries' determination that the HEP does not meet all the approval criteria outlined in the HEA. NOAA Fisheries, DWR, and PG&E initiated the neutral third-party review process described in the HEA and identified six potential reviewers. NOAA Fisheries also requested additional technical information. On October 20, 2017, DWR and PG&E responded to NOAA Fisheries with the requested technical information that was available at the time, along with a suggestion for a neutral third-party reviewer.

DWR and PG&E will continue to work with NOAA Fisheries to identify and agree upon a neutral third-party reviewer to independently evaluate the effectiveness of the proposed HEP measures toward achieving the HEA fish enhancement goals.

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*, 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 if unintentionally introduced. Based on the results, SWP locations were classified into one of three groups: unable to support, potentially able to support, or able to support long-term populations of quagga and zebra mussels (see Bulletin 132-12). Understanding where quagga and zebra mussels may survive in the SWP was used to prioritize management efforts.

Early Detection Monitoring. DWR routinely monitors the California Aqueduct, SWP reservoirs, and the Delta for the presence

of quagga and zebra mussels. DWR uses two methods to monitor for mussels: zooplankton tows (with DNA analysis) for veligers (the free floating larval stage) and settlement plates (see Bulletin 132-10).

In 2017, DWR and two collaborating water agencies, Santa Clara Valley Water District and The Metropolitan Water District of Southern California, sampled for veligers at 16 locations in the SWP (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.

Prevention and Response Planning

To protect against and prepare for mussels in the SWP, the Aquatic Nuisance Species Program developed several planning documents to guide actions and identify vulnerabilities. The *Quagga and Zebra Mussel Vector Management Plan for the State Water Project* identifies potential mussel points-of-entry and vectors and outlines mechanisms to reduce the risk of introduction. The two primary vectors of mussels are downstream transport of planktonic veligers in natural and constructed waterways and overland transport of veligers and attached adults on watercraft. A critical component of the vector management plan is reducing the risk posed by watercraft. To accomplish this, DWR contracted with the California Department of Parks and Recreation and the Los Angeles County Department of Parks and Recreation to implement vessel inspection and outreach programs at San Luis State Recreation Area (San Luis Reservoir, O'Neill Forebay, and Los Banos Creek Reservoir) and Pyramid and Castaic lakes (see Bulletin 132-12).

During the vessel inspection, watercraft are inspected for attached mussels and for the presence of standing water that could harbor mussel veligers. Watercraft must be 100 percent dry in order to launch, otherwise they fail inspection and must wait 7–8 days before returning. At San Luis State Recreation Area, 14,289 vessels were inspected during 2017. Of those vessels, 444 failed the inspection due to the presence of water. At Pyramid Lake, 13,620 vessels were inspected, with 738 failures. At Castaic Lake, 26,808 vessels were inspected, and 1,132 failed the inspection. All failures were the result of the presence of wet equipment or standing water.

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

DWR also 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).

Quagga Mussels in the SWP

West Branch. In December 2016, quagga mussels were discovered in the West Branch of the SWP. The mussels were initially discovered in the Angeles Tunnel, which moves water between Pyramid Lake and Elderberry Forebay. The tunnel had been dewatered for approximately three weeks to conduct infrastructure condition assessment

inspections and maintenance at the time the discovery was made. Subsequently, a video inspection via remote operated vehicle was conducted on the intake structure to the Angeles Tunnel. One adult mussel was observed and appeared to be alive. Los Angeles Department of Water and Power and The Metropolitan Water District of Southern California conducted an inspection of Elderberry Forebay, which had a lowered lake elevation, and found two dead quagga mussels near the Castaic Power Plant (see Bulletin 132-17).

DFW classified Pyramid Lake and Elderberry Forebay as "infested" with quagga mussels and Castaic Lake as "presumed infested" because it is downstream of Pyramid Lake and Elderberry Forebay. DFW requires managers of infested water bodies to submit mussel containment and eradication plans. The Aquatic Nuisance Species Program submitted the first draft of a quagga mussel control plan for Pyramid Lake, Angeles Tunnel, and Castaic Lake in April 2017. A second draft was submitted in September 2017 that addressed comments received from DFW. Additional comments were received from DFW in November 2017, and the Aquatic Nuisance Species Program will submit the third draft of the plan by February 2018. The third draft will address shear stress through the Pyramid stream release structure and low calcium conditions in Pyramid Lake as control measures for quagga mussels.

Monitoring for adult and veliger mussels continued in Castaic and Pyramid lakes throughout 2017 to determine if any mussels were present in Castaic Lake and to delineate the mussel population and determine if a viable population was present in Pyramid Lake. Veliger samples were collected twice monthly and analyzed by two separate labs. No veligers were detected in either lake during 2017. Additionally, adult mussels were not found on any of the settlement plates deployed in the lakes. A remotely operated underwater vehicle video inspection was conducted in Pyramid Lake on May 23, 2017. Buoy anchor chains located near Pyramid Dam were inspected down to a depth of 269 feet; no mussels were observed. Anchor chains located west of Chumash Island and at the Pyramid inlet were also inspected; no mussels were observed.

Calcium concentrations in Pyramid Lake have historically been suitable to support a quagga mussel population. However, during 2017, calcium concentrations declined to levels marginally able to support adult mussels and unable to support mussel reproduction and veliger development. The calcium decline was caused by large inflows of low-calcium water from the Delta through the SWP. Inadequate calcium may be the reason that no further mussels were discovered in Pyramid Lake and no veligers have been detected. Calcium concentrations will continue to be monitored in 2018.

East Branch. In February 2017, mussel veligers were observed by microscope in water samples collected from the North Park valve of the Santa Ana Pipeline, which transports water from Silverwood Lake to Lake Perris. DNA analysis could not confirm that these were quagga or zebra mussel veligers. Extensive veliger sampling occurred upstream and downstream of the North Park valve throughout the remainder of 2017 and no veligers were detected. Adult mussels were not detected on settlement plates in Silverwood Lake or Lake Perris. Because the veliger detection was unconfirmed, and there were no additional detections, the Santa Ana Pipeline was not classified as "infested" by DFW. DWR and The Metropolitan Water District of Southern California will continue to closely monitor the SWP East Branch.

California WaterFix

California WaterFix will construct new north Delta conveyance facilities that will add flexibility to how water will be diverted

from the Delta. California WaterFix will allow for more natural flows in the Delta to benefit salmon, smelt, other species, and water quality. It will increase water supply reliability by giving the water projects that divert from the Delta more flexibility to move water without harming fish. California WaterFix will also better balance the associated water quality and hydrodynamic benefits for fish, drinking water, agriculture, and other beneficial uses.

California WaterFix activities in 2017 included those listed below:

- obtaining Section 106 National Historic Preservation Act programmatic agreement
- presenting case-in-chief and participating in State Water Resources Control Board's water right change petition
- obtaining incidental take permit
- obtaining BiOps (Section 7 ESA permit)
- certifying final Environmental Impact Report

Aquatic Science Peer Review

As Phases 1 and 2A concluded in 2016, Phase 2B of the aquatic science peer review continued in early January 2017. The purpose of the peer review was to provide NOAA Fisheries, USFWS, and DFW with an independent scientific evaluation of the methods and approaches for developing the BiOps and analyses prepared for the DFW incidental take permit application. Phase 2B resulted in a report drafted by the review panel and made public in March.

The independent review panel reviewed the products from two phases of the ongoing California WaterFix assessment:

- responses by the agencies to the panel's initial Phase 1 review comments, the adaptive management framework, and the biological assessment under CESA
- draft information for two genetic stocks of Chinook salmon, steelhead, and green sturgeon (*Acipenser medirostris*), and for delta smelt (*Hypomesus transpacificus*) and longfin smelt (*Spirinchus thaleichthys*)

The DFW developed minimum Delta outflow criteria for the spring period (March through May), which is similar to what occurs under current take authorizations for the CVP and SWP coordinated long-term operations. Operating to the outflow criteria could help to minimize the effects of the California WaterFix on longfin smelt. This differed from what was submitted as part of the incidental take permit application, which would require the CVP/SWP to operate to achieve a minimum Delta outflow, rather than operate to operational criteria that may result in achieving a minimum Delta outflow. DWR worked collaboratively with DFW, based on the review panel's input, to incorporate the changes into the final incidental take permit application.

ESA Section 7 Consultation

After the request to begin the formal consultation process under Section 7 of the ESA in 2016, the biological assessment was updated in 2017 and included a final adaptive management program for the California WaterFix and the current 2008 and 2009 BiOps for the coordinated long-term operation of the CVP and SWP. This draft adaptive management program contains key elements associated with an adaptive management approach including identified areas of uncertainty, suggested research actions to help address uncertainties, and an initial set of objectives for addressing operations and other management actions associated with listed species.

A BiOp from NOAA Fisheries was issued on June 16, 2017, followed by a BiOp from USFWS issued on June 23, 2017.

NOAA Fisheries and USFWS prepared a mixed programmatic BiOp on the project, approving some actions that are not subject

to further Section 7 consultation, as well as providing programmatic review of future actions that would be authorized at a later time.

With each BiOp giving a determination of not likely to jeopardize listed species or destroy or adversely modify designated critical habitat, DWR achieved a critical milestone in the project planning process.

Incidental Take Permit

The incidental take permit was issued by the DFW on July 26, 2017. This permit authorizes the incidental take of State-listed species associated with future operation of the SWP with the addition of the California WaterFix.

Environmental Review Certification

On July 21, 2017, DWR's Acting Director signed the notice of determination and decision documents for the final environmental impact report/environmental impact statement, approving California WaterFix as the proposed project under the California Environmental Quality Act.

DWR then adopted the findings of fact and statement of overriding considerations, adopted the mitigation monitoring and reporting program, approved the California WaterFix, and filed the notice of determination with the Governor's Office of Planning and Research. The final environmental impact report/environmental impact statement exemplifies an unprecedented level of public review, comment processing, and scientific input to refine and improve the proposed project.

In addition to the certification, DWR also filed a "validation action" with the Sacramento County Superior Court to affirm DWR's authority to, among other things, issue revenue bonds to finance the planning, design, construction, and other capital costs of California WaterFix.

Change Petition Hearing

In August 2015, DWR and Reclamation submitted a petition to the State Water Resources Control Board for a change to SWP water rights necessary for the implementation of key components of California WaterFix.

On July 26, 2016, the State Water Resources Control Board change petition hearings for the California WaterFix began. Direct testimony for Part 1 of the hearing concluded in December 2016.

The rebuttal portion of Part 1 began on April 25, 2017, when DWR and the U.S. Department of the Interior (collectively, the petitioners) presented Part 1 rebuttal testimony responding to other parties' cases-in-chief. After each of the witnesses or panel of witnesses summarized their testimony, other parties to the hearing had the opportunity to cross-examine the rebuttal witnesses. Once the petitioners completed presenting rebuttal testimony, protesting parties had an opportunity to present their rebuttal testimony. Part 1 of the change petition hearing ended on November 8, 2017.

Part 2 will focus on effects of the petition on fish and wildlife and recreational uses, including what appropriate Delta flow criteria should be included in any project approval; public interest considerations; and consideration of the final California Environmental Quality Act document. Part 2 is scheduled to begin January 18, 2018, and will continue as scheduled by the State Water Resources Control Board.

Water Contractor Vote

In fall 2017, several SWP and federal water contractors' board of directors voted whether to participate in the funding of California WaterFix. Although Westlands Water District voted to not participate, other water agencies—such as The Metropolitan Water District of Southern California; Kern County

Water Agency; Santa Clara Valley Water District; and Alameda County Flood Control and Water Conservation District, Zone 7—voted to approve and support a financial commitment to fund the project.

California EcoRestore

California EcoRestore was established in April 2015 as an initiative under the California Natural Resources Agency to advance a minimum of 30,000 acres of critical habitat restoration in the Delta and Suisun Marsh by 2020. California EcoRestore's three primary purposes are to accelerate habitat restoration, guide the development of regional restoration plans, and facilitate the development of adaptive management plans for habitat projects.

In May 2015, DWR's Director created the DWR EcoRestore Program to provide DWR with centralized coordination, communication, and integration of all habitat restoration planning and implementation efforts. This program functions as DWR's main connection point to the California EcoRestore initiative, and the two efforts provide mutual support to one another as needed.

Both EcoRestore efforts, working closely with DWR's restoration programs, have been instrumental in addressing many of the challenges constraining restoration project implementation. The initiative includes 29 habitat restoration and fish passage projects, including two projects under construction in 2017, the Wallace Weir modification and fish rescue facility in the northern Yolo Bypass, and the Tule Red tidal restoration project in the Suisun Marsh. Planning, design, and permitting work continues on the remaining efforts, including multiple projects scheduled to break ground in 2018.

In 2017, the DWR EcoRestore program provided assistance to successfully establish contracts for two Fish Restoration Program (FRP) projects that will construct "turnkey" tidal habitat restoration projects to benefit delta smelt in the Delta and Suisun Marsh. These two projects, known as Yolo Flyway Farms and Wings Landing, amount to more than 500 creditable acres toward the BiOp requirements. The FRP is assessing the need for a second request for proposal to be released in 2018.

DWR EcoRestore worked with DWR's Real Estate Branch and FRP to complete direct acquisitions of important habitat restoration properties, including Chipps Island, Arnold Slough, Stringer, and Bradmoor Island (Property 330), totaling 1,642 acres.

Biological Opinions for CVP/SWP Operations

NOAA Fisheries and USFWS have both issued BiOps on CVP and SWP operations that include reasonable and prudent alternatives to avoid jeopardizing or adversely modifying critical habitat of federally listed species. (For more information see the sidebar, Endangered Species and Biological Opinions.) Both the 2008 USFWS and 2009 NOAA Fisheries BiOps were challenged in federal court but were eventually upheld and are the basis for ESA compliance for the SWP and CVP. For more information about the federal litigation, see Bulletins 132-12 through 132-16.

Reinitiation of ESA Consultation

In August 2016, DWR and Reclamation requested reinitiation of ESA Section 7 consultation with USFWS and NOAA Fisheries on the coordinated long-term operation of the CVP and SWP. Several factors resulted in the request for reinitiation of consultation, including the apparent decline in the status of several listed species, new information related to recent multiple years of drought, and the evolution of best available science. The overall goal of

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 federal Endangered Species Act (ESA; Title 16, United States Code Sections 1531–1544 [1973]) and the California Endangered Species Act (CESA; California Fish and Game Code Sections 2050–2100 [1984]) 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 (BiOps) 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 BiOp 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 specify reasonable and prudent alternatives that the "action agency" may take to avoid the likely jeopardy or adverse modification. In the BiOp, the wildlife agency includes an incidental take statement that estimates the amount or extent of incidental take likely to result from the action and specifies terms and conditions to implement to minimize the impacts of the incidental take.

CESA is substantially similar to ESA in all aspects. 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.

reinitiating consultation is to achieve durable and sustainable BiOps issued by USFWS and NOAA Fisheries that account for the updated status of the species and species' needs as developed through ongoing collaborative science processes, operation of CVP and SWP facilities, existing operations of the CVP and SWP, and operation of potentially new components of the CVP and SWP.

Long-term Operations Biological Opinions Annual Science Review

The NOAA Fisheries' BiOp requires Reclamation and NOAA Fisheries to host a workshop no later than November 30 of each year. The purpose of the annual workshop is to review the effectiveness of the prior year's water operations and regulatory actions prescribed in the BiOps' reasonable and prudent alternatives. The review was expanded to include a review of the implementation of the USFWS BiOp's reasonable and prudent alternatives. The

review will enable NOAA Fisheries and USFWS to use lessons learned, incorporate new science, and make appropriate, scientifically justified adjustments to the reasonable and prudent alternatives and their implementation. The annual reviews have been conducted since 2010.

The last Annual Science Review was in November 2015. In April 2016, Reclamation and NOAA Fisheries agreed to temporarily modify the frequency of the Long-term Operations Biological Opinions Annual Science Review from annual to biennial from 2016 through 2020. After that, Reclamation and NOAA Fisheries will evaluate whether to make this change permanent or consider additional changes. The most recent science review was held in December 2017.

Delta Operations for Delta Smelt and Longfin Smelt

The Smelt Working Group is an interagency team of experts on delta smelt and longfin smelt biology that meets regularly from December through June to assess the risk to delta smelt and longfin smelt from operations at the 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).

The 2016–2017 water year was amongst the wettest on record, and flows during most of the year exceeded levels requiring action as prescribed by the BiOp. The USFWS issued one determination on January 6, requiring that Old River and Middle River flows remain more positive than –5000 cfs to protect pre-spawning delta smelt. High Delta outflows persisted after February 7, precluding the need for restrictions during the remainder of the water year.

Fish Restoration Program

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

Prospect Island

Prospect Island is in the Cache Slough Complex immediately east of the southern end of the Yolo Bypass in the Delta. This tidal restoration project will convert roughly 1,609 acres of flooded uncultivated land to fully tidal habitat.

The public draft environmental impact report was released in August 2016, and public comments were being reviewed and considered.

A pre-application meeting with permitting agencies was held on April 6, 2017. Staff from the U.S. Army Corps of Engineers, USFWS, NOAA Fisheries, and DFW were represented. A Section 404 permit application was submitted to the U.S. Army Corps of Engineers in July, and an encroachment permit application was submitted to the Central Valley Flood Protection Board in October.

On May 8, 2017, DWR held a Prospect and Ryer Islands Groundwater Workshop to establish a common understanding of the information provided in DWR's seepage reports and to discuss types of monitoring that should be conducted. DWR's North Central Region Office performed additional analysis in 2017 and concluded that groundwater levels on Ryer Island are primarily influenced by local precipitation, Miner Slough stage, and the operation of Ryer Island's drainage system. Results of the 2017 additional analysis were in concurrence with North Central Region Office's 2014

seepage report that the occurrence and elevation of surface water on Prospect Island do not appear to affect groundwater levels on Ryer Island and should not exacerbate Ryer Island's seepage conditions.

Decker Island

Decker Island is located in the Delta along the Sacramento River at Horseshoe Bend. The project site is currently an established emergent wetland with muted tidal connectivity to Horseshoe Bend to the south that transitions to upland habitat in the north. The project would enhance up to 140 acres of tidal wetland, associated high marsh, and riparian habitats. The project includes work to lower a section of levee, reconfiguring internal berms, and excavating a southern breach. Together, these actions will increase site water levels and flow, increase access for fish, inhibit the establishment of invasive vegetation, and enhance access to upland habitat.

A mitigated negative declaration and initial study were released for public review in August 2016, and the final California Environmental Quality Act document was adopted in April 2017. DWR was pursuing project construction in August 2017, but construction was dependent upon acquiring a 6-acre flowage easement on the neighboring property. Portions of this strip of property will flood once the project is built and fully tidal. Negotiations looked promising until October 2016 when the neighboring landowner was unwilling to consider DWR's real estate options. This delayed construction until at least 2018. In September 2017, the neighboring landowner, through their counsel, verbally accepted an offer for the easements. DWR's Real Estate Branch is working to acquire the necessary easements so that construction can proceed in 2018.

Bradmoor Island

Located within Suisun Marsh, Bradmoor Island includes 730 acres of managed wetlands, tidal berms, and associated uplands in three parcels. DWR purchased the 245-acre Overlook Club (Property 332) in February 2013, the 257-acre Flying D Club (Property 329) in February 2016, and the 253-acre Wildwing Club (Property 330) in March 2017. All three properties will be restored to tidal action together and will be connected through interior breaches. Restoration planning began concurrently with property acquisition. The island is currently managed as three separate duck clubs under lease agreements with DWR, which will continue until March 2019. Permits for restoration are anticipated to be obtained in Spring 2019, with construction of restoration features planned in fall 2019. Restoration will result in conversion of managed seasonal wetlands to tidal wetlands at intertidal and subtidal elevations, as well as enhancement of adjacent tidal wetlands.

Arnold Slough

Arnold Slough is located in eastern Suisun Marsh, adjacent to the Blacklock Restoration Project and across Nurse Slough from the Bradmoor Island tidal habitat restoration project.

Arnold Slough (Property 604) is a 260-acre property that was acquired by DWR in April 2017. Shortly after being purchased, the water control structure on the exterior levee was displaced due to high water events. DWR repaired the water control structure in August 2017. Restoration planning is ongoing while the property is managed as a duck club under a lease agreement until 2019. Permits for restoration are anticipated to be obtained by spring 2019. Restoration will result in conversion of managed seasonal wetlands to tidal wetlands at intertidal and subtidal elevations, and enhancement of adjacent tidal wetlands.

Chipps Island

Chipps Island is at the western boundary of the Delta and is the southernmost portion of Suisun Marsh. The island is in Solano County at the confluence of the Sacramento and San Joaquin rivers. Chipps Island is comprised of three main parcels: north, east, and west. In September 2017, DWR acquired the north and east parcels. The north parcel is a fully-managed wetland, while the east and west parcels experience muted tidal conditions mainly through several existing dredger channels. The western parcel is owned by The Metropolitan Water District of Southern California. Early surveys necessary for restoration planning, such as topographic and bathymetric surveys, were completed by December 31, 2017. A jurisdictional wetland delineation will be completed February through March 2018.

As part of the acquisition negotiation, DWR agreed to remediate three notices of violations issued to the previous landowner. Remediation will include removal of floating docks and a shipping container in Spoonbill Creek that were placed without regulatory permission. The floating docks were removed in December 2017, and DWR is working with the U.S. Army Corps of Engineers, the San Francisco Bay Conservation and Development Commission, and the San Francisco Regional Water Quality Control Board to remove the shipping container.

Winter Island

Winter Island is in the Delta at the confluence of the Sacramento and San Joaquin rivers.

DWR acquired approximately 589 acres on Winter Island in 2016 for tidal wetland restoration. A design meeting was held in June 2017 and three out of five alternatives were selected to move forward into modeling and the proposed project selection. The three alternatives were modeled and a technical review meeting was held in September 2017 to review the alternatives. A project design alternative was selected that consists of three project elements: (1) breaching the southern levee; (2) widening an existing eastern tidal channel; and (3) breaching the northern levee. Restoration planning and environmental compliance documentation preparation will be ongoing. A draft mitigated negative declaration for public review is anticipated in 2018, and project construction is anticipated to begin in 2019.

Tule Red

The State and Federal Contractors Water Agency (SFCWA) is undertaking the Tule Red tidal restoration project in Suisun Marsh to provide restoration acreage credit to DWR's 8,000-acre tidal habitat restoration requirement pursuant to the 2008 USFWS delta smelt BiOp. Through a public entity contract with SFCWA, DWR will provide project oversight and purchase an estimated 610 habitat acreage credits through phased project progress payments to reimburse SFCWA for project deliverables. In mid-September 2016, SFCWA started construction on the initial restoration activities.

In 2017, SFCWA terminated its construction contract. The contractor did not properly bid the project given the wet construction conditions. SFCWA re-bid the contract and hired a new contractor in September. The new contractor was able to get about 10 days of grading work done before the construction season ended on September 30. The construction of Tule Red will be delayed by a full year.

Fish Restoration Program Requests for Proposals

The FRP continues efforts to acquire more restoration properties. In an effort to reach its BiOp restoration requirements, DWR developed a process to solicit proposals for restoration projects in which private and nonprofit entities would acquire property and develop and implement

tidal habitat restoration projects that meet DWR criteria. The solicitation period ended in February 2017, at which time the FRP evaluated submitted proposals. Two proposals, Yolo Flyway Farms tidal habitat restoration project and Wings Landing tidal habitat restoration project, were selected and entered into habitat restoration project agreements as of August 1, 2017. Each contract has a specified number of deliverables that will be paid through the duration of the contract. Successful completion of the tidal habitat projects will ultimately result in creditable acres that will be applied to DWR's mitigation requirements.

Yolo Flyway Farms

The Yolo Flyway Farms tidal habitat restoration project is located in the Yolo Bypass in the northern Delta and will restore approximately 294 acres of tidal habitat. Construction is expected to occur in summer 2018.

Wings Landing

The Wings Landing tidal habit restoration project is located in the north central portion of Suisun Marsh and will restore approximately 270 acres of tidal habitat. Construction is expected to begin in summer 2020.

Outreach

In 2017, the FRP continued its outreach efforts, primarily by distributing eNews updates and updating the FRP website with new documents. The website provides an overview of the program and serves as a publicly accessible repository for documents that are relevant to the program's efforts, including links to project-specific documents for each separate restoration project under the FRP. The website also provides a means by which the public can contact the program. Stakeholders and members of the public can request to receive emails containing general updates of the program and announcements of significant events such as the release of environmental documents for the individual projects.

Monitoring and Research

In 2017, the FRP monitoring program refined sampling methods for fish and invertebrates in shallow-water and wetland habitats. Sampling for macroinvertebrates and zooplankton was concentrated during the spring when salmon and smelt are most abundant in the Delta. Sampling for fish was paired with long-term DFW fish surveys (summer tow net and fall midwater trawl) to compare fish catch in shallow water versus deep channels. These data also provided a pre-project baseline for fish and invertebrate communities in and around future restoration sites. The monitoring team also completed the *Tidal Wetland Monitoring Framework for the Upper San Francisco Estuary* to aid in development of restoration project monitoring plans. The framework was used to draft a monitoring and adaptive management plan for Decker Island and will be used for all the FRP restoration sites.

In addition to the ongoing monitoring efforts, FRP is planning to conduct research in Suisun Marsh and the Delta investigating the effectiveness of restoration techniques to deter invasive plant establishment. The proposed studies will compare methods of active native plant revegetation at the Dutch Slough, Decker Island, and Bradmoor Island restoration sites to examine the utility of selected strategies for limiting the colonization and establishment of non-native invasive plants within a restoration framework. In 2017, the FRP initiated planning and permitting for projects in Dutch Slough and Bradmoor Island. The FRP began planning a third research study on phragmites control at the Blacklock Restoration Project and held pre-application meetings with the USFWS and Reclamation in August and November 2017.

Decisions on Endangered Species

Table 3-1 lists fish species of concern found in the Delta. No status changes were made in 2017.

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 17 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 long period of time.

The abundance index for longfin smelt is shown on Figure 3-1. The index for 2017 was higher than the previous 3 years, but was still similar to the low values that have persisted since the early 2000s.

Figure 3-2 shows the fall midwater trawl abundance index for delta smelt. In 2017, the index dropped to the lowest level observed since the survey began in 1967.

Figure 3-3 shows estimates of returning adult winter-run Chinook salmon from 1970 through 2017. 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 2017 was 977, which was a 37 percent decrease from the 2016 escapement estimate.

Table 3-1 Special Status Delta Fish Species

Common Name	Scientific Name	ESA Listing	CESA Listing
delta smelt	*Hypomesus transpacificus*	threatened[1] (4/5/1993)	endangered (1/20/2010)
longfin smelt	*Spirinchus thaleichthys*	candidate[2] (4/2/2012)	threatened (4/9/2010)
Chinook salmon (winter-run)	*Oncorhynchus tshawytscha*	endangered (2/3/1994)	endangered (9/22/1989)
Chinook salmon (spring-run)	*Oncorhynchus tshawytscha*	threatened (11/15/1999)	threatened (2/5/1999)
Chinook salmon (fall-/late fall-run)	*Oncorhynchus tshawytscha*	species of concern (4/15/2004)	none
steelhead (Central Valley DPS)	*Oncorhynchus mykiss*	threatened (5/18/1998)	none
green sturgeon (southern DPS)	*Acipenser medirostris*	threatened (6/6/2006)	none
Sacramento splittail	*Pogonichthys macrolepidotus*	none	species of concern
Pacific lamprey	*Entosphenus tridentata*	species of concern	none
river lamprey	*Lampetra ayresii*	none	species of concern

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

[1] 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.

[2] 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.

[a] No sampling in 1974 or 1979

Figure 3-1 **Longfin Smelt Fall Midwater Trawl Abundance Index, 1967–2017**

Figure 3-2 **Delta Smelt Fall Midwater Trawl Abundance Index, 1967–2017**

Figure 3-3 **Estimated Total Adult Winter-run Chinook Salmon Escapement, 1970–2017**

Figure 3-4 shows estimates of returning adult spring-run Chinook salmon from 1985 through 2017. Individual estimates are shown for the FRFH and the principal spring-run spawning streams: Battle Creek, Clear Creek, Mill Creek, Deer Creek, and Butte Creek. The escapement estimates are shown separately for each stream because the Feather River estimate is based on returns to the FRFH, where the genetic integrity of spring-run Chinook salmon is uncertain. The estimated escapement for 2017 was 691 for the FRFH and 1,047 for the other streams combined. The 2017 escapement estimate was 4 times lower than the 2014 parent stock estimate for the FRFH, and the lowest value for FRFH on record. For naturally spawned fish in Battle, Clear, Mill, Deer, and Butte creeks, the 2017 estimate was 6.5 times lower than the 2014 parent stock estimate.

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

Pelagic Organism Decline in the Upper San Francisco Estuary

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

Figure 3-4 Estimated Total Adult Spring-run Chinook Salmon Escapement, 1985–2017

Pelagic fish species in decline include delta smelt, longfin smelt, striped bass (*Morone saxatilis*), and threadfin shad (*Dorosoma petenense*). These declines resulted in significant management consequences, including limits on SWP and CVP pumping operations for the protection of delta smelt (listed as threatened under ESA and endangered under CESA) and longfin smelt (listed as threatened under CESA).

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

Several Management, Analysis, and Synthesis Team efforts began in 2017 to better understand the effects of stressors in the San Francisco Estuary and to examine potential ways to manage the stressors. These included the following endeavors:

- a multi-agency effort to examine how the treatment of invasive aquatic weeds affects habitat, water quality, and the food web
- a synthetic examination of the capacity of the San Francisco Estuary to recover after drought, and how management may enhance the resiliency of the ecosystem
- development of a conceptual model of the longfin smelt life cycle to identify factors that may impact the survival, abundance, and distribution of the species in the system

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 Federal Energy Regulatory Commission relicensing of the Oroville Facilities and then to satisfy the NOAA Fisheries BiOp for CVP and SWP long-term operations. More recently, efforts have been focused on satisfying the NOAA Fisheries BiOp with the Oroville Facilities license issuance by developing baseline information that satisfies current requirements and will also directly benefit planning and implementation of license requirements. Field program elements have included operation of rotary screw traps, acoustic and radio telemetry, salmon and steelhead spawning surveys, salmon escapement surveys, spring-run Chinook salmon tagging, otolith thermal marking studies, snorkel and beach seining surveys, green sturgeon studies, steelhead passive integrated transponder and acoustic tagging, hatchery juvenile Chinook salmon movement and survival studies, and salmonid predator studies.

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

Rotary Screw Traps

Rotary screw traps capture juvenile salmon and steelhead as they emigrate from the Feather River. Over the last 20 years, DWR

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

has used rotary screw traps as the primary method to assess the general abundance and timing of emigrating juvenile salmon and steelhead in the lower Feather River.

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

In 2017, the rotary screw traps were not fished during most of the emigration period. High flows in the low-flow and high-flow channels in February forced trapping operations to stop earlier than usual. In the low-flow channel, one rotary screw trap was stationed at Gateway Riffle (River Mile [RM] 59.5) from December 19 until February 6. Within the high-flow channel, one rotary screw trap was operated at Herringer Riffle (RM 45.8) from December 19 until February 4. The Gateway and Herringer traps were operated for a limited number of days from May through July once the high flows began to subside. Passage estimates for juvenile Chinook salmon were not calculated in 2017 due to the limited number of fish caught (n=1,771).

Although Chinook salmon and steelhead were the primary targets of trapping efforts, records were kept on all fish species caught. Twenty species were caught during the 2017 season. Chinook salmon was the dominant species, comprising 89 percent of the catch.

Salmon Escapement Survey

The salmon escapement survey provides information crucial to the management and conservation of Feather River salmon populations. The primary purpose of the salmon escapement survey is to evaluate the abundance of Chinook salmon spawning in the lower Feather River by mark-recapture methods using salmon carcasses. Other important objectives are to (1) catalog the distribution and success of spawning, (2) estimate the number of hatchery salmon spawning in the river, and (3) identify trends in population and age structure.

The 2017 Chinook salmon spawning escapement survey began September 5 and continued through December 21. The survey area covered 16 river miles of the lower Feather River from the Table Mountain Bridge in downtown Oroville to the East Gridley Road Bridge. The population estimate generated from the mark-recapture component of the study includes both naturally spawning fall- and spring-run Chinook salmon since their spawning is currently not fully segregated on the Feather River.

The carcass mark-recapture study resulted in an in-river spawning population estimate of 10,534 Chinook salmon for the lower Feather River in 2017. The total spawning population consisted of an estimated 8,120 adults and 2,414 grilse (presumably 2-year-old salmon less than 66 centimeters in fork length). The number of grilse salmon in the escapement is an important metric in projecting future salmon abundance, and perhaps more importantly the number of salmon available for the commercial and recreational fisheries the following year. Feather River Chinook salmon annually make up a large proportion of the total population of Chinook salmon harvested off the coast and in inland 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 Fish Barrier Dam and Gridley Bridge is searched.

Chinook Salmon

Over the last 50 years, the presence of Oroville Dam has resulted in the loss of spawning gravel in the lower Feather River. In addition to degraded spawning habitat, there is increased competition between spring-run and fall-run Chinook salmon for the remaining suitable spawning gravel on riffles. To address this problem, in 2014 the Feather River Gravel Supplementation and Improvement Project was implemented in accordance with Appendix B, Section B105 of the *Settlement Agreement for Licensing of the Oroville Facilities*, March 2006. In June and July 2014, 8,300 cubic yards of spawning gravel were added to the lower Feather River near the FRFH.

In early 2017 a series of high flow events in the low-flow channel removed much of the spawning gravel that was placed during the 2014 gravel supplementation and improvement project. Additionally, the high flows filled in a small side channel below the FRFH known as Moe's Side Channel. In June 2017, DWR initiated another gravel supplementation project to replace 5,000 cubic yards of displaced spawning gravel in certain locations of the 2014 gravel project area and remove approximately 3,000 cubic yards of gravel from Moe's Side Channel.

In 2017, redd mapping was performed in the gravel supplementation areas and other spawning sites in the low-flow channel and high-flow channel to document use and provide information for future gravel projects in the lower Feather River.

Ground surveys for the 2017 Chinook salmon redd survey began on October 3 and continued until December 14. The redd survey consisted of a total of 41 days over 11 survey weeks. In the gravel supplementation project area surveys were concentrated in lower, middle, and upper Auditorium Riffle as well as the section between Cottonwood Riffle and upper Moe's Side Channel. Hatchery Riffle, upper Hatchery Riffle, and Moe's Side Channel were also sampled. Redd surveys were also performed in the low-flow channel below the gravel project area and in the high-flow channel from the Thermalito Afterbay Outlet to the Gridley Bridge.

During the 11 weekly surveys, 2,722 redds were found within the low-flow and high-flow channels. A total of 2,670 redds were mapped in the low-flow channel, and 52 redds in the high-flow channel. Within the low-flow channel, 2,046 redds were discovered inside the gravel supplementation project area and 624 outside the project area.

The week 6 survey (November 6–9) covering the entire gravel supplementation project area revealed the highest number of redds (505). The second highest total was 473 redds for the survey conducted the week of October 30 (in the same area). The locations with the largest number of redds were Moe's Side Channel with 489 (18.0 percent) and Lower Auditorium Riffle with 486 (17.9 percent). The average depth for all salmon redds was 0.43 meters (1.41 feet), and the average water velocity was 0.50 meters (1.64 feet) per second. The average redd length and width was 2.3 meters (7.5 feet) by 1.1 meters (3.6 feet), respectively.

Steelhead

Beginning in 2003, DWR began collecting information on steelhead redds in the lower Feather River below Oroville Dam. This information was collected to better understand natural steelhead spawning and production in conjunction with FRFH steelhead spawning. The primary objectives of the project were to (1) obtain detailed information on the relative abundance and distribution of spawning steelhead, (2) provide baseline data on the physical characteristics of steelhead redds for modeling exercises and inform future restoration projects, and (3) comply with requirements regarding steelhead abundance in the 2004 BiOp for the coordinated long-term operation of the CVP and SWP.

In 2017, DWR's ability to perform the steelhead redd survey was heavily limited spatially and temporally. Three surveys (yielding eight steelhead redds) were performed in early to mid-January before heavy rainfall and inflows to Lake Oroville increased flows on the lower Feather River, rendering the survey ineffective. By January 14 river flows increased to over 12,000 cfs and turbidity reached levels to where surveyors could not see the river bottom. Feather River flows remained elevated during the typical steelhead spawning survey period (January through March) and no other redd survey was performed in 2017. In subsequent years, DWR anticipates resuming the steelhead redd survey.

FRFH Spring-run Chinook Salmon Tagging

To better manage broodstock selection at the FRFH, a program was developed in 2003 to mark spring-run Chinook salmon entering the FRFH in the spring. The spring-run Chinook salmon tagging program allows DFW to segregate the spawning of spring- and fall-run Chinook salmon in the hatchery in the fall when the populations are mixed together in the fish ladder. The program also investigates potential differences in spawning distribution and timing of the early arriving spring-run Chinook salmon in the river.

Early arriving spring-run Chinook salmon entering the hatchery in May and June were marked with individually numbered 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 fall-run, allowing segregated spawning for each run. The tags also enabled the escapement survey crew to differentiate spring- and fall-run salmon, so that any potential differences in spawning success, distribution, or behavior of the two runs can be analyzed.

In 2017, 762 Central Valley spring-run Chinook salmon were tagged at the FRFH: this was the lowest number of spring-run fish tagged since program inception (2004). Tagging began on June 5 and ended on July 14. Hatchery spawning began in late September, and a total of 707 tagged fish were recaptured: 691 at the FRFH and 16 in the river escapement survey, for a hatchery return rate of 92.8%, the highest ever recorded.

Snorkel Surveys

From 1999 to 2007, DWR conducted snorkel surveys focused on juvenile steelhead. Other species were also surveyed in the process. 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, and cover) where juvenile Chinook salmon and steelhead occur

(3) identify potential sites for channel improvement and structural habitat restoration
(4) determine the spatial and temporal distribution of other non-salmonid fishes
(5) collect information related to the fish community of the lower Feather River

In July and August 2017, DWR continued to collect data to determine the relative abundance and distributions of age-0 steelhead and salmon prior to habitat improvements. The duration of the survey was notably shorter than in previous years due to high flow conditions persisting through the spring months. The snorkel surveys were conducted at 21 permanent sites. Non-salmonid species were also identified and counted. The program also succeeded in qualifying habitat characteristics where juvenile steelhead and salmon occur as well as identifying high-use areas of the low-flow channel that may benefit from habitat improvements.

A total of 96 steelhead were identified and counted; 88 were considered juveniles (≤200 millimeters in length). All but one steelhead observation occurred in the low-flow channel, which is upstream of the Thermalito Afterbay Outlet. This result was expected with the first survey occurring in July, well after the primary rearing and emigration period for juvenile Chinook salmon.

Snorkel surveys in 2017 demonstrated that successful spawning occurred despite high flow conditions during much of the steelhead spawning season.

Beach Seining

DWR conducted beach seining surveys in the lower Feather River between January 1997 and August 2001 to document fish distribution throughout the lower Feather River. Since 2008, beach seining occurred in all years except 2010–2012 to further document the distribution and condition of steelhead and salmon in both the low-flow and high-flow channel during the primary emigration and rearing period (roughly December through July).

Although targeted at steelhead and salmon, beach seining is useful to augment screw trap data for documenting the distribution and relative abundance of all fish species found in the lower Feather River. Beginning in 2015, the objectives for beach seining included two new components: (1) capturing spring-run smolts released from the FRFH to augment survival and emigration rate data collected via acoustic tagging studies, and (2) collecting random samples of juvenile Chinook salmon for an ongoing *Ceratonova shasta* study. This study is looking at the rate of infection and disease from the parasite *C. shasta* experienced by juvenile Chinook salmon rearing or emigrating in the lower Feather River.

Beach seining surveys were conducted from February through August 2017. A total of 44 seine hauls and 567 individual fishes were sampled during the 2017 survey. Native fishes dominated the beach seine catch (485 fish) and represented nearly 86 percent of the overall catch. Sacramento sucker (117), juvenile Chinook salmon (112), and juvenile minnows (105) were the most abundant groups captured. Steelhead were not encountered during normal beach seine surveys during 2017. The high-flow channel, downstream of the Thermalito Afterbay Outlet, accounted for 82 percent of the overall catch, where 465 fishes were captured.

In response to the Oroville Dam spillways incident, during the winter and spring months of 2017, beach seining methods were used extensively in the collection of fishes stranded in the floodplain due to flow fluctuations necessitated by the response to the Oroville Dam spillways incident.

These stranding surveys were not part of the normal beach seine study and are not included here (see the Spillways Incident Fish Stranding section later in this chapter).

Sturgeon Studies

Green Sturgeon

Green sturgeon studies data is collected in the lower Feather River to determine the following information:

- potential adult migration barriers
- migration patterns
- distribution and habitat preferences
- annual abundance of adults
- identification of spawning and rearing areas

This data assists DWR management with long-term management decisions concerning future monitoring programs, operational changes to the facilities, and/or habitat enhancement within the lower Feather River. Green sturgeon studies are expected to expand once the Federal Energy Regulatory Commission license is issued for the Oroville Facilities and the NOAA Fisheries' BiOp is in effect.

Dual Frequency Identification Sonar Surveys

In 2017, 87 dual frequency identification sonar surveys were completed from January 23 to December 6. Surveys were conducted at 17 locations from Verona (RM 0) to the Fish Barrier Dam (RM 67). Included in these surveys were two full longitudinal surveys from the Fish Barrier Dam to Verona that each took place over the span of 2–3 days. A total of 301 sturgeon detections were made during the survey season.

Most of the detections were at the Fish Barrier Dam between May and the end of June. Sonar footage revealed an estimated 25–35 individuals, though the numbers could be greater due to the inability to survey the Fish Barrier Dam in its entirety because of blocked access. The footage clearly indicated spawning behavior and was integral in the deployment of egg mats and larval D-nets (mesh net on a D-shaped frame), which produced both eggs and larvae. Most of the remaining detections occurred near the following locations:

- Shanghai Bend (RM 25.5), 7
- Sunset Pumps Rock Weir (RM 38.5), 4
- Honcut Creek (RM 44), 10
- Thermalito Afterbay Outlet (RM 59), 10

Egg Mat and D-net Surveys

In 2017, ten sturgeon egg mats were deployed just downstream from the Fish Barrier Dam from May 8 through June 27. Larval D-nets were deployed from May 3 through August 9 from the Fish Barrier Dam to just upstream of the Thermalito Afterbay Outlet. During sampling, flows ranged from 6,760 cfs to 2,320 cfs, and water temperatures ranged from 12.1–14.9°C (53.8–58.5°F). Two green sturgeon eggs and 11 sturgeon larvae were recovered from the area just downstream of the Fish Barrier Dam between May 30 and June 21.

Sturgeon Angling/Telemetry

Three adult sturgeon were tagged during the 2017 sampling season. A gravid female white sturgeon was tagged March 8 just downstream of Shanghai Bend and left the Feather River system on May 10. Two male green sturgeon were captured just downstream of the Fish Barrier Dam. One was tagged on May 2 and the other on May 3. One green sturgeon left the Feather River system on June 17. The other green sturgeon was detected from May 3 through June 17 at the Fish Barrier Dam.

Additionally, a total of 22 acoustically tagged sturgeon that were previously tagged elsewhere entered the lower Feather River. Of those, nine were identified as white

sturgeon and five as green sturgeon. On average, the white sturgeon resided in the Feather River system longer than the green sturgeon—31 days compared to 9:

- The average date that the sturgeon entered the lower Feather River was March 20 for white sturgeon and March 16 for green sturgeon.
- The average date that the sturgeon left the Feather River system was April 22 for white sturgeon and March 26 for green sturgeon.

The white sturgeon were likely spawning in the basin while the majority of the green sturgeon that were acoustically tagged were not.

While there were many detections of sturgeon above Sunset Pumps using sonar, there were no acoustic detections from tagged sturgeon, so the large number of sturgeon detected through sonar surveys at the Fish Barrier Dam were not part of the analysis of resident time.

The Oroville Dam, its associated facilities, and the basin experienced high precipitation during winter and spring. It appears that sturgeon did well in these conditions. This is the first time sturgeon larvae have been sampled in the lower Feather River. In addition, it is the first time sturgeon spawning has been documented in the low-flow channel. It is also the highest abundance of sturgeon estimated in the Feather River system to date.

Ceratonova shasta Sampling

Ceratonova (synonym *Ceratomyxa*) *shasta* is a myxozoan parasite that infects salmonid fishes and is native to anadromous fish tributaries of the Pacific Northwest in North America, including the Feather River. *C. shasta* has a complex life cycle involving an invertebrate polychaete worm host (*Manayunkia speciosa*) as well as the vertebrate salmon host. Infected worms release actinospores into the water that infect fish by attaching to the gills. The parasite spreads through the blood into the intestine and other organs and tissues. Myospores are released into the water when the fish dies and infect the worms, completing the life cycle.

A high prevalence of severe *C. shasta* infection (45–83 percent) was observed in natural Feather River juvenile Chinook salmon sampled in the high-flow channel between 2012–2016. Juveniles collected in the low-flow channel were far less likely to be infected (<10 percent prevalence of infection).

In 2017, DWR again partnered with the USFWS Coleman National Fish Health Laboratory to better understand the problem observed in the lower Feather River. The objectives of this study were to

(1) compare the prevalence and severity of *C. shasta* and *Parvicapsula minibicornis* (myxozoan kidney parasite) infection in natural origin Chinook salmon juveniles in the low-flow and high-flow reaches of the Feather River from January until outmigration tapers off in late spring;
(2) determine the level of *C. shasta* infectivity in a portion of the infectious zone (Gridley Boat Ramp to Boyd's Pump Boat Ramp) from January through early May using a filtered water eDNA technique and further define the temporal and spatial aspects of the infectious zone; and
(3) document *C. shasta* infection in FRFH spring-run Chinook salmon juveniles released in March and April and recaptured downstream days later.

Collecting fish and water samples was a challenge because of unusually high flows. These flows peaked at over 100,000 cfs in February and remained unusually high throughout the sampling season. The rotary screw traps were inoperable and beach

seining was difficult due to the excessive flows. Much of the beach seine sampling was done in off-channel pools formed after the water had receded. In 2017, only 30 percent of the samples were obtained with a *C. shasta* infectivity rate of 10 percent. Only one *P. minibicornis* infection was discovered.

Increased turbidity was also an issue for water sample testing, as the high turbidity caused samples to be nonfilterable with high inhibition for eDNA analysis. There were little to no actinospore concentrations found in longitudinal collections from the bottom of the low-flow channel to Boyd's Pump Boat Ramp between January and May.

Steelhead Mark Recapture Study

An abundance estimate of the wild steelhead population spawning in the Feather River is currently lacking. FRFH data suggest that nearly all steelhead are of hatchery origin. Redd survey, snorkeling, and angling data suggest that steelhead also spawn in the upper river but abundance data is difficult to gather. Redd surveys provide information on habitat preferences, spawn timing, and general location of spawners, but are not useful for estimating abundance. Although the FRFH has useful long-term data on abundance and origin, it is only half of the information necessary to understand population size and structure (hatchery versus natural origin, size, etc.) in the Feather River. Additional methods are needed to better understand the size and structure of the steelhead population spawning in the river.

Passive integrated transponder tags allow for all steelhead encountered during any sampling activity (electrofishing, seining, weir operations, or hatchery operations) to be individually identified. This allows movement and growth patterns of both juveniles and adults to be monitored for years instead of weeks or months. It also allows DWR to more closely monitor when juvenile and adult steelhead are present in the system and how operations may affect their behavior. Furthermore, because each fish is individually marked, a mark-recapture study can be performed to estimate abundance. Details can also be learned about short- and long-term growth and overall life history behavior.

In 2017, a mark-recapture study was performed to estimate both the population size and the ratio of natural to hatchery origin steelhead in the mile-long section between the Highway 70 Bridge and Table Mountain Bridge in Oroville (RM 67). Between November 6 and December 28, steelhead caught by hook and line were tagged with a passive integrated transponder tag and then released back to the river. A total of 188 fish were captured, 11 of which were subsequently recaptured. Of those 188 fish, 131 were of hatchery origin, and 57 were of natural origin. A population estimate of 1,702 steelhead adults was generated for the sampling period. It demonstrates that there may be more natural origin steelhead in the river than previously thought based on hatchery data alone. Increasing this effort in future years or operating count weirs will provide the best data possible.

Spillways Incident Fish Stranding

As a result of the Oroville Dam spillways incident, there were four periods of rapid flow reduction on the lower Feather River. The rapid flow reductions, authorized by the U.S. Army Corps of Engineers, occurred on February 27, March 27, May 1, and May 19, 2017, and raised concern about the possibility of stranding special status fish species.

Fish stranding that occurred after the Oroville Dam spillways incident was surveyed, documented, and evaluated by DWR, DFW, and the Pacific States Marine Fisheries Commission.

Aerial surveys were performed to determine the extent of stranding ponds and to focus field efforts on areas of concern. An aerial survey was completed on February 26 prior to the first decrease in flow. Another aerial survey was completed on February 27 to determine the stranding locations in the low-flow and high-flow channel after the low-flow channel was decreased to 600 cfs. Another two flights were completed on February 28—one to inform stranding pond surveys and another to gather high-resolution aerial orthorectified photographs (orthophotographs) of the stranding areas on the entire 67 river miles of the lower Feather River. The high-resolution aerial orthophotographs were used with geographic information system software to map and measure stranding areas in the upper 53 river miles.

Stranding pond surveys and fish rescues began on February 27 starting at RM 14 and continuing upstream through RM 66. Above the confluence with Sutter Bypass below RM 14, the floodplain adjacent to the river that had been flooded contained isolated ponds. Larger ponds in the lowest 14 river miles were sampled using eDNA techniques to detect the presence of salmonids and sturgeon. Primary surveys ended on March 15 when flows had increased to 40,000 cfs and most of the isolated ponds were reconnected to the river. Additional sampling occurred following the other rapid flow reductions.

Tissue samples and otoliths were collected from many of the observed salmonid mortalities. Location, date, and basic species information was recorded. Samples were preserved by freezing or alcohol. Photographs were taken of some locations to further document observations.

In pools that remained wet, mortality was low and subsequent flows reconnected many of these habitats with the main river channel. However, mortality was 100 percent in pools that dried out rapidly.

Table 3-2 summarizes numbers of special status species that were stranded. A large proportion of juvenile fall- and spring-run Chinook salmon had likely already migrated out of the area but some juvenile and yearling steelhead would have been actively rearing in the river. No green sturgeon

Table 3-2 Observed and Extrapolated Numbers of Special Status Species Stranded in Isolated Ponds during the Oroville Dam Spillways Incident

Life Stage	Target Species	Number Observed Stranded	Extrapolated Range Stranded
juvenile	Chinook salmon (fall-run)	3,938	267,894–346,469
juvenile	Chinook salmon (late fall-run)	13	260–884
juvenile	Chinook salmon (spring-run)	71	4,817–5,380
juvenile	Chinook salmon (winter-run)	2	NA–0
adult	Chinook salmon	2	136–136
yearling	hatchery Central Valley steelhead	19	1,289–1,631
adult	hatchery Central Valley steelhead	4	58–268
fry	wild Central Valley steelhead	1	70–87
yearling	wild Central Valley steelhead	20	575–1,355
adult	wild Central Valley steelhead	10	145–676
juvenile	green sturgeon	0	NA
adult	green sturgeon	0	NA

were observed or detected with eDNA sampling or using conventional methods (e.g., beach seining or electrofishing) during stranding surveys.

Fish-related Mitigation Projects

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

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

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

The agreement provides for two funding components. One component is the Annual Mitigation Account for compensating the annual fish loss. It has no expiration date and is funded annually. The second is a $15 million Lump Sum Account provided by DWR for additional projects to compensate for post-1986 fish loss. This account was closed on December 31, 2016, per the Delta Fish Agreement.

Since 1986, DWR has spent $77.6 million on mitigation projects developed under the Delta Fish Agreement. Mitigation fund expenditures through December 31, 2017, were $63 million for the Annual Mitigation Account and $14.59 million for the $15 million Lump Sum Account.

Climate Change

Climate change is having a profound impact on California's water resources, as evidenced by greater weather extremes, reduced snowpack, higher sea level, and changes in river flows. Models predict that more precipitation will fall as rain instead of snow, exacerbating flood risks and creating additional challenges for water supply reliability. These hydrologic changes will challenge current and future operation of the SWP.

DWR's efforts throughout 2017 represent the continuation of its multipronged approach

to addressing these issues by conducting research to better understand potential future impacts; monitoring and reporting greenhouse gas (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 providing climate data.

DWR remains committed to contributing to statewide, national, and international efforts to mitigate the future impacts of climate change by reducing GHG emissions from its activities and adapting to unavoidable climate change impacts.

Completed in 2017

Data Development and Distribution

Hydroclimate Report Water Year 2016. Following the reports, *Climate Change Impacts in the United States* (National Climate Assessment, 2014) and *Indicators of Climate Change in California* (Office of Environmental Health Hazard Assessment, 2013), DWR published *Hydroclimate Report Water Year 2015* in 2016. The report documented the characteristics of a changing climate on California's water resources. It included climate tracking indicators such as precipitation, temperature, snowpack, and streamflow in order to visualize long-term climate trends. The *Hydroclimate Report Water Year 2016*, published in 2017, updated the 2015 report with data from water year 2015–2016 and added new information and analyses. The hydroclimate report will continue to be issued yearly and will document annual observations of California's climate and water resources. By tracking change through a collection of indicators on an annual basis, DWR hopes to better identify changes in climate to better understand how climate changes may effect water resources and anticipate future changes.

Policy

Environmental Stewardship and Sustainability Policies Guidebook. The DWR Environmental Coordination Committee finalized and approved release of the *DWR Environmental Stewardship & Sustainability Guidebook* and the associated compendium *DWR Environmental Stewardship Stories* in August 2017. The guidebook provides direction and background to DWR employees in managing and protecting California's environmental resources as they plan, implement, and manage California's water projects and programs. The *DWR Environmental Stewardship Stories* provides examples of DWR projects that have applied environmental stewardship principles outlined in DWR's environmental stewardship policy.

Research

Paleohydrology. In September 2015, DWR executed a contract with the University of Arizona to develop long-term streamflow or precipitation reconstructions using tree ring data for larger Southern California watersheds, the Kern River, and Colorado River inflow to Lake Powell.

The work was completed in 2017 and entailed field data collection, sample processing, and statistical modeling. Work also included preparation of a guidebook for water managers on using the data.

Findings indicated that the recent 2012–2016 drought was, for most of Southern California, the worst 5-year drought in the past six centuries. Southern California precipitation and streamflow, as well as Kern River streamflow, showed more annual variability during the 20th and 21st centuries than they did over the past six centuries, although average flow and precipitation quantities have not changed markedly.

Ongoing during 2017

Planning

Statewide Flood Management Planning. The Statewide Flood Management Planning Program worked on a follow-up to the 2013 report, *California's Flood Future: Recommendations for Managing the State's Flood Risk*. The follow-up report, *Investing in California's Flood Future: An Outcome-Driven Approach to Flood Management*, will provide a framework for an outcome-driven approach to flood and water management, as well as recommendations for prioritized actions to improve governance and funding and remove obstacles to flood management actions. Additionally, this report will provide a strategy for how the State may fund these actions. The report is intended to guide local, State, and federal decisions about policies and financial investments to improve public safety, enhance environmental stewardship, and achieve economic stability.

Several detailed technical attachments are being developed to support this report. They focus on specific challenges facing flood management (i.e., flood risk awareness, regional flood management needs, agency alignment, funding mechanisms, and regulatory compliance). As part of the program's efforts, DWR coordinated with over 240 flood and water management agencies, the U.S. Army Corps of Engineers, and regional and technical organizations such as the County Engineers Association of California, Coastal Hazards Adaptation Resiliency Group, Floodplain Management Association, and Bay Area Flood Protection Agencies Association. The report is expected to be completed in 2018.

Data Collection and Climate Services. Since 2011, DWR has continued developing the Flood Emergency Response Information Exchange. Information in the exchange has been linked to the climate data in the California Climate Data Archive.

In 2017, DWR continued developing tools and partnerships for observing data systems:

- Improvements were made to the California Climate Tracker.
- In partnership with the National Oceanic and Atmospheric Administration's Earth Systems Research Laboratory, two new atmospheric river observatories were added—one at Robie Thermalito Pumping-Generating Plant and one on Twitchell Island. This was done as one component of the Oroville Dam spillways incident response and addressed some identified gaps in the observing system.
- The Advanced Quantitative Precipitation Information System project advanced with several local radar systems installed and site selection for the others continuing.
- The Airborne Snow Observatory expanded across the San Joaquin River tributary watersheds, including the Kings River, and worked to expand into the American, Yuba, and Feather river watersheds. Work continued on a transition plan to move the project out of NASA and into an ongoing operational construct.
- Work continued on the Bulletin 195 (*Rainfall Analysis for Drainage Design*) tool.
- A new project began on the Forecast Informed Reservoir Operations for Prado Dam in Orange County.
- The Lake Mendocino Forecast Informed Reservoir Operations project continues with the viability assessment completed in 2017 and efforts to do an operational iteration through a planned major deviation from the water control manual. It is an involved process with the U.S. Army Corps of Engineers that will continue into the future.
- The Center for Western Weather and Water Extremes has developed new tools related to helping water managers with

projecting atmospheric rivers in a more robust manner.

- Lastly, there was an offshore airborne observing component in a 2017 partnership with the U. S. Air Force and National Oceanic and Atmospheric Administration. Planes flew through atmospheric rivers over the Pacific Ocean and collected data on their characteristics.

Developing these partnerships and collaborations will continue into 2018.

Sustainable Groundwater Management Act Implementation (Climate Change Objectives). DWR's initial role in the Sustainable Groundwater Management Act is to provide regulations to revise basin boundaries, prioritize the alluvial groundwater basins, provide technical assistance, and evaluate groundwater sustainability plans. Considering that the act requires applicable basins achieve their sustainability goals by year 2040 (or 2042, depending on the basin), DWR recognizes that climate change has the potential to exacerbate many ongoing issues with groundwater within the planning horizon. Climate change assessments will be a requirement and a key component of groundwater sustainability plans to assess future risk and to avoid undesirable results within defined basins under the Sustainable Groundwater Management Act.

In 2017, substantial progress was made to develop a data downloader tool that would allow groundwater sustainability agencies to download data pertinent to their sustainable groundwater planning area, including all climate change related data. Both 2030 and 2070 central tendency climate change scenarios, originally developed for the Water Storage Investment Program, will be available. Both of the extreme 2070 scenarios from the Water Storage Investment Program (Hot-Extreme Warming and Wet-Moderate Warming) will also be included in the data downloader tool.

A comprehensive guidance document using the climate data to develop future water budgets was also developed. These products are proceeding through the final review and refinement process and are scheduled for release to the public in early to mid-2018.

Policy

Development of Internal DWR Policies on Climate Change Mitigation, Analysis, and Adaptation. In 2010, DWR began a three-phase process to develop a comprehensive DWR Climate Action Plan that will contain internal policies to address climate change mitigation, effects analysis, and adaptation.

Climate Action Plan Phase I. Completed in 2012, Climate Action Plan Phase I is the comprehensive DWR-wide *Greenhouse Gas Emissions Reduction Plan* that covers mitigation of GHG emissions. The plan lays out steps to cut DWR's GHG emissions by 50 percent below 1990 levels by 2020 and 80 percent below 1990 levels by 2050.

DWR's 5-year average of GHG emissions spanning years 2011–2015 was 52 percent below 1990 levels and 49 percent below 2010 levels. This level of emissions is the lowest ever recorded by DWR and represents substantial and consistent reductions in emissions over the last decade. DWR is already well ahead of schedule for achieving its 2020 and 2050 GHG emissions reduction goals. The *Greenhouse Gas Emissions Reduction Plan* projected that 2015 emissions should be approximately 2.1 million metric tons of carbon dioxide equivalent (mtCO2e) to be on track to achieve the reduction goals by 2020. DWR achieved its target emissions reductions for 2020 in 2015, five years ahead of schedule.

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

During 2017, the draft guidance document was finalized and was awaiting approval. It is expected to be completed in 2018.

Climate Action Plan Phase III. Phase III of the Climate Action Plan evaluates the vulnerability of DWR facilities and operations to key climate change impacts and develops adaptation strategies to improve DWR's resiliency to climate change. During 2017, substantial progress was made on development of a draft guidance document which is expected to be circulated for review in 2018.

Reporting

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

In 2017, DWR received final acceptance of its third-party verified 2016 GHG emissions from The Climate Registry. Annual reports to the California Air Resources Board have been submitted and accepted for years up to and including 2015 pursuant to California mandatory GHG emissions reporting regulations (California Code of Regulations, Title 17, Sections 95100–95158). The 2016 annual report is currently in draft form and is expected to be completed in 2018.

Environmental Document Review

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

During 2017, the Division of Environmental Services, Environmental Document Review Section tracked documents related to development along the California Aqueduct, highway projects with potential for conflict related to multiple crossings of aqueduct facilities and competing drainage improvements, multiuse trails within SWP right-of-way, land management related to wildlife habitat, levee encroachment, dam safety issues, water transfers and other water supply issues, wastewater treatment and conveyance, quarry development, solar and wind power facilities, and climate change issues. The number of environmental documents addressing significant climate change issues increased from 2, in 2010, to 26 in 2013 (after the California Environmental Quality Act guidelines were amended to address GHG emissions pursuant to Senate Bill 97 [Dutton; Chapter 185, Statutes of 2007]). However, in 2014, climate change issues began to be addressed in the general plan process, resulting in only 10 documents clearly dealing with climate change being processed that year. In 2017, 15 documents primarily related to climate change issues were processed.

DWR comments submitted through the California Environmental Quality Act and/or National Environmental Policy Act processes addressed a number of issues, including safety and water supply; encroachment on physical facilities; impacts from tunnels and overcrossings of SWP facilities;

groundwater overdraft; potential damage to SWP pipelines and aqueducts; wildlife issues, including migration, setbacks, and habitat conservation lands; experimental detonations near SWP facilities; development and operation of wind and solar projects; and jurisdictional dams.

In 2017, the Environmental Document Review Section screened 2,594 State Clearinghouse documents. After screening, 866 documents were referred for information, including notices of preparation and various final documents. Additionally, 109 formal referrals were made for negative declarations, notices of preparation, environmental impact reports, and National Environmental Policy Act documents.

Eighty-two formal referrals were made related to SWP issues. The majority were sent to the Division of Operations and Maintenance, and 11 were sent to the State Water Project Analysis Office.

The total number of referrals and requests sent to the Division of Operations and Maintenance and the State Water Project Analysis Office decreased slightly from 2016 when 100 referrals were made.

In 2017, formal referrals to all other DWR reviewers, including the Central Valley Flood Protection Board, Delta Levees, and the Division of Safety of Dams, remained at 27. 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

Elderberry Dam, between Elderberry Forebay (left) and Castaic Lake (right).

Significant Events in 2017

Heavy rainfall resulted in periods of non-State Water Project (SWP) water inflow at several locations along the California Aqueduct. These inflows originated as either direct floodwater inflow, admitted during and after storm events, or as excess surface water conveyed to the California Aqueduct. The inflows had little negative effect on SWP water quality.

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

The Department of Water Resources (DWR), Division of Operations and Maintenance currently maintains 16 automated water quality monitoring stations at key locations along the State Water Project (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 (State Water Board) establishes water quality objectives to protect a variety of beneficial uses of water within the Bay-Delta. The objectives are contained in the water quality control plans (WQCPs) adopted by the State Water Board. In July 2014, the Drinking Water Program was transitioned from the California Department of Public Health (CDPH) to the State Water Board. The State Water Board 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.

Water delivered through SWP facilities is subject to water quality objectives contained in Article 19 of the SWP water contracts. (See Chapter 9, Water Contracts and Deliveries.)

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

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

Water Quality Standards

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

2016–2017 Water Year Hydrologic Classifications

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

State Water Resources Control Board

The State Water Resources Control Board (State Water Board), 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 (Regional Water Board) efforts, and reviewing petitions that contest Regional Water Board actions. The five State Water Board members are appointed by the Governor and confirmed by the Senate. The State Water Board 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 State Water Board and Regional Water Boards adopt water quality control plans (WQCPs). The WQCPs contain water quality objectives necessary for the protection of designated beneficial uses, such as municipal and industrial, agricultural, and fish and wildlife. The State Water Board and Regional Water Boards implement these objectives in a number of ways, depending on the circumstances.

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 State Water Board is required to conduct periodic updates of the Bay-Delta Plan. As part of the update process, the State Water Board conducts proceedings to gather information, receive recommendations, consider public comments, and facilitate detailed discussions to evaluate new information relevant to potential changes to the water quality objectives. Recent issues of concern related to the WQCP include drought, pelagic organism decline, special status fish species, Delta inflow, San Joaquin River flows, and southern Delta salinity.

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

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

The Sacramento Valley 40-30-30 Index was wet, and the San Joaquin Valley Water Year Hydrologic Classification (San Joaquin Valley 60-20-20 Index) was wet, based on observed data for water year 2016–2017.

For a detailed discussion of water year 2016–2017, see Chapter 8, Water Supply.

2006 Bay-Delta Plan Review

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

The WQCP review and amendment process consists of reviewing the Bay-Delta Plan to identify elements that may need to be amended or added. 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 State Water Board is conducting the WQCP review in four phases. For additional information, see Bulletins 132-11 through 132-17.

Phase I

Phase I (initiated in 2009) 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.

On September 15, 2016, the State Water Board released proposed plan amendments and a draft revised substitute environmental document for proposed (Phase I) updates to the Bay-Delta Plan. The public hearing to receive public comments on the proposed plan amendments and draft revised substitute environmental document began in November 2016 and continued in January 2017. The public outreach process was extensive, with a 6-month public comment period from September 15, 2016, to March 17, 2017.

Phase II

Initiated in 2012, Phase II focuses on requirements for flows and cold water habitat in the Sacramento River, its tributaries, and tributaries to the Delta, Delta outflows, and water project operations in the interior Delta.

In October 2017, the State Water Board released the final Scientific Basis Report prepared to support the Phase II updates of the Bay-Delta Plan. The State Water Board also posted a series of questions for public input to help refine potential Phase II changes to the Bay-Delta Plan. The deadline to submit input was November 9, 2017.

Phase III

Phase III will change water rights and other measures needed to implement the updated plan. Implementation will begin once final objectives for Phase I and Phase II have been adopted.

Phase IV

Phase IV involves developing and implementing flow objectives for priority Delta tributaries that currently are not specifically regulated in the Bay-Delta Plan. The State Water Board plans to develop

flow criteria for a minimum of five priority tributaries by 2025.

SWP Operations to Meet Delta Water Quality Requirements

In 2017, DWR and the Bureau of Reclamation (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 biological opinions (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 delta smelt, steelhead, green sturgeon, and the winter and spring runs of Chinook salmon.

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

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

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

Delta Cross Channel Gates

The Delta Cross Channel gates are operated in accordance with the Bay-Delta Plan/D-1641 and other regulatory requirements. In 2017, the gates were open for 128 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 U.S. Fish and Wildlife Service, National Marine Fisheries Service, and Department of Fish and Wildlife.

Municipal and Industrial Objectives

The Bay-Delta Plan includes a year-round 250 milligrams per liter (mg/L) (maximum mean daily) chloride objective that is in effect at Delta export locations (Contra Costa Canal Pumping Plant No. 1, Clifton Court Forebay, Jones Pumping Plant, and Barker Slough). Chloride levels remained below the objective for all days in 2017.

An additional municipal and industrial water quality objective for chloride at the Contra Costa Canal Intake, near Rock Slough, specifies that the chloride level must be below 150 mg/L (maximum mean daily) for a minimum number of days during the year, dependent upon the water year forecast. For calendar year 2017, the objective of 240 days was met.

Agricultural Salinity Objectives

The Bay-Delta Plan contains agricultural salinity objectives (specified as electrical conductivity, or EC—see Specific Conductance section later in this chapter for more information on EC). The salinity objectives, which vary by location, are based on both water year type and a 14-day running average during the irrigation season,

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

from April to mid-August, at established compliance stations at Emmaton, Jersey Point, Terminous, and San Andreas in the West and Central Delta. The agricultural salinity objectives at these Delta locations become less stringent under dryer conditions. The Terminous, San Andreas, Emmaton, and Jersey Point wet water year objectives were met for calendar year 2017.

In the South Delta, salinity may be influenced by San Joaquin River flows, in-Delta diversions, and SWP exports, and water circulation may be influenced by the annual placement of South Delta barriers. South Delta salinity objectives are based on a 30-day running average. The 1.0 millisiemens per centimeter (mS/cm) objective for the South Delta was met at Vernalis, Old River near Middle River, Old River near Tracy Road Bridge, and San Joaquin River at Brandt Bridge. The 0.7 mS/cm objective for the South Delta (April through August) was met at Vernalis, Old River near Middle River, Old River near Tracy Road Bridge, and San Joaquin River at Brandt Bridge. The SWP and CVP share responsibility for meeting the agricultural EC objectives imposed at these South Delta compliance locations.

State Water Board Actions Related to South Delta Salinity Objectives

One of the D-1641 salinity objectives for the interior southern Delta requires DWR and Reclamation to maintain 0.7 mS/cm EC at three compliance points within the South Delta. In response to allegations that this salinity objective was not being met and would not be met, the State Water Board issued a cease and desist order, State Water Board Order WR 2006-0006. The order required DWR and Reclamation to

- submit a compliance schedule and regular progress reports;
- immediately report any potential or actual exceedance of the D-1641 interior southern Delta salinity objective to the State Water Board along with a description of corrective actions that DWR and Reclamation would use to avoid or curtail the exceedance; and
- take corrective actions to eliminate the threat of violation of the D-1641 interior southern Delta salinity objective by July 1, 2009.

In January 2010, the State Water Board adopted Order WR 2010-0002, which modified Order WR 2006-0006 to extend the compliance deadline (see State Water Board website for past details). The extension was necessary because the National Marine Fisheries Service issued a BiOp in June 2009 that prohibited construction of permanent, operable gates in the southern Delta as part of the South Delta Improvements Program. Construction of the gates was a central component of DWR and Reclamation's plan to achieve the salinity objective.

Order WR 2010-002 also required

- DWR to continue to implement and improve upon the temporary barriers program;
- both DWR and Reclamation to study the effectiveness and feasibility of alternative salinity control measures; and
- both DWR and Reclamation to provide technical assistance to the State Water Board in its efforts to review and update the 2006 Bay-Delta Plan.

From 2010 to 2016, DWR continued to submit to the State Water Board the required monitoring and status reports and notifications of potential and actual exceedances of interior southern Delta salinity objectives.

In December 2016, a letter from the Delta Watermaster informed DWR and Reclamation that the State Water Board had determined that the compliance plan specified in order WR 2010-0002 was due by June 19, 2017. The compliance plan

was submitted to the State Water Board on June 19, 2017.

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 the months of January through May 2017, in million acre-feet, was 8.53, 12.65, 5.52, 6.61, and 5.84, respectively. The X2 habitat protection objective at Chipps Island was 28 days in February, 31 days in March, 30 days in April, 31 days in May, and 30 days in June. The X2 habitat protection objective at Port Chicago was 28 days in February, 26 days in March, 30 days in April, and 11 days in May.

The X2 objectives were met in calendar year 2017.

Net Delta Outflow Index Standard

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

Specific minimum monthly NDOI standards for the protection of fish and wildlife are based on water year type. In 2017, the monthly mean NDOI was highest in February, averaging 248,842 cfs. The lowest monthly mean NDOI occurred in December with 6,997 cfs, which was above the objective of 4,500 cfs. All monthly NDOI objectives were met in 2017.

River Flow Standards

Water quality objectives include minimum flow requirements measured in the Sacramento River at Rio Vista. These flow

standards, incorporated from the winter-run salmon BiOp, set flow requirements based on the Sacramento Valley 40-30-30 Index. Water year 2016–2017 was wet, requiring mean monthly flows of 3,000 cfs for September, 4,000 cfs for October, and 4,500 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 actual mean monthly flows were 13,566 cfs in September; 9,057 cfs in October; 9,095 cfs in November; and 11,583 cfs in December. The monthly and 7-day average Rio Vista flow requirements were met for calendar year 2017.

Water quality objectives also specify minimum flow requirements measured in the San Joaquin River at Vernalis. These flow standards are based on the San Joaquin Valley 60-20-20 Index, which was wet for water year 2016–2017. If the position of X2 is required to be at or west of Chipps Island, the required minimum monthly average Vernalis flow is 3,420 cfs from February to April 14 and May 16 to June. Otherwise the Vernalis base-flow objective is 2,130 cfs.

A San Joaquin River spring pulse flow (a short-term increase in stream flow) is required from April 15 to May 15 at Vernalis. This spring pulse flow requirement varies based on the location of X2 during April. However, the CALFED Operations Group may vary the actual timing and duration of the pulse attraction flow based on real-time monitoring data. (For background on the CALFED Bay-Delta Program, see Bulletins 132-95 through 132-11.)

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

Export Standards

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

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 U.S. Fish and Wildlife Service and the 2009 National Marine Fisheries Service BiOps typically control the export rate for most of the winter and spring. Under these conditions, the Delta can be pushed into excess conditions more often. Additional information about the BiOps can be found in Chapter 3, Environmental Programs.

During 2017, the Delta was in excess conditions from January 1 to September 2, September 28 to October 5, and November 1 to November 30, for a total of 283 days. Within this period, the 14-day export/inflow ratio averaged 21 percent, meeting both the 35 percent and 65 percent export limitations for the year.

The Delta was in balanced conditions from September 3 to September 27, October 6 to October 31, and December 1 to December 31, for a total of 82 days. Within this period, the 3-day export/inflow ratio averaged about 39 percent. However,

the export/inflow ratio met the 35 percent limitation within the months from February to June accounting for higher ratios in other months, when the limitation is 65 percent.

South Delta Temporary Barriers Project

The South Delta Temporary Barriers Project began as a test project in 1991. 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, and previous bulletins.

Delta Mercury Control Program and Mercury Monitoring and Evaluation

DWR's Mercury Monitoring and Evaluation Section was established in 2012 in the Division of Environmental Services to carry out DWR's regulatory compliance responsibilities for the Delta Mercury Control Program (DMCP). Regulatory-required studies for wetlands, open water, and dredging are conducted, as well as oversight of in-kind support for educational outreach. DWR is also tracking the developing Statewide Mercury Control Policy and Mercury Control Program for Reservoirs.

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

Continuing work in 2017 included

- sampling of a third tidal wetland (Lindsey Slough) for tidal wetland control studies, and beginning installation of instrumentation for sampling at a fourth tidal wetland (Westervelt) located near the junction of the Cosumnes and Mokelumne rivers;
- data collection for field and laboratory open water studies to provide information for the open water modeling control study and identifying possible best management practices;
- DWR and consultant collaboration to create mercury models for the Delta and Yolo Bypass; and
- work on the Statewide Mercury Control Policy and Mercury Control Program for Reservoirs.

Tidal Wetlands

Sampling associated with the third tidal wetland control study of North Lindsey Slough, in the Cache Slough Complex, began in December 2016. However, the storms that occurred in the beginning of 2017 flooded the site and equipment. Therefore, sampling could not continue until June 2017 when flood waters had receded and instruments were reinstalled and working properly.

The primary objective of the tidal wetland control studies is to collect data to calculate mercury and MeHg loads into and out of the wetland. Flow and basic water quality parameters are being measured in a breach near the mouth of the wetland using an acoustic Doppler current profiler and a sonde, respectively. Water samples are being collected approximately monthly using a set of autosamplers that are placed

at the breach near the mouth. The samplers collect samples hourly over a 25-hour tidal cycle. All samples are analyzed by DWR's Bryte Chemical Laboratory for water quality parameters, except for MeHg, which is analyzed by Moss Landing Marine Laboratories. All flow and water quality data are uploaded into DWR's Water Data Library. An analysis of the data will be done after a full year of data has been collected, which should be in June 2018.

In 2017, a fourth wetland was investigated to determine if it met the sampling criteria for establishing a flow and autosampler station. The criteria were met, and a flow meter and a water quality sonde were placed at the mouth of the wetland. The freshwater tidal wetland is located off the Cosumnes River to the east of where it intersects with the Mokelumne River. Like previous studies, this final control study will be one year in length. Sampling in this wetland will begin in 2018.

Open Water

Field Work

Due to the lack of significant and long-term flooding of the Yolo Bypass in previous sampling years, only one major flooding event was sampled prior to 2017 (described in Bulletin 132-17). In 2017, the Yolo Bypass was continuously flooded from January through April. During this approximately 4-month flooding event, nine independent water sampling events were conducted. For each Yolo Bypass sampling event, samples were collected over the course of two days: all major inputs and the northern section of the Toe Drain on the first day, and all major outflow points and the southern section of the Toe Drain on the second day. Samples were analyzed for total and dissolved mercury and MeHg, as well as many other parameters.

One objective of the inlet-outlet study is to estimate loads to determine the mass of constituents entering and leaving the Yolo Bypass. Loads are calculated by multiplying the concentration of a constituent by the water flow. No instrumentation is available to accurately measure the flow of water exiting the Yolo Bypass once floodwaters significantly inundate the Yolo Bypass. In 2017, modeled bypass outflows were calculated for the 2017 flooding event. In 2018, the mass loads of mercury, MeHg, suspended sediment, and other parameters will be calculated. These mass load calculations will allow examination of whether the Yolo Bypass is a sink or source for the parameters of interest, which will then be compared to previous work showing MeHg production within the Yolo Bypass when flooded. This field information is also being used to verify model results associated with Yolo Bypass model runs.

Also being examined is whether decaying vegetation could be a source of in-bypass MeHg production when the Yolo Bypass floods. Preliminary experiments have illustrated that vegetated pasture land produces more MeHg than sediment alone. Since pasture land is the largest land use in the Yolo Bypass, one hypothesis is that decaying vegetation, inundated by floodwaters, could be one of the large sources of in-bypass MeHg production. To examine this idea, a mesocosm experiment was conducted simulating flooding over pasture lands in the Yolo Bypass. This experiment also examined if there are best management practices that can be applied to help lower MeHg production.

The 35-day mesocosm experiment started in December 2017. The experiment consisted of five treatments simulating different land use practices including grazing and disking. Water in the treatments was drained and replaced every seven days. Water samples were collected before and after each water replacement. The water samples were analyzed for various parameters including dissolved MeHg and dissolved organic carbon. To examine vegetation deterioration,

biomass samples before and after the treatment were also collected. Data analysis to examine whether there are significant changes in water column MeHg associated with different land use approaches will be completed in early 2018.

In addition to the mesocosm experiment, in the fall of 2017, monocultures of the dominant vegetation in irrigated and dryland pastures and seasonal wetlands were also collected. These vegetation samples will be archived and potentially used in future experiments.

In 2016, the U.S. Geological Survey completed its erosion experiments to provide information on the relative erodibility of different land uses in the Yolo Bypass. In 2017, the U.S. Geological Survey continued work on a final report for publication. See Bulletin 132-17 for more information.

Modeling Work

To fulfill DMCP phase 1 open water regulatory requirements, DWR is developing mercury models for the Delta and the Yolo Bypass (see discussion in Bulletins 132-13 and 132-14). DWR's Delta Simulation Model 2 (DSM2) is being used for mercury modeling in the Delta. The Dynamic Mercury Cycling Model is being used to model mercury in the Yolo Bypass. Data from the open water field studies provides some of the information for the development of the Yolo Bypass model. Additionally, the Bay-Delta Office has been funding a separate effort to modernize DSM2, via the development of the General Transport Model.

Many modeling milestones were completed in 2017 for the DSM2 and the Yolo Bypass Dynamic Mercury Cycling Model. It is anticipated that calibration and validation will be completed for the two mercury models and sensitivity and scenario model runs will begin in 2018.

Dredging

DWR is required to submit study work plans to the Central Valley Water Board to evaluate management practices to minimize increases in MeHg and mercury discharges from dredging and dredge material reuse.

No dredging activity was identified during the DMCP Phase 1 period of the regulation. Therefore, DWR was not required to submit control study work plans for dredging. If any new proposals for DWR projects will involve dredging or spoils usage, DWR will confer with project staff and the Central Valley Water Board (see Bulletins 132-14 and 132-15).

Delta Mercury Exposure Reduction Program

Elevated concentrations of mercury in fish pose a human health threat. The objective of the Delta Mercury Exposure Reduction Program is to provide educational outreach to reduce human exposure to mercury from consumption of contaminated Delta fish. All entities regulated under the DMCP are required to participate in a mercury exposure reduction program. DWR is providing up to $20,000 per year through 2019 of in-kind support for brochure and sign production. In 2017, there was no request from the Central Valley Water Board for in-kind support for brochures, signs, etc.

Statewide Mercury Control Policy and Mercury Control Program for Reservoirs

The State Water Board is developing a statewide mercury policy to control mercury in California's waters. Regulatory delays have pushed back the adoption date for this regulation since 2016. Currently, it is anticipated that the policy and its regulations will be presented to the State Water Board for adoption in 2019 or 2020. It is anticipated that eight DWR reservoirs or inland water bodies will be regulated under this new

regulation: Castaic Lake, Lake Del Valle, Lake Oroville, Mile Long Pond (Oroville Wildlife Area), O'Neill Forebay, Pyramid Lake, San Luis Reservoir, and Thermalito Afterbay.

In 2017, DWR continued to track developments associated with the Statewide Mercury Control Program for Reservoirs and attended all reservoir owner/operator meetings convened by the State Water Board. 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 fall 2017, the State Water Board shifted from stakeholder meetings with technical staff to stakeholder meetings with decision-makers of the various affected water agencies. DWR attended these meetings.

In 2017, the Central Valley Water Board distributed a comprehensive reservoir survey to all potentially affected reservoir owner/operators. This survey was designed to gather information to gain an understanding of operational parameters, reservoir characteristics, specialized management, and fisheries management in the reservoir. As in 2016, DWR coordinated responses across multiple divisions within DWR to ensure that the survey of DWR reservoirs was accurate and complete. DWR submitted its survey responses to the Central Valley Water Board. A report of the results is available on the water boards web page.

Special Studies and Biological Surveys

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

Fall Dissolved Oxygen Study in the Stockton Deep Water Ship Channel

Historically, during the late summer and early fall, DO levels in the eastern and central portions of the Stockton Deep Water Ship Channel have dropped below both the 5.0 mg/L and 6.0 mg/L water quality objectives set by the State Water Board and the Central Valley Water Board, 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.

The spring barrier was not installed in 2017. Installation of the fall barrier began on September 26, and removal of the fall barrier was completed on November 27.

Methods

In 2017, DO concentration monitoring in the Stockton Deep Water Ship Channel was conducted by boat on 9 monitoring runs, from June 6 to November 6. 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 6.14 to 9.86 mg/L at the surface and 5.95 to 9.78 mg/L at the bottom. In the western portion of the channel, DO concentrations ranged from 6.37 to 9.18 mg/L at the surface and 6.15 to 9.01 mg/L at the bottom. In the central portion of the channel, DO concentrations were variable, ranging from 6.14 to 8.98 mg/L at the surface and 5.95 to 8.85 mg/L at the bottom. In the eastern portion of the channel, DO levels were similar compared to the other regions, ranging from 6.93 to 9.86 mg/L at the surface and 6.72 to 9.78 mg/L at the bottom. In 2017, bottom DO concentrations never fell below the objectives.

Large storms in late fall 2017 improved DO conditions, and monitoring operations for the fall 2017 special study were suspended after November 6.

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
- 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 2017. 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 173 species of benthic macrofauna were collected in 2017 at the 10 sampling sites. Of the 173 species, 10 represented nearly 80 percent of all organisms collected:

- amphipods: *Americorophium spinicorne*, *Americorophium stimpsoni*, *Ampelisca abdita,* and *Gammarus daiberi*
- Asian clams: *Corbicula fluminea* and *Potamocorbula amurensis*
- sabellid polychaete: *Manayunkia speciosa*
- tubificid worms: *Ilyodrilus frantzi, Limnodrilus hoffmeisteri,* and *Varichaetadrilus angustipenis*

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. The remaining eight species, *Gammarus daiberi*, *Manayunkia speciosa*, *Limnodrilus hoffmeisteri*, *Varichaetadrilus angustipenis*, *Ilyodrilus frantzi*, *Americorophium spinicorne*, *Americorophium stimpsoni*, and *Corbicula fluminea* are predominantly fresh water species and were collected mostly 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 2017 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
- 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 156 samples taken in 2017, 93.6 percent (146 samples) had chlorophyll *a* levels below 10 micrograms per liter (µg/L). Chlorophyll *a* levels below 10 µg/L are considered limiting for zooplankton growth. Of the 10 samples with chlorophyll *a* concentrations above 10 µg/L, three were from the San Joaquin River at Vernalis from July to September; one was from Franks Tract near Russo's Landing in July; one was from the San Joaquin River at Potato Point in July; two were from Disappointment Slough near Bishop Cut in July and August; two were from the San Joaquin River at Buckley Cove in July and August; and one was from the Sacramento River above Point Sacramento

in July. The mean chlorophyll *a* concentration for all samples in 2017 was 3.41 µg/L; the median value was 2.18 µg/L. In 2016, the mean was slightly higher (5.89 µg/L), but the median was similar (2.09 µg/L). The maximum chlorophyll *a* concentration in 2017 was 24.93 µg/L, recorded in July on the Sacramento River above Point Sacramento. It was much lower than the maximum in 2016 (71.01 µg/L). The minimum chlorophyll *a* concentration was 0.65 µg/L, recorded in December on the San Joaquin River at Buckley Cove.

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 2017 was 1.48 µg/L, and the median value was 1.21 µg/L. The maximum pheophytin *a* concentration was 5.01 µg/L, recorded in Franks Tract near Russo's Landing in January. The minimum pheophytin *a* concentration was 0.50 µg/L, recorded in both San Pablo Bay near the mouth of the Petaluma River in October and Suisun Bay off Middle Point near Nichols in December.

Cyanobacteria and green algae constituted 98.6 percent of the organisms collected in 2017. Cyanobacteria alone constituted 95.4 percent due to the presence of small-celled but numerically dominant genera such as *Chroococcus* and *Synechococcus*.

All organisms collected fell into the following categories (in order of abundance):

(1) cyanobacteria (class Cyanophyceae)
(2) green algae (classes Chlorophyceae, Nephrophyceae, Prasinophyceae, and Ulvophyceae)
(3) cryptophyte flagellates (class Cryptophyceae)
(4) centric diatoms (class Coscinodiscophyceae)
(5) pennate diatoms (classes Bacillariophyceae and Fragilariophyceae)
(6) chrysophyte flagellates (class Chrysophyceae)
(7) euglenoid flagellates (class Euglenophyceae)
(8) dinoflagellates (class Dinophyceae)
(9) eustigmatophyte flagellates (class Eustimagophyceae)

The 10 most common genera collected were

(1) *Chroococcus* (cyanobacterium);
(2) *Synechococcus* (cyanobacterium);
(3) *Chlorella* (green alga);
(4) *Plagioselmis* (cryptophyte flagellate);
(5) *Drepanochloris* (green alga);
(6) *Cyclotella* (centric diatom);
(7) *Planktolyngbya* (cyanobacterium);
(8) *Cyanophanon* (cyanobacterium);
(9) *Nitzschia* (pennate diatom); and
(10) *Hemiselmis* (cryptophyte flagellate).

The cyanobacterium genus *Chroococcus* dominated samples throughout the year, and cyanobacteria numbers overall were high compared to other phytoplankton.

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 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.

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

The Division of Operations and Maintenance 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 EC (a measurement of water's capability to pass electrical flow), turbidity (a measurement of suspended particles), pH (a measurement of how acidic or basic water is), UV254 (254 nanometer ultraviolet absorbance; a measurement of dissolved organic carbon), and fluorometry (a measurement of algal biomass). SWP water contractors rely on these essential data to assess the quality of water delivered by the SWP.

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

Table 4-1 provides mean concentrations for 27 water quality parameters assessed at several SWP facilities and at the CVP's Delta-Mendota Canal in 2017. Data for specific conductance, dissolved organic carbon, bromide, turbidity, and arsenic are summarized below.

Specific Conductance

Specific conductance (also referred to as electrical conductivity or EC) is an important water quality measurement that estimates the amount of total dissolved salts in a water body. Examples of typical EC concentrations include a range of 30 to 1,500 microsiemens per centimeter (µS/cm) for potable water and over 50,000 µS/cm for sea water. Mean annual EC was 76 µS/cm at Thermalito Afterbay; 357 µS/cm at the North Bay Aqueduct, Barker Slough Pumping Plant; and 237 µS/cm at the Delta-Mendota Canal.

Table 4-1 Mean Water Quality at Selected SWP Grab Sample[1] Locations in 2017

Constituent	Units[2]	Reporting Limit	Thermalito Afterbay at Outlet	North Bay Aqueduct, Barker Slough Pumping Plant	Delta-Mendota Canal Upstream of McCabe Road	California Aqueduct					
						Banks Pumping Plant	O'Neill Forebay Outlet (Check 13)	Kettleman City (Check 21)	Teerink Pumping Plant	Tehachapi Afterbay (Check 41)	Devil Canyon Second Afterbay
Alkalinity	mg/L as $CaCO_3$	1	34	98	46	42	46	46	46	45	49
Antimony	mg/L	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	0.001	0.001	0.002	0.002	0.001	0.002	0.002
Beryllium	mg/L	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Boron	mg/L	0.1	<0.1	0.2	0.1	0.1	0.1	0.1	0.1	0.1	<0.1
Bromide	mg/L	0.01	<0.01	0.06	0.07	0.07	0.09	0.09	0.1	0.09	0.1
Calcium	mg/L	1	7	18	11	11	12	13	13	13	14
Chloride	mg/L	1	<1	27	27	23	31	33	35	30	36
Chromium	mg/L	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	0.018	0.001	0.002
Hardness	mg/L as $CaCO_3$	1	31	101	52	52	59	60	61	60	64
Iron	mg/L	0.005	0.014	0.061	0.028	0.034	0.024	0.017	0.014	0.022	0.018
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	3	14	5	6	7	7	7	7	7
Manganese	mg/L	0.005	<0.005	0.074	0.008	0.015	0.009	<0.005	<0.005	<0.005	<0.005
Nitrite + Nitrate	mg/L as N	0.01	0.02	0.18	0.52	0.39	0.46	0.48	0.45	0.49	0.51
Organic Carbon, Dissolved	mg/L as C	0.5	NR	6.5	3.5	3.5	3.6	3.3	3.4	3.5	3.3
Organic Carbon, Total	mg/L as C	0.5	NR	6.7	3.7	3.6	3.6	3.3	3.5	3.7	3.4
Phosphate-Ortho	mg/L as P	0.01	0.01	0.18	0.09	0.1	0.11	0.1	0.1	0.11	0.1
Phosphorus, Total	mg/L	0.01	0.02	0.23	0.11	0.12	0.11	0.11	0.11	0.12	0.1
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	3	33	19	19	25	25	27	24	28
Specific Conductance	µS/cm	1	76	357	237	204	249	254	273	243	268
Sulfate	mg/L	1 or 5	2	36	22	15	20	20	20	19	20
Total Dissolved Solids	mg/L	1	52	211	138	128	143	146	150	139	153
Turbidity	NTU	1 or 2	6	14	12	15	9	7	9	14	3
Zinc	mg/L	0.005	<0.005	<0.005	<0.005	<0.005	0.002	0.001	0.004	<0.005	<0.005

[1] 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 of water sampled monthly from January through December. When an analytical result for a constituent is a "non-detect," the annual mean for the constituent is calculated using "0" for the non-detect result, which accounts for some mean values that are less than the reporting limit. Unless noted otherwise, data in the table represents the dissolved (filtered) fraction for each analyte.

[2] mg/L = milligrams per liter; µS/cm = microsiemens per centimeter; NTU = nephelometric turbidity unit; NR = No data recorded at this location.

Mean EC ranged from 204 to 273 µS/cm in the California Aqueduct.

Dissolved Organic Carbon

Dissolved organic carbon measures the amount of organic matter in water. Monitoring of dissolved organic carbon is important to water treatment facility operators as dissolved organic carbon has the potential to facilitate the formation of trihalomethanes (potential toxins) during the chlorination process. Dissolved organic carbon was highest at the North Bay Aqueduct, Barker Slough Pumping Plant at 6.5 mg/L, while concentrations in the California Aqueduct ranged from 3.3 to 3.6 mg/L.

Bromide

Bromide is another parameter that has the potential to form trihalomethanes during water treatment. Bromide concentrations ranged from less than 0.01 mg/L at Thermalito Afterbay to 0.1 mg/L at Teerink Pumping Plant and Devil Canyon Second Afterbay.

Turbidity

Turbidity monitoring is important because of the potential for increased turbidity to increase the cost of water treatment. Banks Pumping Plant exhibited the highest level of turbidity with an annual mean of 15 NTU (nephelometric turbidity units). Other locations had mean turbidity values ranging from 3 to 14 NTU.

Arsenic

Mean arsenic concentrations ranged from less than 0.001 mg/L at Thermalito Afterbay to 0.003 mg/L at Barker Slough Pumping Plant. These surface water values fall below the 0.010 mg/L maximum contaminant level for arsenic in drinking water. (The maximum contaminant level is the maximum level of a contaminant in drinking water at which no known or anticipated adverse effect on human health would occur.)

Pesticides, Herbicides, and Other Organic Compounds

In 2017, DWR sampled for pesticides, herbicides, and other organic compounds in March, June, and September at several SWP facilities and the Delta-Mendota Canal (see Table 4-2). The sampled SWP facilities include those shown on Table 4-1 with the exception of Thermalito Afterbay but the inclusion of the East Branch Aqueduct at Check 66. The concentrations of the detected herbicides ranged from 0.05 to 0.29 µg/L. No pesticides, herbicides, or other organic compounds were detected at the six sites sampled in March. In June, the herbicide metolachlor was detected at a concentration of 0.29 µg/L at Barker Slough Pumping Plant and 0.05 µg/L at Check 21. In September, the herbicide 2,4-dichlorophenoxyacetic acid (2,4-D) was detected at the following concentrations in the California Aqueduct: 0.2 µg/L at Banks Pumping Plant; and 0.1 µg/L at both O'Neill Forebay Outlet (Check 13) and Check 21. The detected amounts of pesticides were below established maximum contaminant levels.

In addition to the March, June, and September samples, select volatile organic compounds are sampled monthly at Barker Slough Pumping Plant, the Clifton Court Forebay intake structure, Banks Pumping Plant, and South Bay Aqueduct at Check 7. As is typical for these samples, all results were below the detection limit with the exception of one result (1 µg/L) at South Bay Aqueduct at Check 7 on April 7, 2017.

Taste and Odor

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

Table 4-2 Pesticides, Herbicides, and Other Organic Substances Detected in the SWP in 2017

Sampling Location[1]	Sampling Station ID Number	Sample Date	Chemical Detected[2]	Concentration (micrograms per liter)
North Bay Aqueduct, Barker Slough Pumping Plant	KG000000	3/14/17	none	—
		6/20/17	Metolachlor	0.29
		9/20/17	none	—
Delta-Mendota Canal upstream of McCabe Road	DMC06716	3/14/17	none	—
		6/20/17	none	—
		9/19/17	none	—
California Aqueduct at Banks Pumping Plant	KA000331	3/14/17	none	—
		6/19/17	none	—
		9/20/17	2,4-D[3]	0.2
California Aqueduct at O'Neill Forebay Outlet (Check 13)	KA007089	3/14/17	none	—
		6/20/17	none	—
		9/19/17	2,4-D[3]	0.1
California Aqueduct near Kettleman City (Check 21)	KA017226	3/14/17	none	—
		6/20/17	Metolachlor	0.05
		9/19/17	2,4-D[3]	0.1
Teerink Pumping Plant	KA027813	3/14/17	none	—
		6/20/17	none	—
		9/19/17	none	—
California Aqueduct at Tehachapi Afterbay (Check 41)	KA030341	3/15/17	none	—
		9/20/17	none	—
California Aqueduct at Devil Canyon Second Afterbay	KA041323	6/21/17	none	—
		9/20/17	none	—

[1] Water at these locations was sampled in March, June, and September 2017.
[2] Only chemicals found in detectable amounts at the sampling stations are included in this table.
[3] 2,4-D = dichlorophenoxyacetic acid

cyanobacteria. Geosmin and MIB are natural by-products of algal chlorophyll production.

DWR's evaluation of a taste and odor event is based on microscopic examination of samples, and most importantly, the chemical analysis of MIB and geosmin. When sampling results indicate that concentrations of these compounds in SWP waters are increasing within the 10 nanograms per liter range, DWR responds by searching for the location of the source of the geosmin or MIB. To do this, water quality samples are collected and analyzed to ascertain the presence of possible algal sources. If an algal source is identified, DWR develops an aquatic herbicide application plan to control the specific algae that are associated with the elevated geosmin and/or MIB concentrations. In 2017, DWR applied aquatic algaecides to control taste- and odor-producing cyanobacteria in the South Bay Aqueduct, Patterson Reservoir, Pyramid Lake, Silverwood Lake, and Lake Perris.

Non-SWP Water

Non-SWP water is considered to be any input to the SWP that is not directly diverted from the Delta. Non-SWP water can be admitted to the California Aqueduct for conveyance and redistribution provided it does not result in the degradation of SWP water quality, cause toxicity to fish and wildlife, or adversely affect beneficial users. For more information, see discussion in Bulletin 132-17 and previous bulletins.

Groundwater Turn-ins

During 2017, 72,178 acre-feet of groundwater was pumped into the California Aqueduct from various sources in the San Joaquin Field Division (see Table 4-3).

Table 4-3 Inflows to the California Aqueduct in 2017

San Joaquin Field Division	Amount (acre-feet)
Arvin-Edison Water Storage District	5,863
Kern County Water Agency	66,315
San Luis Field Division	
Floodwaters from west-side ephemeral creeks	2,686
San Joaquin River conveyed through Lateral 7	3,746
Kings River conveyed through Lateral 7	15,908
Total	**94,518**

Arvin-Edison Water Storage District conveyed water from the Friant-Kern Canal and Kern County Water Agency conveyed water from the Kern River. There were no significant associated water quality issues to report.

Floodwater and Surface Water Inflows

Heavy rainfall in 2017 resulted in periods of non-SWP water inflow at several locations along the California Aqueduct in the San Luis Field Division. These inflows originated as either direct floodwater inflow, admitted during and after storm events, or as excess surface water conveyed to the California Aqueduct for flooding relief or distribution to users further from the source. The inflow volume from these sources in 2017 totaled 22,340 acre-feet (see Table 4-3). There were no significant associated water quality issues to report.

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

The Municipal Water Quality Program Branch includes the Municipal Water Quality Investigations (MWQI) Program and the Quality Assurance/Quality Control Program (Quality Assurance Program).

Municipal Water Quality Investigations Program

The MWQI Program conducts water quality monitoring (both real time and discrete) in the Delta for municipal and industrial uses. Since its inception in 1983, information derived from this program has been supplied to the SWP water contractors and other agencies delivering Delta-sourced drinking water. This information is used extensively by federal, State, and local agencies and the public in water supply planning studies. Data from this program are used to identify long-term trends in water quality changes in the Delta and the SWP. Monitoring data also help MWQI and other agencies develop research and mitigation measures to reduce drinking water contaminants in Delta waters. In collaboration with the Division of Operations and Maintenance, and through modeling, monitoring data derived from this program are used as an "early warning" system of changing conditions in source water, which

can be used to provide advance notice to Delta water users of possible drinking water quality problems. Additionally, the MWQI Program provides technical water quality expertise to other units within DWR, local municipal water agencies, the State Water Board, and the Regional Water Boards. The program contributes water quality expertise while participating in regulatory, planning, and data sharing efforts.

Real Time Data and Forecasting Comprehensive Program

The Real Time Data and Forecasting Comprehensive Program is the central element of the MWQI Program. The program provides real-time water quality monitoring data and associated modeled (predictive and non-predictive) water quality data to urban SWP water contractors. The information enables contractors to know in advance the condition or potential condition of Delta and SWP water before it reaches their treatment facilities. The program continually works to further develop real-time system capabilities and improve Delta and SWP forecast modeling.

The Real Time Data and Forecasting Comprehensive Program entails the following elements:

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

MWQI Program Special Studies

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

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

The following studies were in progress during 2017:

- fluorescence of dissolved organic matter proof of concept study
- DSM2 nutrient monitoring study
- Cache Slough Complex pre-restoration baseline monitoring
- LT2 (Long Term 2 Enhanced Surface Water Treatment Rule) pathogen special project monitoring

Accomplishments for the 2016–2017 MWQI Work Plan

During 2017, 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 and aqueduct seasonal forecasts
- development of several projects to assess historical conditions for the Delta and aqueduct models (DSM2 and DSM2 Aqueduct Extension Model of the SWP)

Quality Assurance Program

The Quality Assurance Program is responsible for ensuring that all DWR water-related data are collected in a way that is scientifically sound, legally defensible, properly documented, and are comparable and compatible with data from State and federal agencies and other partners. This program identifies quality assurance principles and quality control practices necessary to ensure valid data from the time a sample is collected through the final stages of data interpretation, dissemination, and reporting. The program also provides quality assurance/quality control documentation support, guidance manuals, and training to employees who conduct environmental measurements. The guiding policy for the program is the Quality Assurance/Control Policy for Water-Related Monitoring Programs (Water Resources Engineering Memorandum No. 60, September 18, 1992). Monitoring programs are encouraged to follow standardized procedures including quality control measurements in their sampling protocols.

The Quality Assurance Program integrates planned quality control activities at all levels of environmental monitoring programs through

- standardized project design and organization;
- establishment of data quality objectives;
- defined sampling, analysis, and quality control procedures;
- practices for data assessment and validation;
- guidelines for report preparation; and
- means to assess progress, feedback, and process improvement.

In 2017, activities consisted of planning for the new strategy of the Quality Assurance Program, including the development of a new 5-year strategic plan.

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 State Water Board'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 2017, the laboratory upgraded its capability and capacity to detect and analyze total nutrients (total phosphorus, total Kjeldahl nitrogen, and dissolved organic nitrogen) with the purchase of a discrete analyzer. It is a fully automated and computer-controlled spectroscopic instrument that generates data that are highly stable, accurate, and reproducible. The instrument's detection limit has been established at 10 parts per billion.

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 DWR's Quality Assurance Program to replace these contracts as they expire each fiscal year. On July 1, 2017, the contract with The Metropolitan Water District of Southern California for taste and odor analyses was renewed for $147,600 over 3 years.

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

Suisun Marsh Program Activities

Suisun Marsh consists of approximately 59,000 acres of tidal and managed brackish water wetlands and 30,000 acres of bays and sloughs. It is the largest contiguous brackish marsh remaining in the United States. Situated in southern Solano County, west of the Delta and north of Suisun Bay, the marsh encompasses more than 10 percent of California's remaining natural wetlands. The marsh is the resting and feeding ground for thousands of waterfowl and shorebirds migrating on the Pacific Flyway. It provides important habitat for more than 221 bird species, 45 mammal species, 16 reptile and amphibian species, and more than 40 fish species.

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

Through agreements and plans, DWR has been working in coordination with Reclamation, Department of Fish and Wildlife, Suisun Resource Conservation District, U.S. Fish and Wildlife Service, and other agencies, on habitat management,

preservation, and restoration of Suisun Marsh.

Revised Suisun Marsh Preservation Agreement

In 1987, DWR, Reclamation, Department of Fish and Wildlife, and the Suisun Resource Conservation District signed the *Suisun Marsh Preservation Agreement* (SMPA), a contractual framework for implementation of the *Plan of Protection for Suisun Marsh*. It required Reclamation and DWR to meet salinity standards as specified in the State Water Board's 1978 WQCP, set a time line for implementing the *Plan of Protection for the Suisun Marsh*, and delineated monitoring and mitigation requirements. A revised SMPA and *Revised Mitigation and Monitoring Agreement* were signed in 2005 to include actions to meet channel water salinity standards consistent with D-1641 and to implement landowner-based management activities in lieu of the western marsh facilities proposed in the plan of protection.

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

SMPA 2015

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

Facility Operations, Maintenance, and Related Activities

Morrow Island Distribution System

MIDS is an interior ditch bordered by levees that was created to distribute water to managed wetlands on the western edge of Suisun Marsh. Water with relatively lower salinity is taken from Goodyear Slough in the west through water control structures that transport the water into MIDS. Water is then distributed to managed wetlands through private landowner water control structures along the ditch. Water not used by the landowners exits into Grizzly Bay through water control structures in the east (see Figure 4-2). Routine maintenance during 2017 included mowing, spraying, and drying out and distributing vegetation spoils to an adjacent landowner.

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 U.S. Fish and Wildlife Service 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, the Department of Fish and Wildlife issued an incidental take permit for the ongoing and long-term operation of existing SWP facilities in the Delta for the protection of longfin smelt. MIDS is included as one of these facilities.

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

To minimize the take of longfin smelt at the MIDS diversion, the Department of Fish and Wildlife 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.

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 2016–2017. The control season (generally October 2016 through May 2017) started in September 2016. The flashboards were installed and the boat locks became operational on September 30, 2016. The SMSCG were tidally operated from October 17 to December 8. Salinity was within the 12–14 mS/cm range for the compliance stations, so operations ceased. The flashboards were removed on May 12, 2017, and the gates were set to the open position.

Roaring River Slough Distribution System

The Roaring River Slough Distribution System is operated and maintained as needed to provide lower-salinity water to managed wetland properties.

Levee Repair. In February 2017, high water and storm events caused Roaring River Slough Distribution System levees to erode. Sandbags and durable polyethylene sheeting were installed in 13 locations to stabilize the levees and prevent further erosion. DWR began emergency repairs in March to fix the levees. Exterior levee repairs were 5,375 linear feet for a total of 6,370 cubic yards, and interior levee repairs were 9,100 linear feet for a total of 11,865 cubic yards. Additionally, interior ditch cleaning and road maintenance were done. All repairs were completed on July 20.

Eastern Drain Gate Replacement Project. DWR replaced the existing exterior and interior water control structure. Levees were repaired and roads were regraded and resurfaced. Work began on June 12 and in-water work began on June 15. The project was completed on July 31.

Goodyear Slough Outfall

The Goodyear Slough Outfall is operated and maintained as needed to provide lower-salinity water to managed wetland properties. In 2017, maintenance activities included mowing, spraying, ditch clearing, road maintenance, and removing floating debris.

Water Quality and Compliance

Salinity levels for the 2016–2017 control season were below monthly standards for all five compliance stations.

Details about salinity levels in the marsh are available in a monthly report entitled *Suisun Marsh Monitoring Program Channel Water Salinity Report*.

Suisun Marsh Expenditure History

Suisun Marsh expenditures and reimbursements administered by DWR for calendar years 1968 through 2017 are summarized in Table 4-4. From 1968 through December 31, 2017, DWR disbursed more than $183.7 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 the State Water Board. Reclamation has reimbursed DWR approximately $63.3 million (34 percent), and the State's General Fund has reimbursed approximately $9.5 million (5.2 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's reimbursements, General Fund reimbursements, and DWR's cumulative expenditure balance.

Table 4-4 Suisun Marsh Expenditures and Reimbursements Administered by DWR, Calendar Years 1968–2017 (in dollars)

Sheet 1 of 2

Year [1]	Suisun Marsh Costs [2]	General Fund Payment [3]	Adjustment for General Fund Payment[1] [4]	Reclamation Invoice Payment[3] [5]	Interest Payment Credited Back to Contractors [6]	Net SWP Costs [2] through [6] [7]	Recreation Costs[2] [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)[a]	(2,039,752)	(11,952,113)	253,516	(12,205,629)
1989	2,341,960	(9,478,000)	6,634,600	(1,219,691)[a]	(283,857)	(2,004,988)	79,643	(2,084,631)
1990	3,030,010			(695,450)		2,334,560	101,460	2,233,100
1991	6,223,042			(2,925,429)		3,297,613	210,454	3,087,159
1992	2,737,259			(1,174,655)		1,562,604	91,951	1,470,653
1993	2,979,255			(238,130)		2,741,125	99,897	2,641,228
1994	3,192,213			(1,962,549)		1,229,664	107,281	1,122,383
1995	2,721,978			(647,138)		2,074,840	91,218	1,983,622
1996	3,391,678			(1,482,396)		1,909,282	113,244	1,796,038
1997	3,634,267			(1,520,219)		2,114,048	121,132	1,992,916
1998	5,342,834			(1,107,501)		4,235,333	177,132	4,058,201
1999	8,867,742			(2,696,200)		6,171,542	301,424	5,870,118
2000	2,857,534			(3,300,053)		(442,519)	98,146	(540,665)
2001	2,621,301			(444,009)		2,177,292	89,431	2,087,861
2002	3,752,486			(791,319)		2,961,167	124,387	2,836,780
2003	3,258,583			(2,389,979)		868,604	107,566	761,038
2004	2,874,629			(952,940)		1,921,689	94,885	1,826,804
2005	3,940,876			(1,409,296)		2,531,580	130,049	2,401,531
2006	5,796,008			(868,449)		4,927,559	193,478	4,734,081
2007	4,113,515			(939,879)		3,173,636	135,753	3,037,883
2008	3,827,189			(1,670,278)		2,156,911	125,783	2,031,128
2009	4,696,688			(1,123,705)		3,572,983	154,991	3,417,991

Table 4-4 Suisun Marsh Expenditures and Reimbursements Administered by DWR, Calendar Years 1968–2017 (in dollars)

Sheet 2 of 2

Year [1]	Suisun Marsh Costs [2]	General Fund Payment [3]	Adjustment for General Fund Payment[1] [4]	Reclamation Invoice Payment[3] [5]	Interest Payment Credited Back to Contractors [6]	Net SWP Costs [2] through [6] [7]	Recreation Costs[2] [8]	SWP Water Contractors' Costs [7] minus [8] [9]
2010	2,834,952			(1,663,530)		1,171,422	93,553	1,077,869
2011	3,772,476			(1,748,136)		2,024,340	124,492	1,899,848
2012	6,370,822			(1,860,585)		4,510,237	186,973	4,323,263
2013	5,665,863			0		5,665,863	186,973	5,478,889
2014	4,992,333			0		4,992,333	164,747	4,827,586
2015	5,553,741			(6,431,161)		(877,421)	183,273	(1,060,694)
2016	8,767,276			0		8,767,276	289,348	8,477,928
2017	13,407,476			(2,136,908)		11,270,568	442,467	10,828,101
Total	**183,703,278**	**(9,478,000)**	**6,634,600**	**(63,268,310)**	**(2,323,609)**	**115,267,959**	**6,127,956**	**109,140,003**

[1] Under California Water Code section 12912.5 (Chapter 716, Statutes of 1989 [Assembly Bill 1442, Baker]), the General Fund paid 20 percent of the Suisun Marsh costs through June 1988, which totaled $9,478,000. This $9,478,000 payment included $2,843,400 which represents 5.2 percent of the Suisun Marsh costs through June 1988 paid by the General Fund. The Suisun Marsh costs billed to the SWP water contractors have been reduced by $2,843,000. The remaining $6,634,600 received from the General Fund represents DWR's recreation project purpose share of 14 percent.

[2] 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.

[3] Co-payments were made by Reclamation in 2013 and 2014 due to disputed invoices. All disputed charges were resolved and paid in July 2015.

[a] Excludes interest payments made by Reclamation.

Chapter 5
Local Assistance

Crafton Hills Reservoir in San Bernardino, California.

Significant Events in 2017

The Department of Water Resources (DWR), in coordination with four other State agencies, issued the report, *Making Water Conservation a California Way of Life*. The report was developed in response to the Governor's Executive Order B-37-16. Recommendations in the report serve as the foundation for a long-term water use efficiency framework, guiding urban water management into the foreseeable future and the development of related legislation.

The Residential Turf Replacement Rebate Program continued, and 4.3 million square feet of high water-use turf was converted to low water-use landscapes.

The California Irrigation Management Information System (CIMIS) experienced an all-time high number of website hits, and approximately 18.4 million reports were generated from the CIMIS database. Several new CIMIS stations were approved for installation. One station, Highland, became an active station.

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 water contractors.

Davis-Grunsky Act Program

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

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

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

Water Use Efficiency

Activities of the Water Use and Efficiency Branch in the Division of Statewide Integrated Water Management include providing technical assistance to local agencies; managing water use efficiency financial assistance programs; managing the California Irrigation Management Information System (CIMIS); reviewing, tracking, and reporting on urban and agricultural water management plans and water loss audit reports; and promoting water recycling and 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 irrigation scheduling, resource planning, research, and modeling.

In 2017, DWR's CIMIS network collected data from 155 stations, with approximately 60 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 over the years to more than 58,000 in 2017.

Approximately 18.4 million reports were generated from the database using the CIMIS website in 2017. This number of reports increased from the average annual data query of about two million in previous years. The trend of increased CIMIS data use was attributed to both active outreach efforts and the five-year drought that ended April 7, 2017.

In 2017, DWR conducted numerous outreach activities at farm shows and conferences to promote the use of CIMIS data. CIMIS continued providing the spatially distributed reference evapotranspiration data, known as Spatial CIMIS.

CIMIS data are used to promote water use efficiency in agricultural operations and support of California Water Code (CWC) requirements pertaining to conservation, development, and utilization of State water resources and the Model Water Efficient Landscape Ordinance (California Code of Regulations, Title 23, Sections 490–494).

In anticipation of increased future demand, the CIMIS program is continually expanding the network and upgrading its systems. In 2016, as part of a multi-agency investigation, five stations were installed in the Sacramento-San Joaquin Delta to quantify consumptive water use within the Delta. Agencies involved in this investigation include the University of California, Davis; the State Water Resources Control Board; NASA's Ames Research Center; the U.S. Department of Agriculture; and several local agencies. A preliminary report has been released. The investigation continued into 2017, and the final report is expected in 2018.

During 2017, several new CIMIS stations were approved for installation. One station, Pescadero, became an active station.

Executive Order B-37-16: Making Water Conservation a California Way of Life

In April 2017, DWR and four other State agencies, including the State Water Resources Control Board, California Public Utilities Commission, California Department of Food and Agriculture, and California Energy Commission, released a report that provides a long-term framework to make water conservation a California way of life, as directed by the Governor's Executive Order B-37-16, issued on May 9, 2016.

The report outlines a suite of actions that can be implemented with existing, new or expanded authorities to meet these four objectives: (1) use water more wisely, (2) eliminate water waste, (3) strengthen local drought resilience, and (4) improve agricultural water use efficiency and drought planning. The report lists actions that can be implemented using existing authorities and includes recommended additional actions and authorities that require legislation for implementation.

Water Loss Audit Reporting

DWR drafted regulations to satisfy the requirements of CWC Section 10608.34, created by Senate Bill 555 (Wolk; 2015). The statute required that beginning in 2017, all urban retail water suppliers perform water loss audits of their water distribution systems, validate those audits, and submit them annually to DWR by October 1. The draft regulations specify the minimum standard for conducting a water loss audit and the minimum requirement for how water loss auditors must conduct validation of those audits.

DWR developed proposed regulations based largely on statutory requirements and input from several stakeholder meetings. The regulations are scheduled to be adopted by the California Water Commission in early 2018.

Alternative Water Supplies

DWR's goal is to improve water management by promoting the increased use of alternative water supplies through planning, technical, and financial assistance. As part of a balanced water portfolio, alternative water supplies help meet existing and future water supply and environmental needs and provide resiliency during drought or restrictions on water imports.

A primary alternative water supply activity is to manage the Water Desalination Grant Program funded by voter-approved bonds.

Proposition 50 was approved in 2002. Three rounds of Proposition 50

funding supported 51 completed and continuing projects. These projects were awarded $47.7 million for planning, construction, pilot studies, and research. Proposition 50 funds are essentially exhausted.

In 2014, Proposition 1 was approved and provided $93.1 million in local assistance. In 2017, applications were accepted and reviewed during the first round of funding; awards for this round were made in early 2018. The Water Desalination Grant Program transitioned to a continuous application process in 2018 for remaining bond funds.

Agricultural Water Management Plans

The Agricultural Water Management Planning Act (CWC Section 10800, et seq.) requires all water suppliers to increase water use efficiency. Agricultural water suppliers are responsible for preparing, implementing, and updating an agricultural water management plan (AWMP), measuring the volume of water delivered to customers, adopting a pricing structure, and implementing efficient water management practices. Agricultural water suppliers that fail to meet the specified water management planning requirements are not eligible for water grants or loans awarded or administered by the State.

Agricultural water suppliers were required to prepare and adopt an AWMP on or before December 31, 2012, and to update the AWMP on December 31, 2015, and every five years thereafter. Updated AWMPs must be submitted to DWR within 30 days of adoption.

"Agricultural water supplier" is defined in CWC Section 10608.12(a) 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 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.

Under the Emergency Services Act, and in response to the declared Drought Emergency, the Governor issued Executive Order B-29-15 on April 1, 2015. The executive order required all midsized agricultural water suppliers (those that provide water to 10,000 to 25,000 irrigated acres of land) to develop AWMPs that include a detailed drought management plan and quantification of water supplies and demands for 2013, 2014, and 2015, to the extent data is available. These AWMPs were required to be submitted to DWR by July 1, 2016. The executive order also directed DWR to prioritize grant funding for midsized agricultural water suppliers' AWMPs.

In 2017, DWR received AWMPs from 92 agricultural water suppliers: 46 large suppliers (serving more than 25,000 acres of irrigated land), 27 mid-sized suppliers (serving 10,000 to 25,000 acres of irrigated land), and 19 smaller suppliers (serving less than 10,000 acres of irrigated land). DWR submitted a report to the Legislature on the status of AWMP submittals and the implementation of associated efficient water management practices or best management practices for those water suppliers submitting a Bureau of Reclamation plan in lieu of a state plan.

Urban Water Management Plans

In accordance with the Urban Water Management Planning Act (CWC Section 10610 et seq.), California urban water suppliers are required to adopt and

submit urban water management plans to DWR every five years. The plans support long-term resource planning and ensure adequate water supplies are available to meet existing and future water demands.

CWC Section 10617 defines "urban water supplier" as a supplier, either publicly or privately owned, providing water for municipal purposes either directly or indirectly to more than 3,000 customers or supplying more than 3,000 acre-feet of water annually.

In 2017, fifty-six urban water suppliers submitted urban water management plans to DWR, bringing the total number of plans submitted for both 2016 and 2017 to 411. The urban water management plans and their associated data are available online. DWR is reviewing the plans for consistency with the CWC. DWR also prepared a report to the Legislature on the status of urban water management plans and highlighted plans that serve as good examples of incorporating exemplary demand management measures.

Water Use Efficiency Grants and Loans Program

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 funds the implementation of urban best management practices and agricultural efficient water management practices that result in local, regional, and statewide benefits. Benefits include water conservation, improved in-stream flows, improved water quality, and energy efficiency, among others.

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

In 2017, DWR's Water Use Efficiency Grant Program continued to manage grant agreements from previous proposal solicitations funded by Proposition 50, pursuant to CWC Section 79550(g).

Proposition 1 CalConserve Water Use Efficiency Revolving Fund Loan Program

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

This loan program implements CWC Sections 81000–81046, Assembly Bill 2636 (Gatto; 2014), which authorizes DWR to provide $10 million in available funding to assist local agencies in implementing water use efficiency and leak repair projects.

The $10 million in the CalConserve fund designated, $5 million for a pilot project for local agencies to provide water efficiency upgrades to eligible residents, and $5 million for loans that local agencies can offer customers to repair or replace cracked or leaking water pipes.

In 2016, a loan of $3.25 million was awarded, leaving $6.75 million in loan funds available. In 2017, a loan agreement was developed for the awarded $3 million, and CalConserve continued to have an open solicitation on a first-come, first-served basis for the remaining funds. There were no new applications received in 2017.

Proposition 1 Agricultural Water Use Efficiency Grants Program

This $33 million grant program implements CWC Section 79746(a)(2), created by Proposition 1 (2014), which authorizes DWR

to provide funding for agricultural water management planning and agricultural water use efficiency projects and programs developed pursuant to the Agricultural Water Management Planning Act (CWC Section 10800, et seq.).

Thirty million dollars of this funding is allocated for agricultural water use efficiency grants. DWR released a proposal solicitation package in January 2016 and received 50 proposals. In December 2016, DWR announced the final funding awards allocating $24.5 million for 16 implementation and infrastructure improvement projects, and $5.27 million for 22 other projects (including Research and Development; technical assistance; and training, education, and outreach) with total awards of $29.8 million. The grant awards were matched by applicants' local cost-share of approximately $32.3 million. In 2017, grant agreements were developed and executed for most of the 38 projects awarded in 2016.

The remaining $3 million is allocated to fund a joint request for proposal with DWR and the California Department of Food and Agriculture for a pilot project that will encourage partnerships between an agricultural water supplier and its growers. The pilot program's goals are to improve water use efficiency by saving water and reducing greenhouse gas emissions related to on-farm and agricultural water supplier's water conveyance activities.

In 2017, DWR and California Department of Food and Agriculture released a joint Request for Proposals and received four applications. DWR has $3 million available from Proposition 1 to fund the water supplier's conveyance. California Department of Food and Agriculture has $3 million from the State Water Efficiency and Enhancement Program to incentivize the installation of irrigation systems that save water and reduce greenhouse gases on farms in the area that will directly benefit from the conveyance system funded by DWR. One application was selected and resulted in DWR awarding North San Joaquin Water Conservation District a $3 million grant from Proposition 1 funds. Nineteen of its agricultural operators (farmers) will receive funding for on-farm improvements through the California Department of Food and Agriculture's State Water Efficiency and Enhancement Program funds as part of this DWR/California Department of Food and Agriculture joint pilot program.

Turf Replacement Program

In August 2015, DWR announced two rebate programs to help Californians further conserve water during the state's historic drought. The rebate programs are financed by the Proposition 1 water bond, approved by voters in 2014. The programs helped implement Executive Order B-29-15 directives to bolster the State's drought response. The executive order called for the collective replacement of 50 million square feet of lawns and ornamental turf in partnership with local agencies. The rebate programs contributed to the reduction of water use in homes by providing funds toward the replacement of more than 15.5 million square feet of turf.

With $24 million in Proposition 1 funding, the Turf Replacement Rebate Program will rebate $2 per square foot of turf replaced, up to $2,000 per household, and the rebate may be used in tandem with other State or local turf replacement programs. Consumers are eligible to replace turf that is living or dead at the time of the rebate application. The turf rebate program is estimated to benefit more than 10,000 homes, with half of the allocated funds initially reserved for disadvantaged communities hardest hit by the drought. Twelve million dollars of the lawn removal funds are targeted for residents in disadvantaged communities with areas of depleted groundwater basins. The turf rebate program is monitored by Department of

Water Resources (DWR) and administered by the Electric & Gas Industries Association. Approximately $1 million is targeted for lawn removal in institutional properties, such as schools, through an interagency agreement with the California Conservation Corps. In 2017, 4.3 million square feet of high water use turf was converted to low water use landscapes with funding from the Turf Replacement Rebate Program. More than 15.5 million square feet of turf have been converted since the program's inception in 2015.

Integrated Regional Water Management Grant Programs

DWR provides financial assistance to build capacity for sustainable management of water resources on a regional scale throughout California. Major activities include management of the Integrated Regional Water Management (IRWM) Grant Program and the Sustainable Groundwater Planning Grant Program made possible by voter-approved general obligation bonds Propositions 1, and the Stormwater/Flood Management Grant Program funded by Proposition 1E. Other activities include providing directed grants and funding to individual agencies in the State as General Funds are appropriated and designated for such assistance.

In addition to routine grant administration and management for previously awarded grants, the following awards were made in 2017.

Proposition 1 IRWM Grant Program

The Water Quality, Supply, and Infrastructure Improvement Act of 2014, approved by the California voters on November 4, 2014, authorized $510 million in IRWM funding to DWR. A specific funding amount was allocated to each of the 12 largely hydrologic region-based Funding Areas identified in the legislation. A minimum of $102 million is intended to benefit disadvantaged communities.

In 2017, DWR awarded $4.2 million as Planning Grants to 15 established IRWM Regions to develop or update their IRWM plans to be eligible for future project implementation funding. Forty-eight million dollars was awarded to 11 of 12 proposals (one for each funding area) for the Disadvantaged Community Involvement Program. The goal of that program is to ensure that disadvantaged communities and other underrepresented communities (e.g., Tribes) are identified, their needs are assessed, they are engaged in a meaningful way in the IRWM planning process, and ultimately projects benefiting the underrepresented communities are identified for Proposition 1 implementation funding. DWR also began the development of the Proposition 1 IRWM implementation grant program in coordination with regional stakeholders and plans to begin the solicitation process in late 2018.

Sustainable Groundwater Grant Program

Proposition 1 also authorized $100 million for competitive grants for projects that develop and implement groundwater plans and projects under the 2014 Sustainable Groundwater Management Act.

In 2017, DWR released the Groundwater Sustainability Plans and Projects Proposal Solicitation Package, to solicit proposals to award competitive grants to Groundwater Sustainability Agencies for the development of Groundwater Sustainability Plans and related projects. DWR received a total of 78 applications requesting $86.4 million in grant funds, with total project costs of approximately $150 million.

Agricultural Drainage Program

The Agricultural Drainage Program's mission is to improve water quality in the San Joaquin River and seek in-valley solutions to surface and subsurface agricultural drainage water problems, particularly on the west side of the San Joaquin Valley. The program's mission will be accomplished by promoting newer technologies and management practices that can reduce or eliminate the off-site discharge of saline water, and by collaborating with regulatory and local drainage agencies.

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 2017, 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
- preparing shallow groundwater and irrigation methods maps of drainage-impaired areas for 2014–2015, using drainage monitoring data in conjunction with land use and irrigation methods data
- maintaining equipment for the Real-Time Water Quality Monitoring Program to collect flow, electrical conductivity, and temperature data from several satellite-linked and web-accessible stations on the mainstem of the San Joaquin River and its major eastside tributaries
- producing weekly forecasts of salinity and flow conditions on the San Joaquin River near Vernalis and other upstream stations using the San Joaquin River Input-Output Day model and publishing them on DWR's website
- collaborating with the Central Valley Regional Water Quality Control Board and State Water Resources Control Board, by providing data, attending committee meetings, and reviewing program documents for the Central Valley Salinity Alternatives for Long-term Sustainability initiative
- collaborating with local drainage agencies on implementing the Watershed Analysis Risk Management Framework model (a decision support system developed jointly by the University of California, Merced, and the Bureau of Reclamation), which can be applied to any watershed and can guide stakeholders to a consensus watershed management plan

San Joaquin River Water Quality Grant Program

The program provides funding to support projects that will result in direct, measurable water quality improvements to the San Joaquin River by reducing or eliminating discharges of subsurface agricultural drainage, a significant water quality concern for the San Joaquin River.

In 2017, recommendations for funding were prepared and forwarded for approval. These recommendations are expected to be approved and released in 2018. The amount of Proposition 84 available funding is $36.6 million.

Chapter 6
Legislation and Litigation

Wildflowers along a stream at Table Mountain near Oroville, California.

Significant Events in 2017

During 2017 there was no significant State or federal legislation affecting management of the State Water Project.

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

There was no significant State or federal legislation in 2017 affecting management of the SWP.

Litigation

As of December 31, 2017, 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

State Water Resources Control Board

***California Sportfishing Protection Alliance, et al. v. California State Water Resources Control Board, et al.*, California Department of Water Resources and United States Bureau of Reclamation, Real Parties in Interest (Case No. RG15-780498).** On August 4, 2015, the California Sportfishing Protection Alliance filed a petition for writ of mandate challenging the State Water Resources Control Board's (State Water Board) orders granting temporary urgency change petitions to DWR and Bureau of Reclamation in 2014 and 2015. (For information about the temporary urgency change petitions, see Bulletin 132-16, Chapter 4, Water Quality Programs.) DWR and Bureau of Reclamation are named as real parties in interest.

On September 16, 2015, the California Sportfishing Protection Alliance filed a first amended complaint claiming that the State Water Board's orders violate the federal Clean Water Act, the Central Valley Basin Plan, and the Public Trust Doctrine. On October 21, 2015, the State Water Board filed a demurrer to dismiss the action. A hearing on the matter was held in January 2016. In April 2016, a second amended complaint was filed by the California Sportfishing Protection Alliance, et al. A trial date was set for August 7, 2017. DWR filed Motions for Summary Judgment and Summary Adjudication which are pending with the court.

Bay Delta Conservation Plan

***Property Reserve, Inc. v. The Superior Court of San Joaquin County* (C067758); *California Department of Water Resources*, real party in interest; *The Carolyn Nichols Revocable Living Trust v. The Superior Court of San Joaquin County* (C067765); *California Department of Water Resources*, Real Party in Interest; Coordinated Proceedings Special Title (Rule 3.550) *California Department of Water Resources Cases* (C068469); (Judicial Council Coordination Proceeding No. 4594); (2016) 1 Cal. 5th 151).** Twenty-four Delta property owners declined DWR's request to gain temporary entry onto their properties to perform environmental and geological surveys. DWR sought orders for temporary entry onto the respondents' properties under Code of Civil Procedure Section 1245.010 et seq. (More information about this litigation is available in Bulletin 132-14 and earlier bulletins.)

On March 13, 2014, the Third District Court of Appeals determined that the precondemnation entry order process was not sufficient to give DWR access to private

properties to conduct the surveys. The court ruled that both the geotechnical studies and less disruptive environmental surveys would constitute takings, and therefore, DWR would need to bring condemnation actions to get the access it sought. By the end of 2014, an appeal had been filed with the Supreme Court of California, where briefing was completed in early 2015. On August 22, 2016, the Supreme Court reversed the Court of Appeals decision and remanded the case for further proceedings. Supplemental briefs have been submitted by the parties. In June 2017, the plaintiff's motion for attorney fees and costs was denied. The court further issued orders allowing the California WaterFix (CWF) geotechnical and environmental studies to move forward.

***Delta Stewardship Council Cases* (Super. Ct. Sacramento County, Coordinated Proceedings Special Title (Rule 3.550), Judicial Council Coordination Proceeding No. 4758; C082944, application pending).** The following cases were coordinated into this proceeding: (1) *San Luis & Delta-Mendota Water Authority v. Delta Stewardship Council* (Super. Ct. Sacramento County, No. 34-2013-80001500); (2) *State Water Contractors, et al. v. Delta Stewardship Council* (Super. Ct. Sacramento County, No. 34-2013-80001530); (3) *North Coast Rivers Alliance, et al. v. Delta Stewardship Council* (Super. Ct. Sacramento County, No. 34-2013-80001534); (4) *California Water Impact Network, et al. v. Delta Stewardship Council* (Super. Ct. San Francisco County, No. CPF13513047); (5) *Central Delta Water Agency, et al. v. Delta Stewardship Council* (Super. Ct. San Francisco County, No. CPF13513048); (6) *Save the California Delta Alliance v. Delta Stewardship Council* (Super. Ct. San Francisco County, No. CPF13513049); (7) *City of Stockton v. Delta Stewardship Council* (Super. Ct. San Joaquin County, No. 39-2013-00298188).

In May 2013, the Delta Stewardship Council adopted its *Delta Plan* after approving and certifying a programmatic environmental impact report (EIR) for the plan. Subsequently, the Delta Stewardship Council adopted the implementing regulations to make the *Delta Plan's* 14 policies legally enforceable. The regulations were approved by the Office of Administrative Law (California Code of Regulations, Title 23, Sections 5001-5016) and became legally effective on September 1, 2013. In May and June 2013, several public water agencies, environmental organizations, and the City of Stockton filed seven separate lawsuits challenging the *Delta Plan*, the programmatic EIR, and the associated regulations. The cases were consolidated in Sacramento County Superior Court.

In June 2016, the court ruled that the *Delta Plan* did not comply with the Delta Reform Act (2009), failed to promote options for conveyance and storage, and failed to include quantified or measurable targets for achieving reduced Delta reliance. The Delta Stewardship Council and the State and federal water contractors filed appeals in November and December 2016 with the Third District Court of Appeals. The filing of the appeals means that the lower court's judgment vacating the *Delta Plan* is automatically stayed pending the outcome of the appeals.

In January 2017, the Court of Appeals approved a settlement between the City of Stockton and the Delta Stewardship Council, meaning that Stockton will not be participating in the case on appeal. The stipulated judgment resolved Stockton's lawsuit in exchange for some assurances regarding the application and meaning of *Delta Plan* Policy WR P1 (Reduce Reliance on the Delta through Improved Regional Water Self-Reliance, [Title 23, California Code of Regulations Section 5003]) related to Stockton General Plan definitions and future public works projects.

The parties in the litigation earlier agreed by stipulation to preserve the petitioners' California Environmental Quality Act claims while the Delta Stewardship Council takes steps to remedy the deficiencies identified in the lower court ruling.

Hydropower

Oroville Facilities Relicensing—Federal Energy Regulatory Commission Project No. 2100

***Butte County, et al. v. California Department of Water Resources* (C071785, application pending).** DWR is seeking renewal of the Federal Energy Regulatory Commission license for its hydroelectric generation facilities at Oroville (Project No. 2100). DWR filed its relicensing application in 2005. The original 50-year Federal Energy Regulatory Commission license expired on January 31, 2007. In February 2008, the Federal Energy Regulatory Commission authorized continued operation by issuing an annual license—under the same terms and conditions—that renews each year until the Federal Energy Regulatory Commission issues a new license. (Details of the license renewal negotiations and earlier litigation are described in previous bulletins.)

In January 2012, the court denied the petitioners' requests to set aside the EIR prepared by DWR and upheld the award to DWR of $675,087 in charges for the administrative record required to proceed with the suit. The court found that the EIR was legally adequate and noted that the record preparation complied with the California Environmental Quality Act and was reasonable and necessary. The petitioners, Butte and Plumas counties, appealed the judgment in August 2012, and the appellate briefs were filed in 2013 and 2014.

In 2016, the court of appeals ordered the parties to file supplemental briefs on the issue of whether federal law, United States Code: Federal Power Act, preempts State law (California Environmental Quality Act). All parties filed briefs, and Friends of the River and the California Sportfishing Protection Alliance filed amicus curiae briefs. The plaintiffs/appellants and the defendant/respondent filed a response to the amicus curiae briefs. In 2017, appellants filed additional citations for oral arguments and requested oral arguments be scheduled.

Oroville Spillway

***Bechtel, et al. v. California Department of Water Resources* (Superior Court Butte County Case No 17 CV. 00298).** On August 25, 2017, Francis Bechtel, et al. v. California Department of Water Resources was filed. This is a class action lawsuit on behalf of the approximately 188,000 residents of Oroville, Marysville, Yuba City, and other areas near the Feather River who were ordered to evacuate their homes on February 12, 2017, in response to the "failing emergency spillway" at the Oroville Dam. Plaintiffs seek damages for loss of use of their property, diminution in value, relocation expenses, and other incidental and consequential damages, including litigation costs and injunctive relief. DWR has filed a petition seeking coordination with other Oroville cases and is currently awaiting a venue decision from the Butte County Superior Court.

***Whitney v. California Department of Water Resources* (Superior Court Tehama County Case No. 17C100209).** On October 6, 2017, plaintiffs George and Virginia Whitney, owners of an RV park in Corning, California, filed a lawsuit against DWR alleging flood damages caused by the Oroville Dam spillways incident.

***Mission Springs Water District v. Desert Water Agency* (Superior Ct., Riverside County; Case No. PSC 1600676).** In March 2017, Mission Springs Water District amended its petition for writ of mandate and writ

of administrative mandate against Desert Water Agency to name DWR as a real party in interest. In the petition, originally filed in February 2016, Mission Springs challenged the decision of Desert Water Agency to elect to become a Groundwater Sustainability Agency in an area that Mission Springs claimed to be outside the statutory boundaries of Desert Water Agency. Under the Sustainable Groundwater Management Act, Desert Water Agency is deemed to be an exclusive Groundwater Sustainability Agency, but only within its statutory boundaries.

California WaterFix State Litigation

The following litigation regarding CWF filed in state court have coordinated in one proceeding.

California Environmental Quality Act

***California Department of Water Resources Environmental Impact Cases* (Super. Ct. Sacramento County, Coordinated Proceedings Special Title (Rule 3.550). Judicial Council Coordination Proceeding No. 4942).** In July 2017, DWR certified the EIR, approved CWF (Alternative 4a), and filed a notice of determination. In August 2017, several different petitioners filed petitions for writ of mandate in four different superior court venues within the State of California challenging DWR's project approval. The cases have been coordinated in Sacramento County Superior Court.

Validation

***California Department of Water Resources v. All Persons Interested in the matter of the Authorization of Revenue Bonds, the Issuance, Sale and Delivery of CWF's Revenue Bonds Series A*.** On July, 21, 2017, DWR filed a validation action in Sacramento County Superior Court to confirm the validity of a proposed financing approach for CWF. Numerous entities and organizations supporting and opposing the CWF have filed answers to this action, which is in the pretrial phase.

California Endangered Species Act: Incidental Take Permit

***County of San Joaquin, et al., v. California Department of Water Resources and California Department of Fish and Wildlife* (Case No. 34-2017-80002677); *CWF Bay.Org et al. v. California Department of Fish and Wildlife and Department of Water Resources* (Case No. 34.2017.80002695); *North Delta Water Agency v. California Department of Fish and Wildlife and DWR as Real Party in Interest* (Case No. 34-2017-80002725).** After the Department of Fish and Wildlife issued an incidental take permit for CWF to DWR on July 28, 2017, three lawsuits were filed that challenged the adequacy of the incidental take permit. The incidental take permit provided coverage for incidental take to DWR for construction and operation of CWF for several State-listed species found in the Sacramento-San Joaquin Delta (Delta).

In November 2017, the cases were ruled to be related, designated complex cases, and assigned in Sacramento County Superior Court. The Department of Fish and Wildlife is in the process of preparing the administrative record for the litigation.

A case management conference for the coordinated proceeding was scheduled for November 11, 2017.

California WaterFix Federal Litigation

Endangered Species Act: Biological Opinions

***Bay.Org, et al., v. Ryan Zinke, et al.* (Case No. 4:17-cv-3739-YGR); *Golden Gate Salmon Association, et al., v. Wilbur Ross, et al. (*Case No. 4:17-cv-3742-YGR).** On June 29, 2017, environmental groups and water districts filed two lawsuits in federal court challenging the adequacy of the biological opinions for CWF. The claims allege that the federal fish

agencies did not adequately analyze the impacts of CWF operations on the listed endangered species in the Delta.

The U.S. Fish and Wildlife Service's biological opinion on CWF analyzed potential impacts to 16 Endangered Species Act listed species and critical habitat and determined that CWF was not likely to jeopardize the continued existence of the species nor destroy or adversely modify the critical habitats.

The National Marine Fisheries Service's biological opinion on CWF analyzed potential impacts to the listed winter-run and spring-run salmon and their critical habitat and determined that CWF was not likely to jeopardize the continued existence of the species nor destroy or adversely modify the critical habitats.

On August 30, 2017, the cases were transferred to the Eastern District Court of California. On October 10, 2017, the Eastern District Court granted motions of DWR, the State water contractors, and The Metropolitan Water District of Southern California to intervene in the cases in support of the biological opinions.

Also in October 2017, the court issued a schedule for preparing the administrative records for the cases in spring 2018 and for filing briefs in the fall and winter of 2018, with the schedule dates for the National Marine Fisheries Service's case preceding the U.S. Fish and Wildlife Service case by about 2 months. The federal agencies are in the process of preparing the administrative record.

California WaterFix State Water Resources Control Board Proceedings

DWR submitted its application to the State Water Board for a change of point of diversion for the CWF project on May 31, 2016. The evidentiary hearing in response to this application was scheduled in two parts, with the first part focusing on impacts to water user rights and the second part focusing on fish and wildlife. These evidentiary hearings are necessary for the State Water Board to obtain pertinent evidence to ascertain whether it should approve the joint (DWR and Bureau of Reclamation) petition to add three new points of diversion/rediversion to specified water rights permits in connection with CWF. There were more than 70 named parties at the close of 2017, including water districts, state agencies, environmental groups, counties, cities, and private individuals. Part 1 of the proceedings commenced on December 2016 and was completed in June 2017.

In August 2017, the State Water Board granted DWR's request to establish a schedule for Part 2 of the hearing. All parties were required to submit their cases-in-chief by November 30, 2017, with a prehearing conference on October 19, 2017.

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)* (C078249 and C080572, app. pending*); Central Delta Water Agency, et al. v. Kern County Water Agency et al., California Department of Water Resources 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. California Department of Water Resources (*Super. Ct. Kern County, No. S-1500-CV-270635-KCT/Super. Ct. Sacramento County, No. 34-2010-80000703) (Rosedale Rio Bravo).** After lengthy negotiations conducted in Monterey, the Monterey Agreement was signed in December 1994 by DWR, five SWP water contractors, and the Central Coast Water Authority. The agreement contained principles to guide the amendment of SWP

water contracts to address water allocation and issues related to SWP management and financing.

From 1995 to 1999, 27 of the 29 SWP water contractors executed Monterey Amendments. The Monterey Agreement EIR was certified in October 1995, and in December 1995, a lawsuit was filed (*Planning and Conservation League v. DWR*) challenging the EIR. A new "Monterey Plus EIR" was prepared, certified in 2010, and challenged in court (*Central Delta I, Central Delta II*, and *Rosedale-Rio Bravo*).

In November 2014, the court ordered DWR to decertify the Monterey Plus EIR and revise and certify it by December 31, 2015 (*Central Delta I* and *Rosedale-Rio Bravo*). In October and December 2014, appeals were filed in *Central Delta I*. On August 10, 2015, the court granted DWR's request for an extension and set a new deadline of June 30, 2016, for completion of a revised Monterey Plus EIR. (For more information about the Monterey Agreement, the Monterey amendments, and related litigation, see Bulletins 132-95 through 132-04 and 132-10 through 132-17.)

In April 2016, a draft revised Monterey Plus EIR was released, and in May 2016, at DWR's request, the court extended the deadline for completion of the revised Monterey Plus EIR to September 28, 2016. In September 2016, DWR certified the revised Monterey Plus EIR, filed a notice of decision, and returned the writ to the court. In 2017, there were no changes or new developments for the Monterey Amendment litigation.

For more information about the revised Monterey Plus EIR, see Chapter 9, Water Contracts and Deliveries.

***Center for Food Safety, et al. v. California Department of Water Resources* (Super. Ct. Sacramento County, No. 34-2016-800002469) (C086215 app. pending).** After DWR certified the revised Monterey Plus EIR and returned the writ to the court in September 2016, the Center for Food Safety, Center for Biological Diversity, California Sportfishing Protection Alliance, California Water Impact Network, Central Delta Water Agency, and South Delta Water Agency filed a new lawsuit on October 21, 2016, challenging the revised Monterey Plus EIR. In October 2017, the court denied petitioners' petition for writ of mandate and discharged the writ against DWR. In December 2017, petitioners filed an appeal at the Third District Court of Appeals.

***City of Antioch v. California Department of Water Resources* (Case No. 34-2017-00218154).** On August 28, 2017, the City of Antioch (Antioch) filed a complaint against DWR for breach of contract. A provision of the 1968 water supply agreement between Antioch and DWR provides that the State will not grant compensation for damages caused by the SWP to other Delta entities that would be "substantially more favorable" than the terms of the 1968 agreement with Antioch. In 2016, DWR entered into an agreement with Contra Costa Water District that Antioch alleges violates this provision.

DWR filed a demurrer on December 15, 2017, arguing that Antioch failed to state facts sufficient to constitute a cause of action.

Construction Arbitration

***D.A. McCosker Construction Co., dba Independent Construction Company v. California 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. A 32-day arbitration commenced on January 11, 2016. The arbitrator issued a decision on November 21, 2016, finding DWR responsible for $1.5 million of Independent Construction Company's contract claims.

In April 2017, DWR filed a petition with the Sacramento County Superior Court to vacate the arbitration award due to legal error by the arbitrator. On July 12, 2017, the court vacated the award and remanded the case back to the arbitrator to address three separate issues. In December 2017, the parties filed additional briefs.

***Blocka Construction Inc. v. Department of Water Resources* (OAH/PWCA No. A-0032-2016).** Blocka was awarded a contract for upgrades to the pumping control systems in the Sutter Bypass in the amount of just over $5 million. Following completion in November 2015, Blocka asserted claims in the amount of approximately $6.5 million, claiming that significant design changes caused extended delays in completing the project. DWR disputed responsibility for the delays and responded by asserting liquidated damages due to the delay. Prior to engaging in extensive discovery, the parties agreed to mediation. In April 2017, after two days of negotiations, the matter was settled for $2.85 million.

***Spiniello Companies v. Department of Water Resources* (OAH/PWCA No. A-0016-2016).** Spiniello Companies, which completed the Mentone Pipeline project and related East Branch Extension facilities, filed an arbitration complaint against DWR in July 2016, seeking approximately $16 million in damages. The complaint alleged differing site conditions as well as damages for owner-caused delay due to a flash flood, among several other claims. DWR is contesting the matter and has withheld $4.5 million due to the contractor's late completion of the project. In September 2017, discovery started with the exchange of hundreds of thousands of pages of project and environmental records in anticipation of a two-day mediation. If the case is not resolved through mediation, the case will proceed to an arbitration hearing.

Clean Water Act

***Catskill Mountains Chapter of Trout Unlimited, Inc., et al. v. United States Environmental Protection Agency, et al.* (N.Y.Dist.Ct., No. 7:08-CV-05606-KMK, app. pending).** A number of environmental groups, private entities, and governmental agencies controlling or utilizing water filed an action challenging the application of the U.S. Environmental Protection Agency's Water Transfer Rule under the Clean Water Act. The Clean Water Act 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 Environmental Protection Agency has applied the Clean Water Act provisions to transfers of water between navigable bodies of water and not to "water transfers." According to the Clean Water Act, "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 Environmental Protection Agency Water Transfer Rule to be inconsistent with the Clean Water Act. The decision was appealed. As the outcome of the case will have a direct and material effect on the operations of the SWP, DWR filed an amicus curiae brief in June 2014 to advise the court of relevant information and arguments the court might wish to consider. Following oral arguments on December 1, 2015, the appellate court reversed the trial court and

reinstated the Water Transfer Rule. On March 6, 2017, a petition for rehearing was filed by the plaintiffs.

Drought-Related Actions

***San Joaquin River Exchange Contractors Water Authority, et al. v. State of California, SWRCB, et al.,* California Department of Water Resources and United States Bureau of Reclamation, Real Parties in Interest (Super. Ct. Sacramento County, No. 34-2016-80002277).** In 2014 and 2015, due to severe drought, the Governor issued various executive orders, declarations, and emergency proclamations directing 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 2015, DWR and Bureau of Reclamation submitted temporary urgency change petitions to the State Water Board, requesting temporary modification of certain requirements in Water Right Decision 1641 to allow management of reservoir releases on a pattern that would conserve upstream storage for fish and wildlife protection and provide for Delta salinity control later in the year while providing critical water for supply needs.

The State Water Board issued orders in response to the temporary urgency change petitions. The State Water Board received numerous comments and objections to the temporary urgency change petition orders and 10 petitions for reconsideration. In December 2015, the State Water Board issued water right order WR 2015-0043 affirming the temporary urgency change petition orders and renewing them for another 180 days. The order also denied in part and granted in part the petitions for reconsideration. A petition for writ of administrative mandamus and complaint for declaratory relief was filed January 14, 2016.

For 2017, there are no new developments or changes in this case.

DWR and U.S. Department of the Interior and Reclamation are named as real parties in interest. The issues include impacts to fish and wildlife and the exchange contractors' and others' water supply, and whether the State Water Board acted outside its authority in authorizing the changes specified in the temporary urgency change petition orders.

***California Water Curtailment Cases* (Super. Ct. Santa Clara County, No. 1-15-CV-285182, Coordinated Proceedings Special Title (Rule 3.550), Judicial Council Coordination Proceeding No. 4838).** The following cases were coordinated into this proceeding: (1) *Byron-Bethany Irrigation District v. California State Water Resources Control Board, et al.* (Super. Ct. Contra Costa County, No. N150967); (2) *West Side Irrigation District, Central Delta Water Agency, South Delta Water Agency, and Woods Irrigation Company v. California State Water Resources Control Board, et al.* (Super. Ct. Sacramento County, No. 34-2015-80002121); (3) *Banta-Carbona Irrigation District v. California State Water Resources Control Board, et al.* (Super. Ct. San Joaquin County, No. 39-2015-00326421); (4) *Patterson Irrigation District v. California State Water Resources Control Board, et al.* (Super. Ct. Stanislaus County, No. 2015307); (5) *San Joaquin Tributaries Authority, Oakdale Irrigation District, and South San Joaquin Irrigation District v. California State Water Resources Control Board, et al.* (Super. Ct. Stanislaus County, No. 2015366). On January 17, 2014, the Governor proclaimed a state of emergency to address the record dry conditions around the state. On the same day, as directed by the proclamation, the State Water Board issued a statewide notice of water shortages and potential for future curtailment of water right diversions. If necessary, the State Water Board would curtail diversions of water on a water right priority basis to prevent unreasonable diversion or use of water so that appropriate minimum amounts of water would be available for public trust needs for minimum flows for State- and federally-

listed anadromous fish, to protect senior water rights, and for minimum health and safety needs.

In May 2014, the State Water Board issued curtailment notices. A statewide notice of water shortages and potential for future curtailment of water right diversions was issued again in January 2015, followed by curtailment notices issued in April, May, and June 2015. In July 2015, the State Water Board began rescinding the curtailment notices and all notices were rescinded by the end of the year.

In June and September 2015, five complaints were filed by different water districts in several different county superior courts. The plaintiffs requested a writ of mandate, declaratory and injunctive relief, and damages. The cases were consolidated in Santa Clara County Superior Court. After the State Water Board's first round of demurrers, which were partially granted (allowed: issues related to due process violations and the scope of the State Water Board's authority; not allowed: takings claims, claims for declaratory and injunctive relief, and the Delta pool) the plaintiffs amended their complaints, and the State Water Board filed another round of demurrers. These demurrers and motions by plaintiffs were head on April 28, 2017. On May 4, 2017, the court ruled on all demurrers and motions in favor of the State Water Board. The first phase of the trial was scheduled for January 26, 2018. DWR has intervened in the litigation, joining in parts with the State Water Board and the State water contractors.

Chapter 7
Water Supply Development and Reliability

Grizzly Dam and Lake Davis located on Big Grizzly Creek in Plumas County.

Significant Events in 2017

On April 7, 2017, the Governor issued Executive Order B-40-17, which rescinded January 2014 and April 2014 drought emergency proclamations and four additional executive orders issued in 2014 and 2015. Executive Order B-40-17 builds on actions and includes mandates specified in Executive Order B-37-16 (issued on May 9, 2016).

Information in this chapter was contributed by the State Water Project Analysis Office, the Division of Integrated Regional Water Management, the Division of Statewide Integrated Water Management, and the Bay-Delta Office.

The Department of Water Resources (DWR) works to improve the reliability of State Water Project (SWP) water supplies and the long-term water contract annual Table A water allocations delivered to SWP water contractors. DWR is engaged in planning activities to develop additional water supplies and storage capacity.

Developing new water supplies and storage projects that are economically, environmentally, and technically sound, while satisfying institutional requirements and political concerns, presents significant challenges. Many concerns center on possible adverse effects that additional storage and delivery facilities may have locally and on the Sacramento-San Joaquin Delta (Delta). In the SWP conveyance system, the Delta is the critical link between water supplies in the Sacramento Valley and deliveries to the rest of the Central Valley and Southern California. DWR works with State and federal governments, local agencies, and public interest stakeholder groups to ensure water supply reliability now and in the future.

Supply Development and Reliability

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. This includes the following activities:

- facilitating transfers between SWP water contractors and other agencies, including Central Valley Project (CVP) contractors
- funding studies on the Giant Garter Snake, a protected species known to inhabit rice growing regions of the Sacramento Valley, and on rice evapotranspiration, to better understand issues related to the transfer of water made available by crop idling
- supporting the planning and implementation of local and regional conjunctive-use projects in the Sacramento Valley
- constructing, operating, and maintaining groundwater and land subsidence monitoring networks to detect potential impacts caused by groundwater substitution transfers and other groundwater management activities in the Sacramento Valley
- developing analytical tools to improve estimates on the effects of streamflow depletion due to groundwater substitution transfers on the SWP
- developing analytical tools to support and enhance sustainable groundwater management in the Sacramento Valley
- assisting with the development and implementation of restoration projects in the Feather River watershed to reduce sedimentation in Lake Oroville and preserve watershed storage capacity
- 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. For more information, see the sidebar, Transfer and Exchange Evaluations.

For information about 2017 water transfers, see Chapter 9, Water Contracts and Deliveries.

Transfer and Exchange Evaluations

An important element of any water transfer is to determine what quantity of water, if any, is transferable.

The transferability of water depends on many factors including the source of the water being transferred, what actions are taken to make water available, when the water can be made available, and the type of water rights the existing user holds. Several California Water Code (CWC) provisions authorize temporary transfers of water under rights issued by the State Water Resources Control Board (State Water Board) (appropriative water rights issued after 1914) and placed conditions on the transfers to protect those not involved in them.

Short-term transfers, of less than one year, are authorized under CWC Sections 1725–1732. Long-term transfers, for periods greater than one year, are authorized by CWC Sections 1735–1737. Other CWC sections specify conditions under which water can be transferred and legal protections for those transferring water.

Transfers based on water rights obtained before 1914 are not under State Water Board jurisdiction but must comply with the requirements of the California Environmental Quality Act (CEQA) and possibly the National Environmental Policy Act (NEPA).

The CWC sections noted above contain provisions intended to protect other legal users of water and fish and wildlife from the possible adverse effects of a water transfer. These provisions reflect the concept that changes can be made to the authorized place and purpose of use or point of diversion of a water supply as long as there is no injury to others as a result of the change (the "no injury rule"). The no injury rule in State water law is intended to protect other legal users from the potential expansion of water use beyond what would have been consumed by the original users in the absence of the transfer. Hence, under the no injury rule, only "new water" is transferable (i.e., water added to the downstream water supply only as a result of the transfer). To protect other users, a transfer would not be authorized to the extent that it would reduce the amount or timing of water that would otherwise be available to downstream users, regardless of the water right priority of those users.

CWC Section 1810(d) requires the Department of Water Resources (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 State Water Project (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 reduce consumptive use of water. Because transfers may result in direct impacts and third-party impacts (impacts to parties not involved in the transfer), certain CWC provisions were enacted to limit potential impacts. For example, since additional groundwater pumping from a groundwater substitution project may potentially affect other groundwater users in the area, CWC Section 1745.10 requires that the groundwater substitution project: (1) be consistent with a groundwater management plan adopted pursuant to State law for the affected area or (2) if a management plan has not been adopted, the transfer project proponent determines the transfer would not create or contribute to conditions of long-term overdraft in the affected groundwater basin.

Injury can also occur due to streamflow depletion induced by increased pumping from wells for groundwater substitution transfers. Consequently, to mitigate possible impacts from groundwater substitution transfers, DWR assesses a streamflow depletion factor, which represents an estimate of the potential effects of the additional groundwater pumping on the surface water system. Each type of transfer has its own set of potential impacts that must be evaluated to protect parties not involved in the transfer.

With the exception of short-term transfers under CWC Section 1725 et seq. (which provides for an expedited process for water transfers based on rights issued by the State Water Board), water transfers are subject to compliance with CEQA and, possibly, NEPA. The CEQA/NEPA and State Water Board 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 State Water Board to expedite the review and approval of water transfer proposals and suspended the provisions of CEQA for actions taken by DWR related to transfers. The proclamation did not suspend CEQA for local agencies.

Staff in DWR's State Water Project Analysis Office, Division of Operations and Maintenance, Division of Integrated Regional Water Management, and the Office of the Chief Counsel evaluate proposed water transfers to determine whether the transfers will impact the SWP, other water users, the environment, or the area from which the water will be transferred. In 2016, DWR and the Bureau of Reclamation issued a white paper providing technical information about water transfers requiring use of water project facilities.

SWP Delivery Capability Report

The *State Water Project Final Delivery Capability Report 2015* was released in July 2015. The next update (*Report 2017*) is expected in 2018.

Delivery capability depends on three factors:

(1) the availability of water at the source
(2) the ability to convey water from the source to the desired point of delivery
(3) the level of demand

To assist local water supply agencies' plans for reliable supplies, assess their overall water supply needs, and determine the amount of deliveries expected from the SWP, the report presented the existing overall delivery capability of the SWP system and the allocation of that capacity to each of the contractors under a range of hydrologic conditions. The 2015 report and its appendices provided information on the annual SWP deliveries in the 10-year historical sequence preceding the publication date (2005–2014); simulation model results on the current (2015) level of development; and a range of future conditions (2035 level of development and climate change with varying regulations and facilities).

In order to provide a conservative estimate of water delivery capability for current conditions, no planned facility improvements to the SWP infrastructure were assumed, and the analysis of the ability to convey water from the source to the points of delivery assumed only current SWP facilities, regulations, and water rights permits existing in 2015. The level of demand for SWP water assumed the maximum Table A amounts and reflected current trends in demand from SWP water contractors.

Executive Orders B-37-16 and B-40-17

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

The Governor issued Executive Order B-37-16 on May 9, 2016, to establish long-term water conservation measures by building on existing temporary statewide emergency water restrictions. DWR participated with five State agencies tasked with implementation of the order. The five agencies will establish a long-term water conservation framework that will be part of the implementation of the California Water Action Plan.

On April 7, 2017, the Governor issued Executive Order B-40-17, which rescinded the emergency proclamations (January and April 2014) and four drought-related executive orders issued in 2014 and 2015. The order lifted the drought emergency, except in Fresno, Kings, Tulare, and Tuolumne counties, and built on Executive Order B-37-16 mandates. Additionally, on April 7, 2017, five State agencies released *Making Water Conservation a California Way of Life*, the framework for implementing the four inter–related objectives in Executive Order B-37-16: using water more wisely, eliminating water waste, strengthening local drought resilience, and improving agricultural water use efficiency and drought planning.

SWP Future Water Supply Program

The Future Water Supply Program's goal is to improve and protect the water supply reliability of the SWP while protecting the environment and other legal users of water. The program consists of two main components: Sacramento Valley groundwater and upper Feather River watershed management.

The Sacramento Valley groundwater component provides technical support for the Lower Yuba River Accord, monitors other groundwater and conjunctive-use projects, and assesses conditions of the Sacramento Valley Groundwater Basin that may affect SWP yield. The four primary objectives of the Sacramento Valley groundwater component are to (1) collect, analyze, and report data to determine the effects of groundwater substitution transfers on the SWP; (2) analyze and report on groundwater substitution transfers that use SWP facilities; (3) monitor groundwater management planning and implementation activities that may affect SWP yield; and (4) develop and utilize analytical tools to support the estimation of streamflow depletion due to groundwater substitution transfers and enhance 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 2017 to implement and enhance monitoring activities for assessing the immediate and long-term hydrologic effects of these actions.

SWP Water Rights Activities

Water Right Permits and Licenses

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 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 and license specifies the authorized maximum quantities of direct diversion and diversion to storage, point of diversion, place of use, and purpose of use. A change in 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 State Water Resources Control Board (State Water Board) approval.

Diversion and use of SWP water throughout the SWP service area continues to be developed. However, due to a number of factors, including operational and regulatory constraints, water deliveries have not yet reached the maximum quantities anticipated.

Petition for Temporary Change to Consolidate Place of Use

On April 20, 2017, DWR and the Bureau of Reclamation (Reclamation) submitted a petition for temporary change under CWC Section 1725, et seq., to the State Water Board. In the petition, DWR and Reclamation requested changes to their water right permits that would temporarily consolidate the SWP and CVP authorized places of use.

Although hydrologic conditions in 2017 improved over the previous dry years, part of California still experienced severe drought conditions, especially south of the Delta. The consolidated place of use enhanced operational flexibility and reduced energy

consumption for both SWP and CVP without increasing Delta exports and injuring other legal water users. The State Water Board issued an order on June 8, 2017, approving the requested changes; the order remains in effect for 1 year.

For more information about transfers and exchanges, please see Chapter 9, Water Contracts and Deliveries.

Water Right Change Petition for California WaterFix

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

On August 25, 2015, DWR and Reclamation submitted a joint petition to the State Water Board requesting changes in SWP and CVP water right permit conditions. The petition proposes adding points of diversion of water for the SWP and CVP associated with California WaterFix. The State Water Board change petition hearing for California WaterFix that began in July 2016 continued in 2017.

For additional information about California WaterFix, see Chapter 3, Environmental Programs.

Water Quality Control Plan for the San Francisco Bay/ Sacramento-San Joaquin Delta Estuary

The Delta and Suisun Marsh are located where California's two major river systems, the Sacramento and the San Joaquin, converge and flow westward to meet incoming seawater tides flowing through the San Francisco Bay. The watershed of the Delta is a critical source of water supply for much of California. It's 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 Delta.

Water originating in the Delta watershed is delivered to areas within the watershed and to areas south and west of the Delta. The largest water distribution systems that release stored water into the Delta and directly divert water from the Delta are the SWP, operated by DWR, and the federal CVP, operated by Reclamation. Numerous other water storage and diversion projects also influence Delta inflows, outflows, water quality, and other hydrologic characteristics.

The State Water Board regulates the quality of water in the Delta, the diversion and use of water within the Delta, and the diversion of water from the Delta for water supply. The State Water Board 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 Delta. The State Water Board establishes water quality objectives to protect a variety of beneficial uses of water. The objectives are contained in a water quality control plan adopted by the State Water Board.

The State Water Board 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). Water Right Decision 1641, adopted by the State Water Board in 1999, implements the objectives of the Bay-Delta Plan by placing conditions on water right permits and licenses for the SWP and CVP that require

the projects to meet certain objectives in the Bay-Delta Plan.

2006 Bay-Delta Plan Review

CWC Section 13240 requires that the water quality control plan be periodically reviewed. Federal Clean Water Act Section 303(c) (33 U.S.C. Section 1313(c)) requires a triennial review of State water quality "standards," as defined in the act. Formal review of the 2006 Bay-Delta Plan began in October 2008. The review 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.

The review and amendment process for the 2006 Bay-Delta Plan includes the following components:

- identifying elements that may need to be amended or new elements that may need to be added
- preparing any amendments to or revisions of the entire water quality control plan
- State Water Board's adoption of some or all of the amendments or revisions

State Water Board information-gathering activities may affect the scope of the 2006 Bay-Delta Plan review and may include evidentiary hearings on critical issues concerning the Delta's ecology.

In 2017, State Water Board continued its review and update of the 2006 Bay-Delta Plan.

On September 15, 2016, the State Water Board released the draft revised *Substitute Environmental Document in Support of Potential Changes to the Water Quality Control Plan for the San Francisco Bay/Sacramento-San Joaquin Delta Estuary: San Joaquin River Flows and Southern Delta Water Quality* (Substitute Environmental Document).

The State Water Board proposed to update two elements of the 2006 Bay-Delta Plan.

(1) San Joaquin River flow objectives for the protection of fish and wildlife: the flow element of the proposed plan update would increase the required flows left in the rivers and would change the area currently protected by flow requirements by adding compliance locations on the Stanislaus, Tuolumne, and Merced Rivers, instead of only on the San Joaquin River at Vernalis.

(2) Southern Delta salinity objectives for the protection of agriculture: the southern Delta salinity element of the proposed plan update would increase salinity objectives while generally maintaining existing conditions and changing compliance locations.

The State Water Board is also proposing to update the program of implementation to achieve these objectives, which will include monitoring and special studies to fulfill information needs and to evaluate the effectiveness of the new objectives and their implementation.

The revised Substitute Environmental Document and associated appendices were prepared in compliance with the California Environmental Quality Act, the California Water Code, and other applicable State and federal requirements. The document included an analysis of the expected environmental, water supply, economic, and hydropower effects of the Lower San Joaquin River flow and southern Delta salinity alternatives. The public comment period ended March 17, 2017. The State Water Board held five days of public hearings beginning in November 2016 and ending in January 2017.

For more information about the water quality control plan, see Chapter 4, Water Quality Programs.

Storage Program

Due to lack of funding, DWR is no longer the State lead agency for the Storage Program. 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. DWR continues to participate in these planning efforts in a limited manner as described below.

In 2014, California voters passed Proposition 1, which included $2.7 billion for investments in water storage projects. The California Water Commission, through the Water Storage Investment Program, will allocate funding for the public benefits of these projects, including ecosystem and water quality improvements, flood control, emergency response, and recreation. In 2017, the California Water Commission received 12 applications.

Surface Storage Investigations

Surface storage investigations are developing environmental documentation and feasibility studies for four of the five surface storage projects identified for further study in the CALFED record of decision. The four projects are discussed below. Efforts in 2017 were focused on applying for funding from the Water Storage Investment Program administered by the California Water Commission.

Los Vaqueros Reservoir Expansion Project

Contra Costa Water District owns and operates the 160,000 acre-foot Los Vaqueros Reservoir just southwest of the Delta. The Los Vaqueros Reservoir Expansion Project involves analysis of increasing the size of the reservoir to 275,000 acre-feet (increasing the storage by 115,000 acre-feet).

The project objectives are to (1) develop water supplies for environmental water management; (2) 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.

Contra Costa Water District and local, State, and federal partners continue to study the feasibility of a 275,000 acre-foot expansion alternative in the context of other Delta initiatives to improve Delta conveyance and Delta fisheries protection, including long-term programs being explored in California WaterFix and California EcoRestore. In August 2017, Contra Costa Water District submitted an application for funding to the Water Storage Investment Program.

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. Expansion of Shasta Lake is not eligible for funding under the Water Storage Investment Program.

North-of-the-Delta Offstream Storage Investigation

The Sites Project Authority 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.

In 2016, the SWP provided funding for DWR to continue participation in the investigation. Funding has been provided for transition support from the DWR-led study to the locally-led study and to evaluate potential effects of the Sites project implementation on the SWP. This may include a potential Sites project coordinated operations plan and potential benefits to participating SWP water contractors and Bay-Delta water quality and ecosystems. In 2017, the Sites Joint Powers Authority submitted an application to the Water Storage Investment Program for funding. Also, project partners released public draft environmental and feasibility reports in 2017.

Upper San Joaquin River Basin Storage Investigation

Reclamation, in coordination with other local, State, and federal agencies, is evaluating opportunities for increased storage in the upper San Joaquin River watershed. The objectives of the Upper San Joaquin River Basin Storage Investigation are to (1) increase water supply reliability and operational flexibility in the CVP's Friant Division, other San Joaquin Valley areas, and other regions; and (2) enhance water temperature and flow conditions in the San Joaquin River in support of San Joaquin River restoration efforts. Other opportunities include additional hydropower generation, reduction of flood damages, water quality improvements, and recreation site development.

In 2017, the San Joaquin Valley Water Infrastructure Authority submitted a Water Storage Investment Program application for funding for the Temperance Flat Reservoir Project.

Delta Conveyance Program

The Delta Conveyance Program previously consisted of projects proposed in the North and South Delta. As a result of the efforts associated with the California WaterFix 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 SWP Delta Compliance Program addresses regulatory requirements under the National Marine Fisheries Service's and U.S. Fish and Wildlife Service's biological opinions and the California Department of Fish and Wildlife's incidental take permit for the CVP and SWP Long-term Operations Criteria and Plan. For more information about the SWP Delta Compliance Program see Chapter 2, Delta Resources.

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 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 Lower Yuba River Accord is based on three agreements: (1) a water purchase agreement between Yuba County Water Agency and DWR; (2) conjunctive use agreements between Yuba County Water Agency and its member units; and (3) a fisheries agreement between DWR, California Department of Fish and Wildlife, and several environmental groups, with U.S. Fish and Wildlife Service and National Marine Fisheries Service signing a letter of support (but not signatory to the Agreement).

In 2017, the Sacramento Valley Water Year Hydrologic Classification (Sacramento Valley 40-30-30 Index) was wet and the Delta was in excess conditions throughout most of the transfer season. Thus, there was no Component 1, 2, or 3 water, and no Component 4 water was purchased by the participating SWP and CVP contractors.

A shortfall of 869 acre-feet of prepaid Component 1 water from 2015 remains (see Bulletin 132-16, Chapter 3, Environmental Programs) and must be repaid by Yuba County Water Agency in the next water year that is not classified as dry or critical.

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

Chapter 8
Water Supply

The first manual snow survey of 2017, on January 3, at Phillips Station, California.

Significant Events in 2017

Water year 2016–2017 turned out to be an above average year for precipitation and mountain snowpack. It marked a welcome increase after five consecutive years of below average mountain snowpack. The state received precipitation at 157 percent of average in water year 2016–2017 compared to 104, 74, and 56 percent of average in water years 2015–2016, 2014–2015, and 2013–2014, respectively. Overall, annual precipitation, snow, and runoff followed a decreasing gradient from north to south. The Northern Sierra 8-Station Precipitation Index had 94.7 inches of precipitation, which represents 189 percent of the index average. Rainfall in the months of December, January, and February represented 44 percent of this total. The San Joaquin 5-Station Precipitation and Tulare Basin 6-Station Precipitation indices totaled 72.7 inches (178 percent of average), and 46.9 inches (160 percent of average), respectively. The statewide mountain snowpack on April 1 was 163 percent of average, but peaked a few weeks later on April 17 at 170 percent (47.8 inches of snow water equivalent) of the April 1 average.

Statewide river runoff totaled 217 percent of average in the 2016–2017 water year, which was a dramatic increase over the previous water year's total of 97 percent of average. The Feather River runoff totaled 231 percent of average. Water year runoff totals for the Sacramento River Region (SRR), San Joaquin 4 Rivers (SJR), and Tulare Lake Region (TLR) were 212, 254, and 239 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 "wet," based on observed data for water year 2016–2017.

A net increase in average reservoir storage was realized in water year 2016–2017. The year began at 82 percent of average on October 1 and finished at 120 percent of average at the end of September.

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. The water supply indices are 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 2016–2017

Precipitation

California experienced above average rainfall (164 percent of average) for the water year, and regionally, precipitation varied widely. Figure 8-1 presents water year precipitation for the various regions of the state.

Table 8-1 presents monthly precipitation totals for water year 2016–2017 at various gauges located throughout the state, listed north to south. Statewide, the wettest months, as measured by inches of precipitation, were January and February when all stations in the list received well over average precipitation. Grant Grove measured about 432 percent of average in January, while Blue Canyon measured 330 percent of average in February.

October was warmer-than-average and wet for California. The average precipitation for the month was 283 percent of average and the third wettest October in 122 years. November was a warmer-than-average and drier-than-average month receiving about 70 percent of the statewide precipitation average.

Figure 8-1 **Statewide Precipitation by Hydrologic Region, 2016–2017 Water Year, as Percent of Average**

Table 8-1 Monthly Precipitation Totals at Various Locations in California, Water Year[1] 2016–2017

	Monthly Precipitation (inches)															
	Water Year 2016–2017													Water Year 2017–2018		
	2016			2017												
Station[2]	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	WY Total	Oct	Nov	Dec
Mount Shasta City	11.84	4.60	4.54	12.77	10.68	5.65	8.36	0.44	1.33	0.00	0.12	0.25	**60.58**	0.61	4.13	0.29
percent of average	*506*	*100*	*77*	*199*	*191*	*128*	*298*	*26*	*125*	*0*	*39*	*32*	***168***	*26*	*90*	*5*
Eureka Woodley Island	10.92	6.98	7.87	10.51	11.10	7.97	5.46	1.31	0.59	0.07	0.03	0.94	**63.75**	1.64	7.40	1.94
percent of average	*365*	*126*	*123*	*162*	*215*	*153*	*190*	*72*	*97*	*64*	*13*	*124*	***167***	*55*	*134*	*30*
Blue Canyon (DWR-2)	17.97	7.30	15.94	37.00	32.22	9.54	12.90	0.64	0.90	0.00	0.00	1.13	**135.54**	1.00	18.75	0.98
percent of average	*479*	*93*	*152*	*298*	*330*	*112*	*257*	*24*	*102*	*0*	*0*	*153*	***216***	*27*	*238*	*9*
Sacramento WB City	4.41	1.33	3.71	9.85	8.18	2.76	3.36	0.10	0.19	0.00	0.00	0.00	**33.89**	0.15	2.13	0.14
percent of average	*479*	*66*	*116*	*263*	*250*	*115*	*227*	*22*	*146*	*0*	*0*	*0*	***189***	*16*	*105*	*4*
San Francisco WB AP	2.43	2.21	4.39	9.42	7.60	3.93	2.25	0.00	0.10	0.00	0.01	0.10	**32.44**	0.21	2.77	0.07
percent of average	*238*	*80*	*99*	*192*	*183*	*131*	*139*	*0*	*53*	*0*	*20*	*77*	***143***	*21*	*100*	*2*
Yosemite Headquarters	6.58	2.20	8.34	25.48	16.52	5.34	5.60	0.82	0.74	0.00	2.29	1.41	**75.32**	0.52	4.28	0.24
percent of average	*383*	*52*	*127*	*380*	*263*	*108*	*173*	*58*	*130*	*0*	*1,145*	*227*	***205***	*30*	*101*	*4*
Fresno WB AP	0.67	1.38	2.51	5.50	2.52	1.08	3.42	0.12	0.00	0.00	0.00	0.16	**17.36**	0.09	0.28	0.04
percent of average	*140*	*124*	*143*	*274*	*121*	*58*	*317*	*43*	*0*	*0*	*0*	*107*	***159***	*19*	*25*	*2*
Grant Grove	4.41	1.18	9.51	32.29	15.82	4.76	4.97	0.82	0.90	0.00	1.18	0.66	**76.50**	0.15	2.77	0.17
percent of average	*225*	*23*	*122*	*432*	*219*	*63*	*115*	*70*	*321*	*0*	*1,686*	*122*	***175***	*8*	*54*	*2*
Los Angeles WSO AP	0.36	1.11	2.78	7.44	4.04	0.08	0.38	0.13	0.00	0.00	0.00	0.08	**16.40**	0.00	0.10	0.01
percent of average	*95*	*79*	*132*	*276*	*138*	*4*	*41*	*93*	*0*	*0*	*0*	*44*	***129***	*0*	*7*	*0*
San Diego NWS Lindbergh Field	0.07	0.61	4.22	3.01	3.71	0.08	0.01	0.92	0.02	0.00	0.00	0.08	**12.73**	0.00	0.02	0.07
percent of average	*17*	*54*	*221*	*147*	*193*	*5*	*1*	*438*	*29*	*0*	*0*	*44*	***123***	*0*	*2*	*4*

[1]Water Year = October 1–September 30
[2]AP = Airport; NWS = National Weather Service; WB = Weather Bureau; WSO = Weather Service Office

December was a cooler-than-average and wetter-than-average month receiving 119 percent of the statewide precipitation average. January was a cooler-than-average and wetter-than-average month. Statewide precipitation was 237 percent of average and was the fifth wettest January on record. The first storms of 2017 arrived in the first week with precipitation reaching most of the state via an atmospheric river that started in the southern part of the state and shifted northward. Temperatures warmed with the atmospheric river with freezing elevations jumping from below 4,000 feet to above 8,000 feet. In the second week a pair of atmospheric rivers made landfall with heavy rain and freezing elevations nearing 10,000 feet in the first event and above 7,000 feet in the second. Cold air behind the atmospheric rivers led to heavy snowfall in the Sierra Nevada Mountains with accumulations topping five feet in some places. In week three, cooler temperatures and drier air led to a break in the storms. A fourth atmospheric river event made landfall at the end of the third week followed by cold air and continued precipitation that drove snow totals to above average. A short-duration fifth atmospheric river made landfall in the fourth week with freezing elevations only jumping to 6,000 feet. Temperatures warmed to close out the month with drier conditions. February was a warmer-than-average and wetter-than-average month. Statewide precipitation was 219 percent of average and the fourth wettest February on record. Towards the end of the first week, the first of six atmospheric rivers to impact

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 listed below:

1) Mount Shasta City
2) Shasta Dam
3) Mineral
4) Quincy
5) Brush Creek
6) Sierraville Ranger Station
7) Blue Canyon
8) Pacific House

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 listed below:

1) Calaveras Big Trees
2) Hetch Hetchy Reservoir
3) Yosemite Headquarters
4) North Fork Ranger Station
5) Huntington Lake

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 listed below:

1) Balch Power House
2) Springville
3) Giant Forest
4) Pascoes
5) Ash Mountain
6) Isabella

the state during the month made landfall. Freezing elevations were below 8,000 feet yielding notable increases to the snowpack at higher elevations. The second week saw a series of back-to-back atmospheric river events with freezing elevations jumping above 10,000 feet leading to flood-producing runoff. Flood impacts were widespread across the state. A short break in the weather closed out the week before the second set of three atmospheric rivers made landfall in week three. Freezing elevations again topped 10,000 feet in the first event while the second two events saw the freezing elevation drop below 8,000 feet. March was a warmer-than-average and drier-than-average month receiving 73 percent of average precipitation. April was a warmer-than-average and wetter-than-average month. Statewide precipitation was 170 percent of average for the month. May, June, July, August, and September were all warmer-than-average and drier-than-average. Statewide precipitation for the months of May through September were 30, 84, 8, 0, and 12 percent of average, respectively.

Eureka Woodley Island on the north coast of California and Mount Shasta City in the north central part of the state received 63.75 and 60.58 inches of precipitation, respectively. For the 2016–2017 water year, precipitation for those stations was well above normal for all months except December, May, July, August, and September.

Blue Canyon experienced precipitation above 200 percent of normal in October, January, February, and April of water year 2016–2017. The station totals for the water year were 135.54 inches and 216 percent of average. The month of October accumulated the largest percent of normal for the water year–17.97 inches, which was 479 percent of average.

Areas of the Central Valley and the San Francisco Bay Area received the largest amount of precipitation in January. Precipitation totals in the month of January were 9.85 inches (263 percent of average) for Sacramento, 5.50 inches (274 percent of average) for Fresno, and 9.42 inches (214 percent of average) for San Francisco. For the water year, Sacramento received 189 percent of its annual precipitation average, Fresno received 159 percent of its annual average, and San Francisco received 163 percent of average. Sacramento, Fresno, and San Francisco all received above average precipitation for six or more months out of the 12 months of the water year.

In the San Joaquin and Tulare Lake watersheds, water year total precipitation was significantly above average for the water year. The largest amounts of precipitation fell in these watersheds during December, January, and February, which is similar to what transpired in the northern parts of California. Approximately one-half of the water year precipitation fell during those 3 months for Yosemite Headquarters and Grant Grove. Water year precipitation totals at those two sites were 205 and 175 percent of their respective annual averages.

Further south, Los Angeles and San Diego were also above average for the 2016–2017 water year, totaling 16.4 inches (129 percent of average) and 12.73 inches, (123 percent of average), respectively. The heaviest 3 months were December, January, and February. Over 85 percent of the total water year precipitation was received during these 3 months for both Los Angeles and San Diego.

The monthly totals for the Northern Sierra 8-Station, San Joaquin 5-Station, and Tulare Basin 6-Station precipitation indices for the water year are presented in Table 8-2. Precipitation for the three indices totaled 94.7 inches (189 percent of average), 72.7 inches (178 percent of average), and 46.9 inches (160 percent of average), respectively.

Table 8-2 Regional Monthly Precipitation for Water Year 2016–2017

		Northern Sierra 8-Station Precipitation Index		San Joaquin 5-Station Precipitation Index		Tulare Basin 6-Station Precipitation Index	
	Month	Precipitation (inches)	Percent of Monthly Average	Precipitation (inches)	Percent of Monthly Average	Precipitation (inches)	Percent of Monthly Average
2016	October	12.6	420	6.4	304	1.6	133
	November	5.4	85	2.8	59	1.9	61
	December	11.6	138	8.5	137	7.4	168
2017	January	23.6	262	25.2	336	19.3	350
	February	23.4	293	17.7	256	10.7	205
	March	6.9	100	4.3	70	2.3	48
	April	9.6	246	6.1	169	2.6	100
	May	0.5	23	0.4	22	0.2	18
	June	0.8	80	0.1	16	0.1	25
	July	0.0	0	0.0	0	0.0	0
	August	0.1	33	0.3	150	0.2	100
	September	0.4	44	0.9	128	0.5	83
	Total[1]	**94.7**	**189**	**72.7**	**178**	**46.9**	**160**

[1]Totals may not sum as expected due to rounding.

For the Northern Sierra 8-Station Precipitation Index, January and February were quite wet, registering 23.6 inches (262 percent of average) and 23.4 inches (293 percent of average), respectively. The 4-month period, December through March, typically the wettest period in the Sierra Nevada, accumulated 65.5 inches, which is two-thirds of the water year total for the index and 203 percent of the average (32.3 inches) that accumulates during those 4 months for the index.

For the San Joaquin 5-Station Precipitation Index, the total accumulated precipitation during December through March was 55.7 inches, which represents 77 percent of the water year total for the index and 209 percent of the average (26.7 inches) that accumulates during those 4 months for the index.

The Tulare Basin 6-Station Precipitation Index accumulated a total of 39.7 inches during December through March, which represents 85 percent of the water year total for the index and 201 percent of the average (19.8 inches) that accumulates during those 4 months for the index.

Mountain Snowpack

Precipitation that fell during water year 2016–2017 consisted of rain and snow; snow accumulation was above normal as of April 1. 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 45.7 inches or 163 percent of average. This was a tremendous improvement relative to water years 2014–2015 and 2015–2016, which were only 5 percent and 86 percent of average, respectively. April 1 is typically the average annual date of peak snow accumulation. In 2017, the mountain snowpack peaked on April 17 at 47.8 inches of snow water content or 170 percent of its April 1 average.

Table 8-3 Statewide Mountain Snowpack for Water Year 2016–2017

	Date	Snow Water Equivalent (inches)	Percent of Average	Percent of April 1 Average[1]
2016	October 1	0.0	0	0
	November 1	0.0	0	0
	December 1	2.9	61	10
2017	January 1	6.5	64	23
	February 1	30.5	174	108
	March 1	45.4	184	162
	April 1	45.7	163	163
	May 1	41.4	192	149
	June 1	16.6	192	59
	July 1	1.5	89	5
	August 1	0.0	0	0
	September 1	0.0	0	0

[1]April 1 is the average date of peak statewide mountain snowpack. This table is based on snow pillow (a device for measuring mountain snowpack at automated reporting stations) data.

River Runoff

Statewide river runoff totaled 217 percent of average in the 2016–2017 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 these areas ranged from 212 to almost 254 percent of 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 170, 209, and 223 percent of average, for the SRR, SJR, and TLR regions, respectively.

Water Supply Indices

The Sacramento Valley 40-30-30 Index and the San Joaquin Valley 60-20-20 Index were "wet," based on observed data for water year 2016–2017.

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

Water Year 2017–2018 October through December Water Conditions

The last 3 months of calendar year 2017 marked the beginning of a new water year, 2017–2018. October was a warmer-than-average and drier-than-average month. Statewide, the October average precipitation for

Table 8-4 Unimpaired Runoff for Water Year 2016–2017 (million acre-feet)

	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	WY
SRR runoff	0.90	1.07	3.20	6.56	10.18	4.27	4.90	3.26	1.75	0.78	0.51	0.44	37.82
percent of average	*190*	*125*	*190*	*267*	*428*	*147*	*213*	*150*	*142*	*132*	*126*	*112*	*212*
SJR runoff	0.28	0.17	0.51	1.97	2.47	1.25	1.71	2.58	2.47	1.01	0.28	0.13	14.84
percent of average	*422*	*127*	*214*	*454*	*568*	*198*	*205*	*186*	*232*	*230*	*239*	*225*	*254*
TLR runoff	0.04	0.04	0.10	0.75	0.88	0.61	0.92	1.45	1.48	0.64	0.21	0.10	7.23
percent of average	*71*	*56*	*89*	*423*	*492*	*225*	*231*	*203*	*243*	*222*	*216*	*174*	*239*
Feather River runoff	0.18	0.19	0.78	1.60	2.92	1.22	1.51	0.94	0.41	0.20	0.13	0.10	10.17
percent of average	*182*	*94*	*206*	*287*	*541*	*165*	*242*	*156*	*125*	*130*	*129*	*108*	*231*
Statewide runoff percent of average	*262*	*142*	*171*	*266*	*396*	*155*	*202*	*170*	*192*	*182*	*162*	*134*	*217*

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
2) Feather River at Oroville (inflow to Lake Oroville)
3) Yuba River near Smartville
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 (inflow to New Melones Reservoir)
2) Tuolumne River below La Grange (inflow to New Don Pedro Reservoir)
3) Merced River below Merced Falls (inflow to Lake McClure)
4) San Joaquin River below Millerton Lake (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
2) Kaweah River below Terminus Reservoir
3) Tule River below Lake Success
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 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

(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 (*continued*)

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

(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.

the month was 31 percent of average. November was a warmer-than-average and wetter-than-average month for California. Statewide, the average November precipitation for the month was 123 percent of average. December was a warmer-than-average and drier-than-average month. The average precipitation statewide was 7 percent of average.

At the end of December, water year runoff totals were 72 percent of average for the SRR, 86 percent of average for the SJR, and 78 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 2016–2017 began at 82 percent of average reservoir storage. The storage increased but remained below average until January 2017. Thereafter, the percent of average remained in the range of 111 to 122 percent for the remaining months of the water year and finished at 120 percent of average at the end of September.

Table 8-5 Monthly Reservoir Storage for Water Year 2016–2017 (thousand acre-feet)

Reservoir	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Shasta	2,765	2,910	3,342	3,546	3,779	4,031	4,263	4,353	4,211	3,942	3,627	3,382
percent of average	*105*	*109*	*120*	*117*	*115*	*110*	*110*	*114*	*118*	*125*	*129*	*128*
Oroville	1,559	1,486	1,982	2,842	2,706	2,681	2,622	2,466	2,331	2,111	1,704	1,332
percent of average	*75*	*71*	*92*	*124*	*111*	*100*	*92*	*84*	*82*	*83*	*75*	*62*
Folsom	354	447	400	408	404	591	724	937	953	883	778	664
percent of average	*72*	*97*	*85*	*82*	*75*	*93*	*100*	*117*	*122*	*133*	*131*	*122*
San Luis	590	867	1,249	1,700	1,991	2,015	1,998	1,910	1,997	1,925	1,837	1,752
percent of average	*56*	*73*	*91*	*108*	*117*	*112*	*113*	*122*	*160*	*199*	*219*	*189*
Pardee	189	194	188	204	204	192	200	206	205	198	192	189
percent of average	*109*	*111*	*106*	*114*	*113*	*105*	*109*	*108*	*106*	*105*	*104*	*105*
New Melones	510	529	628	1,013	1,578	1,812	2,002	2,079	2,181	2,141	2,045	2,024
percent of average	*38*	*39*	*46*	*72*	*108*	*121*	*135*	*140*	*146*	*150*	*152*	*155*
Don Pedro	1,324	1,358	1,515	1,795	2,003	1,760	1,641	1,770	1,980	1,993	1,797	1,699
percent of average	*102*	*104*	*114*	*130*	*141*	*120*	*112*	*116*	*125*	*132*	*128*	*127*
Millerton	209	295	367	343	429	201	261	407	488	501	414	365
percent of average	*103*	*131*	*133*	*104*	*128*	*55*	*73*	*103*	*119*	*152*	*169*	*165*
Pine Flat	186	208	276	618	776	585	504	757	992	896	713	591
percent of average	*54*	*56*	*68*	*132*	*148*	*104*	*83*	*106*	*146*	*180*	*193*	*178*
Kaweah	11	13	21	47	99	52	83	133	172	103	17	17
percent of average	*94*	*95*	*124*	*213*	*387*	*119*	*106*	*110*	*162*	*197*	*85*	*130*
Success	5	5	12	39	50	43	66	78	84	76	37	11
percent of average	*58*	*56*	*90*	*224*	*206*	*133*	*154*	*150*	*176*	*231*	*202*	*92*
Isabella	90	88	94	215	329	246	273	337	353	284	242	212
percent of average	*54*	*56*	*58*	*123*	*178*	*121*	*117*	*113*	*113*	*106*	*115*	*116*
Statewide percent of average	*85*	*88*	*97*	*113*	*122*	*113*	*111*	*112*	*116*	*121*	*122*	*120*

State Water Project Storage

The State Water Project (SWP) operates a complex system of dams, canals, and reservoirs to collect and store water for future deliveries. Lake Oroville is the first of two primary SWP conservation facilities. Lake Oroville inflow comes from tributaries of the Feather River.

San Luis Reservoir is the second primary SWP conservation facility. This Central California joint-use facility derives its inflow from pumping at the Gianelli Pumping-Generating Plant. San Luis is an off-stream storage reservoir. Most of the water is pumped into the reservoir from late fall to early spring. This water is temporarily 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.

2017 Storage Totals in Major SWP Reservoirs

End-of-year storage on December 31, 2017, in major SWP reservoirs and the State's share of joint-use reservoirs was 2.5 million acre-feet (maf) or 48 percent of maximum storage, compared to 3.24 maf or 61 percent of maximum storage at the end of 2016. The average end-of-month total storage in major SWP reservoirs for 2017 was 3.6 maf.

Lake Oroville

Lake Oroville has a maximum water storage capacity of 3,537,577 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.

2017 Inflow. Total Lake Oroville inflow for 2017 was 9.0 maf, which was 234 percent of the average (3.86 maf) over the last 30 years. Maximum daily inflow occurred on February 9 at 308,429 af. Minimum daily inflow occurred on September 9 at 686 af. Peak monthly total inflow occurred in February at 2.7 maf, 30 percent of the 2017 total. The highest total inflow in the last 30 years (1988–2017) was in 2017 at 9,009,424 af. The lowest total inflow for the same period was in 2015 at 1,295,451 af.

Figure 8-2 shows monthly Lake Oroville inflow for 2015, 2016, and 2017.

Figure 8-3 shows historical maximum and minimum cumulative Lake Oroville inflow and the current cumulative inflow for 2017.

2017 Storage. Minimum storage occurred on November 14 at 1,175,971 af, 33 percent of lake capacity. Maximum storage occurred on February 11 at 3,578,364 af, 101 percent of lake capacity. End-of-year Lake Oroville storage was 1,230,670 af. Figure 8-4 shows storage in Lake Oroville for 2016 and 2017.

2017 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 2,027,835 af. The SWP share of this capacity is 1,062,180 af.

San Luis Reservoir reached its maximum storage on March 9 at 2,027,835 af, 100 percent of its normal maximum operating capacity. At the beginning of 2017, San Luis Reservoir contained 1,249,284 af, 62 percent of its capacity. The SWP storage share was 791,746 af. The highest end-of-month SWP share of water storage occurred in July at 1,113,484 af. Figure 8-5 shows the SWP share of storage and total storage in San Luis Reservoir for 2016 and 2017.

2017 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 2017, Lake Del Valle held 31,739 af, which was about 41 percent of its maximum capacity of 77,111 af. Its highest storage occurred on February 22 at 50,218 af. Its lowest storage occurred on December 25 at 25,376 af.

On December 31, storage in Lake Del Valle was 25,417 af, 33 percent of its maximum capacity. There was 88,543 af of natural inflow into Lake Del Valle, and no inflow from the South Bay Aqueduct. There was 73,694 af of releases to Arroyo Valle, and releases for 2017 to the South Bay Aqueduct from Lake Del Valle totaled 18,141 af.

2017 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 2017, these reservoirs held 468,256 af, which is 68 percent of their combined normal maximum operating capacity of 689,021 af. At the end of 2017, the reservoirs held 551,871 af, 80 percent of combined normal maximum operating capacity.

Figure 8-2 Monthly Inflow into Lake Oroville from the Feather River, 2015–2017

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

Figure 8-4 **Storage in Lake Oroville, 2016 and 2017**

Figure 8-5 **SWP Share of Storage and Total Storage in San Luis Reservoir, 2016 and 2017**

Diversions from the Delta

The SWP diverts water from the Sacramento-San Joaquin Delta (Delta), through the Barker Slough and Banks pumping plants, for delivery to SWP water contractors' storage facilities. The SWP diverts water from Barker Slough Pumping Plant to the North Bay Aqueduct. Water is delivered from Banks Pumping Plant to the South Bay Area through the South Bay Aqueduct, and to the San Joaquin Valley, Central Coastal, and Southern California areas through the California Aqueduct. The Central Valley Project (CVP) diverts water to similar areas from the Delta through Jones Pumping Plant and Contra Costa Pumping Plant.

In 2017, the North Bay Aqueduct received 38,129 af of water from the Barker Slough Pumping Plant.

Figure 8-6 shows the amounts of water pumped each month for 2017 at Banks Pumping Plant, totaling 3,434,071 af. Of this amount, the SWP diverted 3,419,171 af. There was no water pumped for the Cross Valley Canal, and 14,900 af was wheeled for the CVP.

The CVP diverted 2,794,654 af at Jones Pumping Plant and 115,521 af at Contra Costa Pumping Plant in 2017.

The combined Delta exports include all of these plants. Figure 8-7 shows the monthly amounts of water diverted from the Delta in 2017 by the SWP and CVP. Maximum daily Delta exports occurred on February 2 at 29,136 af. Combined SWP and CVP monthly Delta exports in 2017 varied from a low of 286,131 af in March, to a high of 718,279 af in January. Delta exports totaled approximately 6.3 maf in 2017.

Figure 8-8 shows monthly total amounts pumped at Dos Amigos Pumping Plant for 2017. Dos Amigos Pumping Plant diverts water from O'Neill Forebay to the California Aqueduct. Dos Amigos pumped the largest amount in August at 555,316 af.

Figure 8-9 shows the amount of water pumped each month in 2017 at Edmonston Pumping Plant. Water pumped through the Edmonston Pumping Plant for delivery to Southern California totaled 1,965,395 af.

Figure 8-6 Water Pumped at Banks Pumping Plant, 2017

Figure 8-7 Sacramento-San Joaquin Delta Exports by State Water Project and Central Valley Project, 2017

Figure 8-8 **Water Pumped at Dos Amigos Pumping Plant, 2017**

Figure 8-9 **Water Pumped at Edmonston Pumping Plant, 2017**

Chapter 9
Water Contracts and Deliveries

Lake Oroville emergency spillway.

Significant Events in 2017

A total of 4,786,635 acre-feet (af) of State Water Project (SWP) and non-SWP water was delivered to 29 SWP water contractors and 21 other agencies. The portion delivered to SWP water contractors was 3,711,703 af; the portion delivered to non-SWP contractors was 1,074,932 af.

The hydrologic conditions in the Sacramento and San Joaquin river watersheds were classified as "wet" and "wet," respectively. As a result, the Department of Water Resources (DWR) approved 85 percent of the SWP water contractors' Table A allocation requests.

Two SWP water contractors recovered approximately 78,553 af of water from water banks.

Information for this chapter was provided by the State Water Project Analysis Office.

State Water Project (SWP) water supply contracts between the Department of Water Resources (DWR) and 29 public agencies and local water districts provide for water service from the SWP and are the basis for the SWP's construction and ongoing 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.

SWP Water Supply Contracts

SWP water supply contracts set forth the maximum amount of water a SWP water contractor may request each year from the SWP, and these water amounts are written within the contracts in a list format known as Table A. "Table A" or "Table A water" represents a portion or all of the annual Table A amount requested by SWP water contractors and approved for delivery by DWR based on hydrologic conditions, current reservoir storage, and combined requests from the SWP water contractors. Under certain water year conditions, DWR is not able to deliver the quantity of water requested by SWP water contractors. In those years, a proportional amount is allocated and delivered according to the SWP water contracts by prorating the amount in proportion to each SWP water contractor's annual Table A amount. Table A amounts may also be used as a factor to allocate other available water supplies to each contractor. Approved Table A amounts may also be referred to in this chapter as "approved amounts," "approved water," or "allocated water."

SWP water provided under the SWP water supply contracts include current year Table A amounts, transfer and exchange of Table A water, carryover water, Turn-Back Pools A and B water, Multiyear Water Pool Program water, and Article 21 water.

DWR enters into agreements with SWP water contractors and non-SWP contractors; these agreements may be amended periodically, to convey SWP and non-SWP water through the California Aqueduct. Using SWP facilities, DWR conveys non-SWP water for various agencies according to the terms of water rights and water transfer and exchange agreements. DWR also enters into agreements to approve construction, operation, and maintenance of SWP facilities, including turnouts and turn-ins.

The State Water Project Analysis Office (SWPAO) uses a numbering system for contracts, amendments, and agreements executed by DWR. These numbers, referred to as SWPAO numbers, are designated in Chapter 9 text as "SWPAO #XXXXX" and are located in parentheses in descending order, after each contract, amendment, or agreement description. These numbers can be used as identifiers to contact DWR staff for more detailed information on a particular document.

Contract Extension Negotiations

In May 2013, DWR and the SWP water contractors began negotiations in a public forum to develop contract amendments to extend the term and change certain financial provisions of the SWP water supply contracts. In June 2014, the negotiators for DWR and the SWP water contractors reached a general agreement on principles for such an amendment (the "Agreement in Principle").

Currently, the SWP water supply contracts remain in effect for whichever period is longest: (1) the project repayment period,

SWP Water Supply Contracts

The first State Water Project (SWP) 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 SWP water supply contracts; by the end of 1967, 31 agencies had contracted for water. In addition, an SWP water supply contract was executed with the City of West Covina in December 1963, but it was terminated in August 1965, and the city's Table A amount was transferred to Metropolitan through an amendment to its SWP water supply contract with DWR. SWP water supply 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 DWR has contracts with 29 SWP water contracting agencies. Those contracts have been amended periodically, and as needed, to incorporate mutually agreed upon modifications.

All SWP water supply contracts signed in the 1960s included an estimated date for initial water deliveries and a schedule of the water delivery amount the SWP water contractor could expect annually (annual Table A amounts). That amount was designed to increase gradually until the maximum amount of annual Table A was reached. The total combined maximum annual Table A amount for all SWP water contracting agencies was initially 4,230,000 acre-feet (af), assuming full development of the SWP.

The contracts were executed for 75 years or until all bonds sold as part of the California Water Resources Development Bond Act were repaid, whichever period was longer. As a result of amendments to contracts in the 1990s, the current combined maximum annual Table A amount totals 4,172,786 af, and the contracts are in effect for the longest of the following periods: (1) the project repayment period, which extends to December 31, 2035; (2) 75 years from the date of the contract; or (3) the period ending with the latest maturity date of any bond used to finance the construction costs of project facilities.

which extends to December 31, 2035, 75 years from the effective date of the contract; or (2) until all bonds issued to finance construction costs of SWP facilities are repaid. Each SWP water contractor may elect to receive continued service under its SWP water contract contingent upon certain specified terms and conditions and other reasonable and equitable terms mutually agreed upon by DWR and the SWP water contractors.

The 75-year SWP water supply contract term results in the contracts having varying termination dates that range between December 31, 2035, and December 31, 2042. Under the Agreement in Principle, each SWP water contractor that signs an

amendment would extend its contract term to December 31, 2085.

Also under the Agreement in Principle, payment provisions for capital costs and certain other costs will be amended from an amortized basis to an annual "pay as you go" basis. The "pay as you go" provisions will provide revenues needed by DWR to operate the SWP in a fiscally sound manner. The SWP water contracts' current provisions authorizing DWR to charge the SWP water contractors annually for the full amount of required annual debt service and coverage on the bonds will continue in any extended SWP water contract.

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

- an increase in DWR's operating reserves—a mechanism for financing capital projects with interest from the SWP water contractors
- the establishment of accounts to fund certain State Water Resources Development System expenses not chargeable to the SWP water contractors
- the establishment of a finance committee consisting of DWR and SWP water contractor representatives to serve as a forum for discussions and to provide a channel for recommendations concerning SWP financial policies

Before any SWP water contract amendment is adopted, DWR must accomplish the following as part of the contract amendment process: (1) complete an environmental review pursuant to the California Environmental Quality Act and (2) deliver a presentation in an informational hearing to the California Legislature. In 2016, DWR released the draft environmental impact report (EIR) on August 17, 2016, and held a public hearing in Sacramento on September 12, 2016. The public comment period closed on October 17, 2016.

Amendments to SWP Water Supply Contracts

All of the original SWP water supply contracts signed by DWR and the 29 SWP water contractors have been amended to incorporate mutually desired changes. Most amendments fall under the following general categories:

- permanent transfers of Table A amounts from one SWP water contractor to another
- allocation of costs and benefits for the addition or enlargement of SWP facilities
- purchase of excess capacity in the California Aqueduct
- provisions to implement Monterey Agreement principles

2017 Amendments to SWP Water Supply Contracts

There were no amendments to the SWP water supply contracts in 2017.

Monterey Amendments

The primary elements of the Monterey Amendments included changes in water allocation procedures where shortages and surpluses would be shared among contractors in proportion to their Table A amounts, transfers of Table A amounts from agricultural contractors to municipal and industrial contractors, the transfer of ownership of approximately 20,000 acres of land known as the Kern Fan Element in exchange for the retirement of 45,000 acre-feet (af) of agricultural contractor Table A amounts, financial restructuring, and additional and pre-approval of water supply management practices. The Monterey Amendments are discussed in detail in Bulletin 132-95, Chapter 1, Summary of Significant Events.

In 2017, DWR continued to operate the SWP according to the SWP water supply contracts,

the Monterey Amendments, and the May 5, 2003, settlement agreement for the Planning and Conservation League v. DWR (1995) lawsuit. The May 2003 settlement agreement is discussed in detail in Bulletin 132-04, Chapter 9, Water Contracts and Deliveries. As required by the settlement agreement, the Monterey Plus EIR was prepared and eventually certified by DWR in 2010. The adequacy of the Monterey Plus EIR was challenged, and the court found that the Monterey Plus EIR complied with the California Environmental Quality Act in all respects except with regard to its discussion/analysis of the development, use, and operation of the Kern Water Bank (KWB), located within Kern County, near Bakersfield, California. In November 2014, the court ordered DWR to correct the deficiencies in a revised Monterey Plus EIR and to recertify the revised Monterey Plus EIR by December 31, 2015. In July 2015, the court granted DWR's request for a 6-month extension, changing the deadline to June 30, 2016.

DWR developed the Monterey Plus draft revised EIR making changes to the 2010 Monterey Plus EIR as a result of DWR's re-analysis of the Kern Fan Element property transfer and a new analysis of the KWB development and continued use and operation. Since DWR decertified the Monterey Plus EIR, pursuant to the Court's order, the final revised EIR also includes, without modification, the 2007 draft EIR, and the 2010 final EIR. The revised EIR supplements and does not supersede the analysis of the Monterey Plus EIR.

The revised EIR did not identify any new impacts or changes to impacts caused by the transfer of the Kern Fan Element property; therefore, the Monterey Plus EIR fully disclosed all impacts caused by the transfer of the Kern Fan Element property. Consequently, the major focus of the revised EIR is on the development and continued use and operation of the KWB as a locally owned and operated groundwater banking and recovery project.

The draft revised EIR describes and analyzes the development and continued use and operations of the KWB. The analysis identified potentially significant impacts, before mitigation, related to groundwater levels and quality, Kern River water quality, the Cross Valley Canal, terrestrial biological resources, erosion, hazardous materials, waterborne disease, cultural and paleontological resources, greenhouse gas emissions, and cumulative impacts. Potentially significant and unavoidable impacts were found only related to cumulative growth-related impacts.

As a responsible agency, the Kern Water Bank Authority adopted a resolution on May 25, 2016 that approved a long-term recovery operations plan, which includes monitoring and reporting groundwater conditions, implementing proactive measures, implementing actions to certain triggers, and other conditions. The resolution also includes an agreement to implement the Monterey revised EIR mitigation measures that apply to the Kern Water Bank Authority.

DWR circulated the draft revised EIR for public and agency comment from April 28, 2016 through June 13, 2016. During the comment period, DWR held public hearings in Fresno and Bakersfield on June 1 and 2, 2016, respectively.

The final revised EIR consists of the response to comments, the comment letters, the draft revised EIR, and related appendices, including without modification—the 2007 draft EIR, and the 2010 final EIR. On September 20, 2016, DWR decided to carry out the proposed project by continuing the use and operation of the KWB by the Kern Water Bank Authority. DWR filed a notice of determination with the State Clearinghouse on September 22, 2016. (The revised EIR has the same State Clearinghouse number

as the Monterey Plus EIR, 2003011118.) In October 2017, the Sacramento County Superior Court discharged the 2014 writ and ruled in favor of DWR by denying a petition challenging the revised EIR.

See Chapter 6, Legislation and Litigation, for a more detailed description of 2017 Monterey Amendment litigation activities and the current status of the Monterey Amendment litigation.

Miscellaneous Agreements with SWP Water Contractors

2017 Water Conveyance and Exchange Agreements

Water conveyance and exchange agreements that were executed or pending execution with SWP water contractors during 2017 are described below.

Avek/Kern/San Gorgonio

A letter agreement among DWR, AVEK, Kern, and San Gorgonio, dated November 2, 2017, and executed November 15, 2017, approved the conveyance of up to 1,700 af of non-SWP Water to San Gorgonio. This non-SWP water was Nickel Family LLC's pre-1914 water rights water that San Gorgonio acquired from AVEK and was made available to DWR at Reach 12E of the California Aqueduct for subsequent delivery by DWR to San Gorgonio. DWR conveyed the non-SWP water to San Gorgonio under Article 55 of San Gorgonio's water supply contract with DWR. This agreement is effective through December 31, 2017. During 2017, a total of 1,700 af of non-SWP water was conveyed to San Gorgonio under this agreement. (SWPAO #17032)

Kern

A letter agreement between DWR and Kern, dated November 21, 2017, and executed November 22, 2017, approved the conveyance of up to 50,000 af of San Joaquin River Exchange Contractors' 2017 Central Valley Project (CVP) water to Kern. Reclamation made the CVP water available at O'Neill Forebay. DWR conveyed the non-SWP water to Kern under Article 55 of Kern's water supply contract with DWR. This agreement is effective through February 28, 2018. During 2017, a total of 23,522 af of non-SWP water was conveyed to Kern under this agreement. (SWPAO #17031)

Tulare

A letter agreement between DWR and Tulare, dated August 15, 2017, and executed on August 21, 2017, approved the conveyance of up to 4,000 af of CVP water to Tulare. This non-SWP water was made available by Fresno Slough Water District for delivery to Angiola Water District, a member unit of Tulare. Reclamation made the non-SWP water available at O'Neill Forebay. DWR conveyed the non-SWP water to Tulare under Article 55 of Tulare's water supply contract with DWR. This agreement was effective through December 31, 2017. During 2017, a total of 4,000 af of non-SWP water was conveyed to Tulare under this agreement. (SWPAO #17025)

AVEK/Kern

A letter agreement among DWR, AVEK, and Kern, dated August 16, 2017, and executed August 25, 2017, approved the transfer of up to 35,000 af of AVEK's Table A water to Kern through December 31, 2017, on behalf of landowner Homer, which farms in both AVEK's and Kern's service areas. During 2017, a total of 34,643 af of AVEK's Table A water was delivered to Kern under this agreement. (SWPAO #17024)

Crestline/San Gorgonio

A letter agreement among DWR, Crestline, and San Gorgonio, dated July 31, 2017, and executed August 7, 2017, approved the delivery of up to 2,000 af of Crestline's Table A water to San Gorgonio by December 31, 2017. In exchange, San

Gorgonio will return up to 1,000 af, based on an unbalanced exchange ratio of 2:1, of its future Table A water to AVEK by December 31, 2027. During 2017, a total of 2,000 af of Crestline's Table A water was delivered to San Gorgonio under this agreement. (SWPAO #17023)

Kern

A letter agreement between DWR and Kern, dated July 7, 2017, and executed July 12, 2017, approved the delivery of up to 50,000 af of Westlands Water District's (Westlands) CVP water to Kern through February 28, 2018. This water was delivered to Kern for storage in the Semitropic Water Storage District's Groundwater Banking Program. The stored water will be returned to Westlands by December 31, 2028. Reclamation made this non-SWP water available at O'Neill Forebay. DWR conveyed the non-SWP water to Kern under Article 55 of Kern's water supply contract with DWR. In 2017, a total of 30,789 af of non-SWP water was delivered to Kern under this agreement. (SWPAO #17020)

Santa Clara

A letter agreement between DWR and Santa Clara, dated July 31, 2017, and executed August 21, 2017, approved the exchange of up to 75,000 af of SWP water with Santa Clara's CVP water. Reclamation would make up to 75,000 af of Santa Clara's CVP water available to DWR at O'Neill Forebay. DWR would deliver the CVP water to SWP service areas south of O'Neill Forebay. In exchange, DWR would deliver an equal amount of SWP water to Santa Clara. DWR filed a petition with the State Water Resources Control Board (State Water Board) and received a 1-year approval effective June 8, 2017 for the consolidation of CVP and SWP places of use. This agreement terminates on June 7, 2018. During 2017, a total of 15,115 af of CVP water was made available to DWR at O'Neil Forebay, and a total of 15,115 af of SWP water was delivered to Santa Clara under this agreement. (SWPAO #17019)

Kings/Tulare

A letter agreement among DWR, Kings, and Tulare, dated May 3, 2017, and executed May 5, 2017, approved the transfer of up to 3,000 af of Tulare's Table A water to Kings through December 31, 2017, on behalf of landowner Sandridge Partners, which farms in both Tulare's and Kings' service areas. During 2017, a total of 2,159 af of Tulare's Table A water was delivered to Kings under this agreement. (SWPAO #17018)

Empire/Kern

A letter agreement among DWR, Empire, and Kern, dated May 3, 2017, and executed July 5, 2017, approved the transfer of up to 1,500 af of Empire's Table A water to Kern through December 31, 2017, on behalf of landowner Sandridge Partners, which farms in both Empire's and Kern's service areas. During 2017, a total of 1,280 af of Empire's Table A water was delivered to Kern under this agreement. (SWPAO #17017)

Kern/Tulare

A letter agreement among DWR, Kern, and Tulare, dated April 20, 2017, and executed June 6, 2017, approved the transfer of up to 10,000 af of Tulare's Table A water to Kern through December 31, 2017, on behalf of landowner Sandridge Partners, which farms in both Tulare's and Kern's service areas. During 2017, no water was moved under this agreement. (SWPAO #17016)

Tulare/Westlands/San Luis Water District

A change in point of delivery agreement among DWR, Tulare, San Luis Water District (San Luis), and Westlands, executed July 31, 2017, approved the delivery of up to a total of 60,000 af of Tulare's SWP Table A water to Westlands and San Luis through June 7, 2018. This is to facilitate the delivery of Westlands' and San Luis' acquired Kings

River pre-1914 water rights water from J.G. Boswell Company, a landowner in Tulare, to Westlands' and San Luis' services areas. DWR filed a petition with the State Water Board and received a 1-year approval effective June 8, 2017, for the consolidation of SWP and CVP places of use. During 2017, no water was moved under this agreement. (SWPAO #17015)

Kern/Tulare

A letter agreement among DWR, Kern, and Tulare, dated April 17, 2017, and executed June 21, 2017, approved the transfer of up to 10,000 af of Tulare's Table A water to Kern through December 31, 2017, on behalf of landowner J.G. Boswell Company, which farms in both Tulare's and Kern's service areas. During 2017, no water was moved under this agreement. (SWPAO #17013)

Tulare/Westlands

A letter agreement among DWR, Tulare, and Westlands, dated March 9, 2017, and executed March 27, 2017, approved the transfer of up to 4,000 af of Tulare's Table A water to Westlands on behalf of Westlake Farms Incorporated, which farms in both Tulare's and Westlands' service areas. Tulare's Table A water would be used on lands within the Kings County portion of Westlands' service area, which is within the SWP place of use. During 2017, no water was delivered to Westlands under this agreement. (SWPAO #17008)

Castaic Lake/Metropolitan

A letter agreement among DWR, Castaic Lake, and Metropolitan, dated February 8, 2017, and executed February 9, 2017, approved an unbalanced water exchange of SWP water between Castaic Lake and Metropolitan. The agreement allowed for the delivery of up to 30,000 af of Castaic Lake's SWP water to Metropolitan. In exchange, Metropolitan will return up to 20,000 af of its SWP water to Castaic Lake, based on an unbalanced exchange ratio of 3:2, by December 31, 2017. Under this agreement, should Metropolitan's Article 56(c) carryover water in San Luis Reservoir spill, Metropolitan's obligation to return water to Castaic Lake is reduced by the amount of Metropolitan's carryover water spilled. There was a carryover spill of 7,952 af in 2017, therefore, Metropolitan's obligation to return water to Castaic Lake was reduced from 20,000 af to 12,048 af under the terms and conditions of this agreement. During 2017, a total of 30,000 af of Castaic Lake's Article 56(c) carryover water was made available and delivered to Metropolitan. A total of 12,048 af was delivered to Castaic Lake, thereby completing this agreement. (SWPAO #17007)

Kern/Tulare

A letter agreement among DWR, Kern, and Tulare, dated February 9, 2017, and executed February 10, 2017, approved the transfer of up to 3,000 af of Tulare's SWP water to Kern through December 31, 2017, on behalf of Sandridge Partners Incorporated, which farms in both Kern's and Tulare's service areas. During 2017, no water was delivered to Kern under this agreement. (SWPAO #17006)

Metropolitan/Santa Barbara

A letter agreement among DWR, Metropolitan, and Santa Barbara, dated February 8, 2017, and executed February 9, 2017, approved an unbalanced water exchange of SWP water between Metropolitan and Santa Barbara through December 31, 2017. The agreement allowed the delivery of up to 15,584 af of Santa Barbara's SWP water to Metropolitan. In exchange, Metropolitan will return up to 10,389 af to Santa Barbara, based on an unbalanced exchange ratio of 3:2, of its SWP water. Under this agreement, should Metropolitan's Article 56(c) carryover water in San Luis Reservoir spill, Metropolitan's obligation to return water to Santa Barbara is reduced by the amount of Metropolitan's

carryover water spilled. In addition, should Santa Barbara take delivery of Article 21 water prior to Metropolitan providing the return water to Santa Barbara, Metropolitan's obligation to return water to Santa Barbara is further reduced by 50 percent of the amount of Article 21 water delivered to Santa Barbara. In 2017, 4,131 af of Metropolitan's carryover water was spilled in San Luis and 4,720 af of Article 21 water was delivered to Santa Barbara. Therefore, Metropolitan's obligation to return water to Santa Barbara was reduced from 10,389 af to 3,898 af under the terms and conditions of this agreement. During 2017, a total of 15,584 af of Santa Barbara's Article 56(c) carryover water was delivered to Metropolitan, and a total of 3,898 af of Metropolitan's Table A water was delivered to Santa Barbara, thereby completing this agreement. (SWPAO #17005)

Empire

A contract between DWR and Empire, executed March 6, 2017, approved the delivery of unscheduled water to Empire in 2017 at times when SWP water was not needed for fulfilling Table A deliveries or for meeting project operational commitments. During 2017, no unscheduled water was available for delivery to Empire. (SWPAO #17004)

Dudley Ridge

A letter agreement between DWR and Dudley Ridge, dated January 27, 2017, and executed January 29, 2017, approved the conveyance of up to 371 af of Friant Division CVP water to Dudley Ridge for use on lands within the CVP place of use in Kings County. DWR conveyed the non-SWP water to Dudley Ridge under Article 55 of Dudley Ridge's water supply contract with DWR. This agreement was effective through December 31, 2017. During 2017, a total of 371 af of non-SWP water was conveyed to Dudley Ridge under this agreement. (SWPAO #17003)

Kern/Metropolitan

A change in point of delivery agreement among DWR, Kern, and Metropolitan, executed September 22, 2017, approved the delivery of up to 1,000 af of SWP water for storage in Kern County through December 31, 2017 and for future return of the stored water to Metropolitan by December 31, 2023. The SWP water was acquired by Irvine Ranch Water District (Irvine Ranch) on behalf of Metropolitan under a separate water exchange agreement executed September 19, 2017, among DWR, Metropolitan, and Santa Barbara (SWPAO #17001). The SWP water was delivered to the banking facilities located on Irvine Ranch property in Kern County known as "Strand Ranch" and integrated into a water banking program operated by Rosedale-Rio Bravo Water Storage District (Rosedale-Rio Bravo). During 2017, a total of 578 af was delivered to Kern under this agreement. (SWPAO #17002)

Metropolitan/Santa Barbara

A letter agreement among DWR, Metropolitan, and Santa Barbara, dated June 23, 2017, and executed September 19, 2017, approved the delivery of up to 1,000 af of Santa Barbara's approved Table A water to Metropolitan through December 31, 2017. In exchange, Metropolitan will return its future approved Table A water equal to one-half, less 15 percent losses, of the total amount delivered to Metropolitan, to Santa Barbara through December 31, 2023. The water was acquired by Irvine Ranch and delivered to Kern County under the terms and conditions of a change in point of delivery agreement, executed September 22, 2017, among DWR, Kern, and Metropolitan (SWPAO #17002). During 2017, a total of 578 af of Santa Barbara's Table A water was delivered to Kern's turnouts. (SWPAO #17001)

Kern

A letter agreement between DWR and Kern, executed February 7, 2017, approved

the conveyance of up to 13,629 af of Friant Division CVP water to Kern through December 31, 2017. Wheeler Ridge-Maricopa Water Storage District, a member unit of Kern, acquired this non-SWP water from two CVP Friant Division contractors. This non-SWP water was made available to DWR at O'Neill Forebay. DWR conveyed the non-SWP water to Kern under Article 55 of Kern's water supply contract with DWR. During 2017, a total of 13,629 af of water was conveyed to Kern under this agreement. (SWPAO #16033)

Castaic Lake/Kern

A long-term change in point of delivery agreement among DWR, Castaic Lake, and Kern, executed June 1, 2017, provides for the delivery of a portion of Castaic Lake's approved SWP water to Kern for storage under the Semitropic Groundwater Banking and Exchange Program and for future return of the stored water to Castaic Lake through December 31, 2035. The terms and conditions of this agreement also govern the prior water deliveries under two previous point of delivery agreements and their respective amendments among DWR, Castaic Lake, and Kern (SWPAO #02015, SWPAO #02015-A, SWPAO #03060, and SWPAO #03060-A, Bulletin 132-12). During 2017, a total of 5,340 af of Castaic Lake's water was delivered to Kern under this agreement, of which 5,000 af was Table A water and 340 af was Article 56(c) carryover water. (SWPAO #16032)

Dudley Ridge/San Gabriel

A multiyear exchange agreement among DWR, Dudley Ridge, and San Gabriel, executed April 11, 2017, approves the delivery of Dudley Ridge's approved Table A water to San Gabriel through December 31, 2035. In exchange, San Gabriel will return its future Table A water to Dudley Ridge within ten years of Dudley Ridge's water being delivered to San Gabriel or by December 31, 2035, whichever comes earlier. Terms and conditions of this agreement also cover prior water deliveries under a previous multi-year water exchange agreement among DWR, Dudley Ridge, and San Gabriel (SWPAO #10013, Bulletin 132-11). During 2017, a total of 1,487 af of Dudley Ridge's water was delivered to San Gabriel under this agreement, of which 35 af was Table A water and 1,452 af was Article 56(c) carryover water. (SWPAO #16028)

AVEK/Kern

A letter agreement among DWR, AVEK, and Kern, dated October 14, 2016, and executed January 3, 2017, approved the transfer of up to 5,000 af of AVEK's SWP water to Kern, on behalf of Tejon Ranch Company, which farms in both AVEK's and Kern's service areas. During 2017, no water was moved under this agreement. (SWPAO #16025)

AVEK/Metropolitan

A change in point of delivery agreement among DWR, AVEK, and Metropolitan, executed March 1, 2017, approves the delivery of up to 30,000 af of Metropolitan's approved SWP water to AVEK for storage in the groundwater basin underlying AVEK and for the future return of the stored water to Metropolitan through December 31, 2025. During 2017, a total of 10,000 af of Metropolitan's Table A water was delivered to AVEK under this agreement. (SWPAO #16006)

Santa Clara

An amendment (SWPAO 15017-A) between DWR and Santa Clara, executed October 31, 2017, extends the term of an agreement between DWR and Santa Clara (SWPAO #15017), to December 31, 2020. SWPAO #15017, executed September 21, 2015, allowed for additional temporary points of delivery to Santa Clara at O'Neill Forebay and/or San Luis Reservoir through December 31, 2017, to facilitate the return of Santa Clara's previously stored water in

the Semitropic Water Banking and Exchange Program. (SWPAO #15017 and #15017-A)

An amendment (SWPAO #15016-A) between DWR and Santa Clara, executed November 21, 2017, extends the term of an agreement between DWR and Santa Clara, (SWPAO #15016), to December 31, 2020. SWPAO #15016 executed September 21, 2015, allowed for additional temporary points of delivery of Santa Clara's SWP water at O'Neill Forebay and/or San Luis Reservoir through December 31, 2017. During 2017, a total of 3,497 af of a portion of Santa Clara's Article 56(c) carryover water was delivered to San Luis Reservoir under this agreement. (SWPAO #15016, #15016-A)

AVEK/Littlerock

An amendment (SWPAO #07031-A) among DWR, AVEK, and Littlerock, dated December 12, 2017, and executed December 22, 2017, extends the term of a letter agreement among DWR, AVEK, and Littlerock (SWPAO #07031), originally executed December 31, 2007, to December 31, 2020. SWPAO #07031 allowed for the delivery of up to 1,380 af of Littlerock's approved Table A water to AVEK through December 31, 2007, in exchange for an equal amount of AVEK's approved future Table A water to Littlerock by December 31, 2017. During 2017, no water was moved under this agreement. (SWPAO #07031-A, SWPAO #07031)

Water Conveyance and Exchange Agreements Prior to 2017

Mojave/Santa Clara

A letter agreement among DWR, Mojave, and Santa Clara, dated December 22, 2016, and executed December 29, 2016, approved the delivery of up to 8,000 af of Mojave's SWP water to Santa Clara by December 31, 2016. In exchange, Santa Clara will return to Mojave up to 4,000 af, based on an unbalanced exchange ratio of 2:1 of its future SWP water by December 31, 2026. During 2017, a total of 4,000 af of Santa Clara's Table A water was delivered to Mojave, thereby completing this agreement. (SWPAO #16022)

AVEK/Santa Clara

A letter agreement among DWR, AVEK, and Santa Clara, dated August 10, 2016, and executed August 24, 2016, approved delivery of up to 10,000 af of AVEK's SWP water to Santa Clara by December 31, 2016. In exchange, Santa Clara will return to Mojave up to 5,000 af, based on an unbalanced exchange ratio of 2:1 of its future SWP water by December 31, 2026. During 2017, a total of 5,000 af of Santa Clara's Table A water was delivered to AVEK, thereby completing this agreement. (SWPAO #16019)

AVEK/Santa Barbara

A letter agreement among DWR, AVEK, and Santa Barbara, dated August 9, 2016, and executed August 11, 2016, approved the delivery of up to 10,000 af of AVEK's SWP water to Santa Barbara by December 31, 2016. In exchange, Santa Barbara will return up to 5,000 af to AVEK, based on an unbalanced exchange ratio of 2:1 of its future SWP water by December 31, 2026. This agreement allowed storage of a portion of AVEK's SWP water in San Luis Reservoir that Santa Barbara was unable to take to its service area by December 31, 2016. The water stored in San Luis Reservoir was classified as carryover water and will be delivered to Santa Barbara in years 2017 and/or 2018. In 2016, a total of 10,000 af of AVEK's Table A water was made available to Santa Barbara; of this amount, 3,526 af of water was delivered to Santa Barbara and 6,474 af was stored in San Luis Reservoir as carryover water. During 2017, of the 6,474 af stored as carryover water, 5,793 af was spilled, and 681 af was delivered to Santa Barbara. Also in 2017, a total of 3,000 af of Santa Barbara's Table A water was

delivered to AVEK under this agreement. (SWPAO #16017)

Kern

A letter agreement between DWR and Kern, dated July 26, 2016, and executed August 22, 2016, approved the conveyance of up to 55,300 af per year for a combined total of up to 110,600 af of Kern-Tulare Water District's 2016 and 2017 CVP water to Kern. Reclamation made this non-SWP water available to DWR at O'Neill Forebay and/or Banks Pumping Plant. DWR conveyed the non-SWP water to Kern under Article 55 of Kern's water supply contract with DWR. This agreement is effective through February 28, 2018. During 2017, a total of 18,716 af of water was conveyed to Kern under this agreement. (SWPAO #16012)

San Bernardino/Santa Clara

A letter agreement among DWR, San Bernardino, and Santa Clara, dated July 16, 2015, and executed August 4, 2015, approved the delivery of up to 2,500 af of San Bernardino's approved 2015 Table A water to Santa Clara by December 31, 2015. In exchange, Santa Clara will return up to 5,000 af, based on an exchange ratio of 1:2 of its future approved SWP water. Santa Clara will return to San Bernardino up to 2,500 af by December 31, 2018, and up to 2,500 af by December 31, 2023. During 2017, a total of 2,500 af of Santa Clara's Table A water was delivered to San Bernardino under this agreement. (SWPAO #15014)

AVEK/Santa Barbara

A letter agreement (SWPAO #15005) among DWR, AVEK, and Santa Barbara, dated March 26, 2015, and executed April 10, 2015, approved the delivery of up to 7,500 af of AVEK's approved SWP water to Santa Barbara through December 31, 2015. In exchange, Santa Barbara will return up to 7,500 af to AVEK, based on an even exchange ratio of 1:1 of its future approved SWP water through December 31, 2025. An amendment (SWPAO #15005-A), dated July 27, 2015, and executed August 31, 2015, allowed a portion of AVEK's SWP water that Santa Barbara was unable to take full delivery to its service area by December 31, 2015, to be stored in San Luis Reservoir as carryover water for later delivery to Santa Barbara by December 31, 2017. Another amendment (SWPAO #15005-B), dated March 16, 2016, and executed March 22, 2016, increased the maximum water exchange amount from up to 7,500 af under the original agreement to up to 10,000 af. During 2017, a total of 5,781 af of Santa Barbara's Table A water was delivered to AVEK. A total of 796 af was delivered to Santa Barbara, of which 756 af was water previously stored in San Luis Reservoir as carryover water, and 40 af was Article 56(c) carryover water. (SWPAO #15005, #15005-A, and #15005-B)

AVEK/Santa Clara

A letter agreement among DWR, AVEK, and Santa Clara, dated March 18, 2015, and executed April 23, 2015, approved the delivery of up to 15,000 af of AVEK's approved SWP water to Santa Barbara by December 31, 2015. In exchange, Santa Clara will return up to 15,000 af to AVEK, based on an even exchange ratio of 1:1, of its future approved SWP water through December 31, 2025. During 2017, a total of 7,500 af of Santa Clara's Table A water was delivered to AVEK, thereby completing this agreement. (SWPAO #15004)

Palmdale/San Bernardino

A letter agreement among DWR, Palmdale, and San Bernardino, dated August 1, 2014, and executed August 14, 2014, approved the delivery of up to 2,500 af of San Bernardino's SWP water to Palmdale by December 31, 2014. In exchange, Palmdale will return up to 5,625 af to San Bernardino, based on an unbalanced exchange ratio of 1:2.25, of its future SWP water through December 31, 2018. During 2017, a total of 2,250 af of

Palmdale's Table A water was delivered to San Bernardino under this agreement. (SWPAO #14013)

Butte

A letter agreement between DWR and Butte, dated July 7, 2014, and executed July 29, 2014, approved the conveyance of up to 3,000 af per year of non-SWP water to California Water Service Company, a member agency of Butte through December 31, 2017. This non-SWP water is made available by Pacific Gas & Electric Company for DWR to convey to California Water Service Company's turnouts at the Thermalito Power Canal under Article 55 of Butte's water supply contract with DWR. During 2017, a total of 2,153 af of non-SWP water was conveyed under this agreement. (SWPAO #14011)

Butte

Three multiyear agreements (SWPAO #13013, #13014, and #13015) were executed in 2014 among DWR, Butte, and several participating SWP contractors. Butte's water supply contract with DWR allows for a maximum annual Table A amount of 27,500 af. Butte determined that 24,000 af of its annual Table A amount is not needed to meet its in-county demands for 2014 through 2021 and requested a transfer of up to 24,000 af per year of its Table A water to Palmdale, Dudley Ridge, and Kern. Up to 10,000 af of Butte's allocated Table A water is made available to transfer to Palmdale. Up to 14,000 af of Butte's allocated Table A water is shared on a percentage basis of 85.66 and 14.34 percent for transfer to Kern and Dudley Ridge, respectively. Butte also determined that the difference of 3,500 af per year (27,500 af minus 24,000 af) may not be fully utilized by Butte for its in-county needs and requested to transfer 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 2017, Butte's allocated Table A water was transferred as follows:

Butte/Kern. A multiyear agreement among DWR, Butte, and Kern, executed August 5, 2014, approved the annual delivery of a portion of Butte's allocated Table A water plus a portion of Butte's Additional Water when it becomes available to four of Kern's member units (Belridge Water Storage District, Berrenda Mesa Water Storage District, Lost Hills Water District, and Wheeler Ridge-Maricopa Water Storage District) in years 2014 through 2021. During 2017, a total of 11,610 af of Butte's Table A water was delivered to Kern under this agreement. (SWPAO #13015)

Butte/Dudley Ridge. A multiyear agreement among DWR, Butte, and Dudley Ridge, executed August 5, 2014, approved the annual delivery of a portion of Butte's allocated Table A water plus a portion of Butte's Additional Water when it becomes available to Dudley Ridge in years 2014 through 2021. During 2017, a total of 1,943 af of Butte's Table A water was delivered to Dudley Ridge under this agreement. (SWPAO #13014)

Butte/Palmdale. A multiyear agreement among DWR, Butte, and Palmdale, executed August 5, 2014, approved the annual delivery of a portion of Butte's allocated Table A water plus a portion of Butte's Additional Water when it becomes available to Palmdale in years 2014 through 2021. During 2017, a total of 7,916 af of Butte's Table A water was delivered to Palmdale under this agreement. (SWPAO #13013)

Dudley Ridge/Kern/Metropolitan

A multiyear exchange and change in point of delivery agreement among DWR, Dudley Ridge, Kern, and Metropolitan, executed December 16, 2013, approved the delivery of up to 8,700 af of Dudley Ridge's SWP water to Metropolitan by December 31,

2017. In exchange, Metropolitan will return up to 4,350 af to Dudley Ridge, based on an unbalanced exchange ratio of 2:1, of its future SWP water by December 31, 2022. This agreement allowed for the delivery of a portion of Dudley Ridge's SWP water to either Metropolitan's service area and/or to Kern's turnouts. Water delivered to Kern's turnouts was 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 2017, a total of 143 af of Metropolitan's Table A water was delivered to Dudley Ridge. Additionally, 5,062 af of Dudley Ridge's water was delivered to Kern's turnouts: 1,574 af was Table A water and 3,488 af was Article 21 water. (SWPAO #13012)

Coachella/Kern

A multiyear change in point of delivery and conveyance agreement among DWR, Coachella, and Kern, executed July 30, 2013, approved the annual delivery of up to 16,500 af of water acquired by Coachella through December 31, 2035. Glorious Land Company (GLC) and Rosedale-Rio Bravo executed an agreement in 2005 to provide a water supply from Rosedale-Rio Bravo to GLC's development project in Riverside County. GLC was not yet ready to receive the water to which it was entitled under the 2005 Rosedale-Rio Bravo/GLC agreement. In 2012, GLC and Coachella executed an assignment agreement that allowed Coachella to annually acquire up to 16,500 af of Rosedale-Rio Bravo's water under the 2005 Rosedale-Rio Bravo/GLC agreement (Assigned Water). This agreement allows for the delivery of 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 in exchange for a like amount of Assigned Water and/or (2) conveyance of the Assigned Water to Coachella under Article 55 of Coachella's water supply contract with DWR by direct pump-in of the Assigned Water into the California Aqueduct. During 2017, a total of 5,397 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 without any expected return. During 2017, a total of 7,500 af of Tulare's Table A water was delivered under this agreement. (SWPAO #12011)

Palmdale/Santa Barbara

A letter agreement among DWR, Palmdale, and Santa Barbara, dated February 28, 2011, and executed May 16, 2011, approved the exchange of up to 7,000 af of Santa Barbara's 2010 carryover water with Palmdale's future Table A water. To prevent the potential loss in the event that San Luis Reservoir would spill, Santa Barbara's 2010 carryover water was provided to Palmdale at O'Neil Forebay and subsequently delivered to Kern to facilitate a partial return of a previous water exchange between Kern and Palmdale (SWPAO #07029, Bulletin 132-09). Palmdale will return the water to Santa Barbara by December 31, 2021. During 2017, a total of 794 af of Palmdale's Table A water was delivered to Santa Barbara under this agreement. (SWPAO #11006)

Dudley Ridge/Kern

A multiyear same landowner transfer agreement among DWR, Dudley Ridge, and Kern, executed June 13, 2011, provides for the delivery of a portion of Dudley Ridge's Table A water for same landowner transfers to Kern through December 31, 2020 without any expected return. During 2017, a total of 9,025 af of Dudley Ridge's

water was delivered to Kern under this agreement: 4,225 af was Table A water and 4,800 af was Article 56(c) carryover water. (SWPAO #10030)

Empire/Westlands

A long-term change in place of use agreement among DWR, Empire, and Westlands, executed March 3, 2011, approved the annual delivery of up to 2,000 af of Empire's Table A water to Westlands through April 1, 2027. This transfer was made on behalf of two landowners, Brooks Farms and Newton Brothers Farms, who farm in Empire's and Westlands' service areas. DWR received the State Water Board approval on November 21, 2011 for the long-term change in place of use. During 2017, a total of 100 af of Empire's Table A water was delivered to Westlands under this agreement. (SWPAO #10008)

Tulare/Westlands

A long-term change in place of use agreement among DWR, Tulare, and Westlands, executed January 7, 2011, approved the annual delivery of up to 8,000 af of Tulare's 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, who farm in Tulare's and Westlands' service areas. DWR filed a petition with the State Water Board and received approval for a temporary change in place of use. The State Water Board issued an order authorizing the long-term change in place of use on November 21, 2011. In 2017, a total of 3,000 af of Tulare's water was delivered to Westlands under this agreement: 2,000 af was Table A water and 1,000 af was Article 56(c) carryover water. (SWPAO #10006)

Crestline/San Bernardino

A point of delivery agreement among DWR, Crestline, and San Bernardino, executed April 17, 2008, approved the delivery of a portion of San Bernardino's approved Table A water to Crestline. This agreement provides a total of 7,600 af for an emergency water supply to Lake Arrowhead Community Services District through December 31, 2020. During 2017, a total of 219 af of San Bernardino's Table A water was delivered to Crestline under this agreement. (SWPAO #07025)

Kings/Westlands

A long-term change in point of delivery agreement among DWR, Kings, and Westlands, executed May 6, 2008, provided for the delivery of Kings' approved SWP water to specific Westlands' turnouts located on the California Aqueduct for use on Westlands' agricultural lands within Kings' service area. This agreement is effective through December 31, 2035. During 2017, a total of 242 af of King's Article 21 water was delivered to Westlands' turnouts under this agreement. (SWPAO #07010)

Kings/Westlands

A long-term change in point of delivery agreement among DWR, Kings, and Westlands, executed March 24, 2004, provides for the delivery of up to 5,000 af of Kings' annual Table A water through Westlands' turnouts for use at Lemoore Naval Air Station. This agreement is effective through December 31, 2035. During 2017, a total of 1,656 af of Kings' Table A water was delivered to Westlands' turnouts under this agreement. (SWPAO #04005)

Solano/Cities of Fairfield, Vacaville, and Benicia

A settlement agreement among DWR, Solano, and the cities of Fairfield, Vacaville, and Benicia, which includes conveyance service by Solano, was executed on May 19, 2003. This agreement provides for delivery of up to 31,620 af per year of settlement water, through December 31, 2035, 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 2017, a total of 6,857 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 2017, a total of 4 af of Kings' Table A water was delivered to Westlands' turnouts. (SWPAO #02031)

Kern

A long-term change in point of delivery agreement between DWR and Kern, executed June 8, 2000, approved the delivery of a portion of Kern's annual Table A water to Western Hills Water District (Western Hills). In exchange, Kern will receive a like amount of local water acquired by Western Hills in the Pioneer Groundwater Bank. The State Water Board approved Western Hills' service area to be included within the authorized SWP place of use on April 21, 2000. During 2017, a total 738 af of Kern's water was delivered to Western Hills: 694 af was Table A water; 44 af was Article 56(c) carryover water. (SWPAO #01001)

Napa/Solano

A change in point of delivery agreement among DWR, Napa, and Solano, executed December 26, 2001, approved the delivery of up to 628 af of Napa's annual Table A water to the City of Vallejo's Water Treatment Plant in Solano's service area; this water is subsequently the City of American Canyon, a member agency of Napa. This agreement is effective through December 31, 2035. During 2017, a total of 24 af of Napa's Table A water was delivered to Solano's turnouts. (SWPAO #00029)

AVEK/Mojave

A change in point of delivery agreement (SWPAO #97003) among DWR, AVEK, and Mojave, executed November 13, 1997, allows for the delivery of up to 2,250 af of Mojave's approved Table A water to AVEK's turnouts through December 31, 2019. Mojave's water is delivered to the solar power generating plant that is located within Mojave's service area, but is not located near any of Mojave's delivery facilities. AVEK has the conveyance facilities and has agreed to provide water service on Mojave's behalf. An amendment (SWPAO #97003-A), executed January 12, 2012, extends the term of the original agreement to December 31, 2035, and increases the delivery amount to up to 4,800 af annually to AVEK's turnouts. SWPAO #97003-A allows the delivery of up to 1,800 af annually of Mojave's approved Table A water through AVEK's turnouts for use by the solar power generating plant, and the delivery of up to 3,000 af of Mojave's approved Table A water to AVEK's groundwater basin as a backup water supply to the plant in the event of an outage on the SWP system. Another amendment (SWPAO #97003-B) among DWR, Mojave, and AVEK, executed April 30, 2015, approved an additional point of delivery of Mojave's SWP Table A water to AVEK's turnout at Reach 20A of the California Aqueduct. During 2017, a total of 929 af of Mojave's water was delivered to AVEK under this agreement: 868 af was Table A water; and 61 af was Article 56(c) carryover water. (SWPAO #97003-B, #97003-A, and #97003)

Introduction of Local Water Agreement

AVEK

An agreement between DWR and AVEK, executed April 25, 2017, approved the introduction and conveyance of up to 26,000 af of AVEK's local groundwater into

the California Aqueduct within AVEK's service area, effective January 1, 2017 through December 31, 2020. During 2017, no water was moved under this agreement. (SWPAO #16026)

Turnout Agreements

AVEK

On May 1, 2017, DWR executed an agreement with AVEK for the operation and maintenance of the Fairmont, Willow Siphon, and Eastside Treatment Plant turnouts. The Fairmont, Willow Siphon, and Eastside Treatment Plant turnouts are located at Mileposts 323.19, 326.91, and 359.82, respectively, and have maximum design capacities of 180 cubic feet per second (cfs), 7 cfs, and 22 cfs, respectively.

Metropolitan

On May 15, 2017, DWR executed an agreement with Metropolitan for funding the costs of environmental analysis, planning and preliminary design of the Lake Perris Water Recovery Project.

Activities Related to the Monterey Amendments

Storage of Water Outside SWP Contractor Service Areas

Pursuant to Article 56(c) of the Monterey Amendments, eight 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 2017, a total of 349,721 af was conveyed to storage, including losses, and 12,238 af was recovered from storage.

Water Pool Programs

Turn-Back Water Pool Program. Pursuant to Article 56(d) of the Monterey Amendments, the Turn-Back Water Pool Program was initiated through "Notice to State Water Project Contractors, No. 17-03," dated February 10, 2017. All SWP water contractors who have signed the Monterey Amendments were permitted to participate in the program.

The program allowed SWP water contractors to offer a portion of their approved 2017 Table A water for sale in a turn-back pool for use by interested SWP water contractors. Based on Table A supply and demand, the Turn-Back Water Pool Program water was allocated among the purchasing contractors.

Initial offers for sales of Pool A and Pool B water of the Turn-Back Water Pool Program occurred in February and March 2017, respectively, with 9,000 af purchased under Pool A, and 3,750 af purchased under Pool B. Pool A Turn-Back water sold for $34.44 per af (50 percent of the 2017 Delta Water Rate). Pool B Turn-Back water sold for $17.22 per af (25 percent of the 2017 Delta Water Rate).

The 2017 Turn-Back Water Pool Program closed on June 1, 2017. Notices to SWP water contractors describing the Turn-Back Water Pool Program are available upon request.

Table 9-2 lists the SWP water contractors who participated in Pool A and Pool B of the 2017 Turn-Back Water Pool Program.

Multiyear Water Pool Program. The 2015–2016 Multiyear Water Pool Program was initiated through a program letter sent to all SWP water contractors, dated February 2, 2015.

The Multiyear Water Pool Program closed on June 15, 2016, and all deliveries under

Table 9-1 Storage of Water Outside SWP Water Contractor Service Areas in 2017 (acre-feet)[1]

Contractor	Contract Status	Storage Provider	To Storage (includes losses, if any)	From Storage	Return By
Alameda-Zone 7					
SWPAO #99018	Continuing	Semitropic	0	0	2035
SWPAO #00037[a]	Continuing	Semitropic	0	0	2035
SWPAO #01035[a]	Continuing	Semitropic	0	0	2035
SWPAO #02010[a]	Continuing	Semitropic	0	0	2035
SWPAO #03008[a]	Continuing	Semitropic	0	0	2035
SWPAO #04017	Continuing	Semitropic	17,500	0	2035
SWPAO #06010	Continuing	Cawelo	12,500	0	2035
Alameda County					
SWPAO #99017	Continuing	Semitropic	0	0	2035
SWPAO #00030	Continuing	Semitropic	0	0	2035
SWPAO #07005	Continuing	Semitropic	0	0	2035
SWPAO #10009	Continuing	Semitropic	19,302	0	2035
Castaic Lake					
SWPAO #02015[a]	Continuing	Semitropic	0	0	2035
SWPAO #03060[a]	Continuing	Semitropic	0	0	2035
SWPAO #05016	Continuing	Rosedale-Rio Bravo	0	0	2035
SWPAO #16032	Continuing	Semitropic	5,340	0	2035
Dudley Ridge					
SWP Water					
SWPAO #08050	Continuing	Kern Water Bank	39,901	0	2035
SWPAO #09002	Continuing	Semitropic	0	0	2035
Non-SWP Water					
SWPAO #09040[a]	Continuing	Kern Water Bank	0	0	2020
SWPAO #03053	Continuing	Cawelo	0	0	2035
Metropolitan					
SWPAO #95010	Continuing	Semitropic	69,511	0	2035
SWPAO #01013[a]	Continuing	Arvin-Edison	57,307	12,238	2035
SWPAO #03019	Continuing	Kern Delta	47,197	0	2035
SWPAO #11011	Continuing	Mojave	0	0	2035
SWPAO #11022	Continuing	Rosedale-Rio Bravo	0	0	2017
SWPAO #16006	Continuing	AVEK	10,000	0	2025
Santa Barbara					
SWPAO #17022	Continuing	Semitropic	0	0	2035
San Bernardino					
SWPAO #11015	Continuing	Kern Delta	0	0	2035
Santa Clara					
SWP Water					
SWPAO #99016	Continuing	Semitropic	0	0	2035
SWPAO #00031	Continuing	Semitropic	0	0	2035
SWPAO #06011	Continuing	Semitropic	0	0	2035
SWPAO #10012	Continuing	Semitropic	3,555	0	2035
Non-SWP Water					
SWPAO #06012[a]	Continuing	Semitropic	0	0	2035
SWPAO #10029	Continuing	Semitropic	0	0	2035
SWPAO #11012	Continuing	Semitropic	67,608	0	2035
Total[2]			**349,721**	**12,238**	

[1] Storage amounts in this table may differ from the amounts in Table 9-4 due to water-type reclassification.
[2] 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.
[a] Indicates amendments to agreement.

Table 9-2 Turn-Back Water Pool Program (acre-feet)

	Pool A	
Ventura	**9,000**	
Alameda-Zone 7		**470**
Santa Clara		**582**
Kings		**54**
Dudley Ridge		**264**
Kern-Agricultural		**5,724**
Tulare		**510**
Santa Barbara		**265**
Coachella		**806**
Desert		**325**
	Pool B	
Ventura	**3,750**	
Alameda-Zone 7		**242**
Kings		**28**
Dudley Ridge		**136**
Kern-Agricultural		**2,946**
Tulare		**262**
Santa Barbara		**136**

the program were made in 2015 and 2016, except for 693 af. The remaining 693 af was carried over and delivered to Tulare in January 2017.

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 a 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 delta excess conditions Solano County and Napa County are contracted to receive Article 21 deliveries in all years. During 2017, 296,919 af of Article 21 water was delivered to SWP water contractors.

Table 9-3 lists Article 21 water delivered to SWP water contractors.

Table 9-3 Article 21 Water Deliveries (acre-feet)

Contractor	Purchased
AVEK	17,400
Dudley	15,722
Kern-Agricultural	114,112
Kings	1,414
Metropolitan	123,950
Napa	6,429
San Gabriel	3,057
Santa Barbara	4,835
Ventura	10,000
Total	**269,919**

Flexible Storage Program

Pursuant to Article 54 of the Monterey Amendments, the Flexible Storage Program provides the option to SWP water contractors participating in the repayment of the capital costs of Castaic Lake and Lake Perris to withdraw water in excess of approved deliveries. The program objective is to provide additional flexibility to benefit local water management activities. Participating SWP water contractors are given 5 years to replace withdrawn stored water with approved SWP or non-SWP water.

Flexible storage allows for withdrawal of up to 160,000 af at Castaic Lake and 65,000 af at Lake Perris. SWP water contractors participating in the Castaic Lake Flexible Storage Program include Metropolitan, Ventura, and Castaic. These contractors

are allowed to withdraw up to a maximum of 153,940 af, 1,377 af, and 4,683 af, respectively. Metropolitan is the only SWP water contractor allowed to withdraw water, up to a maximum of 65,000 af, from Lake Perris.

In 2017, Metropolitan started the year with a balance of -65,000 af in flexible storage. Metropolitan did not withdraw any water in 2017, but repaid 65,000 af in flexible storage, leaving Metropolitan with an end-of-year balance of zero. Castaic Lake started the year with a balance of -85 af in flexible storage. Castaic Lake did not withdraw any water in 2017, but repaid 85 af, leaving Castaic Lake with an end-of-year balance of zero.

Carryover Program

Pursuant to Article 56 of the Monterey Amendments, SWP water contractors can elect to store SWP water outside of their respective service areas and carry the water 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.

In 2017, a total to 463,127 af of carryover water was delivered. Twenty SWP water contractors took delivery of Article 56(c) water in the amount of 462,083 af of previously approved Table A water, carried over as extended carryover. A total of 1,044 af of SWP water contractors' carryover water was delivered to non-SWP contractors.

2017 Water Transfers

When dry or critical hydrologic conditions result in significant water supply shortages, DWR enters into water transfer conveyance agreements with SWP water contractors and non-SWP contractors. Transfer water is made available from a combination of reservoir releases and groundwater substitution. Conveyance losses and carriage water losses are a component of water transfer deliveries. In 2017, there were no water transfers.

Lower Yuba River Accord

For Lower Yuba River Accord background information, see the sidebar, Lower Yuba River Accord.

Component 1, 2, 3, and 4 Water Deliveries

In 2017, the Sacramento 40-30-30 Water Supply Index was “wet,” and the Delta was in excess conditions throughout most of the water transfer season. Due to the “wet” water supply index classification, there were no Component 1 water deliveries. Additionally, there were no Component 2, 3, or 4 water deliveries. A shortfall of 869 af of prepaid Component 1 water from 2015 remains and must be repaid by Yuba in the next year that is not classified as dry or critical.

For additional information about the Lower Yuba River Accord, see previous Bulletin 132 editions.

Agreements with Non-SWP Contractors

In addition to negotiating agreements with SWP water contractors to provide for specified water deliveries, DWR also enters into agreements with non-SWP contractors to provide water conveyance service.

Lower Yuba River Accord

The Lower Yuba River Accord (Yuba Accord) settled long standing litigation over instream flow issues associated with the operation of the Yuba River Development Project. Operated by the Yuba County Water Agency (Yuba), the Yuba River Development Project's primary purposes are water supply, flood control, power generation, recreation, and environmental protection and enhancement.

The Yuba Accord was developed collaboratively by fisheries, environmental, and agricultural interests and local, state, and federal agencies. It provides a framework for a comprehensive, science-based, consensus-oriented program to protect and enhance 24 miles of the lower Yuba River extending from Englebright Dam downstream to the Yuba River's confluence with the Feather River. The Yuba Accord establishes instream flow requirements to provide sufficient flows in the river for fisheries and to allow Yuba to meet local water needs and transfer water to other users. It provides Yuba with a source of revenue for local activities, including a comprehensive conjunctive use program, flood control improvements, and a lower Yuba River fisheries program. It also improves water supply reliability for the State Water Project (SWP) and Central Valley Project (CVP).

The Yuba Accord is based on three separate but related agreements: a water purchase agreement; a set of conjunctive use agreements; and a fisheries agreement. The agreements were executed in late 2007 and early 2008, and the State Water Resources Control Board approved the Yuba Accord on March 25, 2008.

Fisheries Agreement

The Fisheries Agreement is between DWR, Yuba, the Department of Fish and Wildlife, Friends of the River, South Yuba Citizens League, The Bay Institute, and Trout Unlimited. The U.S. Fish and Wildlife Service and National Marine Fisheries Service participate under the Statement of Support for Proposed Lower Yuba River Fisheries Agreement. The Fisheries Agreement establishes instream flow requirements to benefit salmon, steelhead, and other fish species in the lower Yuba River by improving instream habitat conditions. The agreement also establishes a long-term fisheries monitoring, studies, and enhancement program for the lower Yuba River.

Conjunctive Use Agreements

The conjunctive use agreements between Yuba and its member units establish a comprehensive conjunctive use program that integrates surface water and groundwater supplies with the local irrigation districts and mutual water companies that Yuba serves in Yuba County. Groundwater supplies will help meet local water supply needs in dry years, facilitating Yuba's operation of its storage facilities to meet the instream flow requirements called for in the Fisheries Agreement and commitments of water transfer in the Water Purchase Agreement.

Water Purchase Agreement

The Water Purchase Agreement is between Yuba and DWR. It creates a long-term water transfer program, allowing Yuba River water to be transferred to other users in

California and to provide 60,000 acre-feet per year to offset Delta SWP and CVP export reductions for the protection and restoration of Delta fisheries. The Water Purchase Agreement has been amended five times, and 24 agencies have agreed to continue their participation through 2020.

Under the agreement, the range of transfer volumes is segregated into four components, which reflect variations in pricing, purpose of use, and schedule:

Component 1 water includes 60,000 af purchased by DWR and Reclamation annually.

Component 2 water includes water that DWR and Reclamation purchase from Yuba—15,000 af in a dry year and 30,000 af in a critical year.

Component 3 water supplies include 40,000 af of water that Yuba makes available for purchase by DWR and Reclamation under certain SWP and CVP delivery allocation scenarios.

Component 4 water includes any additional water available from surface and groundwater supplies that Yuba may offer to DWR and Reclamation for purchase.

Reclamation and Cross Valley Canal Contractors

Through eight, 3-party Cross Valley Canal (CVC) contracts with Reclamation and CVC water contractors and the associated changes in points of delivery contracts, DWR conveys CVP water for CVC water contractors. Current contracts are effective March 1, 2016 through February 28, 2018. The following eight CVP water contractors are defined as CVC water contractors: County of Fresno, County of Tulare, Hills Valley Irrigation District, Kern-Tulare Water District, Lower Tule River Irrigation District, Pixley Irrigation District, Rag Gulch Water District, and the Tri-Valley Water District.

DWR entered into two new change in point of delivery (POD) contracts in 2017. DWR executed an agreement with Kern-Tulare Water District to change the POD from Reach 12E to Reaches 9–13B of the California Aqueduct for up to 70,550 af of its 2017–2018 CVP water on June 21, 2017. This change facilitated delivery to Kern County Water Authority. (SWPAO #17301)

DWR executed an agreement with Lower Tule River Irrigation District to change the POD from Reach 12E to Reaches 10A–12E of the California Aqueduct for up to 2,000 af of its 2017–2018 CVP water on September 6, 2017. This change facilitated delivery to Semitropic Water District. (SWPAO #17302)

DWR delivered a total of 36,860 af to CVC water contractors during 2017 as follows: Kern-Tulare, 33,750 af (SWPAO #16307, #16310, and #17301); Lower Tule River Irrigation District, 1,555 af (SWPAO #16308); and Pixley Irrigation District, 1,555 af (SWPAO #16309).

Del Puerto Water District

An exchange agreement among DWR, Reclamation, Del Puerto Water District (Del

Puerto), and Oak Flat Water District (Oak Flat), executed November 21, 2017, approved the exchange of up to 2,000 af of Del Puerto's CVP water for an equivalent amount of Oak Flat's SWP water through June 7, 2018. DWR will deliver up to 2,000 af of SWP water 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 the State Water Resources Control Board (State Water Board), and received a 1-year approval order, effective June 8, 2017, for the consolidation of SWP and CVP places of use. During 2017, a total of 311 af was delivered to Oak Flat's turnouts under this agreement. (SWPAO #17012)

An exchange agreement among DWR, Reclamation, Del Puerto, and Oak Flat, executed September 6, 2016, approved the exchange of up to 2,000 af of Del Puerto's CVP water for an equivalent amount of Oak Flat's SWP water through May 16, 2017. DWR agreed to deliver up to 2,000 af of SWP water to Del Puerto using Oak Flat's turnouts in the California Aqueduct. In exchange, Reclamation would make an equivalent amount of Del Puerto's CVP water available to DWR at O'Neill Forebay. DWR filed a petition with the State Water Board, and received a 1-year approval order, effective May 17, 2016, for the consolidation of SWP and CVP places of use. During 2017, a total of 106 af was delivered to Oak Flat's turnouts under this agreement. (SWPAO #16003)

Reclamation—Joint Point of Diversion

On March 24, 2016, DWR renewed the joint point of diversion agreement with Reclamation. Under this agreement, DWR makes excess SWP conveyance capacity available to Reclamation for the conveyance of water from the Delta at Banks Pumping Plant. This includes: (1) making up for curtailed water exports from Jones Pumping Plant associated with improving conditions for fish in the Delta; (2) replacing water exports foregone during maintenance and repair of CVP facilities between the Delta and O'Neill Forebay; and (3) conveying Reclamation's share of Component 1 water provided under the Yuba Accord. As part of the joint point of diversion agreement, the first 21,000 af conveyed through Banks Pumping Plant for July, August, and September of each year include a charge for the temporary barriers in the Delta.

In 2017, DWR pumped 14,900 af of CVP water at Banks Pumping Plant. After applying a 2 percent deduction for contract conveyance losses, DWR conveyed 14,602 af of CVP water at O'Neill Forebay. (SWPAO #16300 and #12300)

Reclamation and Kern National Wildlife Refuge—U.S. Fish and Wildlife Service

A letter agreement sent by DWR on September 17, 2012, and accepted by Reclamation on September 21, 2012, provided for DWR to deliver up to 30,500 af of CVP water to the Kern National Wildlife Refuge from June 1, 2012, through September 30, 2028. Under this agreement, DWR conveys CVP water from the end of Reach 7 of the California Aqueduct to Buena Vista Water Storage District's turnouts in Reaches 10A and 12E. DWR conveyed a total of 29,021 af during 2017. (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 472 af to the national cemetery

through Reach 2B of the California Aqueduct in 2017 under this pending agreement. (SWPAO #10310)

Reclamation and Byron Bethany Irrigation District—Musco Family Olive Company

A pending agreement among DWR, Byron Bethany Irrigation District (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 478 af in 2017 under this pending agreement. (SWPAO #04300)

Delta Settlement Agreements

DWR negotiated contracts with various Delta agencies to settle adverse impact claims by the agencies against DWR due to operation of the SWP. Water deliveries to these agencies in 2017 are reported in the sections covering deliveries to non-SWP contractors later in this chapter.

Byron Bethany Irrigation District

DWR and Byron Bethany executed an agreement on May 28, 2003, that describes the nature and extent of Byron Bethany's right for the diversion of water from the Delta for agricultural, municipal, and industrial uses within the district. This agreement terminated a 1993 exchange agreement.

City of Antioch

DWR and the City of Antioch executed an agreement on April 11, 1968, that requires DWR to reimburse the City of Antioch for decreases in usable San Joaquin River water availability caused by operation of the SWP. The agreement was amended October 29, 2013 to update boundaries and clarify measurement definitions. DWR reimburses the City of Antioch for the purchase of substitute water when the number of usable days, as defined by the contract, is below 208. Credits for the number of usable days above 208 in this same period accrue to offset the water-day deficiencies in future years.

In 2017, DWR determined that 246 usable days were available to the City of Antioch under the contract. This resulted in 38 days of carryover credit to offset future water deficiency entitlements. With no deficiency in water supply, DWR did not reimburse the City of Antioch for purchase of substitute water.

Contra Costa Water District

DWR and Contra Costa Water District (Contra Costa) executed an agreement on April 21, 1967, that requires DWR to reimburse Contra Costa for decreases in availability of usable river water in Mallard Slough caused by operation of the SWP. DWR reimburses Contra Costa for the purchase of substitute water when the number of usable days, as defined by the contract, is below 142. Credits for the number of usable days above 142 in this same period accrue to offset the water-day deficiencies in future years.

In 2017, DWR determined that 188 usable days were available to Contra Costa under the contract, resulting in 46 days of carryover credit to offset future water deficiency entitlements. With no deficiency in water supply, DWR did not reimburse Contra Costa Water District for contract deficiencies.

East Contra Costa Irrigation District

DWR and East Contra Costa Irrigation District (East Contra Costa) executed an agreement on January 7, 1981, that requires East Contra Costa to make payments to DWR for the assurance of adequate water supply and specific water quality from Delta channels. An agreement between DWR, East Contra Costa, and Contra Costa, executed April 11, 1991, allows for intake at Rock Slough on Contra Costa Canal by Contra Costa to treat water for municipal and industrial users within East Contra Costa's service area. It

was amended February 7, 2000, to allow diversions under both contracts at the Rock Slough intake of the Contra Costa Canal and the Los Vaqueros Reservoir intake at Old River.

East Contra Costa paid DWR $47,681 for the assurance of adequate water supply and specific water quality in 2017.

North Delta Water Agency

North Delta Water Agency's (North Delta) agreement with DWR, executed January 28, 1981, requires North Delta to make payments to DWR for the assurance of adequate water supply and specific water quality from Delta channels. An amendment signed on January 21, 1997, changed the monitoring station at Emmaton to Three Mile Slough and reduced North Delta's payments in lieu of assessments on land DWR owns within North Delta's jurisdiction. A memorandum of understanding was executed on May 26, 1998, to establish the joint position with respect to implementation of water quality objectives contained in the 1995 Bay-Delta water quality control plan.

An agreement executed on May 21, 2008, resolved a lawsuit regarding the assessment of Department of Fish and Wildlife's (DFW) land within North Delta boundaries. Under this agreement DWR agreed to reimburse North Delta for lands owned by DFW within North Delta's boundaries. The 2008 agreement expired May 4, 2011. Effective 2017 DFW will directly pay North Delta for the assessment of DFW lands. DWR invoiced North Delta $617,836 for the assurance of adequate water supply and specific water quality in 2017.

South Delta Water Agency

In September 1990, DWR completed negotiations for a long-term agreement with South Delta Water Agency and Reclamation. The parties agreed to proceed with the design, construction, and operation of certain barrier facilities in South Delta channels. These facilities resolved portions of the lawsuit that South Delta Water Agency filed in 1982 regarding the alleged effects of export pumping by the SWP and CVP on water levels, quality, and circulation in the South Delta.

DWR annually installs and operates 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.

For more information about the temporary barriers in the South Delta, see Chapter 2, Delta Resources.

Water 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.

Summary of 2017 Water Deliveries

In 2017, a total of 4,786,635 af of SWP and non-SWP water was delivered to 29 SWP water contractors and 21 non-SWP agencies. The SWP portion totaled 3,711,703 af, and the non-SWP portion totaled 1,074,932 af.

Figure 9-1 shows amounts of water delivered to various locations during 2017.

SWP

DWR conveys SWP water, as defined in the SWP water contracts. SWP water includes current year Table A water, transfer and exchange of Table A water, carryover of Table A water, Turn-Back Pools A and B water, Multiyear Water Pool Program water, and Article 21 water.

The 2,247,352 af delivered to SWP water contractors was categorized as follows:

- 2,247,352 af of Table A water
- 367,946 af of transfers and exchanges of Table A water among SWP water contractors
- 13,443 af of Turn-Back Water Pool Program and Multiyear Water Pool Program water
- 462,083 af of 2017 carryover water
- 296,677 af of Article 21 water
- 78,553 af of water bank recovery
- 42,467 af of delivery of backup water
- 6,857 af of settlement water
- 25,822 af of local water
- 6,218 af of permit water
- 164,284 af of other non-SWP programs

Non-SWP

DWR conveys non-SWP water to various non-SWP contractors according to the terms of water rights and water transfer and exchange agreements. Non-SWP water may include contracted supply; water bank recovery water; local water; recreation water; fish and wildlife enhancement water; water delivered to Cross Valley Canal contractors, Reclamation, and Delta agencies; and annual contracts.

The 1,074,932 af portion delivered to 21 non-SWP agencies was categorized accordingly:

- 13,191 af of SWP contracted supply
- 982,524 af of regulated delivery of local supply
- 341 af for parks and recreation
- 780 af for fish and wildlife
- 48,125 af for Cross Valley Canal Contractors
- 29,021 af for Kern National Wildlife Refuge
- 950 af for annual contracts

Allocation of Table A Water

Each year, by October 1, SWP water contractors submit initial requests for Table A water deliveries allocated to them for use in the subsequent calendar year. Initial Table A allocation amounts for the coming year are made by DWR in December. The Table A allocations are based on operations studies that assume 90 percent exceedance of historical water supply (where exceedance refers to the possibility that water supply in the coming year will be less than the historical average annual water supply), current reservoir storage, and total requests by the SWP water contractors. Forecasts for the year are updated as hydrologic conditions change. Table A amounts are increased or decreased depending on both actual and projected hydrologic conditions, though decreases are rare as the 90 percent exceedance criterion is fairly conservative.

On October 1, 2016, SWP water contractors submitted initial requests for 2017 totaling 4.17 million acre-feet (maf).

DWR approved delivery of 0.83 maf on December 1, 2016, resulting in initial Table A amounts of 20 percent of SWP water contractor requests. DWR increased the 2017 Table A amounts to 3.6 maf, for a final allocation of 85 percent, on April 14, 2017.

Figure 9-1 Water Delivered in 2017 and Delivery Locations of SWP Water Contractors and Feather River Area Districts with Water Rights Agreements with DWR

Table 9-4 lists the changes in Table A amounts that were approved by DWR based on updated hydrologic conditions.

Table 9-4 2017 Allocated Table A Amounts

Notice to SWP Contractors No.	Allocation Amount (maf)	Percentage of Requested Water
16-09	0.84	20
16-10	1.89	45
17-01	2.54	60
17-05	3.56	85

Specific Water Delivery Information

Specific information about water deliveries made to SWP water contractors and other agencies during 2017, and historical deliveries from 1962 through 2017, is presented in the following four sections, each with a corresponding table located at the end of the chapter.

Please note that the water delivery figures listed in the tables are accurate at the time of this Bulletin 132 publication, but small volumes of water may be reclassified over time pursuant to SWP water 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.

Water Delivered to SWP Water Contractors in 2017 by Service Area

Table 9-5 shows SWP water delivered in 2017 by service area. The following information is arranged by column number.

Columns 1 through 5 show a detailed breakdown of Table A water delivered to SWP water contractors in 2017. (The amounts also include SWP water that was delivered to non-SWP contractors.)

Column 3 shows 13,443 af of Water Pool Program water delivered to SWP water contractors in 2017.

Column 4 shows 463,127 af was carried over from previous years for delivery in 2017. The carryover water included deliveries to non-SWP agencies.

The carryover program was designed to encourage the most effective and beneficial use of water and to avoid obligating SWP water contractors to use or lose water by December 31 of each year. The SWP water contractors' water supply contracts and amendments state the criteria for carrying over Table A water from one year to the next under Articles 12(e), 14(b), and 56(c).

Column 5 shows all Table A water delivered in 2017—a total of 3,103,773 af.

Column 6 shows Article 21 water delivered to SWP water contractors. In 2017, 296,919 af of Article 21 water was delivered.

Column 7 shows 6,857 af of other SWP water. Other SWP water consists of settlement water delivered to Solano.

Column 8 shows a total of 3,407,550 af of SWP water was delivered in 2017. This includes total Table A water not transferred, exchanged or stored; Table A water transferred or exchanged; Multiyear Water Pool Program water; carryover; and other SWP water consisting of settlement water.

Columns 9, 10, and 11 include deliveries of non-SWP water to SWP water contractors. Column 9 shows delivery of 41,467 af of backup water, Column 10 shows 78,553 af of water bank recovery, and Column 11 shows 196,324 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.

Column 12 shows total amounts of water delivered to SWP water contractors. In 2017, the SWP delivered 3,724,894 af of water to the 29 SWP water contractors.

Water Delivered in 2017 by Month

Table 9-6 shows water delivery amounts by month. During 2017, the SWP provided water service to 50 agencies, including 29 SWP water contractors. The following discussion summarizes the SWP and non-SWP water deliveries.

SWP Water. SWP water, as defined in the SWP water contracts, includes current year Table A amounts, transfer and exchange of Table A water, carryover of Table A water, Turn-Back Pools A and B water, Multiyear Water Pool Program water, and Article 21 water. Detailed information concerning those conveyances for 2017 is found under the "Miscellaneous Agreements with SWP Water Contractors" section in this chapter's preceding pages or is listed below.

Deliveries in the North Bay area included 500 af of Vallejo permit water delivered to Napa, and 6,857 af of settlement water delivered pursuant to the May 19, 2003, Settlement Agreement among DWR, Solano County Water Agency, and the Cities of Fairfield, Vacaville, and Benicia.

In the South Bay area, a total of 17,740 af of local water was delivered to Alameda-Zone 7 and Alameda County. These two South Bay Aqueduct SWP water contractors hold water rights to runoff from the Lake Del Valle watershed.

In the Southern California area, 1,008 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.

Non-SWP Water. In 2017, DWR used SWP facilities to convey non-SWP water for various non-SWP agencies according to the terms of water rights and water transfer and exchange agreements. Detailed information concerning those deliveries is in this chapter's preceding pages or is listed below.

Last Chance Creek Water District. Under the water supply agreement between DWR and Last Chance Creek Water District, dated April 29, 2013, a total of 9,996 af was supplied from Frenchman Lake to Last Chance Creek Water District.

Water Rights Water. Water in this category is transported through SWP facilities to agencies with settlement agreements with DWR. Some water passes through SWP transportation facilities; some is stored in SWP reservoirs for release later. In 2017, the following water was delivered to the Feather River, North Bay, South Bay, Delta, and Southern California areas, as summarized below.

Seven non-SWP contractors in the Feather River Area received 955,906 af, under their water right settlement agreements, as follows:

- Garden Highway Mutual Water Company, 17,163 af
- Joint Water Districts Board, 642,745 af
- Oswald Water District, 1,506 af
- Plumas Mutual Water Company, 12,714 af
- Tudor Mutual Water Company, 2,159 af
- Western Canal Water District, 279,287 af
- Valberde and Ramelli, 332 af

DWR conveyed local water totaling 1,304 af through SWP facilities on behalf of Thermalito Water and Sewer District (formerly Thermalito Irrigation District).

Delta. In the Delta, 15,318 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 diverted 16,091 af of water in 2017 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.*

Annual Table A Water and Water Conveyed by Type Since 1962

Table 9-7 shows information on annual Table A water and water conveyed, by type, for the previous 56 years. The following discussion is arranged according to column numbers.

Annual Table A Water. Columns 1 through 7 show the amount of SWP water contractors' annual maximum Table A water by area for years 1962 through 2017 as specified in the Table A schedules of the SWP water contracts.

In some instances, Table A schedules—projections of each contractor's need for water to 2035—have been amended to meet the needs of individual contractors. The amounts of annual Table A water each SWP water contractor may request for years 1962 through 2035 can be found in Table B-4 of Appendix B in the back of this bulletin.

Water Delivered. Columns 8 through 16 show water delivered or conveyed, including initial fill water and operational losses and storage changes.

Table A Water. Column 8 shows amounts of Table A water delivered each year from 1962 through 2017. In 2017, a total of 3,103,773 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 2017. 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 2017, a total of 296,919 af of Article 21 or unscheduled water was delivered.

Other Water. Column 10 includes amounts of water classified as other water delivered in 2017, including non-SWP water conveyed through SWP facilities and regulated delivery of local supply. In 2017, a total of 417,962 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 contractors on the Feather River, including Last Chance Creek Water District. In 2017, a total of 967,206 af was delivered to agencies in the Feather River area.

Recreation and Fish and Wildlife Water. Column 12 shows water conveyed for recreational use or to improve water quality for fish and wildlife. In 2017, a total of 775 af of SWP water was conveyed for this purpose.

Initial Fill Water. The quantities listed in Column 14 represent the amounts used to initially fill the aqueducts and reservoirs south of the Delta to maximum operating capacities. Initial filling began in 1962, with the filling of the South Bay Aqueduct, and was completed in 1979, when Lake Perris reached its maximum operating capacity of 127,000 af. In 1996 and 1997, the Coastal Aqueduct was initially filled.

Operational Losses. Column 15 includes the total amounts of water lost through evaporation and seepage, net storage changes in reservoirs south of the Delta, and amounts of inflow from local drainage areas,

including inflows into San Luis Canal and from the Kern River Intertie. Negative values are indicated for years when withdrawals and evaporation from reservoirs south of the Delta exceed the amounts of water added to the reservoirs.

SWP Water Delivered Since 1962

Table 9-8 shows SWP water delivered by category from 1962 to 2017.

Table 9-5 Water Delivered to SWP Water Contractors in 2017, by Service Area (acre-feet)[1,2]

Service Area and SWP Contractor	Table A Water Deliveries					SWP Water			Non-SWP Water			Total Water Delivered [12]
	2017 Table A Not Transferred, Exchanged, or Stored [1]	2017 Table A Transferred or Exchanged [2]	2017 Water Pool Programs [3]	Carryover Water [4]	Total Table A [5]	2017 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	167	21,385	-	-	21,552	-	-	21,552	-	-	2,153	23,705
Plumas	363	-	-	-	363	-	-	363	-	-	-	363
Yuba City	1,746	-	-	-	1,746	-	-	1,746	-	-	-	1,746
North Bay												
Napa	950	24	-	822	1,796	6,429	-	8,225	-	-	-	8,225
Solano	15,190	-	-	-	15,190	-	6,857	22,047	-	-	6,218	28,265
South Bay												
Alameda-Zone 7	29,314	29,124	712	2,959	62,109	-	-	62,109	-	-	11,236	73,345
Alameda County	9,260	18,000	-	1,776	29,036	-	-	29,036	-	-	6,504	35,540
Santa Clara	9,779	19,000	582	25,972	55,333	-	-	55,333	599	-	82,723	138,655
San Joaquin Valley												
Oak Flat	2,858	-	-	35	2,893	-	-	2,893	-	-	-	2,893
Kings	3,489	1,660	82	-	5,231	1,414	-	6,645	-	-	-	6,645
Dudley Ridge	5,707	22,294	400	9,838	38,239	15,722	-	53,961	14,460	-	371	68,792
Empire	318	1,380	-	-	1,698	-	-	1,698	-	-	-	1,698
Kern	740,162	8,145	8,670	165,613	922,590	114,112	-	1,036,702	688	66,315	67,940	1,171,645
Tulare	37,460	11,659	1,465	7,336	57,920	-	-	57,920	-	-	4,000	61,920
Central Coastal												
San Luis Obispo	2,263	-	-	582	2,845	-	-	2,845	-	-	-	2,845
Santa Barbara	15,770	9,359	401	18,150	43,680	4,835	-	48,515	1,437	-	-	49,952
Southern California												
AVEK	48,706	34,643	-	15,581	98,930	17,400	-	116,330	-	-	-	116,330
Castaic Lake	38,132	-	-	33,442	71,574	-	-	71,574	-	-	-	71,574
Coachella	47,617	-	806	30,088	78,511	-	-	78,511	-	-	5,397	83,908
Crestline	294	2,000	-	-	2,294	-	-	2,294	-	-	1,008	3,302
Desert	19,188	-	325	12,123	31,636	-	-	31,636	-	-	-	31,636
Littlerock	-	-	-	-	-	-	-	-	-	-	-	-
Metropolitan	1,084,494	196,991	-	130,511	1,411,996	123,950	-	1,535,946	25,283	12,238	-	1,573,467
Mojave	29,127	868	-	820	30,815	-	-	30,815	-	-	7,074	37,889
Palmdale	4,355	3,100	-	1,587	9,042	-	-	9,042	-	-	-	9,042
San Bernardino	69,342	219	-	4,185	73,746	-	-	73,746	-	-	-	73,746
San Gabriel	17,505	-	-	7	17,512	3,057	-	20,569	-	-	-	20,569
San Gorgonio	9,546	-	-	1,700	11,246	-	-	11,246	-	-	1,700	12,946
Ventura	4,250	-	-	-	4,250	10,000	1	14,251	-	-	-	14,251
Total	**2,247,352**	**379,851**	**13,443**	**463,127**	**3,103,773**	**296,919**	**6,858**	**3,407,550**	**42,467**	**78,553**	**196,324**	**3,724,894**

[1] 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.

[2] This table includes SWP water that was delivered to non-SWP contractors. Transfers and exchanges shown in Column 2 include SWP water deliveries to non-SWP contractors.

Table 9-6 Total Amounts of Water Delivered in 2017, by Month (acre-feet)

Contracting Agency and Type of Service	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	2017 Total Deliveries
FEATHER RIVER AREA													
SWP Agencies													
City of Yuba City													
Table A	0	0	0	0	0	0	888	858	0	0	0	0	1,746
Yuba Total	0	0	0	0	0	0	888	858	0	0	0	0	1,746
County of Butte													
Table A	5	1	5	3	18	21	31	28	23	21	5	6	167
Table A Transferred to Others*	0	0	0	0	0	0	2,342	2,602	13,719	788	1,034	900	21,385
Non-SWP Water	102	29	0	4	177	252	339	419	320	253	129	129	2,153
Butte Total (*excluded from total)	107	30	5	7	195	273	370	447	343	274	134	135	2,320
Plumas County Flood Control and Water Conservation District													
Table A	12	18	7	0	34	59	78	73	56	23	1	2	363
Plumas Total	12	18	7	0	34	59	78	73	56	23	1	2	363
Non-SWP Contractors													
Garden Highway Mutual Water Company													
Regulated delivery of local supply	0	0	0	4	2,898	2,553	3,822	1,978	996	4,785	127	0	17,163
Joint Water Districts Board													
Regulated delivery of local supply	9,800	0	0	0	84,813	90,642	116,970	105,180	42,560	58,600	76,720	57,460	642,745
Last Chance Creek Water District													
Regulated delivery of local supply	0	0	0	0	0	192	2,348	3,868	1,819	1,428	119	222	9,996
Oswald Water District													
Regulated delivery of local supply	0	0	0	0	171	322	344	294	261	114	0	0	1,506
Plumas Mutual Water Company													
Regulated delivery of local supply	0	0	0	0	2,154	2,604	2,983	2,123	1,646	1,195	9	0	12,714
South Feather Water and Power Agency													
Regulated delivery of local supply	0	0	0	0	0	0	0	0	0	0	0	0	0
Thermalito Water and Sewer District													
Regulated delivery of local supply	32	20	2	0	79	152	213	225	184	197	108	92	1,304
Tudor Mutual Water Company													
Regulated delivery of local supply	0	0	0	0	276	481	473	318	491	120	0	0	2,159
Western Canal Water District													
Regulated delivery of local supply	1,071	0	0	0	43,448	41,728	60,748	43,373	8,829	29,456	32,408	18,226	279,287
Valberde and Ramelli													
Regulated delivery of local supply	0	0	0	0	0	36	66	77	98	33	19	3	332

Table 9-6 Total Amounts of Water Delivered in 2017, by Month (acre-feet)

Contracting Agency and Type of Service	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	2017 Total Deliveries
SWP	17	19	12	3	52	80	997	959	79	44	6	8	2,276
Non-SWP	11,005	49	2	8	134,016	138,962	188,306	157,855	57,204	96,181	109,639	76,132	969,359
Feather River Area Total	***11,022***	***68***	***14***	***11***	***134,068***	***139,042***	***189,303***	***158,814***	***57,283***	***96,225***	***109,645***	***76,140***	***971,635***
NORTH BAY AREA													
SWP Agencies													
Napa County Flood Control and Water Conservation District													
Table A	0	0	0	0	0	0	0	0	0	0	0	950	950
Table A Transferred to Others*	0	0	0	0	0	5	3	6	5	5	0	0	24
Article 21	0	759	154	177	355	465	654	771	889	1,210	995	0	6,429
Carryover Water	822	0	0	0	0	0	0	0	0	0	0	0	822
Napa Total (*excluded from total)	822	759	154	177	355	465	654	771	889	1,210	995	950	8,201
Solano County Water Agency													
Table A	0	0	0	0	0	564	220	4,257	3,984	2,579	2,206	1,380	15,190
Table A Transferred from Others	0	0	0	0	0	5	3	6	5	5	0	0	24
Other SWP Water	0	0	0	135	2,506	1,875	1,938	0	0	0	0	403	6,857
Non-SWP Water	0	0	0	0	0	214	481	750	750	1,539	1,309	1,175	6,218
Solano Total (*excluded from total)	0	0	0	135	2,506	2,658	2,642	5,013	4,739	4,123	3,515	2,958	28,289
SWP	822	759	154	312	2,861	2,909	2,815	5,034	4,878	3,794	3,201	2,733	30,272
Non-SWP	0	0	0	0	0	214	481	750	750	1,539	1,309	1,175	6,218
North Bay Area Total	***822***	***759***	***154***	***312***	***2,861***	***3,123***	***3,296***	***5,784***	***5,628***	***5,333***	***4,510***	***3,908***	***36,490***
SOUTH BAY AREA													
SWP Agencies													
Alameda County Flood Control and Water Conservation District, Zone 7													
Table A	0	0	62	353	1,033	1,783	5,896	6,153	4,755	3,679	2,886	2,714	29,314
Table A Transferred to Others*	0	0	596	606	2,602	2,995	3,068	5,484	12,024	1,748	1	0	29,124
Pool Program Water	0	0	0	0	0	0	0	0	442	270	0	0	712
Carryover Water	928	1,013	142	0	0	0	0	0	0	0	0	0	2,083
Carryover Water Transferred to Others*	544	332	0	0	0	0	0	0	0	0	0	0	876
Non-SWP Water	0	152	1,354	1,673	3,554	3,743	149	35	110	234	217	15	11,236
Alameda-Zone 7 Total (*excluded from total)	928	1,165	1,558	2,026	4,587	5,526	6,045	6,188	5,307	4,183	3,103	2,729	43,345
Alameda County Water District													
Table A	0	0	0	0	0	0	950	1,945	1,764	1,670	1,551	1,380	9,260
Table A Transferred to Others*	0	0	887	901	3,867	4,452	4,559	3,334	0	0	0	0	18,000

Table 9-6 Total Amounts of Water Delivered in 2017, by Month (acre-feet)

Contracting Agency and Type of Service	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	2017 Total Deliveries
Carryover Water	474	0	0	0	0	0	0	0	0	0	0	0	474
Carryover Water Transferred to Others*	808	494	0	0	0	0	0	0	0	0	0	0	1,302
Non-SWP Water	842	898	64	797	1,359	1,586	958	0	0	0	0	0	6,504
Alameda County Total (*excluded from total)	1,316	898	64	797	1,359	1,586	1,908	1,945	1,764	1,670	1,551	1,380	16,238
Santa Clara Valley Water District													
Table A	0	0	0	0	0	0	0	492	387	8,900	0	0	9,779
Table A Transferred to Others*	0	0	1,250	1,250	0	0	2,500	3,000	6,500	1,500	0	3,000	19,000
Pool Program Water	0	0	0	0	0	0	582	0	0	0	0	0	582
Carryover Water	3,497	0	0	0	0	0	3,452	6,728	9,339	0	0	0	23,016
Carryover Water Transferred to Others*	1,803	1,153	0	0	0	0	0	0	0	0	0	0	2,956
Delivery of Backup Water Transferred from Others	0	0	599	0	0	0	0	0	0	0	0	0	599
Non-SWP Water Transferred from Others	0	0	1,470	2,102	9,023	10,389	10,638	9,448	7,922	6,610	14,666	10,455	82,723
Santa Clara Total (*excluded from total)	3,497	0	2,069	2,102	9,023	10,389	14,672	16,668	17,648	15,510	14,666	10,455	116,699
Non-SWP Contractors													
Byron Bethany Irrigation District													
Regulated delivery of local supply	111	106	283	676	2,912	3,342	3,082	2,114	1,518	706	263	205	15,318
California State Parks/Fish and Wildlife (SWP Share)													
Lake Del Valle	0	0	0	2	7	11	6	11	7	0	1	1	46
SWP	4,899	1,013	204	355	1,040	1,794	10,886	15,329	16,694	14,519	4,438	4,095	75,266
Non-SWP	953	1,156	3,770	5,248	16,848	19,060	14,827	11,597	9,550	7,550	15,146	10,675	116,380
South Bay Area Total	***5,852***	***2,169***	***3,974***	***5,603***	***17,888***	***20,854***	***25,713***	***26,926***	***26,244***	***22,069***	***19,584***	***14,770***	***191,646***
SAN JOAQUIN VALLEY AREA													
SWP Agencies													
County of Kings													
Table A	0	186	0	0	0	282	292	1,430	983	104	212	0	3,489
Table A Transferred from Others	0	0	0	0	0	134	622	537	375	491	0	0	2,159
Table A Transferred to Others*	0	0	0	0	175	253	259	274	251	207	119	122	1,660
Pool Program Water	0	0	0	0	0	64	18	0	0	0	0	0	82
Article 21	0	0	406	546	220	0	0	0	0	0	0	0	1,172
Article 21 Transferred to Others*	0	0	93	111	38	0	0	0	0	0	0	0	242
Kings Total (*excluded from total)	0	186	406	546	220	480	932	1,967	1,358	595	212	0	6,902

Table 9-6 Total Amounts of Water Delivered in 2017, by Month (acre-feet)

Contracting Agency and Type of Service	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	2017 Total Deliveries
Dudley Ridge Water District													
Table A	0	0	0	0	637	1,774	1,159	81	164	1,211	525	156	5,707
Table A Water Transferred from Others	0	0	0	0	0	0	641	2,641	4,141	2,000	97	46	9,566
Table A Transferred to Others*	0	0	1,083	0	930	1,791	1,989	3,147	3,262	6,615	3,477	0	22,294
Pool Program Water	0	0	0	0	0	0	0	0	0	400	0	0	400
Article 21	0	527	2,598	1,936	742	0	0	0	0	0	0	0	5,803
Article 21 Water Transferred to Others*	0	1,625	5,277	2,302	715	0	0	0	0	0	0	0	9,919
Carryover Water	759	213	0	0	0	0	0	0	0	0	0	0	972
Carryover Water Transferred to Others*	0	8,866	0	0	0	0	0	0	0	0	0	0	8,866
Delivery of Backup Water Transferred from Others	11,318	3,142	0	0	0	0	0	0	0	0	0	0	14,460
Non-SWP Water Transferred from Others	0	371	0	0	0	0	0	0	0	0	0	0	371
Dudley Ridge Total (*excluded from total)	12,077	4,253	2,598	1,936	1,379	1,774	1,800	2,722	4,305	3,611	622	202	37,279
Empire West Side Irrigation District													
Table A	0	0	0	0	0	0	0	0	0	0	33	285	318
Table A Transferred to Others*	0	0	0	0	0	0	0	0	0	0	1,280	100	1,380
Empire Total (*excluded from total)	0	0	0	0	0	0	0	0	0	0	33	285	318
Kern County Water Agency													
Table A	0	0	484	16,021	36,753	77,164	126,719	156,958	123,771	121,000	67,025	14,267	740,162
Table A Transferred from Others	0	0	3,552	4,761	18,067	24,747	29,097	58,384	58,624	47,549	30,689	10,767	286,237
Table A Transferred to Others*	0	0	24	35	78	100	123	7,566	85	71	26	37	8,145
Pool Program Water	0	0	0	0	0	0	0	0	0	0	8,670	0	8,670
Article 21	0	26,894	41,118	27,368	18,732	0	0	0	0	0	0	0	114,112
Article 21 Transferred from Others	0	1,625	1,789	2,302	715	0	0	0	0	0	0	0	6,431
Carryover Water	76,494	75,157	7,543	0	0	0	0	0	0	0	0	0	159,194
Carryover Water Transferred from Others	3,464	10,728	0	0	0	0	0	0	0	0	0	0	14,192
Carryover Water Transferred to Others*	6,397	22	0	0	0	0	0	0	0	0	0	0	6,419
Water Bank Recovery	0	0	6,841	15,559	22,790	20,344	781	0	0	0	0	0	66,315
Delivery of Backup Water	688	0	0	0	0	0	0	0	0	0	0	0	688
Delivery of Backup Water Transferred to Others*	11,318	3,142	599	0	0	0	0	0	0	0	0	0	15,059
Non-SWP Water Transferred from Others	0	0	3,007	10,622	0	0	7,800	6,969	5,877	4,021	3,351	26,293	67,940
Non-SWP Water Transferred to Others*	0	0	1,470	2,102	9,023	10,389	10,638	9,448	7,922	6,610	6,490	10,613	74,705
Kern Total (*excluded from total)	80,646	114,404	64,334	76,633	97,057	122,255	164,397	222,311	188,272	172,570	109,735	51,327	1,463,941

Table 9-6 Total Amounts of Water Delivered in 2017, by Month (acre-feet)

Contracting Agency and Type of Service	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	2017 Total Deliveries
Oak Flat Water District													
Table A	0	0	0	88	575	604	644	472	206	155	42	72	2,858
Carryover Water	0	0	35	0	0	0	0	0	0	0	0	0	35
Oak Flat Total	0	0	35	88	575	604	644	472	206	155	42	72	2,893
Tulare Lake Basin Water Storage District													
Table A	0	0	0	0	0	0	0	0	2	465	15,077	21,916	37,460
Table A Transferred to Others*	0	0	0	0	0	134	2,622	2,537	3,875	2,491	0	0	11,659
Pool Program Water	693	0	0	0	0	0	0	0	26	746	0	0	1,465
Carryover Water	1,303	5,033	0	0	0	0	0	0	0	0	0	0	6,336
Carryover Water Transferred to Others*	1,000	0	0	0	0	0	0	0	0	0	0	0	1,000
Non-SWP Water Transferred from Others	0	0	0	0	0	0	0	525	1,833	1,617	8	17	4,000
Tulare Total (*excluded from total)	1,996	5,033	0	0	0	0	0	525	1,861	2,828	15,085	21,933	49,261
California State Parks/Fish and Wildlife (SWP Share)													
California Fish and Wildlife, O'Neill	4	0	5	3	38	54	53	53	46	51	28	33	368
California Fish and Wildlife, Lateral 4	0	0	0	0	0	33	18	0	0	0	0	0	51
California State Parks, O'Neill	0	1	0	0	0	1	0	1	0	1	0	0	4
California State Parks, San Luis	0	1	0	0	0	1	0	2	1	0	0	1	6
California State Parks/Fish and Wildlife (SWP Share) Total	4	2	5	3	38	89	71	56	47	52	28	34	429
Non-SWP Contractors													
Bureau of Reclamation													
Non-SWP Water Transferred to Others*	0	371	3,007	10,622	0	0	0	525	1,833	1,617	9,571	29,091	56,637
Kern National Wildlife Refuge	2,395	1,443	0	0	2,559	0	0	2,766	5,754	6,042	4,829	3,233	29,021
California Fish and Wildlife	3	0	3	2	31	71	58	44	38	40	22	27	339
California State Parks	0	0	1	1	0	0	2	0	2	0	1	0	7
Reclamation Total (*excluded from total)	2,398	1,443	4	3	2,590	71	60	2,810	5,794	6,082	4,852	3,260	29,367
CVP Annual Contractors													
Musco Family Olive Company	23	34	29	27	41	41	39	54	64	73	48	5	478
San Joaquin Valley National Cemetery	1	1	10	23	71	80	94	80	59	37	7	9	472
CVP Annual Contractors Total	24	35	39	50	112	121	133	134	123	110	55	14	950
Cross Valley Canal Contractors													
Kerm-Tulare Water District	0	0	0	0	0	3,425	12,575	0	5,497	5,947	4,557	13,014	45,015
Lower Tule River Irrigation District	0	0	0	0	0	0	0	0	0	106	1,449	0	1,555
Pixley Irrigation District	0	0	0	0	0	0	0	0	0	106	1,449	0	1,555
Cross Valley Canal Total	0	0	0	0	0	3,425	12,575	0	5,497	6,159	7,455	13,014	48,125

Table 9-6 Total Amounts of Water Delivered in 2017, by Month (acre-feet)

Contracting Agency and Type of Service	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	2017 Total Deliveries
Western Hills Water District													
Table A Point of Delivery from SWP	0	0	24	35	78	100	123	115	85	71	26	37	694
Carryover Water Point of Delivery from SWP	22	22	0	0	0	0	0	0	0	0	0	0	44
Western Hills Total	22	22	24	35	78	100	123	115	85	71	26	37	738
Westlands Water District													
Table A Transferred from Others	0	0	0	0	175	253	2,259	274	251	207	119	222	3,760
Article 21 Transferred from Others	0	0	93	111	38	0	0	0	0	0	0	0	242
Carryover Water Transferred from Others	1,000	0	0	0	0	0	0	0	0	0	0	0	1,000
Non-SWP Water Transferred to Others*	0	0	0	0	0	0	7,800	6,969	0	4,021	3,351	2,771	24,912
Westlands Total (*excluded from total)	1,000	0	93	111	213	253	2,259	274	251	207	119	222	5,002
SWP	83,739	120,387	57,647	53,171	76,770	105,211	161,645	220,948	188,675	174,451	122,543	47,802	1,412,989
Non-SWP	14,428	4,991	9,891	26,234	25,492	23,961	21,349	10,438	19,124	17,989	15,721	42,598	232,216
San Joaquin Valley Area Total	***98,167***	***125,378***	***67,538***	***79,405***	***102,262***	***129,172***	***182,994***	***231,386***	***207,799***	***192,440***	***138,264***	***90,400***	***1,645,205***
CENTRAL COASTAL AREA													
SWP Agencies													
San Luis Obispo County Flood Control and Water Conservation District													
Table A	0	0	186	319	266	267	331	431	199	135	33	96	2,263
Carryover Water	250	232	100	0	0	0	0	0	0	0	0	0	582
San Luis Obispo Total	250	232	286	319	266	267	331	431	199	135	33	96	2,845
Santa Barbara County Flood Control and Water Conservation District													
Table A	0	0	0	0	48	1,939	2,635	3,138	2,188	2,639	661	2,522	15,770
Table A Transferred from Others	0	0	411	270	2,080	1,080	0	0	850	0	0	0	4,691
Table A Transferred to Others*	0	0	0	0	0	2,100	2,501	1,649	1,250	1,859	0	0	9,359
Pool Program Water	0	0	0	0	0	0	401	0	0	0	0	0	401
Article 21	0	561	1,542	1,844	888	0	0	0	0	0	0	0	4,835
Carryover Water	1,449	916	201	0	0	0	0	0	0	0	0	0	2,566
Carryover Water Transferred from Others	0	40	0	0	0	0	0	0	0	0	0	0	40
Carryover Water Transferred to Others*	0	15,584	0	0	0	0	0	0	0	0	0	0	15,584
Delivery of Backup Water	846	591	0	0	0	0	0	0	0	0	0	0	1,437
Santa Barbara Total (*excluded from total)	2,295	2,108	2,154	2,114	3,016	3,019	3,036	3,138	3,038	2,639	661	2,522	29,740
SWP	1,699	1,749	2,440	2,433	3,282	3,286	3,367	3,569	3,237	2,774	694	2,618	31,148
Non-SWP	846	591	0	0	0	0	0	0	0	0	0	0	1,437
Central Coastal Area Total	***2,545***	***2,340***	***2,440***	***2,433***	***3,282***	***3,286***	***3,367***	***3,569***	***3,237***	***2,774***	***694***	***2,618***	***32,585***

Table 9-6 Total Amounts of Water Delivered in 2017, by Month (acre-feet)

Contracting Agency and Type of Service	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	2017 Total Deliveries
SOUTHERN CALIFORNIA AREA													
SWP Agencies													
Antelope Valley-East Kern Water Agency													
Table A	0	0	2,072	135	4,670	8,376	6,699	4,548	5,161	6,349	7,887	2,809	48,706
Table A Transferred from Others	0	0	56	90	91	2,223	5,163	7,271	6,321	4,875	1,541	4,518	32,149
Table A Transferred to Others*	0	0	0	0	0	0	0	3,346	11,050	17,974	1,242	1,031	34,643
Article 21	0	0	4,900	9,286	3,214	0	0	0	0	0	0	0	17,400
Carryover Water	5,715	7,733	2,093	0	0	0	0	0	0	0	0	0	15,541
Carryover Water Transferred from Others	24	37	0	0	0	0	0	0	0	0	0	0	61
Carryover Water Transferred to Others*	0	40	0	0	0	0	0	0	0	0	0	0	40
AVEK Total (*excluded from total)	5,739	7,770	9,121	9,511	7,975	10,599	11,862	11,819	11,482	11,224	9,428	7,327	113,857
Castaic Lake Water Agency													
Table A	0	0	46	40	1,508	7,565	7,492	5,705	4,480	4,478	3,389	3,429	38,132
Table A Transferred from Others	0	0	2,436	4,106	5,391	115	0	0	0	0	0	0	12,048
Carryover Water	1,529	1,540	33	0	0	0	0	0	0	0	0	0	3,102
Carryover Water Transferred to Others*	158	30,182	0	0	0	0	0	0	0	0	0	0	30,340
Castaic Lake Total (*excluded from total)	1,529	1,540	2,515	4,146	6,899	7,680	7,492	5,705	4,480	4,478	3,389	3,429	53,282
Coachella Valley Water District													
Table A	0	0	3,081	4,591	1,300	0	0	0	0	8,207	15,219	15,219	47,617
Pool Program Water	0	0	0	0	0	0	806	0	0	0	0	0	806
Carryover Water	18,129	0	0	0	0	0	0	0	0	0	0	0	18,129
Carryover Water Transferred to Others*	11,959	0	0	0	0	0	0	0	0	0	0	0	11,959
Non-SWP Water Transferred from Others	0	0	0	0	0	0	0	0	0	0	0	5,397	5,397
Coachella Total	18,129	0	3,081	4,591	1,300	0	806	0	0	8,207	15,219	20,616	71,949
Crestline-Lake Arrowhead Water Agency													
Table A	0	0	0	0	0	0	0	0	0	124	85	85	294
Table A Transferred from Others	76	40	0	0	0	0	0	0	0	64	37	2	219
Table A Transferred to Others*	0	0	0	0	0	0	0	700	1,300	0	0	0	2,000
Non-SWP Water	88	85	85	69	72	134	148	146	181	0	0	0	1,008
Crestline Total (*excluded from total)	164	125	85	69	72	134	148	146	181	188	122	87	1,521
Desert Water Agency													
Table A	0	0	1,242	1,850	524	0	0	0	0	3,306	6,133	6,133	19,188
Pool Program Water	0	0	0	0	0	0	325	0	0	0	0	0	325
Carryover Water	7,306	0	0	0	0	0	0	0	0	0	0	0	7,306

Table 9-6 Total Amounts of Water Delivered in 2017, by Month (acre-feet)

Contracting Agency and Type of Service	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	2017 Total Deliveries
Carryover Water Transferred to Others*	4,817	0	0	0	0	0	0	0	0	0	0	0	4,817
Desert Total	7,306	0	1,242	1,850	524	0	325	0	0	3,306	6,133	6,133	26,819
The Metropolitan Water District of Southern California													
Table A	0	0	30,761	58,022	103,664	117,414	134,321	145,653	132,432	123,586	108,995	129,646	1,084,494
Table A Transferred from Others	0	0	1,048	0	0	0	0	526	0	578	0	0	2,152
Table A Transferred to Others*	0	0	4,916	7,630	18,139	16,704	19,481	46,099	23,242	23,212	26,286	11,282	196,991
Article 21	0	0	42,567	63,424	17,959	0	0	0	0	0	0	0	123,950
Carryover Water	15,457	85,950	27,800	0	0	0	0	0	0	0	0	0	129,207
Carryover Water Transferred from Others	23,151	45,584	0	0	0	0	0	0	0	0	0	0	68,735
Carryover Water Transferred to Others*	151	1,153	0	0	0	0	0	0	0	0	0	0	1,304
Water Bank Recovery	12,238	0	0	0	0	0	0	0	0	0	0	0	12,238
Delivery of Backup Water	25,283	0	0	0	0	0	0	0	0	0	0	0	25,283
Metropolitan Total (*excluded from total)	76,129	131,534	102,176	121,446	121,623	117,414	134,321	146,179	132,432	124,164	108,995	129,646	1,446,059
Mojave Water Agency													
Table A	0	0	319	569	1,397	3,085	2,937	3,392	675	8,241	7,635	877	29,127
Table A Transferred from Others	0	0	0	0	0	0	0	0	4,000	0	0	0	4,000
Table A Transferred to Others*	0	0	56	90	91	123	162	122	71	94	41	18	868
Carryover Water	310	291	158	0	0	0	0	0	0	0	0	0	759
Carryover Water Transferred to Others*	24	37	0	0	0	0	0	0	0	0	0	0	61
Non-SWP Water	466	697	898	860	861	898	925	929	540	0	0	0	7,074
Mojave Total (*excluded from total)	776	988	1,375	1,429	2,258	3,983	3,862	4,321	5,215	8,241	7,635	877	40,960
Palmdale Water District													
Table A	0	0	698	480	1,173	1,563	441	0	0	0	0	0	4,355
Table A Transferred from Others	0	0	0	0	0	0	1,701	1,961	1,532	788	1,034	900	7,916
Table A Transferred to Others*	0	0	1,000	625	625	0	0	0	850	0	0	0	3,100
Carryover Water	837	498	252	0	0	0	0	0	0	0	0	0	1,587
Palmdale Total	837	498	950	480	1,173	1,563	2,142	1,961	1,532	788	1,034	900	13,858
San Bernardino Valley Municipal Water District													
Table A	0	1,167	182	1,783	7,708	9,634	8,485	8,835	9,109	7,753	6,928	7,758	69,342
Table A Transferred from Others	0	0	2,250	1,875	625	0	0	0	0	0	0	0	4,750
Table A Transferred to Others*	76	40	0	0	0	0	0	0	0	64	37	2	219
Carryover Water	4,023	162	0	0	0	0	0	0	0	0	0	0	4,185
San Bernardino Total (*excluded from total)	4,023	1,329	2,432	3,658	8,333	9,634	8,485	8,835	9,109	7,753	6,928	7,758	78,277

Table 9-6 Total Amounts of Water Delivered in 2017, by Month (acre-feet)

Contracting Agency and Type of Service	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	2017 Total Deliveries
San Gabriel Valley Municipal Water District													
Table A	7	0	961	1,813	786	3,150	942	1,808	2,266	1,867	1,891	2,014	17,505
Table A Transferred from Others	0	0	35	0	0	0	0	0	0	0	0	0	35
Article 21	0	0	1,517	1,540	0	0	0	0	0	0	0	0	3,057
Carryover Water	7	0	0	0	0	0	0	0	0	0	0	0	7
Carryover Water Transferred from Others	0	1,452	0	0	0	0	0	0	0	0	0	0	1,452
San Gabriel Total (*excluded from total)	14	1,452	2,513	3,353	786	3,150	942	1,808	2,266	1,867	1,891	2,014	22,056
San Gorgonio Pass Water Agency													
Table A	0	0	990	1,343	1,418	1,391	1,423	603	87	1,406	0	885	9,546
Table A Transferred from Others	0	0	0	0	0	0	0	700	1,300	0	0	0	2,000
Carryover Water	1,340	294	66	0	0	0	0	0	0	0	0	0	1,700
Non-SWP Water Transferred from Others	0	0	0	0	0	0	0	0	0	0	1,387	313	1,700
San Gorgonio Total	1,340	294	1,056	1,343	1,418	1,391	1,423	1,303	1,387	1,406	1,387	1,198	14,946
Ventura County Watershed Protection District													
Table A	0	0	0	204	204	204	204	204	204	204	2,154	668	4,250
Article 21	0	0	0	0	0	5,805	4,195	0	0	0	0	0	10,000
Other SWP Water	0	0	0	0	0	0	0	0	0	0	0	1	1
Ventura Total	0	0	0	204	204	6,009	4,399	204	204	204	2,154	669	14,251
California State Parks/Fish and Wildlife (SWP Share)													
Castaic Lagoon	0	0	0	0	11	5	3	7	6	1	1	0	34
Lake Perris—Parks and Recreation	0	0	0	0	32	0	24	11	24	9	12	16	128
Lake Perris—Fish and Wildlife	0	0	0	0	0	22	0	0	0	0	0	0	22
Pyramid Lake	1	1	2	3	5	4	3	4	2	2	2	2	31
Silverwood Lake	2	2	3	5	6	12	13	13	9	10	8	2	85
California State Parks/Fish and Wildlife (SWP Share) Total	3	3	5	8	54	43	43	35	41	22	23	20	300
SWP	77,914	144,751	125,568	151,159	151,686	160,568	175,177	181,241	167,608	171,848	162,951	174,964	1,845,435
Non-SWP	38,075	782	983	929	933	1,032	1,073	1,075	721	0	1,387	5,710	52,700

Table 9-6 Total Amounts of Water Delivered in 2017, by Month (acre-feet)

Contracting Agency and Type of Service	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	2017 Total Deliveries
Southern California Area Total	***115,989***	***145,533***	***126,551***	***152,088***	***152,619***	***161,600***	***176,250***	***182,316***	***168,329***	***171,848***	***164,338***	***180,674***	***1,898,135***
SWP WATER													
SWP Water Contracts													
Table A	24	1,372	41,096	87,614	163,716	236,839	302,787	347,064	292,896	308,102	250,573	215,269	2,247,352
Table A Transfers and Exchanges	76	40	9,788	11,102	26,254	28,304	37,227	72,026	77,148	56,350	33,398	16,233	367,946
Pool Water	693	0	0	0	0	64	2,132	0	468	1,416	8,670	0	13,443
Carryover Water	167,268	236,873	38,423	0	0	0	3,452	6,728	9,339	0	0	0	462,083
Subtotal	*168,061*	*238,285*	*89,307*	*98,716*	*189,970*	*265,207*	*345,598*	*425,818*	*379,851*	*365,868*	*292,641*	*231,502*	*3,090,824*
Other Water Supply Contracts													
Article 21	0	30,366	100,079	108,423	42,825	6,270	4,849	771	889	1,210	995	0	296,677
Settlement Water	0	0	0	135	2,506	1,875	1,938	0	0	0	0	403	6,857
Delivery of Backup Water	38,135	3,733	599	0	0	0	0	0	0	0	0	0	42,467
Water Bank Recovery	12,238	0	6,841	15,559	22,790	20,344	781	0	0	0	0	0	78,553
Other SWP Programs	0	0	0	0	0	0	0	0	0	0	0	1	1
Subtotal	*50,373*	*34,099*	*107,519*	*124,117*	*68,121*	*28,489*	*7,568*	*771*	*889*	*1,210*	*995*	*404*	*424,555*
Non-SWP Water Supply Contracts													
Local Water	1,396	1,832	2,401	3,399	5,846	6,361	2,180	1,110	831	234	217	15	25,822
Vallejo Permit Water	0	0	0	0	0	214	481	750	750	1,539	1,309	1,175	6,218
Other Non-SWP Programs	102	400	4,477	12,728	9,200	10,641	18,777	17,361	15,952	12,501	19,541	42,604	164,284
Subtotal	*1,498*	*2,232*	*6,878*	*16,127*	*15,046*	*17,216*	*21,438*	*19,221*	*17,533*	*14,274*	*21,067*	*43,794*	*196,324*
SWP Total	***219,932***	***274,616***	***203,704***	***238,960***	***273,137***	***310,912***	***374,604***	***445,810***	***398,273***	***381,352***	***314,703***	***275,700***	***3,711,703***
NON-SWP WATER													
Non-SWP Contractors													
SWP Contracted Supply Delivered to Non-SWP Contractors	1,022	22	117	146	291	353	2,382	7,840	336	278	145	259	13,191
Regulated delivery of local supply	11,014	126	285	680	136,751	142,052	191,049	159,550	58,402	96,634	109,773	76,208	982,524
California State Parks	3	5	6	11	61	34	51	49	51	23	25	22	341
California Fish and Wildlife	7	0	8	5	69	180	129	97	84	91	50	60	780
CVP/Reclamation Contractors													
Cross Valley Canal Contractors	0	0	0	0	0	3,425	12,575	0	5,497	6,159	7,455	13,014	48,125
Kern National Wildlife Refuge	2,395	1,443	0	0	2,559	0	0	2,766	5,754	6,042	4,829	3,233	29,021
Annual Contracts	24	35	39	50	112	121	133	134	123	110	55	14	950
Non-SWP Total	***14,465***	***1,631***	***455***	***892***	***139,843***	***146,165***	***206,319***	***170,436***	***70,247***	***109,337***	***122,332***	***92,810***	***1,074,932***
Grand Total	**234,397**	**276,247**	**204,159**	**239,852**	**412,980**	**457,077**	**580,923**	**616,246**	**468,520**	**490,689**	**437,035**	**368,510**	**4,786,635**

Table 9-7 Total Amounts of Annual Table A Water and Water Conveyed, by Type, 1962–2017 (acre-feet)

Year	Annual Table A Amounts According to Long-term Water Supply Contracts							Water Conveyed								
								Deliveries								
	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[1] [9]	Other Water[2] [10]	Feather River Diversions[3] [11]	Recreation/ Fish and Wildlife Water [12]	Subtotal [13]	Initial Fill Water [14]	Losses and Storage Changes[4] [15]	**Total** [16]
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 9-7 Total Amounts of Annual Table A Water and Water Conveyed, by Type, 1962–2017 (acre-feet) *(Continued)*

Year	Annual Table A Amounts According to Long-term Water Supply Contracts							Water Conveyed								
								Deliveries								
	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[1] [9]	Other Water[2] [10]	Feather River Diversions[3] [11]	Recreation/ Fish and Wildlife Water [12]	Subtotal [13]	Initial Fill Water [14]	Losses and Storage Changes[4] [15]	**Total** [16]
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	43,774	1,094,944	3,628	4,837,034	-	(119,981)	4,717,053
2007	11,520	70,231	222,619	1,170,000	70,486	2,584,450	4,129,306	2,180,751	309,973	598,789	1,193,237	2,581	4,285,331	-	(524,851)	3,760,480
2008	39,120	70,606	222,619	1,170,000	70,486	2,593,100	4,165,931	1,244,240	2,729	769,517	1,087,669	2,778	3,106,933	-	(758,813)	2,348,120
2009	39,190	70,981	222,619	1,170,000	70,486	2,593,100	4,166,376	1,385,266	6,032	709,885	1,125,147	2,047	3,228,377	-	(31,319)	3,197,058
2010	13,491	76,531	222,619	1,140,000	70,486	2,623,100	4,146,227	2,010,672	7,505	790,602	978,172	1,167	3,788,118	-	461,751	4,249,869
2011	14,388	76,581	222,619	1,140,000	70,486	2,623,100	4,147,174	2,847,572	420,691	388,632	1,028,542	1,593	4,687,030	-	358,354	5,045,384
2012	39,420	76,631	222,619	1,140,000	70,486	2,623,100	4,172,256	2,593,699	-	367,609	1,047,832	1,609	4,010,749	-	(537,209)	3,473,540
2013	39,510	76,681	222,619	1,140,000	70,486	2,623,100	4,172,396	1,623,212	-	614,203	1,166,635	1,641	3,405,691	-	(256,889)	3,148,802
2014	39,600	76,731	222,619	1,136,556	70,486	2,626,544	4,172,536	475,533	1,444	699,235	839,792	677	2,016,681	-	(222,460)	1,794,221
2015	39,700	76,781	222,619	1,133,556	70,486	2,629,544	4,172,686	846,547	690	585,239	675,530	721	2,108,727	-	(419,759)	1,688,968
2016	39,800	76,781	222,619	1,133,556	70,486	2,629,544	4,172,786	2,021,847	3,319	343,516	974,673	1,401	3,344,756	-	(235,410)	3,109,346
2017	39,800	76,781	222,619	1,133,556	70,486	2,629,544	4,172,786	3,103,773	296,919	417,962	967,206	775	4,786,635	-	(206,091)	4,580,544
Total	**615,533**	**1,748,763**	**8,683,704**	**49,132,600**	**2,139,176**	**96,258,235**	**158,578,011**	**87,161,878**	**9,318,534**	**15,454,949**	**46,469,835**	**157,655**	**158,562,851**	**1,834,310**	**(1,128,574)**	**159,268,587**

[1] 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).
[2] Includes amounts of SWP and non-SWP water conveyed for SWP and non-SWP water contractors.
[3] Includes amounts of water diverted under various water rights agreements.
[4] 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 9-8 SWP Water Delivered by Category, 1962–2017 (acre-feet)

Year	Table Water A			Article 21/Unscheduled			Other SWP Water Deliveries				Total Deliveries
	Municipal and Industrial	Agricultural	Total Table A[1]	Municipal and Industrial	Agricultural	Total Article 21/ Unscheduled	Other Water[2]	Feather River Diversions[3]	Fish & Wildlife/ Recreation Water	Total Other SWP Water Deliveries	
1962	0	0	0	0	0	0	9,704	7,499	0	17,203	17,203
1963	0	0	0	0	0	0	13,212	16,049	0	29,261	29,261
1964	0	0	0	0	0	0	21,743	17,891	0	39,634	39,634
1965	0	0	0	0	0	0	35,985	27,425	0	63,410	63,410
1966	0	0	0	0	0	0	59,599	33,361	0	92,960	92,960
1967	5,563	5,791	11,354	0	0	0	45,225	24,639	0	69,864	81,218
1968	86,541	85,168	171,709	10,000	111,534	121,534	1,214	903,367	0	904,581	1,197,824
1969	63,956	129,064	193,020	0	72,397	72,397	8,692	832,454	0	841,146	1,106,563
1970	83,415	150,578	233,993	0	131,848	131,848	25,401	804,320	0	829,721	1,195,562
1971	93,776	263,564	357,340	0	294,581	294,581	35,438	825,886	8	861,332	1,513,253
1972	186,796	425,005	611,801	0	422,322	422,322	53,848	875,529	6,489	935,866	1,969,989
1973	297,497	395,391	692,888	0	294,916	294,916	29,540	851,285	1,155	881,980	1,869,784
1974	423,982	450,093	874,075	0	412,453	412,453	31,493	963,956	2,118	997,567	2,284,095
1975	670,492	553,498	1,223,990	356	620,329	620,685	46,995	924,696	3,377	975,068	2,819,743
1976	631,876	741,126	1,373,002	4,147	547,538	551,685	103,546	1,018,653	1,745	1,123,944	3,048,631
1977	354,930	218,966	573,896	0	0	0	410,991	624,497	1,111	1,036,599	1,610,495
1978	782,625	529,740	1,312,365	0	16,215	16,215	177,245	836,864	1,691	1,015,800	2,344,380
1979	692,888	711,404	1,404,292	0	646,830	646,830	431,693	933,067	1,766	1,366,526	3,417,648
1980	726,545	784,946	1,511,491	52,200	350,017	402,217	40,269	925,750	2,131	968,150	2,881,858
1981	1,053,273	835,852	1,889,125	18,920	889,508	908,428	283,310	993,785	4,688	1,281,783	4,079,336
1982	916,014	822,042	1,738,056	140	214,994	215,134	144,267	819,586	4,646	968,499	2,921,689
1983	482,749	701,370	1,184,119	0	13,019	13,019	172,030	633,778	7,849	813,657	2,010,795
1984	725,799	861,794	1,587,593	3,663	259,254	262,917	366,273	891,128	7,040	1,264,441	3,114,951
1985	983,341	929,424	1,912,765	9,638	292,206	301,844	474,417	924,049	4,033	1,402,499	3,617,108
1986	998,611	1,009,295	2,007,906	2,595	21,755	24,350	177,176	843,040	3,865	1,024,081	3,056,337
1987	1,079,983	1,033,932	2,113,915	6,949	107,958	114,907	375,810	882,301	7,672	1,265,783	3,494,605
1988	1,308,071	1,068,302	2,376,373	0	0	0	520,375	884,877	4,889	1,410,141	3,786,514
1989	1,602,543	1,251,204	2,853,747	0	0	0	474,559	830,500	8,135	1,313,194	4,166,941
1990	1,876,072	706,079	2,582,151	0	90	90	424,697	875,099	9,262	1,309,058	3,891,299
1991	536,669	12,444	549,113	3,521	0	3,521	543,582	565,395	4,879	1,113,856	1,666,490

Table 9-8 SWP Water Delivered by Category, 1962–2017 (acre-feet) *(Continued)*

Year	Table Water A			Article 21/Unscheduled			Other SWP Water Deliveries				Total Deliveries
	Municipal and Industrial	Agricultural	Total Table A[1]	Municipal and Industrial	Agricultural	Total Article 21/ Unscheduled	Other Water[2]	Feather River Diversions[3]	Fish & Wildlife/ Recreation Water	Total Other SWP Water Deliveries	
1992	955,687	455,112	1,410,799	1,156	0	1,156	166,992	613,978	2,605	783,575	2,195,530
1993	1,069,258	1,243,978	2,313,236	0	0	0	256,853	822,589	2,609	1,082,051	3,395,287
1994	1,134,992	614,359	1,749,351	48,150	64,475	112,625	236,739	874,018	8,200	1,118,957	2,980,933
1995	801,570	1,165,523	1,967,093	17,984	46,346	64,330	85,560	860,077	2,575	948,212	2,979,635
1996	1,143,638	1,371,186	2,514,824	12,091	16,556	28,647	252,346	1,005,148	3,907	1,261,401	3,804,872
1997	1,220,200	1,040,183	2,260,383	2,814	18,618	21,432	322,000	993,211	4,146	1,319,357	3,601,172
1998	865,795	860,724	1,726,519	9,982	10,306	20,288	127,405	872,738	2,108	1,002,251	2,749,058
1999	1,405,311	1,333,592	2,738,903	61,191	96,879	158,070	85,312	1,108,672	4,324	1,198,308	4,095,281
2000	1,949,922	1,222,485	3,172,407	170,302	138,483	308,785	353,584	1,085,886	4,096	1,443,566	4,924,758
2001	1,173,731	407,305	1,579,291	14,971	33,174	48,145	632,403	1,077,997	2,942	1,713,342	3,340,778
2002	1,921,139	713,533	2,634,672	15,478	27,637	43,115	311,976	1,131,880	3,712	1,447,568	4,125,355
2003	2,188,647	787,170	2,975,817	23,019	36,809	59,828	160,087	1,006,995	2,862	1,169,944	4,205,589
2004	2,001,278	643,509	2,644,787	103,890	114,606	218,496	403,542	1,171,835	2,887	1,578,264	4,441,547
2005	1,923,222	904,034	2,827,256	186,787	544,296	731,083	92,858	1,074,706	1,515	1,169,079	4,727,418
2006	1,973,419	999,930	2,973,349	293,358	327,981	621,339	143,774	1,094,944	3,628	1,242,346	4,837,034
2007	1,670,711	510,040	2,180,751	186,570	123,403	309,973	598,789	1,193,237	2,581	1,794,607	4,285,331
2008	1,024,147	220,093	1,244,240	2,729	0	2,729	769,517	1,087,669	2,778	1,859,964	3,106,933
2009	1,036,052	349,214	1,385,266	6,032	0	6,032	709,885	1,125,147	2,047	1,837,079	3,228,377
2010	1,503,322	507,350	2,010,672	7,505	0	7,505	790,602	978,172	1,167	1,769,941	3,788,118
2011	1,871,986	975,586	2,847,572	207,307	213,384	420,691	388,632	1,028,542	1,593	1,418,767	4,687,030
2012	1,880,188	713,511	2,593,699	0	0	0	367,609	1,047,832	1,609	1,417,050	4,010,749
2013	1,198,284	424,928	1,623,212	0	0	0	614,203	1,166,635	1,641	1,782,479	3,405,691
2014	405,814	69,719	475,533	1,444	0	1,444	698,035	839,792	677	1,538,504	2,015,481
2015	620,511	226,036	846,547	690	0	690	585,388	675,530	721	1,261,639	2,108,876
2016	1,505,529	509,362	2,014,444	3,319	0	3,319	344,408	974,513	1,399	1,320,320	3,338,083
2017	2,060,712	1,043,061	3,103,773	165,671	131,248	296,919	471,962	967,206	775	1,385,943	4,786,635
Total	**53,169,072**	**33,992,806**	**87,161,878**	**1,654,569**	**7,663,965**	**9,318,534**	**15,454,949**	**46,469,835**	**157,655**	**62,082,439**	**158,562,851**

[1] Includes Table A, Table A transfers, Table A exchanges, Carryover, and Pool Water.
[2] Includes water conveyed for SWP and non-SWP water contractors.
[3] Includes amounts of water diverted according to various water rights agreements.

Chapter 10
Power Resources

Workers disassemble the shoo-fly circuit that temporarily rerouted power lines at the Lake Oroville spillway site in Butte County, California.

Significant Events in 2017

Energy used at the 29 State Water Project (SWP) pumping and generating plants totaled 9.65 million megawatt hours (MWh). To meet SWP energy needs, the Department of Water Resources (DWR) purchased 2.87 million MWh of energy at a cost of $81.06 million. This included (1) 1.16 million MWh of short-term energy from five energy marketers at a cost of $43.52 million, including California Independent System Operator (CAISO) energy costs; (2) 0.44 million MWh from four renewable energy electric utilities at a cost of $16.97 million; and (3) 1.27 million MWh of long-term energy at a cost of $20.56 million. Additional associated energy costs totaled $309.69 million, including transmission costs. The total cost of energy-related costs for 2017 was $390.75 million.

Pursuant to Western Systems Power Pool (WSPP) bilateral trades, transactions made under the Lodi Energy Center Power Sales Agreement, transactions under CAISO, and revenues from other long-term contracts, DWR received a total of $92.90 million.

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.

State Water Project (SWP) water supply contractors depend on the SWP to obtain economical sources of power 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 2017, CAISO focused on issues affecting grid reliability such as increased photovoltaic energy generation, increased fossil fuel resource retirements within California, natural gas supply limitations due to Aliso Canyon gas storage concerns, and the continued need for flexible resources, including electric storage.

CAISO maintained initiatives to expand the CAISO Balancing Authority Area to include entities outside the current CAISO footprint. Among these initiatives are the Review Transmission Access Charge Structure, Regional Resource Adequacy, Regional Integration of California Greenhouse Gas Compliance, and Energy Imbalance Market Governance.

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 2017:

- market initiatives roadmap
- stakeholder initiatives catalog
- two-tier real-time bid cost recovery
- bid cost recovery enhancements
- Aliso Canyon gas-electric coordination
- energy storage and distributed energy resources
- local market power mitigation enhancements
- review transmission access charge structure

- generator interconnection driven network upgrade cost recovery
- congestion revenue rights auction efficiency
- budget and grid management charge process
- commitment cost enhancements, phase 3
- commitment costs and default energy
- energy imbalance market greenhouse gas (GHG) enhancements
- generator interconnection process enhancements
- reactive power requirements
- frequency response, phase 2
- metering rules enhancements
- transmission planning
- regional energy market
- stepped constraint parameters
- local capacity procurement for 2018 requirements
- annual resource adequacy processes including the Path 26 allocation, import allocation, and net qualifying capacity
- flexible capacity needs study process for 2018
- flexible resource adequacy criteria and must-offer obligation, phase 2
- reliability services initiative, phase 2

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 Aliso Canyon tariff amendments (ER16-1649, ER17-110)
- CAISO demand response report (ER06-615)
- CAISO energy imbalance market (ER13-1372, ER14-1729, ER15-33, ER15-1919, ER16-1518)
- CAISO pricing enhancements (ER16-1886, ER17-415)
- CAISO energy storage enhancements (ER16-1735)
- CAISO definition of load serving entity (ER17-218)
- CAISO flexible ramping product (ER16-2023)
- CAISO frequency response, phase 1 (ER16-1483)
- CAISO local market power mitigation (ER16-1983)
- Department of Energy notice of proposed rulemaking for fuel-secure generation units (RM17-3, RM18-1)
- FERC notice of proposed rulemaking on uplift cost allocation and transparency (RM17-2, ER17-1459)
- FERC notice of proposed rulemaking on electric storage participation (AD16-20, RM16-23)
- Pacific Gas & Electric Company (PG&E) transmission owner tariff filing (TO18) hearing process (ER16-2320)
- PG&E transmission owner tariff filing (TO19) proposal to increase transmission revenue requirement rates for retail and wholesale customers of CAISO (ER17-2154)
- San Diego Gas & Electric transmission owner tariff filing (TO4—Cycle 5) proposal to increase transmission revenue requirement rates for retail and wholesale customers of CAISO (ER18-358)
- Southern California Edison (SCE) transmission owner tariff filing (TO2018) proposal to increase transmission revenue requirement rates for retail and wholesale customers of CAISO (ER18-169)

- PG&E proposed annual update to its transmission revenue balancing account (ER18-54)
- San Diego Gas & Electric proposed annual update to its transmission revenue balancing account adjustment and transmission access charge balancing account adjustment (ER18-211)
- SCE proposed annual update to its transmission revenue balancing account (ER18-154) and reliability services tariff (ER18-184)
- GridLiance West Transco purchase of Valley Electric Association high-voltage assets and initial formula rate (ER17-706)

In April 2015, DWR submitted a motion to intervene in Case Nos. 15-1057 and 15-1241 (consolidated) before the U.S. Court of Appeals for the District of Columbia Circuit. The consolidated case was petitioned by the Transmission Agency of Northern California, Modesto Irrigation District, the City of Santa Clara, and the City of Redding. The petitioners are seeking to appeal FERC orders (EL14-44 and ER15-223) relating to a complaint against PG&E. The complaint alleges a breach of PG&E's contractual obligations under the operating agreement for the California-Oregon Intertie resulting from the loss of DWR's participation in PG&E's Pacific AC Intertie remedial action scheme and termination of the PG&E-DWR Comprehensive Agreement. Briefs were filed in 2016, and in May 2017, the Court ruled to deny the Transmission Agency of Northern California's petition.

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 can be found in Bulletin 132-11.

NERC Reliability Compliance—Internal Compliance Program Improvements

In 2017, WECC required DWR to complete an Inherent Risk Assessment and Compliance Oversight Plan survey. After assessing DWR's survey response, WECC issued Inherent Risk Assessment and Compliance Oversight Plan reports in December 2017. The Inherent Risk Assessment report identified DWR's inherent risk and corresponding risk factors and provided an assessment of the risk factors. The Compliance Oversight Plan report included a plan for monitoring DWR's compliance with NERC standards based on DWR's inherent risks. This included a WECC compliance audit scheduled to occur in February 2019.

NERC has a Risk-Based Compliance Monitoring and Enforcement Program in which entities that have effective internal controls and low reliability risks may receive fewer audits from NERC and WECC, reduced audit scope, and reduced penalties for noncompliance. Consequently, in 2017, in addition to the annual audit of its internal compliance program policies and associated processes, DWR evaluated standard-specific internal controls and improved its process for documenting compliance. DWR plans to complete the internal controls evaluation

and compliance documentation of high risk standards in 2018 in preparation for the 2019 WECC audit.

In 2017, NERC increased its effort requiring owners of bulk electric system transmission elements to formally assign a registered transmission planner and a transmission operator to their transmission system elements. Consequently, DWR began reviewing its options and anticipated completing the formal assignments in 2018.

DWR also submitted, in compliance with the requirements of the reliability standards, its annual self-certification to WECC in February 2017. The submittal certified DWR's compliance with the requirements of a WECC-determined subset of standards or provided a violation report supported by a mitigation plan to resolve the outstanding items. Violation of these standards can lead to financial penalties or reduced operating flexibility.

Greenhouse Gas Management

In 2017, DWR reported its calendar year 2016 pump load, generation, and sulfur hexafluoride emissions to the California Air Resources Board. DWR's sulfur hexafluoride emissions were below the maximum allowable limit; however, because the allowable limit will be lower in future years, DWR will continue to implement plans to further reduce its sulfur hexafluoride emissions. DWR also reported its 2016 GHG emissions to The Climate Registry.

DWR had sufficient compliance instruments to meet its contractual obligation for the Lodi Energy Center's Cap-and-Trade Program compliance cost. Because of this, DWR did not participate in the allowance auctions administered by the California Air Resources Board in 2017.

Hydropower License Planning and Compliance

DWR holds three hydropower licenses and two conduit exemptions issued by FERC. The FERC projects and project numbers are listed below:

- 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
- 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 operations since FERC has the authority to levy fines for noncompliance. FERC also considers the record of compliance when considering the conditions 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 original 50-year license expired January 31, 2007. On February 1, 2007, FERC issued an annual license with the same terms and conditions as DWR's expired license. The original license automatically renews annually until the new license is issued. Issuance of the new license had been delayed pending issuance of the National Marine Fisheries Service biological opinion,

which was completed and filed with FERC on December 5, 2016. With the filing of the National Marine Fisheries Service biological opinion, FERC now has all required documentation to issue a new license, which is anticipated in 2018.

For more information about Oroville Facilities relicensing compliance, see Chapter 3, Environmental Programs, and Chapter 13, Recreation.

South SWP Hydropower Relicensing

The existing FERC license for South SWP Hydropower covers Warne, Castaic, and Devil Canyon power plants and expires on January 31, 2022.

On August 1, 2016, DWR filed two preliminary application documents and notices of intent with FERC for the relicensing of South SWP Hydropower and requested that the Devil Canyon Powerplant (i.e., Devil Canyon Project) be relicensed separately from Warne and Castaic power plants. The first preliminary application document and notice of intent were submitted by DWR and Los Angeles Department of Water and Power (LADWP) for the relicensing of Warne and Castaic power plants. (LADWP operates and maintains the Castaic Powerplant and is a joint licensee with DWR on FERC Project No. 2426.) Warne and Castaic power plants will continue to be referred to as South SWP Hydropower. The second preliminary application document and notice of intent were filed solely on behalf of DWR for the relicensing of the Devil Canyon Project.

With the August 1, 2016 submission of the Devil Canyon Project preliminary action document, DWR also requested FERC's approval to use the Traditional License Process in lieu of the Integrated Licensing Process, which is FERC's default relicensing process. DWR and LADWP will use the Integrated License Process for South SWP Hydropower relicensing.

On September 30, 2016, FERC issued a notice to proceed and approved DWR's request to use the Traditional License Process for the Devil Canyon Project. Upon completion of the relicensing effort, FERC will issue one new license to DWR and LADWP as co-licensees for the Warne and Castaic power plants, which will retain the name and number South SWP Hydropower, FERC Project No. 2426, and one new license to DWR for the Devil Canyon Powerplant, to be assigned the name and number Devil Canyon Project, FERC Project No. 14797.

On February 8, 2017, DWR and LADWP held a study plan meeting with various stakeholders to discuss the proposed study plan for South SWP Hydropower. In March 2017, DWR and LADWP held additional meetings to discuss the proposed study plan and resolve study needs. On June 14, 2017, FERC approved the revised study plan for South SWP Hydropower. Additionally, DWR initiated various environmental and other studies needed to support the relicensing process.

From June through September 2017, DWR consulted with various Native American tribes whose traditional sites could potentially be affected by the project.

On April 6, 2017, FERC approved DWR's application for a license amendment to remove two 115 kilovolt transmission lines from the South SWP Hydropower license. The two lines are located at the switchyard of the Devil Canyon Powerplant.

Hardluck Campground. On December 11, 2015, FERC issued an order approving DWR's request to permanently close Hardluck Campground and remove it as a requirement of the South SWP Hypdropower license. Hardluck Campground had been closed since 2008 to protect habitat for the federally

listed, endangered Arroyo toad (*Anaxyrus californicus*). In the order, FERC also required DWR to complete a demand analysis in consultation with the United States Forest Service to determine whether there was sufficient demand for a replacement campground. DWR submitted a demand analysis on August 1, 2016. In a letter dated February 22, 2017, FERC indicated that development of a replacement campground for Hardluck Campground would not be required. However, FERC stated the need for recreation opportunities previously provided by Hardluck Campground should be explored within the context of the South SWP Hydropower relicensing process.

Existing SWP Power Facilities

Figure 10-1 shows the names, locations, and nameplate capacities of the SWP's primary power facilities.

Hydroelectric

Hydroelectric generation provides the largest share of SWP power resources. The combined Hyatt Pumping-Generating Plant and Robie Thermalito Pumping-Generating Plant (Hyatt-Thermalito) generate about 2.2 billion kilowatt hours of energy in a median water year, while the 3 megawatts (MW) from the Thermalito Diversion Dam Powerplant add another 24 million kilowatt hours 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

DWR enters into renewable energy agreements with various entities. These agreements provide for zero GHG emission energy used by the SWP and assist DWR in meeting its 2020 GHG reduction goals.

DWR Power Planning Activities

DWR does long-term power planning for the SWP through periodic development of an Integrated Resource Plan (IRP). The IRP concludes with plans for long-term and mid-term power procurements necessary to provide power to operate the SWP and ensures rate stability through energy market disruptions. IRP 2016 will be succeeded by IRP 2019; development of the new IRP will begin in the spring of 2019 and is expected to be completed in fall 2020. IRP 2019 will look at current and future SWP operational scenarios, the corresponding power portfolio needs, and uncertainties. It will also make recommendations related to the quantity, timing, and energy products that should be utilized to protect against energy market volatility.

In May 2012, DWR's California Environmental Quality Act Climate Change Committee oversaw the completion of DWR's *Climate Action Plan Phase I: Greenhouse Gas Emissions Reduction Plan* that established DWR's overall GHG emissions reduction strategy. *Climate Action Plan Phase I* assessed GHG emissions from ongoing activities, set goals for GHG reductions that exceeded the GHG reduction targets in both Assembly Bill 32 (Nunez; Chapter 488, Statutes of 2006) and Senate Bill 350 (De León; Chapter 547, Statutes of 2015), and presented 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 *Climate Action Plan Phase I* emission reduction goals. DWR has exceeded the Renewable Energy Procurement Plan targets since 2013.

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

Figure 10-1 Names, Locations, and Nameplate Capacities of Primary State Water Project Power Facilities

CAISO Market Redesign and Technology Upgrade 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 400,000 megawatt hours (MWh) 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). Effective November 1, 2017, through the contract termination date of September 30, 2019, DWR receives renewable energy credits bundled with energy from four of the five hydroelectric plants.

In May 2010, DWR entered into an agreement with the Northern California Power Agency and various public agencies to finance, construct, operate, and maintain the Lodi Energy Center—a 280 MW natural gas combined cycle combustion turbine generation facility that Northern California Power Agency would own and operate, and from which DWR would receive 33.5 percent of the output. The facility achieved its commercial operation date on November 27, 2012.

On March 13, 2014, DWR executed a consent and amendment agreement with RE Columbia and RE Camelot transferring the RE Columbia generation facility to RE Camelot. Under the 20-year power purchase agreement through 2034, the 45 MW solar power plant is expected to deliver approximately 124,000 MWh of annual generation.

On October 19, 2015, DWR and Solar Star California XLIV executed a 20-year power purchase agreement, with an optional 10-year extension. Under the agreement, DWR will receive approximately 24,700 MWh of renewable photovoltaic energy annually from the Pearblossom Solar Facility, which is located adjacent to the Pearblossom Pumping Plant.

On November 5, 2015, DWR executed a power purchase agreement with Solverde 1 for renewable photovoltaic energy. Under the 20-year agreement through 2036, the 85 MW plant is expected to deliver approximately 230,000 MWh of annual generation.

On December 16, 2015, DWR executed a Western Systems Power Pool (WSPP) agreement with Metropolitan for the purchase of 51.4 MW of capacity and renewable energy credits bundled with energy. The contract provides certified renewable energy from five small hydroelectric plants owned and operated by Metropolitan. Under this agreement, DWR will receive an estimated 54,574 MWh of annual energy and renewable energy credits.

The agreement term is January 1, 2016, through December 31, 2020.

On October 1, 2017, DWR began to receive zero-emission energy from the Boulder Canyon Project (Hoover Dam), located near Boulder City, Nevada. DWR entered into a 50-year contract with the U.S. Department of Energy, Western Area Power Administration (Desert South West Region) and the Bureau of Reclamation for up to 6,500 MWh of annual generation.

The renewable energy procured under these agreements will further increase the amount of renewable and zero GHG emission energy used by the SWP and will help DWR meet its 2020 GHG reduction goals.

Short-term Purchase Agreements

DWR typically engages in short-term power transactions with member utilities and energy marketers under the WSPP. In 2017, these transactions included energy and capacity to meet the requirements of resource adequacy, which is a planning and procurement process to ensure adequate resources.

Additionally, 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. The agreement term expired on September 30, 2017.

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 periods when power costs are lower and maximize power generation 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 transmission interconnection and network transmission service for SWP power resources and pumping loads. Detailed information about past contractual transmission agreements is available in previous editions of Bulletin 132.

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 2016, DWR and SCE coordinated engineering, design, and construction of the transmission facilities for Citrus Pump Station, located in San Bernardino County. Clementine Substation, the SCE transmission interconnection facility for Citrus Pump Station, achieved commercial operation in May 2016.

It is anticipated that Citrus Pump Station will enter commercial operation in January 2018. SCE subsequently performed a final true-up of DWR-SCE Citrus Pump Station Interconnection Facilities Agreement

costs. It yielded a reduction in the monthly interconnection facilities charge and a refund of the income tax component of contribution security tax.

The pumping capacities increased at Crafton Hills Pump Station and Cherry Valley Pump Station in 2017. As a result, SCE performed a rate study, and along with DWR, amended the respective wholesale distribution service agreements for Crafton Hills and Cherry Valley pump stations.

In December 2017, DWR and SCE executed a construction agreement in which SCE provided funding for DWR to perform engineering, design, and construction of relay upgrades at DWR's Mojave Siphon and Devil Canyon power plants.

SWP Power Operations in 2017

Tables 10-1 through 10-4, at the end of the chapter, present historical information about SWP power operations for calendar year 2017, including energy consumed, generated, purchased, and sold. Note that in some instances, these tables may not sum as expected due to rounding.

Energy Consumed

In 2017, energy used for SWP operations at the 29 SWP pumping and generating plants totaled 9.65 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 2017.

Energy Generated and Purchased

Table 10-2 shows the amounts of energy generated at SWP facilities in 2017, as well as energy purchased for SWP operations.

Hydroelectric

The Hyatt-Thermalito power complex in Oroville generated 2,376,003 MWh of energy in 2017.

Energy generated at SWP aqueduct recovery plants—Gianelli, Alamo, Mojave Siphon, Devil Canyon, and Warne—totaled 2,143,139 MWh.

Natural Gas

The SWP received generation from the Lodi Energy Center. SWP's 33.5 percent share of the Lodi Energy Center's energy output for 2017 was 243,390 MWh.

Contractual Resource Arrangements in 2017

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 2017, LADWP provided 493,910 MWh for DWR's share of energy generated at Castaic Powerplant.

DWR's share of Gianelli Pumping-Generating Plant used 231,309 MWh and generated 153,785 MWh of energy in 2017.

Purchases and Costs

Table 10-3 shows the amounts of energy, transmission, and other services purchased in 2017. Amounts include contractual short-term and long-term energy trades

and associated transactions of energy, transmission, capacity, and ancillary services with CAISO, and miscellaneous energy-related costs.

DWR transacted 2.87 million MWh of energy at a cost of $81.06 million. Other SWP-related costs include $4.74 million for transmission service outside CAISO and $304.95 million for operation, maintenance, and miscellaneous CAISO charges, among other things. Key costs associated with the latter amount are (1) $0.15 million for debt service and $4.85 million for operations and maintenance, both related to Pine Flat Powerplant; and (2) $9.41 million for debt service and $5.67 million for capital improvement, management, operations, and maintenance, connected to the Lodi Energy Center. The $4.74 million for transmission service outside CAISO includes $0.42 million for PG&E and $3.32 million for SCE, among other things.

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 2017, the power plant provided 899,458 MWh of energy to the SWP at an energy component cost of $6.87 million.

Under the Metropolitan Small Hydro contract, DWR purchased 123,044 MWh of energy in 2017 from four small hydroelectric power plants on the Metropolitan system at a cost of $7.04 million.

Also, under the Lodi Energy Center Power Sales Agreement with Northern California Power Agency, DWR received a purchase credit of $12.88 million based on 243,390 MWh generated at the Lodi Energy Center plant during 2017 and conveyed to the CAISO power grid. This amount is shown as revenue in Table 10-4.

Under renewable energy contracts with RE Camelot, LLC; Metropolitan; Solar Star California XLIV, LLC; and Solverde 1, LLC, DWR received a total of 438,742 MWh at a cost of $16.97 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 2017, the SWP purchased 1.16 million MWh of short-term energy under agreements with bilateral marketers at a cost of $43.52 million. These purchases are reflected in Table 10-3.

Contractual Sales of Excess Power

In 2017, DWR received $92.90 million in energy revenues. This includes (1) $32.95 million connected to bilateral trades and $40.51 million for ancillary service transactions, both made through CAISO; and (2) $19.42 million associated with long-term contracts, including, among other things, $12.88 million related to the Lodi Energy Center Power Sales Agreement with Northern California Power Agency.

Under the terms of the contract with the U.S. Department of Energy, Western Area Power Administration, DWR acts as CAISO scheduling coordinator for the joint-use facilities of the San Luis Unit and certain DWR pumping facilities occasionally used to pump federal water. During 2017, DWR collected a net revenue of $2.36 million. The actual CAISO charges and revenue associated with this amount are included—but not listed independently—on Tables 10-3 and 10-4.

Forecasting Power Operations

Each year, after reviewing the SWP water contractors' water delivery requests and the

construction schedule for future facilities, DWR forecasts the associated energy consumption and generation through 2035. Short-term power requirements, based on actual water supply and reservoir storage levels, are determined for the current and two ensuing years of operation. Long-term operational studies for the remaining years are based on median-year water supply conditions and optimal reservoir storage levels. The forecast also includes losses in reservoirs and aqueducts, recreation water, and water to replace storage in reservoirs south of the Delta.

Actual SWP power requirements may vary significantly from the forecast amounts. Those variations are due to the amount of water available and delivered in a given year. For example, dry conditions in Northern California could result in a reduction in the amount of water available for delivery and for generation. If full deliveries could not be made, less power would be used. Power requirements could also decrease during a wet year because of the availability of local water in the San Joaquin Valley or Southern California.

Conversely, power requirements could exceed the amount originally forecast if actual water deliveries are greater than the amounts estimated. For example, if additional pumping is needed to refill reservoirs south of the Delta after an unexpectedly dry year, more power would be used.

Table 10-1 Energy Used at Pumping Plants and Power Plants in 2017, 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)	2	176	143	5	0	0	0	0	5	142	5	1	478
North Bay Interim Pumping Plant	0	0	0	0	0	0	0	0	0	0	0	0	0
Cordelia Pumping Plant	434	396	88	161	681	683	851	1,071	1,121	1,133	1,015	907	8,542
Barker Slough Pumping Plant	153	139	36	64	495	566	589	1,150	1,147	1,048	852	729	6,968
South Bay Pumping Plant	2,099	1,909	793	1,298	4,180	5,204	8,978	12,673	13,086	7,151	6,728	7,495	71,594
Del Valle Pumping Plant	12	13	13	11	9	5	5	5	5	7	11	11	108
Banks Pumping Plant	133,597	109,662	15,619	24,405	71,392	111,904	114,437	125,200	93,289	25,223	73,441	73,963	972,133
Gianelli Pumping-Generating Plant (SWP share)	77,801	24,321	2,216	11,247	16,252	42,781	14,620	3,642	1,777	0	19,705	16,948	231,309
Dos Amigos Pumping Plant (SWP share)	34,970	42,460	20,144	32,800	42,390	36,810	49,252	59,196	53,835	50,082	39,062	36,136	497,137
Buena Vista Pumping Plant	36,149	38,628	32,523	40,661	49,389	49,526	52,856	50,011	45,191	47,158	40,834	44,535	527,461
Teerink Pumping Plant	42,328	43,649	35,380	43,304	50,630	49,413	53,021	50,311	46,283	49,277	43,539	48,349	555,483
Chrisman Pumping Plant	93,324	97,353	78,213	94,937	109,180	105,554	113,264	108,629	100,668	108,391	96,534	107,652	1,213,697
Edmonston Pumping Plant	341,259	356,452	279,411	341,869	395,249	379,540	404,950	388,463	364,600	393,476	352,800	396,149	4,394,217
Alamo Powerplant (station service)	129	3	9	21	13	12	2	0	6	0	281	0	475
Pearblossom Pumping Plant	27,980	64,446	65,527	77,745	77,965	75,547	80,741	80,871	77,147	77,913	79,572	81,406	866,861
Pine Flat Powerplant (station service)[1]	2,121	44	0	0	0	0	0	0	0	0	1,215	1,366	4,746
Mojave Siphon Powerplant (station service)	219	0	31	0	12	13	0	0	1	1	0	0	277
Devil Canyon Powerplant (station service)	849	0	41	0	0	0	1	3	13	3	0	0	911
Oso Pumping Plant	27,851	14,283	4,328	7,088	13,066	11,199	12,101	10,315	8,791	12,403	7,415	12,196	141,035
Warne Powerplant (station service)	0	223	531	370	43	5	0	47	144	22	78	0	1,462
Las Perillas Pumping Plant	246	720	608	751	1,243	1,629	1,779	1,589	1,128	686	106	343	10,828
Badger Hill Pumping Plant	642	1,810	1,496	1,863	3,148	3,850	4,217	3,775	2,651	1,641	253	889	26,234
Devil's Den Pumping Plant	1,789	1,652	1,711	1,748	2,340	2,339	2,431	2,553	2,285	1,972	540	1,825	23,186
Bluestone Pumping Plant	1,673	1,553	1,610	1,642	2,200	2,202	2,262	2,406	2,146	1,851	486	1,697	21,729
Polonio Pass Pumping Plant	1,801	1,663	1,712	1,745	2,326	2,332	2,397	2,531	2,274	1,969	534	1,839	23,122
Greenspot Pump Station	1,475	490	1,262	1,712	1,777	1,100	152	107	62	276	55	68	8,535
Crafton Hills Pump Station	1,741	664	1,752	2,361	2,769	2,864	3,195	2,618	2,430	2,291	2,101	2,077	26,863
Cherry Valley Pump Station	149	24	107	179	190	185	209	179	187	205	195	141	1,949
Citrus Pump Station	0	0	12	125	809	2,067	4,136	3,554	3,753	2,450	2,480	3,570	22,957
Total Energy Required for the SWP[2]	**830,791**	**802,733**	**545,315**	**688,114**	**847,747**	**887,329**	**926,444**	**910,900**	**824,025**	**786,771**	**769,835**	**840,292**	**9,660,296**

[1] Pine Flat station service energy provided by CAISO under Market Redesign and Technology Upgrade (MRTU) operation.

[2] Totals may not sum as expected due to rounding.

Table 10-2 Energy Generated and Purchased in 2017, by Month (megawatt-hours)

Sources of Energy	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
SWP Energy Sources													
Hyatt-Thermalito Power Complex	298,055	67,826	265,439	222,542	329,627	255,201	222,564	289,765	222,084	58,478	59,067	85,355	2,376,003
Gianelli Pumping-Generating Plant (SWP share)	0	0	3,718	11,327	25,572	0	10,672	4,829	14,831	62,849	19,059	929	153,785
Alamo Powerplant	5,553	8,938	8,975	7,838	8,604	9,512	10,158	10,063	7,114	10,253	6,113	10,221	103,342
Mojave Siphon Powerplant	3,169	7,699	7,617	9,102	8,118	8,750	9,128	8,467	8,714	8,099	9,585	9,847	98,295
Devil Canyon Powerplant	57,903	112,435	118,808	137,908	132,695	127,691	134,139	137,328	129,861	129,962	132,276	142,511	1,493,517
Warne Powerplant	53,901	26,380	9,211	15,289	20,373	25,182	28,338	23,002	20,705	27,535	16,142	28,140	294,200
Subtotal	*418,581*	*223,278*	*413,767*	*404,005*	*524,989*	*426,335*	*414,999*	*473,454*	*403,311*	*297,175*	*242,242*	*277,005*	*4,519,141*
Energy Sources from Long-term Agreements													
Castaic Powerplant	95,808	52,272	14,824	30,168	47,208	38,784	37,944	35,232	32,050	43,512	23,964	42,144	493,910
Metropolitan Small Hydro Generation	4,676	7,792	9,198	10,366	12,764	10,912	11,814	13,240	14,781	11,113	5,800	10,589	123,044
Pine Flat Powerplant (Kings River Conservation District)	7,059	70,989	121,382	102,293	118,028	138,093	142,040	103,612	55,833	34,854	5,275	0	899,458
Energy to Metropolitan for CRA[1] Pumping	0	0	0	0	0	0	0	0	0	0	0	0	0
Energy from Metropolitan for CRA[1]	0	0	0	0	0	0	0	0	0	0	0	0	0
Lodi Energy Center	13,037	5,138	2,374	0	1,151	12,059	18,095	22,180	31,363	45,574	42,402	50,017	243,390
Renewable Energy[2]	21,044	22,810	36,704	42,798	48,370	49,384	49,300	44,366	42,271	38,716	23,855	19,124	438,742
Purchases													
Purchases (Firm and WSPP Contracts)	103,200	86,400	93,300	96,200	98,400	91,200	103,200	93,600	96,000	98,721	96,707	103,533	1,160,461
CAISO Energy[3]	180,424	339,192	-143,859	2,485	-2,013	132,621	167,147	147,396	179,779	262,681	371,991	387,898	2,025,742
Subtotal	*425,248*	*584,593*	*133,922*	*284,309*	*323,908*	*473,053*	*529,540*	*459,625*	*452,077*	*535,171*	*569,995*	*613,305*	*5,384,747*
Total Resources	843,829	807,871	547,689	688,314	848,898	899,388	944,539	933,080	855,388	832,345	812,237	890,309	9,903,888
Less Energy Sales[4]	-13,037	-5,138	-2,374	-200	-1,151	-12,059	-18,095	-22,180	-31,363	-45,574	-42,402	-50,017	-243,590
Total Energy Provided to the SWP[5]	**830,791**	**802,733**	**545,315**	**688,114**	**847,747**	**887,329**	**926,444**	**910,900**	**824,025**	**786,771**	**769,835**	**840,292**	**9,660,296**

[1] Contractual Resource Arrangement (CRA).
[2] Alameda Municipal Power, RE Camelot LLC, Solar Star California XLIV, LLC, The Metropolitan Water District of Southern California, & Solverde 1, LLC.
[3] Energy provided by CAISO for balancing the total SWP loads and resources.
[4] Under the Lodi Energy Center Power Sales Agreement, 243,390 MWh was received as a purchase credit; the remaining 200 MWh was traded bilaterally with energy marketers. See Table 10-4.
[5] Totals may not sum as expected due to rounding.

Table 10-3 Energy, Transmission, and Related Costs in 2017

Category	Energy Trades (MWh)	Energy Cost (in dollars)	Transmission Cost Outside CAISO (in dollars)	Energy-Related Costs (in dollars)	Total Cost (in dollars)
CAISO–Bilateral Trades		3,307			3,307
CAISO–Other[1]				280,557,259	280,557,259
Energy Marketers–Bilaterals (WSPP)	1,160,461	43,524,411		1,555,839	45,080,250
Long-term Contracts[2]	1,265,892[a]	20,557,987	4,739,079	22,840,150	48,137,115
Long-term Energy Markets–Renewable Energy[3]	438,742	16,970,384			16,970,384
Total	**2,865,095**	**81,056,089**	**4,739,079**	**304,953,148**	**390,748,315**

[1] Transmission, capacity, imbalance energy, etc.
[2] California Power Exchange, Kings River Conservation District, Los Angeles Department of Water and Power, The Metropolitan Water District of Southern California, Northern California Power Agency, Pacific Gas & Electric Company, Southern California Edison, and Western Area Power Administration.
[a] Includes 243,390 MWh generated at the Lodi Energy Center.
[3] RE Columbia, LLC, The Metropolitan Water District of Southern California, Solar Star California, XLIV, LCC, and Solverde 1 LLC.

Table 10-4 Energy and Energy-related Revenue in 2017 per Contract Agreements

Category	Energy Trades (MWh)	Energy Revenues (in dollars)	Other Energy-related Revenue (in dollars)	Total Revenues (in dollars)
CAISO–Bilateral Trades		32,949,013		32,949,013
CAISO–Other[1]			40,514,885	40,514,885
Energy Marketers–Bilaterals	200	6,624		6,624
Long-term Contracts[2]	243,390[a]	12,881,283	6,537,371	19,418,654
Long-term Renewable Energy Contracts			15,735	15,735
Total	**243,590**	**45,836,920**	**47,067,991**	**92,904,911**

[1] Transmission, capacity, imbalance energy, etc.
[2] Los Angeles Department of Water and Power, Northern California Power Agency, City of Santa Clara, and Western Area Power Administration.
[a] All from Northern California Power Agency's Lodi Energy Center.

Chapter 11
Facilities Maintenance

Damaged Oroville Dam service spillway.

Significant Events in 2017

In February 2017, Lake Oroville experienced increased reservoir levels as a result of record rainfall and runoff in the Feather River watershed. On February 7, 2017, the Oroville Dam service spillway chute failed. Flows were temporarily halted to inspect and assess the spillway damage. Releases resumed on a limited basis on February 8, 2017.

On February 11, 2017, water flowed down the Oroville Dam emergency spillway for the first time in the life of the structure when Lake Oroville levels surpassed 901 feet, reaching a record high elevation 902.6 feet on February 12, 2017. The releases over the emergency spillway resulted in erosive downstream damage that was substantially greater than expected. Emergency repairs began immediately and were ongoing throughout 2017. Reconstruction and repairs for the service spillway and emergency spillway are expected to be completed by November 2018.

On March 1, 2017, reports were received that the right-wing wall of the Clifton Court Forebay Dam intake structure concrete apron had failed. Bathymetry and dive inspections were subsequently conducted to assess the condition of the intake structure. Emergency repairs for the intake structure were completed by the middle of April 2017.

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.

Dam Safety Inspections and Reports

DWR conducts several types of inspections on SWP facilities to ensure that each dam is safe for continued operation. The O&M Dam Safety Branch (DSB), Division of Safety of Dams (DSOD), Federal Energy Regulatory Commission (FERC), and the Bureau of Reclamation (Reclamation) conduct various inspections and safety analyses to ensure the safety of SWP dams.

O&M staff, through the DSB and field divisions, inspect, collect, and analyze data for all SWP dams and appurtenant structures. DSB also conducts performance and instrumentation analyses and prepares annual reports that are distributed to the field divisions for scheduling and maintenance. The reports are also sent to FERC and to DSOD for their review.

In accordance with Division 3 of the California Water Code, DSOD has regulatory authority over jurisdictional dams owned and operated by DWR.

DSOD is responsible for overseeing all design modifications and construction activities on jurisdictional SWP dams. In accordance with the California Code of Regulations, (Title 23, Division 2, Chapter 1, Article 5), DSOD 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 and geologists evaluate proposed modifications to existing dams, as well as designs for any proposed new jurisdictional dams. DSOD oversees construction activities to ensure work is performed in accordance with approved plans and specifications. DSOD also performs comprehensive independent reevaluations of dams and their appurtenant structures.

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.

Routine Inspections

During 2017, O&M, along with agency representatives from DSOD, FERC, and Reclamation, conducted routine periodic inspections for all the dams in the Oroville Field Division, San Luis Field Division, and Southern Field Division. Inspections for the dams in the Delta Field Division were postponed from their original scheduled date of November 2017 to January 2018.

Table 11-1 shows SWP dam inspections conducted in 2017.

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 Reclamation and are not under DSOD jurisdiction.

Reclamation conducts comprehensive reviews of these joint-use facility dams every 8 years, a change in frequency from every 6 years. The comprehensive reviews for Sisk Dam and O'Neill Dam occurred in 2015; the comprehensive reviews for the Los Banos and Little Panoche detention dams occurred in 2016.

Periodic Facility Reviews are also conducted by Reclamation every 8 years using an alternate schedule spaced between the comprehensive reviews. Periodic Facility Reviews were conducted for the joint-use facilities in 2012. A joint annual site inspection of the facilities with Reclamation, DSB, and San Luis Field Division was conducted in April 2017.

Independent Reviews

Director's Safety Review Board

Under California Water Code, Section 6056, DWR is required to retain a consulting board to review: (1) the adequacy of the design of any dam or reservoir DWR proposes to construct; and (2) the safety of the completed construction, including the terms and conditions for the certificate of approval. In accordance with this California Water Code requirement, DWR formed the DSRB.

The DSRB consists 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. There were three DSRB inspections conducted in 2017, one each for Antelope Dam, Frenchman Dam, and Grizzly Valley Dam.

FERC Reviews

FERC conducts dam safety inspections in conjunction with O&M on an annual basis for SWP dams under its jurisdiction. DWR is the licensee for FERC Project No. 2100 (P-2100) and FERC Project No. 2426 (P-2426). P-2100 consists of dams associated with Oroville Field Division facilities that include Oroville Dam, Thermalito Diversion Dam, Feather River Fish Barrier Dam, Thermalito Forebay Dam, and Thermalito Afterbay Dam. P-2426 dams are associated with Pyramid, Quail, Cedar Springs, and Devil Canyon Second Afterbay facilities in Southern Field Division. Every 5 years, a FERC Part 12D inspection is also conducted. The last Part 12D inspections occurred in 2014 and 2015 for P-2100 and P-2426, respectively.

As a supplement to the FERC Part 12D safety inspection, FERC's Dam Safety Performance Monitoring Program requires that a potential failure mode analysis be performed for FERC-licensed dams. The potential failure mode analysis involves document review and site visits to develop a comprehensive list of potential failure modes at each

Table 11-1 State Water Project Dam Inspections in 2017

Field Division	Facility	Type of Inspection: Operations & Maintenance-Dam Safety Branch	Division of Safety of Dams	Federal Energy Regulatory Commission	Bureau of Reclamation Annual Inspection	Bureau of Reclamation 8-Year Comprehensive Review	Director's Safety Review Board	Part 12D 5-Year Review
Oroville								
	Antelope Dam	X	X	–	–	–	X	–
	Frenchman Dam	X	X	–	–	–	X	–
	Grizzly Valley Dam	X	X	–	–	–	X	–
	Oroville Dam	X	X	X	–	–	–	–
	Bidwell Canyon Saddle Dam	X	X	X	–	–	–	–
	Parish Camp Saddle Dam	X	X	X	–	–	–	–
	Thermalito Diversion Dam	X	X	X	–	–	–	–
	Thermalito Forebay Dam	X	X	X	–	–	–	–
	Thermalito Afterbay Dam	X	X	X	–	–	–	–
	Feather River Fish Barrier Dam	X	X	X	–	–	–	–
Delta								
	Bethany Dams	–	–*	–	–	–	–	–
	Clifton Court Forebay Dam	–	–*	–	–	–	–	–
	Del Valle Dam	–	–*	–	–	–	–	–
	Dyer Reservoir	–	–*	–	–	–	–	–
	Patterson Dam	–	–*	–	–	–	–	–
San Luis								
	Little Panoche Detention Dam	X	–	–	X	–	–	–
	Los Banos Detention Dam	X	–	–	X	–	–	–
	O'Neill Dam	X	–	–	X	–	–	–
	Sisk Dam	X	–	–	X	–	–	–
Southern								
	West Branch							
	Castaic Dam	X	X	–	–	–	–	–
	Pyramid Dam	X	X	X	–	–	–	–
	Quail Canal and Dam	X	–	X	–	–	–	–
	East Branch							
	Cedar Springs Dam	X	X	X	–	–	–	–
	Devil Canyon Second Afterbay Dam	X	X	X	–	–	–	–
	Perris Dam	X	X	–	–	–	–	–
	Crafton Hills Dam	X	X	–	–	–	–	–
	Crafton Hills Reservoir Enlargement Dam	X	X	–	–	–	–	–

"X" indicates dam inspection was conducted at SWP facility.

"–" indicates dam inspection was not conducted at SWP facility.

* The Delta Field Division annual Operations and Maintenance and Division of Safety of Dams inspections were postponed from November 2017 to January 2018 due to a scheduling conflict. The Division of Safety of Dams inspects dams at least once every fiscal year (July 1 through June 30). Dams in the Delta Field Division were last inspected in November 2016.

dam. From the FERC review process, two documents are generated: the FERC Part 12D safety inspection report and the potential failure mode analysis report. FERC-licensed facilities are also inspected annually by DSB and FERC's Dam Safety Engineer.

Supporting Technical Information Document

The *Supporting Technical Information Document* is a separate report that summarizes SWP project elements and details that do not change significantly over time. In the event of an emergency, the document serves as a summary and general overview for DWR, FERC, and consultants. The document is updated as required but is not generated as part of any of the dam safety inspections.

Condition Assessment Program Inspections

Condition Assessment Program inspections are scheduled biennially, every 5 years, or every 10 years. Future inspections intend to identify trends in maintenance and aging of the SWP.

In 2017, Condition Assessment Program inspections were performed on 33 different reaches of the SWP along more than 415 miles of canals. To aid in maintenance efforts, check structures, control buildings, compound grounds, roads, culverts, drain inlets, overchutes, turn-ins, turnouts, and utility crossings along the canal were inspected and rated.

Spillway Inspection Program

A series of new investigations and assessments throughout SWP facilities was initiated following the failure of the Oroville Dam service spillway in 2017.

A detailed spillway and condition inspection program was initiated to determine the condition of SWP spillways and outlet structures similar to those of Oroville Dam (Phase 1: Inspection and Evaluation) and repair or improve as recommended, based on the inspections (Phase 2: Repairs and Analysis). These inspections included nondestructive evaluation techniques, ground penetrating radar, and underwater remotely operated vehicles. Throughout 2017, several spillway and outlet structure inspections and evaluations were started or completed.

Arroyo Pasajero Program

The Arroyo Pasajero watershed 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 watershed and its tributaries transport heavy sediment loads eroded from throughout the 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 drain inlets to release floodwater into the California Aqueduct, an evacuation culvert to release floodwater east of the California Aqueduct, and the West Side Detention Basin, which was designed to store floodwater runoff and sediment west of 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.

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.

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 2017, 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. Work to address the transfer documents continued in 2017.

Related Activities

Environmental Protection Agency (EPA) Review of Atlas Mine Area Operable Unit

The West Side Detention Basin is an area of interest in the U.S. Environmental Protection Agency's (EPA) *Superfund Record of Decision: Atlas Asbestos Mine, CA*, issued by the EPA in 1991. Five-year reviews of the Atlas Mine Area Operable Unit, part of the Atlas Asbestos Mine Site in Fresno County, 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 2017, DWR continued its standard operating procedures within the basin to comply with the EPA's Comprehensive Environmental Response Compensation and Liability Act (Superfund law).

California Department of Transportation Lassen Avenue Bridge Project

In September 2011, the California Department of Transportation informed DWR that funding existed through final design of 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. The comments focused on flood control and ongoing operations and maintenance needs related to properly maintaining the channel. Throughout 2017, the California Department of Transportation continued to work on the California Environmental Quality Act and National Environmental Policy Act processes, as well as permitting and design of the proposed bridge project.

Cantua Creek Stream Group

Planning for a restoration project similar to the West Side Detention Basin restoration project began in 2006 for the Cantua Creek Stream Group detention basins. The project's goal is to improve aqueduct flood protection and water quality between Mileposts 128.48 and 141.57.

A feasibility-level study for the Cantua Creek Stream Group Improvements Project, completed in April 2011, identified actions such as raising embankments, making modifications to structures, and acquiring flood easements to provide a 50-year level of protection for the California Aqueduct. Improving water quality in the aqueduct was a significant goal of the study, since currently, several of the existing drain inlets are not gated, and sediment-laden floodwater flows directly into the aqueduct with little detention and decanting. Increasing flood storage and detention of this floodwater prior to releasing it into the California Aqueduct would provide a significant benefit to water quality in the aqueduct.

In 2017, construction continued between February and May, and the project was closed out in July.

Repairs, Modifications, and Inspections by Field Division

DWR continually monitors all SWP facilities and performs repairs, modifications, and inspections as necessary to ensure safe, reliable water delivery. The following sections describe significant and noteworthy repairs, modifications, and inspections conducted in 2017 by Oroville, Delta, San Luis, and Southern field divisions.

Oroville Field Division

In 2017, Condition Assessment Program inspections were completed along two miles of the Power Canal in the Oroville Field Division.

On February 7, 2017, the Oroville Dam service spillway chute failed. Flows were temporarily halted to inspect and assess the spillway damage. Releases resumed on a limited basis on February 8, 2017.

On February 11, 2017, the Oroville Dam emergency spillway passed flows for the first time in the life of the structure when Lake Oroville levels surpassed 901 feet, reaching a record high elevation 902.6 feet on February 12, 2017. The releases over the emergency spillway resulted in erosive downstream damage that was substantially greater than expected, triggering a massive emergency repair effort. Repair efforts on the emergency spillway and service spillway continued throughout 2017 and are expected to be completed by November 2018.

On March 2, 2017, the failed tension rods on radial gates 1 and 4 at Thermalito Diversion Dam were replaced as part of the repairs defined in Specification No. 17-16, which also included refurbishing Oroville Dam radial gates.

Specification No. 17-16, in addition for the Thermalito Diversion Dam radial gates repairs, included refurbishing of Oroville Dam radial gates.

On April 7, 2017, the two 60-inch penstocks and a stream release fixed-cone valve were inspected at Thermalito Diversion Dam to assess their condition and operability. The penstocks were inspected using an underwater remotely operated vehicle.

On May 2 and 4, 2017, rope access teams were deployed to inspect all of the radial gates at the Thermalito Diversion Dam. The inspection results were used to develop the scope of maintenance repairs conducted in 2017 under Specification No. 17-16.

On May 10, 2017, penstock No. 1 at the Hyatt Powerplant at Oroville Dam was inspected resulting in the report, *Hyatt Powerplant*

Penstock No. 1 Inspection & Condition Assessment, dated August 2017.

In spring 2017, maintenance repairs needed at the Oroville Dam radial gates were identified through a series of rope access inspections. Some of the maintenance actions were implemented under Specification No. 17-16 work in 2017. The balance is anticipated to occur in 2019 to avoid conflicts with spillway recovery construction.

Between June and August 2017, detailed visual and nondestructive evaluation inspections at Antelope, Frenchman, and Grizzly Valley dams spillways were performed.

In August 2017, a notice to begin work was issued to complete concrete spall and crack repairs inside Antelope, Frenchman, and Grizzly Valley dams spillways. All repairs were completed in October 2017 under Specification No. 17-17, which specified spillway repairs for all three dams. All work under this specification was completed with a Final Construction Report published by the Division of Engineering in November 2017.

In November 2017, following the Oroville Dam spillways incident, radial gate maintenance repairs were initiated at the Oroville Dam service spillway structure. Additional maintenance is not anticipated to be completed until 2019.

On December 6, 2017, the structural condition of penstock No. 1 at Hyatt Powerplant was assessed by consultants using ground penetrating radar and other methods.

On December 7, 2017, an engineering inspection was performed on Palermo Tunnel from the valve chamber to the outlet portal. The inspection included Schmidt Hammer testing throughout the tunnel to determine its structural integrity.

Between December 11 and December 15, 2017, penstock No. 1 at Hyatt Powerplant was surveyed using a LiDAR (light detection and ranging) scan to capture the detailed conditions of the structure.

On December 13, 2017, the underside of the Thermalito Diversion Dam and Power Canal headworks bridge decks was inspected.

Delta Field Division

In the Delta Field Division, features along 24 miles of the California Aqueduct were inspected, spanning one repayment reach and four pools.

Maintenance and emergency repairs were performed along the Roaring River levee. Collaborative work included flood fighting, repairs, and other work, using field division staff, California Conservation Corps, reclamation districts, Department of Fish and Wildlife, emergency contractors, and others.

On March 1, 2017, a routine inspection determined that the concrete apron failed on the right-wing wall of the Clifton Court Forebay Dam intake structure. After engineers evaluated the right-wing wall, bathymetry and dive inspections were conducted. Emergency repairs for the intake structure were undertaken and completed in mid-April 2017.

From September 11 through September 15, 2017, the outlet works and glory-hole spillway at Del Valle Dam were inspected, surveyed, and evaluated using LiDAR scan, rope access inspections, nondestructive evaluation techniques, and ground penetrating radar. A report is estimated to be completed in 2018.

In November 2017, as part of ongoing maintenance activities, two new piezometers were installed on Bethany Forebay Dam, one on the crest and one at the toe. Additionally, the intake structure sediment dredging

project was completed. Both activities addressed a Category-2 recommendation of the 2013 Director's Safety Review Board.

The Clifton Court Forebay Dam Radial Gate Refurbishment Project continued during 2017 and is estimated to be completed by fall 2019.

Delta Field Division dams were not formally inspected during 2017. The annual routine inspections were originally scheduled to occur in November 2017. However, due to scheduling conflicts, the inspections were postponed to January 2018. Routine dam surveillance occurred throughout 2017.

San Luis Field Division

In the San Luis Field Division, 172 miles of the California Aqueduct were inspected, spanning six repayment reaches and 11 aqueduct pools.

In April 2017, all six discharge lines for Units 1 through 6 at Dos Amigos Pumping Plant were inspected.

In June 2017, penstock No. 2 at Gianelli Pumping-Generating Plant was inspected.

In August 2017, Units 3 and 7 at Gianelli Pumping-Generating Plant were overhauled, which included work on the motors, pumps, and valves.

Throughout 2017, the ongoing Corrective Action Study at Sisk Dam continued. The Corrective Action Study is being coordinated and managed by Reclamation and consists of a large-scale, multiyear study to buttress the embankment of Sisk Dam. The study has been divided into two phases. Phase I, consisting of intrusive and non-intrusive stability studies, will be used to determine a course of action (design improvements). Phase II will consist of the design and execution of the embankment improvements. Phase I was completed in December 2017.

San Joaquin Field Division

In the San Joaquin Field Division, 121 miles of the California Aqueduct were inspected, spanning 15 repayment reaches and 20 aqueduct pools.

Southern Field Division

In the Southern Field Division, 96 miles of the West and East branches of the California Aqueduct were inspected, spanning 11 repayment reaches and 27 aqueduct pools.

In March 2017, an underwater inspection of the San Bernardino Intake Tower was completed using a remotely operated vehicle.

In April 2017, 18 new open standpipe piezometers were installed at Castaic Dam's left abutment area to address a 2013 Division of Safety of Dams recommendation.

In July 2017, a detailed visual and nondestructive evaluation inspection of the Cedar Springs Dam spillway and stream release tunnel was performed.

In May 2017, a detailed visual and nondestructive evaluation inspection of the Pyramid Dam spillway structure was performed.

In August 2017, a detailed geologic inspection of the emergency spillway at Pyramid Dam was completed.

On September 13, 2017, the radial gates trunnion anchor rods at Pyramid Dam were inspected and assessed through ultrasonic testing.

In September 2017, a notice to begin work was issued to complete concrete spall

and crack repairs inside the Pyramid Dam spillway under Specification No. 17-19.

In September 2017, a notice to begin work was issued to complete concrete spall and crack repairs inside the Cedar Springs Dam spillway. All repairs were completed in December 2017 under Specification No. 17-20.

In October 2017, a detailed inspection of the stream release tunnel at Castaic Dam was conducted to assess its structural condition.

In October 2017, a detailed visual and nondestructive evaluation inspection of the Castaic Dam spillway and stream release chute was performed.

The Perris Dam spillway approach channel was reinforced with riprap and grout to protect the channel against erosion. Reinforcements occurred approximately 200 feet upstream of the spillway weir and 300 feet downstream of the existing shotcrete lined channel.

The Perris Dam Seismic Remediation Project continued through 2017 (Specification No. 14-03). The project was awarded in fall 2014 and is estimated to be completed in 2018.

Other Inspections

Bridges and Overchutes

In addition to the conveyance facilities, 41 bridges in San Joaquin Field Division and 31 bridges and 85 overchutes in Southern Field Division were inspected as part of a regularly scheduled maintenance program.

Unauthorized Encroachment Inspections

Any alteration, improvement, encroachment, excavation, use or activity within the SWP right-of-way without first obtaining a proper encroachment permit is a misdemeanor punishable by fines of $1,000 a day. To protect the security, safety, and reliability of the SWP, unauthorized encroachment inspections were undertaken along SWP right-of-way in the Delta, San Joaquin, and Southern Field Divisions.

Roads

SWP access roads are routinely inspected by DWR staff as they traverse hundreds of miles of paved and unpaved roadways daily. Additionally, development of a Pavement Management System resulted in the inspection of 959 miles of roads (paved and unpaved) and 785,533 square yards of parking lots during 2016. Pavement condition assessments along SWP access roads are planned to be completed every 5 years. Data reports of distressed and problematic areas will be used to plan road repair projects.

Outages for Maintenance and Repair of Facilities

Table 11-2 presents information, arranged chronologically, about significant scheduled and unscheduled outages at SWP pumping and power plants in 2017. 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 2017, by Month 1 of 5

Month	Facility	Unit	Outage Description
January	Banks Pumping Plant	1	January 1 to May 10 for rotor removal and refurbishment; continued from July 11, 2016
	Barker Slough Pumping Plant	7	January 1 to December 31 for excessive vibration and motor trim balancing; continued from July 30, 2014
	Dos Amigos Pumping Plant	4	January 1 to April 21 for discharge line repair and unit refurbishment; continued from 2016
	Edmonston Pumping Plant	7	January 1 to December 31 for thrust pump problem
	Giannelli Pumping-Generating Plant	3	January 1 to September 6 for motor rewind and butterfly valve replacement; continued from September 19, 2016
	Giannelli Pumping-Generating Plant	4	January 1 to August 12 for motor rewind and butterfly valve replacement; continued from September 19, 2016
	Hyatt Powerplant	1	January 1 to August 1 for river valve operation due to water temperature requirements
	Mojave Siphon Powerplant	3	January 3 to January 27 for Condition Assessment Program inspection and relay test
	Pearblossom Pumping Plant	4	January 3 to January 19 for Condition Assessment Program inspection
	Pearblossom Pumping Plant	5	January 30 to February 17 for Condition Assessment Program inspection
	Polonio Pass Pumping Plant	5	January 1 to February 10 for damaged outboard bearing; continued from 2016
	Polonio Pass Pumping Plant	6	January 1 to November 2 for excitation problems; continued from 2016
	South Bay Pumping Plant	3	January 1 to December 21 for motor pump coupling balance and trip testing; continued from May 15, 2013
	South Bay Pumping Plant	7	January 1 to December 31 for excessive vibration and motor trim balancing; continued from July 30, 2014
	Teerink Pumping Plant	8	January 1 to February 22 for headworks dive to seal stoplog
	Robie Thermalito Pumping-Generating Plant	1	January 1 to December 31 for fire damage; continued from December 4, 2013
	Robie Thermalito Pumping-Generating Plant	2	January 1 to December 31 for fire damage; continued from December 4, 2013
	Robie Thermalito Pumping-Generating Plant	3	January 1 to December 31 for fire damage; continued from December 4, 2013
	Robie Thermalito Pumping-Generating Plant	4	January 1 to December 31 for fire damage; continued from December 4, 2013
February	Hyatt Powerplant	2	February 9 to March 3 due to damaged spillway
	Hyatt Powerplant	3	February 9 to March 8 due to damaged spillway
	Hyatt Powerplant	4	February 9 to March 6 due to damaged spillway

Table 11-2 Outages for Maintenance and Repair of Facilities in 2017, by Month 2 of 5

Month	Facility	Unit	Outage Description
	Hyatt Powerplant	5	February 9 to March 8 due to damaged spillway
	Hyatt Powerplant	6	February 9 to March 7 due to damaged spillway
	Teerink Pumping Plant	8	February 22 to March 9 for control cabinet rewiring
March	Banks Pumping Plant	10	March 23 to April 27 for transformer KYE deluge work and relay testing
	Banks Pumping Plant	11	March 23 to April 27 for transformer KYE deluge work and relay testing
	Mojave Siphon Powerplant	3	March 29 to May 8 for turbine mechanical seal replacement
	Pearblossom Pumping Plant	9	March 9 to April 7 for mechanical seal failure
	Teerink Pumping Plant	3	March 1 to April 26 for oil leak at thrust pump
April	Chrisman Pumping Plant	1	April 3 to May 19 for discharge line #1 work
	Chrisman Pumping Plant	2	April 3 to May 19 for discharge line #1 work
	Chrisman Pumping Plant	3	April 3 to June 30 for discharge line #1 work
	Hyatt Powerplant	2	April 14 to May 19 due to damaged spillway
	Hyatt Powerplant	3	April 14 to May 19 due to damaged spillway
	Pearblossom Pumping Plant	8	April 18 to May 5 for Condition Assessment Program inspection and balance line repairs
May	Banks Pumping Plant	7	May 15 to June 2 for Condition Assessment Program inspection
	Dos Amigos Pumping Plant	1	May 30 to June 14 for discharge line seal replacement
	Edmonston Pumping Plant	12	May 8 to June 21 for transformer preventative maintenance
	Edmonston Pumping Plant	14	May 8 to June 21 for transformer preventative maintenance
	Mojave Siphon Powerplant	1	May 3 to June 8 for mechanical seal failure
	Pearblossom Pumping Plant	1	May 31 to June 16 for Condition Assessment Program inspection and relay test
	Teerink Pumping Plant	2	May 2 to July 28 for rotor removal and test
	Warne Powerplant	1	May 1 to July 5 for Condition Assessment Program inspection and relay replacement
June	Bluestone Pumping Plant	5	June 3 to June 30 for motor bearing high temperature
	Chrisman Pumping Plant	1	June 14 to June 30 for discharge valve installation
	Chrisman Pumping Plant	2	June 14 to June 30 for discharge valve installation
	Devil Canyon Powerplant	2	June 12 to July 6 for Condition Assessment Program inspection and transformer repair
	Pearblossom Pumping Plant	2	June 26 to July 14 for Condition Assessment Program inspection and relay test

Table 11-2 Outages for Maintenance and Repair of Facilities in 2017, by Month 3 of 5

Month	Facility	Unit	Outage Description
July	Banks Pumping Plant	6	July 23 to August 18 for Condition Assessment Program inspection
	Bluestone Pumping Plant	2	July 31 to December 31 for pump inspection
	Buena Vista Pumping Plant	5	July 17 to December 31 for discharge valve refurbishment
	Edmonston Pumping Plant	5	July 17 to August 16 to center motor shaft and check upper and lower guide bearing
	Giannelli Pumping-Generating Plant	7	July 28 to December 31 for turbine and motor refurbishment
	Giannelli Pumping-Generating Plant	8	July 28 to December 31 for turbine and motor refurbishment
	Mojave Siphon Powerplant	3	July 14 to August 1 for leak on mechanical seal
	Pearblossom Pumping Plant	3	July 24 to August 11 for Condition Assessment Program inspection
	Teerink Pumping Plant	7	July 26 to August 14 due to breaker problem
August	Banks Pumping Plant	10	August 27 to September 15 for Condition Assessment Program inspection
	Devil Canyon Powerplant	1	August 8 to August 30 for Condition Assessment Program inspection and relay test
	Devil's Den Pumping Plant	3	August 21 to September 6 for relay calibrations
	Hyatt Powerplant	1	August 1 to September 29 for river valve operation due to water temperature requirements
	Thermalito Diversion Dam	1	August 28 to September 14 for annual maintenance
September	Banks Pumping Plant	8	September 24 to November 15 for Condition Assessment Program inspection and discharge valve seat repair
	Bluestone Pumping Plant	4	September 13 to October 17 for pump and motor bearing replacement
	Hyatt Powerplant	1	September 29 to December 31 for river valve operation due to water temperature requirements
	Hyatt Powerplant	2	September 29 to December 15 for river valve operation due to water temperature requirements
	Hyatt Powerplant	3	September 29 to December 31 for river valve operation due to water temperature requirements
	Oso Pumping Plant	1	September 5 to September 26 for Condition Assessment Program inspection, discharge valve seat replacement and relay testing
	Oso Pumping Plant	2	September 25 to October 20 for Condition Assessment Program inspection, discharge valve seat replacement and relay testing

Table 11-2 Outages for Maintenance and Repair of Facilities in 2017, by Month 4 of 5

Month	Facility	Unit	Outage Description
October	Badger Hill Pumping Plant	3	October 9 to December 2 for excitation problem
	Bluestone Pumping Plant	1	October 30 to November 17 for annual coastal outage
	Bluestone Pumping Plant	3	October 30 to November 17 for annual coastal outage
	Bluestone Pumping Plant	4	October 30 to November 17 for annual coastal outage
	Bluestone Pumping Plant	5	October 23 to December 8 due to bearing problem
	Bluestone Pumping Plant	6	October 30 to November 17 for annual coastal outage
	Chrisman Pumping Plant	1	October 30 to December 8 for discharge line pipe repair
	Chrisman Pumping Plant	2	October 30 to December 8 for discharge line pipe repair
	Chrisman Pumping Plant	3	October 30 to December 8 for discharge line pipe repair
	Chrisman Pumping Plant	4	October 4 to October 28 for head cover bolt repair
	Chrisman Pumping Plant	5	October 4 to October 27 for head cover bolt repair
	Devil's Den Pumping Plant	1	October 30 to November 16 for annual coastal outage
	Devil's Den Pumping Plant	2	October 30 to November 16 for annual coastal outage
	Devil's Den Pumping Plant	3	October 30 to November 16 for annual coastal outage
	Devil's Den Pumping Plant	4	October 30 to November 16 for annual coastal outage
	Devil's Den Pumping Plant	5	October 30 to November 16 for annual coastal outage
	Devil's Den Pumping Plant	6	October 30 to November 16 for annual coastal outage
	Pearblossom Pumping Plant	7	October 9 to November 3 for Condition Assessment Program inspection
	Teerink Pumping Plant	1	October 2 to October 22 for discharge valve refurbishment
	Teerink Pumping Plant	2	October 2 to October 25 for discharge valve refurbishment
	Teerink Pumping Plant	3	October 2 to December 31 for discharge valve installation
November	Badger Hill Pumping Plant	5	November 27 to December 31 for damaged pump bearing
	Badger Hill Pumping Plant	6	November 27 to December 31 for discharge line #2 coating
	Banks Pumping Plant	4	November 5 to December 1 for Condition Assessment Program inspection and valve seat repair
	Dos Amigos Pumping Plant	4	November 27 to December 31 for exciter preventative maintenance
	Edmonston Pumping Plant	10	November 6 to December 28 to install new disconnect switch
	Giannelli Pumping-Generating Plant	5	November 15 to December 18 for relay replacement
	Giannelli Pumping-Generating Plant	6	November 15 to December 19 for relay replacement
	Polonio Pass Pumping Plant	6	November 2 to December 31 for excitation problem and pump refurbishment

Table 11-2 Outages for Maintenance and Repair of Facilities in 2017, by Month 5 of 5

Month	Facility	Unit	Outage Description
December	Banks Pumping Plant	2	December 17 to December 31 for Condition Assessment Program inspection
	Pearblossom Pumping Plant	4	December 4 to December 21 for Condition Assessment Program inspection
	Warne Powerplant	2	December 4 to December 31 for relay replacement

Chapter 12
Engineering, Construction, and Real Estate

Oroville Dam service spillway repair progress on May 20, July 30, August 20, and September 20, 2017.

Significant Events in 2017

Engineering, construction, and real estate work continued to enhance, expand, repair, and protect the State Water Project (SWP) and other facilities within the State. Significant projects included the seismic remediation of Perris Dam; the East Branch Extension Phase II projects; emergency and recovery efforts of Oroville Dam service and emergency spillways; and habitat restoration projects.

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. Oroville Dam was constructed between 1961 and 1967. Construction of the South Bay Aqueduct (SBA) facilities started in 1960, and the first SWP water deliveries through the SBA began in 1962 to Alameda County.

In 1963, work began on the California Aqueduct, and by 1968, the SWP was delivering water to SWP water contractors in the San Joaquin Valley. By 1973, the Department of Water Resources (DWR) had completed the Edmonston Pumping Plant at the foot of the Tehachapi Mountains and other East Branch conveyance facilities; and by that time, the SWP was delivering water to Lake Perris at the southernmost point in Riverside County.

Other water deliveries occurred 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.
- 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 Sacramento-San Joaquin Delta (Delta).

From 1974 through 2017, 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 Gorgonio Pass service area in San Bernardino and Riverside counties with enlargements and expansions in later years; SBA enlargement; Perris Dam seismic remediation; and assessing potential habitat restoration and water conveyance options in the Delta.

Design Activities

In 2017, work to enhance, expand, repair, and protect the SWP water delivery system continued. Engineering activities supported more efficient water deliveries within the confines of legal and environmental constraints and power availability. Significant projects included the 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 2017.

DWR's Division of Engineering (DOE) continued to design projects for development into the construction phase, including awarding construction contracts. DOE worked with many DWR divisions and

offices, as well as local, State, and federal agencies. DOE conducted special studies of dams, canal embankments, and other SWP facilities; prepared preliminary designs and estimates; developed and administered construction contract documents; and carried out construction projects.

The following list includes study and design activities continued from previous reporting periods or initiated in 2017:

- Upper Feather River Light Detection and Ranging (LiDAR) and orthomosaic from photogrammetry, Phase II—study
- Oroville, Thermalito Afterbay, and Thermalito Forebay dams radial gate programmatic refurbishment—design
- Oroville, Thermalito Afterbay, and Thermalito Forebay dams radial gate nondestructive examination of tendons—study
- Oroville and Thermalito Afterbay dams Vs30 exploration (Part 12)—study
- Oroville Dam seepage and slope stability analyses—study
- Oroville Dam emergency spillway stability analyses—study
- 2014 Part 12, Subpart D, Thermalito Diversion Dam stability analyses—study
- 2017 spillway inspections—study
- Bidwell Canyon boat ramp parking expansion (Site 3)—design
- Bidwell Canyon boat ramp lane addition, Stage 1 (Site 5)—design
- Bidwell Canyon Marina parking lot expansion (Site 4)—design
- Bidwell Canyon parking lot expansion and boat ramp lane addition, Stage 2 (Site 8)—design
- Bidwell Saddle Dam Trailhead access improvements (Site 7)—design
- Enterprise boat ramp extension and expansion (Site 6)—design
- Lime Saddle parking expansion (Site 2)—design
- Bidwell Canyon and Lime Saddle Marinas low water access (Site 9)—design
- Oroville Field Division Federal Energy Regulatory Commission License Coordination Branch modular office building project—design
- Oroville emergency recovery Hyatt power lines project—design
- Oroville, Thermalito Afterbay, Thermalito Diversion, Thermalito Forebay, Bidwell Canyon Saddle, Parish Camp Saddle, and Feather River Fish Barrier dams Part 12 updated faulting and seismicity reports—study
- Roaring River Slough Distribution System west drain structure improvement project—design
- Prospect Island tidal habitat restoration—design
- Winter Island tidal habitat restoration—design
- Decker Island habitat restoration—design
- Sacramento maintenance yard rehabilitation project—design
- North Bay Aqueduct alternate intake—study
- Clifton Court Forebay Dam dredging in depth—study
- Santa Clara Pipeline Milepost 37.97 leak repair—design
- South Bay Aqueduct Milepost 35 out of round repair—design
- Delta Field Division Milepost 62 embankment and liner repair—design
- Delta Field Division inclinometer monitoring—study
- Delta Field Division Lower Elkhorn Basin levee setback project—design
- Delta Field Division—seismic study
- Gale Avenue rubber dam repair—design
- San Luis Field Division irrigation crossings inspection and repair—design
- Edmonston Pumping Plant east and west elevators replacement—design

- San Joaquin Field Division Sycamore Island pond isolation project (San Joaquin River Pit 46e)—design
- Buena Vista Pumping Plant water line replacement—design
- California Aqueduct Mileposts 230.88 and 231.25 exploration and engineering—study
- Pyramid Lake west fork Liebre culvert outlet and docks bathymetry—study
- Pyramid Lake Interstate 5 gulches—study
- Castaic Dam outlet works feasible alternatives analysis—study
- Castaic Dam left abutment analysis—study
- Quail Lake differential settlement analysis of the Peace Valley Pipeline intake—study
- Tehachapi East Afterbay—mitigation
- Cottonwood Chute No. 2 generator—design
- Perris Dam seepage recovery—design
- Perris Dam emergency release facility—preliminary design and environmental documents
- SWP seismic loading criteria—study
- California Aqueduct subsidence—study
- Hydropower License Planning and Compliance Office hydrology analysis of Cedar Springs Dam, Pyramid Lake, Lower Quail Canal, and Devil Canyon Second Afterbay for Federal Energy Regulatory Commission Project No. P2426—study
- California WaterFix right-of-way due diligence research—study
- Oroville Dam, Thermalito Diversion Dam, Thermalito Forebay, and Thermalito Afterbay River Outlet workshop for radial gate tendon reliability (Part 12)—study

In 2017, DOE completed the following studies and activities:

- Upper Feather River dams faulting and seismicity updated reports—study
- Thermalito Diversion Dam liquefaction responses to Federal Energy Regulatory Commission—study
- Thermalito Diversion Dam Thermalito Power Canal left embankment investigation—study Crafton Hills
- Reservoir seepage repair—study
- Del Valle Dam conservation outlet works intake structure stability investigation, Phase 1—study
- Del Valle Dam foundation stability analysis—study
- Delta Field Division Suisun Marsh and North Bay roof replacement—design
- Pyramid Lake Interstate 5 gulches—design
- Pyramid Lake radial gate 84th percentile maximum credible earthquake structural reevaluation—study
- SBA compression vault project—design
- SWP LiDAR and photogrammetry 2016—study

Construction Activities

DWR divides the California Aqueduct into the following construction divisions: North San Joaquin, San Luis, South San Joaquin, Tehachapi, Mojave, and Santa Ana divisions of the so-called "main line," and the West and Coastal branches.

DOE worked on 65 construction contracts in various SWP construction divisions in 2017. Contract projects included pipeline repair, control system upgrades, fire systems modernization, equipment refurbishments and upgrades, seismic upgrades of bridges, maintenance facility improvements at dam and reservoir sites, and the addition of new pumping units. Table 12-2 (at the end of the chapter) provides a list of completed, new, and ongoing construction contracts undertaken in 2017. Resolution of contract claims may extend the actual contract closeout beyond the completion or acceptance date.

Since the inception of the SWP, DWR has strived to develop and construct environmentally compliant and sustainable

projects. DWR's environmental scientists work with designers during all phases of design and construction to produce projects that meet the SWP objectives while protecting, restoring, and enhancing the natural and human environments of the State.

The services provided by DWR's environmental scientists include review and develop project designs to minimize environmental impacts; perform preliminary site inspections to assess potential impacts; prepare California Environmental Quality Act documents; develop compliance strategies; draft and review contract specifications; and secure environmental permits. Ongoing construction activities are monitored for compliance with the requirements outlined in the specifications and permits for each construction contract and to ensure that specific mitigation measures are implemented to reduce or eliminate environmental impacts.

SWP—General

Antelope Dam, Frenchman Dam, and Grizzly Valley Dam

Spillway repairs on the Antelope Dam, Frenchman Dam, and Grizzly Valley Dam (Specification No. 17-17) began in August 2017. Work was accepted in November 2017.

Northern Yolo Bypass

Work to modify the Fremont Weir and build a new channel on the Northern Yolo Bypass for improved adult fish passage (Specification No. 17-18) began in September 2017. Work is expected to be accepted in October 2018.

Oroville Division

Bidwell Canyon Boat Ramp Stage I, Lane Additions (Site 5)

The stage I boat ramp lane additions (Specification No. 17-25) began in December 2017. Work consists of extending two boat ramp lanes down to the bottom of the existing stage 1 boat ramp. Work is expected to be accepted in April 2018.

Hyatt Powerplant, Thermalito Diversion Dam Powerplant, and Oroville Operations and Maintenance Center Fire Systems Modernization Project

The goals of the fire systems modernization project are to increase safety and property protection while reducing business interruptions and environmental impacts. The project to furnish and install the new fire detection and evacuation system (Specification No. 15-06) began in October 2015. DWR assisted the contractor with the design work during the construction phase of the project. Work was originally scheduled to be completed in July 2017. The current anticipated completion date is October 2020.

Work included

- upgrading transformer, generator, high voltage tunnel, and Area Control Center communication room fire suppression systems;
- replacing Hyatt Powerplant's oil purification/storage room and high voltage cable oil room carbon dioxide suppression system with a high-pressure water mist system;
- installing water sprinkler and clean agent suppression at specific locations within Hyatt Powerplant and the Area Control Center to meet probable maximum loss criteria;
- providing modifications within the plant and the dam core block that allow a safe outlet for staff during an emergency event and providing additional communications systems throughout the plant; and
- networking all fire detection and suppression systems at all facilities to remote workstations capable of

monitoring and controlling the new and existing systems.

Robie Thermalito Pumping-Generating Plant and Annex, Hyatt Powerplant Air Intake and Access Tunnel Entrance, Feather River Fish Hatchery Buildings, and Operations and Maintenance Plant Maintenance Shop Building

A contract to replace roofing at several facilities (Specification No. 16-04) began in May 2016. This project included the removal and disposal of the existing roofing, roof insulation, and hazardous materials; and the installation of new roofing, skylights, and other roof accessories. The project was completed in December 2016 and accepted in July 2017.

Robie Thermalito Pumping-Generating Plant

Life safety improvements at the Robie Thermalito Pumping-Generating Plant (Specification No. 16-14) began in February 2017. Work includes replacements, upgrades, and modifications and installation of new fire suppression and detection systems. Work is expected to be accepted in October 2018.

Main control board system installation at Robie Thermalito Pumping-Generating Plant (Specification No. 16-11) began in December 2016. Work includes furnishing, programing, assembling, and delivering testing and training. Work is expected to be accepted in November 2018.

Oroville Emergency Response and Recovery

Construction support related to Oroville Dam service spillway (flood control outlet) and emergency spillway repairs (Specification No. 17-04) began in February 2017. Work included providing labor, materials and equipment or services, construction equipment, and hauling of construction equipment. Work was accepted in April 2017.

Repair work and improvements at multiple locations related to the Oroville Dam complex (Specification No. 17-08) began in March 2017. Work was accepted in September 2017.

Oroville Dam service spillway (flood control outlet) and emergency spillway restoration (Specification No. 17-09) began in April 2017. Work includes removing and replacing the upper and lower flood control outlet chute, restoring sections of the flood control outlet foundation, and strengthening the emergency spillway. Work is expected to be accepted in July 2019.

Thermalito Diversion Pool

Removing accumulated sediment and debris in the Thermalito Diversion Pool to enable the downstream flow of water (Specification 17-07) began in February 2017. Work included providing, when directed, labor, materials and equipment or services, construction equipment, and hauling of construction equipment. Work was accepted in May 2017.

A water-based operation (Specification No. 17-10) began in June 2017. Work included removal of accumulated sediment and debris. Work was completed in December 2017. Acceptance is expected in July 2018.

Oroville Dam and Thermalito Diversion Dam

The radial gates maintenance repair project (Specification No. 17-16) began in August 2017. Work was accepted in November 2017.

South Bay Aqueduct (SBA)

Santa Clara Pipeline

Storage Yard. A contract (Specification No. 16-03) to improve the storage yard and to furnish pipe began in August 2016. Work included fabricating new 85.5-inch and 73.5-inch steel pipe and appurtenances and transporting the newly-fabricated pipe (and existing DWR-furnished pipe) from Sunol, California, to Fremont, California, for storage. Work was completed in November 2016 and accepted in April 2017.

Mileposts 16.30, 28.90, 34.23, and 41.68. This project (Specification No. 16-09) included

- modifying existing Pacific Gas & Electric Company Line 303 gas line at Milepost 16.30 (Station 859+58) on the SBA Alameda Canal to provide cathodic isolation of the gas line;
- modifying existing Bayside Valve Vault at Milepost 28.90 to furnish and install lockout for existing 72-inch butterfly valve, 2-inch diameter polyvinyl chloride (PVC) conduit with control cable, pull boxes, wirings, raceways, and appurtenances;
- modifying the existing Santa Clara Pipeline at Milepost 34.23 blow-off discharge pipe to excavate, remove, and replace approximately 70 linear feet of existing 6-inch diameter steel discharge pipe; and
- modifying existing Grossmont Valve Vault at Milepost 41.68 to furnish and install lockout for existing 54-inch butterfly valve.

Work began in October 2016 and was accepted in November 2017.

North San Joaquin Division

Clifton Court Forebay Dam

The refurbishment of radial gates 1, 2, 3, 4, and 5 on the Clifton Court Forebay Dam control structure (Specification No. 16-06) began in October 2016. This project involves the sequential removal, refurbishment to original design at shop, transport back to the site, and reinstallation of the radial gates. Work is scheduled to be completed in October 2019. Acceptance is expected in November 2019.

Sherman Island

Construction of the Little Baja and the Manzo Ranch fish release sites, on the northwest side of Sherman Island, began in April 2016 (Specification No. 16-01). The project complies with the 2009 National Marine Fisheries Service's biological opinion mandate to reduce predation and improve survival rates of fish salvaged from the Skinner Fish Facility. The project is scheduled to be completed by April 2018.

West Weber North Storage Facility

Work required to provide a facility that will be used in DWR's flood-fighting and related emergency response functions (Specification No. 17-01) began in May 2017. Work includes modifications to an existing warehouse building, construction of a rock conveyor and barge docking area, and other various site improvements. Work is expected to be accepted in March 2018.

SWP Telecommunications Towers

Construction of telecommunications towers at three SWP facility locations (Specification No. 17-02) began in May 2017. Work was accepted in December 2017.

San Luis Division

San Luis Canal

This work (Specification No. 16-07), which began in September 2016, is for the Cantua Creek Stream Group Improvements Project. This project will provide a 50-year level of flood protection for the San Luis Canal section of the California Aqueduct.

Work included improving storage in the ponding basins through flood easement acquisition, raising and constructing various sections of the San Luis Canal embankments, raising adjacent roads, constructing a concrete weir, and removing sediment buildup along several drainage features along the canal.

The project was completed in October 2017 and accepted in November 2017.

Gale Avenue Rubber Dam Repair

Repair and related work on the Gale Avenue rubber dam (Specification No. 17-03) began in May 2017. Work was accepted in November 2017.

Mojave Division

Milepost 335.80

The emergency canal lining repair project (Specification No. 15-16) began in October 2015. Work included dewatering, removal of the concrete liner and unsuitable material, backfill, and concrete and joint sealant repair. Work was completed in June 2016 and accepted in February 2017.

Cedar Springs Dam

Spillway repair work (Specification No. 17-20) began in September 2017. Work was accepted in November 2017.

Santa Ana Division

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 Gorgonio 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 cubic feet per second 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 Pump Station. Transformers, accessories, tools, and spare parts were manufactured, tested, and delivered for Citrus Pump Station under a contract (Specification No. 10-20) that began in March 2011. The equipment was delivered to the completion contractor in December 2015. Work was accepted in July 2017.

Crafton Hills Pump Station, Cherry Valley Pump Station, and Mentone Pipeline. Manufacturing, testing, and delivery of 12 AWWA (American Water Works Association) butterfly valve assemblies with actuators for Crafton Hills Pump Station, Cherry Valley Pump Station, and Mentone Pipeline (Specification No. 10-17) began in February 2011. Spare parts and special tools were included in the contract work. Work was completed in mid-2013 and accepted in July 2017.

Crafton Hills and Citrus Pump Stations. Work (Specification No. 13-12) on the Crafton Hills and Citrus pump stations included manufacturing, factory testing, and commissioning equipment for a prefabricated control building and associated equipment, accessories, tools, special tools, and spare parts. Also included were 5 kilovolt (kV), 4,000 amperes (A) switchgear motor breaker cubicle assemblies; 5 kV, 4,000 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 was completed in October 2016. Acceptance is expected in October 2018.

Crafton Hills, Citrus, and Cherry Valley Pump Stations. Manufacturing, testing, and delivery of 14 ANSI (American National Standards Institute) butterfly valve assemblies with actuators for Citrus Pump Station, Crafton Hills Pump Station, and Cherry Valley Pump Station (Specification No. 10-16) began in January 2011. Spare parts and special tools were included in the contract work. Work was completed in July 2013 and accepted in July 2017.

Manufacturing, testing, and delivering 12 ANSI ball valve assemblies with actuators and 4 actuators for Citrus Pump Station, Crafton Hills Pump Station, and Cherry Valley Pump Station (Specification No. 10-18) began in January 2011. The valves were delivered to the site in October 2012. Spare parts and special tools were included in the contract work. Work was accepted in July 2017.

Work to provide pumps, motors, variable frequency drives, excitation system equipment, and associated hardware for the pump stations (Specification No. 13-01) began in June 2013. Units were delivered in December 2015. Work was accepted in July 2017.

In March 2015, work began on a contract for the following completion work (Specification No. 14-21) at Citrus, Crafton Hills, and Cherry Valley pump stations:

- install DWR-furnished pumps, motors, valves, switchgear equipment and materials, motor field supply equipment and materials
- replace existing station service transformer with new DWR-furnished station service transformer

Acceptance is expected in July 2018.

West Branch

Oso Pumping Plant

Work to construct a 14,400 square-foot civil maintenance and mobile equipment building at Oso Pumping Plant (Specification No. 07-22) began in December 2007. Work was completed in July 2012 and accepted in July 2017.

Perris Dam

The seismic remediation of Perris Dam (Specification No. 14-03) began in August 2014. The work involves construction of a new compacted berm; extension of the existing blanket drain; construction of a new drain line, a new toe drain, and a relief well system; cement deep soil mixing treatment of the alluvium beneath the footprint of the compacted berm; road work; and other related work. The rock material for the project is being produced on-site using blasting methods and a rock processing plant. Acceptance is expected in March 2018.

Oak Valley. Mitigation work for the Perris Dam seismic remediation project (Specification No. 15-01) began in June 2015. The work involves the following activities:

- excavating, grading, and revegetating a new channel and floodplain system
- protecting native trees and vegetation
- monitoring well destruction
- earthwork, including excavation
- transporting, stockpiling, and placing fill and rock structures for grade control
- installing biotechnical structures
- installing erosion control devices
- installing a hog exclusion fence and gate
- planting, seeding, irrigating, and plant establishment

The work was completed in January 2017 and accepted in April 2017.

Pyramid Dam

Repairs to the Pyramid Dam spillway (Specification No. 17-19) began in September 2017. Work was accepted in November 2017.

Construction Activities in Multiple Divisions

Suisun Marsh, North Bay Aqueduct, North San Joaquin Division, and San Luis Division

Montezuma Slough Control Buildings, Barker Slough Pumping Plant, Cordelia Pumping Plant, Gianelli Pumping-Generating Plant Control House, and San Luis Operations and Maintenance Center Buildings. Roofing replacement at several DWR facilities began in August 2016 (Specification No. 16-10) Work included removing and disposing of existing roofing, roof insulation, and hazardous materials; and providing and installing a new roof, skylights, and other roof accessories. The project was completed in April 2017 and accepted in May 2017.

Roaring River Distribution System

Pipe replacement (Specification No. 17-11) began in June 2017. Work included replacing an existing 36-inch pipe with a 48-inch pipe adjacent to the DWR salinity gate structures within the Montezuma Slough. Work was accepted in July 2017.

San Luis, San Joaquin, and Southern Field Divisions

The seismic retrofit of bridges addressed existing seismic deficiencies in 23 bridges (9 DWR and 14 Reclamation) located in the San Luis, San Joaquin, and Southern field divisions. There are 22 structures that carry local streets and roads over the California Aqueduct, and one that supports the aqueduct operational road over a local county road. The work included constructing shear keys at bridge piers and abutments, replacing some existing reinforced concrete bridge deck, installing hot mix asphalt pavement and dikes, and installing metal beam guard railing. The seismic retrofit was required to prevent potential collapse during an earthquake, and deck replacement work was required due to deterioration of the concrete decks from heavy truck traffic.

Phase I. Work on the Duncan Road Bridge, Goss Road (Goodwin Drive) Bridge, Maple Avenue Bridge, Mesquite Street Bridge, and the Ranchero Road Bridge in the Southern Field Division (Specification No. 14-09) began in August 2014. The bridge decks were replaced at the Maple Avenue and the Ranchero Road bridges. Work was completed in September 2015 and accepted in August 2017.

San Joaquin Field Division

Replacement of the existing standby engine generators with new liquefied petroleum gas and diesel standby engine generators (Specification No. 14-19) began at 21 check sites and 8 pumping plant sites in the San Joaquin Field Division in May 2015. Work includes installing new fuel tanks, transfer switches, and load banks to support operation of the new standby engine generators. The sites include all of the Coastal Branch pumping plants and check sites; all check sites from Check 22 to 39 on the California Aqueduct; and Teerink, Buena Vista, and Edmonston pumping plants. Acceptance is expected in June 2018.

Badger Hill Pipeline and Mojave Siphon

Work to remove and replace the existing lining in manifolds and pipeline, construct a flow metering vault, remove and replace a joint seal at Mojave Siphon Check 66, and remove and reinstall pipe spool pieces (Specification No. 13-14) began in the San Joaquin and Southern field divisions in November 2013. Because of emergency work in Specification No. 5-16, work under this contract (Specification No. 13-14) was suspended through November 2017. Work

is scheduled to be completed in June 2018. Acceptance is expected in September 2018.

Real Estate Activities

DWR processed a net total of $13.02 million in payments in 2017 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, 2017.

SWP Acquisitions

In 2017, DWR conducted the following activities related to SWP acquisitions:

- executed a memorandum close out file as part of the 2015 emergency drought barrier project at West False River, effectively completing the right-of-way agreement for damages to the ferry and reimbursement of expenses to the Delta Ferry Authority in Contra Costa County
- received recorded copies of a grant deed and a quitclaim deed for property acquired as part of the Prospect Island acquisition and tidal habitat restoration project, removing an encumbrance to title, allowing for construction of the preferred alternative
- executed a reimbursement agreement with Winter Island Farms, LLC for an invoice for services provided on behalf of Reclamation District 2122 in Contra Costa County as part of the Winter Island Farms, LLC acquisition
- completed the acquisition of DWR Parcel No. SML-150 (98.26 acres), also known as Solano County Assessor Parcel No. 0048-040-420, for the Arnold Slough (formerly known as Property 604) tidal restoration project, a component of DWR and California Department of Fish and Wildlife's (DFW) Fish Restoration Program
- completed the acquisition of DWR Parcel No. SML-151 (181.69 acres), also known as Solano County Assessor Parcel No. 0048-040-440, for the Arnold Slough (formerly known as Property 604) tidal restoration project, a component of DWR and DFW's Fish Restoration Program
- closed escrow and received the recorded grant deed for the fee acquisition of DWR Parcel Nos. SML-150 and SML-153 located on Bradmoor Island in Solano County as part of the Fish Restoration Program
- completed the acquisition of DWR Parcel Nos. SML-154 and SML-155 (656 ± acres) for the Chipps Island tidal habitat restoration project, a component of DWR and DFW's Fish Restoration Program
- received approval from Eastern Municipal Water District and the California Department of Parks and Recreation to cut and cap an 18-inch water line encountered on DWR Parcel No. 3-305 during construction activities related to the Lake Perris Dam Remediation Project in Riverside County
- acquired temporary right-of-way to allow the DOE to award and issue the notice to proceed for the emergency construction contract to restore and repair erosion damage along the SBA
- processed final payment to the mineral rights owner for activities that were required for the Sycamore Island pond isolation project in Fresno County, including excavation and removal of 28,429.58 cubic yards of borrowed material used for the repair and strengthening of the existing berm
- negotiated the acquisition of one permanent easement (1.66 acres) to be used to construct and operate a new fish screen and ladder at the Wallace Weir Fish Rescue Facility in Yolo County, as required by the 2009 National Marine Fisheries Service biological opinion for

the coordinated long-term operations of the Central Valley Project and SWP

- obtained a one-year extension on a County of San Bernardino Department of Public Works Excavation Permit that will allow DWR to install an 18-inch arched corrugated metal pipe under Opal Avenue adjacent to the Citrus Reservoir, as part of the East Branch Extension Phase II Mentone Pipeline project
- executed 5 quitclaim deeds, releasing temporary construction easements that were secured as part of the East Branch Extension Phase II project
- executed a permit to use land located in the city of Pescadero, San Mateo County for the California Irrigation Management Information System station land use agreement, allowing DWR and San Mateo Resource Conservation District to install, maintain, and operate a computerized weather station to collect weather information necessary for the California Irrigation Management Information System program
- received and processed a recorded easement deed from Pacific Gas and Electric Company for a 0.87 acre electric distribution line easement, to accommodate the Federal Aviation Administration's requirement to provide a light atop an existing high-power electric transmission tower located on Sherman Island in Sacramento County
- negotiated the acquisition of two permanent easements to facilitate the removal of agricultural crossings for the Yolo Bypass Habitat Restoration Program's Agricultural Road Crossing 4 Fish Passage Project
- negotiated the acquisition of one temporary construction easement to facilitate the construction of a fish ladder for the Yolo Bypass Habitat Restoration Program's Fremont Weir Adult Fish Passage Modification Project
- delivered an escrow package, which included a land acquisition cost warrant in the amount of $5,397,600, escrow instructions, executed deed, irrevocable dedication, and memorandum for DWR parcel No. FRP-12, thereby completing the initial task outlined in the request for proposal scope of work in support of DWR and DFW's Fish Restoration Program
- negotiated and obtained a fully executed encroachment permit from the California Department of Transportation to allow DWR to install thermal cameras on Isleton Bridge in Sacramento County in order to conduct a hydrodynamic study to predict Salmon behavior and optimize behavioral barriers

Temporary Entry Permits

In 2017, DWR obtained 28 temporary entry permits:

- Clifton Court Forebay predation study, 2
- Coastal Branch—operations and maintenance, 1
- Earthquake Engineering Program, 1
- Fish Restoration Program, Lower Yolo Ranch tidal restoration project, 2
- Fish Restoration Program, West Island, 2
- Gale Avenue rubber dam repair project, 1
- Lake Perris emergency release facility project, 2
- North Bay Aqueduct erosion, 2
- North Central Region Office—Bethel Island water quality monitoring station project, 1
- North Central Region Office temporary entry permits—North Roberts Island, 1
- North Central Region Office Coordinated Temporary Entry Permits Program, 2
- South Bay Aqueduct emergency repairs, Mileposts 15.25 to 15.75, 2
- South Delta Improvements Program—Temporary Barriers Project, 2
- Temporary Barriers Project—Head of Old River, 1
- west shore Lake Oroville phase 3 investigation, 6

SWP Property Management

In 2017, DWR conducted the following activities related to property management:

- managed leasing activities of SWP nonoperating properties, which produced $742,446
- processed 41 and executed 30 encroachment permit applications
- collected fees totaling $666,780 for review and inspection costs related to encroachment permit applications
- coordinated review of 14 tentative tract map developments within 1 mile of the California Aqueduct

SWP Appraisals

In 2017, 57 percent of total appraisal assignments (16 of 28) completed by DWR were exclusively for the SWP:

- Fish Restoration Program—completed five appraisals and three appraisal reviews
- SWP property management—completed one appraisal review initiated by owner for well pump removal as part and parcel of a Sutter County damages claim
- Meins Landing Acquisition Project—completed one appraisal
- Flood Corridor Grants Program—completed three appraisals and three appraisal reviews

Table 12-1 Design Activities, 2017

Sheet 1 of 4

Construction Division and Facility	Design Activity	Date Design Began	Design Actual/ Estimated Completion Date
Upper Feather River Division			
Antelope Dam, Grizzly Valley Dam, and Frenchman Dam spillways	Inspections	June 2017	TBD
Upper Feather River dams	Faulting and seismicity updated reports	February 2016	November 2019
Upper Feather River	Phase II Light Detection and Ranging (LiDAR) and orthomosaic from photogrammetry study	March 2017	July 2019
Oroville Division			
Oroville, Thermalito Afterbay, and Thermalito Forebay dams	Radial gate programmatic refurbishment	December 2016	November 2018
	Radial gate nondestructive examination of tendons study	July 2015	December 2017
Oroville and Thermalito Afterbay dams	Thermalito Vs30 exploration (Part 12)	February 2016	December 2017
Oroville Dam	Seepage and slope stability analyses	July 2016	September 2018
	Emergency spillway stability analysis (Part 12)	January 2017	June 2018
Thermalito Diversion Dam	Liquefaction responses to Federal Energy Regulatory Commission study	May 2017	September 2017
	Thermalito Power Canal left embankment investigation	March 2016	January 2017
Bidwell Canyon Boat Ramp, Site 3	Parking expansion	June 2017	September 2018
Bidwell Canyon Boat Ramp, Site 5	Stage 1 boat ramp lane additions	June 2017	July 2018
Bidwell Canyon Boat Ramp, Site 8	Stage 2 parking lot expansion and boat ramp lane addition	June 2017	March 2019
Bidwell Canyon Marina, Site 4	Parking lot expansion	November 2017	February 2019
Bidwell Saddle Dam Trailhead, Site 7	Access improvements	June 2017	April 2019

Table 12-1 Design Activities, 2017

Sheet 2 of 4

Construction Division and Facility	Design Activity	Date Design Began	Design Actual/ Estimated Completion Date
Enterprise, Site 6	Boat ramp extension and expansion	June 2017	December 2018
Lime Saddle, Site 2	Parking expansion	June 2017	June 2018
Bidwell Canyon and Lime Saddle Marinas, Site 9	Low water access	June 2017	October 2018
Oroville Field Division Federal Energy Regulatory Commission License Coordination Branch	Modular office building project	February 2017	May 2019
Hyatt power lines	Emergency recovery Hyatt power lines project	February 2017	December 2019
Oroville, Thermalito Afterbay, Thermalito Diversion, Thermalito Forebay, Bidwell Canyon Saddle, Parish Camp Saddle, and Feather River Fish Barrier dams	Updated faulting and seismicity reports (Part 12)	January 2017	April 2018
Oroville Dam, Thermalito Diversion Dam, Thermalito Forebay, and Thermalito Afterbay River Outlet	Workshop for radial gate tendon reliability study (Part 12)	January 2017	October 2017
Suisun Marsh Facilities			
Roaring River Slough Distribution System	West drain structure improvement project	November 2017	April 2018
Delta Facilities			
Prospect Island	Tidal habitat restoration	November 2016	March 2018
Winter Island	Tidal habitat restoration	March 2015	October 2019
Decker Island	Habitat restoration	January 2016	June 2018
Sacramento Maintenance Yard, Phase 1	Rehabilitation project	December 2017	May 2018
North Bay Aqueduct			
North Bay Aqueduct	Alternate intake study	October 2008	June 2018
South Bay Aqueduct			
South Bay Aqueduct	Milepost 35 out of round repair	August 2017	October 2021
	Compression vault project	January 2015	June 2019
Del Valle Dam	Phase 1 conservation outlet works intake structure stability investigation	February 2016	February 2017
	Foundation stability analysis	April 2016	November 2017
Del Valle Dam Spillway	Inspections	September 2017	TBD
North San Joaquin Division			
Clifton Court Forebay Dam	Dredging in-depth study	June 2016	December 2018
Delta Field Division	Lower Elkhorn Basin levee setback	April 2016	July 2019
	Inclinometer monitoring	December 2014	December 2017
	Milepost 62 embankment and liner repair	May 2015	October 2016
	Seismic study	July 2011	July 2017
Delta Field Division Suisun Marsh and North Bay	Roof replacement	May 2015	June 2017
Santa Clara Pipeline	Milepost 37.97 leak repair	December 2016	January 2017

Table 12-1 Design Activities, 2017

Sheet 3 of 4

Construction Division and Facility	Design Activity	Date Design Began	Design Actual/ Estimated Completion Date
San Luis Division			
Gale Avenue	Rubber dam repair	April 2016	April 2017
San Luis Field Division	Inspect and repair irrigation crossings	July 2016	July 2017
South San Joaquin Division			
Buena Vista Pumping Plant	Replace water line	October 2016	June 2017
California Aqueduct	Mileposts 230.88 and 231.25 exploration and engineering study	May 2016	June 2017
San Joaquin Field Division	Sycamore Island pond isolation project (San Joaquin River Pit 46e)	July 2015	December 2017
West Branch			
Pyramid Dam Spillway	Inspections	May 2017	TBD
Pyramid Lake	Bathymetry study for West Liebre culvert outlet and docks	September 2016	June 2017
	Interstate 5 gulches study	October 2016	May 2017
	Interstate 5 gulches design	October 2016	May 2017
	Radial gate 84th percentile maximum credible earthquake structural re-evaluation study	May 2016	November 2017
Castaic Dam	Left abutment analysis study	November 2015	December 2017
	Outlet works feasible alternatives analysis	November 2011	December 2017
Castaic Dam Spillway	Inspections	October 2017	TBD
Quail Lake	Differential settlement analysis of Peace Valley Pipeline intake	August 2016	February 2017
Tehachapi Division			
Edmonston Pumping Plant	East and west elevators replacement	December 2017	December 2020
Mojave Division			
Tehachapi East Afterbay	Mitigation	March 2012	October 2017
Cottonwood Chute No. 2	Generator design	March 2016	February 2019
Cedar Springs Dam Spillway	Inspections	July 2017	TBD
Santa Ana Division			
Perris Dam	Seepage recovery	January 2016	December 2017
	Emergency release facility preliminary design and environmental documents	October 2006	January 2019
Crafton Hills Reservoir	Seepage repair study	May 2016	November 2016
Miscellaneous			
State Water Project	Seismic loading criteria study	February 2015	June 2017
	Light Detection and Ranging (LiDAR) and ortho photogrammetry study	June 2016	March 2017
California Aqueduct	Subsidence study	September 2014	December 2017

Table 12-1 Design Activities, 2017

Sheet 4 of 4

Construction Division and Facility	Design Activity	Date Design Began	Design Actual/ Estimated Completion Date
Cedar Springs Dam, Pyramid Lake, Lower Quail Canal, Devil Canyon Second Afterbay Dam	Hydropower License Planning and Compliance Office hydrology analysis for Federal Energy Regulatory Commission Project No. P2426	June 2016	October 2017
Bouldin Island	Access roads and site improvement—California WaterFix	December 2017	August 2018
Legal Delta	California WaterFix right-of-way due diligence research study	October 2017	December 2019

Table 12-2 Construction Activities, 2017

Sheet 1 of 3

Construction Division and Facility	Construction Contract (Specification Number)	Notice to Begin Work	Acceptance Date (expected or actual)	Estimated Total Contract Costs (in thousands of dollars)
State Water Project—General				
Antelope Dam, Frenchman Dam, and Grizzly Valley Dam	Spillway repairs (17-17)	August 2017	November 2017	403
Northern Yolo Bypass	Fremont Weir modification to build new channel for improved adult fish passage (17-18)	September 2017	October 2018	8,292
Oroville Division				
Bidwell Canyon Boat Ramp, Site 5	Stage 1 boat ramp lane additions (17-25)	December 2017	April 2018	1,274
Hyatt Powerplant, Thermalito Diversion Dam Powerplant, and Oroville Operations and Maintenance Center	Fire systems modernization (15-06)	October 2015	July 2017	14,875
Robie Thermalito Pumping-Generating Plant and Annex, Hyatt Powerplant Air Intake and Access Tunnel Entrance, Feather River Fish Hatchery Buildings, and Operations and Maintenance Plant Maintenance Shop Building	Installation of new roofing, skylights, and other roof accessories (16-04)	May 2016	July 2017	1,615
Robie Thermalito Pumping-Generating Plant	Life safety improvements (16-04)	February 2017	October 2018	1,688
	Main control board system installation (16-11)	December 2016	November 2018	2,470
Oroville Dam	Service spillway (flood control outlet) and emergency spillway repairs (17-04)	February 2017	April 2017	108,152
	Repairs and improvements at multiple locations in the Oroville Dam complex(17-08)	March 2017	September 2017	7,759
	Service spillway (flood control outlet) and emergency spillway restoration (17-09)	April 2017	July 2019	701,814
Thermalito Diversion Pool	Sediment and debris removal (17-07)	February 2017	May 2017	37,655
	Water-based operation to remove sediment and debris (17-10)	June 2017	July 2018	22,395
Oroville Dam and Thermalito Diversion Dam	Radial gates maintenance repair (17-16)	August 2017	November 2017	1,538
South Bay Aqueduct				
Santa Clara Pipeline				
Storage Yard	Improve storage yard and furnish pipe (16-03)	August 2016	April 2017	1,755
Mileposts 16.30, 28.90, 34.23, and 41.68	Modify valve vaults to furnish and install lockouts for butterfly valves and modify an existing gas line (16-09)	October 2016	November 2017	3,597
North San Joaquin Division				
Clifton Court Forebay Dam	Refurbish radial gates 1, 2, 3, 4, and 5 (16-06)	September 2016	October 2020	3,960
Sherman Island	Construct fish release sites at Little Baja and Manzo Ranch (16-01)	April 2016	January 2019	2,268

Table 12-2 Construction Activities, 2017

Sheet 2 of 3

Construction Division and Facility	Construction Contract (Specification Number)	Notice to Begin Work	Acceptance Date (expected or actual)	Estimated Total Contract Costs (in thousands of dollars)
West Weber North Storage Facility	Site improvements (17-01)	May 2017	May 2018	9,285
SWP Telecommunications Towers	Construction (17-02)	May 2017	December 2017	633
San Luis Division				
San Luis Canal	Improve flood protection along canal (16-07)	July 2016	November 2017	1,238
Gale Avenue Rubber Dam Repair	Repairs and related work (17-03)	May 2017	November 2017	1,078
Mojave Division				
Milepost 335.80	Emergency canal lining repair (15-16)	October 2015	February 2017	1,052
Cedar Springs Dam	Spillway repair (17-20)	September 2017	November 2017	443
Santa Ana Division				
East Branch Extension Phase II				
Citrus Pump Station	Manufacture, test, and deliver transformers and accessories (10-20)	March 2011	July 2017	721
Crafton Hills and Cherry Valley pump stations and Mentone Pipeline	Manufacture, test, and deliver 12 AWWA butterfly valves (10-17)	February 2011	July 2017	497
Crafton Hills and Citrus pump stations	Furnish 5 kV switchgear (13-12)	May 2014	March 2016	4,565
Crafton Hills, Citrus, and Cherry Valley pump stations	Manufacture, test, and deliver 14 ANSI butterfly valves (10-16)	January 2011	July 2017	1,188
	Manufacture, test, and deliver 12 ANSI ball valves (10-18)	January 2011	July 2017	2,993
	Provide pumps, motors, variable frequency drives, and excitation system equipment (13-01)	June 2013	July 2017	18,151
	Crafton Hills Pump Station Expansion (completion work), construct Citrus Pump Station (completion work), and install one additional pump/motor unit at Cherry Valley Pump Station (14-21)	March 2015	July 2018	23,871
West Branch				
Oso Pumping Plant	Construct civil maintenance and mobile equipment building (07-22)	December 2007	July 2017	2,811
Perris Dam	Seismic remediation of dam embankment (14-03)	August 2014	March 2018	75,539
Oak Valley	Mitigation for Perris Dam seismic remediation impacts (15-01)	June 2015	April 2017	2,357
Pyramid Dam	Spillway repairs (17-19)	September 2017	November 2017	968

Table 12-2 Construction Activities, 2017

Sheet 3 of 3

Construction Division and Facility	Construction Contract (Specification Number)	Notice to Begin Work	Acceptance Date (expected or actual)	Estimated Total Contract Costs (in thousands of dollars)
Multiple Divisions				
Suisun Marsh, North Bay Aqueduct, North San Joaquin Division, and San Luis Division	Replace roofing at Montezuma Slough control buildings, Barker Slough Pumping Plant, Cordelia Pumping Plant, Gianelli Pumping-Generating Plant control house, and San Luis Operations and Maintenance center buildings (16-10)	August 2016	June 2017	1,530
Roaring River Distribution System	(17-11)	June 2017	July 2017	1,167
San Luis, San Joaquin, and Southern field divisions	Phase I seismic retrofit of bridges (14-09)	August 2014	March 2015	1,564
San Joaquin Field Division	Replace standby engine generators (14-19)	May 2015	June 2018	4,450
Badger Hill Pipeline and Mojave Siphon	Pipeline repair (13-14)	November 2013	September 2018	3,325

Chapter 13
Recreation

Windsurfers and a kiteboarder at Sherman Island County Park in the Sacramento-San Joaquin Delta.

Significant Events in 2017

In 2017, the Oroville Dam spillways incident affected recreation use in the Lake Oroville State Recreation Area. To compensate for the loss of some recreation facilities, the Department of Water Resources (DWR) improved other recreation facilities.

In early 2017, DWR awarded a long-term contract to a new concessionaire to manage the recreation facilities at Pyramid Lake.

DWR resumed normal operations at Lake Davis, following 17 years of decreased water levels related to containment efforts to prevent the spread of Northern Pike. Higher lake levels will improve conditions for boating, fishing, and other water-related activities.

Information for this chapter was provided by the Division of Integrated Regional Water Management, the Public Affairs Office, the Division of Environmental Services, the Division of Operations and Maintenance, and the State Water Project Analysis Office.

The State Water Project (SWP) is a multipurpose project that provides recreational benefits to millions of Californians. In addition to providing water supply, flood control, and habitat for fish and wildlife, the SWP offers extensive and varied recreational opportunities—tours, sightseeing, fishing, hunting, picnicking, camping, boating, water skiing, bicycling, hiking, and swimming. Under the Davis-Dolwig Act, these recreational opportunities, as well as fish and wildlife enhancements, are not allocable as water and power costs to the SWP water contractors. The Davis-Dolwig Act, together with the Burns-Porter Act, provides financing for SWP recreational facilities and fish and wildlife enhancement projects, declaring that these projects benefit all the people of California and should be paid for by all Californians. Department of Water Resources (DWR) coordinates with the California Department of Parks and Recreation (California State Parks) and the Department of Fish and Wildlife to ensure that the recreation and fish and wildlife enhancement potential at SWP facilities is fully realized.

Recreation Areas

The SWP has 37 developed recreation areas or sites throughout California, including 18 developed fishing access sites. Figure 13-1 shows the name and location of each area.

Recreation Use

Recreation Days

Since the SWP began delivering water in 1962, nearly 252 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 2017, SWP facilities supported an estimated 4.5 million recreation days of use (Table 13-1), up seven percent from 2016's 4.2 million recreation days. Most of the SWP recreation use was concentrated at the major reservoirs, with approximately 40 percent of the recreation attendance occurring in the Oroville Field Division and 37 percent occurring in Southern Field Division.

SWP Educational Visitors Centers

Visitation at DWR's three SWP educational visitors centers, in recreation days, totaled approximately 555,600. This included

- 156,800 at Lake Oroville Visitors Center;
- 243,800 at Romero Overlook Visitors Center, San Luis Reservoir; and
- 155,000 at Vista del Lago Visitors Center, Pyramid Lake.

Overall, the recreation usage of nearly 4.5 million recreation days at the SWP facilities listed in Table 13-1 contributed significantly to the total visitation reported at the 280 units of the California State Park System.

Impacts To Recreation Use

Lake Oroville

The Oroville Dam spillways incident in February 2017 affected several Oroville recreation facilities. The recreation facilities most affected by the spillways incident were located near the Oroville Dam and around the Diversion Pool, primarily the Spillway Recreation Area, Oroville Dam Overlook Day Use Areas, Diversion Pool Day Use Areas, and several trailheads.

Flows over the Oroville Dam emergency spillway in February washed out the road used to access the Spillway Recreation Area. Closure of the Spillway Recreation Area

Figure 13-1 Names and Locations of SWP Recreation Areas

Table 13-1 Estimated Recreation Days in 2017, by Field Division and Facility

Field Division and Facility	Recreation Day (rounded)	
Oroville Field Division		
Frenchman Lake	102,000	e(1)
Antelope Lake	92,500	e(1)
Lake Davis	89,000	e(1)
Lake Oroville, Thermalito Diversion Pool, and Thermalito Forebay	702,800	
Thermalito Afterbay and Oroville Wildlife Area	387,600	
Feather River Fish Hatchery	277,800	
Lake Oroville Visitors Center	156,800	
Subtotal	***1,808,500***	
Delta Field Division		
Lake Del Valle	457,000	
Bethany Reservoir	10,000	e(1)
Fishing Access Site:		
Niels Hansen	53	e(1)
California Aqueduct:		
Walk-in Fishing	47	e(1)
Bikeway	19	e(1)
White Slough Wildlife Area	9,100	
Subtotal	***476,219***	
San Luis Field Division		
San Luis Reservoir State Recreation Area: San Luis Reservoir, O'Neill Forebay, and Los Banos Reservoir	289,100	
Romero Overlook Visitors Center	243,800	
Subtotal	***532,900***	
San Joaquin Field Division		
Fishing Access Sites: Kettleman City, Lost Hills, Buttonwillow, and California Aqueduct Walk-in Fishing	15,100	e(1)
Subtotal	***15,100***	
Southern Field Division		
Silverwood Lake	329,300	
Lake Perris	551,500	
Vista del Lago Visitors Center	155,000	
Pyramid Lake	167,000	
Castaic Lake and Castaic Lagoon	447,700	
Fishing Access Sites:		
Quail Lake	2,200	e(1)
Longview Road	100	e(1)
California Aqueduct:		
Walk-in Fishing	3,000	e(1)
Bikeway	3,900	e(1)
Subtotal	***1,659,700***	
Total for Recreational Sites	**3,936,819**	
Total for Visitors Centers	**555,600**	
Grand Total	**4,492,400**	

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 where marked "e," which are based on partial data. e(1): These locations are not regularly monitored and are visually monitored only. It is likely that these areas are used significantly more than what is represented here, but it is difficult to ascertain realistic annual use.

also led to the closure of several miles of trails. Figure 13-2 depicts most of the trail closures. According to California State Parks, before the Oroville Dam spillways incident, bike users had access to about 37.27 miles of trails within the Lake Oroville State Recreation Area. About 5.5 miles of usable trails remained accessible, an 86 percent reduction. Equestrians have access to additional trails throughout the Loafer Creek area.

The Overlook Day Use Areas remained closed throughout 2017, and the adjacent parking lots were used as construction/staging areas for the recovery effort. Burma Road, sections of the Dan Beebe and Brad Freeman Trails, and the entire Diversion Pool were also closed to the public.

The remaining recreation facilities that were not physically affected by the Oroville Dam spillways incident experienced an increase in visitation. Recreation areas like Bidwell Canyon, Loafer Creek, and Lime Saddle almost reached recreation-use capacity during Memorial Day and Fourth of July weekends. Visitation to recreation facilities over Labor Day weekend was relatively low due to high temperatures, local fires, and poor air quality due to smoke.

It is unknown when the recreation facilities will reopen to the public. DWR improved some recreation facilities and planned to improve and expand others to offset some of the lost recreation use.

Lake Del Valle

Lake Del Valle State Recreation Area experienced record flooding, which closed the park for the entire month of February. An extensive clean-up process was underway throughout February and early March to enable recreation use at the park again.

Pyramid Lake

The concession contractor for Pyramid Lake abandoned the recreation facilities. A temporary SWP concessionaire was contracted to manage the facilities while a search was performed for a long-term concessionaire. After the search, the temporary concessionaire was awarded a long-term contract with DWR to manage the recreation facilities at Pyramid Lake.

Facilities

Planning

Lake Oroville State Recreation Area

Proposed projects will improve or expand several recreation facilities to offset some of the recreation lost due to the Oroville Dam spillways incident. Many of the projects will require permits and the scope is subject to change as the projects develop.

Parking will be increased at the following locations:

- Lime Saddle Boat Ramp (60 vehicle/trailer spaces)
- Loafer Creek Recreation Area (Stage 1, 100 vehicle/trailer spaces)
- Bidwell Canyon Marina (108 single-vehicle spaces)
- Enterprise Boat Ramp (new Stage 2, 10 vehicle/trailer spaces)
- Bidwell Canyon Boat Ramp (Stage 2, 30 vehicle/trailer spaces)
- Loafer Creek Recreation Area (new Stage 2, 200 vehicle/trailer spaces)
- Loafer Creek Boat Ramp (20 vehicle/trailer spaces)

New boat launch lanes will be added at the following locations:

- Bidwell Canyon Boat Ramp (Stage 1, 2 lanes)
- Enterprise Boat Ramp (2 lanes)

Figure 13-2 Map of Locations Affected by the Oroville Dam Spillways Incident in February 2017.

- Bidwell Canyon Boat Ramp (Stage 2, 2 lanes)
- Loafer Creek Recreation Area (Stage 2, 8 lanes)

Other projects increased efficiency at boat ramps and marina access at low lake levels (Bidwell Canyon Marina and Lime Saddle Boat Ramp). The Bidwell Saddle Dam Trailhead was also improved.

Lake Del Valle State Recreation Area

An equipment storage building is being planned for 2018.

A project is being planned to build a trail to connect Lake Del Valle State Recreation Area with Shadow Cliffs Regional Park.

Castaic Lake State Recreation Area

The Los Angeles County Department of Parks and Recreation plans to

- renovate 10 restroom roofs that are leaking and/or have wood rot;
- add a covered picnic pavilion that will accommodate users with disabilities and is close to the play areas and the restroom; and
- purchase over $150,000 in communication equipment to add free WiFi in their facilities and implement a

new point-of-sale hand-held device to enable the acceptance of credit cards.

Silverwood Lake State Recreation Area

California State Parks plans to install an HVAC system in their visitors center, install "Skytube" in the restrooms, and improve lighting for the reception desk. Carpeting will be installed on all of the cement floors when the leaking walls are replaced.

Silverwood Lake State Recreation Area also plans to make parking lot #3 accessible for users with disabilities by repaving one-half mile of the lot and installing a path that goes around the creek crossing.

New Facilities

Lake Oroville State Recreation Area

A gravel parking area was added at Loafer Creek Boat Ramp parking lot to accommodate approximately 20 vehicles with trailers.

A gravel parking lot was completed at Lime Saddle Recreation Area. Additional work is scheduled in early 2018 to pave the gravel parking lot and provide lighting. Additional upgrades will also be made to the facility to accommodate users with disabilities.

A gravel parking lot was added at Bidwell Saddle Dam Trailhead. Additional work is scheduled in spring 2018 to provide potable water to the site, add picnic tables, shade trees, and shade ramadas.

Lake Del Valle State Recreation Area

The following projects were completed:

- installed a storage shed in the Service Yard as supply storage for convenience camping cabins
- installed 144.5-ton boulders in the campground
- replaced street signs near the park entrance
- supplied two storage sheds for concessionaires
- completed Service Yard Phase II grading and concrete work
- installed five camping cabins with air conditioning, heat, bunk beds, and ceiling fans
- demolished and replaced restroom buildings #10, 19, and 21 in the campground with a cement restroom with funding from Land and Water Conservation Fund annual allotments provided by DWR and the Wildlife Conservation Board
- installed a stabilized water system

Silverwood Lake State Recreation Area

California State Parks installed a new gazebo at Upper Garces Point to replace the one that was destroyed in the 2003 wildfire.

Improvements to Facilities

Lake Davis Recreation Area

The U.S. Forest Service performed road repair near Camp #5.

Lake Del Valle State Recreation Area

The heavy winter rains in 2017 caused Lake Del Valle facilities to flood. The Rocky Ridge Visitors Center and boat ramp were especially hard-hit by this flooding.

Several weeks were needed to repair and clean up the facilities from the flood damage. Siding was replaced at the Water Treatment Plant office. Trail maintenance, campsite rehabilitation, and stump grading was performed by East Bay Regional Park District following the winter floods.

Castaic Lake State Recreation Area

The Los Angeles County Department of Parks and Recreation replaced the roof on Restroom #15.

Lake Perris State Recreation Area

California State Parks repaved parking lots 5, 6, and 7 into a launch ramp consolidation and repaving project; and removed an invasive plant tamarisk, at the east end of the lake.

Silverwood Lake State Recreation Area

The following improvements were made by California State Parks:

- Several picnic sites in the Cleghorn Day Use Area were modified to accommodate users with disabilities. Modifications included constructing a cement picnic pad with a cement picnic table and a cement sidewalk leading to it.
- New sidewalks were added to the Cleghorn Day Use Area to accommodate users with disabilities. A turnaround was added near the water's edge for wheelchair accessibility.
- Restroom #27 in the old Mesa Campground was demolished and replaced with upgraded restroom stalls and showers, including two accessible stalls.
- Mesa Kiosk #1 was modified to accommodate users with disabilities.
- The recreational vehicle sanitation station by the Mesa Kiosk was renovated.
- All exterior restroom incandescent or sodium vapor lights were replaced with LED lights.
- The culvert drain in the "duck pond" day use area was repaired to allow proper drainage during heavy rains.
- The campfire center was renovated to provide wheelchair users access to the stage area.

Recreation Activities

The SWP, with its many reservoirs and hundreds of miles of aqueducts, offers Californians extensive and varied recreational opportunities. From Antelope Lake in Northern California to Lake Perris in Southern California, the SWP includes facilities for anglers, boaters, campers, hikers, cyclists, and many others. While DWR manages the routing of water through the aqueducts and reservoirs, the recreational facilities are operated variously by federal, State, and local agencies and, in many cases, their private concessionaires. Visitors to SWP recreation facilities can swim, water ski, picnic, and enjoy many other recreational activities. Figure 13-3 shows the various types of recreation available along the SWP.

Antelope Lake Recreation Area

DWR and the U.S. Forest Service co-hosted a fall kid's fishing derby. Drought information, coloring books, and prizes, including fishing poles and fishing reels, were provided. Twenty-Five children participated in the fishing derby.

Lake Davis Recreation Area

The Lake Davis Father's Day Fishing Derby for kids and adults was attended by 50 people and was hosted by the Volunteer Fire Department.

Lake Davis was the venue for a bike race with approximately 200 participants.

Lake Oroville State Recreation Area

DWR, California State Parks, and other agencies sponsored several activities at Lake Oroville State Recreation Area in 2017.

Kiwanis hosted a "Hooked on Fishing, Not on Drugs" free kid's fishing day at Bedrock Park in the spring. Approximately 1,200 people attended the half-day event.

California State Parks hosted Bidwell Bar Days at the Bidwell Canyon Day Use Area's historic Toll House. The event treated 1,100 park visitors to a day in the life of the old west.

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. An estimated 24,000 participants attended it.

Six hundred forty visitors celebrated the annual Harvest Fest at Lake Oroville Visitors Center.

DWR, California State Parks, Department of Forestry and Fire Protection, with assistance from the California Conservation Corps, hosted a Catch A Special Thrill (C.A.S.T.) for Kids fishing event for children with special needs. Due to the Oroville Dam spillways incident, the 13th annual Lake Oroville C.A.S.T. event, usually held at the Spillway Launch Ramp, was moved to the Bidwell Marina. Eighty boat captains, twice the number registered for the event, showed up to take children fishing. Twenty people donated gift baskets for a fund-raiser to cover miscellaneous expenses. Besides learning about the sport of fishing, the children also learned about fishing ethics, boating safety, and California's natural resources.

California State Parks hosted the annual Frontier Christmas at the Lake Oroville Visitors Center. Approximately 1,100 visitors learned how to make pioneer crafts and pan for gold.

Lake Del Valle State Recreation Area

East Bay Regional Park District sponsored or co-sponsored the following activities:

- five Aquatic Adventure Camps, co-sponsored by the Richmond Police Activities League program, the City of Patterson, the City of Pittsburg, and the East Bay Regional Park District serving 149 children
- Coastal Cleanup 2017, where 137 volunteers cleaned up the lake shoreline by removing 150 pounds of trash and 200 pounds of recycled materials
- 216 Regional in Nature programs led by naturalists serving 3,000 individuals and 11 other nature programs serving 647 individuals
- 15 campfire programs serving 1,144 attendees
- 41 boat tours of Lake Del Valle serving 671 attendees
- the Community Outreach Overnight Program, co-sponsored by the YMCA, provided three camping trips at Lake Del Valle for 96 children and their families
- 14,240 visitors educated at Rocky Ridge Visitors Center about the local natural history

Brannan Island State Recreation Area

DWR, California State Parks, California Department of Forestry and Fire Protection, California Conservation Corps, and the C.A.S.T. for Kids Foundation held a fishing event at Brannan Island State Recreation Area for 32 disabled and disadvantaged children. California Department of Forestry and Fire Protection brought a fire-fighting helicopter and taught the kids about fire-fighting practices that use the latest techniques and technologies. The children were allowed to explore the helicopter.

San Luis Reservoir State Recreation Area

DWR and its partners,including California State Parks, the California Department of Forestry and Fire Protection, Department of Fish and Wildlife (DFW), the San Joaquin River Exchange Contractors Water Authority, the San Luis & Delta-Mendota Water Authority, and the Bureau of Reclamation, hosted 25 special needs children at a C.A.S.T.

Figure 13-3 Types of Recreation along the SWP

for Kids fishing event at O'Neill Forebay. Ten of the area's top Delta tournament fishermen took the children out for an adventure, educating the children about fishing and fishing ethics.

Castaic Lake State Recreation Area

The Los Angeles County Department of Parks and Recreation, along with Friends of Castaic Lake sponsored the following activities:

- 10 "Splash in the Water" events for 300 children ages 7 to 14 who learned about water safety, kayaking, canoeing, standup paddle boarding, and sailing
- 16 sessions of FamCamp (formerly Aquatic Adventure Camp) co-sponsored by DWR for 3,500 participants ages 17 and under teaching boating safety, camping, and team-building principles
- 58 days of dragon boat paddling for 1,200 participants to learn how to paddle as a team
- Four moonlight kayak classes for 75 participants who learned about the environment at the lake, the State Water Project, water safety, and boating safety
- Moonlight Fishing on the Lake sponsored by Friends of Castaic Lake for 150 guests
- Junior Lifeguard Program co-sponsored by the Los Angeles County Department of Parks and Recreation for 550 participants ages 9 to 17 who learned life guarding, first aid, CPR, and water safety skills
- Nine dates of "Splash Party" sponsored by the County of Los Angeles for 300 participants
- C.A.S.T. for Kids event hosted by DWR, Los Angeles County Department of Parks and Recreation, and the Friends of Castaic Lake, where 35 disabled and disadvantaged children had the opportunity to learn how to fish with the area's top anglers

Silverwood Lake State Recreation Area

California State Parks sponsored the following activities:

- Bald Eagle barge tours for park visitors to conduct eagle counts, held on Saturdays and Sundays from December through March, served an average of 25 people per tour.
- An Adopt-a-School program serving three schools and over 100 children took place from January through April.
- International Coastal Cleanup Day, sponsored by the California Coastal Commission and the California State Parks Division of Boating and Waterways to promote a clean watershed and stewardship of the waterways, had 60 participants.
- The annual Earth Day celebration was enjoyed by 65 participants.
- The sixth annual Apple Festival, held near the Silverwood Historic Apple Orchard, provided apple picking, 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 65 participants.
- A C.A.S.T. for Kids fishing event, co-hosted by DWR with assistance by the DFW, and supported by approximately 45 volunteers, paired 25 special needs children with 19 experienced bass fishermen for a day of fishing on the lake.

Lake Perris State Recreation Area

The Perris Dam Remediation Project was completed and the lake was filled to its normal water level. As a result, bicyclists will be allowed to ride their bicycles across the dam.

Four hundred kids participated in a fishing derby, and 150 kids participated in two

2-week sessions of the annual Aquatic Adventure camps.

Fifty junior lifeguards participated in a three-week training program.

Amendment to Oroville Recreation Plan Due to Temporary Closures

The Spillway Recreation Facilities, the Diversion Pool, and certain trails were closed during much of 2017 due to the emergency repairs at the Oroville Dam Spillway. To help offset these temporary closures and provide additional recreational opportunities that benefit the local community in the near term, DWR requested FERC amend the current Oroville Facilities recreation plan to include a variety of recreation improvements. These improvements include parking lot expansions, trailhead improvements, new and extended boat ramp lanes, and a substantial new two-stage boat launch facility at Loafer Creek. FERC approved these projects, and DWR implemented several of them in 2017.

Fish Planting

In 2017, the DFW planted 404,400 fish into SWP reservoirs. (See Table 13-2) This was a 29.2 percent decrease from the 571,500 fish planted last year. DWR continued its triploid Chinook salmon plants in 2017, having planted 91,300 fish into Lake Oroville.

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 85 percent SWP Table for 2017 maximum diversion amounts under the onshore recreation agreement were allocated at 85 percent, or a total of 5,765 acre-feet (af) as follows: 2,338 af at San Luis Reservoir; 340 af at Lake Del Valle; 1,981 af at Castaic Lake and Castaic Lagoon; 1,063 af at Lake Perris; and 43 af at Bethany Reservoir. Actual deliveries under the agreement totaled 218 af as follows: 10 af at San Luis Division; 46 af at Lake Del Valle; 34 af at Castaic Lake and Castaic Lagoon; 128 af at Lake Perris; 0 af at Bethany Reservoir; addition deliveries to California State Parks were 85 af at Silverwood Lake and 31 af at Pyramid Lake.

Recreation Financing

Capital Cost Allocations

Table 13-3 shows capital costs allocated to recreation and fish and wildlife enhancement and overall costs of lands acquired for recreation development through 2017. Total capital costs increased by $24,343,183 over those reported in Bulletin 132-17 due to an increase of $24,262,631 in 2017, and an upward adjustment of $80,552 in years prior to 2017. The increase in 2017 included $23,282,608 in joint costs and $980,023 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 13-2 Fish Planted by the Department of Fish and Wildlife in 2017 (thousands)

Location and Size	Eagle Lake Trout	Brook Trout	Rainbow Trout	Chinook Salmon	Steelhead Trout	Kokanee Salmon	Total for Lake
Antelope Lake							
Catchable	3.8		7.8				11.6
Lake Davis							132.9
Fingerling			100.0				
Subcatchable			32.9				
Frenchman Lake							
Fingerling		No Fish Planted in 2017					
Catchable							
Lake Oroville							91.3
Fingerling				21.6			
Catchable				69.7			
Thermalito Afterbay							
Trophy					0.3		0.3
Lake Del Valle							
Catchable			5.4				5.4
Los Banos Reservoir							
Catchable			5.4				5.4
Pyramid Lake							
Catchable	3.9		19.7				23.6
Castaic Lake							
Catchable	10.4		22.2				32.6
Silverwood Lake							
Catchable	14.4		69.5				83.9
Lake Perris							
Catchable			17.4				17.4
Total	**32.5**	**0.0**	**280.3**	**91.3**	**0.3**	**0.0**	**404.4**

[1] Information provided by the Department of Fish and Wildlife, using the following size classes: yearling = a maximum of 20.0 fish per pound; fingerling = 16.1 fish per pound or smaller (less than 5 inches in length); subcatchable = between 16.0 and 6.1 fish per pound (about 7 inches in length); catchable = between 6.0 and 1.0 fish per pound (most frequently 2.0 fish per pound, about 12 inches in length); supercatchable = larger than 1.0 fish per pound and up to 0.34 fish per pound (up to about 19 inches in length); and trophy = greater than 2.99 fish per pound or 0.33 fish per pound or larger (larger than about 19 inches in length).

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
	1952–2016 Updated	2017	Subtotal	1952–2016 Updated	2017	Subtotal	
Frenchman Dam and Lake (78.5%)[a]							
California Water Resources Development Bond Fund	102,997	0	*102,997*	3,379	0	*3,379*	**106,376**
All Other Funds	2,724,710	3426	*2,728,136*	49,950	0	*49,950*	**2,778,086**
Antelope Dam and Lake (100%)[a]							
California Water Resources Development Bond Fund	1,033,261	0	*1,033,261*	3,167	0	*3,167*	**1,036,428**
All Other Funds	4,631,343	3,807	*4,635,150*	201,137	0	*201,137*	**4,836,287**
Grizzly Valley Dam and Lake Davis (99.0%)[a]							
California Water Resources Development Bond Fund	4,003,092	0	*4,003,092*	204,475	0	*204,475*	**4,207,567**
All Other Funds	4,194,902	0	*4,194,902*	554,246	0	*554,246*	**4,749,148**
Other Feather River Projects (100%)[a]							
California Water Resources Development Bond Fund	0	0	*0*	9	0	*9*	**9**
All Other Funds	746,153	0	*746,153*	9,921	0	*9,921*	**756,074**
Delta Facilities (3.4%)[a]							
California Water Resources Development Bond Fund	0	0	*0*	0	0	*0*	**0**
All Other Funds	15,250,885	757,398	*16,008,283*	0	0	*0*	**16,008283**
San Luis Dam and Reservoir, O'Neill Forebay, and Los Banos Reservoir (3.4%)[a]							
California Water Resources Development Bond Fund	988,910	0	*988,910*	395,284	0	*395,284*	**1,384,194**
All Other Funds	5,171,375	11,640	*5,183,015*	867,243	0	*867,243*	**6,050,258**
California Aqueduct, Delta to Dos Amigos Pumping Plant (3.4%)[a]							
California Water Resources Development Bond Fund	4,467,667	0	*4,467,667*	422,681	0	*422,681*	**4,890,348**
All Other Funds	6,397,205	407,963	*6,805,168*	-91,879	0	*-91,879*	**6,713,289**
Oroville Division (2.9%)[a]							
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	7,321,483	13,161,923	*20,483,406*	7,043,876	878,239	*7,922,115*	**28,405,521**
Del Valle Dam and Lake Del Valle (48.0%)[a]							
California Water Resources Development Bond Fund	10,546,762	0	*10,546,762*	519,425	0	*519,425*	**11,066,187**
All Other Funds	4,397,801	4,507	*4,402,308*	-32,202	0	*-32,202*	**4,370,106**
California Aqueduct, Dos Amigos Pumping Plant to Termini (0.4%–32.3%)[a,b]							
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	126,879,163	8,931,944	*135,811,107*	7,173,836	101,784	*7,275,620*	**143,086,727**
Total	**252,965,087**	**23,282,608**	***276,247,695***	**29,014,604**	**980,023**	***29,994,627***	**306,242,322**

[a] Percentages are the share of joint costs.
[b] Specific costs for Dos Amigos Pumping Plant to Termini include $2,905,649 for Castaic Dam and Lake, $795,130 for Cedar Springs Dam and Silverwood Lake, $6,557,329 for Perris Dam and Lake Perris, and $898,059 for the California Aqueduct.

Chapter 14
Financial Analysis

A deer stands on the shore of Lake Oroville near a series of grounded protective buoys.

Significant Events in 2017

On December 19, the Department of Water Resources (DWR) delivered $350.670 million of Water System Revenue Bonds, Series AX, and $140.825 million of Water System Revenue Bonds, Series AY. The proceeds were presold on December 6 to refinance previously sold bonds 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 2017 through 2027.

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 operations, maintenance, power, and replacement (OMP&R) costs; and debt service payments for bonds expended for construction. The results of the current financial analysis, dated December 31, 2017, 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 that future construction costs through the year 2027, including reimbursement of $777 million interim financing for prior expenditures, will total $2.6 billion. Special capital requirements for revenue bond financing of these construction costs are projected at $149 million for a total capital requirement of $2.8 billion. This projection includes construction and financing costs for the following significant SWP projects planned for completion by 2027:

- Perris Dam remediation
- Thermalito Diversion Dam Powerplant restoration and modernization
- Phase II of the East Branch Extension
- Hyatt Powerplant refurbishments
- Gianelli Pumping-Generating Plant refurbishments
- Edmonston Pumping Plant refurbishments
- SWP relay replacement program
- SWP Sacramento-San Joaquin Delta (Delta) compliance program
- SWP fire systems modernization
- Sherman and Twitchell islands fish screens

Most of these capital requirements will be financed from the projected sale of $2.7 billion of revenue bonds. SWP water contractors will directly be paying $0.15 million. The remaining $45 million of the total capital requirement of $2.8 billion will be financed from capital resources revenues and the transfer of 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 SWP water supply contractors. Table 14-1 also excludes the costs of associated facilities financed and constructed by local interests or State agencies other than DWR. Those facilities are essential for realizing full benefits from the SWP and include onshore 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 2027. Estimates of future capital expenditures include allowances for construction cost escalation of 5 percent per year from 2018 through 2027. Right-of-way

Table 14-3 Allocation of Capital Expenditures (in thousands of dollars)

				Preliminary Allocation Among Project Purposes			
Facilities and Construction Divisions	**Expenditures Incurred Through 2017**	**Future Expenditures**	**Total**	Water Supply and Power Generation	Flood Control[1]	Recreation and Fish and Wildlife Enhancement	Other[2]
Project Construction Expenditures							
Upper Feather Division	20,031	0	20,031	1,561	0	18,470	0
Oroville Division (excludes Small Hydro)	1,424,892	639,776	2,064,668	1,951,188	71,524	41,956	0
Delta Facilities Division	501,456	361,021	862,477	825,998	0	36,479	0
North Bay Aqueduct	120,853	5,965	126,818	126,818	0	0	0
South Bay Aqueduct	408,905	1,575	410,480	386,737	8307	15,436	0
California Aqueduct							
North San Joaquin Division	334,299	59,407	393,706	380,090	0	13,616	0
San Luis Division	355,679	68,756	424,435	409,329	0	15,106	0
South San Joaquin Division	354,137	92,598	446,736	428,569	0	18,167	0
Tehachapi Division	388,782	37,091	425,873	404,914	0	20,959	0
Mojave Division (excludes Small Hydro)	383,130	27,282	410,412	369,525	0	40,888	0
Santa Ana Division	443,136	92,528	535,664	436,956	0	98,708	0
West Branch	572,315	110,130	682,445	641,254	0	41,191	0
Coastal Branch	503,240	14,722	517,961	517,961	0	0	0
Subtotal, California Aqueduct	*3,334,718*	*502,514*	*3,837,233*	*3,588,598*	*0*	*248,635*	*0*
Other Project Facilities							
Small Hydroelectric Power Generating Facilities	100,316	21,631	121,947	121,947	0	0	0
Off-Aqueduct Power Generating Facilities	491,574	0	491,574	491,574	0	0	0
East Branch Enlargement	462,031	0	462,031	462,031	0	0	0
East Branch Extension	413,906	4,925	418,831	418,831	0	0	0
Coastal Power Allocation	30,708	0	30,708	30,708	0	0	0
Agricultural Drainage Facilities	88,920	12,783	101,703	0	0	0	101,703
Planning and Pre-operations	82,228	32,720	114,948	114,948	0	0	0
Unassigned/Miscellaneous	68,379	247,658	316,038	0	0	0	316,038
Subtotal, Project Construction Expenditures	*7,548,919*	*1,830,569*	*9,379,488*	*8,520,940*	*79,831*	*360,977*	*417,741*
Other Capital Requirements							
Davis-Grunsky Act Program	130,000	0	130,000	0	0	0	130,000
Total Capital Expenditures	**7,678,919**	**1,830,569**	**9,509,488**	**8,520,940**	**79,831**	**360,977**	**547,741**

[1] Reflects DWR's allocation to this purpose, irrespective of federal payments.

[2] 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.

costs are escalated at 4 percent per year from 2018 through 2027. Capital expenditures for the SWP also include requirements other than those for construction, such as disbursements made as part of the Davis-Grunsky Act Program (Line 16) and special capital requirements under revenue bond financing (Line 17). DWR will decide whether to construct facilities only after examining alternatives and completing environmental documentation and other review processes.

Line 1, Initial Project Facilities, includes only those facilities completed in the initial construction program, which concluded December 31, 1973 (see Bulletin 132-74, Chapter 2). Additional costs after 1973, and estimated costs of remaining work on the initial SWP facilities, are not included.

Line 2, North Bay Aqueduct, consists of the costs for Phase II, improvements, and the Alternate Intake Project.

Operational in May 1988, Phase II connected with the Phase I facilities, which were completed in 1968 (Phase I costs are included in the initial project facilities discussed in Line 1). Phase II included costs for pipelines, pumping plants, and a small reservoir necessary to divert water from the western Delta to Napa and Solano counties for urban use. The improvements consisted of replacing the existing tank with two 5-million-gallon tanks. Construction of the new tanks began in 2007 and was completed in 2010.

The Alternate Intake Project, currently in the design phase, includes a new point of diversion along the Sacramento River or its tributaries, a new pumping plant, an in-line storage tank, and an underground pipeline connection to the existing North Bay Aqueduct. Completion of the environmental documentation, design, and construction have been postponed. An administrative draft environmental impact report is scheduled to be completed in 2018.

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 Branch Enlargement. Phase I included the enlargement share of power plant costs at Mojave Siphon and Devil Canyon. (The remaining power plant costs are included in Line 11.) East Branch Enlargement costs for Phase I, by facility, are presented in Table 14-4. Costs for Alamo Powerplant consist of expenditures for Unit 1 facilities allocated to enlargement.

Work on the draft environmental impact report, mapping, and conceptual design for Phase II of the enlargement began in

March 2007 and ceased in 2013 at the request of the participating contractors. Project costs include raising the canal embankment and concrete lining, constructing additional siphon barrels, adding bays to check structures, constructing Unit 2 at Alamo Powerplant, and adding two pump/motor units and a discharge line at Pearblossom Pumping Plant. 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 Gorgonio 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 included 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 2018. All costs in Line 9 will be allocated to and repaid by the two participating contractors.

Table 14-4 East Branch Enlargement 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
Total	**453.4**

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 South Bay Aqueduct (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 power plants 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 2018 through 2027 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/California WaterFix costs. DWR's share of the Bay Delta Conservation Plan/California WaterFix expenditures for preliminary planning and environmental

Table 14-5 Estimated Capital Costs for Power Generation and Transmission Facilities

Power Plants and Transmission Lines	Amount (in millions of dollars)
Power Plants	
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	41.3
Hyatt	46.2
Robie Thermalito	120.4
Thermalito Diversion Dam	14.1
Subtotal	*872.9*
Transmission Lines	
Midway–Wheeler Ridge	10.7
Geysers–Lakeville	6.9
Subtotal	*17.6*
Total	**890.5**

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

Table 14-6 Estimated Future Costs for Planning Additional Conservation Facilities

Activity	Amount (in millions of dollars)
SWP Future Water Supply	32.7
Other Planning Costs	0.0
Total	**32.7**

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, 2017, 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.

Table 14-7 Application of Revenue Bond Proceeds (in millions of dollars)

Bond Series[1]	Construction Expenditures	Other Capital Requirements					Total Principal Amount of Bonds
		Reimbursement of General Fund	Capitalized Interest	Capitalized Operating Costs	Bond Financing and Refunding Costs[2]	*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
Water System Facilities Series AJ	69.3	0.0	3.7	0.0	143.9	*147.6*	216.9

Table 14-7 Application of Revenue Bond Proceeds (in millions of dollars)

Bond Series[1]	Construction Expenditures	Other Capital Requirements					Total Principal Amount of Bonds
		Reimbursement of General Fund	Capitalized Interest	Capitalized Operating Costs	Bond Financing and Refunding Costs[2]	*Subtotal*	
Water System Facilities Series AK	32.0	0.0	0.9	0.0	3.4	*4.3*	36.3
Water System Facilities Series AL	0.0	0.0	0.0	0.0	105.9	*105.9*	105.9
Water System Facilities Series AM	0.0	0.0	0.0	0.0	184.0	*184.0*	184.0
Water System Facilities Series AN	44.8	0.0	0.3	0.0	4.4	*4.7*	49.5
Water System Facilities Series AO	0.0	0.0	0.0	0.0	317.5	*317.5*	317.5
Water System Facilities Series AP	47.7	0.0	1.2	0.0	(3.5)	*(2.4)*	45.3
Water System Facilities Series AQ	122.6	0.0	7.2	0.0	(9.6)	*(2.4)*	120.2
Water System Facilities Series AR	168.1	0.0	5.4	0.0	(12.1)	*(6.7)*	161.4
Water System Facilities Series AS	0.0	0.0	0.0	0.0	645.8	*645.8*	645.8
Water System Facilities Series AT	139.5	0.0	5.9	0.0	3.9	*9.8*	149.2
Water System Facilities Series AU	104.6	0.0	3.4	0.0	1.3	*4.7*	109.3
Water System Facilities Series AV	120.9	0.0	7.3	0.0	(21.7)	(14.4)	106.5
Water System Facilities Series AW	363.0	0.0	29.5	0.0	35.7	*65.1*	428.1
Water System Facilities Series AX	0.0	0.0	0.0	0.0	350.7	*350.7*	350.7
Water System Facilities Series AY	0.0	0.0	0.0	0.0	140.8	*140.8*	140.8
Subtotal	*4,391.7*	*2.6*	*334.6*	*14.8*	*6,699.9*	*7,051.9*	*11,443.7*[a]
Future East Branch Enlargement Bonds	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Future East Branch Extension Bonds	4.9	0.0	0.2	0.0	0.2	0.4	5.3
Future SBA Enlargement Bonds	1.6	0.0	0.1	0.0	0.1	0.1	1.7
Future Water System Facilities Bonds	2,556.3	0.0	65.2	0.0	83.0	148.1	2,704.4
Total	**6,954.5**	**2.6**	**400.0**	**14.8**	**6,783.2**	**7,200.6**	**14,155.2**

[1] 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.

[2] Bond financing and refunding costs include funds applied to debt service reserve requirements.

[a] Includes $6,574.6 million of refunded principal, leaving a net principal obligation of $4,869.1 million.

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 21 percent of the expenditures through 2017 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 6 percent, of the construction expenditures through 2017.

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, 2017, DWR had sold $11.4 billion of revenue bonds. That amount includes $6.6 billion of refunded bonds, leaving a total principal obligation of $4.8 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 $483 million of Water System Revenue Bond proceeds has been applied to the East Branch Enlargement project through December 31, 2017. Of this total, $425 million was used for construction expenditures and $58 million was used for bond discounts, interest costs, and debt service reserve requirements.

Line 23, East Branch Enlargement, Future Bonds, shows no projected bond sales for this financial analysis.

Line 24, East Branch Extension, Current Bonds, shows that $412 million of Water System Revenue Bond proceeds has been spent through December 31, 2017.

Line 25, East Branch Extension, Future Bonds, shows DWR's estimate of $5 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 $224 million of Water System Revenue Bond proceeds had been spent through December 31, 2017.

Line 27, South Bay Aqueduct Enlargement, Future Bonds, shows DWR's estimate of $2 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, 2017, $2.4 billion of proceeds from Water System Revenue Bonds, Series A through Series AY, was applied to SWP projects other than the East Branch Enlargement, the East Branch Extension, and the SBA Enlargement. Of this total, $2.2 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 $2.7 billion of future water revenue bonds is needed to provide $2.6 billion for construction of SWP water system facilities and $0.1 billion for bond discounts, interest costs, and debt service reserve requirements.

Line 30, Subtotal, Water System Revenue Bonds, is the total of Lines 22 through 29.

Line 31, Initial Project Facilities Bond Proceeds, shows the amount of general obligation bonds sold to provide financing costs for initial SWP facilities and for costs of planning certain additional conservation facilities.

Financing initial facilities from general obligation bonds was completed in mid-1972 and totaled $1.444 billion: $1.750 billion Burns-Porter Act authorization less $130 million reserved for the Davis-Grunsky Act Program and $176 million "offset" for additional conservation facilities. (The Burns-Porter Act provides that to the extent California Water Fund monies are expended, an equal amount of general obligation bonds are reserved [offset] for financing the construction of additional conservation facilities in certain watersheds.)

In mid-1972, the reservation of offset bonds was effectively limited to $176 million, the total amount of California Water Fund monies expended up to that time. By mid-1972, all general obligation bonds authorized by the Burns-Porter Act had been offset, reserved for the Davis-Grunsky Act Program, or used for SWP construction.

Approximately $8.5 million of the offset bonds was used to finance planning studies of the Middle Fork Eel River Development. This financial analysis is not based on the use of any offset bond proceeds to meet capital requirements. If, at some time, the State constructs an additional conservation facility, as specified in California Water Code Section 12938, the remaining offset bonds could be sold.

Line 32, Davis-Grunsky Act Program Bond Proceeds, shows, for simplification, the entire $130 million of capital expenditures authorized for the Davis-Grunsky Act Program, according to the Burns-Porter Act, as being funded by proceeds from the sale of general obligation bonds. In fact, $102 million originated from bond proceeds while $28 million from the California Water

Fund was used for the program in lieu of bond proceeds prior to 1969. Since the final offset in 1994, DWR has accumulated $44.6 million in capital costs through fiscal year 2006–2007.

Line 33, Application of California Water Fund Monies, shows the amount of SWP costs financed under the Burns-Porter Act. The act provides that any available money in the California Water Fund must be used for construction in lieu of proceeds from the sale of general obligation bonds.

When the Burns-Porter Act became effective in late 1960, approximately $97 million had been accumulated in the fund. That balance, plus subsequent appropriations, interest earnings, and other miscellaneous income to the fund through December 31, 2015, was used to finance a total of $508 million of SWP costs.

Line 34, Interim Financing, shows the net annual amounts of funds flowing into and out of the Water Revenue Commercial Paper Notes program. This program was established in March 1993 to provide an ongoing source of interim financing for water system projects prior to permanent financing from the sale of long-term revenue bonds. DWR has authority to issue up to $300 million of Water Revenue Commercial Paper Notes. In addition, DWR authorized issuance of its Water Revenue Commercial Paper Notes for $500 million to cover costs of the Oroville Dam Spillway Recovery and Restoration Project that is not federally reimbursed. 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 2018 through 2027 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 OMP&R costs and meet all repayment obligations on funds used to finance SWP construction and other authorized costs during the period 2018 through 2027. 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 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

- 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 (Cologne; Chapter 411, Statutes of 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 (RFWE) amounted to $5 million per year and were appropriated by the California Legislature from the State tideland oil revenues. There have been no appropriations from this fund since 1985.

Legislation enacted in 1989 offset a portion of the amount owed to the SWP by the State for costs allocated to RFWE against the amount the SWP owed to the California Water Fund (see Line 39). Since the final offset in 1994, DWR has accumulated $98.5 million in capital costs through December 31, 2017.

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 RFWE. Starting in fiscal year 2012–2013, $7.5 million is being appropriated for ongoing 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 for SWP 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 2019 water charges to be billed on July 1, 2018. 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 2018 charges included in Appendix B are as described below.

- Future capital costs in Appendix B are based on the prevailing prices as of December 31, 2017. Those costs presented in the financial analysis include allowances for price escalation.
- Pre-2018 charges in Appendix B represent charges as they should have been, according to currently known conditions. Pre-2018 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 2018 and thereafter have been adjusted for any apparent overpayments or underpayments of pre-2018 charges.
- 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 AY bonds. Charges in Table 14-2 apply to Series A through Series AY 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 AY bonds. Surcharge values included in Table 14-2 apply to Series B through Series AY bonds and to assumed future issues required to finance SWP construction costs included in Table 4-1.

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

Table 14-8 Revenue Bond Proceeds Affecting Project Interest Rate (in millions of dollars)

	Proceeds Included in Project Interest Rate					
	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]	**Total Principal Amount of Bonds**	**Percentage of Total Amount Included in Calculating Project Interest Rate [4] / [5]**
Project	[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[a]	0.2	0.4	25.4	35.6	71
Water System Revenue Bonds (Series J)						
Pyramid Project	0.0	0.0	75.9[b]	75.9	99.2[b]	77
Alamo Project	0.0	0.0	45.6[b]	45.6	57.1[b]	80
Small Hydro Project I	0.0	0.0	27.8[b]	27.8	38.8[b]	72
Water System Revenue Bonds (Series L)						
Small Hydro Project I	0.0	0.0	1.5[b]	1.5	2.1[b]	71
Water System Revenue Bonds (Series Q)						
Pyramid Project	0.0	0.0	3.0[b]	3.0	3.9[b]	77
Alamo Project	0.0	0.0	4.8[b]	4.8	6.0[b]	80
Water System Revenue Bonds (Series S)						
Pyramid Project	0.0	0.0	8.0[b]	8.0	10.4[b]	77
Alamo Project	0.0	0.0	7.6[b]	7.6	9.5[b]	80
Water System Revenue Bonds (Series U)						
Pyramid Project	0.0	0.0	2.4[b]	2.4	3.2[b]	75
Alamo Project	0.0	0.0	3.2[b]	3.2	4.0[b]	80
Water System Revenue Bonds (Series W)						
Pyramid Project	0.0	0.0	27.7[b]	27.7	36.0[b]	77
Alamo Project	0.0	0.0	11.8[b]	11.8	14.7[b]	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[b]	16.3	22.7[b]	72
Water System Revenue Bonds (Series X)						
Pyramid Project	0.0	0.0	8.5[b]	8.5	11.0[b]	77
Alamo Project (Series H refunding)	0.0	0.0	0.3[b]	0.3	0.3[b]	100
Alamo Project (Series F refunding)	0.0	0.0	3.9[b]	3.9	4.9[b]	79
Small Hydro Project	0.0	0.0	4.6[b]	4.6	6.4[b]	72

[a] 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]).

[b] 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[1] (thousands)	Interest Cost (thousands)	Issue Interest Rate[2] (percent)	Project Interest Rate[3] (percent)
$ 50,000,000 Bond Anticipation Notes	11/21/63	11/21/63	26,944	531	1.971	1.971
$100,000,000 Series A Water Bonds	2/18/64	2/18/64	3,402,000	119,750	3.520	3.508
$ 50,000,000 Series B Water Bonds	5/5/64	5/5/64	1,726,000	60,986	3.533	3.516
$100,000,000 Series C Water Bonds	10/7/64	10/7/64	3,452,000	123,764	3.585	3.544
$100,000,000 Series D Water Bonds	2/16/65	2/16/65	3,497,900	122,403	3.499	3.531
$100,000,000 Series E Water Bonds	11/23/65	11/23/65	3,497,900	130,029	3.717	3.573
$100,000,000 Series F Water Bonds	6/8/66	6/8/66	3,497,900	137,359	3.927	3.638
$100,000,000 Series G Water Bonds	11/22/66	11/22/66	3,497,900	143,788	4.111	3.711
$100,000,000 Series H Water Bonds	3/21/67	3/21/67	3,497,900	129,261	3.695	3.709
$100,000,000 Series J Water Bonds	7/18/67	7/18/67	3,497,900	143,199	4.094	3.754
$100,000,000 Series K Water Bonds	11/14/67	11/14/67	3,497,900	163,887	4.685	3.853
$150,000,000 Revenue Bonds, Oroville Division, Series A	4/3/68	4/3/68	5,228,700	270,289	5.169	
$100,000,000 Series L Water Bonds	7/11/68	7/11/68	3,497,900	166,918	4.772	3.941
$100,000,000 Series M Water Bonds	10/22/68	10/22/68	3,497,900	169,989	4.860	4.021
$ 94,995,000 Revenue Bonds, Oroville Division, Series B	4/1/69	4/1/69	3,423,460	195,902	5.722	
$ 46,761,000 Cumulative 1970 General Fund Borrowing, repaid 7/10/70	-		4,938	346	7.007	
$200,000,000 Series N and P Bond Anticipation Notes	6/16/70	6/16/70	200,000	11,660	5.830	4.030
$100,000,000 Series N Water Bonds	2/2/71	2/2/71	3,447,900	190,292	5.519	4.148
$100,000,000 Series Q Bond Anticipation Notes	3/10/71	3/10/71	100,000	2,349	2.349	4.143
$100,000,000 Series P Water Bonds	4/21/71	4/21/71	3,397,900	193,377	5.691	4.255
$150,000,000 Series Q and R Water Bonds	11/9/71	11/9/71	5,171,850	265,734	5.138	4.342
$ 40,000,000 Series S Water Bonds	3/28/72	3/28/72	1,399,160	76,509	5.468	4.371
$139,165,000 Devil Canyon-Castaic Revenue Bonds	8/8/72	8/8/72	4,776,204	258,839	5.419	4.457
$ 10,000,000 Series T Water Bonds	3/20/73	3/20/73	185,265	9,491	5.123	4.459
$ 10,000,000 Series U Water Bonds	1/13/76	1/13/76	158,750	8,731	5.500	4.462
$ 10,000,000 Series V Water Bonds	11/15/77	11/15/77	158,750	7,573	4.770	4.462
$ 95,800,000 Pyramid Hydroelectric Revenue Bonds	10/23/79	10/23/79	2,260,072	172,495	7.632	4.584
$150,000,000 Reid Gardner Project, Series A Bond Anticipation Notes	7/1/81	7/1/81	347,906	29,572	8.500	
$ 75,600,000 Bottle Rock Project, Bond Anticipation Notes	12/1/81	12/1/81	264,600	25,137	9.500	
$ 24,400,000 Alamo Project, Bond Anticipation Notes	12/1/81	12/1/81	24,266	2,305	9.499	4.589
$200,000,000 Reid Gardner Project, Series B Revenue Bonds	7/7/82	7/7/82	4,623,137	553,793	11.979	
$125,000,000 Reid Gardner Project, Series C Revenue Bonds	11/16/82	11/16/82	2,720,045	255,744	9.402	
$ 37,500,000 Small Hydro Project I, Series D Revenue Bonds	11/16/82	11/16/82	837,769	84,587	10.097	4.666
$ 37,500,000 South Geysers Project, Series D Revenue Bonds	11/16/82	11/16/82	930,325	90,021	9.676	
$125,000,000 Bottle Rock Project, Series E Revenue Bonds	4/27/83	4/27/83	2,624,805	225,102	8.576	
$ 50,000,000 Alamo Project, Series F Revenue Bonds	4/27/83	4/27/83	1,190,763	100,836	8.468	4.727
$ 25,000,000 South Geysers Project, Series F Revenue Bonds	4/27/83	4/27/83	608,550	52,578	8.640	
$239,505,000 Reid Gardner Project, Series G Revenue Bonds	3/15/85	3/15/85	4,524,136	425,840	9.413	
$206,690,000 Power Facilities Series H Revenue Bonds	6/20/86	6/20/86	4,430,520	347,745	7.849	4.713
$132,000,000 East Branch Enlargement, Series A Water System Revenue Bonds	7/15/86	7/15/86	3,427,165	254,915	7.438	

Table 14-9 Actual Bond Sales and Project Interest Rates, by Date of Sale 2 of 3

Bond Sales	Date of Sale	Delivery Date	Dollar-Years[1] (thousands)	Interest Cost (thousands)	Issue Interest Rate[2] (percent)	Project Interest Rate[3] (percent)
$100,000,000 Series B Water System Revenue Bonds	5/5/87	5/5/87	2,564,012	194,817	7.598	
$ 9,000,000 Series C Water System Revenue Bonds	12/1/87	12/1/87	324,000	31,995	9.875	
$100,000,000 Series D Water System Revenue Bonds	6/14/88	6/14/88	2,640,510	201,253	7.622	
$ 9,000,000 Series E Water System Revenue Bonds	11/29/88	12/5/88	324,000	31,995	9.875	
$160,030,000 Series F Water System Revenue Bonds	3/15/89	4/20/89	2,779,838	189,261	6.808	
$100,000,000 Series G Water System Revenue Bonds	3/6/90	3/6/90	2,434,175	172,277	7.077	
$100,000,000 Series H Water System Revenue Bonds	1/10/91	1/10/91	2,459,172	168,857	6.866	
$180,000,000 Series I Water System Revenue Bonds	5/14/91	5/14/91	4,366,680	294,090	6.735	
$649,835,000 Series J Water System Revenue Bonds	1/16/92	1/28/92	12,422,222	745,198	5.999	
$100,000,000 Series K Water System Revenue Bonds	5/12/92	6/4/92	2,366,783	147,064	6.214	
$ 9,000,000 Series W Water Bonds	8/19/92	8/19/92	95,250	6,172	6.480	4.621
$537,830,000 Series L Water System Revenue Bonds	5/19/93	6/2/93	11,414,859	640,518	5.611	4.620
$ 2,000,000 Series X Water Bonds	9/1/93	9/1/93	26,000	1,247	4.796	4.621
$ 1,400,000 Series Y Water Bonds	11/30/94	11/30/94	19,483	1,249	6.411	
$190,000,000 Series M Water System Revenue Bonds	12/9/93	12/21/93	3,911,846	194,981	4.984	
$152,000,000 Series N Water System Revenue Bonds	3/3/95	3/14/95	2,241,606	122,658	5.472	
$335,000,000 Series O Water System Revenue Bonds	12/5/95	12/20/95	7,528,890	375,667	4.990	
$160,000,000 Series P Water System Revenue Bonds	5/7/96	5/22/96	3,553,823	204,524	5.755	
$266,630,000 Series Q Water System Revenue Bonds	11/5/96	12/4/96	5,481,815	299,846	5.470	4.620
$ 20,700,000 Series R Water System Revenue Bonds	3/10/97	3/12/97	564,125	36,627	6.493	
$200,205,000 Series S Water System Revenue Bonds	7/30/97	8/13/97	4,093,110	203,755	4.978	4.615
$135,665,000 Series T Water System Revenue Bonds	7/30/97	3/4/98	1,310,620	66,942	5.108	
$207,180,000 Series U Water System Revenue Bonds	11/19/98	12/1/98	4,032,075	200,758	4.979	
$ 20,580,000 Series V Water System Revenue Bonds	11/19/98	12/1/98	525,100	32,819	6.250	
$260,995,000 Series W Water System Revenue Bonds	5/1/01	5/17/01	3,659,312	195,822	5.351	4.613
$160,225,000 Series X Water System Revenue Bonds	5/1/02	6/4/02	2,732,785	139,109	5.090	4.610
$329,885,000 Series Y Water System Revenue Bonds	7/25/02	3/5/03	4,422,973	222,654	5.034	
$170,655,000 Series Z Water System Revenue Bonds	10/1/02	10/16/02	1,706,132	75,696	4.437	
$108,705,000 Series AA Water System Revenue Bonds	10/4/02	3/5/03	2,114,341	104,220	4.929	
$189,625,000 Series AB Water System Revenue Bonds	3/9/04	3/18/04	4,344,942	173,788	4.000	
$272,070,000 Series AC Water System Revenue Bonds	12/15/04	1/6/05	4,479,436	209,150	4.669	
$112,390,000 Series AD Water System Revenue Bonds	6/14/05	7/7/05	1,827,449	90,461	4.950	4.608
$632,890,000 Series AE Water System Revenue Bonds	4/23/08	5/1/08	8,884,000	436,216	4.910	
$287,735,000 Series AF Water System Revenue Bonds	3/11/09	3/19/09	2,980,895	143,464	4.813	
$169,115,000 Series AG Water System Revenue Bonds	11/17/09	12/2/09	2,907,605	142,774	4.910	
$ 97,675,000 Series AH Water System Revenue Bonds	10/27/10	11/9/10	1,432,014	72,176	5.040	4.610
$ 92,275,000 Series AI Water System Revenue Bonds	10/27/10	9/7/11	698,716	34,936	5.000	
$216,930,000 Series AJ Water System Revenue Bonds	10/6/11	10/13/11	2,080,429	100,663	4.839	
$ 36,370,000 Series AK Water System Revenue Bonds	2/28/12	3/13/12	495,566	23,466	4.735	
$105,875,000 Series AL Water System Revenue Bonds	2/28/12	9/5/12	739,447	36,972	5.000	

Table 14-9 Actual Bond Sales and Project Interest Rates, by Date of Sale 3 of 3

Bond Sales	Date of Sale	Delivery Date	Dollar-Years[1] (thousands)	Interest Cost (thousands)	Issue Interest Rate[2] (percent)	Project Interest Rate[3] (percent)
$183,960,000 Series AM Water System Revenue Bonds	2/28/12	3/5/13	1,440,539	72,027	5.000	
$ 49,525,000 Series AN Water System Revenue Bonds	9/19/12	9/27/12	646,489	31,783	4.916	
$317,505,000 Series AO Water System Revenue Bonds	9/19/12	9/27/12	2,830,185	71,219	2.516	
$45,340,000 Series AP Water System Revenue Bonds	3/12/13	3/26/13	621,111	25,008	4.026	
$120,205,000 Series AQ Water System Revenue Bonds	5/21/13	6/18/13	2,120,496	85,993	4.055	
$161,445,000 Series AR Water System Revenue Bonds	2/25/14	3/6/14	2,126,626	91,827	4.318	
$645,795,000 Series AS Water System Revenue Bonds	9/30/14	10/30/14	7,285,936	363,246	4.986	
$149,245,000 Series AT Water System Revenue Bonds[4]	10/29/14	11/6/14	2,784,834	83,541	3.000	
$109,275,000 Series AU Water System Revenue Bonds[4]	8/25/15	9/2/15	1,946,180	40,285	2.070	
$106,530,000 Series AV Water System Revenue Bonds	5/10/16	5/24/16	1,302,906	56,488	4.336	
$428,130,000 Series AW Water System Revenue Bonds	10/13/16	10/20/16	5,454,047	259,585	4.759	
$350,670,000 Series AX Water System Revenue Bonds	12/6/17	12/9/17	3,796,404	146,006	3.846	
$140,825,000 Series AY Water System Revenue Bonds	12/6/17	12/9/17	1,200,189	30,038	2.503	
Total			**253,096,960**	**13,846,808**		
Portion allocated to Project Interest Rate			**63,903,487**	**2,945,789**	**4.610**	**4.610**

[1] A unit equivalent to one dollar of principal amount outstanding for one year.
[2] The total interest rate (without regard to discounts paid or to premiums received) divided by the total dollar-years, expressed as a percent.
[3] 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 Branch Extension Facilities, or South Bay Aqueduct Enlargement Facilities.)
[4] Variable rate issue. Assumed an interest rate. Actual interest cost and rate will vary.

- capital cost component of the Transportation Charge for Tehachapi Afterbay
- capital cost component of the Transportation Charge for SBA Enlargement

Line 15, Rate Management Adjustments, shows the projected amount of revenue reductions allocated to contractors after repayment of the California Water Fund (see Line 39). Under provisions of the Monterey Amendment, the reduction amount allocated to agricultural contractors is deposited into a trust fund to stabilize payments in water-short years. The urban contractor allocation is applied as a direct reduction in charges.

Line 16, Federal Payments for Project Operating Costs, shows federal payments made in accordance with the December 31, 1961, agreement between California and the United States providing for DWR to operate and maintain the San Luis Joint-Use Facilities. According to the January 12, 1972, supplement to the agreement, the Bureau of Reclamation (Reclamation) initially paid 45 percent of operations, maintenance, and replacement (OM&R) costs for those activities. (The percentage does not apply to power costs; Reclamation and DWR each provide their own power to pump water through the joint facilities.)

The percentage paid by Reclamation is periodically reviewed by Reclamation and DWR. A review of the percentage paid by Reclamation was completed in 1987 and resulted in a federal share of 44.09 percent. During the most recent review concluded in August 2015, DWR agreed to reevaluate Reclamation's percentage every five years based on the preceding five years of actual operating expenditures. Operating

expenditures for calendar years 2006 through 2010 were reviewed, and the percentage paid by Reclamation for calendar years 2011 through 2015 was retroactively reduced to 39.72 percent. The amounts in Line 16 are based on the assumption that the federal share will continue at this level for calendar years 2016 through 2027. However, it is anticipated that the percentage paid by Reclamation for calendar years 2016–2020 will be revised once all expenditures through 2015 are known and a new percentage can be determined.

Line 17, Appropriations for Operating Costs Allocated to Recreation, shows appropriations made under the Davis-Dolwig Act. In passing the Davis-Dolwig Act, the California Legislature declared its intent that, except for funds provided according to Assembly Bill 12 (Porter, et al.; Chapter 27, Statutes of 1966), DWR's budget will include appropriations of monies from the General Fund necessary for RFWE in connection with State water projects.

Annual OMP&R costs allocated to RFWE 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 RFWE against the amount the SWP owed to the California Water Fund (see Line 39). Since the final offset in 1994, DWR has accumulated $236.2 million in OMP&R costs through December 31, 2017.

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 RFWE. Starting in fiscal year 2012–2013, $7.5 million is being appropriated for ongoing OM&R and capital RFWE 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 $78.7 million of loans disbursed as of December 31, 2017. 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 power plants 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

- 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
- 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 2017. 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, 2017, a net deposit (which includes returned deposits) of $112.6 million had been made; $96.4 million had been spent for replacement costs. The balance of the replacement reserve as of that date was $38.2 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

Table 14-10 Operations, Maintenance, Power, and Replacement Costs by Facility, Composition, and Purpose (in thousands of dollars)

	Calendar Year															
Feature	1962–2015	2016	2017	1962–2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028–2035	**TOTAL**
Project Facility																
Feather River facilities	1,631,273	71,422	70,308	1,779,843	68,044	68,986	71,203	72,448	71,815	72,023	74,449	73,643	74,668	75,059	632,686	3,134,858
North Bay Aqueduct	115,448	8,727	5,946	130,121	9,121	9,083	9,011	9,292	9,269	9,296	9,579	9,461	9,572	9,602	80,177	303,584
Delta facilities	988,499	85,318	44,246	1,118,063	80,252	79,198	77,916	79,038	70,567	70,772	73,156	72,364	73,371	73,755	621,696	2,490,148
Suisun Marsh	61,008	5,827	13,061	79,896	7,286	7,082	7,000	7,114	7,052	7,073	7,311	7,232	7,332	7,371	62,130	213,879
South Bay Aqueduct	404,709	27,185	23,354	455,248	23,305	21,268	20,862	21,380	21,160	21,223	21,859	21,584	21,833	21,896	182,594	854,212
California Aqueduct																
Delta to Edmonston	4,551,251	237,513	280,134	5,068,897	225,890	228,990	225,728	242,888	237,456	223,097	250,160	243,613	234,475	239,648	2,005,980	9,407,844
Edmonston to Perris	4,132,195	238,737	270,718	4,641,650	232,033	225,915	213,367	241,880	242,724	245,283	246,328	245,862	243,061	248,147	2,056,032	9,082,282
West Branch	174,253	34,534	39,712	248,499	31,199	31,066	39,188	33,211	32,925	33,173	34,121	34,093	34,953	34,689	288,304	875,421
Coastal Branch	356,874	23,389	27,935	408,198	22,479	22,448	21,655	23,352	23,167	23,236	23,930	23,628	23,898	23,967	199,805	839,763
East Branch Enlargement	138,217	10,524	9,840	158,581	10,092	10,572	11,391	11,475	11,262	11,183	11,445	11,209	11,253	11,199	90,245	359,907
East Branch Extension	51,454	5,585	9,027	66,066	7,907	7,811	7,688	7,824	7,758	7,781	8,027	7,932	8,031	8,063	67,549	212,437
Off-Aqueduct power-generating facilities	1,587,873	109	109	1,588,091	110	110	111	111	112	113	113	114	114	115	939	1,590,153
Recreation, planning, and Central Valley Project negotiations	9,230	1,202	1,745	12,177	1,160	1,160	1,160	1,160	1,160	1,160	1,160	1,160	1,160	1,160	10,440	34,217
Water quality monitoring	424,976	12,683	12,683	450,342	12,683	12,683	12,683	11,379	11,379	11,379	11,379	11,379	11,379	11,379	102,411	670,455
Davis-Grunsky Act Program	6,094	272	192	6,558	288	288	288	288	288	288	288	288	288	288	2,592	12,030
Subtotal	*14,640,185*	*763,027*	*809,010*	*16,212,221*	*731,849*	*726,660*	*719,251*	*762,840*	*748,094*	*737,080*	*773,305*	*763,562*	*755,388*	*766,338*	*6,403,580*	*30,100,168*
Payments to/credits from PG&E under Comprehensive Agreement	(59,848)	0	0	(59,848)	0	0	0	0	0	0	0	0	0	0	0	(59,848)
Total OMP&R Costs	**14,580,337**	**763,027**	**809,010**	**16,152,373**	**731,849**	**726,660**	**719,251**	**762,840**	**748,094**	**737,080**	**773,305**	**763,562**	**755,388**	**766,338**	**6,403,580**	**30,40,320**
Composition																
Salaries and expenses of headquarters personnel	4,108,920	207,473	227,955	4,544,348	194,461	185,556	179,608	198,129	191,856	181,340	202,416	199,891	191,872	202,094	1,702,722	8,174,293
Salaries and expenses of field personnel	5,643,777	214,416	222,876	6,081,069	190,128	181,421	175,606	193,714	187,582	177,300	197,906	195,437	187,597	197,591	1,664,783	9,630,134
Pumping power																
Used by pumping plants	4,088,857	377,935	430,462	4,897,253	381,107	396,206	393,405	396,761	391,128	398,279	394,226	389,238	397,094	387,834	3,165,973	11,988,504
Produced by generation plants	(677,154)	(36,906)	(72,392)	(786,452)	(33,957)	(36,633)	(29,479)	(25,875)	(22,584)	(19,952)	(21,356)	(21,118)	(21,289)	(21,296)	(130,837)	(1,170,828)
Off-Aqueduct power-generating facilities requirement	1,587,873	109	109	1,588,091	110	110	111	111	112	113	113	114	114	115	939	1,590,153
Oroville-Thermalito insurance premiums	8,963	0	0	8,963	0	0	0	0	0	0	0	0	0	0	0	8,963
Less portion of costs incurred during construction	(121,051)	0	0	(121,051)	0	0	0	0	0	0	0	0	0	0	0	(121,051)
Payments to/credits from PG&E under Comprehensive Agreement	(59,848)	0	0	(59,848)	0	0	0	0	0	0	0	0	0	0	0	(59,848)
Total OMP&R Costs	**14,580,337**	**763,027**	**809,010**	**16,152,373**	**731,849**	**726,660**	**719,251**	**762,840**	**748,094**	**737,080**	**773,305**	**763,562**	**755,388**	**766,338**	**6,403,580**	**30,040,320**
Project Purpose																
Water supply and power generation	13,905,138	725,919	770,789	15,401,846	692,091	686,885	679,476	723,065	708,319	697,305	733,531	723,787	715,613	726,563	6,085,382	28,573,863
Recreation and fish and wildlife enhancement	290,697	18,649	22,656	332,002	22,656	22,656	22,656	22,656	22,656	22,656	22,656	22,656	22,656	22,656	181,250	739,815
Flood control	11,610	735	726	13,071	726	726	726	726	726	726	726	726	726	726	5,806	26,135
Miscellaneous purposes																
Federal share: San Luis and Delta facilities	393,304	16,048	13,602	422,954	14,825	14,825	14,825	14,825	14,825	14,825	14,825	14,825	14,825	14,825	118,598	689,800
Other (Davis-Grunsky, drainage, City of Los Angeles)	39,436	1,676	1,237	42,349	1,551	1,568	1,568	1,568	1,568	1,568	1,568	1,568	1,568	1,568	12,544	70,556
Payments to/credits from PG&E under Comprehensive Agreement	(59,848)	0	0	(59,848)	0	0	0	0	0	0	0	0	0	0	0	(59,848)
Total OMP&R Costs	**14,580,337**	**763,027**	**809,010**	**16,152,373**	**731,849**	**726,660**	**719,251**	**762,840**	**748,094**	**737,080**	**773,305**	**763,562**	**755,388**	**766,338**	**6,403,580**	**30,040,320**

net of several income and expenditure items. Income items related to revenue bonds are as follows:

- proceeds set aside to pay bond interest during construction (capitalized interest)
- proceeds set aside for first year operating costs (capitalized operations and maintenance)
- water contractor payments or bond proceeds set aside for debt service reserves
- water contractor payments for revenue bond cover requirements
- deposits to and withdrawals from operating reserves to meet day-to-day cash flow requirements

The 1952–2017 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 are as follows:

- 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
- 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, 2017, show the total principal and interest payments, respectively, on bonds sold to date. Table 14-11 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 AY).

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 2.80 percent; and
- 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

Table 14-11 Annual Debt Service on Bonds Sold through December 31, 2017 (in thousands of dollars)

Calendar Year	Series A through Y Water Bonds		Oroville Revenue Bonds[1]		Pyramid Project Revenue Bonds[2]		Alamo Project Revenue Bonds[2]		Small Hydro Project Revenue Bonds[2]		Water System Facilities Water System Revenue Bonds[3]		*Subtotal*		Devil Canyon-Castaic Project Revenue Bonds		Reid Gardner Project Revenue Bonds[2,3]		South Geysers Project Revenue Bonds[2]		Bottle Rock Project Revenue Bonds[2]		East Branch Enlargement Project Water System Revenue Bonds[3]		Coastal Extension Facilities Water System Revenue Bonds		East Branch Extension Facilities Water System Revenue Bonds[3]		South Bay Enlargement Facilities Water System Revenue Bonds[3]		Tehachapi East Afterbay Facilities Water System Revenue Bonds[3]		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	2,803	0	0	0	0	0	0	0	0	0	0	*0*	*2,803*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2,803
1965	0	11,114	0	0	0	0	0	0	0	0	0	0	*0*	*11,114*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	11,114
1966	0	16,742	0	0	0	0	0	0	0	0	0	0	*0*	*16,742*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	16,742
1967	0	26,912	0	0	0	0	0	0	0	0	0	0	*0*	*26,912*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	26,912
1968	0	37,760	0	3,876	0	0	0	0	0	0	0	0	*0*	*41,636*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	41,636
1969	0	47,461	0	10,448	0	0	0	0	0	0	0	0	*0*	*57,909*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	57,909
1970	0	53,198	0	13,145	0	0	0	0	0	0	0	0	*0*	*66,343*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	66,343
1971	0	62,898	0	13,145	0	0	0	0	0	0	0	0	*0*	*76,043*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	76,043
1972	0	67,974	1,260	13,112	0	0	0	0	0	0	0	0	*1,260*	*81,086*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,260	81,086
1973	1,200	69,348	1,330	13,042	0	0	0	0	0	0	0	0	*2,530*	*82,390*	0	7,708	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2,530	90,098
1974	3,000	69,532	1,400	12,969	0	0	0	0	0	0	0	0	*4,400*	*82,501*	0	7,708	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4,400	90,209
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	0	6,475	89,967
1976	7,000	69,407	1,555	12,811	0	0	0	0	0	0	0	0	*8,555*	*82,218*	0	7,708	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8,555	89,926
1977	10,200	69,323	1,635	12,727	0	0	0	0	0	0	0	0	*11,835*	*82,050*	0	7,708	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	11,835	89,758
1978	12,700	69,312	5,775	12,537	0	0	0	0	0	0	0	0	*18,475*	*81,849*	0	7,708	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	18,475	89,557
1979	13,650	68,690	11,585	12,275	0	0	0	0	0	0	0	0	*25,235*	*80,965*	0	7,708	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	25,235	88,673
1980	16,050	67,968	3,265	11,739	0	7,900	0	0	0	0	0	0	*19,315*	*87,607*	0	7,708	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	19,315	95,315
1981	18,050	67,109	4,885	11,444	0	7,292	0	0	0	0	0	0	*22,935*	*85,845*	0	7,708	0	5,312	0	0	0	0	0	0	0	0	0	0	0	0	0	0	22,935	98,865
1982	19,250	66,162	17,920	10,968	0	7,292	0	0	0	0	0	0	*37,170*	*84,422*	0	7,708	0	14,347	0	0	0	0	0	0	0	0	0	0	0	0	0	0	37,170	106,477
1983	20,520	65,148	21,110	10,147	0	7,292	0	2,449	0	3,727	0	0	*41,630*	*88,763*	900	7,708	0	35,719	0	4,777	0	6,017	0	0	0	0	0	0	0	0	0	0	42,530	142,984
1984	21,785	64,068	10,005	9,013	640	7,292	0	4,198	0	3,727	0	0	*32,430*	*88,298*	955	7,647	0	35,719	0	5,647	0	10,315	0	0	0	0	0	0	0	0	0	0	33,385	147,626
1985	22,555	62,932	12,700	8,628	675	7,238	0	4,198	0	3,727	0	0	*35,930*	*86,723*	1,010	7,583	9,425	27,209	0	5,647	0	10,315	0	0	0	0	0	0	0	0	0	0	46,365	137,477
1986	23,830	61,742	11,435	7,859	715	7,377	0	4,263	0	3,537	0	0	*35,980*	*84,778*	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	0	42,095	145,027
1987	25,495	60,492	11,715	7,188	790	7,513	265	4,329	0	3,348	0	4,952	*38,265*	*87,822*	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	0	45,565	153,159
1988	26,770	59,165	6,685	6,664	830	7,447	280	4,314	345	3,348	710	11,037	*35,620*	*91,975*	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	0	44,855	157,881
1989	28,145	57,825	33,705	5,513	875	7,378	295	4,298	365	3,328	1,148	14,373	*64,533*	*92,715*	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	0	76,980	154,898
1990	29,385	56,473	10,385	4,301	930	7,305	320	4,279	405	3,304	1,227	19,555	*42,652*	*95,217*	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	0	54,255	159,331
1991	30,365	55,070	12,055	3,922	980	7,227	335	4,257	430	3,276	2,129	27,569	*46,294*	*101,321*	1,435	7,107	7,170	29,302	818	5,535	1,791	11,376	1,197	16,856	0	0	0	0	0	0	0	0	58,705	171,497
1992	31,745	54,233	14,135	2,985	2,395	5,308	1,260	3,086	960	2,553	5,108	28,412	*55,603*	*96,577*	1,520	7,010	8,950	27,188	1,934	4,136	4,575	7,942	2,583	22,241	0	0	0	0	0	0	0	0	75,165	165,094
1993	33,390	52,707	13,755	2,237	1,525	5,688	755	3,300	445	2,640	4,576	29,965	*54,446*	*96,537*	1,610	6,907	8,820	26,953	901	4,256	3,264	8,385	3,040	21,428	0	0	0	0	0	0	0	0	72,081	164,466
1994	35,075	51,273	35,225	934	1,580	5,634	780	3,274	695	2,569	5,910	38,223	*79,265*	*101,907*	1,705	6,799	77,105	26,273	1,588	4,072	3,374	8,270	4,567	20,752	0	0	0	0	0	0	0	0	167,604	168,073
1995	36,280	49,747	0	0	1,635	5,570	805	3,242	745	2,536	8,064	37,879	*47,529*	*98,974*	1,810	6,684	5,420	19,230	1,695	4,004	3,521	8,133	4,979	20,499	0	0	0	0	0	0	0	0	64,954	157,524
1996	37,520	48,069	0	0	2,320	5,486	1,055	3,203	3,135	2,464	10,459	58,171	*54,489*	*117,393*	1,920	6,561	49,465	18,130	3,043	3,908	3,682	7,974	4,771	23,240	0	0	0	0	0	0	0	0	117,370	177,206
1997	37,215	46,410	0	0	1,695	5,274	875	3,073	585	2,283	14,375	67,909	*54,745*	*124,949*	2,035	6,432	7,515	15,255	1,825	3,696	3,861	7,741	6,300	23,702	0	1,981	0	76	0	0	0	0	76,281	183,832
1998	37,295	44,782	0	0	1,770	5,237	910	3,059	625	2,258	16,755	68,584	*57,355*	*123,920*	2,155	6,295	5,045	16,144	1,935	3,637	4,030	7,509	6,760	23,966	0	1,829	0	229	0	0	0	0	77,280	183,529
1999	38,220	43,177	0	0	1,845	5,141	960	3,004	680	2,229	18,701	68,086	*60,406*	*121,637*	2,285	6,160	9,310	11,660	2,081	3,549	4,240	7,318	7,518	25,032	0	1,808	65	2,930	0	0	0	0	85,905	180,094
2000	39,510	41,521	0	0	1,925	5,045	1,010	2,955	610	2,197	19,536	66,900	*62,591*	*118,618*	2,420	6,040	9,870	11,194	1,950	3,448	4,470	7,098	8,974	24,651	0	1,808	915	2,928	0	0	0	0	91,190	175,785
2001	40,600	39,805	0	0	2,250	4,949	1,155	2,902	780	2,272	20,945	66,417	*65,730*	*116,345*	2,565	5,912	10,365	10,758	2,045	3,344	4,720	6,856	9,425	24,188	0	2,131	950	2,889	0	0	0	0	95,800	172,423
2002	41,740	38,037	0	0	2,460	4,619	1,280	2,758	950	2,192	23,918	63,126	*70,348*	*110,732*	2,720	5,773	11,185	10,010	2,225	3,074	5,265	6,323	9,817	23,099	335	2,311	1,245	3,481	0	0	0	0	103,140	164,803
2003	43,590	36,215	0	0	2,500	4,429	1,315	2,671	940	2,110	23,441	60,465	*71,786*	*105,890*	2,885	5,626	2,135	9,313	2,335	2,890	5,445	5,939	9,988	18,479	245	2,310	1,105	4,278	0	0	0	0	95,924	154,725
2004	45,730	34,302	0	0	2,500	4,291	1,330	2,598	970	2,059	26,396	58,988	*76,926*	*102,238*	3,055	5,470	2,210	9,214	2,425	2,758	5,610	5,633	9,883	20,583	220	2,298	2,045	4,747	0	91	0	55	102,374	153,087
2005	46,985	32,302	0	0	2,727	4,097	1,461	2,487	1,327	1,987	23,064	58,061	*75,564*	*98,934*	3,240	5,305	8,825	9,112	2,759	2,598	5,959	5,289	3,669	20,046	305	2,163	2,124	5,345	0	435	0	171	102,445	149,398
2006	48,275	30,248	0	0	2,868	3,985	1,527	2,437	1,371	1,924	28,901	59,149	*82,942*	*97,743*	3,435	5,130	9,340	8,617	2,920	2,453	6,326	4,958	11,627	20,182	240	2,235	2,222	5,731	82	669	0	287	119,134	148,004
2007	49,765	28,126	0	0	3,023	3,817	1,622	2,346	1,451	1,846	30,267	58,239	*86,128*	*94,374*	3,640	4,945	9,835	8,079	3,101	2,278	6,731	4,578	12,229	19,664	1,015	2,225	2,305	5,825	239	698	75	306	125,298	142,972
2008	51,755	25,937	0	0	2,794	3,525	1,618	2,147	1,161	1,763	25,352	60,365	*82,680*	*93,737*	3,860	4,749	23,689	8,084	2,765	2,037	5,637	4,096	10,602	18,753	179	2,167	51	7,036	247	2,926	80	1,961	129,790	145,546
2009	54,095	23,654	0	0	2,947	3,391	1,743	2,042	1,168	1,699	33,484	62,154	*93,437*	*92,940*	4,090	4,540	25,475	5,581	2,908	1,915	5,981	3,787	12,289	18,007	200	1,943	2,629	7,580	2,604	5,354	1,843	3,160	151,456	144,807
2010	55,785	21,278	0	0	3,525	3,249	2,078	2,000	1,399	1,610	31,016	61,546	*93,803*	*89,683*	4,335	4,319	33,201	5,523	3,221	1,750	6,611	3,439	12,644	17,746	2,790	2,059	2,803	7,780	3,334	6,045	1,911	3,094	164,653	141,438
2011	57,275	18,827	0	0	2,599	2,795	1,465	1,749	1,045	1,335	40,105	60,528	*102,489*	*85,234*	4,595	4,085	33,105	4,344	2,917	1,510	6,366	3,066	14,115	15,805	1,237	1,802	2,826	7,869	3,782	7,343	1,992	3,062	173,424	134,120
2012	58,615	16,278	0	0	2,761	2,596	1,574	1,600	1,060	1,313	43,169	56,395	*107,179*	*78,182*	4,875	3,837	35,031	2,558	3,116	1,274	6,845	2,500	14,853	15,051	1,294	1,483	2,955	7,929	4,527	8,298	2,094	2,948	182,769	124,060
2013	60,455	13,731	0	0	4,214	2,385	2,601	1,471	2,191	1,242	48,284	54,026	*117,745*	*72,855*	5,165	3,574	8,657	860	4,825	1,049	10,997	2,035	13,816	11,472	1,482	1,381	4,605	10,946	5,737	8,684	2,200	2,880	175,229	115,736
2014	57,985	11,296	0	0	4,831	2,129	3,107	1,301	2,405	1,122	56,254	48,391	*124,582*	*64,239*	5,475	3,303	260	427	4,164	787	8,619	1,460	15,082	11,821	2,106	1,217	4,835	13,224	6,147	6,910	2,296	1,901	173,566	105,289
2015	53,775	8,885	0	0	5,272	1,907	3,126	1,178	2,741	993	71,571	54,891	*136,485*	*67,854*	5,805	3,015	860	444	3,795	567	2,556	1,000	14,691	12,001	2,492	1,194	9,249	15,164	7,503	8,453	2,816	2,561	186,252	112,253
2016	46,215	6,666	0	0	5,671	1,665	3,211	1,038	3,084	860	74,865	55,159	*133,046*	*65,388*	6,150	2,710	0	199	0	193	0	438	19,939	11,304	2,518	1,159	9,659	14,913	7,798	7,740	2,919	2,454	182,029	106,498
2017	**38,145**	**4,652**	**0**	**0**	**6,445**	**1,388**	**3,654**	**884**	**3,246**	**706**	**76,134**	**58,691**	***127,624***	***66,321***	**6,520**	**2,388**	**0**	**0**	**0**	**0**	**0**	**0**	**18,743**	**10,522**	**2,400**	**1,079**	**10,089**	**15,652**	**7,240**	**8,128**	**2,622**	**2,354**	**175,238**	**106,444**

Table 14-11 Annual Debt Service on Bonds Sold through December 31, 2017 (in thousands of dollars)

Calendar Year	Series A through Y Water Bonds		Oroville Revenue Bonds[1]		Pyramid Project Revenue Bonds[2]		Alamo Project Revenue Bonds[2]		Small Hydro Project Revenue Bonds[2]		Water System Facilities Water System Revenue Bonds[3]		*Subtotal*		Devil Canyon-Castaic Project Revenue Bonds		Reid Gardner Project Revenue Bonds[2,3]		South Geysers Project Revenue Bonds[2]		Bottle Rock Project Revenue Bonds[2]		East Branch Enlargement Project Water System Revenue Bonds[3]		Coastal Extension Facilities Water System Revenue Bonds		East Branch Extension Facilities Water System Revenue Bonds[3]		South Bay Enlargement Facilities Water System Revenue Bonds[3]		Tehachapi East Afterbay Facilities Water System Revenue Bonds[3]		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	4,661	1,122	2,720	724	2,442	557	70,157	60,287	*105,415*	*65,701*	6,910	2,045	0	0	0	0	0	0	22,883	10,522	1,572	1,009	11,246	14,962	7,487	7,784	2,557	2,227	158,070	104,250
2019	16,975	1,804	0	0	4,493	908	2,732	604	2,173	440	79,508	58,272	*105,881*	*62,028*	7,325	1,682	0	0	0	0	0	0	20,661	9,020	983	963	11,826	14,695	7,727	7,550	2,651	2,143	157,054	98,081
2020	17,405	956	0	0	5,281	705	3,159	486	2,713	332	76,274	55,042	*104,832*	*57,521*	7,765	1,298	0	0	0	0	0	0	21,013	8,045	1,740	914	12,579	14,129	8,153	7,199	2,821	2,014	158,903	91,120
2021	8,595	318	0	0	2,539	446	1,610	333	1,128	196	81,472	50,938	*95,344*	*52,231*	8,230	890	0	0	0	0	0	0	22,671	7,024	1,881	828	13,126	13,565	8,485	6,820	2,954	1,891	152,691	83,249
2022	1,885	59	0	0	5,231	323	4,987	256	1,185	141	79,095	47,074	*92,383*	*47,853*	8,725	458	0	0	0	0	0	0	22,650	5,938	2,678	734	13,652	12,961	8,822	6,431	3,109	1,754	152,019	76,129
2023	85	7	0	0	1,028	107	543	65	651	82	87,463	43,250	*89,770*	*43,511*	0	0	0	0	0	0	0	0	18,695	4,857	1,961	611	13,711	12,332	9,394	6,018	3,300	1,604	136,831	68,933
2024	35	2	0	0	649	62	366	40	433	54	88,558	38,419	*90,041*	*38,577*	0	0	0	0	0	0	0	0	20,801	3,947	2,050	527	14,167	11,699	9,848	5,546	3,480	1,436	140,387	61,732
2025	0	0	0	0	135	33	96	23	170	35	84,622	35,200	*85,023*	*35,291*	0	0	0	0	0	0	0	0	25,251	2,993	1,672	439	14,810	11,043	10,166	5,117	3,566	1,271	140,488	56,154
2026	0	0	0	0	141	26	101	18	192	27	82,187	30,533	*82,621*	*30,604*	0	0	0	0	0	0	0	0	9,216	1,757	1,788	370	15,948	10,355	11,602	4,609	4,320	1,091	125,495	48,786
2027	0	0	0	0	376	19	268	13	272	20	93,540	26,586	*94,456*	*26,638*	0	0	0	0	0	0	0	0	9,902	1,345	1,759	303	19,850	9,614	12,727	4,052	4,845	878	143,539	42,830
2028	0	0	0	0	0	0	0	0	152	10	79,024	22,009	*79,176*	*22,019*	0	0	0	0	0	0	0	0	6,451	872	2,730	224	25,323	8,665	14,142	3,433	5,591	640	133,413	35,853
2029	0	0	0	0	0	0	0	0	160	5	88,379	17,615	*88,539*	*17,620*	0	0	0	0	0	0	0	0	7,090	553	2,859	115	26,381	7,447	14,787	2,722	5,855	360	145,511	28,817
2030	0	0	0	0	0	0	0	0	0	0	60,665	14,139	*60,665*	*14,139*	0	0	0	0	0	0	0	0	1,315	258	0	0	19,564	6,185	7,918	2,028	320	75	89,782	22,685
2031	0	0	0	0	0	0	0	0	0	0	62,353	12,336	*62,353*	*12,336*	0	0	0	0	0	0	0	0	1,335	232	0	0	20,521	5,215	8,266	1,678	330	66	92,805	19,527
2032	0	0	0	0	0	0	0	0	0	0	65,228	9,579	*65,228*	*9,579*	0	0	0	0	0	0	0	0	1,395	175	0	0	21,676	4,198	8,659	1,278	346	52	97,304	15,282
2033	0	0	0	0	0	0	0	0	0	0	67,403	7,260	*67,403*	*7,260*	0	0	0	0	0	0	0	0	1,435	133	0	0	22,717	3,155	6,694	883	361	39	98,610	11,470
2034	0	0	0	0	0	0	0	0	0	0	69,793	4,864	*69,793*	*4,864*	0	0	0	0	0	0	0	0	1,480	90	0	0	25,026	2,061	7,029	587	377	26	103,705	7,628
2035	0	0	0	0	0	0	0	0	0	0	71,995	2,502	*71,995*	*2,502*	0	0	0	0	0	0	0	0	1,525	46	0	0	26,032	1,056	7,292	317	386	14	107,230	3,935
Total	**1,582,400**	**2,384,309**	**244,995**	**246,522**	**107,046**	**195,904**	**60,354**	**100,952**	**48,985**	**81,983**	**2,173,580**	**2,074,111**	***4,217,360***	***5,083,781***	**139,165**	**283,872**	**440,493**	**567,878**	**65,341**	**114,454**	**137,654**	**224,290**	**483,077**	**612,596**	**42,731**	**45,620**	**390,832**	**309,890**	**218,438**	**145,825**	**68,017**	**44,775**	**6,203,108**	**7,432,980**

[1] Principal and interest schedule adjusted to reflect early redemption of bonds.
[2] Allocated portions of Power Facilities Revenue Bonds and Water System Revenue Bonds.
[3] Interest includes a minimum fee for Water System Revenue Bonds Series AB.

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 RFWE 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 2019 and 2024. 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 2019 and 2024, 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 2019 dollars and as escalated rates reflecting assumed future inflation of 4.5 percent from 2019 through 2024.

Table 14-12 Estimated Unit Water Charges for 2019 and 2024, by Service Area (in dollars per acre-foot)

Service Area and Charge	2019 (in 2019 dollars)	2024 (in 2024 dollars)
Feather River Area		
Capital; OM&R	**493**	**549**
North Bay Area		
Capital; OM&R	462	521
Power	43	48
Total	**505**	**569**
South Bay Area		
Capital; OM&R	358	424
Power	54	63
Total	**412**	**487**
Coastal Area		
Capital; OM&R	1,246	1,357
Power	126	174
Total	**1,372**	**1,531**
San Joaquin Area		
Capital; OM&R	197	218
Power	28	33
Total	**225**	**251**
Southern California Area		
Capital; OM&R	385	430
Power	150	179
Total	**535**	**609**

Table 14-1 Capital Requirements and Financing, December 31, 2017 (in thousands of dollars)

	Calendar Year															
Line Number/Item	1952–2015	2016	2017	1952–2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2018–2027	1952–2027
CAPITAL REQUIREMENTS																
1. Initial Project Facilities	2,202,316	0	0	2,202,316	0	0	0	0	0	0	0	0	0	0	0	2,202,316
2. North Bay Aqueduct	115,784	626	230	116,640	149	4,421	110	380	905	0	0	0	0	0	5,965	122,605
3. Delta and Suisun Marsh Facilities	321,958	20,816	22,276	365,051	72,345	117,997	74,150	48,346	15,333	9,336	7,836	7,838	7,840	0	361,021	726,072
4. Final Four Units at Banks Pumping Plant	43,673	0	0	43,673	0	0	0	0	0	0	0	0	0	0	0	43,673
5. Coastal Branch Aqueduct	516,130	2,113	1,807	520,050	1,097	2,281	2,130	113	272	272	272	272	272	0	6,981	527,031
6. West Branch Aqueduct	217,904	3,329	4,265	225,498	7,695	17,402	15,879	72,255	24,489	1,647	0	0	0	0	139,367	364,865
7. East Branch Enlargement	462,031	0	0	462,031	0	0	0	0	0	0	0	0	0	0	0	462,031
8. East Branch Improvements	463,639	61,140	29,342	554,121	12,763	23,571	31,848	8,800	0	0	0	0	0	0	76,982	631,103
9. East Branch Extension	360,775	40,146	12,985	413,906	4,577	155	155	38	0	0	0	0	0	0	4,925	418,831
10. South Bay Aqueduct Improvements and Enlargement	271,043	5,160	598	276,802	1,575	0	0	0	0	0	0	0	0	0	1,575	278,377
11. Power Generation and Transmission Facilities	869,267	11,368	9,746	890,380	58,261	13,357	15,725	6,561	4,900	0	0	0	0	0	98,804	989,184
12. Additional Conservation Facilities	170,103	2,829	2,857	175,789	3,272	3,272	3,272	3,272	3,272	3,272	3,272	3,272	3,272	3,272	32,720	208,509
13. Agricultural Drainage Facilities	86,471	1,405	1,045	88,920	1,263	1,280	1,280	1,280	1,280	1,280	1,280	1,280	1,280	1,280	12,783	101,703
14. Other Costs	561,726	84,853	567,162	1,213,740	419,457	222,308	167,053	142,356	67,616	30,874	18,449	10,771	10,563	0	1,089,446	2,303,186
15. Total Project Construction Expenditures	**6,662,821**	**233,785**	**652,312**	**7,548,919**	**582,454**	**406,044**	**311,602**	**283,401**	**118,067**	**46,681**	**31,109**	**23,433**	**23,227**	**4,552**	**1,830,569**	**9,379,488**
16. Davis-Grunsky Act Program Costs	130,000	0	0	130,000	0	0	0	0	0	0	0	0	0	0	0	130,000
17. Special Capital Requirements Under Revenue Bond Financing	583,007	(24,500)	0	558,507	49,738	32,934	25,225	22,774	9,299	3,465	2,182	1,545	1,528	0	148,691	707,197
18. Total Capital Requirements	**7,375,828**	**209,285**	**652,312**	**8,237,425**	**632,192**	**438,978**	**336,827**	**306,175**	**127,366**	**50,146**	**33,291**	**24,978**	**24,755**	**4,552**	**1,979,260**	**10,216,685**
19. Power Facilities Capital Requirements	869,267	11,368	9,746	890,380	58,261	13,357	15,725	6,561	4,900	0	0	0	0	0	98,804	989,184
20. Water Facilities Capital Requirements	6,506,561	197,917	642,566	7,347,045	573,931	425,621	321,102	299,614	122,466	50,146	33,291	24,978	24,755	4,552	1,880,456	9,227,501
FINANCING OF CAPITAL REQUIREMENTS																
Power Facilities Revenue Bond Proceeds																
21. Power Facilities Revenue Bonds through Series H	1,162,458	0	0	1,162,458	0	0	0	0	0	0	0	0	0	0	0	1,162,458
Water System Revenue Bond Proceeds																
22. East Branch Enlargement, Current Bonds	482,639	0	0	482,639	0	0	0	0	0	0	0	0	0	0	0	482,639
23. East Branch Enlargement, Future Bonds	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24. East Branch Extension, Current Bonds	382,745	29,175	0	411,920	0	0	0	0	0	0	0	0	0	0	0	411,920
25. East Branch Extension, Future Bonds	0	0	0	0	4,973	168	168	41	0	0	0	0	0	0	5,350	5,350
26. South Bay Aqueduct Enlargement, Current Bonds	219,043	5,375	0	224,418	0	0	0	0	0	0	0	0	0	0	0	224,418
27. South Bay Aqueduct Enlargement, Future Bonds	0	0	0	0	1,711	0	0	0	0	0	0	0	0	0	1,711	1,711
28. Water System Facilities, Current Bonds	2,229,004	157,830	0	2,386,834	0	0	0	0	0	0	0	0	0	0	0	2,386,834
29. Water System Facilities, Future Bonds	0	0	0	0	878,276	934,310	352,159	281,634	142,866	25,646	48,791	10,478	30,255	0	2,704,415	2,704,415
30. Subtotal, Water System Revenue Bonds	*3,313,432*	*192,380*	*0*	*3,505,812*	*884,960*	*934,478*	*352,327*	*281,675*	*142,866*	*25,646*	*48,791*	*10,478*	*30,255*	*0*	*2,711,477*	*6,217,288*
Other Capital Financing																
31. Initial Project Facilities Bond Proceeds	1,452,452	0	0	1,452,452	0	0	0	0	0	0	0	0	0	0	0	1,452,452
32. Davis-Grunsky Act Program Bond Proceeds	130,000	0	0	130,000	0	0	0	0	0	0	0	0	0	0	0	130,000
33. Application of CA Water Fund Monies (Tideland Oil Revenues)	508,056	0	0	508,056	0	0	0	0	0	0	0	0	0	0	0	508,056
34. Interim Financing	117,628	12,030	647,707	777,366	(257,418)	(500,000)	(20,000)	20,000	(20,000)	20,000	(20,000)	10,000	(10,000)	52	(777,366)	0
35. Direct Pay	7,544	375	105	8,023	149	0	0	0	0	0	0	0	0	0	149	8,172
36. Application of Capital Resources Revenues to Construction	566,269	0	0	566,269	0	0	0	0	0	0	0	0	0	0	0	566,269
37. Revenue Transfers Applied	117,990	4,500	4,500	126,990	4,500	4,500	4,500	4,500	4,500	4,500	4,500	4,500	4,500	4,500	45,000	171,990
38. Subtotal, Other Capital Financing	*2,899,938*	*16,905*	*652,312*	*3,569,156*	*(252,769)*	*(495,500)*	*(15,500)*	*24,500*	*(15,500)*	*24,500*	*(15,500)*	*14,500*	*(5,500)*	*4,552*	*(732,217)*	*2,836,939*
39. Total Financing of Capital Requirements	**7,375,828**	**209,285**	**652,312**	**8,237,425**	**632,192**	**438,978**	**336,827**	**306,175**	**127,366**	**50,146**	**33,291**	**24,978**	**24,755**	**4,552**	**1,979,260**	**10,216,685**

Table 14-2 State Water Project Revenues and Expenditures, December 31, 2017 (in thousands of dollars)

	Calendar Year															
Line Number/Item	1952–2015	2016	2017	1952–2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2018–2027	1952–2027
PROJECT REVENUES																
1. Capital Resources Revenues	814,701	0	0	814,701	0	0	0	0	0	0	0	0	0	0	0	814,701
Water Contractor Payments																
2. Transportation Capital	5,152,864	182,696	186,551	5,522,111	182,712	178,934	178,846	179,000	186,544	184,193	181,925	180,718	179,666	178,828	1,811,365	7,333,476
3. Transportation Minimum	4,698,642	246,748	242,958	5,188,348	267,298	266,080	270,959	269,576	272,272	274,995	277,745	280,522	283,327	286,161	2,748,936	7,937,284
4. Transportation Variable	6,250,578	309,072	394,076	6,953,726	249,863	262,780	253,212	292,363	294,992	284,795	299,411	300,999	285,454	295,539	2,819,410	9,773,136
5. Off-Aqueduct Power Facilities	2,983,559	4,612	3,378	2,991,549	3,610	6,700	10,700	200	200	200	200	200	200	200	22,410	3,013,959
6. Delta Water Charge	3,614,591	298,433	287,401	4,200,426	289,898	292,514	292,398	292,398	292,398	292,398	292,398	292,398	292,398	292,398	2,921,597	7,122,023
7. East Branch Enlargement	1,023,101	45,930	47,025	1,116,056	46,394	47,442	47,603	48,398	47,016	40,720	42,216	46,585	24,998	25,339	416,710	1,532,767
8. East Branch Extension	208,497	33,486	35,702	277,685	39,021	42,241	42,569	42,425	42,393	41,747	41,594	41,647	42,276	46,297	422,210	699,895
9. Coastal Extension	60,229	4,596	4,349	69,175	3,227	2,433	3,317	3,386	4,264	3,215	3,221	2,638	2,698	2,578	30,977	100,151
10. South Bay Aqueduct Improvements and Enlargement	104,208	20,232	20,034	144,474	20,577	20,651	20,723	20,711	20,660	20,874	20,868	20,743	21,918	22,643	210,367	354,841
11. Tehachapi East Afterbay	45,557	6,753	6,229	58,540	5,994	6,059	6,111	6,123	6,146	6,198	6,214	6,115	6,833	7,223	63,016	121,556
12. Water Revenue Bond Surcharge	778,831	45,130	41,778	865,740	80,571	107,903	108,449	109,982	109,254	113,157	110,512	105,524	100,721	105,791	1,051,862	1,917,602
13. Subtotal, Water Contractor Payments	*24,920,657*	*1,197,690*	*1,269,483*	*27,387,830*	*1,189,165*	*1,233,736*	*1,234,886*	*1,264,563*	*1,276,141*	*1,262,491*	*1,276,304*	*1,278,089*	*1,240,489*	*1,262,996*	*12,518,860*	*39,906,690*
14. Revenue Bond Cover Adjustments	(1,065,141)	(55,032)	(55,239)	(1,175,412)	(55,242)	(62,237)	(61,051)	(59,878)	(59,657)	(56,819)	(55,923)	(54,562)	(48,972)	(51,993)	(566,335)	(1,741,747)
15. Rate Management Adjustments	(542,562)	(40,471)	(40,471)	(623,503)	(40,471)	(40,471)	(40,471)	(40,471)	(40,471)	(40,471)	(40,471)	(40,471)	(40,471)	(40,471)	(404,706)	(1,028,209)
Other Revenues																
16. Federal Payments for Project Operating Costs	416,426	16,367	17,195	449,989	17,195	17,195	17,195	17,195	17,195	17,195	17,195	17,195	17,195	17,195	171,950	621,939
17. Appropriations for Operating Costs Allocated to Recreation	44,588	3,594	12,326	60,509	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	100,000	160,509
18. Davis-Grunsky Loan Repayments	76,252	1,295	1,195	78,742	1,004	958	889	882	871	866	789	726	693	610	8,288	87,030
19. Revenue Bond Proceeds	652,977	0	0	652,977	0	0	0	0	0	0	0	0	0	0	0	652,977
20. Interest Earnings on Operating Revenues	577,350	1,385	3,099	581,834	2,245	2,245	2,245	2,245	2,245	2,245	2,245	2,245	2,245	2,245	22,450	604,284
21. Oroville-Thermalito Payments	249,279	0	0	249,279	0	0	0	0	0	0	0	0	0	0	0	249,279
22. Miscellaneous Revenues	184,264	0	0	184,264	0	0	0	0	0	0	0	0	0	0	0	184,264
23. Subtotal, Other Revenues	*2,201,137*	*22,641*	*33,816*	*2,257,593*	*30,444*	*30,398*	*30,329*	*30,322*	*30,311*	*30,306*	*30,229*	*30,166*	*30,133*	*30,050*	*302,688*	*2,560,282*
24. Total Operating Revenues	**25,514,091**	**1,124,829**	**1,207,589**	**27,846,508**	**1,123,896**	**1,161,426**	**1,163,694**	**1,194,537**	**1,206,324**	**1,195,507**	**1,210,139**	**1,213,222**	**1,181,179**	**1,200,583**	**11,850,507**	**39,697,016**
25. Total Operating Revenues and Capital Resources Revenues	**26,328,792**	**1,124,829**	**1,207,589**	**28,661,209**	**1,123,896**	**1,161,426**	**1,163,694**	**1,194,537**	**1,206,324**	**1,195,507**	**1,210,139**	**1,213,222**	**1,181,179**	**1,200,583**	**11,850,507**	**40,511,717**
PROJECT EXPENSES																
26. Project Operations, Maintenance, Power, and Replacement Costs	14,580,337	763,027	809,010	16,152,373	731,849	726,660	719,251	762,840	748,094	737,080	773,305	763,562	755,388	766,338	7,484,366	24,251,762
27. Deposits to Replacement Reserves	98,227	4,947	9,426	112,600	0	0	0	0	0	0	0	0	0	0	0	112,600
28. Deposits to Special Reserves Under Revenue Bond Financing	689,638	63,828	102,971	856,437	108,421	90,295	31,822	4,071	13,801	23,118	2,625	15,713	12,988	5,504	308,357	549,771
29. Capital Resources Expenditures	686,932	0	0	686,932	0	0	0	0	0	0	0	0	0	0	0	686,932
Payments of Bond Debt Service																
30. Principal Repayments on Bonds Sold Through December 31, 2015 (Current Bonds)	3,512,004	182,029	175,238	3,869,271	158,070	157,054	158,903	152,691	152,019	136,831	140,387	140,488	125,495	143,539	1,465,477	5,334,748
31. Interest on Bonds Sold Through December 31, 2015 (Current Bonds)	6,342,399	106,498	106,444	6,555,341	104,250	98,081	91,120	83,249	76,129	68,933	61,732	56,154	48,786	42,830	731,264	7,286,605
32. Future Water Bond Principal Repayments	0	0	0	0	9,617	50,073	98,747	120,915	141,197	154,605	160,960	169,520	175,401	183,533	1,264,568	1,264,568
33. Future Water Bond Interest Payments	0	0	0	0	7,190	34,763	59,351	66,271	70,585	70,440	66,630	63,285	58,621	54,339	551,475	551,475
34. Total Principal	**3,512,004**	**182,029**	**175,238**	**3,869,271**	**167,687**	**207,127**	**257,650**	**273,606**	**293,216**	**291,436**	**301,347**	**310,008**	**300,896**	**327,072**	**2,730,045**	**6,599,316**
35. Total Interest	**6,342,399**	**106,498**	**106,444**	**6,555,341**	**111,440**	**132,844**	**150,471**	**149,520**	**146,714**	**139,373**	**128,362**	**119,439**	**107,407**	**97,169**	**1,282,739**	**7,838,080**
36. Subtotal, Bond Debt Service	*9,854,403*	*288,527*	*281,682*	*10,424,612*	*279,127*	*339,971*	*408,121*	*423,126*	*439,930*	*430,809*	*429,709*	*429,447*	*408,303*	*424,241*	*4,012,784*	*14,437,396*
NET REVENUES																
37. Total Operating Expenses and Bond Debt Service	**25,909,537**	**1,120,329**	**1,203,089**	**28,232,954**	**1,119,396**	**1,156,926**	**1,159,194**	**1,190,037**	**1,201,824**	**1,191,007**	**1,205,639**	**1,208,722**	**1,176,679**	**1,196,083**	**11,805,507**	**40,038,462**
38. Net System Revenues	419,255	4,500	4,500	428,255	4,500	4,500	4,500	4,500	4,500	4,500	4,500	4,500	4,500	4,500	45,000	473,255
Application of Net System Revenues																
39. California Water Fund Repayment	305,765	0	0	305,765	0	0	0	0	0	0	0	0	0	0	0	305,765
40. Revenues Used for Capital Expenditures	113,490	4,500	4,500	122,490	4,500	4,500	4,500	4,500	4,500	4,500	4,500	4,500	4,500	4,500	45,000	167,490

Chapter 15
SWP Education and Information

DWR's Public Affairs Office staff explains water-wise landscape exhibit at Cal Expo's Home and Landscape event in Sacramento on January 27, 2017.

Significant Events in 2017

During 2017, the Department of Water Resources (DWR) received hundreds of media inquiries regarding the Oroville Dam spillways incident and the Oroville Spillway Recovery Project. The Public Affairs Office (PAO) coordinated regular briefings and community events to communicate about the response and recovery effort and developed a dynamic web page documenting the project's progress. Videos and drone footage were also posted to DWR's YouTube page, with some videos receiving up to 100,000 views.

The Oroville Dam spillways incident brought news crews and visitors from around the world, with 70,000 more people visiting the Lake Oroville Visitors Center in 2017 than in 2016.

PAO also continued its water conservation campaign; distributed press releases on State Water Project (SWP) allocations; and broadcast the annual snow surveys at Phillips Station near Lake Tahoe via Facebook Live video.

Followers on DWR's Facebook page increased from 9,391 to 31,763, and Twitter followers grew from 5,760 to 19,200 in 2017.

PAO also continued educating the public on water issues by providing exhibits at events throughout California, including the California State Fair. PAO teamed up with DWR's Division of Integrated Regional Water Management staff to provide water education information to more than 3,000 children, family members, and teachers.

Through DWR's tours program, PAO coordinated visits to SWP facilities for students from various California schools, as well as 13 international groups that included guests from Australia, Bolivia, China, Japan, Peru, and South Korea.

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, blogs, brochures, and other printed and electronic communications. Additional avenues of communication include videos, graphics, exhibits, press conferences, photography, public meetings, social media, and special events.

News Topics

Selected highlights below provide examples of PAO's 2017 outreach efforts and news media responses related to State Water Project (SWP) policy, programs, events and activities.

Oroville Spillways Recovery

During 2017, DWR received hundreds of inquiries from media outlets throughout the state, nation, and world regarding the Oroville spillways incident and recovery. PAO coordinated regular briefings and community events to communicate about the emergency response and subsequent recovery effort. PAO developed and maintained a dynamic webpage on the Oroville Spillways Recovery Project. Images documenting the emergency response and recovery efforts were shared with the public via an online gallery. Video and drone footage were also regularly posted to DWR's YouTube page, with some videos receiving up to 100,000 views.

High Precipitation Year

The water year 2016–2017 began with responses to impacts from a severe and prolonged drought. January and February set new records for precipitation accumulation in some places due to atmospheric river events. The Northern Sierra 8-Station Precipitation Index set a record for water-year accumulation with 94.7 inches, more than six inches above the previous record of 88.49 inches set in 1983. Water year 2016–2017 was the first on record to have more than 20 inches of precipitation in back-to-back months on the 8-station index. While conditions were wet further south, it was not record-breaking. In the San Joaquin basin, water year 2016–2017 placed second to water year 1982–1983 and in the Tulare Basin, seventh.

Water Conservation

On April 7, 2017, the Governor issued Executive Order B-40-17, lifting the drought emergency in all California counties except Fresno, Kings, Tulare and Tuolumne. Executive Order B-40-17 built on actions in Executive Order B-37-16 to establish long-term water conservation measures. On the same day Executive Order B-40-17 was issued, *Making Water Conservation a California Way of Life* was published. Five State agencies—DWR, the State Water Resources Control Board, the California Public Utilities Commission, the California Department of Food and Agriculture, and the California Energy Commission—were charged with implementing the executive order's four inter-related objectives: (1) use water more wisely; (2) eliminate water waste; (3) strengthen local drought resilience; and (4) improve agricultural water use efficiency and drought planning. *Making Water Conservation a California Way of Life* outlines a suite of actions that can be implemented using existing authorities to implement the four objectives and includes recommended additional actions and authorities to meet executive order requirements that require legislation for implementation.

In addition to meeting the requirements in the executive order, DWR continues to promote water conservation through media contacts, organized outreach campaigns, and educational events. The messages stressed that various water conservation measures and water use efficiency efforts—especially outdoors—can significantly contribute to minimizing water waste, replenishing groundwater tables, and mitigating drought.

Save Our Water is an 8-year partnership between DWR and the Association of California Water Agencies. In 2017, *Save Our Water* continued the statewide campaign, *Water Conservation. It's For Life*. The campaign focused on ways to save water both inside and outside the home. Helpful conservation tips included encouraging drought-tolerant landscaping, adjusting sprinklers, and fixing leaks. The campaign featured radio, weather and traffic sponsorships, and outdoor advertisements.

Sustainable Groundwater Management Act

Since the passage of the Sustainable Groundwater Management Act in 2009, DWR has been working to support local development of Groundwater Sustainability Agencies and Groundwater Sustainability Plans. DWR hosted several public meetings and workshops throughout the state and launched communication efforts to educate stakeholders about the new requirements. DWR also collaborated with other state agencies and professional organizations.

Snow Surveys

Following five years of severe drought, there was a record year of snowfall and precipitation for California in 2017. There was heightened public and media interest about Sierra Nevada snowpack conditions. Multiple media outlets attended DWR's media-oriented snow surveys at Phillips Station near Lake Tahoe. PAO organized press conferences, broadcast the surveys via Facebook live video, and shared snow survey results on DWR's website and various social media platforms.

With the significant snowfall in 2017, DWR conducted a fifth media-oriented snow survey in May, which found 27.8 inches of snow water equivalent (the amount of water in the snowpack), 190 percent of the May 1 long-term average for Phillips Station.

SWP Allocations

On November 28, 2016, DWR announced an initial allocation of 20 percent for 2017 for the 29 SWP water contractors that collectively serve more than 27 million Californians and about 750,000 acres of irrigated farmland. Throughout the year, DWR announced further increases: 45 percent on December 21; 60 percent on January 18; and a final allocation of 85 percent on April 14. PAO distributed press releases for each allocation announcement and fielded media calls.

News Media

Publications

Brochures

PAO creates and maintains approximately 40 brochures describing the SWP, its mission, and facilities. They 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 2017 included updated versions of the *Fishing Along the SWP, San Luis Joint-Use Complex, North Bay Aqueduct,* and *The History of California's Water Development.*

In 2017, PAO completed Spanish translations for the *Flood Preparedness Week* flyers, Turf Rebate cards, East Porterville Water Supply Project and Water Conservation messages.

DWR Magazine

Published three times a year, this news magazine features articles describing DWR programs, staff, and activities. In 2017, article topics included the Oroville Dam spillways incident; a new research vessel, the *Sentinel*; quagga mussel prevention; the proposed new Delta research station; the Robie Thermalito Pumping-Generating Plant repair; and California WaterFix project developments.

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, water managers, other stakeholders, and interested members of the public of current water issues relevant to DWR and its programs.

Topics highlighted in the weekday news clips include water supply, water quality, drought, watershed programs, activities of other water-related agencies and groups, and relevant legislation.

Spotlight Stories and Social Media

In 2017, Spotlight Stories featured on DWR's main website discussed SWP activities. DWR also shared Spotlight Stories on its social media platforms, which include Facebook, Twitter, and Instagram.

Spotlight Stories included the Oroville Dam spillways incident at Lake Oroville and reconstruction of the service and emergency spillways; Lake Oroville community meetings; Catch A Special Thrill event for children at San Luis Reservoir; 50th anniversary of the Feather River Fish Hatchery; SWP lake and reservoir recreation information; Feather River salmon spawning gravel improvements; DWR snow surveys; quagga mussel prevention; 2017 winter storms; SWP allocations; algae blooms; and reservoir and water conditions.

DWR continued to increase its social media presence in 2017. Followers on DWR's Facebook page increased from 9,319 to 31,763 and Twitter followers grew from 5,760 to 19,200 in 2017.

PAO posted multiple messages per week on Facebook, Twitter and Instagram about various DWR projects, updates and activities of interest to the public and DWR employees.

Website

In 2017, DWR launched an effort to fully redesign its public website (water.ca.gov). PAO wrote and edited content, advised on page layout, and selected photos for SWP program pages that existed on the old and new versions of DWR's public website.

Community Relations and Outreach

In 2017, PAO continued to educate the public about water by providing exhibits at the following events:

- Oroville Salmon Festival
- Oroville Feather Fiesta Days
- Earth Day events
- World Ag Expo, Tulare
- Ag Day at the State Capitol
- Hooked on Fishing, Not on Drugs, Oroville
- Healthy Kids Day, Oroville
- California State Fair, Sacramento
- Department of Social Services Emergency Preparedness Fair, Sacramento
- Governor's Office of Emergency Services National Preparedness Month
- California Day of Preparedness, Sacramento
- 50th Annual Native American Day, Sacramento

California State Fair

In July 2017, DWR participated in the California State Fair and showcased water conservation in various exhibits. The outdoor exhibits displayed drought-tolerant plants, as well as fruits, vegetables, and herbs that require minimal water. The indoor exhibit provided educational materials on methods to reduce water use, both inside and outside the home.

DWR Tours Program

DWR's tours program regularly attracts international and domestic groups interested in touring SWP facilities and learning about California's water system. In 2017, 13 international groups toured the SWP facilities and visitors centers, bringing a total of 224 international guests from Australia, Bolivia, China, Japan, Peru, and South Korea. A large number of student groups from various schools throughout California also toured the facilities.

The following groups visited the Delta Field Division:

- San Joaquin County Office of Education Teacher Studies Program (2 tours)
- Metropolitan Water District of Southern California (10 tours)
- Plumas County School District (4 tours)
- University of California Davis (2 tours)

Throughout 2017, a total of 650 visitors representing media, elected officials, and stakeholders made 97 visits to Oroville to view the spillways recovery efforts. The Oroville Field Division coordinated these tours out of its headquarters.

SWP Visitors Centers

DWR's three visitors centers at Lake Oroville, San Luis Reservoir, and Pyramid Lake house exhibits and information related to the SWP and DWR's mission by engaging visitors with current and future water issues. DWR also provides the public with information on water safety and recreational opportunities at SWP facilities. Figure 15-1 shows the SWP visitors centers locations.

DWR worked closely with partners and stakeholders to advance long-range interpretive master plans for DWR's visitors centers, focusing on Lake Oroville's visitors center first. The plans provide recommendations to meet the current needs of Lake Oroville's visitors center and visitors. Additionally, the plans will guide the development of new exhibits. A temporary exhibit with two iPad stations was installed to survey visitors and collect their input on upgrades to the center, and 2,098 completed surveys were received.

Lake Oroville Visitors Center

The Oroville Dam spillways incident brought news crews and visitors from all over the world to the Lake Oroville Visitors Center so they could see and learn about the spillways incident and reconstruction. Seventy thousand more people visited the visitors center in 2017 than in 2016. During the spillways recovery project, the visitors center auditorium featured spillway exhibits and live television monitoring of the construction progress.

A group of 30 Chico State University geographers visited the Lake Oroville Visitors Center for a tour and program regarding the spillways incident.

The University of California, Davis, Hubert H. Humphrey Fellowship Program brought natural resources management professionals from around the world to visit the Lake Oroville Visitors Center. The fellows were from Pakistan, Morocco, Belarus, Mexico, and Russia.

Four groups of 145 elementary school students participating in the Plumas County Office of Education's outdoor education program, Plumas to the Pacific, visited the

Figure 15-1 **Visitors Centers on the SWP**

Lake Oroville Visitors Center and the Feather River Fish Hatchery. The Office of Education's new program, "Year of the Trout," teaches elementary students about steelhead and recreation along the Feather River.

SWP Recreation Outreach Events

The goal of the SWP recreation outreach program is to educate the public about water safety and the many recreational opportunities available at SWP facilities. As part of this outreach effort, PAO attends community events, state and county fairs, and state and federally sponsored events. PAO also forms partnerships with state, federal, and community groups.

DWR, the California Department of Parks and Recreation, and several partner agencies co-sponsored or attended the following recreation outreach events in 2017:

- International Sportsmen's Exposition, Sacramento
- Tulare County Drought Resources Fair
- Feather Fiesta Days, Oroville
- Hooked on Fishing, Not on Drugs, Oroville
- Lake Davis Fishing Derby
- Plumas National Forest Children's Fishing Derby
- Oroville Salmon Festival

The Jack Splash Club was created by PAO to help build interest in and educate children and their families in the Oroville area about safe water recreation. The Oroville YMCA helps manage the club.

DWR also co-sponsors and coordinates Catch A Special Thrill (C.A.S.T.) fishing events for children with special needs. During 2017, C.A.S.T. events were held at Lake Oroville, Silverwood Lake, and Los Banos.

DWR continued its partnerships with communities to offer eight Aquatic Adventure Camps throughout the summer months, teaching water safety to young people. In 2017, the camps utilized SWP facilities at Lake Del Valle and Lake Perris.

School Education Program

DWR's 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 California schools, educators, and water districts. PAO staff also supports professional development for teachers and attends public events for school children. The program achievements for 2017 are described below.

Public Events and Outreach

In 2017, PAO and Division of Integrated Regional Water Management staff provided materials and interacted with more than 3,000 children, teachers, and family members at multiple events, including the following:

- San Joaquin County Ag Venture, Stockton, Lodi, and Manteca
- State Scientist Day, Sacramento
- Children's Water Education Festival, Orange County
- California Native American Heritage Day, Sacramento
- California Science Teachers Association Annual Conference, Sacramento

As in previous years, PAO staff organized a team of DWR judges from multiple divisions and offices to judge and provide a special award for the best water resources project at the Sacramento Regional Science and Engineering Fair.

Supplementary Teaching Materials

Supplementary teaching materials included posters, maps, worksheets, workbooks, and

videos were provided to California teachers, water agencies, and other non-formal educators through the *Water Facts & Fun* online catalog and at outreach events. In 2017, approximately 55,000 materials were sent to educators throughout California. PAO staff developed a new poster in 2017 on the topic of groundwater geared toward high school students.

Collaboration and Partnerships

DWR's School Education Program collaborates and pools resources with other entities interested in educating California's youth on the importance of water resources. During 2017, PAO staff participated in the following collaborative activities/meetings:

- California Project Water Education for Teachers (WET) Program Advisory Committee
- California Department of Education's California Environmental Education Interagency Network Committee
- Water Education Committee meetings
- Creek Week Planning Committee
- Caring for Our Watersheds contest, sponsored by Agrium Inc. and the Center for Land-Based Learning
- California Department of Education's California Regional Environmental Education Community Network
- California Environmental Education Foundation Teacher Institute
- Floodplain and Delta Ecology Institute for teachers
- Sacramento River Floodplain Ecology Institute for teachers, co-sponsored with California State University, Chico
- Central Valley Floodplain Ecology Institute for educators
- Sacramento Floodplain Ecology Institute, co-sponsored with the Yolo County Office of Education
- Delta Studies Institute for teachers, co-sponsored with the San Joaquin County Office of Education

Glossary

This glossary contains terms used in the text of Bulletin 132-18 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.

actinospores One of two life stages of Myxozoan parasites. This life stage is released into the water column from infected polychaete worms and infect fish such as salmon. See Myxozoan.

adaptive management The process of improving management effectiveness by learning from the results of carefully designed decisions or experiments.

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.

alluvial fan The alluvial deposit of a stream where it issues from a gorge upon a plain or of a tributary stream at its junction with the main stream.

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.

arroyo (1) A watercourse (such as a creek) in an arid region; (2) a water-carved gully or channel.

arsenic A solid substance (metalloid) naturally existing in the Earth's crust and in crushed rock. It is highly toxic in its inorganic form. Higher levels of arsenic tend to be found in groundwater (aquifers) as compared to surface waters (e.g., lakes and rivers).

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.

B

Bay-Delta Plan Formally known as the San Francisco Bay/Sacramento–San Joaquin Delta Estuary Water Quality Control Plan, it establishes water quality control measures and flow requirements needed to provide reasonable protection of beneficial uses in the Bay-Delta watershed. The State Water Resources Control Board is responsible for adopting and updating the Bay-Delta Plan.

beach seine A rectangular net with poles attached to the ends that is held vertically in the water and dragged through the water a short distance to capture fish.

beneficial use Water quality beneficial use categories for water are designated by State law. Beneficial uses of the waters of the State that may be protected against water quality degradation include, but are not limited to, domestic, municipal, agricultural, and industrial supply; power generation; recreation; aesthetic enjoyment; navigation; and preservation and enhancement of fish, wildlife, and other aquatic resources or preserves.

benthic organisms Aquatic animals without backbones that dwell on or in the bottom sediments of fresh or salt water.

berm A narrow shelf, path, or ledge typically at the top or bottom of a slope; also, a mound or wall of earth or sand.

biological assessment A document prepared as part of the Endangered Species Act, Section 7 process to determine whether a proposed major construction activity under the authority of a federal action agency is likely to adversely affect listed species, proposed species, or designated critical habitat.

biological opinion A scientific assessment issued by the U.S. Fish and Wildlife Service or National Marine Fisheries Service, required by the Endangered Species Act for listed species. Determines the likelihood of a federal action to jeopardize the continued existence of listed species or result in the destruction or adverse modification of critical habitat.

biota Living organisms of a region, as in a stream or other body of water.

brackish water Water containing dissolved minerals in amounts that exceed normally acceptable standards for municipal, domestic, and irrigation uses. Considerably less saline than seawater.

bromide A salt which naturally occurs in small quantities in seawater; a compound of bromine.

Burns-Porter Act (California Water Code Section 12930 et seq.) Formally known as the California Water Resources Development Bond Act, this act passed the Legislature in 1959 and was approved by voters in 1960. It provided initial funding of $1.75 billion in general obligation bonds and authorized construction of the State Water Project facilities.

bypass As part of a flood management system, a natural overflow area or channel that allows excessive floodwaters to flow or be diverted from a main river channel to prevent water from overflowing the main river channel.

C

CALFED Bay-Delta Program (CALFED) A federal and State multiagency program established by the 1994 Bay-Delta Accord. CALFED's mission was to develop and implement a long-term comprehensive plan that would restore ecological health and improve water management in the Bay-Delta system. In 2010, all functions and responsibilities of CALFED were assumed by the Delta Stewardship Council.

California Environmental Quality Act (California Public Resources Code Section 21000 et seq.) Passed by the Legislature in 1970 shortly after the United States federal government passed the National Environmental Policy Act, this act codified a statewide policy of environmental protection.

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 Waterfix An infrastructure project that would include constructing two tunnels to convey water from the north to the south Delta. The purpose of WaterFix is to modernize water infrastructure and provide a secure and reliable source of water to meet the needs of farmers and communities, while including measures to address the needs of fish and wildlife.

case-in-chief The portion of a trial whereby the party with the burden of proof in the case presents its evidence. The term differs from a rebuttal, whereby a party seeks to contradict the other party's evidence.

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.

chloride (1) A compound of chlorine with another element or group especially: a salt or ester of hydrochloric acid; (2) a monovalent anion consisting of one atom of chlorine. Chloride is one of the most common anions found in tap water. It generally combines with calcium, magnesium, or sodium to form various salts: for example, sodium chloride (NaCl) is formed when chloride and sodium combine.

chlorophyll *a* One of the main groups of pigments contained in the algal species that make up phytoplankton.

chrysophyte flagellates Dominating the phytoplankton community in many water bodies that have low levels of nutrients, chrysophyte flagellates may have one or two flagella.

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.

conduit exemptions In certain cases, projects may qualify for an exemption from Federal Energy Regulatory Commission licensing. Those receiving an exemption are exempt from the requirements of Part I of the Federal Power Act.

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.

cryptophyte A plant that produces its buds underwater (such as algae) or underground on corms, bulbs, or rhizomes.

cryptophyte flagellates Single-celled algae that have two flagella used for swimming. The cryptophytes are single-celled flagellates and have pigments found in no other group of algae (phycoerythrin and phycocyanin). Pigments are structures that absorb light and include the pigment, chlorophyll.

cubic feet per second A volumetric flow rate, which is equivalent to a volume of 1 cubic foot flowing every second.

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.

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.

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.

dissolved organic carbon A general description of the organic material dissolved in water. Organic carbon occurs as the result of decomposition of plant or animal material.

dissolved organic nitrogen That subset of dissolved organic carbon that also contains nitrogen. Dissolved organic nitrogen compounds in lakes and rivers originate from photosynthetic organisms (algae and plants) and excretion of nitrogenous waste by animals, but leachate (liquid that drains or 'leaches' from a landfill) from soil, sewage discharge, and atmospheric deposition can also contribute organic nitrogen to the 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.

D-net A net with an orifice shaped like the letter D used for collecting bottom plankton and larval fish.

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 condition Hydrologic conditions during a defined period, greater than one dry year, when precipitation and runoff are much less than average.

Dynamic Mercury Cycling Model (D-MCM) An aquatic mercury cycling model used to model mercury biogeochemical processes in the Yolo Bypass. It includes inorganic mercury, methylmercury, and elemental mercury in water, sediments, and a food web. Hydrodynamic inputs for D-MCM are generated with TUFLOW, a high-resolution hydrodynamic model.

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.

egg mat A man-made device to mimic the job of plants in the wild, it catches fish eggs and offers some protection from predators until the laid eggs can be seen and counted or collected for sampling or surveying.

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. Also called specific conductance.

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 (EIR) 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.

euglenoid flagellates A single-celled organism, either green and photosynthetic or colorless and non-photosynthetic, with one or two flagella emerging from a well-defined gullet.

eustigmatophyte flagellates A single-celled organism with a single pair of flagella with coccoid cells and polysaccharide cell walls found in marine, freshwater and soil environments. Eustigmatophytes contain one or more yellow-green chloroplasts, which contain chlorophyll *a*.

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 inbasin 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

FERC Part 12D inspection Part 12D in the Code of Federal Regulations contains the regulations governing the periodic inspection of FERC-licensed dam projects by an independent consultant.

fish planting 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 “stocking” or simply “planting”).

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.

forage 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.

fry Young, recently hatched fish that are able to swim and catch their own food.

G

geosmin An organic compound with a distinct earthy flavor and aroma, which most people can easily smell. The odor detection threshold of geosmin is very low, ranging from 0.006 to 0.01 micrograms per liter in water. Geosmin literally translates to "earth smell," and is a contributor to the strong scent (petrichor) that occurs in the air when rain falls after a dry spell of weather or when soil is disturbed.

green algae A large, informal grouping of algaes (singular: green alga). Like plants, green algae contain two forms of chlorophyll, which the algae use to capture light energy to fuel the manufacture of sugars. Unlike plants, green algae are primarily aquatic.

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 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.

hydroelectric Relating to or denoting the generation of electricity using flowing water (typically from a reservoir held behind a dam or other barrier) to drive a turbine that powers a generator.

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

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-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.

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

macrofauna Animals large enough to be seen by the naked eye.

maximum contaminant level The highest drinking water contaminant concentration allowed under federal and State Safe Drinking Water Act regulations.

megawatt (MW) One million watts.

megawatt hour (MWh) A unit of energy. It is a measure of the actual amount of power consumed or produced by one megawatt expended for a period of one hour.

mercury A silver-white poisonous heavy metallic element that is liquid at ordinary temperatures and is used especially in batteries, in dental amalgam, and in scientific instruments. Mercury can enter watersheds in many ways, including as the byproduct of industrial combustion. Mercury is emitted into the air as a particulate where it can combine with other elements to form

methylmercury (MeHg). In this form it can be introduced to bodies of water and easily transferred up through the food chain.

mesocosm Any outdoor experimental system that examines the natural environment under controlled conditions. Mesocosm studies provide a link between field surveys and highly controlled laboratory experiments.

methylmercury (MeHg) See mercury.

microsiemens One million siemens. See siemens.

millisiemens One thousand siemens. See siemens.

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 SWP water supply contracts.

Monterey Amendments Amendments to the SWP 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.

Myxozoan A group of microscopic parasites often with two life stages. The myxospore stage infects several types of aquatic worms when ingested. This produces the actinospore stage, which then infects the fish host.

N

natural community conservation planning 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.

O

Operations Criteria and Plan (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.

orthomosaic An orthophoto, orthophotograph or orthoimage is an aerial photograph geometrically corrected ("orthorectified") such that the scale is uniform: the photo has the same lack of distortion as a map. Unlike an uncorrected aerial photograph, an orthophotograph can be used to measure true distances, because it is an accurate representation of the Earth's surface, having been adjusted for topographic relief, lens distortion, and camera tilt.

orthorectified photographs (orthophotographs) See orthomosaic.

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

passive integrated transponder tag A small radio transponder that contains a specific code, which allows individual fish, as well as amphibians, reptiles, birds and even rocks, to be assigned a unique 10 or 15 digit alphanumeric identification number.

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.

penstock (1) A sluice or gate for regulating a flow (as of water); (2) a conduit or pipe for conducting water.

Periodic Facility Review Part 12D in the Code of Federal Regulations contains the regulations governing the periodic inspection of FERC-licensed dam projects by an independent consultant.

pH A measure of acidity and alkalinity of a substance, measured on a scale from 1 to 14. A value of 7 represents neutrality. Lower numbers indicate increasing acidity (the lower the number, the more acidic it is) and higher numbers increasing alkalinity (the higher the number, the more alkaline the substance is). Water has a pH of 7.

pheophytin *a* A primary degradation product of chlorophyll *a*, and its relative concentration is useful for estimating the general physiological state of phytoplankton populations.

phytoplankton Minute plants, such as algae, that live suspended in bodies of water and drift with the current.

place of use Water rights most often have a place of use. The place of use may be defined in a court decree or adjudication and shown on an associated map. In most court decrees, the place of the use for a water right is "forever", unless another case comes up to change that place.

potential failure mode analysis (PFMA) PFMA is common among any dam safety organization, and as the name implies, is a focused analysis of the of the targeted dam to potentially develop a catastrophic failure event based on structural conditions, the age of the dam's infrastructure, seismic events, major flooding events, operational protocols (think of human error), and surveillance approach. The goal of a PFMA is to wargame how this dam can fail, identify those failure modes and what would trigger them, and then establish a surveillance and monitoring program that would recognize an identified (as found in the PFMA) catastrophic triggering event in its early stages to prevent it.

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.

preliminary application document One of the documents required by the Federal Energy Regulatory Commission to file an original, new, or subsequent hydropower license application using the Traditional Licensing Process. The preliminary application document is filed during the first stage of the three-stage process.

proposal solicitation package As part of the formal solicitation for grant applications, a proposal solicitation package 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.

pumping-generating plant A plant that can either pump water or generate electricity.

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.

radiotelemetry 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.

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 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.

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.)

reservoir A large natural or artificial lake used as a source of water supply.

riparian 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 zones provide important fish and wildlife habitat.

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."

rotary screw trap A tool that is commonly used to assess changes in the abundance or production of juvenile Chinook salmon. These traps are also being used in some locations to assess the success of restoration activities. Rotary screw traps consist of a funnel-shaped cone that is screened with 3-millimeter (mm) diameter perforated plate. The trap cone is suspended above the water between two aluminum pontoons. Baffles in the trap cone cause the trap cone to rotate as water flows past the trap. As the trap cone rotates, fish that are moving downstream past the trap are guided into a livebox that is attached to the rear of the trap cone.

rubber dam A water controlling structure that can be inflated by air or water. When the bladder is deflated, impounded water is released and the bladder becomes virtually flat.

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 Consisting of or containing salt. Saline water (more commonly known as salt water) is water that contains a high concentration of dissolved salts (mainly sodium chloride).

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.

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.

scour Erosion occurring over a region of limited extent due to local flow conditions, such as may be caused by the presence of hydraulic structures. Scour is the result of the erosive action of flowing water excavating and carrying away material from the bed and banks of streams. Caused by swiftly moving water, scour can scoop out scour holes, compromising the integrity of a structure.

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.

siemens The derived unit of electric conductance, electric susceptance, and electric admittance in the International System of Units (SI). It is named after the German inventor and industrialist Ernst Werner von Siemens, and was previously called the millimho. One siemens is equal to 1,000 millisiemens or 1,000,000 microsiemens.

slough A wetland, usually a swamp or shallow lake, often a backwater to a larger body of water. Water tends to be stagnant or may flow slowly on a seasonal basis. Along the West Coast, sloughs are often named for the quiet, backwater parts of bays and therefore, they are part of the estuary, where freshwater flows from creeks and runoff from land mix with salty ocean water transported by the tides.

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.

sonde Any of various devices for testing physical conditions (as at high altitudes, below the earth's surface, or inside the body). Sondes are ideal for profiling and monitoring water conditions in industrial and wastewater effluents, lakes, rivers, wetlands, estuaries, coastal waters, and the open ocean. Torpedo-shaped in appearance, sondes may have multiple sensors that record a range of water quality data.

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.

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.

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).

streamflow The rate of water flow past a specified point in a channel.

subsidence See land subsidence.

sulfate A salt produced by combining sulfuric acid with other substances. Sulfates can be found in almost all natural water. The origin of most sulfate compounds is the oxidation of sulfite ores, the presence of shales, or the industrial wastes. Sulfate is one of the major dissolved components of rain. Three types of treatment systems will remove sulfate from drinking water: reverse osmosis, distillation, or ion exchange.

surface storage Surface storage uses reservoirs to collect water for later release and use.

Sustainable Groundwater Management Act A three-bill legislative package, composed of AB 1739 (Dickinson), SB 1168 (Pavley), and SB 1319 (Pavley), collectively known as the Sustainable Groundwater Management Act (SGMA), which was passed in 2014.

T

Tablel A amount Refers to a table in the water supply contracts that sets forth the annual amount of project water that an individual contractor may request under their contract. Table A amounts are used by DWR for allocating State Water Project supplies and costs among the contractors.

take (federal Endangered Species Act) To harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct; may include significant habitat modification or degradation if it kills or injures wildlife by significantly impairing essential behavioral patterns including breeding, feeding, or sheltering.

taxon (1) A scientifically classified group or entity: a taxonomic unit (such as a genus or order) of any rank; (2) the name applied to a taxonomic group in a formal system of nomenclature

telemetry The process of recording and transmitting the readings of an instrument. Fish radio telemetry involves tracking the movement of fish using surgically-implanted radio transmitters.

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.

total Kjeldahl nitrogen (TKN) The U.S. EPA-approved parameter used to measure organic nitrogen and ammonia. The TKN content of influent municipal wastewater is typically between 35 and 60 mg/L. The original TKN method was developed by the Danish chemist Johan Kjeldahl in 1883.

total phosphorous An essential nutrient for plants and animals. It is naturally limited in most fresh water systems because it is not as abundant as carbon and nitrogen; introducing a small amount of additional phosphorus into a waterway can have adverse effects. Sources of phosphorus include soil and rocks, wastewater treatment.

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.

trace metals The metals subset of trace elements; that is, metals normally present in small but measurable amounts in animal and plant cells and tissues and that are a necessary part of nutrition and physiology. Many biometals are trace metals. Ingestion of, or exposure to, excessive quantities can be toxic.

transmission owner tariff (TOT) Describes the terms under which a utility provides open access to its transmission system to wholesale customers seeking to: (1) interconnect generation facilities to the utility's transmission system to deliver energy and capacity services to the California Independent System Operator (CAISO) controlled grid; (2) interconnect wholesale load to SCE's transmission system; or (3) interconnect new transmission facilities to the utility's transmission system. A utility's TOT also sets revenue requirements and applicable rates and charges for transmission access over the CAISO controlled grid and set the terms and conditions for transmission expansion. A utility's TOT is not applicable for customers seeking service under that utility's retail rates, or interconnection of power projects to the

utility's distribution system, or for any other purpose not authorized by the Federal Energy Regulatory Commission.

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.

trihalomethanes Any of various derivatives of methane (such as chloroform) that have three halogen atoms per molecule and are formed especially during the chlorination of drinking 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.

2-methylisoborneol (MIB) MIB and geosmin together account for the majority of biologically-caused taste and odor outbreaks worldwide. MIB has a distinct earthy or musty odor, which most people can easily smell. The odor detection threshold of MIB is very low, ranging from 0.002 to 0.02 micrograms per liter in water. MIB is produced by various blue-green algae (cyanobacteria) and filamentous bacteria in the class Actinomyces, and also some other prokaryotes and eukaryotes.

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.

UV254 A water quality test parameter that provides a measurement of the amount of light absorbed by organic compounds. The measurement technique works by shining ultraviolet (UV) light at 254 nanometers through a quartz cell that contains a representative water sample.

V

veliger The free-floating larval stage of mussels.

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 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 control plan (WQCP) Designates beneficial uses and water quality objectives for waters of the State, including surface waters and groundwater. It also includes programs of implementation to achieve water quality objectives.

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 Right Decision 1641 (D-1641) Adopted by the State Water Board in 1999, implements the objectives of the Bay-Delta Plan by placing conditions on water right permits and licenses for the SWP and CVP that require the projects to meet certain objectives in the Bay-Delta Plan.

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. (3) Flood management weirs are lowered sections of levees that allow flood flows in excess of downstream channel capacity to escape into a bypass channel or basin.

wetlands Lands including swamps, marshes, bogs, and similar areas such as wet meadows, river overflows, mud flats, and natural ponds. An area characterized by periodic inundation or saturation, certain types of soils, and vegetation adapted for life in saturated soil conditions.

Wild and Scenic River systems State and federally designated river systems under the 1968 national Wild and Scenic Rivers Act and the 1972 California Wild and Scenic Rivers Act. Seventeen rivers in California, including many forks and tributaries, are designated wild, scenic, or recreational.

wheel As applied to water and power, to provide the use of one agency's conveyance facilities for the purpose of transporting another agency's supply.

X

X2 Delta outflow interaction with tides determines the location of the X2 isohaline salinity gradient. X2 is the location in the Bay-Delta where the tidally averaged bottom salinity is 2 parts per thousand. It is expressed as the distance in kilometers from the Golden Gate Bridge. X2 is used as a primary indicator in managing Delta outflow.

Z

zooplankton Small aquatic animals that are suspended or swimming in water.

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Appendix B

Data and Computations

Used to Determine

2019 Water Charges

Appendix B, Data and Computations Used to Determine 2019 Water Charges, was previously printed and distributed under an August 2018 cover letter from Pedro Villalobos, 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 2018. However, Table B-7 was not published in the August 2018 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-82.

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Data and Computations
Used to Determine 2019 Water Charges

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State Water Project Water Contractors

The State Water Project water 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 Gorgonio Pass Water Agency	San Gorgonio
San Luis Obispo County Flood Control and Water Conservation District	San Luis Obispo
Santa Barbara County Flood Control and Water Conservation District	Santa Barbara
Santa Clara Valley Water District	Santa Clara
Solano County Water Agency	Solano
Tulare Lake Basin Water Storage District	Tulare
Ventura County Watershed Protection District	Ventura

Appendix B
Data and Computations
Used to Determine 2019 Water Charges

The State of California, acting by and through the Department of Water Resources (DWR) annually furnishes Statements of Charges to the 29 State Water Project (SWP or Project) water 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 SWP water contractors during calendar year 2019. The information is based on established data about the SWP, both known and projected, as of June 2018; 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 contractors include the costs of facilities for the conservation and development of a water supply and the conveyance of such supply to SWP service areas. These facilities are classified as "Project Conservation Facilities" and "Project Transportation Facilities" in the *Standard Provisions for Water Supply Contract*. Names of the main facilities in each classification follow.

Project Conservation Facilities

- Frenchman Dam and Lake
- Grizzly Valley Dam and Lake Davis
- Antelope Dam and Lake
- Oroville Dam and Lake Oroville
- Oroville power facilities
- Delta facilities
- Suisun Marsh facilities
- Yolo Bypass
- A portion of the California Aqueduct from the Delta to Dos Amigos Pumping Plant
- 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 SWP water 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 SWP water contractor's turnout(s). Generally, the annual charge represents each SWP water contractor's proportionate share of the reimbursable capital costs and operating costs of the Project Transportation Facilities.

Each SWP water contractor's allocated share of those reimbursable capital costs is amortized for repayment to DWR, and certain variations are allowed in the amortization methods. SWP water contractors' shares of reimbursable operating costs are repaid in the year such costs are incurred by DWR.

The East Branch Enlargement Transportation Charge is paid by the seven Southern California SWP water 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 SWP water contractors pay an allocated share of the debt service on revenue bonds sold to finance the enlargement. Each SWP water 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 SWP water contractors in their respective service areas.

Transportation charges for the Tehachapi East Afterbay are repaid by those SWP water contractors using electrical power for delivery of their Table A water downstream of the Tehachapi East 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 DWR all reimbursable capital costs;
(2) conservation and transportation minimum OMP&R components, which will return to DWR all reimbursable operating costs that do not depend on or vary with quantities of water actually delivered to the SWP water contractors; and
(3) a transportation variable OMP&R component, which will return to DWR all reimbursable operating costs that

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 Wildlife 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 Wildlife 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 Wildlife agreement)

Minimum OMP&R Component

1. Direct O&M costs of Transportation Facilities
   a. Headquarters and field divisions (portion)
   b. Insurance and Federal Energy Regulatory Commission (FERC) costs (portion)
2. General O&M costs related to Transportation Facilities
   a. Contractor Accounting Office (portion)
   b. Financial and contract administration (portion)
   c. Power planning for SWP facilities (portion)
3. Power costs and credits related to pumping water to Southern California reservoirs for project operations (storage changes)
4. Power costs for pumping water to replenish losses from Transportation Facilities (downstream costs)
5. Other power costs
   a. Station service at Transportation Facility power and pumping plants
   b. Certain transmission service costs (transmission access charges, downstream costs, etc.)
6. Replacement deposits for SWP control centers (portion)
7. Off-Aqueduct Power Facility costs—bond service, bond cover costs (25 percent of bond service), bond reserves, transmission service costs, fuel costs, taxes, and O&M—less power sales allocated to Off-Aqueduct Power Facilities
8. Program costs (portion to offset annual fish losses resulting from pumping at Banks Pumping Plant (Department of Water Resources-Department of Fish and Wildlife 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 Wildlife agreement)

Note: Excludes costs recovered under the East Branch Enlargement Transportation Charge.

Figure B-3 Composition of Delta Water Charge and Transportation Charge

depend on and vary with quantities of water actually delivered to the SWP water contractors.

The formula for computing the Delta Water Rate, Article 22(f) of the *Standard Provisions for Water Supply Contract*, was designed to ensure that all adjustments for prior overpayments or underpayments of the Delta Water Charge are accounted for in a redetermination of the rate. Since the redetermined rate applies to all future allocations, such adjustments are amortized during the remainder of the project repayment period. This appendix includes a redetermination of the Delta Water Rate for 2019.

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 2018, included in those tables, are the redetermined amounts and do not equal the amounts actually paid by SWP water 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 SWP water 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 water contractor in its annual Statement of Charges.

These redeterminations exclude four charges associated with water service other than the Delta Water Charge and the Transportation Charge. The excluded charges (and the manner in which they are treated in this appendix) are outlined below.

(1) Advances of funds pursuant to Article 24(d) of the standard provisions for excess capacity constructed by DWR at the request of SWP water contractors.
(2) Advances of funds pursuant to Article 10(d) of the standard provisions for delivery structures (turnouts) constructed by DWR at the request of SWP water 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 SWP water 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 SWP water 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 non-SWP water contractor 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 SWP water 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 DWR 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 DWR 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 DWR on or before the fifteenth day of the month following actual water delivery.

Bases for Allocating Reimbursable Costs among SWP Water Contractors

This section describes procedures for allocating reimbursable costs of Project Transportation Facilities among SWP water 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 SWP water 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 SWP water contractors under planned conditions of full development.

The derivation of ratios that represent the proportionate maximum use of each aqueduct reach by the respective SWP water 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 SWP water contractors were last reported in Tables B-1 and B-2 of Bulletin 132-91. Under Article 53 of the Monterey Amendment, agricultural SWP water contractors may sell up to 130,000 acre-feet of aqueduct capacity to municipal and industrial SWP water 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 2019 and after reimbursable minimum OMP&R costs among SWP water contractors. Requested excess capacity is omitted when deriving ratios applicable to capital costs because the capital costs for the

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
2D	Junction, Foothill Pipeline Near Cone Camp Road to Citrus Pump Station
2E	Citrus Pump Station to Crafton Hills Pump Station
3A	Crafton Hills Pump Station to Crafton Hills Reservoir
3B	Crafton Hills Reservoir to Carter Street Valve Vault
3C	Carter Street Valve Vault to Garden Air Creek
3D	Yucaipa Connector Pipeline to Yucaipa Pipeline Tie-in
3E	Yucaipa Pipeline Tie-in to Carter Street Valve Vault
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

Table 1 Summary of Permanent Aqueduct Capacity Transfers

SWP Water Contractor		Capacity Transfer		
Seller	Buyer	Amount (acre-feet)	Effective Year	Transfer Description
Transfers under Monterey Amendment				
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
Subtotal under Article 53		*114,000*		
Transfers outside of Monterey Amendment				
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
Subtotal outside of Article 53		*159,022*		

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 a return to DWR 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 SWP water contractors in proportion

to the actual annual use of that reach by the respective SWP water contractors.

Table B-3 summarizes the total power costs, credits, and transmission costs for each aqueduct pumping and power recovery plant. Variable costs are as follows.

- 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 water 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 SWP water contractor. Projected deliveries for years 2018 through 2035 are based on SWP water contractors' requests for future water deliveries. The quantities included in Table B-5A also include non-project water delivered to SWP water 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 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, SWP water 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 SWP water contractor. The quantities also include amounts of non-project 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 SWP water 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 SWP water 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 SWP water 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 non-project 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 at the top 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 costs as of December 31, 2017; 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 SWP water 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 DWR in connection with each SWP water contractor's turnouts. Costs incurred by DWR for both State-constructed and SWP water contractor-constructed delivery structures are paid directly by the SWP water contractors for which the structures are built. DWR incurs design review and construction inspection costs in connection with SWP water 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 DWR for requested excess capacity;
- advances by SWP water contractors of funds for such costs; and
- credits for advances in excess of costs which were applied to respective SWP water contractors' installments of the capital cost component of the Transportation Charge in 1981.

Table 2 Project Purpose Cost Allocation Factors (percentages)[a]

PROJECT FACILITIES	Water Supply and Power Generation		All Other Purposes (Nonreimbursable)	
	Capital Costs	Minimum OMP&R Costs	Capital Costs	Minimum OMP&R Costs
Project Conservation Facilities				
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[b]	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
Transportation Facilities				
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[c]	78.0[d]
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)[e,f]	94.3 / 99.6	96.9 / 99.6	5.7 / 0.4	3.1 / 0.4
Aqueduct and Plants[e,f]	94.3 / 99.6	96.9 / 99.6	5.7 / 0.4	3.1 / 0.4
Pyramid Dam and Lake[e,f]	94.3 / 96.1	96.9 / 96.1	5.7 / 3.9	3.1 / 3.9
Castaic Dam and Lake[e,f]	94.3 / 91.1	96.9 / 91.1	5.7 / 8.9	3.1 / 8.9
Silverwood Dam and Lake[e,f]	94.3 / 85.3	96.9 / 85.3	5.7 / 14.7	3.1 / 14.7
Perris Dam and Lake[e,f]	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

[a] Percentages indicated apply to the majority of the facilities with minor exceptions.
[b] 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.
[c] Percentage indicated consists of 48.0 percent of costs allocated to recreation and 26.8 percent to flood control.
[d] Percentage indicated consists of 44.9 percent of costs allocated to recreation and 33.1 percent to flood control.
[e] Percentage indicated is used for 2012 and previous years.
[f] Percentage indicated is used for 2013 and forward.

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 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 DWR 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 DWR, with interest, through SWP water 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 DWR 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 SWP water 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 electric power transmission and station service costs up to 2004, and electric power transmission and station service costs for 2005 and after that do not vary with power usage allocable to aqueduct pumping and recovery plants;
(4) all costs for equipment, materials, and supplies;
(5) portions of the power and replacement costs of all pumping plants and power plants that are up-aqueduct from Devil Canyon Powerplant and Castaic Powerplant and that are allocable to the annual conveyance of water lost to evaporation and seepage from respective aqueduct reaches or placed into storage in respective reservoirs of the Project Transportation Facilities (after initial fill);
(6) credits, which offset those costs in (5) above, for deliveries drawn from reservoir storage; and
(7) projected operating costs (labor only) were not escalated for calendar years 2019 and 2020, and escalation of certain projected operating costs (labor and operating expense) were 1 percent per year for 2021–2035. Labor and operating expense escalation rates were originally set at 4.0 percent per year for 2019 through 2020, in the Bulletin 132-18 Criteria Memorandum; however, operating cost escalations were eliminated in the Statements of Charges.

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 SWP water 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 SWP water 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 SWP water 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 SWP water contractor is the basis for the Transportation Charge components.

Table B-14 summarizes each SWP water 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 and San Gorgonio Pass Water Agency.

Both Table B-14 and Table C of the six SWP water 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 SWP water 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 SWP water 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 and adding Municipal Water Quality Investigation

Table 3 Criteria for Amortizing Capital Costs of Transportation Facilities

Contractor	Year of Initial Payment[a]
Alameda County Flood Control and Water Conservation District, Zone 7	1963[b]
Alameda County Water District	1963
Antelope Valley-East Kern Water Agency	1963
Castaic Lake Water Agency	1964
City of Yuba City	[c]
Coachella Valley Water District	1964
County of Butte	[c]
County of Kings	1968
Crestline-Lake Arrowhead Water Agency	1964
Desert Water Agency	1963[d]
Dudley Ridge Water District	1968[e]
Empire West Side Irrigation District	1968[e]
Kern County Water Agency	
Agricultural Use	1968[e]
Municipal and Industrial Use	1968[e]
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 Bernardino Valley Municipal Water District	1963
San Gabriel Valley Municipal Water District	1963[d]
San Gorgonio Pass Water Agency	1963[d]
San Luis Obispo County Flood Control and Water Conservation District	1964[f]
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[e]
Ventura County Watershed Protection District	1964

[a] Allocated capital costs of transportation facilities amortized in equal annual installments unless otherwise noted.

[b] Principal payments on each annual capital cost prior to 1971 delayed until calendar year 1972, except payments for 1963.

[c] For City of Yuba City and County of Butte, payments for Delta Water Charge only.

[d] Payment deferred for 1963 and added to 1964 payment with accrued interest.

[e] For Dudley Ridge Water District, Empire West Side Irrigation District, Kern County Water Agency (agricultural use), Oak Flat Water District, and Tulare Lake Basin Water Storage District, according to Article 45 of the contracts for supply of agricultural water, capital costs of transportation facilities allocated to agricultural water supply are amortized by using an equivalent unit rate per acre-foot applied to the annual allocations (Table B-4) through the project repayment period.

[f] For San Luis Obispo and Santa Barbara, all principal and interest payments for costs of the Coastal Stub were deferred until 1976.

program costs to participating SWP water contractors.

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 SWP water 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 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 SWP water 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 water contractors in proportion to their maximum Table A amounts. As costs are incurred, related charges will be included in the SWP water contractors' annual Statements of Charges as part of the minimum. Between 2002 and 2010, the Monterey Amendment litigation costs recovered from SWP water contractors were $15.8 million.

Table B-16B summarizes annual Off-Aqueduct Power Facility charges allocated to each SWP 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.

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
Total	**3,997,767**

Any revenues collected and not needed during the year are refunded to the SWP water contractors in the next year.

Table 5 summarizes Off-Aqueduct Power Facility charges and credits related to deliveries for 2017. 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. Defeasance of Off-Aqueduct Power facilities bonds occurred in June 2016, so no debt service charges or bond cover are included. Additionally, Reid Gardner, Unit 4 Powerplant remediation costs are projected for 2018, 2019, and 2020 and then only minor operating costs are projected post-2020.

Annual Off-Aqueduct Power Facility charges are allocated among SWP water 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 SWP water 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

Table 5 Summary of 2017 Off-Aqueduct Power Facility Charges and Credits (in dollars)

Charges by Item	
Reid Gardner Powerplant	0
Reid Gardner Closure Costs	3,269,296
Bottle Rock Powerplant	108,572
South Geysers Powerplant	0
Subtotal	*3,377,868*
Credits by Item	
Power Sales	0
Net Total Charge	**3,337,868**

Table 6 Projected Charges for Off-Aqueduct Power Facilities (in dollars)

Year	Total Annual Cost	25 Percent Bond Cover
2018	3,610,000	-
2019	**6,700,000**	**-**
2020	10,700,000	-
2021	200,000	-
2022	200,000	-
2023	200,000	-
2024	200,000	-
2025	200,000	-
2026	200,000	-
2027	200,000	-
2028	200,000	-
2029	200,000	-
2030	200,000	-
2031	200,000	-
2032	200,000	-
2033	200,000	-
2034	200,000	-
2035	200,000	-

each aqueduct pumping plant and power plant for each year of the project. The following provisions are for calculating the variable OMP&R component of the Transportation Charge.

- An annual charge per acre-foot of projected water deliveries to all SWP water 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 DWR.
- The total annual variable OMP&R component for any SWP water 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 SWP water contractor.

Table 7 Kilowatt-Hour per Acre-Foot Factors for Allocating Off-Aqueduct Power Facility Costs

	kWh per acre-foot[a]	
Pumping Plant	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

[a] Includes transmission losses.

The data summarized in Table B-17 are derived by dividing the costs shown in Table B-3 by the water quantities shown in Table B-6. However, certain costs included in Table B-3 for extra peaking service, which would otherwise constitute variable OMP&R costs, are assigned directly to SWP water 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 SWP water 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 SWP water 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 SWP water 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 SWP water 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 2019 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 SWP water contractors who have executed the Monterey Amendment. Included in Table B-20A is the Delta Water Rate for the two SWP water 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 2019 Delta Water Rate from Table B-20A.

Table B-21 summarizes the annual Delta Water Charge for each SWP water 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 SWP water contractor, as shown in Table B-4. The projected Delta Water Charges through 2035 include the assumption of escalation of projected operating costs at 1.0 percent per year for 2021–2035.

Water System Revenue Bond Surcharge

Table B-22 summarizes the Water System Revenue Bond (WSRB) Surcharge to the capital cost component of the Delta Water and Transportation charges for each SWP water contractor. The surcharge shown in Table B-22 is the difference between the capital cost component and the financing costs of WSRB Series B through Series AY. This surcharge is levied according to an amendment to the water supply contracts, which was signed by all of the SWP water contractors.

Total Water Charges

Table B-23 summarizes the total annual charges to each SWP water 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 SWP water 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 SWP water 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

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 and Badger Hill	Buena Vista	Teerink	Chrisman	Edmonston	Pearblossom	Oso	Total
1972	0	0	0	0	0	10,579	24,700	0	0	0	0	0	0	35,279
1973	0	0	0	0	0	0	6,016	0	0	0	0	0	0	6,016
1974	0	0	0	0	0	0	7,140	0	0	0	0	0	0	7,140
1975	0	0	0	0	0	494	6,397	0	0	0	0	0	0	6,891
1976	0	0	0	0	0	0	1,981	0	0	0	0	0	0	1,981
1977	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1978	0	0	0	0	0	45,145	3,680	0	0	0	0	0	0	48,825
1979	0	0	0	0	0	0	3,306	0	0	0	0	0	0	3,306
1980	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1981	0	0	0	0	0	12,126	0	0	0	0	0	0	0	12,126
1982	0	0	0	0	0	89,339	0	0	0	0	0	0	0	89,339
1983	0	0	0	35	7,594	3,534	152	0	0	0	0	0	0	11,315
1984	0	0	0	2,096	84,396	38,607	7,203	11,173	3,823	3,593	0	0	0	150,891
1985	0	0	0	1,480	19,612	8,841	763	4,488	4,412	8,929	28,353	0	0	76,878
1986	0	0	0	0	1,864	863	0	291	354	766	2,683	0	0	6,821
1987	0	0	0	604	17,129	7,838	835	2,295	1,806	3,460	11,058	0	0	45,025
1988	639	39	287	894	43,475	20,082	2,213	5,792	4,367	8,272	25,886	0	0	111,946
1989	2,491	566	1,483	70	40,251	18,642	1,935	3,401	1,531	2,058	3,793	0	0	76,221
1990	45	0	18	343	19,524	9,044	0	150	145	314	643	0	0	30,226
1991	903	0	281	0	21	8	0	15	17	39	139	41	0	1,464
1992	208	117	203	0	7,070	2,502	0	182	190	435	0	0	0	10,907
1993	0	681	889	4,483	123,080	54,741	0	8,898	5,458	10,900	35,068	11,139	0	255,337
1994	0	366	393	679	6,566	2,795	454	1,083	155	357	1,121	0	132	14,101
1995	0	0	0	1,717	24,464	9,422	27	1,865	3,475	782	1,104	400	0	43,256
1996	4	0	1	1,983	10,031	4,976	0	391	432	1,015	3,404	1,160	0	23,397
1997	0	1,780	2,152	3,107	337,357	165,774	1,753	34,604	12,296	15,910	21,028	0	0	595,761
1998	0	0	0	20,966	235,693	106,251	2,354	697	848	1,836	6,426	0	0	375,071
1999	0	0	0	0	63,196	26,235	0	3,394	4,136	8,959	31,350	7,740	0	145,010
2000–2017	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	**4,290**	**3,549**	**5,707**	**38,457**	**1,041,323**	**637,838**	**70,909**	**78,719**	**43,445**	**67,625**	**172,056**	**20,480**	**132**	**2,184,530**

Table 9 Extra Peaking Charges for Additional Power, by Contractor (in dollars)

Year	Napa	Solano	Alameda-Zone 7	Alameda County	Santa Clara	Dudley Ridge	Empire	Kern	Kings	Oak Flat	Tulare	AVEK	Castaic Lake	Coachella	Desert	Littlerock	Palmdale	San Gabriel	Total
1972	0	0	0	0	0	0	0	35,269	0	0	10	0	0	0	0	0	0	0	35,279
1973	0	0	0	0	0	0	0	6,016	0	0	0	0	0	0	0	0	0	0	6,016
1974	0	0	0	0	0	0	0	7,140	0	0	0	0	0	0	0	0	0	0	7,140
1975	0	0	0	0	0	0	0	6,891	0	0	0	0	0	0	0	0	0	0	6,891
1976	0	0	0	0	0	0	0	1,981	0	0	0	0	0	0	0	0	0	0	1,981
1977	0	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0	0	0
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
2000–2017	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	**5,893**	**7,653**	**34,577**	**13,644**	**3,521**	**55,250**	**5,974**	**1,620,176**	**3,692**	**2,017**	**102,158**	**123,049**	**9,858**	**24,983**	**41,156**	**2,439**	**74,749**	**53,741**	**2,184,530**

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 water deliveries are less than the amounts shown in Table B-4.

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 SWP water contractor's turnout) and for wheeling service to entities other than the SWP water contractors.

The cumulative unit conveyance costs indicated for reaches in Table B-25 do not necessarily equal the equivalent unit Transportation Charges to SWP water 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 SWP water contractors; however, the unit costs included in Table B-25 reflect the effect of melding the respective buildups and allocation criteria of all SWP water 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 water 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 SWP water contractors. Currently, this table includes only minimum OMP&R costs attributable to the East Branch Enlargement. In accordance with Article 49(e)(1), the SWP water 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 SWP water contractors.

Table B-28 shows each participating SWP water 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 SWP water contractor. This component consists of each SWP water

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 and Second Afterbay
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

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 SWP water 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 Charge for each participating SWP water 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 SWP water contractors—San Bernardino Valley Municipal Water District and San Gorgonio Pass Water Agency—in accordance with their amended water supply contracts. The factors for distributing minimum costs are shown in *Table 11*. *Table 12* shows the capital factors and the corresponding debt service, including the 25 percent bond cover, for each of the phases in 2019.

South Bay Aqueduct Enlargement Charges

The South Bay Aqueduct Enlargement construction costs are being recovered in full by Alameda County Flood Control and Water Conservation District, Zone 7. Capital charges related to a portion of the enlargement construction costs benefitting off-peak pumping are initially paid by Alameda-Zone 7 to meet the bond resolution and later recovered from SWP water contractors with a transportation variable charge. The off-peak pumping charges originally paid by Alameda-Zone 7 are then returned to Alameda-Zone 7 as a credit in the subsequent year. Future Bulletin 132 editions will include the finalized minimum and capital cost distribution factors and the corresponding debt service of the South Bay Aqueduct Enlargement project once the pending contract amendment is final. The 2018 Statements of Charges (Bulletin 132-17) began to recover and redistribute the costs of these enlarged facilities using agreed upon distribution factors back to 2015.

Short-term Agreements

DWR and the SWP water contractors execute short-term agreements that affect the SWP water contractors' charges.

Municipal Water Quality Investigations

DWR executed a 5-year agreement in 1997 with 16 municipal and industrial SWP water contractors, who agreed to pay for allocated shares of DWR's Municipal Water Quality Investigations program costs. Additional amendments were executed in 2002, 2006, 2008, 2010, 2014, and 2017 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 SWP water 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

SWP water contractors have agreed to participate in several Delta improvement

Table 11 Factors for Distributing Minimum OMP&R Costs of the East Branch Extension Facilities

For Calendar Year 2012 and Previous Years

Reach Number	Reach Description	San Bernardino	San Gorgonio	Total
1	Devil Canyon Powerplant to Junction, Foothill Pipeline near Cone Camp Road	0.557330	0.442670	1.000000
2A	Junction, Foothill Pipeline near Cone Camp Road to Greenspot Pump Station	0.557330	0.442670	1.000000
2B	Greenspot Pump Station to Morton Canyon Valve Vault	0.777778	0.222222	1.000000
2C	Morton Canyon Valve Vault to Crafton Hills Pump Station	0.777778	0.222222	1.000000
2D	Junction, Foothill Pipeline Near Cone Camp Road to Citrus Pump Station	0.777778	0.222222	1.000000
3A	Crafton Hills Pump Station to Crafton Hills Reservoir	0.557330	0.442670	1.000000
3B	Crafton Hills Reservoir to Garden Air Creekt	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

For Calendar Year 2013 and Forward

Reach Number	Reach Description	San Bernardino	San Gorgonio	Total
1	Devil Canyon Powerplant to Junction, Foothill Pipeline near Cone Camp Road	0.81674544	0.18325456	1.00000000
2A	Junction, Foothill Pipeline near Cone Camp Road to Greenspot Pump Station	0.85193106	0.14806894	1.00000000
2B	Greenspot Pump Station to Morton Canyon Valve Vault	0.77144744	0.22855256	1.00000000
2C	Morton Canyon Valve Vault to Crafton Hills Pump Station	0.77144744	0.22855256	1.00000000
2D	Junction, Foothill Pipeline Near Cone Camp Road to Citrus Pump Station	0.76227575	0.23772425	1.00000000
2E[a]	Citrus Pump Station to Crafton Hills Pump Station	0.73896000	0.26104000	1.00000000
3A	Crafton Hills Pump Station to Crafton Hills Reservoir	0.60766673	0.39233327	1.00000000
3B	Crafton Hills Reservoir to Carter Street Valve Vault	0.58333333	0.41666667	1.00000000
3C[a]	Carter Street Vault to Garden Air Creek	0.46994300	0.53005700	1.00000000
3D[a]	Yucaipa Connector Pipeline to Yucaipa Pipeline Tie-In	0.73338500	0.26661500	1.00000000
3E[a]	Yacaipa Pipeline Tie-In to Carter Street Vault	0.73338500	0.26661500	1.00000000
4A	Garden Air Creek to Cherry Valley Pump Station		1.00000000	1.00000000
4B	Cherry Valley Pump Station to Terminus at Noble Creek		1.00000000	1.00000000

[a] Reach designation in Phase II (calendar year 2013 and forward) have been modified to reflect new repayment reaches.

programs that started in 2007 and that will possibly extend into the future.

The first agreement pertains to the Bay Delta Conservation Plan (BDCP) which was 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 SWP

Table 12 East Branch Extension Facilities Debt Service for 2019

SWP Water Contractor	Share of Participation (percent)	Total Debt Service Charge (in dollars)
Phase 1 Original		
San Bernardino	45.8417	**4,521,668**
San Gorgonio	54.1583	**5,341,989**
Subtotal	*100.0000*	***9,863,657***
Phase 1 Improvements		
San Bernardino	63.3410	**3,689,972**
San Gorgonio	36.6590	**2,135,594**
Subtotal	*100.0000*	***5,825,566***
Phase 2		
San Bernardino	64.4210	**12,828,741**
San Gorgonio	35.5790	**7,085,170**
Subtotal	*100.0000*	***19,913,911***
Total		**35,603,134**

water 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 SWP water 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 water 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 water 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 water 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 SWP water contractors as a separate line item in the Statements of Charges.

During 2013, SWP water 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.

During 2015 and 2016, SWP water contractors requested DWR enter into agreements for San Joaquin River flow release purchases with Oakdale Irrigation District and South San Joaquin Irrigation District. The 2015 purchases of $5.75 million and the 2016 purchases of $13.75 million ($2 million invoiced in 2017) were included in the 2017 and 2018 Statements of Charges. Additionally, SWP water contractors agreed to purchase up to $12.5 million of 2018 Oakdale Irrigation District flow releases. This purchase is being reflected in each SWP water contractor's 2019 charges with project interest.

Tables B-1 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-1 Factors for Distributing Reach Capital Costs Among Contractors[a]

Sheet 1 of 2

Reach No.	Reach Description	Napa	Solano	Alameda-Zone 7	Alameda County	Santa Clara	Future Contractor South Bay	Total
	NORTH BAY AQUEDUCT							
1	Barker Slough through Fairfield/Vacaville Turnout	0.29667896	0.70332104					1.00000000
2	Fairfield/Vacaville Turnout to Cordelia Forebay	0.38414552	0.61585448					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			0.22599612	0.20663021	0.49237700	0.07499667	1.00000000
2	Altamont Turnout through Patterson Reservoir			0.22599658	0.20663059	0.49237783	0.07499500	1.00000000
4	Patterson Reservoir to Del Valle Junction			0.19504795	0.21450017	0.51113249	0.07931939	1.00000000
5	Del Valle Junction through Lake del Valle			0.14436367	0.12972254	0.33715573	0.38875806	1.00000000
6	Del Valle Junction through South Livermore Turnout			0.14599918	0.21144710	0.50574745	0.13680627	1.00000000
7	South Livermore Turnout through Vallecitos Turnout				0.25176680	0.60218448	0.14604872	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			0.00954737	0.00872917	0.02080118	0.00342507	N/A

Reach No.	Reach Description	San Luis Obispo	Santa Barbara	AVEK	Castaic Lake	Coachella	Crestline	Desert
	CALIFORNIA AQUEDUCT							
1	Delta through Bethany Reservoir	0.00533010	0.00983337	0.02939084	0.01285827	0.00528315	0.00133612	0.00871300
2A	Bethany Reservoir to Orestimba Creek	0.00557213	0.01027988	0.03072531	0.01343201	0.00552068	0.00139620	0.00910474
2B	Orestimba Creek to O'Neill Forebay	0.00557824	0.01029119	0.03075915	0.01345351	0.00552831	0.00139814	0.00911733
3	O'Neill Forebay to Dos Amigos Pumping Plant	0.00557719	0.01028923	0.03075332	0.01345294	0.00552772	0.00139798	0.00911637
4	Dos Amigos Pumping Plant to Panoche Creek	0.00557607	0.01028717	0.03074719	0.01345233	0.00552710	0.00139784	0.00911536
5	Panoche Creek to Five Points	0.00557467	0.01028462	0.03073954	0.01345157	0.00552633	0.00139763	0.00911409
6	Five Points to Arroyo Pasajero	0.00557257	0.01028074	0.03072799	0.01345042	0.00552517	0.00139733	0.00911216
7	Arroyo Pasajero to Kettleman City	0.00557189	0.01027949	0.03072428	0.01345006	0.00552480	0.00139723	0.00911154
8C	Kettleman City through Milham Avenue	0.00557103	0.01027792	0.03071961	0.01344960	0.00552432	0.00139712	0.00911076
8D	Milham Avenue through Avenal Gap	0.00568611	0.01049020	0.03135418	0.01373353	0.00563986	0.00142632	0.00930130
9	Avenal Gap through Twisselman Road			0.03426625	0.01356094	0.00616886	0.00156011	0.01017373
10A	Twisselman Road through Lost Hills			0.03481391	0.01377767	0.00626946	0.00158556	0.01033963
11B	Lost Hills to 7th Standard Road			0.03835043	0.01517717	0.00691699	0.00174933	0.01140749
12D	7th Standard Road through Elk Hills Road			0.04031661	0.01595523	0.00727790	0.00184059	0.01200265
12E	Elk Hills Road through Tupman Road			0.04037074	0.01597665	0.00728878	0.00184332	0.01202059
13B	Tupman Road to Buena Vista Pumping Plant			0.04379882	0.01733322	0.00791595	0.00200194	0.01305492
14A	Buena Vista Pumping Plant through Santiago Creek			0.04599268	0.01820137	0.00831952	0.00210399	0.01372049
14B	Santiago Creek through Old River Road			0.04682530	0.01853084	0.00847388	0.00214303	0.01397505
14C	Old River Road to Wheeler Ridge Pumping Plant			0.04825217	0.01909545	0.00873768	0.00220973	0.01441013
15A	Wheeler Ridge Pumping Plant to Chrisman Pumping Plant			0.04905609	0.01941356	0.00888679	0.00224744	0.01465600
16A	Chrisman Pumping Plant to Edmonston Pumping Plant			0.05089794	0.02014241	0.00922722	0.00233351	0.01521742
17E	Edmonston Pumping Plant to Porter Tunnel			0.05329388	0.02109050	0.00967107	0.00244575	0.01594937
17F	Porter Tunnel to Junction, West Branch, California Aqueduct			0.05340725	0.02113537	0.00969176	0.00245098	0.01598349
18A	Junction, West Branch, California Aqueduct through Alamo Powerplant			0.13238112		0.02399391	0.00606795	0.03957043
19	Alamo Powerplant to Fairmont			0.13237766		0.02399451	0.00606811	0.03957141
19C	Buttes Junction through Buttes Reservoir			1.00000000				
20A	Fairmont through 70th Street West			0.06847931		0.02576425	0.00651573	0.04249001
20B	70th Street West to Palmdale			0.02276024		0.02702917	0.00683555	0.04457607
21	Palmdale to Littlerock Creek			0.02318952		0.02754716	0.00696651	0.04543034
22A	Littlerock Creek to Pearblossom Pumping Plant			0.01181870		0.02794143	0.00706621	0.04608043
22B	Pearblossom Pumping Plant to West Fork Mojave River					0.02827552	0.00715074	0.04663153
23	West Fork Mojave River to Silverwood Lake					0.00324449	0.00818122	0.00535117
24	Cedar Springs Dam and Silverwood Lake					0.01024605	0.01251569	0.01690478
25	Silverwood Lake to South Portal San Bernardino Tunnel							
26A	South Portal, San Bernardino Tunnel through Devil Canyon Powerplant							
28G	Devil Canyon Powerplant to Barton Road							
28H	Barton Road to Lake Perris							
28J	Perris Dam and Lake Perris							
29A	Junction, West Branch, California Aqueduct through Oso Pumping Plant				0.03544337			
29F	Oso Pumping Plant through Quail Embankment				0.03544339			
29G	Quail Embankment through Warne Powerplant				0.03544339			
29H	Pyramid Dam and Lake				0.02817144			
29J	Pyramid Lake through Castaic Powerplant				0.03544338			
30	Castaic Dam and Lake				0.02927284			
31A	Avenal Gap to Devil's Den Pumping Plant	0.10560301	0.19482503		0.07364766			
33A	Devil's Den Pumping Plant through Tank 1	0.10101221	0.89898779					
33B	Tank 1 through Chorro Valley Turnout	0.09912818	0.90087182					
34	Chorro Valley Turnout through Lopez Turnout	0.05479573	0.94520427					
35	Lopez Turnout through Guadalupe Turnout		1.00000000					

[a] 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[a]

Sheet 2 of 2

Reach No.	Dudley Ridge	Empire	Future Contractor San Joaquin Valley	Kern Municipal and Industrial	Kern Agricultural	Kings	Oak Flat	Tulare
	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.	Littlerock	Mojave	Palmdale	San Bernardino	San Gabriel	San Gorgonio	Metropolitan	Ventura	California Aqueduct Total
	CALIFORNIA AQUEDUCT								
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

[a] 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[a]

Sheet 1 of 2

Reach No.	Reach Description	Napa	Solano	Alameda-Zone 7	Alameda County	Santa Clara	Future South Bay Contractor	Total
	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	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					

[a] Proportionate use factors apply to 2019, and reflect permanent capacity water transfers that have been signed as of February 1, 2018.

TABLE B-2 Factors for Distributing Reach Minimum OMP&R Costs Among Contractors[a]

Sheet 2 of 2

Reach No.	Napa	Solano	Alameda-Zone 7	Dudley Ridge	Empire	Future Contractor San Joaquin Valley	Kern Municipal and Industrial	Kern Agricultural	Kings	Oak Flat	Tulare
	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.	Littlerock	Mojave	Palmdale	San Bernardino	San Gabriel	San Gorgonio	Metroplitan	Ventura	California Aqueduct Total
	CALIFORNIA AQUEDUCT								
1	0.00049038	0.02116470	0.00458381	0.02355980	0.00648455	0.00397230	0.41532271	0.00427768	1.00000000
2A	0.00051367	0.02214484	0.00480091	0.02466751	0.00679050	0.00415906	0.43501287	0.00448079	1.00000000
2B	0.00051423	0.02218483	0.00480654	0.02470151	0.00679919	0.00416478	0.43550968	0.00448571	1.00000000
3	0.00051414	0.02218522	0.00480573	0.02469885	0.00679827	0.00416433	0.43543260	0.00448486	1.00000000
4	0.00051405	0.02218564	0.00480489	0.02469606	0.00679730	0.00416387	0.43535156	0.00448397	1.00000000
5	0.00051393	0.02218616	0.00480382	0.02469256	0.00679607	0.00416328	0.43525035	0.00448285	1.00000000
6	0.00051372	0.02218693	0.00480221	0.02468729	0.00679422	0.00416240	0.43509723	0.00448115	1.00000000
7	0.00051366	0.02218719	0.00480171	0.02468559	0.00679362	0.00416212	0.43504813	0.00448061	1.00000000
8C	0.00050851	0.02192962	0.00475278	0.02442260	0.00672277	0.00411777	0.44211780	0.00443571	1.00000000
8D	0.00051885	0.02238875	0.00484976	0.02492516	0.00686055	0.00420251	0.45117880	0.00452595	1.00000000
9	0.00055796	0.02061192	0.00521674	0.02683029	0.00738240	0.00452372	0.48549902	0.00486719	1.00000000
10A	0.00056659	0.02092935	0.00529783	0.02725335	0.00749802	0.00459505	0.49310270	0.00494246	1.00000000
11B	0.00062024	0.02290463	0.00580164	0.02987521	0.00821533	0.00503710	0.54027985	0.00541051	1.00000000
12D	0.00064998	0.02399884	0.00599767	0.03133251	0.00861365	0.00528280	0.56647688	0.00566994	1.00000000
12E	0.00065079	0.02402828	0.00600523	0.03137638	0.00862529	0.00529020	0.56724183	0.00567708	1.00000000
13B	0.00070354	0.02597118	0.00649222	0.03395142	0.00933012	0.00572435	0.61359604	0.00613732	1.00000000
14A	0.00073704	0.02720257	0.00680126	0.03559402	0.00977890	0.00600130	0.64311092	0.00642936	1.00000000
14B	0.00074743	0.02758281	0.00689726	0.03611670	0.00992049	0.00608943	0.65242374	0.00652003	1.00000000
14C	0.00076634	0.02827615	0.00707171	0.03705347	0.01017549	0.00624735	0.66919487	0.00668485	1.00000000
15A	0.00077741	0.02868221	0.00717384	0.03760115	0.01032464	0.00633968	0.67900489	0.00678133	1.00000000
16A	0.00080298	0.02962205	0.00740997	0.03886148	0.01066844	0.00655218	0.70161679	0.00700445	1.00000000
17E	0.00083480	0.03079028	0.00770356	0.04043105	0.01109636	0.00681681	0.72976182	0.00728186	1.00000000
17F	0.00083646	0.03085132	0.00771884	0.04051162	0.01111844	0.00683040	0.73121394	0.00729630	1.00000000
18A	0.00220155	0.04929713	0.01652427	0.10664131	0.02926634	0.01798005	0.46986948		1.00000000
19	0.00220151	0.04929585	0.01652388	0.10664396	0.02926656	0.01798044	0.46987231		1.00000000
19C									1.00000000
20A	0.00237787	0.05324421	0.01784728	0.11521174	0.03161525	0.01942494	0.50757898		1.00000000
20B	0.00249455	0.05585607	0.01872278	0.12086783	0.03316690	0.02037859	0.53249023		1.00000000
21	0.00254183	0.05691567		0.12318381	0.03380017	0.02076901	0.54265567		1.00000000
22A		0.05772584		0.12494639	0.03428290	0.02106619	0.55040548		1.00000000
22B		0.05830722		0.12620561	0.03462835	0.02127845	0.55595113		1.00000000
23				0.14467451	0.03969010	0.02439237	0.63721302		1.00000000
24				0.22243002	0.04339445	0.02843498	0.64760747		1.00000000
25				0.11825184	0.03722720	0.01993915	0.71389685		1.00000000
26A				0.14947726	0.03997501	0.02520426	0.64898177		1.00000000
28G				0.05126136			0.60057777		1.00000000
28H							0.63302763		1.00000000
28J							0.63302828		1.00000000
29A							0.92702291	0.01274255	1.00000000
29F							0.92702302	0.01274253	1.00000000
29G							0.92979606	0.01278067	1.00000000
29H							0.95753173	0.00897255	1.00000000
29J							0.92980918	0.01278086	1.00000000
30							0.95895422	0.00855971	1.00000000
31A		0.09301782							1.00000000
33A									1.00000000
33B									1.00000000
34									1.00000000
35									1.00000000

[a] Proportionate use factors apply to 2019 and reflect permanent capacity water transfers that have been signed as of February 1, 2018.

TABLE B-3 Power Costs and Credits, Transmission Costs and Annual Replacement Deposits for Each Aqueduct Pumping and Power Recovery Plant[a] (in dollars)

Sheet 1 of 3

	NORTH BAY AQUEDUCT			SOUTH BAY AQUEDUCT	CALIFORNIA AQUEDUCT			
	Reach 1	Reach 3A	Reach 3B	Reach 1[c]	Reach 1	Reach 4	Reach 14A	Reach 15A
Calendar Year	Barker Slough Pumping Plant	Cordelia Pumping Plant Solano	Cordelia Pumping Plant Napa[b]	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	36,054	26,104	11,921	521,799	6,462,089	2,482,790	1,749,495	1,508,344
2000	60,770	42,270	15,522	738,749	8,139,852	3,158,037	3,023,609	3,191,600
2001	370,971	247,499	211,786	4,203,321	27,319,774	10,577,923	14,853,220	15,739,675
2002	192,540	104,564	61,470	2,036,126	17,666,689	7,284,182	8,870,415	9,554,380
2003	198,411	118,387	97,762	2,591,352	24,686,904	9,172,710	10,694,766	11,529,669
2004	262,243	139,241	107,251	2,420,894	22,910,295	9,450,923	12,600,249	13,757,895
2005	291,101	147,895	149,083	2,791,021	33,776,092	12,750,371	11,843,712	12,615,882
2006	241,071	116,793	147,822	2,557,274	24,219,154	10,494,388	11,501,625	12,301,991
2007	461,136	228,029	257,116	4,809,380	23,665,366	11,668,533	17,485,162	18,965,848
2008	430,953	196,005	307,994	3,431,329	14,724,072	6,683,618	11,681,300	13,416,895
2009	221,684	103,270	164,922	2,501,591	13,814,314	4,320,317	7,109,228	7,916,544
2010	265,335	112,286	219,619	2,505,891	27,498,618	9,983,235	11,243,941	11,839,551
2011	276,020	116,080	232,703	3,365,711	40,411,543	15,518,876	14,819,012	15,531,425
2012	277,075	123,869	193,663	3,788,117	24,417,290	12,630,345	14,648,055	14,992,700
2013	445,778	207,880	331,655	5,277,504	23,419,830	9,725,237	13,362,331	13,781,144
2014	389,351	185,037	476,925	4,484,783	18,462,050	4,780,206	8,592,209	8,946,512
2015	391,519	239,568	361,960	5,318,391	16,601,243	6,162,762	10,584,109	11,957,650
2016	279,077	157,084	261,634	4,624,017	37,751,521	12,338,996	16,484,001	17,868,116
2017	308,696	184,157	199,578	3,328,459	47,304,857	22,653,938	24,432,751	25,753,260
2018	602,872	137,098	537,551	6,285,074	31,996,017	14,089,483	17,399,848	18,443,864
2019	**678,414**	**618,045**	**647,460**	**5,161,773**	**37,511,469**	**15,699,796**	**19,385,758**	**18,900,219**
2020	659,506	630,854	629,415	5,184,232	41,354,279	15,098,965	18,610,070	18,071,226
2021	541,661	575,650	838,708	5,383,406	44,183,745	16,830,255	21,055,055	20,460,343
2022	548,241	611,780	873,398	5,404,294	36,761,983	17,050,093	21,323,933	20,723,107
2023	553,916	618,113	882,439	5,460,240	23,792,744	17,226,595	21,544,677	20,937,632
2024	551,338	615,236	878,331	5,434,823	48,892,122	17,146,408	21,444,391	20,840,171
2025	552,844	616,916	880,730	5,449,667	38,467,813	17,193,239	21,502,960	20,897,089
2026	552,903	616,982	880,825	5,450,250	37,074,591	17,195,080	21,505,263	20,899,328
2027	553,102	617,205	881,142	5,452,216	35,795,720	17,201,281	21,513,018	20,906,865
2028	553,327	617,455	881,500	5,454,430	32,165,319	17,208,265	21,521,753	20,915,354
2029	553,167	617,277	881,246	5,452,857	32,785,407	17,203,304	21,515,548	20,909,324
2030	551,991	615,965	879,372	5,441,264	44,364,103	17,166,728	21,469,803	20,864,868
2031	552,450	616,477	880,104	5,445,790	40,125,966	17,181,008	21,487,663	20,882,225
2032	552,961	617,048	880,918	5,450,826	37,162,053	17,196,897	21,507,536	20,901,537
2033	553,104	617,207	881,145	5,452,233	35,893,850	17,201,334	21,513,084	20,906,929
2034	552,605	616,650	880,350	5,447,315	38,247,772	17,185,819	21,493,680	20,888,071
2035	552,835	616,907	880,717	5,449,584	36,288,933	17,192,979	21,502,634	20,896,774
TOTAL	**15,908,784**	**13,664,599**	**19,266,178**	**177,070,210**	**1,226,157,490**	**525,647,939**	**641,108,221**	**647,455,183**

[a] Starting with 2005, transmission costs that vary and depend on power usage are included, therefore recovered through the variable component.

[b] Power costs for the period 1968 through 1987 are for an interim facility.

[c] 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[a] (in dollars)

Sheet 2 of 3

	CALIFORNIA AQUEDUCT (continued)							
	Reach 16A	Reach 17E	Reach 18A	Reach 22B	Reach 23	Reach 26A	Reach 2B (EBX)	Reach 2E (EBX)
Calendar Year	Chrisman Pumping Plant	Edmonston Pumping Plant	Alamo Pumping Plant	Pearblossom Pumping Plant	Mojave Siphon Powerplant	Devil Canyon Powerplant	Greenspot Pump Station	Citrus Pumping 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	3,755,592	14,466,419	(2,980,122)	1,910,542	(2,587,958)	(15,232,207)	0	0
2000	7,198,298	25,885,224	(5,123,988)	3,787,674	(4,402,610)	(25,758,437)	0	0
2001	35,022,118	127,851,427	(3,383,762)	18,669,512	(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	0
2005	27,845,084	97,798,938	(5,880,165)	17,454,941	(6,454,740)	(28,818,797)	69,542	0
2006	26,893,390	84,686,741	(4,091,143)	15,807,815	(6,391,206)	(34,897,387)	123,158	0
2007	41,386,558	138,617,059	(3,029,048)	19,242,314	(5,896,486)	(28,814,592)	248,626	0
2008	26,302,538	82,316,382	(3,426,928)	10,847,852	(3,300,797)	(16,968,293)	243,110	0
2009	16,500,988	75,435,159	(3,266,008)	9,230,210	(2,288,833)	(13,842,660)	360,373	0
2010	26,190,699	95,977,666	(5,115,083)	16,898,107	(5,653,201)	(24,769,829)	313,550	0
2011	33,961,887	118,911,608	(6,536,645)	23,389,212	(7,792,422)	(32,285,174)	372,514	0
2012	33,058,459	115,597,097	(2,492,869)	17,441,248	(8,905,115)	(23,525,846)	451,941	0
2013	30,109,983	106,031,248	(2,081,221)	12,333,069	(4,915,165)	(14,305,918)	487,316	0
2014	19,653,593	68,046,386	(1,786,122)	7,175,403	(1,465,644)	(5,391,598)	316,588	0
2015	26,507,040	94,329,515	(2,289,717)	9,213,782	(2,103,231)	(6,675,218)	343,151	0
2016	39,401,825	141,093,189	(7,801,980)	23,932,730	(8,723,634)	(21,862,397)	695,764	0
2017	56,316,804	204,382,334	(14,494,695)	39,863,001	(21,279,891)	(37,337,924)	368,581	1,044,647
2018	41,424,117	149,825,130	(9,284,472)	26,519,558	(10,476,901)	(21,706,133)	11,618	368,373
2019	**43,128,971**	**157,573,855**	**(10,558,172)**	**30,925,728**	**(14,876,186)**	**(28,205,117)**	**0**	**493,004**
2020	41,230,149	150,605,079	(10,272,299)	29,479,082	(14,566,782)	(27,612,561)	0	398,559
2021	46,612,267	170,246,308	(9,998,167)	29,300,059	(13,057,682)	(24,791,432)	0	531,845
2022	47,211,482	172,437,097	(10,066,721)	29,871,497	(13,152,584)	(24,975,890)	0	538,305
2023	47,700,213	174,222,162	(10,066,330)	30,180,725	(13,152,584)	(24,975,890)	0	543,878
2024	47,478,178	173,411,187	(11,138,964)	30,040,240	(13,152,585)	(24,975,890)	0	541,346
2025	47,607,850	173,884,808	(11,138,769)	30,122,285	(13,152,585)	(24,975,890)	0	542,824
2026	47,612,950	173,903,430	(11,138,631)	30,125,511	(13,152,585)	(24,975,890)	0	542,883
2027	47,630,122	173,966,149	(11,138,631)	30,136,376	(13,152,584)	(24,975,890)	0	543,078
2028	47,649,460	174,036,785	(11,138,631)	30,148,613	(13,152,584)	(24,975,890)	0	543,299
2029	47,635,723	173,986,609	(11,138,631)	30,139,921	(13,152,584)	(24,975,891)	0	543,142
2030	47,534,443	173,616,690	(11,138,631)	30,075,839	(13,152,584)	(24,975,891)	0	541,987
2031	47,573,985	173,761,115	(11,138,631)	30,100,858	(13,152,585)	(24,975,891)	0	542,438
2032	47,617,983	173,921,814	(11,138,631)	30,128,696	(13,152,585)	(24,975,890)	0	542,940
2033	47,630,266	173,966,678	(11,138,631)	30,136,468	(13,152,584)	(24,975,890)	0	543,080
2034	47,587,305	173,809,769	(11,138,631)	30,109,286	(13,152,584)	(24,975,890)	0	542,590
2035	47,607,130	173,882,180	(11,138,631)	30,121,830	(13,152,584)	(24,975,891)	0	542,816
TOTAL	**1,445,273,074**	**5,208,545,849**	**(297,273,967)**	**869,466,872**	**(356,765,398)**	**(1,089,637,136)**	**4,484,385**	**10,431,034**

[a] 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[a] (in dollars)

Sheet 3 of 3

	CALIFORNIA AQUEDUCT (continued)							
	Reach 3A (EBX)	Reach 4B (EBX)	Reach 29A	Reach 29G	Reach 29J	Reach 31A	Reach 33A	
Calendar Year	Crafton Hills Pumping Station	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	Grand Total
	[17]	[18]	[19]	[20]	[21]	[22]	[23]	[24]
1961	0	0	0	0	0	0	0	0
1962	0	0	0	0	0	0	0	36,771
1963	0	0	0	0	0	0	0	55,654
1964	0	0	0	0	0	0	0	73,240
1965	0	0	0	0	0	0	0	137,665
1966	0	0	0	0	0	0	0	186,064
1967	0	0	0	0	0	0	0	231,968
1968	0	0	0	0	0	118,676	0	1,117,913
1969	0	0	0	0	0	78,350	0	773,646
1970	0	0	0	0	0	136,429	0	1,103,798
1971	0	0	0	0	0	166,296	0	1,476,135
1972	0	0	79,315	0	(211,144)	212,938	0	3,073,359
1973	0	0	122,787	0	(1,057,564)	114,897	0	2,934,059
1974	0	0	157,511	0	(1,547,884)	111,442	0	3,683,880
1975	0	0	314,636	0	(2,455,461)	88,451	0	5,817,780
1976	0	0	326,967	0	(2,827,557)	139,279	0	8,211,705
1977	0	0	75,335	0	(3,734,462)	63,079	0	886,421
1978	0	0	89,383	0	(1,542,479)	176,153	0	7,272,153
1979	0	0	102,584	0	(2,776,030)	188,881	0	9,599,576
1980	0	0	236,768	0	(3,415,486)	168,458	0	10,419,251
1981	0	0	444,280	0	(2,834,322)	169,177	0	17,563,899
1982	0	0	539,245	(783,626)	(3,463,971)	168,390	0	13,477,272
1983	0	0	214,069	(1,488,439)	(6,649,718)	17,920	0	(7,452,864)
1984	0	0	484,239	(4,088,209)	(4,710,802)	112,679	0	(4,159,491)
1985	0	0	874,069	(5,930,176)	(15,698,638)	146,843	0	(9,861,182)
1986	0	0	1,269,590	(5,579,301)	(11,072,448)	297,886	0	11,622,736
1987	0	0	1,355,533	(6,445,265)	(11,726,458)	245,082	0	6,701,444
1988	0	0	1,515,349	(7,457,050)	(13,026,992)	214,519	0	6,239,207
1989	0	0	2,156,915	(8,822,367)	(15,535,849)	282,180	0	24,585,082
1990	0	0	2,913,030	(11,225,401)	(20,510,539)	416,832	0	48,154,174
1991	0	0	576,721	(3,882,595)	(6,579,194)	3,610	0	2,462,222
1992	0	0	829,862	(6,369,339)	(10,976,538)	101,665	0	(5,509,968)
1993	0	0	70,836	(4,665,393)	(9,531,404)	(111,306)	0	(24,907,973)
1994	0	0	1,503,796	(7,249,239)	(13,126,331)	206,086	(1,127)	13,499,083
1995	0	0	247,869	(1,934,202)	(4,049,615)	243,434	0	(142,957)
1996	0	0	895,929	(4,248,531)	(8,457,232)	296,170	0	15,870,542
1997	0	0	902,690	(4,824,488)	(8,776,260)	298,483	208,816	14,336,879
1998	0	0	(67,399)	(1,811,154)	(4,644,120)	(55,491)	(92,902)	(24,405,948)
1999	0	0	757,085	(5,831,573)	(9,811,777)	170,445	241,369	(2,343,588)
2000	0	0	1,307,386	(10,161,472)	(17,729,381)	228,532	378,042	(6,020,323)
2001	0	0	6,412,531	(7,918,467)	(13,370,061)	1,061,695	2,140,040	216,231,944
2002	0	0	4,246,409	(11,349,183)	(19,513,997)	547,531	1,344,783	94,808,314
2003	0	0	4,642,103	(10,436,535)	(17,134,431)	637,936	1,538,955	134,765,827
2004	68,914	7,290	5,682,375	(12,281,228)	(21,354,179)	675,724	1,804,179	149,713,081
2005	48,909	2,544	3,705,184	(7,106,531)	(13,339,416)	858,232	1,749,845	162,298,726
2006	144,035	16,226	2,751,478	(7,208,025)	(12,042,760)	866,740	1,540,977	129,780,157
2007	256,313	11,163	7,582,778	(11,444,524)	(21,845,299)	1,341,242	2,345,146	217,541,819
2008	327,193	7,446	4,778,398	(7,762,363)	(14,997,326)	1,168,590	1,735,082	132,143,048
2009	391,267	7,529	4,624,245	(6,997,502)	(15,725,766)	710,827	1,018,536	102,310,234
2010	431,074	19,508	3,835,926	(6,643,531)	(11,641,405)	939,667	1,507,295	155,958,918
2011	500,595	33,173	3,575,569	(5,996,974)	(10,892,193)	1,151,846	2,176,627	210,840,991
2012	551,906	49,825	5,699,845	(8,863,057)	(15,797,149)	1,075,620	2,072,630	187,485,648
2013	570,219	41,037	6,819,394	(9,189,037)	(15,851,695)	1,456,622	2,087,006	180,144,218
2014	439,511	16,538	4,821,976	(4,376,621)	(7,912,327)	1,673,031	2,539,940	130,067,726
2015	458,322	15,059	7,323,783	(6,599,051)	(11,183,098)	1,686,285	1,997,347	164,641,169
2016	770,743	48,431	6,496,197	(7,078,001)	(12,085,744)	1,601,001	3,099,133	249,351,703
2017	1,228,044	85,618	6,560,784	(7,354,995)	(12,930,250)	1,682,434	3,128,105	345,428,292
2018	475,300	203,707	5,920,557	(6,104,793)	(10,006,308)	1,044,462	3,267,727	260,973,749
2019	**433,397**	**76,993**	**4,176,057**	**(4,991,565)**	**(8,134,337)**	**1,255,019**	**3,624,873**	**273,525,454**
2020	410,931	73,002	4,238,492	(5,191,302)	(8,459,583)	1,214,250	3,505,633	265,291,197
2021	467,541	83,059	6,082,917	(6,510,809)	(10,037,043)	772,242	5,072,790	304,642,718
2022	473,220	84,068	6,084,469	(6,437,755)	(9,916,951)	782,307	5,140,521	301,369,894
2023	478,119	84,938	6,147,455	(6,437,755)	(9,916,951)	790,406	5,193,736	291,808,478
2024	475,894	84,543	6,118,840	(6,438,587)	(9,916,951)	786,726	5,169,560	314,286,357
2025	477,193	84,774	6,135,551	(6,437,755)	(9,916,951)	788,875	5,183,679	304,767,147
2026	477,244	84,783	6,136,208	(6,437,755)	(9,916,951)	788,960	5,184,234	303,409,613
2027	477,417	84,813	6,138,421	(6,437,755)	(9,916,951)	789,244	5,186,104	302,250,462
2028	477,610	84,848	6,140,914	(6,438,587)	(9,916,951)	789,565	5,188,209	298,754,063
2029	477,473	84,823	6,139,143	(6,437,755)	(9,916,951)	789,337	5,186,714	299,279,203
2030	476,457	84,643	6,126,091	(6,437,755)	(9,916,951)	787,659	5,175,686	310,151,777
2031	476,854	84,713	6,131,187	(6,437,755)	(9,916,951)	788,314	5,179,991	306,189,325
2032	477,295	84,792	6,136,857	(6,438,587)	(9,916,951)	789,043	5,184,782	303,531,334
2033	477,418	84,814	6,138,440	(6,437,755)	(9,916,951)	789,247	5,186,119	302,349,605
2034	476,987	84,737	6,132,903	(6,437,755)	(9,916,951)	788,535	5,181,442	304,404,005
2035	477,186	84,772	6,135,459	(6,437,755)	(9,916,951)	788,863	5,183,600	302,583,387
TOTAL	**14,650,580**	**1,984,209**	**216,115,315**	**(354,332,980)**	**(641,571,337)**	**39,674,540**	**122,555,224**	**8,459,878,866**

[a] 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)

Sheet 1 of 4

Calendar Year	NORTH BAY AREA			SOUTH BAY AREA[a]				CENTRAL COASTAL AREA		
	Napa[b]	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
TOTAL	**1,080,965**	**2,049,856**	**3,130,821**	**3,720,815**	**2,459,248**	**6,510,783**	**12,690,846**	**1,189,430**	**2,218,494**	**3,407,924**

[a] 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.

[b] 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)

Calendar Year	SAN JOAQUIN VALLEY AREA								
			Kern						
	Dudley Ridge	Empire	Municipal and Industrial	Agricultural	Total	Kings	Oak Flat	Tulare	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
TOTAL	**3,008,632**	**199,000**	**7,693,900**	**51,855,303**	**59,549,203**	**403,050**	**352,822**	**5,959,901**	**69,472,608**

TABLE B-4 Maximum Contractual Table A Amounts (acre-feet)

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]
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	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
TOTAL	**7,507,768**	**4,545,098**	**4,782,511**	**321,556**	**2,626,000**	**127,210**	**4,069,043**	**1,127,720**	**5,909,177**	**1,641,322**

TABLE B-4 Maximum Contractual Table A Amounts (acre-feet)

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]
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
TOTAL	**748,350**	**109,260,272**	**988,000**	**143,654,027**	**449,900**	**775,559**	**106,474**	**1,331,933**	**0**	**233,688,159**

TABLE B-5A Annual Water Quantities Delivered from Each Aqueduct Reach to Each Contractor (acre-feet)

Calendar Year	FEATHER RIVER AREA			NORTH BAY AQUEDUCT							
				Reach 1	Reach 3A		Reach 3A-T		Reach 3B		
	Butte	Grizzly Valley Pipeline Plumas	Yuba City	Solano	Napa	Solano	Napa	Solano	Napa[a]	Solano	Total
	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]
1962	0	0	0	0	0	0	0	0	0	0	0
1963	0	0	0	0	0	0	0	0	0	0	0
1964	0	0	0	0	0	0	0	0	0	0	0
1965	0	0	0	0	0	0	0	0	0	0	0
1966	0	0	0	0	0	0	0	0	0	0	0
1967	0	0	0	0	0	0	0	0	0	0	0
1968	0	0	0	0	0	0	0	0	1,214	0	1,214
1969	0	0	0	0	0	0	0	0	2,687	0	2,687
1970	0	70	0	0	0	0	0	0	3,618	0	3,618
1971	192	64	0	0	0	0	0	0	2,521	0	2,521
1972	186	505	0	0	0	0	0	0	3,647	0	3,647
1973	53	679	0	0	0	0	0	0	3,792	0	3,792
1974	127	648	0	0	0	0	0	0	4,870	0	4,870
1975	253	405	0	0	0	0	0	0	6,840	0	6,840
1976	527	382	0	0	0	0	0	0	7,122	0	7,122
1977	706	303	0	0	0	0	0	0	8,226	0	8,226
1978	579	278	0	0	0	0	0	0	6,034	0	6,034
1979	302	329	0	0	0	0	0	0	6,561	0	6,561
1980	267	295	0	0	0	0	0	0	6,707	0	6,707
1981	221	355	0	0	0	0	0	0	9,001	0	9,001
1982	334	305	0	0	0	0	0	0	1,213	0	1,213
1983	325	262	0	0	0	0	0	0	2,287	0	2,287
1984	177	272	108	0	0	0	0	0	2,923	0	2,923
1985	308	254	62	0	0	0	0	0	4,039	0	4,039
1986	313	317	328	1,400	0	0	0	0	3,519	0	4,919
1987	459	452	88	1,550	0	0	0	0	7,693	0	9,243
1988	385	523	303	1	0	9,725	0	0	5,392	0	15,118
1989	300	486	403	10	0	17,246	0	0	6,195	0	23,451
1990	380	548	494	3,275	0	15,856	0	0	6,940	0	26,071
1991	328	420	265	3,117	0	3,855	0	0	1,380	0	8,352
1992	117	485	642	5,553	0	9,220	0	0	4,001	0	18,774
1993	256	444	746	14,709	0	14,471	0	0	5,286	0	34,466
1994	329	492	1,035	10,343	0	14,913	0	0	6,792	0	32,048
1995	203	308	910	5,452	0	15,893	0	0	5,182	0	26,527
1996	257	360	820	12,930	0	17,069	0	0	4,893	0	34,892
1997	185	231	1,005	16,029	0	17,501	0	0	4,341	0	37,871
1998	527	0	1,054	11,562	0	18,204	0	0	5,359	0	35,125
1999	286	0	1,096	15,191	0	19,562	0	0	5,304	0	40,057
2000	586	0	901	15,490	0	11,290	0	10,235	4,958	0	41,973
2001	513	0	1,065	14,849	0	11,377	0	8,360	9,345	0	43,931
2002	419	0	1,181	18,841	0	11,130	0	8,589	6,875	0	45,435
2003	551	0	1,324	17,260	0	9,682	9	7,009	7,637	0	41,597
2004	1,440	0	1,434	20,951	0	10,691	135	10,860	7,999	500	51,136
2005	527	0	1,894	18,290	0	10,585	160	8,444	7,509	500	45,488
2006	468	0	5,342	16,573	0	10,865	208	7,578	7,581	500	43,305
2007	956	0	2,327	19,187	0	12,301	180	15,312	10,777	500	58,257
2008	451	243	1,923	21,436	15	11,410	37	7,974	13,240	500	54,612
2009	581	200	2,114	15,004	0	8,651	27	6,795	10,877	500	41,854
2010	807	243	2,331	17,598	0	8,231	70	4,487	12,347	500	43,233
2011	1,092	98	2,297	15,202	0	7,761	39	5,032	11,275	0	39,309
2012	1,374	79	2,695	16,508	0	8,298	47	4,541	9,860	0	39,254
2013	908	366	4,850	16,525	0	10,082	60	9,262	12,478	0	48,407
2014	1,617	251	4,237	7,354	0	6,856	41	5,469	14,123	0	33,843
2015	2,763	285	3,004	8,581	0	6,538	66	8,717	11,133	0	35,035
2016	2,518	387	1,229	10,802	1	6,464	45	6,339	8,947	0	32,598
2017	2,320	363	1,746	13,764	0	7,484	24	7,017	8,201	0	36,490
2018	3,048	730	10,542	10,418	0	5,239	0	13,344	15,835	0	44,836
2019	**270**	**731**	**5,760**	**7,089**	**0**	**21,565**	**0**	**0**	**17,415**	**0**	**46,069**
2020	270	731	5,760	6,011	0	22,643	0	0	17,415	0	46,069
2021	270	731	5,760	4,879	0	23,775	0	0	17,415	0	46,069
2022	270	731	5,760	3,690	0	24,964	0	0	17,415	0	46,069
2023	270	731	5,760	3,690	0	24,964	0	0	17,415	0	46,069
2024	270	731	5,760	3,690	0	24,964	0	0	17,415	0	46,069
2025	270	731	5,760	3,690	0	24,964	0	0	17,415	0	46,069
2026	270	731	5,760	3,690	0	24,964	0	0	17,415	0	46,069
2027	270	731	5,760	3,690	0	24,964	0	0	17,415	0	46,069
2028	270	731	5,760	3,690	0	24,964	0	0	17,415	0	46,069
2029	270	731	5,760	3,690	0	24,964	0	0	17,415	0	46,069
2030	270	731	5,760	3,690	0	24,964	0	0	17,415	0	46,069
2031	270	731	5,760	3,690	0	24,964	0	0	17,415	0	46,069
2032	270	731	5,760	3,690	0	24,964	0	0	17,415	0	46,069
2033	270	731	5,760	3,690	0	24,964	0	0	17,415	0	46,069
2034	270	731	5,760	3,690	0	24,964	0	0	17,415	0	46,069
2035	270	731	5,760	3,690	0	24,964	0	0	17,415	0	46,069
TOTAL	**36,411**	**26,144**	**159,715**	**465,394**	**16**	**765,929**	**1,148**	**155,364**	**642,631**	**3,500**	**2,033,982**

[a] 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)

	SOUTH BAY AQUEDUCT[b]										
	Reach 1		Reach 2	Reach 4	Reach 5		Reach 6	Reach 7	Reach 8	Reach 9	
Calendar Year	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	Total
	[12]	[13]	[14]	[15]	[16]	[17]	[18]	[19]	[20]	[21]	[22]
1962	141	8,412	353	0	0	0	0	0	0	0	8,906
1963	814	10,914	917	0	0	0	0	0	0	0	12,645
1964	248	19,238	1,425	0	0	0	0	0	0	0	20,911
1965	637	15,280	1,830	138	0	0	0	1,127	0	15,014	34,026
1966	2,475	0	2,537	499	0	0	0	14,864	0	34,538	54,913
1967	1,527	0	2,391	862	0	0	0	12,882	0	39,101	56,763
1968	1,608	0	3,799	721	5	0	0	24,817	0	70,105	101,055
1969	1,165	0	3,459	1,851	160	0	0	813	0	62,264	69,712
1970	1,345	0	4,558	3,182	164	0	0	0	0	80,311	89,560
1971	546	0	1,908	2,403	160	0	0	5,961	0	87,606	98,584
1972	1,066	0	4,605	2,041	2,777	1,489	0	26,182	0	100,266	138,426
1973	430	0	1,123	1,193	229	0	0	2,521	0	88,582	94,078
1974	177	0	0	975	162	0	0	0	4	88,000	89,318
1975	137	0	1,783	1,864	120	0	714	393	593	88,000	93,604
1976	265	0	7,204	3,384	817	0	5,461	13,774	7,526	88,000	126,431
1977	210	0	4,491	2,213	524	0	5,206	11,284	7,556	76,220	107,704
1978	422	0	2,426	3,754	2,034	0	2,348	854	5,009	95,727	112,574
1979	197	0	4,283	5,567	3,937	0	5,341	3,430	7,444	91,991	122,190
1980	77	0	3,883	6,686	0	1,508	6,144	2,824	6,702	88,000	115,824
1981	1,250	0	4,648	5,273	1,157	5,752	7,262	7,595	8,570	88,000	129,507
1982	473	0	3,043	4,406	630	0	4,571	1,776	4,540	88,000	107,439
1983	179	0	2,712	1,714	50	0	111	0	3,157	86,733	94,656
1984	165	0	4,219	2,219	55	0	126	0	3,338	88,000	98,122
1985	213	0	5,199	2,060	63	0	7,537	11,203	7,813	88,000	122,088
1986	200	0	6,052	2,062	212	0	2,083	5,311	7,068	88,000	110,988
1987	218	0	7,538	2,372	285	0	12,993	15,488	9,902	88,000	136,796
1988	222	0	8,302	4,681	189	0	12,436	24,259	9,205	87,961	147,255
1989	222	0	8,051	6,562	418	0	10,974	17,340	8,702	90,000	142,269
1990	256	0	8,160	8,347	593	0	15,678	22,149	9,554	91,800	156,537
1991	162	0	3,676	3,269	359	0	1,945	9,155	3,493	28,200	50,259
1992	217	0	5,177	2,188	154	0	6,933	12,621	6,532	42,839	76,661
1993	190	0	5,843	8,430	5,964	1,650	13,208	1,792	6,829	62,065	105,971
1994	132	0	4,482	5,427	822	0	9,679	3,379	19,532	57,115	100,568
1995	278	0	6,236	7,195	955	0	15,427	21	17,772	28,756	76,640
1996	277	0	6,151	5,119	388	0	6,968	1,871	11,591	44,850	77,215
1997	138	0	6,647	6,501	1,582	1,323	12,654	1,876	10,864	60,601	102,186
1998	106	0	3,748	2,493	1,277	0	8,347	3,817	11,478	39,610	70,876
1999	148	0	5,048	8,227	1,444	0	13,133	5,326	16,226	52,945	102,497
2000	110	0	7,464	9,761	946	0	16,396	4,498	18,100	78,258	135,533
2001	105	0	7,822	4,879	3,010	0	13,593	0	18,004	47,922	95,335
2002	93	0	7,758	11,619	2,446	0	17,058	5,112	20,616	58,875	123,577
2003	108	0	7,916	11,348	2,887	0	16,684	5,037	12,753	75,981	132,714
2004	72	0	11,754	9,737	3,763	0	21,260	4,968	14,916	59,458	125,928
2005	1,430	0	11,520	10,100	1,826	0	16,597	4,139	10,160	52,364	108,136
2006	830	0	11,546	4,097	2,123	0	19,870	2,708	12,924	64,174	118,272
2007	179	0	10,066	2,563	3,107	0	23,205	8,255	15,107	71,690	134,172
2008	238	0	11,424	2,206	1,899	0	25,363	4,421	18,481	52,530	116,562
2009	211	0	7,054	5,437	1,987	0	16,398	2,551	16,945	66,364	116,947
2010	160	0	7,788	7,528	1,824	0	17,043	330	15,241	45,888	95,802
2011	1,541	0	6,282	6,887	2,173	0	20,098	7	15,203	60,761	112,952
2012	262	0	7,598	9,987	2,972	0	14,112	0	13,331	63,794	112,056
2013	237	0	11,253	9,998	3,171	0	20,197	31	23,609	78,623	147,119
2014	206	0	7,517	4,321	975	0	15,469	8,989	13,669	39,970	91,116
2015	182	0	6,136	3,640	4,594	0	15,520	6,389	14,838	65,773	117,072
2016	53	0	6,677	10,488	3,480	0	20,786	21	9,064	68,652	119,221
2017	85	0	5,791	9,415	3,219	0	13,599	0	9,734	44,995	86,838
2018	299	0	7,553	5,386	2,501	0	15,464	0	17,231	88,182	136,616
2019	**0**	**0**	**9,480**	**7,150**	**2,400**	**0**	**24,341**	**0**	**21,960**	**60,000**	**125,331**
2020	0	0	9,920	7,150	2,400	0	23,901	0	22,364	60,000	125,735
2021	0	0	10,080	7,150	2,400	0	23,741	0	24,278	60,000	127,649
2022	0	0	10,300	7,150	2,400	0	23,521	0	23,220	60,000	126,591
2023	0	0	10,300	7,150	2,400	0	23,521	0	23,220	60,000	126,591
2024	0	0	10,300	7,150	2,400	0	23,521	0	23,220	60,000	126,591
2025	0	0	10,300	7,150	2,400	0	23,521	0	23,220	60,000	126,591
2026	0	0	10,300	7,150	2,400	0	23,521	0	23,220	60,000	126,591
2027	0	0	10,300	7,150	2,400	0	23,521	0	23,220	60,000	126,591
2028	0	0	10,300	7,150	2,400	0	23,521	0	23,220	60,000	126,591
2029	0	0	10,300	7,150	2,400	0	23,521	0	23,220	60,000	126,591
2030	0	0	10,300	7,150	2,400	0	23,521	0	23,220	60,000	126,591
2031	0	0	10,300	7,150	2,400	0	23,521	0	23,220	60,000	126,591
2032	0	0	10,300	7,150	2,400	0	23,521	0	23,220	60,000	126,591
2033	0	0	10,300	7,150	2,400	0	23,521	0	23,220	60,000	126,591
2034	0	0	10,300	7,150	2,400	0	23,521	0	23,220	60,000	126,591
2035	0	0	10,300	7,150	2,400	0	23,521	0	23,220	60,000	126,591
TOTAL	**24,934**	**53,844**	**492,506**	**386,825**	**117,389**	**11,722**	**927,268**	**324,161**	**894,608**	**4,699,454**	**7,932,711**

[b] 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)

	CALIFORNIA AQUEDUCT											
	NORTH SAN JOAQUIN DIVISION						SAN LUIS DIVISION					
	Reach 1	Reach 2A					Reach 3		Reach 3A			
Calendar Year	Kern (Agricultural)	Alameda-Zone 7	Kern (Agricultural)	Oak Flat[c]	Santa Clara	Tulare	Dudley Ridge	Metropolitan	Alameda-Zone 7	Alameda County	AVEK	Castaic Lake
	[23]	[24]	[25]	[26]	[27]	[28]	[29]	[30]	[31]	[32]	[33]	[34]
1962	0	0	0	0	0	0	0	0	0	0	0	0
1963	0	0	0	0	0	0	0	0	0	0	0	0
1964	0	0	0	0	0	0	0	0	0	0	0	0
1965	0	0	0	0	0	0	0	0	0	0	0	0
1966	0	0	0	0	0	0	0	0	0	0	0	0
1967	0	0	0	0	0	0	0	0	0	0	0	0
1968	0	0	0	3,084	0	0	0	0	0	0	0	0
1969	0	0	0	3,016	0	0	0	0	0	0	0	0
1970	0	0	0	5,911	0	0	0	0	0	0	0	0
1971	0	0	0	7,212	0	0	0	0	0	0	0	0
1972	0	0	0	8,166	0	0	0	0	0	0	0	0
1973	0	0	0	3,214	0	0	0	0	0	0	0	0
1974	0	0	0	3,471	0	0	0	0	0	0	0	0
1975	0	0	0	3,576	0	0	0	0	0	0	0	0
1976	0	0	0	4,112	0	0	0	0	0	0	0	0
1977	0	0	0	1,472	0	0	0	0	0	0	0	0
1978	0	0	0	3,906	0	0	0	0	0	0	0	0
1979	0	0	0	6,149	0	0	0	0	0	0	0	0
1980	0	0	0	5,700	0	0	0	0	0	0	0	0
1981	0	0	0	4,300	0	0	0	0	0	0	0	0
1982	0	0	0	3,838	0	0	0	0	0	0	0	0
1983	0	0	0	3,822	0	0	0	0	0	0	0	0
1984	0	0	0	5,700	0	0	0	0	0	0	0	0
1985	0	0	0	5,433	0	0	0	0	0	0	0	0
1986	0	0	0	5,107	0	0	0	0	0	0	0	0
1987	0	0	0	5,625	0	0	0	0	0	0	0	0
1988	0	0	0	4,412	0	0	0	0	0	0	0	0
1989	0	0	0	6,091	0	300	602	0	0	0	0	0
1990	0	0	0	2,922	200	0	0	0	0	0	0	0
1991	0	0	0	141	0	0	0	0	0	0	0	0
1992	0	0	0	2,239	0	0	0	0	0	0	0	0
1993	0	0	0	2,858	0	0	0	0	0	0	0	0
1994	0	0	0	3,071	0	0	0	0	0	0	0	0
1995	0	0	0	5,169	0	0	0	0	0	0	0	0
1996	0	0	0	4,904	0	0	0	0	0	0	0	0
1997	0	0	0	5,238	0	0	0	11,100	0	0	0	0
1998	0	0	0	4,401	0	0	0	(11,100)	0	0	0	0
1999	0	0	0	4,871	0	0	0	0	0	0	0	0
2000	0	0	0	4,508	0	0	0	0	0	0	0	0
2001	0	0	638	3,592	0	0	0	0	0	0	0	0
2002	0	0	773	4,885	0	0	0	0	0	0	0	0
2003	0	7	917	4,266	0	0	0	0	0	0	0	0
2004	0	38	786	4,629	0	0	0	0	0	0	0	0
2005	0	299	1,046	4,194	0	0	0	0	0	0	0	0
2006	0	321	1,103	4,242	0	0	0	0	0	0	0	0
2007	0	320	1,031	3,567	0	0	0	0	0	0	0	0
2008	8,885	56	1,744	1,985	0	0	0	0	0	0	5,873	0
2009	0	0	1,169	1,993	0	0	0	0	0	0	0	3,300
2010	0	0	1,124	2,906	0	0	0	0	0	0	0	0
2011	0	0	1,112	2,715	0	0	0	0	0	0	0	0
2012	0	0	1,258	3,208	0	0	0	0	0	0	0	0
2013	0	0	1,156	2,820	0	0	0	0	0	0	0	0
2014	0	0	609	1,520	0	0	0	0	5,808	7,408	0	0
2015	0	0	718	1,077	0	0	0	0	2,360	6,032	0	0
2016	0	0	677	1,855	0	0	0	0	0	0	0	5,940
2017	0	0	738	2,893	0	0	0	0	0	0	0	30,000
2018	0	0	1,254	2,793	0	0	0	0	0	0	0	0
2019	**0**	**0**	**1,300**	**3,420**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
2020	0	0	1,300	3,420	0	0	0	0	0	0	0	0
2021	0	0	1,300	3,420	0	0	0	0	0	0	0	0
2022	0	0	1,300	3,420	0	0	0	0	0	0	0	0
2023	0	0	1,300	3,420	0	0	0	0	0	0	0	0
2024	0	0	1,300	3,420	0	0	0	0	0	0	0	0
2025	0	0	1,300	3,420	0	0	0	0	0	0	0	0
2026	0	0	1,300	3,420	0	0	0	0	0	0	0	0
2027	0	0	1,300	3,420	0	0	0	0	0	0	0	0
2028	0	0	1,300	3,420	0	0	0	0	0	0	0	0
2029	0	0	1,300	3,420	0	0	0	0	0	0	0	0
2030	0	0	1,300	3,420	0	0	0	0	0	0	0	0
2031	0	0	1,300	3,420	0	0	0	0	0	0	0	0
2032	0	0	1,300	3,420	0	0	0	0	0	0	0	0
2033	0	0	1,300	3,420	0	0	0	0	0	0	0	0
2034	0	0	1,300	3,420	0	0	0	0	0	0	0	0
2035	0	0	1,300	3,420	0	0	0	0	0	0	0	0
TOTAL	**8,885**	**1,041**	**39,953**	**256,919**	**200**	**300**	**602**	**0**	**8,168**	**13,440**	**5,873**	**39,240**

[c] Includes 425 acre-feet of 1988 advance allocation and 141 acre-feet of 1992 advance allocation.

TABLE B-5A Annual Water Quantities Delivered from Each Aqueduct Reach to Each Contractor (acre-feet)

	CALIFORNIA AQUEDUCT (continued)											
	SAN LUIS DIVISION (continued)											
	Reach 3A (continued)							Reach 4				
		Kern								Kern		
Calendar Year	Dudley Ridge	Municipal and Industrial	Agricultural	Metropolitan	Santa Barbara	Santa Clara	Tulare	Castaic Lake	Dudley Ridge	Municipal and Industrial	Agricultural	Tulare
	[35]	[36]	[37]	[38]	[39]	[40]	[41]	[42]	[43]	[44]	[45]	[46]
1962	0	0	0	0	0	0	0	0	0	0	0	0
1963	0	0	0	0	0	0	0	0	0	0	0	0
1964	0	0	0	0	0	0	0	0	0	0	0	0
1965	0	0	0	0	0	0	0	0	0	0	0	0
1966	0	0	0	0	0	0	0	0	0	0	0	0
1967	0	0	0	0	0	0	0	0	0	0	0	0
1968	0	0	0	0	0	0	0	0	0	0	0	0
1969	0	0	0	0	0	0	0	0	0	0	0	0
1970	0	0	0	0	0	0	0	0	0	0	0	0
1971	0	0	0	0	0	0	0	0	0	0	0	0
1972	0	0	0	0	0	0	0	0	0	0	0	0
1973	0	0	0	0	0	0	0	0	0	0	0	0
1974	0	0	0	0	0	0	0	0	0	0	0	0
1975	0	0	0	0	0	0	0	0	0	0	0	0
1976	0	0	0	0	0	0	0	0	0	0	0	0
1977	0	0	0	0	0	0	0	0	0	0	0	0
1978	0	0	0	0	0	0	0	0	0	0	0	0
1979	0	0	0	0	0	0	0	0	0	0	0	0
1980	0	0	0	0	0	0	0	0	0	0	0	0
1981	0	0	0	0	0	0	0	0	0	0	0	0
1982	0	0	0	0	0	0	0	0	0	0	0	0
1983	0	0	0	0	0	0	0	0	0	0	0	0
1984	0	0	0	0	0	0	0	0	0	0	0	0
1985	0	0	0	0	0	0	0	0	0	0	0	0
1986	0	0	0	0	0	0	0	0	0	0	0	0
1987	0	0	0	0	0	0	0	0	0	0	0	0
1988	0	0	0	0	0	0	0	0	0	0	0	0
1989	0	0	0	0	0	0	0	0	1,898	0	12,647	0
1990	0	0	0	0	0	0	0	0	0	0	0	1,500
1991	0	0	0	0	0	0	0	0	0	0	0	0
1992	0	0	0	0	0	0	0	0	0	0	0	0
1993	0	0	0	0	0	0	0	0	0	0	0	0
1994	0	0	0	0	0	0	0	0	0	0	0	0
1995	0	0	0	0	0	0	0	0	14,446	0	3,500	0
1996	0	0	0	0	0	0	0	0	0	1,125	4,162	0
1997	0	0	0	0	0	0	0	0	0	0	0	0
1998	0	0	0	0	0	0	0	0	0	0	0	0
1999	0	0	0	0	0	0	0	0	0	0	0	1,300
2000	0	3,320	68,960	0	0	0	0	0	0	1,517	878	0
2001	0	0	140,242	0	0	30,000	0	0	0	0	0	0
2002	0	6,000	62,024	0	0	0	0	0	0	0	0	0
2003	0	0	151,044	29,596	0	0	0	0	0	0	1,351	0
2004	0	0	44,877	0	0	0	0	0	0	0	0	0
2005	0	0	109,712	50,000	0	8,804	277	0	0	0	7,000	0
2006	0	0	19,575	0	0	0	0	0	0	0	0	0
2007	0	71,567	116,272	0	0	0	0	0	0	0	0	0
2008	0	0	94,562	0	0	0	0	0	0	0	10,721	0
2009	0	0	164,653	52,933	0	9,999	0	0	0	0	0	0
2010	0	0	35,896	120,274	0	9,993	0	0	0	0	0	0
2011	0	0	0	78,324	0	1,825	0	0	0	0	0	0
2012	6,068	0	23,401	0	0	0	0	0	0	0	0	0
2013	0	0	64,524	0	0	6,000	0	6,000	0	0	0	0
2014	16,789	0	104,689	15,000	0	27,476	0	0	0	0	0	0
2015	14,460	0	105,549	0	0	17,115	0	0	0	0	3,278	8,166
2016	0	0	54,247	37,283	7,230	28,878	0	0	0	0	1,047	7,723
2017	0	0	0	15,889	15,584	3,497	0	0	0	0	0	0
2018	7,899	0	21,054	0	0	3,000	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	**45,216**	**80,887**	**1,381,281**	**399,299**	**22,814**	**146,587**	**277**	**6,000**	**16,344**	**2,642**	**44,584**	**18,689**

TABLE B-5A Annual Water Quantities Delivered from Each Aqueduct Reach to Each Contractor (acre-feet)

	CALIFORNIA AQUEDUCT (continued)											
	SAN LUIS DIVISION (continued)								SOUTH SAN JOAQUIN DIVISION			
	Reach 5								Reach 6			
				Kern						Kern		
Calendar Year	Castaic Lake	Dudley Ridge	Empire	Municipal and Industrial	Agricultural	Metropolitan	Oak Flat	Tulare	Empire	Municipal and Industrial	Agricultural	Kings
	[47]	[48]	[49]	[50]	[51]	[52]	[53]	[54]	[55]	[56]	[57]	[58]
1962	0	0	0	0	0	0	0	0	0	0	0	0
1963	0	0	0	0	0	0	0	0	0	0	0	0
1964	0	0	0	0	0	0	0	0	0	0	0	0
1965	0	0	0	0	0	0	0	0	0	0	0	0
1966	0	0	0	0	0	0	0	0	0	0	0	0
1967	0	0	0	0	0	0	0	0	0	0	0	0
1968	0	0	0	0	0	0	0	0	0	0	0	0
1969	0	0	0	0	0	0	0	0	0	0	0	0
1970	0	0	0	0	0	0	0	0	0	0	0	0
1971	0	0	0	0	0	0	0	0	0	0	0	0
1972	0	0	0	0	0	0	0	0	0	0	0	0
1973	0	0	0	0	0	0	0	0	0	0	0	0
1974	0	0	0	0	0	0	0	0	0	0	0	0
1975	0	0	0	0	0	0	0	0	0	0	0	0
1976	0	0	0	0	0	0	0	0	0	0	0	0
1977	0	0	0	0	0	0	0	0	0	0	0	0
1978	0	0	0	0	0	0	0	0	0	0	0	0
1979	0	0	0	0	0	0	0	0	0	0	0	0
1980	0	0	0	0	0	0	0	0	0	0	0	0
1981	0	0	0	0	0	0	0	0	0	0	0	0
1982	0	0	0	0	0	0	0	0	0	0	0	0
1983	0	0	0	0	0	0	0	0	0	0	0	0
1984	0	0	0	0	0	0	0	0	0	0	0	0
1985	0	0	0	0	0	0	0	0	0	0	0	0
1986	0	0	0	0	0	0	0	0	0	0	0	0
1987	0	0	0	0	0	0	0	0	0	0	0	0
1988	0	0	0	0	0	0	0	1,550	0	0	0	0
1989	0	0	0	0	18,831	0	0	0	0	0	8,260	0
1990	0	0	0	0	0	0	0	0	0	0	0	0
1991	0	0	0	0	0	0	0	0	0	0	0	0
1992	0	10,823	0	0	0	0	0	0	0	0	0	0
1993	5,095	27,200	0	0	28,200	0	2,000	1,624	0	0	31,200	0
1994	0	0	0	0	0	0	0	0	0	0	0	0
1995	0	0	0	0	21,776	0	0	0	0	0	3,932	0
1996	0	0	0	1,125	81,507	0	0	4,000	0	0	0	0
1997	0	0	0	9,080	154,940	0	0	3,500	0	0	0	0
1998	0	0	0	0	0	0	0	0	0	20,400	33,340	0
1999	0	0	0	0	0	21,500	0	8,000	0	0	33,776	0
2000	0	0	0	8,130	57,647	0	0	0	0	1,457	35,847	0
2001	0	0	0	0	0	0	0	2,457	0	0	0	0
2002	0	0	0	0	0	0	0	3,000	0	0	0	0
2003	0	0	0	0	0	0	0	3,900	0	0	0	0
2004	0	0	0	0	0	0	0	3,850	0	0	0	3,250
2005	0	0	0	0	0	0	0	1,000	0	0	0	6,954
2006	0	0	0	0	0	0	0	3,000	0	0	0	2,659
2007	0	0	0	0	0	0	0	3,600	0	0	0	3,119
2008	0	0	0	0	0	0	0	1,355	0	0	0	2,159
2009	0	0	870	0	0	0	0	1,490	0	0	0	1,779
2010	0	0	431	0	0	0	0	0	0	0	0	2,477
2011	0	0	0	0	0	0	0	0	400	0	0	2,964
2012	0	0	449	0	0	0	0	2,800	514	0	0	2,706
2013	0	0	692	0	8,393	0	0	5,350	280	0	0	2,666
2014	0	0	303	0	0	0	0	661	38	0	0	1,109
2015	0	0	142	0	1,349	0	0	7,576	120	0	0	391
2016	0	0	425	0	7,553	0	0	24,251	446	0	0	1,009
2017	0	0	0	0	0	0	0	3,000	100	0	0	1,902
2018	0	0	0	0	0	0	0	1,894	0	0	0	4,224
2019	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**750**	**0**	**0**	**3,120**
2020	0	0	0	0	0	0	0	0	750	0	0	3,120
2021	0	0	0	0	0	0	0	0	750	0	0	3,120
2022	0	0	0	0	0	0	0	0	750	0	0	3,120
2023	0	0	0	0	0	0	0	0	750	0	0	3,120
2024	0	0	0	0	0	0	0	0	750	0	0	3,120
2025	0	0	0	0	0	0	0	0	750	0	0	3,120
2026	0	0	0	0	0	0	0	0	750	0	0	3,120
2027	0	0	0	0	0	0	0	0	750	0	0	3,120
2028	0	0	0	0	0	0	0	0	750	0	0	3,120
2029	0	0	0	0	0	0	0	0	750	0	0	3,120
2030	0	0	0	0	0	0	0	0	750	0	0	3,120
2031	0	0	0	0	0	0	0	0	750	0	0	3,120
2032	0	0	0	0	0	0	0	0	750	0	0	3,120
2033	0	0	0	0	0	0	0	0	750	0	0	3,120
2034	0	0	0	0	0	0	0	0	750	0	0	3,120
2035	0	0	0	0	0	0	0	0	750	0	0	3,120
TOTAL	**5,095**	**38,023**	**3,312**	**18,335**	**380,196**	**21,500**	**2,000**	**87,858**	**14,648**	**21,857**	**146,355**	**92,408**

TABLE B-5A Annual Water Quantities Delivered from Each Aqueduct Reach to Each Contractor (acre-feet)

	CALIFORNIA AQUEDUCT (continued)											
	SOUTH SAN JOAQUIN DIVISION (continued)											
	Reach 6 (continued)		Reach 7							Reach 8C		
					Kern							Kern
Calendar Year	Metropolitan	Tulare	Castaic Lake	Dudley Ridge	Municipal and Industrial	Agricultural	Kings	Metropolitan	Tulare	Dudley Ridge	Empire	Municipal and Industrial)
	[59]	[60]	[61]	[62]	[63]	[64]	[65]	[66]	[67]	[68]	[69]	[70]
1962	0	0	0	0	0	0	0	0	0	0	0	0
1963	0	0	0	0	0	0	0	0	0	0	0	0
1964	0	0	0	0	0	0	0	0	0	0	0	0
1965	0	0	0	0	0	0	0	0	0	0	0	0
1966	0	0	0	0	0	0	0	0	0	0	0	0
1967	0	0	0	0	0	0	0	0	0	0	0	0
1968	0	0	0	0	0	0	0	0	0	0	1,978	0
1969	0	0	0	0	0	0	0	0	0	0	56	0
1970	0	0	0	0	0	0	0	0	0	0	3,942	0
1971	0	0	0	0	0	0	0	0	0	0	5,990	0
1972	0	0	0	0	0	0	0	0	0	0	5,795	0
1973	0	0	0	0	0	0	0	0	0	0	3,000	0
1974	0	0	0	0	0	0	0	0	0	0	3,000	0
1975	0	0	0	0	0	0	0	0	0	0	3,000	0
1976	0	0	0	0	0	0	0	0	0	0	3,000	0
1977	0	0	0	0	0	0	0	0	0	0	738	0
1978	0	0	0	0	0	0	0	0	0	0	454	0
1979	0	0	0	0	0	0	0	0	0	0	1,739	0
1980	0	0	0	0	0	0	0	0	0	0	894	0
1981	0	0	0	0	0	0	0	0	0	0	5,859	0
1982	0	0	0	0	0	0	0	0	0	0	361	0
1983	0	0	0	0	0	0	0	0	0	0	0	0
1984	0	0	0	0	0	0	0	0	0	0	0	0
1985	0	0	0	0	0	0	0	0	0	0	5,197	0
1986	0	0	0	0	0	0	0	0	0	0	1,170	0
1987	0	0	0	0	0	0	0	0	0	0	2,525	0
1988	0	0	0	0	0	0	0	0	0	0	3,475	0
1989	0	0	0	0	0	5,262	0	0	0	2,391	3,000	0
1990	0	0	0	0	0	0	0	0	0	0	1,279	0
1991	0	0	0	0	0	0	0	0	0	0	221	0
1992	0	0	0	0	0	0	0	0	0	280	1,354	0
1993	0	0	0	0	18,157	10,043	0	0	0	0	2,741	0
1994	0	0	2,100	0	0	0	0	0	0	0	1,666	0
1995	0	0	0	0	10,875	20,595	0	0	0	0	1,631	989
1996	0	0	0	0	3,424	69,704	0	0	0	95	1,868	0
1997	0	0	0	0	27,079	32,463	0	0	0	0	0	0
1998	0	3,000	0	200	3,998	62,081	0	0	0	90	542	0
1999	11,000	23,000	0	0	7,923	19,500	0	500	4,470	86	3,176	0
2000	0	3,000	1,200	0	0	45,137	0	20,000	20,500	166	1,799	0
2001	0	600	0	0	0	0	0	0	0	14	1,360	0
2002	0	0	0	0	0	0	0	0	12,067	0	1,405	0
2003	0	0	0	0	0	0	0	0	15,103	0	1,436	0
2004	0	0	0	0	0	0	0	0	0	0	3,562	0
2005	0	0	0	0	0	0	6,904	0	4,000	0	3,834	0
2006	0	0	0	0	0	0	2,500	0	6,000	0	3,282	0
2007	0	0	0	0	0	16,214	0	0	2,545	0	2,084	0
2008	0	0	0	400	0	1,998	1,330	0	1,500	0	947	0
2009	0	2,100	0	1,400	0	0	0	0	600	0	164	0
2010	0	0	0	0	0	0	0	0	3,850	0	2,828	0
2011	0	0	0	0	0	0	0	0	2,500	0	1,515	0
2012	0	500	0	0	0	0	2,000	0	0	0	1,279	0
2013	0	1,159	0	500	0	0	0	0	1,121	0	595	0
2014	0	275	0	0	0	0	0	0	0	0	175	0
2015	0	0	0	850	0	0	0	0	0	0	362	0
2016	0	4,257	0	0	0	0	0	0	3,175	0	951	0
2017	0	0	0	0	0	0	0	0	0	0	318	0
2018	0	0	0	0	0	0	0	0	0	0	1,752	0
2019	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1,050**	**0**
2020	0	0	0	0	0	0	0	0	0	0	1,050	0
2021	0	0	0	0	0	0	0	0	0	0	1,050	0
2022	0	0	0	0	0	0	0	0	0	0	1,050	0
2023	0	0	0	0	0	0	0	0	0	0	1,050	0
2024	0	0	0	0	0	0	0	0	0	0	1,050	0
2025	0	0	0	0	0	0	0	0	0	0	1,050	0
2026	0	0	0	0	0	0	0	0	0	0	1,050	0
2027	0	0	0	0	0	0	0	0	0	0	1,050	0
2028	0	0	0	0	0	0	0	0	0	0	1,050	0
2029	0	0	0	0	0	0	0	0	0	0	1,050	0
2030	0	0	0	0	0	0	0	0	0	0	1,050	0
2031	0	0	0	0	0	0	0	0	0	0	1,050	0
2032	0	0	0	0	0	0	0	0	0	0	1,050	0
2033	0	0	0	0	0	0	0	0	0	0	1,050	0
2034	0	0	0	0	0	0	0	0	0	0	1,050	0
2035	0	0	0	0	0	0	0	0	0	0	1,050	0
TOTAL	**11,000**	**37,891**	**3,300**	**3,350**	**71,456**	**282,997**	**12,734**	**20,500**	**77,431**	**3,122**	**117,149**	**989**

TABLE B-5A Annual Water Quantities Delivered from Each Aqueduct Reach to Each Contractor (acre-feet)

	CALIFORNIA AQUEDUCT (continued)											
	SOUTH SAN JOAQUIN DIVISION (continued)											
	Reach 8C (continued)			Reach 8D						Reach 9		
	Kern				Kern							Kern
Calendar Year	Agricultural	Kings	Tulare	Dudley Ridge	Municipal and Industrial	Agricultural	Kings	San Luis Obispo	Tulare	Dudley Ridge	Empire	Municipal and Industrial
	[71]	[72]	[73]	[74]	[75]	[76]	[77]	[78]	[79]	[80]	[81]	[82]
1962	0	0	0	0	0	0	0	0	0	0	0	0
1963	0	0	0	0	0	0	0	0	0	0	0	0
1964	0	0	0	0	0	0	0	0	0	0	0	0
1965	0	0	0	0	0	0	0	0	0	0	0	0
1966	0	0	0	0	0	0	0	0	0	0	0	0
1967	0	0	0	0	0	0	0	0	0	0	0	0
1968	0	900	25,100	26,360	0	0	0	0	0	0	0	0
1969	0	100	7,081	31,375	0	0	0	0	0	0	0	0
1970	0	0	0	40,407	0	0	0	0	3,408	0	0	0
1971	0	3,700	80,906	41,053	0	0	0	0	41,579	0	0	0
1972	0	1,400	144,843	42,443	0	0	0	0	113,550	0	0	0
1973	0	1,500	26,317	22,057	0	1,500	0	0	24,147	0	0	0
1974	0	1,500	32,603	33,390	0	0	0	0	39,686	0	0	0
1975	0	1,600	41,536	40,555	0	0	0	0	44,722	0	0	0
1976	0	1,600	26,595	41,421	0	0	0	0	32,216	0	0	0
1977	0	1,530	12,984	11,153	0	0	0	0	5,097	0	0	0
1978	0	2,070	3,934	51,747	0	0	0	0	8,119	0	0	0
1979	0	2,000	74,758	38,544	0	0	0	0	80,363	0	0	0
1980	0	2,200	35,140	41,000	0	0	0	0	40,304	0	0	0
1981	0	2,300	50,888	41,000	0	0	0	0	32,550	0	0	0
1982	0	1,536	4,405	41,000	0	0	214	0	14,146	0	0	0
1983	0	3,550	1,001	42,900	0	0	0	0	5	0	0	2,217
1984	0	3,100	3,677	45,100	0	0	0	0	2,066	0	0	4,100
1985	0	3,400	68,638	46,251	0	0	0	0	41,153	0	0	0
1986	0	3,700	40,017	50,249	0	0	0	0	39,338	0	0	0
1987	0	4,000	30,359	46,288	0	0	0	0	62,725	0	0	0
1988	0	4,000	46,281	47,994	0	0	0	0	48,035	0	0	1,100
1989	0	4,000	63,703	52,158	0	0	0	0	63,947	0	0	0
1990	0	2,000	23,504	36,296	0	161	0	0	32,066	0	0	0
1991	0	0	1,697	927	0	0	0	0	483	0	0	13,683
1992	0	1,806	15,982	12,667	0	0	0	0	30,746	0	0	28
1993	0	4,000	57,112	23,221	0	0	0	0	65,732	197	0	5,945
1994	0	2,116	21,510	28,793	0	1,726	0	0	40,852	0	0	0
1995	10,527	4,000	40,934	45,240	2,959	27,270	0	0	57,435	0	0	0
1996	1,500	4,000	84,130	52,722	0	1,455	0	100	148,745	0	0	2,236
1997	1,500	0	9,467	57,496	0	0	0	100	9,402	4,900	0	0
1998	1,000	15	8,956	49,435	0	20,000	0	0	8,721	0	0	0
1999	400	4,000	90,334	58,290	0	9,000	0	0	162,631	0	0	0
2000	400	3,600	63,842	57,920	0	0	0	0	113,952	0	0	0
2001	0	1,560	23,300	40,155	0	6,089	0	0	58,369	0	0	0
2002	0	2,854	34,009	48,179	0	7,522	0	0	47,426	0	0	0
2003	0	3,692	25,317	45,732	0	8,350	0	0	61,521	0	0	0
2004	0	5,803	30,546	45,823	0	4,979	0	0	55,625	0	0	0
2005	0	4,057	42,450	58,627	0	0	1,891	0	92,552	0	0	0
2006	0	1,105	34,367	61,410	0	0	3,266	0	64,840	0	0	0
2007	0	657	31,305	39,974	0	7,740	1,921	0	49,633	0	0	0
2008	0	240	14,146	18,974	0	21,242	107	0	16,903	0	0	0
2009	0	1,612	13,522	12,037	0	19,684	0	0	16,794	5,500	0	0
2010	0	26	14,005	17,346	0	14,094	1,900	0	40,609	0	0	0
2011	0	2,160	23,814	22,427	0	65	1,194	0	30,827	292	0	0
2012	0	2,699	25,847	17,122	0	2,168	0	0	56,570	3,400	0	0
2013	0	1,029	16,490	19,605	0	4,239	950	0	24,241	1,941	0	0
2014	0	81	2,880	12,960	0	3,554	66	0	5,118	1,000	0	0
2015	0	838	977	9,473	0	2,000	0	0	617	1,250	0	0
2016	0	2,651	534	11,403	0	140	0	0	2,447	3,430	0	0
2017	0	1,428	17,107	15,319	0	0	1,611	0	39,654	0	774	0
2018	0	1,124	21,643	23,745	0	3,200	98	0	37,214	0	0	0
2019	**0**	**912**	**20,993**	**16,568**	**0**	**0**	**1,368**	**0**	**31,490**	**0**	**0**	**0**
2020	0	912	20,993	17,768	0	0	1,368	0	31,490	0	0	0
2021	0	912	20,993	18,500	0	0	1,368	0	31,490	0	0	0
2022	0	912	20,993	18,500	0	0	1,368	0	31,490	0	0	0
2023	0	912	20,993	18,500	0	0	1,368	0	31,490	0	0	0
2024	0	912	20,993	18,500	0	0	1,368	0	31,490	0	0	0
2025	0	912	20,993	18,500	0	0	1,368	0	31,490	0	0	0
2026	0	912	20,993	18,500	0	0	1,368	0	31,490	0	0	0
2027	0	912	20,993	18,500	0	0	1,368	0	31,490	0	0	0
2028	0	912	20,993	18,500	0	0	1,368	0	31,490	0	0	0
2029	0	912	20,993	18,500	0	0	1,368	0	31,490	0	0	0
2030	0	912	20,993	18,500	0	0	1,368	0	31,490	0	0	0
2031	0	912	20,993	18,500	0	0	1,368	0	31,490	0	0	0
2032	0	912	20,993	18,500	0	0	1,368	0	31,490	0	0	0
2033	0	912	20,993	18,500	0	0	1,368	0	31,490	0	0	0
2034	0	912	20,993	18,500	0	0	1,368	0	31,490	0	0	0
2035	0	912	20,993	18,500	0	0	1,368	0	31,490	0	0	0
TOTAL	**15,327**	**124,343**	**1,967,374**	**2,129,599**	**2,959**	**166,178**	**36,474**	**200**	**2,644,211**	**21,910**	**774**	**29,309**

TABLE B-5A Annual Water Quantities Delivered from Each Aqueduct Reach to Each Contractor (acre-feet)

	CALIFORNIA AQUEDUCT (continued)											
	SOUTH SAN JOAQUIN DIVISION (continued)											
	Reach 9 (continued)		Reach 10A									
	Kern								Kern			
Calendar Year	Agricultural	Tulare	Alameda-Zone 7	Alameda County	AVEK	Castaic Lake	Dudley Ridge	Empire	Municipal and Industrial	Agricultural	Metropolitan	San Bernardino
	[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	30,951	0	0	0	0	0	0	0	0	0	0	0
1969	24,489	0	0	0	0	0	0	0	0	0	0	0
1970	46,114	1,855	0	0	0	0	0	0	0	158	0	0
1971	58,356	0	0	0	0	0	0	0	0	9,973	0	0
1972	75,464	0	0	0	0	0	0	0	0	5,876	0	0
1973	54,583	0	0	0	0	0	0	0	0	22,948	0	0
1974	63,814	0	0	0	0	0	0	0	10,019	22,719	0	0
1975	50,021	0	0	0	0	0	0	0	2,791	72,121	0	0
1976	53,465	0	0	0	0	0	0	0	74	50,444	0	0
1977	24,668	0	0	0	0	0	0	0	201	34,451	0	0
1978	72,231	0	0	0	0	0	0	0	0	161,889	0	0
1979	74,524	0	0	0	0	0	0	0	285	153,245	0	0
1980	79,946	0	0	0	0	0	0	0	3,780	131,836	0	0
1981	76,508	0	0	0	0	0	0	0	341	133,500	0	0
1982	76,877	0	0	0	0	0	0	0	4,700	164,832	0	0
1983	84,573	0	0	0	0	0	0	0	0	146,493	0	0
1984	85,732	0	0	0	0	0	0	0	6,910	150,302	0	0
1985	67,696	0	0	0	0	0	0	0	6,495	153,473	0	0
1986	79,943	0	0	0	0	0	0	0	5,065	198,099	0	0
1987	97,732	0	0	0	0	0	0	0	900	226,521	0	0
1988	83,858	0	0	0	0	0	0	0	9,529	212,495	0	0
1989	91,134	0	0	0	0	0	0	0	21,038	251,979	0	0
1990	83,108	0	0	0	0	0	0	0	25,189	47,472	0	0
1991	601	0	0	0	0	0	0	0	1,142	6,820	0	0
1992	40,183	0	0	0	0	0	0	0	3,685	89,390	0	0
1993	53,597	0	0	0	0	0	0	0	775	233,862	44,496	0
1994	44,994	0	0	0	0	0	0	0	5,227	126,792	0	0
1995	64,076	0	0	0	0	0	0	0	366	229,448	50,000	0
1996	89,291	0	0	6,200	0	0	0	0	6,666	199,854	95,000	0
1997	72,013	0	0	10,000	0	0	900	0	3,577	157,385	125,000	0
1998	57,530	0	1,970	3,780	0	0	0	0	2,603	163,587	39,500	0
1999	72,734	0	22,910	16,100	0	0	0	0	1,657	190,787	75,850	0
2000	73,562	0	23,940	13,380	0	0	0	0	7,672	283,208	0	0
2001	54,198	0	5,000	0	0	0	0	0	160	98,175	0	0
2002	60,957	0	14,287	2,083	0	24,000	0	0	145	171,498	0	0
2003	54,724	0	6,500	18,800	0	0	0	0	217	174,674	70,940	0
2004	54,330	0	5,740	8,000	0	32,522	0	0	65,751	117,286	0	0
2005	53,206	0	0	28,422	0	0	0	0	146	232,519	31,210	0
2006	56,909	0	5,740	27,447	0	0	5,000	0	0	237,623	0	0
2007	66,018	0	717	1,029	0	0	3,000	0	0	203,794	0	0
2008	63,315	0	0	0	0	0	2,800	0	1,702	103,176	0	0
2009	64,007	2,330	0	0	0	0	2,000	0	690	95,798	0	0
2010	76,357	0	3,000	7,000	0	0	2,000	0	14	102,773	74,000	0
2011	78,177	2,000	3,414	16,020	0	0	2,908	0	26	137,476	149,012	0
2012	69,395	2,000	0	7,500	0	0	1,660	0	29	201,876	45,000	2,868
2013	82,005	0	0	0	0	0	2,500	0	2,057	116,190	0	0
2014	67,754	0	0	0	0	0	0	0	0	40,332	0	0
2015	64,809	0	0	0	0	0	0	0	3,751	49,953	0	0
2016	68,699	0	5,000	18,272	0	0	1,075	0	817	101,941	0	0
2017	75,501	0	19,381	19,302	9,226	5,340	2,446	251	867	166,972	77,731	0
2018	49,022	0	0	0	0	0	0	0	452	87,434	0	0
2019	**60,816**	**0**	**0**	**3,240**	**0**	**0**	**0**	**0**	**0**	**138,454**	**64,097**	**0**
2020	60,816	0	0	2,836	0	0	0	0	0	138,454	67,755	0
2021	60,816	0	0	922	0	0	0	0	0	138,454	67,755	0
2022	60,816	0	0	1,980	0	0	0	0	0	138,454	67,755	0
2023	60,816	0	0	1,980	0	0	0	0	0	138,454	67,755	0
2024	60,816	0	0	1,980	0	0	0	0	0	138,454	67,755	0
2025	60,816	0	0	1,980	0	0	0	0	0	138,454	67,755	0
2026	60,816	0	0	1,980	0	0	0	0	0	138,454	67,755	0
2027	60,816	0	0	1,980	0	0	0	0	0	138,454	67,755	0
2028	60,816	0	0	1,980	0	0	0	0	0	138,454	67,755	0
2029	60,816	0	0	1,980	0	0	0	0	0	138,454	67,755	0
2030	60,816	0	0	1,980	0	0	0	0	0	138,454	67,755	0
2031	60,816	0	0	1,980	0	0	0	0	0	138,454	67,755	0
2032	60,816	0	0	1,980	0	0	0	0	0	138,454	67,755	0
2033	60,816	0	0	1,980	0	0	0	0	0	138,454	67,755	0
2034	60,816	0	0	1,980	0	0	0	0	0	138,454	67,755	0
2035	60,816	0	0	1,980	0	0	0	0	0	138,454	67,755	0
TOTAL	**4,297,623**	**8,185**	**117,599**	**238,053**	**9,226**	**61,862**	**26,289**	**251**	**207,511**	**8,825,167**	**2,025,916**	**2,868**

TABLE B-5A Annual Water Quantities Delivered from Each Aqueduct Reach to Each Contractor (acre-feet)

	CALIFORNIA AQUEDUCT (continued)										
	SOUTH SAN JOAQUIN DIVISION (continued)										
	Reach 10A (continued)		Reach 11B							Reach 12D	
						Kern				Kern	
Calendar Year	Santa Clara	Tulare	Castaic Lake	Dudley Ridge	Empire	Municipal and Industrial	Agricultural	Metropolitan	Tulare	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	0	0	0	0	0	24,776	0	0	0	0
1969	0	2,842	0	0	0	0	64,682	0	0	0	0
1970	0	4,315	0	0	0	0	72,279	0	0	0	0
1971	0	0	0	0	0	0	63,773	0	0	0	0
1972	0	0	0	0	0	0	72,358	0	0	0	0
1973	0	0	0	0	0	0	67,544	0	0	0	0
1974	0	0	0	0	0	0	87,476	0	0	0	0
1975	0	0	0	0	0	0	85,675	0	0	0	0
1976	0	0	0	0	0	0	85,067	0	0	0	0
1977	0	0	0	0	0	3,981	29,603	0	0	0	0
1978	0	0	0	0	0	0	88,753	0	0	0	0
1979	0	0	0	0	0	484	108,379	0	0	0	0
1980	0	0	0	0	0	3,112	103,207	0	0	0	0
1981	0	0	0	0	0	494	104,395	0	0	0	0
1982	0	0	0	0	0	798	99,081	0	0	0	0
1983	0	0	0	0	0	2,069	94,117	0	0	0	0
1984	0	0	0	0	0	2,349	124,819	0	0	0	0
1985	0	0	0	0	0	10,666	118,646	0	0	0	0
1986	0	0	0	0	0	8,673	124,836	0	0	0	0
1987	0	0	0	0	0	13,074	111,877	0	0	0	0
1988	0	0	0	0	0	13,509	114,031	0	0	0	0
1989	0	0	0	0	0	9,986	127,058	0	0	0	0
1990	0	0	0	0	0	9,319	104,107	0	0	0	0
1991	0	0	0	0	0	6,099	118	0	0	0	0
1992	0	0	0	0	0	7,419	35,093	0	0	0	0
1993	0	0	0	0	0	2,696	72,645	0	0	0	0
1994	0	0	0	0	0	3,506	71,202	0	0	0	0
1995	0	0	0	0	0	1,154	97,072	0	0	0	0
1996	45,000	0	0	0	0	1,185	96,250	0	0	0	0
1997	35,000	0	0	0	0	1,111	104,823	0	0	0	0
1998	23,800	0	0	0	0	1,311	72,646	0	0	0	0
1999	30,000	0	0	0	0	2,127	92,262	0	0	0	0
2000	23,730	0	0	1,500	0	3,793	89,622	0	0	21	0
2001	0	0	0	0	0	636	73,105	0	0	41	0
2002	3,311	0	0	0	0	1,457	91,123	0	0	760	6
2003	33,000	0	0	0	0	1,379	87,174	0	0	2,431	152
2004	0	0	0	0	0	1,299	97,722	0	0	3,419	768
2005	55,448	0	0	0	0	824	93,554	0	0	2,841	644
2006	64,036	0	0	0	0	0	98,417	0	0	2,513	1,556
2007	3,692	0	0	0	0	4,030	94,334	0	0	2,164	2,284
2008	4,306	0	0	0	0	263	93,417	0	0	1,514	3,000
2009	0	0	0	300	0	127	96,776	0	0	564	4,274
2010	51,990	800	0	5,350	0	381	92,220	0	974	1,904	2,206
2011	65,770	500	0	0	0	1,160	105,682	0	3,500	973	65
2012	0	0	5,500	2,000	0	1,019	94,519	0	0	3,128	939
2013	0	0	5,500	2,500	0	1,167	110,418	0	0	3,473	1,531
2014	0	0	0	9,786	0	0	87,728	0	0	0	5,225
2015	0	0	0	8,200	0	4,553	84,288	0	0	985	3,486
2016	9,634	0	0	5,000	0	1,037	91,735	942	0	2,225	1,442
2017	71,163	0	0	3,291	255	19,966	94,554	0	0	1,830	789
2018	2,600	0	0	0	0	3,563	48,103	0	0	10	966
2019	**0**	**0**	**0**	**0**	**0**	**9,000**	**51,000**	**0**	**0**	**4,226**	**0**
2020	0	0	0	0	0	9,000	51,000	0	0	4,226	0
2021	0	0	0	0	0	9,000	51,000	0	0	4,226	0
2022	0	0	0	0	0	9,000	51,000	0	0	4,226	0
2023	0	0	0	0	0	9,000	51,000	0	0	4,226	0
2024	0	0	0	0	0	9,000	51,000	0	0	4,226	0
2025	0	0	0	0	0	9,000	51,000	0	0	4,226	0
2026	0	0	0	0	0	9,000	51,000	0	0	4,226	0
2027	0	0	0	0	0	9,000	51,000	0	0	4,226	0
2028	0	0	0	0	0	9,000	51,000	0	0	4,226	0
2029	0	0	0	0	0	9,000	51,000	0	0	4,226	0
2030	0	0	0	0	0	9,000	51,000	0	0	4,226	0
2031	0	0	0	0	0	9,000	51,000	0	0	4,226	0
2032	0	0	0	0	0	9,000	51,000	0	0	4,226	0
2033	0	0	0	0	0	9,000	51,000	0	0	4,226	0
2034	0	0	0	0	0	9,000	51,000	0	0	4,226	0
2035	0	0	0	0	0	9,000	51,000	0	0	4,226	0
TOTAL	**522,480**	**8,457**	**11,000**	**37,927**	**255**	**304,776**	**5,310,141**	**942**	**4,474**	**102,638**	**29,333**

TABLE B-5A Annual Water Quantities Delivered from Each Aqueduct Reach to Each Contractor (acre-feet)

	CALIFORNIA AQUEDUCT (continued)										
	SOUTH SAN JOAQUIN DIVISION (continued)										
	Reach 12E										
						Kern					
Calendar Year	Alameda-Zone 7	Alameda County	AVEK	Castaic Lake	Dudley Ridge	Municipal and Industrial	Agricultural	Metropolitan	Santa Barbara	San Bernardino	Santa Clara
	[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	9,279	0	0	0	0
1971	0	0	0	0	0	0	28,056	0	0	0	0
1972	0	0	0	0	0	0	62,342	0	0	0	0
1973	0	0	0	0	0	0	13,082	0	0	0	0
1974	0	0	0	0	0	2,651	4,248	0	0	0	0
1975	0	0	0	0	0	0	10,787	0	0	0	0
1976	0	0	0	0	0	37,519	20,555	0	0	0	0
1977	0	0	0	0	0	20,280	1,737	0	0	0	0
1978	0	0	0	0	0	47,133	15,011	0	0	0	0
1979	0	0	0	0	0	50,740	61,567	0	0	0	0
1980	0	0	0	0	0	32,039	22,252	0	0	0	0
1981	0	0	0	0	0	59,917	58,470	0	0	0	0
1982	0	0	0	0	0	36,139	75,587	0	0	0	0
1983	0	0	0	0	0	0	10,950	0	0	0	0
1984	0	0	0	0	0	63,941	39,929	0	0	0	0
1985	0	0	0	0	0	69,839	84,117	0	0	0	0
1986	0	0	0	0	0	62,109	51,540	0	0	0	0
1987	0	0	0	0	0	95,297	86,223	0	0	0	0
1988	0	0	0	0	0	86,390	123,249	0	0	0	0
1989	0	0	0	0	0	83,965	146,544	0	0	0	0
1990	0	0	0	0	0	82,164	38,973	0	0	0	0
1991	0	0	0	0	0	8,842	303	0	0	0	0
1992	0	0	0	0	0	47,181	57,048	0	0	0	0
1993	0	0	0	0	0	84,822	285,554	5,504	0	0	0
1994	0	0	0	0	0	66,188	77,839	0	0	0	0
1995	0	0	0	0	1,000	107,130	181,097	0	0	0	0
1996	0	0	0	0	4,131	89,257	134,138	0	0	0	0
1997	0	0	0	0	8,012	32,061	128,329	1,486	0	0	0
1998	0	0	0	0	5,925	28,258	88,998	24,234	0	0	0
1999	0	0	0	0	1,321	110,161	255,343	62,162	0	0	0
2000	0	0	0	0	953	11,772	156,215	149,731	0	0	0
2001	0	0	0	0	0	385	51,076	0	0	0	0
2002	0	0	0	0	0	0	135,335	0	0	0	0
2003	0	0	0	0	0	39,479	112,056	45,989	0	0	0
2004	0	0	0	0	1,600	52,303	95,893	0	0	0	0
2005	3,419	1,878	0	20,000	1,154	43,835	340,281	15,384	0	0	2,619
2006	10,000	0	0	20,000	0	82,207	296,230	5,065	0	0	0
2007	0	0	0	8,200	0	1,179	87,764	0	0	0	0
2008	0	0	0	0	0	0	58,983	0	0	0	0
2009	0	0	0	0	0	0	82,434	0	0	0	0
2010	10,000	0	0	25,844	0	4,851	72,809	134,855	0	0	0
2011	10,000	1,960	0	0	0	26,249	309,617	109,787	4,002	8,066	706
2012	20,308	0	0	6,416	200	19,423	102,054	92,803	0	19,066	0
2013	0	0	0	0	0	26,652	60,295	0	0	0	0
2014	0	0	0	0	0	0	500	0	0	0	0
2015	0	0	0	0	0	280	2,750	0	0	0	0
2016	7,000	0	0	0	0	1,225	64,819	3,908	0	0	0
2017	10,619	0	25,417	0	13,924	8,681	332,341	76,519	0	0	0
2018	0	0	0	0	0	27,617	41,171	0	0	0	0
2019	**5,000**	**0**	**0**	**0**	**0**	**50,703**	**67,584**	**31,933**	**0**	**0**	**0**
2020	5,000	0	0	0	0	50,703	67,584	33,656	0	0	0
2021	5,000	0	0	0	0	50,703	67,584	33,656	0	0	0
2022	5,000	0	0	0	0	50,703	67,584	33,656	0	0	0
2023	5,000	0	0	0	0	50,703	67,584	33,656	0	0	0
2024	5,000	0	0	0	0	50,703	67,584	33,656	0	0	0
2025	5,000	0	0	0	0	50,703	67,584	33,656	0	0	0
2026	5,000	0	0	0	0	50,703	67,584	33,656	0	0	0
2027	5,000	0	0	0	0	50,703	67,584	33,656	0	0	0
2028	5,000	0	0	0	0	50,703	67,584	33,656	0	0	0
2029	5,000	0	0	0	0	50,703	67,584	33,656	0	0	0
2030	5,000	0	0	0	0	50,703	67,584	33,656	0	0	0
2031	5,000	0	0	0	0	50,703	67,584	33,656	0	0	0
2032	5,000	0	0	0	0	50,703	67,584	33,656	0	0	0
2033	5,000	0	0	0	0	50,703	67,584	33,656	0	0	0
2034	5,000	0	0	0	0	50,703	67,584	33,656	0	0	0
2035	5,000	0	0	0	0	50,703	67,584	33,656	0	0	0
TOTAL	**156,346**	**3,838**	**25,417**	**80,460**	**38,220**	**2,612,112**	**5,724,698**	**1,297,856**	**4,002**	**27,132**	**3,325**

TABLE B-5A Annual Water Quantities Delivered from Each Aqueduct Reach to Each Contractor (acre-feet)

	CALIFORNIA AQUEDUCT (continued)											
	SOUTH SAN JOAQUIN DIVISION (continued)											
	Reach 13B										Reach 14A	
				Kern							Kern	
Calendar Year	Alameda-Zone 7	Alameda County	Dudley Ridge	Municipal and Industrial	Agricultural	Metropolitan	Palmdale	Santa Barbara	Santa Clara	Tulare	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	4,891	0	0	0	0	0	0	0
1971	0	0	0	0	0	0	0	0	0	0	0	23,844
1972	0	0	0	0	17,388	0	0	0	0	0	0	26,621
1973	0	0	0	0	9,297	0	0	0	0	0	0	15,328
1974	0	0	0	8,038	4,246	0	0	0	0	0	0	7,794
1975	0	0	0	8,538	7,059	0	0	0	0	0	0	10,306
1976	0	0	0	5,626	8,855	0	0	0	0	0	0	268
1977	0	0	0	0	5,024	0	0	0	0	0	0	8,299
1978	0	0	0	21,773	7,601	0	0	0	0	0	0	34,029
1979	0	0	0	5,663	17,766	0	0	0	0	0	3,012	27,356
1980	0	0	0	0	22,515	0	0	0	0	0	4,312	16,876
1981	0	0	0	7,844	14,037	0	0	0	0	0	4,511	13,007
1982	0	0	0	0	25,553	0	0	0	0	0	3,735	24,240
1983	0	0	0	0	3,491	0	0	0	0	0	1,168	20,302
1984	0	0	0	12,117	26,178	0	0	0	0	0	137	35,369
1985	0	0	0	0	67,711	0	0	0	0	0	206	33,103
1986	0	0	0	0	66,551	0	0	0	0	0	180	26,384
1987	0	0	0	5,609	40,374	0	0	0	0	0	610	30,098
1988	0	0	0	9,298	47,167	0	0	0	0	0	622	32,778
1989	0	0	0	5,504	57,114	0	0	0	0	0	721	29,292
1990	0	0	0	7,645	20,423	0	0	0	0	0	673	26,800
1991	0	0	0	0	0	0	0	0	0	0	768	0
1992	0	0	0	789	17,449	0	0	0	0	0	673	16,238
1993	0	0	0	12,798	88,157	0	0	0	0	0	629	17,832
1994	0	0	0	2,494	33,148	0	0	0	0	0	2,513	16,760
1995	0	0	0	8,751	110,685	0	0	0	0	3,500	3	21,234
1996	0	0	0	28,063	64,849	0	0	0	0	0	0	26,978
1997	0	0	0	43,803	49,312	0	0	0	0	0	0	23,035
1998	0	0	0	29,444	40,085	5,500	0	0	0	0	0	15,706
1999	0	0	0	12,969	92,998	0	0	0	0	0	0	21,153
2000	0	0	0	0	102,202	0	0	0	0	0	0	19,264
2001	0	0	1,733	0	33,925	0	0	0	0	0	0	12,452
2002	0	0	736	0	71,444	0	0	0	0	0	0	11,161
2003	0	0	350	2,396	124,582	1,865	0	0	0	0	0	13,685
2004	0	0	1,657	1,922	73,801	0	0	0	0	0	0	13,030
2005	2,321	0	14,540	21,781	269,631	192	0	0	9,014	0	0	15,663
2006	0	0	5,670	11,787	196,116	0	0	0	0	0	0	17,779
2007	0	0	2,161	0	72,240	0	0	0	0	0	0	21,435
2008	0	0	0	200	9,785	0	0	0	2,324	0	0	20,087
2009	0	0	0	0	12,060	0	0	0	0	0	0	22,281
2010	0	0	304	0	63,966	22,000	0	0	0	10,000	0	21,964
2011	2,331	3,420	34,733	4,896	265,382	25,845	7,000	7,893	0	0	0	24,131
2012	0	0	0	448	70,805	1,950	2,500	0	0	8,000	0	25,982
2013	0	0	0	0	14,189	0	0	0	0	0	0	29,414
2014	0	0	0	0	2,246	0	0	0	0	0	0	28,172
2015	0	0	0	0	481	0	0	0	0	0	0	25,886
2016	0	0	0	3,005	12,815	0	0	0	0	0	0	27,686
2017	0	0	28,829	3,201	191,360	4,477	0	0	0	0	0	26,521
2018	0	0	0	0	18,363	0	0	0	0	0	0	10,863
2019	**0**	**0**	**12,000**	**0**	**24,135**	**0**	**0**	**0**	**0**	**0**	**0**	**17,500**
2020	0	0	10,800	0	24,135	0	0	0	0	0	0	17,500
2021	0	0	10,068	0	24,135	0	0	0	0	0	0	17,500
2022	0	0	10,068	0	24,135	0	0	0	0	0	0	17,500
2023	0	0	10,068	0	24,135	0	0	0	0	0	0	17,500
2024	0	0	10,068	0	24,135	0	0	0	0	0	0	17,500
2025	0	0	10,068	0	24,135	0	0	0	0	0	0	17,500
2026	0	0	10,068	0	24,135	0	0	0	0	0	0	17,500
2027	0	0	10,068	0	24,135	0	0	0	0	0	0	17,500
2028	0	0	10,068	0	24,135	0	0	0	0	0	0	17,500
2029	0	0	10,068	0	24,135	0	0	0	0	0	0	17,500
2030	0	0	10,068	0	24,135	0	0	0	0	0	0	17,500
2031	0	0	10,068	0	24,135	0	0	0	0	0	0	17,500
2032	0	0	10,068	0	24,135	0	0	0	0	0	0	17,500
2033	0	0	10,068	0	24,135	0	0	0	0	0	0	17,500
2034	0	0	10,068	0	24,135	0	0	0	0	0	0	17,500
2035	0	0	10,068	0	24,135	0	0	0	0	0	0	17,500
TOTAL	**4,652**	**3,420**	**264,533**	**286,402**	**2,985,612**	**61,829**	**9,500**	**7,893**	**11,338**	**21,500**	**24,473**	**1,285,986**

TABLE B-5A Annual Water Quantities Delivered from Each Aqueduct Reach to Each Contractor (acre-feet)

	CALIFORNIA AQUEDUCT (continued)											
	SOUTH SAN JOAQUIN DIVISION (continued)										TEHACHAPI DIVISION	MOJAVE DIVISION
	Reach 14B		Reach 14C			Reach 15A		Reach 16A			Reach 17E	Reach 18A
	Kern		Kern			Kern			Kern		Kern	
Calendar Year	Municipal and Industrial	Agricultural	Municipal and Industrial	Agricultural	Metropolitan	Municipal and Industrial	Agricultural	AVEK	Municipal and Industrial	Agricultural	(Municipal and Industrial)	AVEK
	[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	3	0	0	0	0	0	0	0	0	0	0
1971	0	49,929	0	24,187	0	0	3,552	0	0	0	0	0
1972	0	77,034	0	35,016	0	0	6,064	0	0	4,768	0	0
1973	0	47,040	0	19,043	0	0	19,916	0	0	1,961	0	0
1974	0	32,356	0	12,601	0	0	18,000	0	3,000	1,564	0	0
1975	0	27,736	0	12,783	0	0	35,420	0	3,200	9,867	0	0
1976	0	35,296	0	9,005	0	0	39,551	0	3,500	11,667	0	3,808
1977	0	13,539	0	3,757	0	0	6,158	0	3,420	685	0	1,231
1978	0	72,351	0	24,542	0	0	31,148	0	7,989	1,655	0	1,321
1979	0	59,413	0	22,372	0	0	38,602	0	2,813	15,808	0	2,098
1980	0	40,513	0	19,953	0	0	37,817	0	2,700	16,145	0	2,610
1981	8	42,753	7	18,729	0	0	39,033	0	2,636	18,156	0	2,340
1982	184	57,739	0	26,479	0	0	47,782	0	1,921	16,577	0	1,669
1983	0	57,922	0	26,613	0	0	37,426	0	1,400	17,907	0	43
1984	10	79,179	2	34,996	0	0	49,848	0	1,338	24,246	0	90
1985	0	72,855	0	31,758	0	0	44,078	0	1,309	16,820	0	8
1986	0	70,864	0	34,566	0	0	42,461	0	1,213	15,559	0	8
1987	9	67,710	10	31,019	0	0	34,748	0	1,665	10,170	0	0
1988	19	75,968	1	37,165	0	16	41,978	0	1,925	8,987	0	0
1989	7	82,201	5	37,800	0	2	43,239	0	2,668	8,649	0	0
1990	13	81,076	9	34,174	0	6	36,347	0	2,819	8,608	0	0
1991	0	0	0	0	0	0	0	2,000	2,588	343	0	0
1992	464	41,143	0	18,084	0	0	24,243	0	2,087	8,275	0	0
1993	0	62,493	0	28,103	0	0	27,997	0	2,494	9,167	0	0
1994	3,000	54,011	1,000	22,624	0	0	29,511	0	3,011	13,877	0	0
1995	0	67,391	0	31,285	0	0	26,134	0	3,188	15,042	0	0
1996	0	85,936	0	38,879	0	0	36,186	0	2,573	18,142	0	0
1997	0	79,790	0	33,512	0	0	36,281	0	3,997	17,048	0	0
1998	0	58,132	0	23,097	0	0	28,712	0	3,751	17,032	0	0
1999	0	67,576	0	31,489	0	0	36,801	0	3,316	24,071	0	0
2000	0	70,585	0	33,716	0	0	40,063	0	3,015	20,919	0	0
2001	0	49,602	0	23,557	0	0	31,192	0	1,894	13,476	0	0
2002	0	52,762	0	27,138	0	0	41,552	0	4,227	14,520	0	0
2003	0	44,576	0	24,783	12,911	0	36,602	0	1,168	16,799	0	0
2004	0	52,012	0	30,313	0	0	40,184	0	2,239	19,714	0	0
2005	0	56,739	0	21,979	0	0	39,870	0	167	18,353	0	11
2006	0	65,142	1,413	20,193	5,440	0	46,244	0	279	22,570	0	0
2007	0	67,955	0	24,947	1,881	0	47,390	0	204	26,229	0	0
2008	0	63,497	0	27,847	0	0	33,029	0	3,834	18,426	0	0
2009	0	60,726	0	27,185	0	0	26,007	0	1,531	19,517	0	0
2010	0	58,110	0	25,477	29,818	0	22,045	0	1,033	19,829	0	0
2011	0	61,859	0	27,061	27,326	0	42,158	0	3,808	17,957	0	0
2012	0	64,489	0	23,446	31,703	0	27,920	0	3,453	19,842	0	0
2013	0	62,137	0	25,004	6,592	0	28,147	0	148	21,311	4	16
2014	0	50,337	0	20,992	0	0	10,784	0	0	18,673	1	0
2015	0	48,996	0	17,267	0	0	10,202	0	2,407	16,214	0	0
2016	0	55,147	0	23,159	911	0	15,901	0	1,324	21,278	0	11
2017	0	67,601	0	28,487	19,176	0	45,572	0	2,249	28,182	0	318
2018	0	18,525	0	10,186	15,132	0	24,471	0	4,946	18,177	0	0
2019	**0**	**41,553**	**0**	**20,500**	**81,059**	**0**	**25,800**	**0**	**8,777**	**15,480**	**0**	**308**
2020	0	41,553	0	20,500	85,678	0	25,800	0	8,777	15,480	0	336
2021	0	41,553	0	20,500	85,678	0	25,800	0	8,777	15,480	0	371
2022	0	41,553	0	20,500	85,678	0	25,800	0	8,777	15,480	0	371
2023	0	41,553	0	20,500	85,678	0	25,800	0	8,777	15,480	0	371
2024	0	41,553	0	20,500	85,678	0	25,800	0	8,777	15,480	0	371
2025	0	41,553	0	20,500	85,678	0	25,800	0	8,777	15,480	0	371
2026	0	41,553	0	20,500	85,678	0	25,800	0	8,777	15,480	0	371
2027	0	41,553	0	20,500	85,678	0	25,800	0	8,777	15,480	0	371
2028	0	41,553	0	20,500	85,678	0	25,800	0	8,777	15,480	0	371
2029	0	41,553	0	20,500	85,678	0	25,800	0	8,777	15,480	0	371
2030	0	41,553	0	20,500	85,678	0	25,800	0	8,777	15,480	0	371
2031	0	41,553	0	20,500	85,678	0	25,800	0	8,777	15,480	0	371
2032	0	41,553	0	20,500	85,678	0	25,800	0	8,777	15,480	0	371
2033	0	41,553	0	20,500	85,678	0	25,800	0	8,777	15,480	0	371
2034	0	41,553	0	20,500	85,678	0	25,800	0	8,777	15,480	0	371
2035	0	41,553	0	20,500	85,678	0	25,800	0	8,777	15,480	0	371
TOTAL	**3,714**	**3,437,147**	**2,447**	**1,534,868**	**1,602,797**	**24**	**1,946,966**	**2,000**	**259,656**	**967,942**	**5**	**21,791**

TABLE B-5A Annual Water Quantities Delivered from Each Aqueduct Reach to Each Contractor (acre-feet)

Calendar Year	CALIFORNIA AQUEDUCT (continued)											
	MOJAVE DIVISION (continued)											
	Reach 19			Reach 20A				Reach 20B			Reach 21	
	AVEK	Metropolitan	Mojave	AVEK	Metropolitan	Mojave	Palmdale	AVEK	Littlerock	Palmdale	AVEK	Littlerock
	[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	0	0	0	0	0	0	0	0	0	0	338
1973	0	0	0	0	0	0	0	0	0	0	0	290
1974	1,223	0	0	0	0	0	0	0	0	0	0	400
1975	7,622	0	0	420	0	0	0	0	0	0	0	520
1976	23,063	0	0	471	0	0	0	416	0	0	0	589
1977	8,927	0	0	773	0	0	0	271	0	0	0	111
1978	36,333	0	0	5,549	0	0	0	934	0	0	0	208
1979	49,910	0	0	7,555	0	0	0	930	0	0	0	133
1980	61,534	0	0	7,605	0	0	0	655	0	0	0	191
1981	65,690	0	0	10,333	0	0	0	966	0	0	0	1,270
1982	41,127	0	0	7,313	0	0	0	8	0	0	0	0
1983	26,377	0	0	6,253	0	0	0	20	0	0	0	38
1984	22,462	0	0	9,558	0	0	0	2	0	0	0	1
1985	23,440	0	0	11,613	0	0	1,510	217	0	32	0	0
1986	16,898	0	0	13,808	0	0	3,041	0	0	45	0	163
1987	15,958	0	0	15,493	0	0	2,389	151	0	1,624	0	1,080
1988	13,471	0	0	17,117	0	0	366	281	0	1,261	0	419
1989	18,007	0	0	23,481	0	0	381	112	0	7,848	0	971
1990	17,281	0	0	25,843	0	0	282	84	0	8,292	0	1,747
1991	728	0	0	4,282	0	1,391	84	131	0	3,830	0	522
1992	7,238	0	0	18,518	0	1,310	185	650	0	3,850	0	251
1993	13,340	0	0	23,662	0	1,514	164	996	0	7,597	0	734
1994	19,122	0	0	25,250	0	1,399	299	124	0	8,119	0	1,098
1995	20,222	0	0	22,385	0	1,227	328	0	0	6,633	0	480
1996	23,919	0	0	26,979	0	1,316	354	0	0	11,080	0	494
1997	28,834	0	64	27,999	0	1,272	313	0	0	11,548	0	444
1998	22,466	0	1,345	25,985	0	0	195	0	0	8,557	0	404
1999	30,944	0	1,439	32,409	0	0	377	36	0	12,901	0	342
2000	34,786	0	1,361	37,819	0	0	0	80	0	9,060	5,002	0
2001	24,370	0	1,385	33,216	0	0	0	282	0	10,427	0	0
2002	14,297	0	1,370	36,311	0	0	0	1,662	0	18,496	0	0
2003	12,145	0	1,285	39,532	0	0	0	2,289	0	11,547	0	0
2004	11,201	0	1,223	40,408	0	0	0	1,774	0	12,139	0	0
2005	11,804	0	1,051	41,496	0	0	0	1,336	0	11,678	0	0
2006	18,438	0	1,021	53,878	0	0	0	1,415	0	12,487	0	0
2007	22,916	0	1,176	47,639	0	0	0	1,349	0	19,609	0	0
2008	9,096	0	1,238	33,919	0	0	0	792	25	14,255	0	0
2009	5,717	0	1,345	35,402	0	0	0	366	42	15,339	0	0
2010	10,825	0	1,181	43,122	0	0	0	643	0	10,969	0	0
2011	55,707	0	2,184	35,543	0	0	0	507	0	9,881	0	0
2012	41,053	0	1,306	33,390	0	0	0	901	0	16,397	0	0
2013	13,414	0	1,095	33,507	0	0	0	693	0	10,567	0	0
2014	621	0	41	15,761	0	1,004	0	744	0	8,406	0	0
2015	0	0	0	12,447	0	1,023	0	447	0	5,836	0	0
2016	15,374	14	0	20,506	0	984	0	677	0	10,516	0	0
2017	74,036	7,526	71	24,629	2,500	858	0	1,204	0	13,858	0	0
2018	36,227	5	0	14,478	0	991	0	611	0	7,832	0	690
2019	**48,079**	**10,000**	**0**	**35,745**	**0**	**1,032**	**0**	**1,264**	**0**	**18,780**	**0**	**1,380**
2020	52,886	0	0	30,631	0	1,032	0	1,391	0	18,780	0	1,380
2021	58,176	0	0	25,003	0	1,032	0	1,533	0	18,780	0	1,380
2022	58,176	0	0	25,003	0	1,032	0	1,533	0	18,780	0	1,380
2023	58,176	0	0	25,003	0	1,032	0	1,533	0	18,780	0	1,380
2024	58,176	0	0	25,003	0	1,032	0	1,533	0	18,780	0	1,380
2025	58,176	0	0	25,003	0	1,032	0	1,533	0	18,780	0	1,380
2026	58,176	0	0	25,003	0	1,032	0	1,533	0	18,780	0	1,380
2027	58,176	0	0	25,003	0	1,032	0	1,533	0	18,780	0	1,380
2028	58,176	0	0	25,003	0	1,032	0	1,533	0	18,780	0	1,380
2029	58,176	0	0	25,003	0	1,032	0	1,533	0	18,780	0	1,380
2030	58,176	0	0	25,003	0	1,032	0	1,533	0	18,780	0	1,380
2031	58,176	0	0	25,003	0	1,032	0	1,533	0	18,780	0	1,380
2032	58,176	0	0	25,003	0	1,032	0	1,533	0	18,780	0	1,380
2033	58,176	0	0	25,003	0	1,032	0	1,533	0	18,780	0	1,380
2034	58,176	0	0	25,003	0	1,032	0	1,533	0	18,780	0	1,380
2035	58,176	0	0	25,003	0	1,032	0	1,533	0	18,780	0	1,380
TOTAL	**2,001,768**	**17,545**	**21,181**	**1,445,078**	**2,500**	**31,833**	**10,268**	**50,406**	**67**	**641,776**	**5,002**	**37,388**

TABLE B-5A Annual Water Quantities Delivered from Each Aqueduct Reach to Each Contractor (acre-feet)

Calendar Year	CALIFORNIA AQUEDUCT (continued)									
	MOJAVE DIVISION (continued)									
	Reach 21 (continued)	Reach 22A		Reach 22B						Reach 23
	Palmdale	AVEK	Littlerock	AVEK[d]	Coachella[e]	Desert[e]	Metropolitan[e]	Mojave	Santa Barbara	Mojave
	[153]	[154]	[155]	[156]	[157]	[158]	[159]	[160]	[161]	[162]
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	55	0	0
1973	0	0	0	0	5,800	9,000	(14,800)	0	0	0
1974	0	0	0	0	6,400	10,000	(16,400)	0	0	14
1975	0	0	0	0	7,000	11,000	(18,000)	0	0	0
1976	0	0	0	0	7,600	12,000	(19,600)	0	0	0
1977	0	0	0	0	0	0	0	22	0	58
1978	0	0	0	0	10,084	15,300	(25,384)	0	0	0
1979	0	0	0	0	10,063	15,000	(25,063)	4,000	0	0
1980	0	3	0	0	10,884	17,000	(27,884)	4,000	0	0
1981	0	46	0	0	12,105	19,000	(31,105)	4,000	0	0
1982	0	174	0	0	13,326	21,000	(34,326)	10,500	0	0
1983	0	268	0	0	14,547	23,000	(37,547)	0	0	0
1984	0	550	0	0	15,768	25,000	(40,768)	0	0	0
1985	16	1,786	0	0	16,989	27,000	(43,989)	0	0	0
1986	10	1,735	0	0	18,210	29,000	(47,210)	0	0	0
1987	1,366	2,273	5	214	19,431	31,500	(50,931)	17	0	0
1988	143	3,210	0	0	20,652	34,000	(54,652)	9	0	0
1989	780	3,591	0	89	21,873	36,500	(58,373)	0	0	200
1990	34	3,988	0	10	23,100	38,100	(61,200)	0	0	0
1991	0	2,427	0	0	6,930	11,430	(18,360)	0	0	0
1992	0	3,859	0	0	10,427	17,197	(27,624)	42	0	0
1993	0	5,098	0	0	0	0	0	0	0	0
1994	0	4,657	0	0	0	0	0	14,634	0	0
1995	0	4,679	0	0	0	0	0	7,495	0	0
1996	0	5,458	0	0	0	0	0	6,111	0	0
1997	0	5,549	0	0	0	0	0	9,038	0	0
1998	0	4,468	0	0	0	0	0	2,580	0	0
1999	0	5,684	0	0	0	0	0	6,705	0	0
2000	0	5,890	0	0	0	0	0	10,019	0	0
2001	0	4,989	0	0	0	0	0	3,048	0	0
2002	0	5,404	0	497	0	0	0	2,976	0	0
2003	0	6,063	0	0	0	0	7,625	13,150	0	0
2004	23	6,095	0	253	0	0	0	11,953	0	0
2005	34	5,184	0	0	0	0	5,942	12,169	0	0
2006	5	6,653	0	0	0	0	0	32,993	0	0
2007	25	7,711	0	588	0	0	0	27,684	0	0
2008	0	4,756	0	0	0	0	0	20,479	0	0
2009	0	4,185	0	0	0	0	0	20,214	0	0
2010	0	3,899	0	0	0	0	0	27,640	0	0
2011	0	2,289	0	0	0	0	30,907	2,915	0	0
2012	0	2,328	0	0	0	0	12,025	9,938	0	0
2013	0	3,227	0	118	0	0	0	5,888	0	0
2014	0	1,318	0	88	0	0	0	2,536	0	0
2015	0	1,298	0	116	0	0	0	7,807	0	0
2016	0	3,155	0	144	0	0	0	12,949	1,125	0
2017	0	2,231	0	0	0	0	0	23,020	0	0
2018	0	689	0	0	0	0	0	5,757	0	0
2019	**0**	**894**	**0**	**0**	**0**	**0**	**0**	**34,554**	**0**	**0**
2020	0	983	0	0	0	0	0	34,758	0	0
2021	0	1,081	0	0	0	0	0	34,974	0	0
2022	0	1,081	0	0	0	0	0	34,974	0	0
2023	0	1,081	0	0	0	0	0	34,974	0	0
2024	0	1,081	0	0	0	0	0	34,974	0	0
2025	0	1,081	0	0	0	0	0	34,974	0	0
2026	0	1,081	0	0	0	0	0	34,974	0	0
2027	0	1,081	0	0	0	0	0	34,974	0	0
2028	0	1,081	0	0	0	0	0	34,974	0	0
2029	0	1,081	0	0	0	0	0	34,974	0	0
2030	0	1,081	0	0	0	0	0	34,974	0	0
2031	0	1,081	0	0	0	0	0	34,974	0	0
2032	0	1,081	0	0	0	0	0	34,974	0	0
2033	0	1,081	0	0	0	0	0	34,974	0	0
2034	0	1,081	0	0	0	0	0	34,974	0	0
2035	0	1,081	0	0	0	0	0	34,974	0	0
TOTAL	**2,436**	**154,959**	**5**	**2,117**	**251,189**	**402,027**	**(596,717)**	**916,265**	**1,125**	**272**

[d] 1988 advance allocation.

[e] 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)

	CALIFORNIA AQUEDUCT (continued)									
	MOJAVE DIVISION (continued)				SANTA ANA DIVISION					
	Reach 24				Reach 26A					Reach 28G
Calendar Year	Crestline	Metropolitan[e]	Mojave	San Bernardino	Coachella[e]	Desert[e]	Metropolitan[e]	San Bernardino[f]	San Gabriel	Metropolitan
	[163]	[164]	[165]	[166]	[167]	[168]	[169]	[170]	[171]	[172]
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	464	0	0	0	0	0	0	1,275	0	0
1973	389	0	0	0	0	0	444	32,426	0	18,942
1974	627	0	0	0	0	0	84,981	16,605	612	0
1975	825	0	0	0	0	0	169,960	13,865	5,450	0
1976	1,002	0	0	0	0	0	215,312	12,273	6,071	0
1977	1,109	0	0	0	0	0	64,823	24,833	8,996	0
1978	1,209	0	0	0	0	0	297,708	4,055	7,771	0
1979	1,260	0	0	0	0	0	260,903	18	290	0
1980	1,239	0	0	0	0	0	300,345	0	1,085	0
1981	1,485	0	0	0	0	0	395,678	16,021	3,619	0
1982	1,238	0	0	0	0	0	214,566	8,409	12,599	0
1983	911	0	0	0	0	0	175,288	5,994	734	0
1984	1,128	0	0	0	0	0	122,311	5,556	7,656	0
1985	1,422	0	0	0	0	0	147,599	7,390	5,028	0
1986	1,506	0	0	0	0	0	215,265	6,421	9,454	0
1987	1,849	0	0	0	0	0	175,012	18,751	10,630	0
1988	2,006	0	0	0	0	0	247,101	21,386	8,948	0
1989	2,170	0	0	0	0	0	326,217	20,782	12,839	0
1990	1,827	0	0	0	0	0	399,387	18,831	16,649	0
1991	849	0	2,032	0	0	0	107,182	3,661	5,399	0
1992	519	0	9,334	0	0	0	219,524	3,358	7,908	0
1993	439	0	10,000	0	23,100	38,100	98,291	4,361	14,397	0
1994	785	0	819	0	14,102	23,257	192,979	9,135	15,230	0
1995	409	0	0	0	23,100	38,100	107,299	696	12,922	0
1996	485	0	0	0	62,219	102,622	73,438	6,064	15,989	0
1997	651	0	0	0	58,100	53,100	157,215	9,654	18,175	0
1998	187	0	0	0	78,100	58,100	36,770	1,878	9,310	0
1999	1,132	0	0	0	50,480	58,100	139,752	12,874	21,729	0
2000	1,194	0	0	0	42,323	58,234	326,647	0	15,140	0
2001	1,057	0	0	0	9,100	15,010	284,007	0	2,360	0
2002	2,189	0	0	0	16,755	27,640	301,700	26,399	24,851	0
2003	1,563	17,249	0	0	14,443	23,819	464,719	5,000	21,934	0
2004	2,006	0	0	0	15,465	21,190	428,316	40,000	12,541	0
2005	807	14,058	341	0	34,356	49,089	361,976	15,834	13,984	0
2006	641	0	0	0	121,100	50,000	404,594	20,000	16,284	0
2007	1,768	0	17,249	710	66,007	27,253	370,971	10,022	4,024	0
2008	848	0	3,679	411	40,171	24,643	210,520	187	7,212	0
2009	894	0	7,488	149	45,074	17,872	138,216	0	11,520	0
2010	357	0	9,331	26	53,866	18,398	463,654	20,008	19,180	0
2011	474	14,141	0	31	84,566	34,076	610,454	368	23,591	0
2012	624	2,994	0	0	98,793	33,806	362,047	50,723	22,058	0
2013	1,368	0	500	0	33,551	17,611	234,576	1,120	9,252	0
2014	1,233	0	0	202	9,966	3,049	95,402	1,345	1,200	0
2015	1,253	0	0	0	26,600	67	110,774	2,100	5,760	0
2016	1,084	0	8,350	76	59,654	21,893	427,649	3,974	16,088	0
2017	294	0	10,866	219	67,648	26,819	721,554	2,560	22,056	0
2018	2,385	0	0	218	77,198	44,932	180,980	124	15,615	0
2019	**3,480**	**0**	**15,894**	**400**	**83,010**	**0**	**296,466**	**0**	**17,280**	**0**
2020	3,480	0	15,690	400	83,010	0	329,670	0	17,280	0
2021	3,480	0	15,474	0	83,010	0	329,670	0	17,280	0
2022	3,480	0	15,474	0	83,010	0	329,670	0	17,280	0
2023	3,480	0	15,474	0	83,010	0	329,670	0	17,280	0
2024	3,480	0	15,474	0	83,010	0	329,670	0	17,280	0
2025	3,480	0	15,474	0	83,010	0	329,670	0	17,280	0
2026	3,480	0	15,474	0	83,010	0	329,670	0	17,280	0
2027	3,480	0	15,474	0	83,010	0	329,670	0	17,280	0
2028	3,480	0	15,474	0	83,010	0	329,670	0	17,280	0
2029	3,480	0	15,474	0	83,010	0	329,670	0	17,280	0
2030	3,480	0	15,474	0	83,010	0	329,670	0	17,280	0
2031	3,480	0	15,474	0	83,010	0	329,670	0	17,280	0
2032	3,480	0	15,474	0	83,010	0	329,670	0	17,280	0
2033	3,480	0	15,474	0	83,010	0	329,670	0	17,280	0
2034	3,480	0	15,474	0	83,010	0	329,670	0	17,280	0
2035	3,480	0	15,474	0	83,010	0	329,670	0	17,280	0
TOTAL	**110,321**	**48,442**	**343,683**	**2,842**	**2,637,007**	**886,780**	**17,015,292**	**486,336**	**797,900**	**18,942**

[e] 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.

[f] Includes 1,650 acre-feet recaptured from groundwater storage in 1982, 10,000 acre-feet in 1987, and 8,749 acre-feet in 1988. This water was stored under DWR's Ground Water Demonstration Program.

TABLE B-5A Annual Water Quantities Delivered from Each Aqueduct Reach to Each Contractor (acre-feet)

Calendar Year	CALIFORNIA AQUEDUCT (continued)									
	SANTA ANA DIVISION (continued)									
	Reach 28H			Reach 28J			Reach EBX1			Reach EBX2C
	Coachella	Desert	Metropolitan	Coachella	Desert	Metropolitan	Coachella	Metropolitan	San Bernardino	San Bernardino
	[173]	[174]	[175]	[176]	[177]	[178]	[179]	[180]	[181]	[182]
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	251	0	0	0	0
1976	0	0	55	0	0	2,000	0	0	0	0
1977	0	0	43	0	0	2,442	0	0	0	0
1978	0	0	48	0	0	64,054	0	0	0	0
1979	0	0	1,290	0	0	94,353	0	0	0	0
1980	0	0	3,013	0	0	91,532	0	0	0	0
1981	0	0	4,365	0	0	149,405	0	0	0	0
1982	0	0	3,961	0	0	155,629	0	0	0	0
1983	0	0	6,645	0	0	41,616	0	0	0	0
1984	0	0	109,743	0	0	5,672	0	0	0	0
1985	0	0	182,781	0	0	6,538	0	0	0	0
1986	0	0	131,439	0	0	30,071	0	0	0	0
1987	0	0	144,743	0	0	26,315	0	0	0	0
1988	0	0	199,641	0	0	22,209	0	0	0	0
1989	0	0	247,430	0	0	51,462	0	0	0	0
1990	0	0	257,796	0	0	36,060	0	0	0	0
1991	0	0	38,832	0	0	5,958	0	0	0	0
1992	0	0	85,341	0	0	12,223	0	0	0	0
1993	0	0	61,841	0	0	4,588	0	0	0	0
1994	0	0	134,262	0	0	4,725	0	0	0	0
1995	0	0	117,762	0	0	21,099	0	0	0	0
1996	0	0	144,906	0	0	12,418	0	0	0	0
1997	0	0	107,853	0	0	47,777	0	0	0	0
1998	6,582	7,708	77,473	1,027	4,839	50,411	0	0	0	0
1999	0	0	206,689	0	0	8,163	0	0	0	0
2000	0	0	379,713	0	0	7,864	0	5,466	18,399	0
2001	0	0	260,984	0	0	33,414	0	0	26,488	0
2002	0	0	340,635	0	0	41,552	0	1,427	37,069	0
2003	0	0	246,485	0	0	50,776	0	74,496	16,703	1,793
2004	0	0	357,995	0	0	20,437	0	120,338	13,229	1,430
2005	0	0	242,245	0	0	114,499	8,163	153,700	12,715	966
2006	0	0	342,734	0	0	32,242	0	147,432	11,832	885
2007	7,221	2,981	271,874	0	0	48,923	0	94,208	38,151	3,130
2008	6,620	1,785	175,460	0	0	10,432	0	16,745	25,038	686
2009	948	391	126,265	0	0	5,849	0	18,314	25,041	4,090
2010	30,415	12,257	129,145	1,311	528	65,439	0	0	19,190	617
2011	5,713	2,303	213,215	0	0	51,638	0	0	19,578	699
2012	16,575	8,266	86,266	2,219	3,029	36,875	0	0	27,534	3,177
2013	28,232	3,180	45,039	4,756	0	40,494	0	0	19,850	3,034
2014	1,103	0	0	1,801	0	998	0	0	4,610	375
2015	10,996	9,611	25,883	0	1,539	977	0	0	15,970	382
2016	9,768	0	72,825	0	0	30,785	0	0	46,122	3,649
2017	4,301	0	285,400	11,959	4,817	59,375	0	0	52,218	6,682
2018	45,338	0	94,626	2,421	0	3,329	0	0	33,210	719
2019	**0**	**33,450**	**267,687**	**0**	**0**	**0**	**0**	**0**	**61,160**	**0**
2020	0	33,450	275,807	0	0	0	0	0	61,160	0
2021	0	33,450	275,807	0	0	0	0	0	61,560	0
2022	0	33,450	275,807	0	0	0	0	0	61,560	0
2023	0	33,450	275,807	0	0	0	0	0	61,560	0
2024	0	33,450	275,807	0	0	0	0	0	61,560	0
2025	0	33,450	275,807	0	0	0	0	0	61,560	0
2026	0	33,450	275,807	0	0	0	0	0	61,560	0
2027	0	33,450	275,807	0	0	0	0	0	61,560	0
2028	0	33,450	275,807	0	0	0	0	0	61,560	0
2029	0	33,450	275,807	0	0	0	0	0	61,560	0
2030	0	33,450	275,807	0	0	0	0	0	61,560	0
2031	0	33,450	275,807	0	0	0	0	0	61,560	0
2032	0	33,450	275,807	0	0	0	0	0	61,560	0
2033	0	33,450	275,807	0	0	0	0	0	61,560	0
2034	0	33,450	275,807	0	0	0	0	0	61,560	0
2035	0	33,450	275,807	0	0	0	0	0	61,560	0
TOTAL	**173,812**	**617,132**	**10,645,340**	**25,494**	**14,752**	**1,602,869**	**8,163**	**632,126**	**1,508,667**	**32,314**

TABLE B-5A Annual Water Quantities Delivered from Each Aqueduct Reach to Each Contractor (acre-feet)

	CALIFORNIA AQUEDUCT (continued)									
	SANTA ANA DIVISION (continued)			WEST BRANCH						
	Reach EBX3A	Reach EBX4B-G	Reach EBX4B	Reach 29A	Reach 29F	Reach 29H		Reach 30		
Calendar Year	San Bernardino	San Gorgonio	San Gorgonio	AVEK	AVEK	Castaic Lake	Ventura	Castaic Lake	Coachella	Desert
	[183]	[184]	[185]	[186]	[187]	[188]	[189]	[190]	[191]	[192]
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	53	0	0	0	0	0
1973	0	0	0	0	20	0	0	0	0	0
1974	0	0	0	0	36	0	0	0	0	0
1975	0	0	0	0	26	0	0	0	0	0
1976	0	0	0	0	24	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	7	0	0
1980	0	0	0	0	0	0	0	1,210	0	0
1981	0	0	0	0	0	0	0	5,761	0	0
1982	0	0	0	0	0	0	0	9,516	0	0
1983	0	0	0	0	0	0	0	9,476	0	0
1984	0	0	0	0	0	0	0	11,477	0	0
1985	0	0	0	0	0	0	0	12,401	0	0
1986	0	0	0	0	0	0	0	13,928	0	0
1987	0	0	0	0	0	0	0	16,167	0	0
1988	0	0	0	0	0	0	0	18,904	0	0
1989	0	0	0	0	0	0	0	21,719	0	0
1990	0	0	0	0	0	0	4,836	22,139	0	0
1991	0	0	0	0	0	0	988	3,846	0	0
1992	0	0	0	0	0	0	0	14,812	0	0
1993	0	0	0	0	6	0	0	13,787	0	0
1994	0	0	0	0	0	0	0	14,919	0	0
1995	0	0	0	0	0	0	0	17,747	0	0
1996	0	0	0	0	0	0	0	18,448	0	0
1997	0	0	0	0	11	0	0	22,842	10,240	16,890
1998	0	0	0	0	7	0	0	19,782	0	0
1999	0	0	0	0	0	0	0	28,813	0	0
2000	0	0	0	0	0	0	2,200	31,085	0	0
2001	0	0	0	0	0	0	0	30,701	0	0
2002	0	0	0	0	0	0	3,148	42,080	0	0
2003	2,617	0	116	0	0	6,768	3,150	44,967	0	0
2004	2,371	0	841	0	0	0	4,047	47,463	0	0
2005	2,035	0	692	0	0	0	0	36,747	0	0
2006	2,614	3,471	807	0	0	0	0	40,017	0	0
2007	5,103	3,758	177	0	0	0	1,890	45,919	0	0
2008	8,823	3,863	1,042	0	0	0	1,980	42,878	0	0
2009	10,066	4,499	1,898	0	0	0	3,150	38,784	0	0
2010	9,538	2,555	5,685	0	0	0	3,150	31,288	0	0
2011	9,384	1,213	9,290	0	0	0	2,520	31,445	0	0
2012	9,604	0	11,010	0	24	0	3,150	36,153	0	0
2013	8,081	0	9,445	0	47	0	2,242	44,126	0	0
2014	4,424	0	5,044	0	0	0	0	29,448	0	0
2015	5,928	0	3,481	0	0	0	630	29,189	0	0
2016	8,431	0	10,816	0	0	0	1,890	31,888	0	0
2017	16,817	0	14,946	510	0	0	2,678	47,912	0	0
2018	1,652	0	9,630	0	0	0	3,619	53,844	0	0
2019	**0**	**250**	**10,130**	**616**	**0**	**0**	**1,890**	**55,120**	**0**	**0**
2020	0	450	9,930	679	0	0	1,890	55,120	0	0
2021	0	650	9,730	742	0	0	1,890	55,120	0	0
2022	0	850	9,530	742	0	0	1,890	55,120	0	0
2023	0	1,050	9,330	742	0	0	1,890	55,120	0	0
2024	0	1,250	9,130	742	0	0	1,890	55,120	0	0
2025	0	1,450	8,930	742	0	0	1,890	55,120	0	0
2026	0	1,600	8,780	742	0	0	1,890	55,120	0	0
2027	0	1,600	8,780	742	0	0	1,890	55,120	0	0
2028	0	1,600	8,780	742	0	0	1,890	55,120	0	0
2029	0	1,600	8,780	742	0	0	1,890	55,120	0	0
2030	0	1,600	8,780	742	0	0	1,890	55,120	0	0
2031	0	1,600	8,780	742	0	0	1,890	55,120	0	0
2032	0	1,600	8,780	742	0	0	1,890	55,120	0	0
2033	0	1,600	8,780	742	0	0	1,890	55,120	0	0
2034	0	1,600	8,780	742	0	0	1,890	55,120	0	0
2035	0	1,600	8,780	742	0	0	1,890	55,120	0	0
TOTAL	**107,488**	**41,309**	**239,430**	**12,935**	**254**	**6,768**	**77,398**	**1,970,675**	**10,240**	**16,890**

TABLE B-5A Annual Water Quantities Delivered from Each Aqueduct Reach to Each Contractor (acre-feet)

	CALIFORNIA AQUEDUCT (continued)								
	WEST BRANCH (continued)				COASTAL BRANCH				
	Reach 30 (continued)				Reach 31A				
								Kern	
Calendar Year	Metropolitan[g]	San Bernardino	Santa Barbara	Ventura	AVEK	Castaic Lake	Dudley Ridge	Municipal and Industrial	Agricultural
	[193]	[194]	[195]	[196]	[197]	[198]	[199]	[200]	[201]
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	7,382	0	0	71,657
1969	0	0	0	0	0	9,970	0	0	52,094
1970	0	0	0	0	0	11,739	0	0	71,910
1971	0	0	0	0	0	12,490	0	0	98,481
1972	71,938	0	0	0	0	13,905	0	0	107,850
1973	155,297	0	0	0	0	9,418	0	0	69,227
1974	209,136	0	0	0	0	9,700	0	0	68,474
1975	374,280	0	0	0	0	10,700	0	0	74,516
1976	420,684	0	0	0	0	11,700	0	0	78,358
1977	122,447	0	0	0	0	5,075	0	0	35,504
1978	171,139	0	0	0	0	11,362	0	0	81,242
1979	145,591	0	0	0	0	19,138	0	0	104,017
1980	164,721	0	0	0	0	13,882	0	0	97,497
1981	277,503	0	0	0	0	12,700	0	0	97,054
1982	351,362	0	0	0	0	12,700	0	0	83,076
1983	157,519	0	0	0	0	12,659	0	0	87,859
1984	260,624	0	0	0	0	12,741	0	0	119,098
1985	390,696	0	0	0	0	12,099	0	0	110,124
1986	379,275	0	0	0	0	13,301	0	0	118,298
1987	417,285	0	0	0	0	11,821	0	0	116,259
1988	488,265	0	0	0	0	11,534	0	0	109,435
1989	589,962	0	0	0	0	14,645	0	0	102,156
1990	764,380	0	0	0	0	6,440	0	0	103,362
1991	257,835	0	1,240	0	0	716	0	0	780
1992	420,849	0	0	0	0	5,887	0	0	73,748
1993	437,470	0	0	0	0	4,157	0	0	90,764
1994	475,900	0	0	0	0	9,422	0	200	77,536
1995	139,882	0	0	0	0	9,486	0	0	85,050
1996	267,618	0	0	0	0	14,052	0	0	100,578
1997	271,379	0	0	1,850	0	4,870	0	0	97,020
1998	187,277	0	0	1,850	0	311	0	0	86,879
1999	327,001	0	0	1,850	0	4,086	0	0	92,095
2000	632,991	0	0	1,850	0	8,395	0	0	85,215
2001	444,764	0	0	1,850	0	1,238	0	0	63,448
2002	723,605	8,601	0	1,850	0	2,737	0	0	65,055
2003	678,964	0	0	1,850	0	4,001	0	0	65,691
2004	797,294	0	0	1,203	0	3,776	0	0	66,498
2005	538,839	0	0	1,665	0	2,709	4,684	0	68,190
2006	574,679	0	0	1,850	0	2,735	0	0	85,214
2007	711,831	0	0	1,110	0	6,071	0	0	93,954
2008	485,156	0	0	1,818	0	0	0	17,059	68,385
2009	589,294	0	0	741	0	1	0	0	83,255
2010	376,877	0	0	925	0	768	2,967	0	81,047
2011	375,921	0	0	1,480	0	1,746	200	0	86,594
2012	553,244	0	0	1,203	33,511	2,404	0	0	50,050
2013	565,849	0	0	648	0	6,128	0	0	82,887
2014	275,992	0	0	93	0	0	0	0	74,406
2015	435,892	0	0	370	0	0	7,500	0	71,616
2016	509,583	0	0	1,110	1,489	0	0	0	86,363
2017	354,401	0	0	11,573	0	370	500	0	94,876
2018	345,201	0	0	555	0	100	0	0	47,649
2019	**395,658**	**0**	**0**	**2,098**	**0**	**2,000**	**0**	**0**	**52,810**
2020	354,334	0	0	1,104	0	2,000	0	0	52,810
2021	354,334	0	0	1,104	0	2,000	0	0	52,810
2022	354,334	0	0	1,104	0	2,000	0	0	52,810
2023	354,334	0	0	1,104	0	2,000	0	0	52,810
2024	354,334	0	0	1,104	0	2,000	0	0	52,810
2025	354,334	0	0	1,104	0	2,000	0	0	52,810
2026	354,334	0	0	1,104	0	2,000	0	0	52,810
2027	354,334	0	0	1,104	0	2,000	0	0	52,810
2028	354,334	0	0	1,104	0	2,000	0	0	52,810
2029	354,334	0	0	1,104	0	2,000	0	0	52,810
2030	354,334	0	0	1,104	0	2,000	0	0	52,810
2031	354,334	0	0	1,104	0	2,000	0	0	52,810
2032	354,334	0	0	1,104	0	2,000	0	0	52,810
2033	354,334	0	0	1,104	0	2,000	0	0	52,810
2034	354,334	0	0	1,104	0	2,000	0	0	52,810
2035	354,334	0	0	1,104	0	2,000	0	0	52,810
TOTAL	**24,732,694**	**8,601**	**1,240**	**59,056**	**35,000**	**397,267**	**15,851**	**17,259**	**5,080,161**

[g] Deliveries exclude 6,171 acre-feet of 1982 exchange water

TABLE B-5A Annual Water Quantities Delivered from Each Aqueduct Reach to Each Contractor (acre-feet)

	CALIFORNIA AQUEDUCT (continued)					
	COASTAL BRANCH (continued)					
	Reach 31A (continued)		Reach 33A			
Calendar Year	Kings	Tulare	San Luis Obispo	Santa Barbara	Total	Grand Total
	[202]	[203]	[204]	[205]	[206]	[207]
1962	0	0	0	0	0	8,906
1963	0	0	0	0	0	12,645
1964	0	0	0	0	0	20,911
1965	0	0	0	0	0	34,026
1966	0	0	0	0	0	54,913
1967	0	0	0	0	0	56,763
1968	0	0	0	0	192,188	294,457
1969	0	0	0	0	195,705	268,104
1970	0	0	0	0	276,211	369,459
1971	0	0	0	0	553,081	654,442
1972	0	0	0	0	895,006	1,037,770
1973	0	0	0	0	638,930	737,532
1974	0	0	0	0	783,984	878,947
1975	0	0	0	0	1,129,728	1,230,830
1976	0	0	0	0	1,245,662	1,380,124
1977	0	0	0	0	465,442	582,381
1978	0	0	0	0	1,339,268	1,458,733
1979	0	0	0	0	1,537,075	1,666,457
1980	0	0	0	0	1,413,363	1,536,456
1981	0	0	0	0	1,779,479	1,918,563
1982	0	0	0	0	1,641,571	1,750,862
1983	0	0	0	0	1,089,626	1,187,156
1984	0	0	0	0	1,489,814	1,591,416
1985	0	0	0	0	1,863,544	1,990,295
1986	0	0	0	0	1,882,290	1,999,155
1987	0	0	0	0	1,984,570	2,131,608
1988	0	0	0	0	2,221,538	2,385,122
1989	0	0	0	0	2,686,838	2,853,747
1990	0	0	0	0	2,398,121	2,582,151
1991	0	0	0	0	489,489	549,113
1992	0	0	0	0	1,374,775	1,471,454
1993	0	0	0	0	2,173,352	2,315,235
1994	0	0	0	0	1,727,504	1,861,976
1995	0	0	0	0	1,926,835	2,031,423
1996	0	0	0	0	2,429,928	2,543,472
1997	0	0	1,099	7,439	2,263,966	2,405,444
1998	0	0	3,592	18,618	1,657,381	1,764,963
1999	0	0	3,743	20,137	2,755,025	2,898,961
2000	0	0	3,962	22,741	3,390,079	3,569,072
2001	0	0	4,283	18,946	2,034,350	2,175,194
2002	0	0	4,355	27,636	2,738,943	2,909,555
2003	0	0	4,453	26,968	3,151,625	3,327,811
2004	0	0	4,165	29,705	3,050,652	3,230,590
2005	0	0	4,251	23,344	3,597,829	3,753,874
2006	0	0	4,209	23,275	3,526,551	3,693,938
2007	49	0	3,776	27,740	3,088,763	3,284,475
2008	0	0	3,402	18,393	1,978,428	2,152,219
2009	0	0	3,801	15,452	2,065,868	2,227,564
2010	276	0	3,757	17,775	2,690,242	2,832,658
2011	238	0	3,819	21,050	3,510,684	3,666,432
2012	0	0	3,944	19,474	2,726,325	2,881,783
2013	0	0	3,681	18,018	2,023,225	2,224,875
2014	0	0	3,206	16,757	1,111,222	1,242,286
2015	0	0	3,438	11,673	1,339,811	1,497,970
2016	0	0	4,199	27,182	2,203,872	2,359,825
2017	1,704	2,159	2,845	29,740	3,639,885	3,767,642
2018	106	0	2,882	20,501	1,566,609	1,762,381
2019	**183**	**0**	**12,696**	**27,291**	**2,305,433**	**2,483,594**
2020	183	0	12,710	27,291	2,304,049	2,482,614
2021	183	0	12,810	27,291	2,302,235	2,482,714
2022	183	0	12,858	27,291	2,303,341	2,482,762
2023	183	0	12,858	27,291	2,303,341	2,482,762
2024	183	0	12,858	27,291	2,303,341	2,482,762
2025	183	0	12,858	27,291	2,303,341	2,482,762
2026	183	0	12,858	27,291	2,303,341	2,482,762
2027	183	0	12,858	27,291	2,303,341	2,482,762
2028	183	0	12,858	27,291	2,303,341	2,482,762
2029	183	0	12,858	27,291	2,303,341	2,482,762
2030	183	0	12,858	27,291	2,303,341	2,482,762
2031	183	0	12,858	27,291	2,303,341	2,482,762
2032	183	0	12,858	27,291	2,303,341	2,482,762
2033	183	0	12,858	27,291	2,303,341	2,482,762
2034	183	0	12,858	27,291	2,303,341	2,482,762
2035	183	0	12,858	27,291	2,303,341	2,482,762
TOTAL	**5,484**	**2,159**	**299,090**	**926,511**	**135,094,743**	**145,283,706**

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

	CALIFORNIA AQUEDUCT												
	SAN LUIS DIVISION												
	Reach 1	Reach 3A											
Calendar Year	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	(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	(6,264)	(8,763)	(6)	(7)	(1)	(16,796)	(76,141)	0	(159)	(1)	(3)	(5)
2016	0	(1,904)	(4,677)	0	0	0	0	(69,891)	0	0	0	0	0
2017	0	0	0	0	(17,988)	0	(14,831)	(68,628)	0	(70,867)	0	0	0
2018	0	0	0	0	0	0	0	(23,332)	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)**	**(8,168)**	**(13,440)**	**(5,964)**	**(21,367)**	**(7)**	**(38,335)**	**(858,460)**	**(2)**	**(356,529)**	**(12)**	**(32)**	**(49)**

TABLE B-5A-Adj Annual Water Quantity Adjustments to Water Delivered from Each Aqueduct Reach to Each Contractor (acre-feet)

	CALIFORNIA AQUEDUCT (continued)												
	SAN LUIS DIVISION (continued)									SOUTH SAN JOAQUIN DIVISION			
	Reach 3A (continued)							Reach 4		Reach 7		Reach 10A	
Calendar Year	San Gabriel	San Gorgonio	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		(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	(1)	(3)	(27)	(187)	(21,076)	0	0	0	0	0	0	(11,185)	(14,115)
2016	0	0	0	0	(6,706)	0	0	0	0	0	0	(324)	0
2017	0	0	0	(11,071)	(83,322)	(4,000)	0	0	0	0	0	0	0
2018	0	0	0	0	(13,999)	(10,338)	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	**(11)**	**(20)**	**(163)**	**(12,203)**	**(299,429)**	**(62,739)**	**(1)**	**(12,806)**	**(6,020)**	**(24,167)**	**(28,145)**	**(32,390)**	**(49,850)**

TABLE B-5A-Adj Annual Water Quantity Adjustments to Water Delivered from Each Aqueduct Reach to Each Contractor (acre-feet)

Sheet 3 of 5

	CALIFORNIA AQUEDUCT (continued)												
	SOUTH SAN JOAQUIN DIVISION (continued)												
	Reach 10A (continued)						Reach 12E						
Calendar Year	Castaic Lake	Desert	Kern (Agricultural)	Metropolitan	San Bernardino	Santa Clara	Alameda-Zone 7	AVEK	Castaic Lake	Coachella	Desert	Kern (Agricultural)	Metropolitan
	[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	(1,813)	(31,500)	0	(30,000)	0	0	0	0	0	0	(20,800)
2002	0	0	0	0	0	0	0	0	0	0	0	(14,638)	0
2003	0	0	0	(10,000)	0	0	0	0	0	0	0	(5,170)	(5,073)
2004	0	0	(3)	(93,555)	0	0	0	0	0	0	0	0	(17,765)
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		(12,469)	(93,986)	0	(20,000)	0		(11,000)	0		(16,618)	(5,000)
2008	0	(4,864)	0	(99,024)	0	(10,000)	0	(8,393)	(11,000)	(3,000)	(3,486)	(103,683)	(8,402)
2009	(4,950)	0	(7,733)	(65,499)	0	(27,319)	0	(6,393)	(11,000)	(3,000)	0	(105,145)	(14,516)
2010		0	(56)	0		0	0	0	(2,750)	(8,393)	0	(43,833)	(52,413)
2011	0	0	0	0	0	0	0	0	0	0	0	(14,223)	(23,419)
2012	0	0	0	0	0	(17,000)	0	0	0	(4,000)	0	(12,815)	0
2013	0	0	(24,626)	(37,544)	0	(27,308)	0	0	0	(16,500)	0	(34,355)	(31,478)
2014	(4,951)	0	(7,476)	(30,049)	(694)	(29,134)	(5,901)	0	(13,824)	(5,000)	0	(90,996)	(9,882)
2015	0	0	(20,190)	(32,517)	0	(40,572)	(5,029)	0	(13,993)	(9,500)	0	(56,927)	(6,899)
2016	0	0	(626)	(12,440)	0	(1,122)	0	0	(5,940)	(16,500)	0	(64,384)	(23,389)
2017	0	0	0	0	0	0	0	0	0	(5,397)	0	(6,075)	(6,375)
2018	0	0	0	0	0	0	0	0	0	(5,952)	0	(13,181)	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	**(9,901)**	**(4,864)**	**(74,992)**	**(506,114)**	**(694)**	**(202,455)**	**(10,930)**	**(14,786)**	**(69,507)**	**(77,242)**	**(3,486)**	**(582,043)**	**(225,411)**

TABLE B-5A-Adj Annual Water Quantity Adjustments to Water Delivered from Each Aqueduct Reach to Each Contractor (acre-feet)

Sheet 4 of 5

	CALIFORNIA AQUEDUCT (continued)											
	SOUTH SAN JOAQUIN DIVISION (continued)											
	Reach 12E (continued)			Reach 13B								Reach 14B
Calendar Year	San Bernardino	Santa Clara	San Gorgonio	Alameda-Zone 7	Alameda County	Dudley Ridge	Kern Agricultural	Metropolitan	Palmdale	San Bernardino	Santa Clara	Kern (Agricultural)
	[40]	[41]	[42]	[43]	[44]	[45]	[46]	[47]	[48]	[49]	[50]	[51]
1962	0	0	0	0	0	0	0	0	0	0	0	0
1963	0	0	0	0	0	0	0	0	0	0	0	0
1964	0	0	0	0	0	0	0	0	0	0	0	0
1965	0	0	0	0	0	0	0	0	0	0	0	0
1966	0	0	0	0	0	0	0	0	0	0	0	0
1967	0	0	0	0	0	0	0	0	0	0	0	0
1968	0	0	0	0	0	0	0	0	0	0	0	0
1969	0	0	0	0	0	0	0	0	0	0	0	0
1970	0	0	0	0	0	0	0	0	0	0	0	0
1971	0	0	0	0	0	0	0	0	0	0	0	0
1972	0	0	0	0	0	0	0	0	0	0	0	0
1973	0	0	0	0	0	0	0	0	0	0	0	0
1974	0	0	0	0	0	0	0	0	0	0	0	0
1975	0	0	0	0	0	0	0	0	0	0	0	0
1976	0	0	0	0	0	0	0	0	0	0	0	0
1977	0	0	0	0	0	0	0	0	0	0	0	0
1978	0	0	0	0	0	0	0	0	0	0	0	0
1979	0	0	0	0	0	0	0	0	0	0	0	0
1980	0	0	0	0	0	0	0	0	0	0	0	0
1981	0	0	0	0	0	0	0	0	0	0	0	0
1982	0	0	0	0	0	0	0	0	0	0	0	0
1983	0	0	0	0	0	0	0	0	0	0	0	0
1984	0	0	0	0	0	0	0	0	0	0	0	0
1985	0	0	0	0	0	0	0	0	0	0	0	0
1986	0	0	0	0	0	0	0	0	0	0	0	0
1987	0	0	0	0	0	0	0	0	0	0	0	0
1988	0	0	0	0	0	0	0	0	0	0	0	0
1989	0	0	0	0	0	0	0	0	0	0	0	0
1990	0	0	0	0	0	0	0	0	0	0	0	0
1991	0	0	0	0	0	0	0	0	0	0	0	0
1992	0	0	0	0	0	0	0	0	0	0	0	0
1993	0	0	0	0	0	0	0	0	0	0	0	0
1994	0	0	0	0	0	0	0	0	0	0	0	0
1995	0	0	0	0	0	0	0	0	0	0	0	0
1996	0	0	0	0	0	0	0	0	0	0	0	0
1997	0	0	0	0	0	0	0	0	0	0	0	0
1998	0	0	0	0	0	0	0	0	0	0	0	0
1999	0	0	0	0	0	0	0	0	0	0	0	0
2000	0	0	0	0	0	0	0	0	0	0	0	0
2001	0	0	0	0	0	0	(132,228)	0	0	0	0	(396)
2002	0	0	0	0	0	0	(22,161)	0	0	0	0	0
2003	0	0	0	0	0	0	(15,316)	(24,523)	0	0	0	0
2004	0	0	0	0	0	0	(43,985)	(4,813)	0	0	0	0
2005	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
2007	0	0	0	0	0	0	(257,750)	0	(4,926)	0	0	0
2008	0	0	0	0	0	0	(228,579)	(25,721)	0	0	0	0
2009	0	(6,134)	0	0	0	0	(186,044)	0	0	0	0	(1,706)
2010	0	0	0	0	0		(59,451)	0	0	0	0	(1,867)
2011	0	0	0	0	0	0	(29,041)	0	0	0	0	0
2012	0	0	0	0	0	(6,068)	(103,364)	0	0	0	0	(73)
2013	(1,500)	0	0	0	0	0	(160,286)	(1,033)	0	0	(17,692)	(264)
2014	(400)	0	0	(931)	(1,088)	(16,789)	(161,077)	(17,184)	0	(3,906)	(5,253)	(6,898)
2015	0	(288)	0	(1,600)	(2,097)	(14,460)	(112,780)	(21,935)	0	0	(4,625)	(10,554)
2016	0	0	0	0	0	0	(28,033)	0	0	0	0	(8,376)
2017	0	0	(1,700)	0	0	0	(60,240)	0	0	0	0	0
2018	0	0	0	0	0	(1,520)	(20,921)	0	0	0	0	(1,337)
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	**(1,900)**	**(6,422)**	**(1,700)**	**(2,531)**	**(3,185)**	**(38,837)**	**(1,621,256)**	**(95,209)**	**(4,926)**	**(3,906)**	**(27,570)**	**(31,471)**

TABLE B-5A-Adj Annual Water Quantity Adjustments to Water Delivered from Each Aqueduct Reach to Each Contractor (acre-feet)

Sheet 5 of 5

	CALIFORNIA AQUEDUCT (continued)									
	SOUTH SAN JOAQUIN DIVISION (continued)				MOJAVE DIVISION				SANTA ANA DIVISION	
	Reach 14C		Reach 15A	Reach 16A	Reach 22A	Reach 22B		Reach 24	Reach EBX2C	
Calendar Year	Kern (Agricultural)	Metropolitan	Kern (Agricultural)	Kern (Agricultural)	AVEK	AVEK	Metropolitan	Metropolitan	San Bernardino	GRAND TOTAL
	[52]	[53]	[54]	[55]	[56]	[57]	[58]	[59]	[60]	[61]
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	(51,089)
2001	(242)	0	0	0	0	(152)	0	0	0	(255,589)
2002	0	0	0	0	0	0	0	0	0	(46,131)
2003	0	(12,380)	0	0	0	0	0	0	0	(90,890)
2004	0	(25,512)	0	0	0	0	0	0	(844)	(197,363)
2005	0	0	0	0	0	0	0	0	(7)	(40,942)
2006	0	0	0	0	0	0	0	0	(2)	(73,814)
2007	0	(24,225)	0	0	0	0	(8,751)	(17,249)	0	(486,841)
2008	0	(37,602)	0	0	0	0	(4,816)	(3,679)	(6)	(681,260)
2009	(5,168)	(54,948)	(2,788)	(444)	0	0	0	(7,488)	(11)	(609,996)
2010	(4,761)	(32,758)	(2,913)	0	0	0	0	(2,891)	0	(542,451)
2011	0	(16,065)	0	0	0	0	0	0	0	(308,580)
2012	(862)	(10,010)	(405)	0	0	0	0	0	0	(230,793)
2013	(4,691)	(33,205)	(406)	0	0	0	0	0	0	(416,788)
2014	(10,773)	(47,358)	(5,962)	0	(1,046)	0	0	0	0	(614,333)
2015	(11,108)	(70,200)	(5,560)	0	(1,516)	0	0	0	0	(597,090)
2016	(4,939)	(29,819)	(3,549)	0	(1,056)	0	0	0	0	(283,675)
2017	0	(5,863)	0	0	0	0	0	0	0	(356,357)
2018	(899)	(10,090)	(850)	0	0	0	0	0	0	(102,419)
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
TOTAL	**(43,443)**	**(410,035)**	**(22,433)**	**(444)**	**(3,618)**	**(152)**	**(13,567)**	**(31,307)**	**(870)**	**(5,986,401)**

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)

	NORTH BAY AREA			SOUTH BAY AREA[a]				CENTRAL COASTAL AREA		
Calendar Year	Napa[b]	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	32,945	36,764
2012	9,907	29,347	39,254	55,239	20,831	63,794	139,864	3,944	19,474	23,418
2013	12,538	35,869	48,407	44,856	23,640	84,623	153,119	3,681	18,018	21,699
2014	14,164	19,679	33,843	34,296	30,066	67,446	131,808	3,206	16,757	19,963
2015	11,199	23,836	35,035	32,432	27,259	82,888	142,579	3,438	11,673	15,111
2016	8,993	23,605	32,598	53,484	27,357	107,164	188,005	4,199	35,537	39,736
2017	8,225	28,265	36,490	62,109	29,036	119,655	210,800	2,845	45,324	48,169
2018	15,835	29,001	44,836	31,203	17,231	93,782	142,216	2,882	20,501	23,383
2019	**17,415**	**28,654**	**46,069**	**48,371**	**25,200**	**60,000**	**133,571**	**12,696**	**27,291**	**39,987**
2020	17,415	28,654	46,069	48,371	25,200	60,000	133,571	12,710	27,291	40,001
2021	17,415	28,654	46,069	48,371	25,200	60,000	133,571	12,810	27,291	40,101
2022	17,415	28,654	46,069	48,371	25,200	60,000	133,571	12,858	27,291	40,149
2023	17,415	28,654	46,069	48,371	25,200	60,000	133,571	12,858	27,291	40,149
2024	17,415	28,654	46,069	48,371	25,200	60,000	133,571	12,858	27,291	40,149
2025	17,415	28,654	46,069	48,371	25,200	60,000	133,571	12,858	27,291	40,149
2026	17,415	28,654	46,069	48,371	25,200	60,000	133,571	12,858	27,291	40,149
2027	17,415	28,654	46,069	48,371	25,200	60,000	133,571	12,858	27,291	40,149
2028	17,415	28,654	46,069	48,371	25,200	60,000	133,571	12,858	27,291	40,149
2029	17,415	28,654	46,069	48,371	25,200	60,000	133,571	12,858	27,291	40,149
2030	17,415	28,654	46,069	48,371	25,200	60,000	133,571	12,858	27,291	40,149
2031	17,415	28,654	46,069	48,371	25,200	60,000	133,571	12,858	27,291	40,149
2032	17,415	28,654	46,069	48,371	25,200	60,000	133,571	12,858	27,291	40,149
2033	17,415	28,654	46,069	48,371	25,200	60,000	133,571	12,858	27,291	40,149
2034	17,415	28,654	46,069	48,371	25,200	60,000	133,571	12,858	27,291	40,149
2035	17,415	28,654	46,069	48,371	25,200	60,000	133,571	12,858	27,291	40,149
TOTAL	**643,795**	**1,390,187**	**2,033,982**	**2,236,728**	**1,543,086**	**5,383,384**	**9,163,198**	**299,290**	**963,585**	**1,262,875**

[a] For the period June 1962 through November 1967, deliveries were supplied by non-project water.

[b] 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

	SAN JOAQUIN VALLEY AREA								
			Kern						
Calendar Year	Dudley Ridge	Empire	Municipal and Industrial	Agricultural	Total	Kings	Oak Flat	Tulare	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	1,157,336	1,194,448	6,556	2,715	63,141	1,329,335
2012	30,450	2,242	27,500	778,144	805,644	7,405	3,208	95,717	944,666
2013	27,046	1,567	33,501	711,840	745,341	4,645	2,820	48,361	829,780
2014	40,535	516	1	516,001	516,002	1,256	1,520	8,934	568,763
2015	41,733	624	11,976	508,842	520,818	1,229	1,077	17,336	582,817
2016	20,908	1,822	9,633	634,649	644,282	3,660	1,855	42,387	714,914
2017	64,309	1,698	36,794	1,153,494	1,190,288	6,645	2,893	61,920	1,327,753
2018	31,644	1,752	36,588	400,438	437,026	5,552	2,793	60,751	539,518
2019	**28,568**	**1,800**	**72,706**	**516,932**	**589,638**	**5,583**	**3,420**	**52,483**	**681,492**
2020	28,568	1,800	72,706	516,932	589,638	5,583	3,420	52,483	681,492
2021	28,568	1,800	72,706	516,932	589,638	5,583	3,420	52,483	681,492
2022	28,568	1,800	72,706	516,932	589,638	5,583	3,420	52,483	681,492
2023	28,568	1,800	72,706	516,932	589,638	5,583	3,420	52,483	681,492
2024	28,568	1,800	72,706	516,932	589,638	5,583	3,420	52,483	681,492
2025	28,568	1,800	72,706	516,932	589,638	5,583	3,420	52,483	681,492
2026	28,568	1,800	72,706	516,932	589,638	5,583	3,420	52,483	681,492
2027	28,568	1,800	72,706	516,932	589,638	5,583	3,420	52,483	681,492
2028	28,568	1,800	72,706	516,932	589,638	5,583	3,420	52,483	681,492
2029	28,568	1,800	72,706	516,932	589,638	5,583	3,420	52,483	681,492
2030	28,568	1,800	72,706	516,932	589,638	5,583	3,420	52,483	681,492
2031	28,568	1,800	72,706	516,932	589,638	5,583	3,420	52,483	681,492
2032	28,568	1,800	72,706	516,932	589,638	5,583	3,420	52,483	681,492
2033	28,568	1,800	72,706	516,932	589,638	5,583	3,420	52,483	681,492
2034	28,568	1,800	72,706	516,932	589,638	5,583	3,420	52,483	681,492
2035	28,568	1,800	72,706	516,932	589,638	5,583	3,420	52,483	681,492
TOTAL	**2,640,986**	**136,389**	**4,049,451**	**43,891,400**	**47,940,851**	**271,443**	**258,919**	**4,878,806**	**56,127,394**

TABLE B-5B Annual Water Quantities Delivered to Each Contractor (acre-feet)

Sheet 3 of 4

Calendar Year	SOUTHERN CALIFORNIA AREA									
	AVEK	Castaic Lake[c]	Coachella	Crestline	Desert	Littlerock	Mojave	Palmdale	San Bernardino	San Gabriel
	[20]	[21]	[22]	[23]	[24]	[25]	[26]	[27]	[28]	[29]
1962	0	0	0	0	0	0	0	0	0	0
1963	0	0	0	0	0	0	0	0	0	0
1964	0	0	0	0	0	0	0	0	0	0
1965	0	0	0	0	0	0	0	0	0	0
1966	0	0	0	0	0	0	0	0	0	0
1967	0	0	0	0	0	0	0	0	0	0
1968	0	7,382	0	0	0	0	0	0	0	0
1969	0	9,970	0	0	0	0	0	0	0	0
1970	0	11,739	0	0	0	0	0	0	0	0
1971	0	12,490	0	0	0	0	0	0	0	0
1972	53	13,905	0	464	0	338	55	0	1,275	0
1973	20	9,418	5,800	389	9,000	290	0	0	32,426	0
1974	1,259	9,700	6,400	627	10,000	400	14	0	16,605	612
1975	8,068	10,700	7,000	825	11,000	520	0	0	13,865	5,450
1976	27,782	11,700	7,600	1,002	12,000	589	0	0	12,273	6,071
1977	11,202	5,075	0	1,109	0	111	80	0	24,833	8,996
1978	44,137	11,362	10,084	1,209	15,300	208	0	0	4,055	7,771
1979	60,493	19,145	10,063	1,260	15,000	133	4,000	0	18	290
1980	72,407	15,092	10,884	1,239	17,000	191	4,000	0	0	1,085
1981	79,375	18,461	12,105	1,485	19,000	1,270	4,000	0	16,021	3,619
1982	50,291	22,216	13,326	1,238	21,000	0	10,500	0	8,409	12,599
1983	32,961	22,135	14,547	911	23,000	38	0	0	5,994	734
1984	32,662	24,218	15,768	1,128	25,000	1	0	0	5,556	7,656
1985	37,064	24,500	16,989	1,422	27,000	0	0	1,558	7,390	5,028
1986	32,449	27,229	18,210	1,506	29,000	163	0	3,096	6,421	9,454
1987	34,089	27,988	19,431	1,849	31,500	1,085	17	5,379	18,751	10,630
1988	34,079	30,438	20,652	2,006	34,000	419	9	1,770	21,386	8,948
1989	45,280	36,364	21,873	2,170	36,500	971	200	9,009	20,782	12,839
1990	47,206	28,579	23,100	1,827	38,100	1,747	0	8,608	18,831	16,649
1991	9,568	4,562	6,930	849	11,430	522	3,423	3,914	3,661	5,399
1992	30,265	20,699	10,427	519	17,197	251	10,686	4,035	3,358	7,908
1993	43,102	23,039	23,100	439	38,100	734	11,514	7,761	4,361	14,397
1994	49,153	26,441	14,102	785	23,257	1,098	16,852	8,418	9,135	15,230
1995	47,286	27,233	23,100	409	38,100	480	8,722	6,961	696	12,922
1996	56,356	32,500	62,219	485	102,622	494	7,427	11,434	6,064	15,989
1997	62,393	27,712	68,340	651	69,990	444	10,374	11,861	9,654	18,175
1998	52,926	20,093	85,709	187	70,647	404	3,925	8,752	1,878	9,310
1999	69,073	32,899	50,480	1,132	58,100	342	8,144	13,278	12,874	21,729
2000	83,577	40,680	42,323	1,194	58,234	0	11,380	9,060	18,399	15,140
2001	62,857	31,939	9,100	1,057	15,010	0	4,433	10,427	26,488	2,360
2002	58,171	68,817	16,755	2,189	27,640	0	4,346	18,496	72,069	24,851
2003	60,029	55,736	14,443	1,563	23,819	0	14,435	11,547	26,113	21,934
2004	59,731	83,761	15,465	2,006	21,190	0	13,176	12,162	57,030	12,541
2005	59,831	59,456	42,519	807	49,089	0	13,561	11,712	31,550	13,984
2006	80,384	62,752	121,100	641	50,000	0	34,014	12,492	35,331	16,284
2007	80,203	60,190	73,228	1,768	30,234	0	46,109	19,634	57,116	4,024
2008	54,436	42,878	46,791	848	26,428	25	25,396	14,255	35,145	7,212
2009	45,670	42,085	46,022	894	18,263	42	29,047	15,339	39,346	11,520
2010	58,489	57,900	85,592	357	31,183	0	38,152	10,969	49,379	19,180
2011	94,046	33,191	90,279	474	36,379	0	5,099	16,881	38,126	23,591
2012	111,207	50,473	117,587	624	45,101	0	11,244	18,897	112,972	22,058
2013	51,022	61,754	66,539	1,368	20,791	0	7,483	10,567	32,085	9,252
2014	18,532	29,448	12,870	1,233	3,049	0	3,581	8,406	10,956	1,200
2015	14,308	29,189	37,596	1,253	11,217	0	8,830	5,836	24,380	5,760
2016	41,356	37,828	69,422	1,084	21,893	0	22,283	10,516	62,252	16,088
2017	137,571	83,622	83,908	294	31,636	0	34,815	13,858	78,496	22,056
2018	52,005	53,944	124,957	2,385	44,932	690	6,748	7,832	35,923	15,615
2019	**86,906**	**57,120**	**83,010**	**3,480**	**33,450**	**1,380**	**51,480**	**18,780**	**61,560**	**17,280**
2020	86,906	57,120	83,010	3,480	33,450	1,380	51,480	18,780	61,560	17,280
2021	86,906	57,120	83,010	3,480	33,450	1,380	51,480	18,780	61,560	17,280
2022	86,906	57,120	83,010	3,480	33,450	1,380	51,480	18,780	61,560	17,280
2023	86,906	57,120	83,010	3,480	33,450	1,380	51,480	18,780	61,560	17,280
2024	86,906	57,120	83,010	3,480	33,450	1,380	51,480	18,780	61,560	17,280
2025	86,906	57,120	83,010	3,480	33,450	1,380	51,480	18,780	61,560	17,280
2026	86,906	57,120	83,010	3,480	33,450	1,380	51,480	18,780	61,560	17,280
2027	86,906	57,120	83,010	3,480	33,450	1,380	51,480	18,780	61,560	17,280
2028	86,906	57,120	83,010	3,480	33,450	1,380	51,480	18,780	61,560	17,280
2029	86,906	57,120	83,010	3,480	33,450	1,380	51,480	18,780	61,560	17,280
2030	86,906	57,120	83,010	3,480	33,450	1,380	51,480	18,780	61,560	17,280
2031	86,906	57,120	83,010	3,480	33,450	1,380	51,480	18,780	61,560	17,280
2032	86,906	57,120	83,010	3,480	33,450	1,380	51,480	18,780	61,560	17,280
2033	86,906	57,120	83,010	3,480	33,450	1,380	51,480	18,780	61,560	17,280
2034	86,906	57,120	83,010	3,480	33,450	1,380	51,480	18,780	61,560	17,280
2035	86,906	57,120	83,010	3,480	33,450	1,380	51,480	18,780	61,560	17,280
TOTAL	**3,771,826**	**2,581,667**	**3,105,905**	**110,321**	**1,937,581**	**37,460**	**1,313,234**	**663,980**	**2,176,248**	**797,900**

[c] 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)

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]
1962	0	0	0	0	0	0	0	0	0	8,906
1963	0	0	0	0	0	0	0	0	0	12,645
1964	0	0	0	0	0	0	0	0	0	20,911
1965	0	0	0	0	0	0	0	0	0	34,026
1966	0	0	0	0	0	0	0	0	0	54,913
1967	0	0	0	0	0	0	0	0	0	56,763
1968	0	0	0	7,382	0	0	0	0	0	294,457
1969	0	0	0	9,970	0	0	0	0	0	268,104
1970	0	0	0	11,739	0	0	70	70	0	369,459
1971	0	0	0	12,490	0	192	64	256	0	654,442
1972	0	71,938	0	88,028	0	186	505	691	0	1,037,770
1973	0	159,883	0	217,226	0	53	679	732	0	737,532
1974	0	277,717	0	323,334	0	127	648	775	0	878,947
1975	0	526,491	0	583,919	0	253	405	658	0	1,230,830
1976	0	618,451	0	697,468	0	527	382	909	0	1,380,124
1977	0	189,755	0	241,161	0	706	303	1,009	0	582,381
1978	0	507,565	0	601,691	0	579	278	857	0	1,458,733
1979	0	477,074	0	587,476	0	302	329	631	0	1,666,457
1980	0	531,727	0	653,625	0	267	295	562	0	1,536,456
1981	0	795,846	0	951,182	0	221	355	576	0	1,918,563
1982	0	691,192	0	830,771	0	334	305	639	0	1,750,862
1983	0	343,521	0	443,841	0	325	262	587	0	1,187,156
1984	0	457,582	0	569,571	108	177	272	557	0	1,591,416
1985	0	683,625	0	804,576	62	308	254	624	0	1,990,295
1986	0	708,840	0	836,368	328	313	317	958	0	1,999,155
1987	0	712,424	0	863,143	88	459	452	999	0	2,131,608
1988	0	902,564	0	1,056,271	303	385	523	1,211	0	2,385,122
1989	0	1,156,698	0	1,342,686	403	300	486	1,189	0	2,853,747
1990	0	1,396,423	4,836	1,585,906	494	380	548	1,422	0	2,582,151
1991	0	391,447	988	442,693	265	328	420	1,013	0	549,113
1992	0	710,313	0	815,658	642	117	485	1,244	0	1,471,454
1993	0	652,190	0	818,737	746	256	444	1,446	0	2,315,235
1994	0	807,866	0	972,337	1,035	329	492	1,856	0	1,861,976
1995	0	436,042	0	601,951	910	203	308	1,421	0	2,031,423
1996	0	593,380	0	888,970	820	257	360	1,437	0	2,543,472
1997	0	721,810	1,850	1,003,254	1,005	185	231	1,421	0	2,405,444
1998	0	410,065	1,850	665,746	1,054	527	0	1,581	0	1,764,963
1999	0	852,617	1,850	1,122,518	1,096	286	0	1,382	0	2,898,961
2000	0	1,522,412	4,050	1,806,449	901	586	0	1,487	0	3,569,072
2001	0	1,023,169	1,850	1,188,690	1,065	513	0	1,578	0	2,175,194
2002	0	1,408,919	4,998	1,707,251	1,181	419	0	1,600	0	2,909,555
2003	116	1,701,615	5,000	1,936,350	1,324	551	0	1,875	0	3,327,811
2004	841	1,724,380	5,250	2,007,533	1,434	1,440	0	2,874	0	3,230,590
2005	692	1,528,045	1,665	1,812,911	1,894	527	0	2,421	0	3,753,874
2006	4,278	1,512,186	1,850	1,931,312	5,342	468	0	5,810	0	3,693,938
2007	3,935	1,499,688	3,000	1,879,129	2,327	956	0	3,283	0	3,284,475
2008	4,905	898,313	3,798	1,160,430	1,923	451	243	2,617	0	2,152,219
2009	6,397	930,871	3,891	1,189,387	2,114	581	200	2,895	0	2,227,564
2010	8,240	1,416,062	4,075	1,779,578	2,331	807	243	3,381	0	2,832,658
2011	10,503	1,686,570	4,000	2,039,139	2,297	1,092	98	3,487	0	3,666,432
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	481,804	4,237	1,617	251	6,105	0	1,242,286
2015	3,481	573,526	1,000	716,376	3,004	2,763	285	6,052	0	1,497,970
2016	10,816	1,083,900	3,000	1,380,438	1,229	2,518	387	4,134	0	2,359,825
2017	14,946	1,624,548	14,251	2,140,001	1,746	2,320	363	4,429	0	3,767,642
2018	9,630	639,273	4,174	998,108	10,542	3,048	730	14,320	0	1,762,381
2019	**10,380**	**1,146,900**	**3,988**	**1,575,714**	**5,760**	**270**	**731**	**6,761**	**0**	**2,483,594**
2020	10,380	1,146,900	2,994	1,574,720	5,760	270	731	6,761	0	2,482,614
2021	10,380	1,146,900	2,994	1,574,720	5,760	270	731	6,761	0	2,482,714
2022	10,380	1,146,900	2,994	1,574,720	5,760	270	731	6,761	0	2,482,762
2023	10,380	1,146,900	2,994	1,574,720	5,760	270	731	6,761	0	2,482,762
2024	10,380	1,146,900	2,994	1,574,720	5,760	270	731	6,761	0	2,482,762
2025	10,380	1,146,900	2,994	1,574,720	5,760	270	731	6,761	0	2,482,762
2026	10,380	1,146,900	2,994	1,574,720	5,760	270	731	6,761	0	2,482,762
2027	10,380	1,146,900	2,994	1,574,720	5,760	270	731	6,761	0	2,482,762
2028	10,380	1,146,900	2,994	1,574,720	5,760	270	731	6,761	0	2,482,762
2029	10,380	1,146,900	2,994	1,574,720	5,760	270	731	6,761	0	2,482,762
2030	10,380	1,146,900	2,994	1,574,720	5,760	270	731	6,761	0	2,482,762
2031	10,380	1,146,900	2,994	1,574,720	5,760	270	731	6,761	0	2,482,762
2032	10,380	1,146,900	2,994	1,574,720	5,760	270	731	6,761	0	2,482,762
2033	10,380	1,146,900	2,994	1,574,720	5,760	270	731	6,761	0	2,482,762
2034	10,380	1,146,900	2,994	1,574,720	5,760	270	731	6,761	0	2,482,762
2035	10,380	1,146,900	2,994	1,574,720	5,760	270	731	6,761	0	2,482,762
TOTAL	**280,739**	**59,560,672**	**136,454**	**76,473,987**	**159,715**	**36,411**	**26,144**	**222,270**	**0**	**145,283,706**

TABLE B-6 Annual Water Quantities Conveyed through Each Pumping and Power Recovery Plant of Project Transportation Facilities (acre-feet)

	NORTH BAY AQUEDUCT											
	Barker Slough Pumping Plant				Cordelia Pumping Plant Solano				Cordelia Pumping Plant Napa			
Calendar Year	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[a]	Total
	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]	[12]
1961	0	0	0	0	0	0	0	0	0	0	0	0
1962	0	0	0	0	0	0	0	0	0	0	0	0
1963	0	0	0	0	0	0	0	0	0	0	0	0
1964	0	0	0	0	0	0	0	0	0	0	0	0
1965	0	0	0	0	0	0	0	0	0	0	0	0
1966	0	0	0	0	0	0	0	0	0	0	0	0
1967	0	0	0	0	0	0	0	0	0	0	0	0
1968	0	0	0	0	0	0	0	0	24	(10)	1,214	1,228
1969	0	0	0	0	0	0	0	0	0	2	2,687	2,689
1970	0	0	0	0	0	0	0	0	0	18	3,618	3,636
1971	0	0	0	0	0	0	0	0	0	4	2,521	2,525
1972	0	0	0	0	0	0	0	0	0	(10)	3,647	3,637
1973	0	0	0	0	0	0	0	0	0	1	3,792	3,793
1974	0	0	0	0	0	0	0	0	0	10	4,870	4,880
1975	0	0	0	0	0	0	0	0	0	10	6,840	6,850
1976	0	0	0	0	0	0	0	0	0	4	7,122	7,126
1977	0	0	0	0	0	0	0	0	0	2	8,226	8,228
1978	0	0	0	0	0	0	0	0	0	(6)	6,034	6,028
1979	0	0	0	0	0	0	0	0	0	1	6,561	6,562
1980	0	0	0	0	0	0	0	0	0	(3)	6,707	6,704
1981	0	0	0	0	0	0	0	0	0	8	9,001	9,009
1982	0	0	0	0	0	0	0	0	0	(8)	1,213	1,205
1983	0	0	0	0	0	0	0	0	0	(12)	2,287	2,275
1984	0	0	0	0	0	0	0	0	0	(15)	2,923	2,908
1985	0	0	0	0	0	0	0	0	0	13	4,039	4,052
1986	0	0	0	0	0	0	0	0	0	(4)	3,519	3,515
1987	0	0	0	0	0	0	0	0	0	0	7,693	7,693
1988	1	283	15,118	15,402	0	0	9,725	9,725	1	(1)	5,392	5,392
1989	0	758	23,451	24,209	0	0	17,246	17,246	0	(4)	6,195	6,191
1990	0	3	26,071	26,074	0	(634)	15,856	15,222	0	3	6,940	6,943
1991	0	667	8,352	9,019	0	124	3,855	3,979	0	198	1,380	1,578
1992	0	1,643	18,774	20,417	0	0	9,220	9,220	0	0	4,001	4,001
1993	0	1,153	34,466	35,619	0	0	14,471	14,471	0	0	5,286	5,286
1994	0	780	32,048	32,828	0	(6)	14,913	14,907	0	0	6,792	6,792
1995	0	908	26,527	27,435	0	0	15,893	15,893	0	0	5,182	5,182
1996	0	1,354	34,892	36,246	0	0	17,069	17,069	0	0	4,893	4,893
1997	0	1,422	37,871	39,293	0	0	17,501	17,501	0	0	4,341	4,341
1998	0	1,343	35,125	36,468	0	0	18,204	18,204	0	0	5,359	5,359
1999	0	2,522	40,057	42,579	0	0	19,562	19,562	0	0	5,304	5,304
2000	0	1,853	41,973	43,826	0	4	21,525	21,529	0	180	4,958	5,138
2001	0	1,760	43,931	45,691	0	0	19,737	19,737	0	0	9,345	9,345
2002	0	496	45,435	45,931	0	0	19,719	19,719	0	0	6,875	6,875
2003	0	3,991	41,597	45,588	0	0	16,700	16,700	0	0	7,637	7,637
2004	0	2,181	51,136	53,317	0	0	21,686	21,686	0	0	8,499	8,499
2005	0	935	45,488	46,423	0	0	19,189	19,189	0	0	8,009	8,009
2006	0	1,005	43,305	44,310	0	0	18,651	18,651	0	0	8,081	8,081
2007	0	1,189	58,257	59,446	0	0	27,793	27,793	0	0	11,277	11,277
2008	0	845	54,612	55,457	0	0	19,436	19,436	0	255	13,740	13,995
2009	0	537	41,854	42,391	0	0	15,473	15,473	0	130	11,377	11,507
2010	0	809	43,233	44,042	0	0	12,788	12,788	0	254	12,847	13,101
2011	0	803	39,309	40,112	0	0	12,832	12,832	0	213	11,275	11,488
2012	0	686	39,254	39,940	0	0	12,886	12,886	0	196	9,860	10,056
2013	0	1,150	48,407	49,557	0	0	19,404	19,404	0	350	12,478	12,828
2014	0	2,597	33,843	36,440	0	0	12,366	12,366	0	970	14,123	15,093
2015	0	144	35,035	35,179	0	0	15,321	15,321	0	76	11,133	11,209
2016	0	552	32,598	33,150	0	0	12,849	12,849	0	278	8,947	9,225
2017	0	1,639	36,490	38,129	0	0	14,525	14,525	0	646	8,201	8,847
2018	0	51	44,836	44,887	0	0	18,583	18,583	0	5	15,835	15,840
2019	**0**	**51**	**46,069**	**46,120**	**0**	**0**	**21,565**	**21,565**	**0**	**5**	**17,415**	**17,420**
2020	0	51	46,069	46,120	0	0	22,643	22,643	0	5	17,415	17,420
2021	0	51	46,069	46,120	0	0	23,775	23,775	0	5	17,415	17,420
2022	0	51	46,069	46,120	0	0	24,964	24,964	0	5	17,415	17,420
2023	0	51	46,069	46,120	0	0	24,964	24,964	0	5	17,415	17,420
2024	0	51	46,069	46,120	0	0	24,964	24,964	0	5	17,415	17,420
2025	0	51	46,069	46,120	0	0	24,964	24,964	0	5	17,415	17,420
2026	0	51	46,069	46,120	0	0	24,964	24,964	0	5	17,415	17,420
2027	0	51	46,069	46,120	0	0	24,964	24,964	0	5	17,415	17,420
2028	0	51	46,069	46,120	0	0	24,964	24,964	0	5	17,415	17,420
2029	0	51	46,069	46,120	0	0	24,964	24,964	0	5	17,415	17,420
2030	0	51	46,069	46,120	0	0	24,964	24,964	0	5	17,415	17,420
2031	0	51	46,069	46,120	0	0	24,964	24,964	0	5	17,415	17,420
2032	0	51	46,069	46,120	0	0	24,964	24,964	0	5	17,415	17,420
2033	0	51	46,069	46,120	0	0	24,964	24,964	0	5	17,415	17,420
2034	0	51	46,069	46,120	0	0	24,964	24,964	0	5	17,415	17,420
2035	0	51	46,069	46,120	0	0	24,964	24,964	0	5	17,415	17,420

[a] 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)

	SOUTH BAY AQUEDUCT						CALIFORNIA AQUEDUCT							
							NORTH SAN JOAQUIN DIVISION							
	South Bay Pumping Plant						Banks Pumping Plant							
							Transportation Water							
				Deliveries						Deliveries				
Calendar Year	Initial Fill Water	Operational Losses	Reservoir Storage Changes	Water Supply[b]	Recreation	Total	Initial Fill Water	Operational Losses	Reservoir Storage Changes	Water Supply	Recreation	Total	Conservation Water	Total
	[13]	[14]	[15]	[16]	[17]	[18]	[19]	[20]	[21]	[22]	[23]	[24]	[25]	[26]
1961	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1962	9	272	0	8,906	0	9,187	0	0	0	0	0	0	0	0
1963	71	185	0	12,645	0	12,901	0	0	0	0	0	0	0	0
1964	171	152	0	20,911	0	21,234	0	0	0	0	0	0	0	0
1965	93	729	0	34,026	0	34,848	0	0	0	0	0	0	0	0
1966	0	1,746	0	54,913	0	56,659	0	0	0	0	0	0	0	0
1967	0	1,677	0	56,763	0	58,440	5,746	1,183	0	11,538	0	18,467	2,957	21,424
1968	0	1,847	0	101,055	0	102,902	11,079	74,464	0	293,243	0	378,786	531,275	910,061
1969	3,449	2,668	0	69,712	0	75,829	7,336	44,287	0	265,417	0	317,040	531,185	848,225
1970	16,279	1,086	(5,355)	89,560	0	101,570	23,947	20,767	(5,355)	365,771	0	405,130	(12,995)	392,135
1971	0	1,815	8,854	98,584	0	109,253	23,207	(10,754)	8,854	651,665	8	672,980	7,708	680,688
1972	0	3,557	2,273	138,426	0	144,256	145,066	9,057	(4,285)	1,033,432	6,489	1,189,759	48,300	1,238,059
1973	0	(33)	(1,510)	94,078	0	92,535	214,941	(4,951)	2,902	733,008	1,155	947,055	55,846	1,002,901
1974	0	1,287	(10,056)	89,318	0	80,549	247,894	(11,526)	(32,510)	873,302	2,118	1,079,278	54,683	1,133,961
1975	0	320	8,550	93,604	0	102,474	110,149	(8,092)	16,101	1,223,332	3,377	1,344,867	(102,625)	1,242,242
1976	0	2,431	1,391	126,431	141	130,394	67,834	5,443	(244,124)	1,372,093	1,745	1,202,991	(442,348)	760,643
1977	0	2,866	2,685	107,704	112	113,367	0	39,897	(157,543)	573,146	1,111	456,611	(13,507)	443,104
1978	0	2,165	(11,249)	112,574	126	103,616	67,457	(36,898)	35,129	1,451,842	1,177	1,518,707	752,075	2,270,782
1979	0	2,401	1,069	122,190	89	125,749	17,397	60,958	(32,307)	1,659,265	1,398	1,706,711	(112,053)	1,594,658
1980	0	1,758	(6,563)	115,824	123	111,142	3,159	58,484	(275,538)	1,529,187	2,131	1,317,423	186,601	1,504,024
1981	0	2,627	13,742	129,507	121	145,997	46,060	85,350	40,536	1,908,986	4,974	2,085,906	(931,878)	1,154,028
1982	0	2,344	(23,928)	107,439	129	85,984	5,979	61,556	99,897	1,743,145	4,646	1,915,223	347,983	2,263,206
1983	0	2,151	(22,886)	94,656	132	74,053	6,071	47,022	(310,477)	1,184,282	7,853	934,751	835,771	1,770,522
1984	0	2,088	8,442	98,122	158	108,810	38,649	97,143	(108,548)	1,587,936	5,874	1,621,054	21,875	1,642,929
1985	0	2,817	(1,607)	122,088	152	123,450	0	110,469	137,783	1,985,632	5,452	2,239,336	(110,569)	2,128,767
1986	0	2,299	(1,850)	110,988	130	111,567	0	90,799	20,177	1,993,278	3,865	2,108,119	200,298	2,308,417
1987	0	2,625	(584)	136,796	137	138,974	0	91,427	(23,116)	2,121,366	7,672	2,197,349	(458,725)	1,738,624
1988	0	2,884	(698)	147,255	142	149,583	0	107,249	(35,484)	2,368,793	4,889	2,445,447	(303,583)	2,141,864
1989	0	2,673	3,296	142,269	152	148,390	0	117,603	(38,058)	2,829,107	8,135	2,916,787	421,131	3,337,918
1990	0	894	1,982	156,537	168	159,581	0	99,059	(290,965)	2,554,658	9,262	2,372,014	(374,027)	1,997,987
1991	0	2,637	(4,532)	50,259	150	48,514	0	80,106	(79,038)	539,748	4,879	545,695	554,904	1,100,599
1992	0	2,881	756	76,661	147	80,445	0	91,391	(218,170)	1,451,436	2,605	1,327,262	61,343	1,388,605
1993	0	1,940	(20,051)	105,971	143	88,003	0	149,372	(273,789)	2,279,323	2,609	2,157,515	849,249	3,006,764
1994	0	1,981	1,714	100,568	168	104,431	0	148,712	(120,985)	1,828,072	3,803	1,859,602	(324,640)	1,534,962
1995	0	1,188	(12,333)	76,640	146	65,641	0	173,074	(397,605)	2,003,475	2,575	1,781,519	293,159	2,074,678
1996	0	981	(1,990)	77,215	150	76,356	0	123,502	78,123	2,507,143	3,902	2,712,670	288,576	3,001,246
1997	0	1,575	5,016	102,186	155	108,932	527	135,106	(98,334)	2,366,152	2,594	2,406,045	(50,000)	2,356,045
1998	0	1,551	3,595	70,876	114	76,136	0	91,319	(346,039)	1,728,257	2,107	1,475,644	120,886	1,596,530
1999	0	2,166	12,313	100,497	139	115,115	0	135,809	(17,569)	2,855,522	4,301	2,978,063	(307,839)	2,670,224
2000	0	2,346	(20,958)	135,533	145	117,066	0	115,895	(13,232)	3,474,523	5,182	3,582,368	(15,487)	3,566,881
2001	0	2,784	1,301	95,335	196	99,616	0	222,144	(17,529)	1,874,096	1,978	2,080,689	86,928	2,167,617
2002	0	2,534	(13,938)	123,577	146	112,319	0	225,032	36,404	2,816,389	4,672	3,082,497	(151,719)	2,930,778
2003	0	2,920	(1,399)	132,714	131	134,366	0	329,699	(49,580)	3,193,449	11,362	3,484,930	225,348	3,710,278
2004	0	2,982	(7,240)	125,928	150	121,820	0	83,788	(4,079)	2,979,217	1,337	3,060,263	103,811	3,164,074
2005	0	2,823	(3,565)	108,136	154	107,548	0	151,931	(163,243)	3,665,023	1,270	3,654,981	535,754	4,190,735
2006	0	2,989	(9,645)	118,272	169	111,785	0	67,040	(129,767)	3,571,009	1,208	3,509,490	43,481	3,552,971
2007	0	2,840	14,928	134,172	146	152,086	0	73,956	133,124	2,736,094	830	2,944,004	(398,297)	2,545,707
2008	0	2,215	880	116,562	166	119,823	0	130,066	(3,350)	1,413,730	1,082	1,541,528	(397,949)	1,143,579
2009	0	1,999	(1,134)	116,947	108	117,920	0	111,805	(1,860)	1,572,819	2,023	1,684,787	928,666	2,613,453
2010	0	1,727	3,436	95,802	117	101,082	0	224,076	51,667	2,243,593	1,163	2,520,499	454,585	2,975,084
2011	0	1,534	(2,332)	112,952	122	112,276	0	314,282	(21,148)	3,315,056	1,588	3,609,778	165,312	3,775,090
2012	0	2,025	5,931	112,056	150	120,162	0	143,580	20,504	2,607,588	1,606	2,773,278	(473,745)	2,299,533
2013	0	2,753	(5,596)	147,119	137	144,413	0	173,145	(6,654)	1,753,556	1,641	1,921,688	(123,957)	1,797,731
2014	0	3,285	4,951	91,116	46	99,398	0	114,127	36,033	588,005	650	738,815	301,102	1,039,917
2015	0	2,727	(8,482)	117,072	43	111,360	0	109,951	(41,424)	859,793	690	929,010	(140,538)	788,472
2016	0	2,031	5,558	119,221	69	126,879	0	106,956	(57,641)	2,039,418	1,399	2,090,132	503,353	2,593,485
2017	0	2,409	(6,363)	86,838	46	82,930	0	118,158	12,421	3,370,366	775	3,501,720	(3,969)	3,497,751
2018	0	3,267	(11,000)	136,616	400	129,283	0	123,926	2,400	1,600,806	8,660	1,735,792	(202,903)	1,532,889
2019	**0**	**3,376**	**0**	**125,331**	**400**	**129,107**	**0**	**122,073**	**11,587**	**2,430,764**	**8,660**	**2,573,084**	**(62,918)**	**2,510,166**
2020	0	3,384	0	125,735	400	129,519	0	120,830	8,000	2,429,784	8,660	2,567,274	71,515	2,638,789
2021	0	3,351	0	127,649	400	131,400	0	128,769	10,725	2,429,884	8,660	2,578,038	(1,095)	2,576,943
2022	0	3,351	0	126,591	400	130,342	0	128,846	(3,483)	2,429,932	8,660	2,563,955	(185,907)	2,378,048
2023	0	3,351	0	126,591	400	130,342	0	128,818	(18,971)	2,429,932	8,660	2,548,439	115,791	2,664,230
2024	0	3,351	0	126,591	400	130,342	0	128,625	11,289	2,429,932	8,660	2,578,506	79,858	2,658,364
2025	0	3,351	0	126,591	400	130,342	0	130,380	(12,518)	2,429,932	8,660	2,556,454	(247,205)	2,309,249
2026	0	3,351	0	126,591	400	130,342	0	128,700	24,308	2,429,932	8,660	2,591,600	246,850	2,838,450
2027	0	3,351	0	126,591	400	130,342	0	128,692	(17,799)	2,429,932	8,660	2,549,485	(12,304)	2,537,181
2028	0	3,351	0	126,591	400	130,342	0	128,783	12,291	2,429,932	8,660	2,579,666	15,430	2,595,096
2029	0	3,351	0	126,591	400	130,342	0	128,671	(9,046)	2,429,932	8,660	2,558,217	(10,778)	2,547,439
2030	0	3,351	0	126,591	400	130,342	0	128,777	20,756	2,429,932	8,660	2,588,125	124,586	2,712,711
2031	0	3,351	0	126,591	400	130,342	0	128,134	(97,726)	2,429,932	8,660	2,469,000	(259,831)	2,209,169
2032	0	3,351	0	126,591	400	130,342	0	128,005	84,999	2,429,932	8,660	2,651,596	138,527	2,790,123
2033	0	3,351	0	126,591	400	130,342	0	127,876	(94,652)	2,429,932	8,660	2,471,816	(184,372)	2,287,444
2034	0	3,351	0	126,591	400	130,342	0	127,725	69,593	2,429,932	8,660	2,635,910	120,375	2,756,285
2035	0	3,351	0	126,591	400	130,342	0	127,379	(242,659)	2,429,932	8,660	2,323,312	(587,531)	1,735,781

[b] For the period June 1962 through November 1967, deliveries were supplied by non-SWP water.

TABLE B-6 Annual Water Quantities Conveyed through Each Pumping and Power Recovery Plant of Project Transportation Facilities (acre-feet)

Sheet 3 of 10

	CALIFORNIA AQUEDUCT (continued)											
	SAN LUIS DIVISION						SOUTH SAN JOAQUIN DIVSION					
	Dos Amigos Pumping Plant						Buena Vista Pumping Plant					
				Deliveries						Deliveries		
Calendar Year	Initial Fill Water	Operational Losses	Reservoir Storage Changes	Water Supply	Recreation	Total	Initial Fill Water	Operational Losses	Reservoir Storage Changes	Water Supply	Recreation	Total
	[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	75,028	48,231	2,307,963	636	2,431,858	0	41,741	48,231	1,505,105	603	1,595,680
2011	0	66,937	(18,816)	3,343,960	870	3,392,951	0	39,914	(18,816)	1,820,268	742	1,842,108
2012	0	113,586	14,573	2,537,793	942	2,666,894	0	95,029	14,573	1,672,197	938	1,782,737
2013	0	174,857	(1,058)	1,549,837	836	1,724,472	0	105,771	(1,058)	1,275,717	795	1,381,225
2014	0	105,741	31,082	433,625	214	570,662	0	72,181	31,082	523,726	172	627,161
2015	0	103,380	(32,942)	724,850	155	795,443	0	46,903	(32,942)	738,410	151	752,522
2016	0	100,424	(63,199)	1,867,265	981	1,905,471	0	63,781	(63,199)	1,428,757	981	1,430,320
2017	0	116,906	18,784	3,485,634	351	3,621,675	0	103,689	18,784	2,087,781	300	2,210,554
2018	0	73,387	13,400	1,475,859	7,210	1,569,856	0	43,925	13,400	1,072,000	7,010	1,136,335
2019	**0**	**75,412**	**11,587**	**2,300,713**	**7,210**	**2,394,922**	**0**	**45,950**	**11,587**	**1,607,294**	**7,010**	**1,671,841**
2020	0	75,497	8,000	2,299,329	7,210	2,390,036	0	46,035	8,000	1,600,919	7,010	1,661,964
2021	0	70,711	10,725	2,297,515	7,210	2,386,161	0	41,249	10,725	1,600,919	7,010	1,659,903
2022	0	70,705	(3,483)	2,298,621	7,210	2,373,053	0	41,243	(3,483)	1,600,919	7,010	1,645,689
2023	0	70,696	(18,971)	2,298,621	7,210	2,357,556	0	41,234	(18,971)	1,600,919	7,010	1,630,192
2024	0	70,575	11,289	2,298,621	7,210	2,387,695	0	41,113	11,289	1,600,919	7,010	1,660,331
2025	0	70,638	(12,518)	2,298,621	7,210	2,363,951	0	41,176	(12,518)	1,600,919	7,010	1,636,587
2026	0	70,650	24,308	2,298,621	7,210	2,400,789	0	41,188	24,308	1,600,919	7,010	1,673,425
2027	0	70,563	(17,799)	2,298,621	7,210	2,358,595	0	41,101	(17,799)	1,600,919	7,010	1,631,231
2028	0	70,703	12,291	2,298,621	7,210	2,388,825	0	41,241	12,291	1,600,919	7,010	1,661,461
2029	0	70,630	(9,046)	2,298,621	7,210	2,367,415	0	41,168	(9,046)	1,600,919	7,010	1,640,051
2030	0	70,694	20,756	2,298,621	7,210	2,397,281	0	41,232	20,756	1,600,919	7,010	1,669,917
2031	0	70,566	(97,726)	2,298,621	7,210	2,278,671	0	41,104	(97,726)	1,600,919	7,010	1,551,307
2032	0	70,168	84,999	2,298,621	7,210	2,460,998	0	40,706	84,999	1,600,919	7,010	1,733,634
2033	0	70,373	(94,652)	2,298,621	7,210	2,281,552	0	40,911	(94,652)	1,600,919	7,010	1,554,188
2034	0	69,865	69,593	2,298,621	7,210	2,445,289	0	40,403	69,593	1,600,919	7,010	1,717,925
2035	0	69,205	(242,659)	2,298,621	7,210	2,132,377	0	39,743	(242,659)	1,600,919	7,010	1,405,013

TABLE B-6 Annual Water Quantities Conveyed through Each Pumping and Power Recovery Plant of Project Transportation Facilities (acre-feet)

	CALIFORNIA AQUEDUCT (continued)											
	SOUTH SAN JOAQUIN DIVSION (continued)											
	Teerink Pumping Plant						Chrisman Pumping Plant					
				Deliveries						Deliveries		
Calendar Year	Initial Fill Water	Operational Losses	Reservoir Storage Changes	Water Supply	Recreation	Total	Initial Fill Water	Operational Losses	Reservoir Storage Changes	Water Supply	Recreation	Total
	[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	90,711	48,231	1,409,122	603	1,548,667	0	58,174	48,231	1,389,990	603	1,496,998
2011	0	114,286	(18,816)	1,695,956	742	1,792,168	0	67,210	(18,816)	1,653,798	742	1,702,934
2012	0	114,502	14,573	1,537,522	938	1,667,535	0	70,999	14,573	1,510,007	938	1,596,517
2013	0	116,975	(1,058)	1,190,730	795	1,307,442	0	69,572	(1,058)	1,162,989	795	1,232,298
2014	0	70,655	31,082	489,254	172	591,163	0	52,458	31,082	484,432	172	568,144
2015	0	67,819	(32,942)	738,123	151	773,151	0	56,466	(32,942)	733,481	151	757,156
2016	0	106,907	(63,199)	1,364,988	981	1,409,677	0	83,653	(63,199)	1,352,636	981	1,374,071
2017	0	127,631	18,784	1,951,859	300	2,098,574	0	114,305	18,784	1,906,287	300	2,039,676
2018	0	40,295	13,400	1,029,620	7,010	1,090,325	0	40,045	13,400	1,005,999	7,010	1,066,454
2019	**0**	**42,320**	**11,587**	**1,446,682**	**7,010**	**1,507,599**	**0**	**42,070**	**11,587**	**1,420,882**	**7,010**	**1,481,549**
2020	0	42,405	8,000	1,435,688	7,010	1,493,103	0	42,155	8,000	1,409,888	7,010	1,467,053
2021	0	37,619	10,725	1,435,688	7,010	1,491,042	0	37,369	10,725	1,409,888	7,010	1,464,992
2022	0	37,613	(3,483)	1,435,688	7,010	1,476,828	0	37,363	(3,483)	1,409,888	7,010	1,450,778
2023	0	37,604	(18,971)	1,435,688	7,010	1,461,331	0	37,354	(18,971)	1,409,888	7,010	1,435,281
2024	0	37,483	11,289	1,435,688	7,010	1,491,470	0	37,233	11,289	1,409,888	7,010	1,465,420
2025	0	37,546	(12,518)	1,435,688	7,010	1,467,726	0	37,296	(12,518)	1,409,888	7,010	1,441,676
2026	0	37,558	24,308	1,435,688	7,010	1,504,564	0	37,308	24,308	1,409,888	7,010	1,478,514
2027	0	37,471	(17,799)	1,435,688	7,010	1,462,370	0	37,221	(17,799)	1,409,888	7,010	1,436,320
2028	0	37,611	12,291	1,435,688	7,010	1,492,600	0	37,361	12,291	1,409,888	7,010	1,466,550
2029	0	37,538	(9,046)	1,435,688	7,010	1,471,190	0	37,288	(9,046)	1,409,888	7,010	1,445,140
2030	0	37,602	20,756	1,435,688	7,010	1,501,056	0	37,352	20,756	1,409,888	7,010	1,475,006
2031	0	37,474	(97,726)	1,435,688	7,010	1,382,446	0	37,224	(97,726)	1,409,888	7,010	1,356,396
2032	0	37,076	84,999	1,435,688	7,010	1,564,773	0	36,826	84,999	1,409,888	7,010	1,538,723
2033	0	37,281	(94,652)	1,435,688	7,010	1,385,327	0	37,031	(94,652)	1,409,888	7,010	1,359,277
2034	0	36,773	69,593	1,435,688	7,010	1,549,064	0	36,523	69,593	1,409,888	7,010	1,523,014
2035	0	36,113	(242,659)	1,435,688	7,010	1,236,152	0	35,863	(242,659)	1,409,888	7,010	1,210,102

TABLE B-6 Annual Water Quantities Conveyed through Each Pumping and Power Recovery Plant of Project Transportation Facilities (acre-feet)

Sheet 5 of 10

	CALIFORNIA AQUEDUCT (continued)											
	TEHACHAPI DIVSION						MOJAVE DIVISION					
	Edmonston Pumping Plant						Alamo Pumping Plant					
				Deliveries						Deliveries		
Calendar Year	Initial Fill Water	Operational Losses	Reservoir Storage Changes	Water Supply	Recreation	Total	Initial Fill Water	Operational Losses	Reservoir Storage Changes	Water Supply	Recreation	Total
	[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	60,181	48,231	1,369,128	603	1,478,143	0	32,025	6,964	956,888	363	996,240
2011	0	64,370	(18,816)	1,632,033	742	1,678,329	0	34,783	(1,405)	1,220,667	500	1,254,545
2012	0	65,684	14,573	1,486,712	938	1,567,907	0	22,523	(229)	892,938	550	915,782
2013	0	69,789	(1,058)	1,141,530	795	1,211,056	0	20,563	3,278	528,614	501	552,956
2014	0	43,179	31,082	465,759	172	540,192	0	16,120	41,923	160,225	81	218,349
2015	0	43,312	(32,942)	714,860	151	725,381	0	10,834	(7,059)	248,779	71	252,625
2016	0	41,071	(63,199)	1,330,034	981	1,308,887	0	6,898	7,625	785,563	163	800,249
2017	0	66,781	18,784	1,875,856	300	1,961,721	0	27,722	(56,730)	1,458,782	235	1,430,009
2018	0	38,495	13,400	982,876	7,010	1,041,781	0	21,647	20,400	579,657	1,630	623,334
2019	**0**	**40,520**	**11,587**	**1,396,625**	**7,010**	**1,455,742**	**0**	**23,065**	**18,587**	**941,243**	**1,630**	**984,525**
2020	0	40,605	8,000	1,385,631	7,010	1,441,246	0	23,170	0	972,504	1,630	997,304
2021	0	35,819	10,725	1,385,631	7,010	1,439,185	0	20,946	(1,117)	972,441	1,630	993,900
2022	0	35,813	(3,483)	1,385,631	7,010	1,424,971	0	20,940	(3,434)	972,441	1,630	991,577
2023	0	35,804	(18,971)	1,385,631	7,010	1,409,474	0	20,939	(18,638)	972,441	1,630	976,372
2024	0	35,683	11,289	1,385,631	7,010	1,439,613	0	20,881	21,309	972,441	1,630	1,016,261
2025	0	35,746	(12,518)	1,385,631	7,010	1,415,869	0	20,965	(11,624)	972,441	1,630	983,412
2026	0	35,758	24,308	1,385,631	7,010	1,452,707	0	20,930	13,030	972,441	1,630	1,008,031
2027	0	35,671	(17,799)	1,385,631	7,010	1,410,513	0	20,861	(6,161)	972,441	1,630	988,771
2028	0	35,811	12,291	1,385,631	7,010	1,440,743	0	20,961	4,006	972,441	1,630	999,038
2029	0	35,738	(9,046)	1,385,631	7,010	1,419,333	0	20,955	(913)	972,441	1,630	994,113
2030	0	35,802	20,756	1,385,631	7,010	1,449,199	0	20,930	8,528	972,441	1,630	1,003,529
2031	0	35,674	(97,726)	1,385,631	7,010	1,330,589	0	20,956	(31,057)	972,441	1,630	963,970
2032	0	35,276	84,999	1,385,631	7,010	1,512,916	0	20,865	43,953	972,441	1,630	1,038,889
2033	0	35,481	(94,652)	1,385,631	7,010	1,333,470	0	20,854	(37,929)	972,441	1,630	956,996
2034	0	34,973	69,593	1,385,631	7,010	1,497,207	0	20,769	28,588	972,441	1,630	1,023,428
2035	0	34,313	(242,659)	1,385,631	7,010	1,184,295	0	20,892	(49,219)	972,441	1,630	945,744

TABLE B-6 Annual Water Quantities Conveyed through Each Pumping and Power Recovery Plant of Project Transportation Facilities (acre-feet)

	CALIFORNIA AQUEDUCT (continued)											
	MOJAVE DIVISION (continued)											
	Pearblossom Pumping Plant						Mojave Siphon Powerplant					
				Deliveries						Deliveries		
Calendar Year	Initial Fill Water	Operational Losses	Reservoir Storage Changes	Water Supply	Recreation	Total	Initial Fill Water	Operational Losses	Reservoir Storage Changes	Water Supply	Recreation	Total
	[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	1,854	6,964	886,249	363	895,430	0	9,649	6,964	858,609	363	875,585
2011	0	7,953	(1,405)	1,114,556	500	1,121,604	0	13,506	(1,405)	1,080,734	500	1,093,335
2012	0	3,499	(229)	797,563	550	801,383	0	3,492	(229)	775,600	550	779,413
2013	0	6,273	3,278	466,095	501	476,147	0	12,172	3,278	460,089	501	476,040
2014	0	11,143	41,923	133,376	81	186,523	0	13,671	41,923	130,752	81	186,427
2015	0	7,067	(7,059)	229,244	71	229,323	0	9,953	(7,059)	221,321	71	224,286
2016	0	8,750	7,625	735,382	163	751,920	0	5,792	7,625	721,164	163	734,744
2017	0	22,451	(56,730)	1,331,551	235	1,297,507	0	7,679	(56,730)	1,308,531	235	1,259,715
2018	0	16,297	20,400	518,134	1,430	556,261	0	12,827	20,400	512,377	1,430	547,034
2019	**0**	**17,715**	**18,587**	**823,761**	**1,430**	**861,493**	**0**	**14,245**	**18,587**	**789,207**	**1,430**	**823,469**
2020	0	17,820	0	865,085	1,430	884,335	0	14,350	0	830,327	1,430	846,107
2021	0	15,596	(1,117)	865,085	1,430	880,994	0	12,126	(1,117)	830,111	1,430	842,550
2022	0	15,590	(3,434)	865,085	1,430	878,671	0	12,120	(3,434)	830,111	1,430	840,227
2023	0	15,589	(18,638)	865,085	1,430	863,466	0	12,119	(18,638)	830,111	1,430	825,022
2024	0	15,531	21,309	865,085	1,430	903,355	0	12,061	21,309	830,111	1,430	864,911
2025	0	15,615	(11,624)	865,085	1,430	870,506	0	12,145	(11,624)	830,111	1,430	832,062
2026	0	15,580	13,030	865,085	1,430	895,125	0	12,110	13,030	830,111	1,430	856,681
2027	0	15,511	(6,161)	865,085	1,430	875,865	0	12,041	(6,161)	830,111	1,430	837,421
2028	0	15,611	4,006	865,085	1,430	886,132	0	12,141	4,006	830,111	1,430	847,688
2029	0	15,605	(913)	865,085	1,430	881,207	0	12,135	(913)	830,111	1,430	842,763
2030	0	15,580	8,528	865,085	1,430	890,623	0	12,110	8,528	830,111	1,430	852,179
2031	0	15,606	(31,057)	865,085	1,430	851,064	0	12,136	(31,057)	830,111	1,430	812,620
2032	0	15,515	43,953	865,085	1,430	925,983	0	12,045	43,953	830,111	1,430	887,539
2033	0	15,504	(37,929)	865,085	1,430	844,090	0	12,034	(37,929)	830,111	1,430	805,646
2034	0	15,419	28,588	865,085	1,430	910,522	0	11,949	28,588	830,111	1,430	872,078
2035	0	15,542	(49,219)	865,085	1,430	832,838	0	12,072	(49,219)	830,111	1,430	794,394

TABLE B-6 Annual Water Quantities Conveyed through Each Pumping and Power Recovery Plant of Project Transportation Facilities (acre-feet)

	CALIFORNIA AQUEDUCT (continued)									
	SANTA ANA DIVISION									
	Devil Canyon Powerplant						Greenspot Pump Station			
				Deliveries						
Calendar Year	Initial Fill Water	Operational Losses	Reservoir Storage Changes	Water Supply	Recreation	Total	Initial Fill Water	Operational Losses	Water Supply Delivery	Total
	[75]	[76]	[77]	[78]	[79]	[80]	[81]	[82]	[83]	[84]
1961	0	0	0	0	0	0	0	0	0	0
1962	0	0	0	0	0	0	0	0	0	0
1963	0	0	0	0	0	0	0	0	0	0
1964	0	0	0	0	0	0	0	0	0	0
1965	0	0	0	0	0	0	0	0	0	0
1966	0	0	0	0	0	0	0	0	0	0
1967	0	0	0	0	0	0	0	0	0	0
1968	0	0	0	0	0	0	0	0	0	0
1969	0	0	0	0	0	0	0	0	0	0
1970	0	0	0	0	0	0	0	0	0	0
1971	0	0	0	0	0	0	0	0	0	0
1972	37	0	0	1,275	0	1,312	0	0	0	0
1973	40,848	14,745	0	51,812	0	107,405	0	0	0	0
1974	74,666	8,367	(4,925)	102,198	0	180,306	0	0	0	0
1975	10,000	1,995	(6,719)	189,526	0	194,802	0	0	0	0
1976	4,168	5,180	(9,182)	235,711	23	235,900	0	0	0	0
1977	0	8,082	(5,235)	101,137	469	104,453	0	0	0	0
1978	14,820	3,754	21,686	373,636	481	414,377	0	0	0	0
1979	12,302	5,620	(27,107)	356,854	485	348,154	0	0	0	0
1980	0	9,468	12,714	395,975	742	418,899	0	0	0	0
1981	0	8,401	(23,448)	569,088	807	554,848	0	0	0	0
1982	0	6,012	44,469	399,799	1,798	452,078	0	0	0	0
1983	0	8,597	5,188	230,277	1,078	245,140	0	0	0	0
1984	0	12,861	(850)	250,938	1,414	264,363	0	0	0	0
1985	0	14,325	(8,791)	349,336	956	355,826	0	0	0	0
1986	0	9,486	8,339	392,650	1,378	411,853	0	0	0	0
1987	0	7,923	(11,335)	375,451	1,118	373,157	0	0	0	0
1988	0	11,090	2,238	499,285	861	513,474	0	0	0	0
1989	0	13,116	(5,487)	658,730	1,301	667,660	0	0	0	0
1990	0	13,439	(4,622)	728,723	1,281	738,821	0	0	0	0
1991	0	10,836	18,308	161,032	340	190,516	0	0	0	0
1992	0	9,157	(9,084)	328,354	371	328,798	0	0	0	0
1993	0	5,602	5,593	244,678	364	256,237	0	0	0	0
1994	0	10,915	(11,045)	393,690	357	393,917	0	0	0	0
1995	0	11,268	2,331	320,978	358	334,935	0	0	0	0
1996	0	9,496	13,015	417,656	494	440,661	0	0	0	0
1997	0	8,087	(19,685)	451,874	416	440,692	0	0	0	0
1998	0	6,700	16,643	332,198	310	355,851	0	0	0	0
1999	0	9,784	(4,177)	497,787	341	503,735	0	0	0	0
2000	0	7,407	(11,040)	853,786	375	850,528	0	0	0	0
2001	0	9,324	8,183	631,363	374	649,244	0	0	0	0
2002	0	10,315	9,682	818,028	413	838,438	0	0	0	0
2003	0	9,198	(18,298)	922,901	260	914,061	0	0	4,526	4,526
2004	0	11,166	15,150	1,033,309	85	1,059,710	0	0	3,798	3,798
2005	0	4,500	(63,441)	1,010,247	0	951,306	0	0	3,686	3,686
2006	0	8,208	7,571	1,153,993	0	1,169,772	0	0	7,775	7,775
2007	0	8,216	(5,872)	953,803	0	956,147	0	0	12,168	12,168
2008	0	10,599	7,759	533,221	0	551,579	0	0	14,408	14,408
2009	0	10,035	(5,600)	410,032	1,025	415,492	0	0	20,542	20,542
2010	0	6,275	5,344	851,786	307	863,712	0	0	18,395	18,395
2011	0	7,359	2,371	1,066,088	417	1,076,235	0	0	20,586	20,586
2012	0	(1,942)	(2,225)	771,982	459	768,274	0	0	23,791	23,791
2013	0	3,306	3,042	458,221	416	464,985	0	0	20,560	20,560
2014	0	9,919	42,495	129,317	27	181,758	0	0	9,843	9,843
2015	0	8,923	(3,561)	220,068	35	225,465	0	0	9,791	9,791
2016	0	(2,942)	3,074	711,654	107	711,893	0	0	22,896	22,896
2017	0	(8,690)	(53,233)	1,297,152	150	1,235,379	0	0	6,682	6,682
2018	0	8,646	20,400	509,774	1,250	540,070	0	0	719	719
2019	**0**	**10,065**	**18,587**	**769,433**	**1,250**	**799,335**	**0**	**0**	**0**	**0**
2020	0	10,167	0	810,757	1,250	822,174	0	0	0	0
2021	0	8,486	(398)	811,157	1,250	820,495	0	0	0	0
2022	0	8,486	13,735	811,157	1,250	834,628	0	0	0	0
2023	0	8,482	(8,417)	811,157	1,250	812,472	0	0	0	0
2024	0	8,462	689	811,157	1,250	821,558	0	0	0	0
2025	0	8,489	4,591	811,157	1,250	825,487	0	0	0	0
2026	0	8,475	(3,819)	811,157	1,250	817,063	0	0	0	0
2027	0	8,479	745	811,157	1,250	821,631	0	0	0	0
2028	0	8,481	(5,355)	811,157	1,250	815,533	0	0	0	0
2029	0	8,481	2,909	811,157	1,250	823,797	0	0	0	0
2030	0	8,480	296	811,157	1,250	821,183	0	0	0	0
2031	0	8,475	(1,976)	811,157	1,250	818,906	0	0	0	0
2032	0	8,449	18,821	811,157	1,250	839,677	0	0	0	0
2033	0	8,449	(23,419)	811,157	1,250	797,437	0	0	0	0
2034	0	8,443	21,651	811,157	1,250	842,501	0	0	0	0
2035	0	8,451	(31,434)	811,157	1,250	789,424	0	0	0	0

TABLE B-6 Annual Water Quantities Conveyed through Each Pumping and Power Recovery Plant of Project Transportation Facilities (acre-feet)

	CALIFORNIA AQUEDUCT (continued)											
	SANTA ANA DIVISION (continued)											
	Citrus Pump Station[c]				Crafton Hills Pump Station				Cherry Valley Pump Station			
Calendar Year	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	Total
	[85]	[86]	[87]	[88]	[89]	[90]	[91]	[92]	[93]	[94]	[95]	[96]
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	0	0	0	0	0	0
1973	0	0	0	0	0	0	0	0	0	0	0	0
1974	0	0	0	0	0	0	0	0	0	0	0	0
1975	0	0	0	0	0	0	0	0	0	0	0	0
1976	0	0	0	0	0	0	0	0	0	0	0	0
1977	0	0	0	0	0	0	0	0	0	0	0	0
1978	0	0	0	0	0	0	0	0	0	0	0	0
1979	0	0	0	0	0	0	0	0	0	0	0	0
1980	0	0	0	0	0	0	0	0	0	0	0	0
1981	0	0	0	0	0	0	0	0	0	0	0	0
1982	0	0	0	0	0	0	0	0	0	0	0	0
1983	0	0	0	0	0	0	0	0	0	0	0	0
1984	0	0	0	0	0	0	0	0	0	0	0	0
1985	0	0	0	0	0	0	0	0	0	0	0	0
1986	0	0	0	0	0	0	0	0	0	0	0	0
1987	0	0	0	0	0	0	0	0	0	0	0	0
1988	0	0	0	0	0	0	0	0	0	0	0	0
1989	0	0	0	0	0	0	0	0	0	0	0	0
1990	0	0	0	0	0	0	0	0	0	0	0	0
1991	0	0	0	0	0	0	0	0	0	0	0	0
1992	0	0	0	0	0	0	0	0	0	0	0	0
1993	0	0	0	0	0	0	0	0	0	0	0	0
1994	0	0	0	0	0	0	0	0	0	0	0	0
1995	0	0	0	0	0	0	0	0	0	0	0	0
1996	0	0	0	0	0	0	0	0	0	0	0	0
1997	0	0	0	0	0	0	0	0	0	0	0	0
1998	0	0	0	0	0	0	0	0	0	0	0	0
1999	0	0	0	0	0	0	0	0	0	0	0	0
2000	0	0	0	0	0	0	0	0	0	0	0	0
2001	0	0	0	0	0	0	0	0	0	0	0	0
2002	0	0	0	0	0	0	0	0	0	0	0	0
2003	0	0	0	0	0	0	2,733	2,733	0	0	116	116
2004	0	0	0	0	0	0	3,212	3,212	0	0	841	841
2005	0	0	0	0	0	0	2,727	2,727	0	0	692	692
2006	0	0	0	0	0	0	6,892	6,892	0	0	807	807
2007	0	0	0	0	0	0	9,038	9,038	0	0	177	177
2008	0	0	0	0	0	0	13,728	13,728	0	0	1,042	1,042
2009	0	0	0	0	0	0	16,463	16,463	0	0	1,898	1,898
2010	0	0	0	0	0	0	17,778	17,778	0	0	5,685	5,685
2011	0	0	0	0	0	0	19,887	19,887	0	0	9,290	9,290
2012	0	0	0	0	0	0	20,614	20,614	0	0	11,010	11,010
2013	0	0	0	0	0	0	17,526	17,526	0	0	9,445	9,445
2014	0	0	0	0	0	0	9,468	9,468	0	0	5,044	5,044
2015	0	0	0	0	0	0	9,409	9,409	0	0	3,481	3,481
2016	0	0	0	0	0	0	19,247	19,247	0	0	10,816	10,816
2017	0	0	31,763	31,763	0	0	31,763	31,763	0	0	14,946	14,946
2018	0	0	11,282	11,282	0	0	11,282	11,282	0	0	9,630	9,630
2019	**0**	**0**	**10,380**	**10,380**	**0**	**0**	**10,380**	**10,380**	**0**	**0**	**10,130**	**10,130**
2020	0	0	10,380	10,380	0	0	10,380	10,380	0	0	9,930	9,930
2021	0	0	10,380	10,380	0	0	10,380	10,380	0	0	9,730	9,730
2022	0	0	10,380	10,380	0	0	10,380	10,380	0	0	9,530	9,530
2023	0	0	10,380	10,380	0	0	10,380	10,380	0	0	9,330	9,330
2024	0	0	10,380	10,380	0	0	10,380	10,380	0	0	9,130	9,130
2025	0	0	10,380	10,380	0	0	10,380	10,380	0	0	8,930	8,930
2026	0	0	10,380	10,380	0	0	10,380	10,380	0	0	8,780	8,780
2027	0	0	10,380	10,380	0	0	10,380	10,380	0	0	8,780	8,780
2028	0	0	10,380	10,380	0	0	10,380	10,380	0	0	8,780	8,780
2029	0	0	10,380	10,380	0	0	10,380	10,380	0	0	8,780	8,780
2030	0	0	10,380	10,380	0	0	10,380	10,380	0	0	8,780	8,780
2031	0	0	10,380	10,380	0	0	10,380	10,380	0	0	8,780	8,780
2032	0	0	10,380	10,380	0	0	10,380	10,380	0	0	8,780	8,780
2033	0	0	10,380	10,380	0	0	10,380	10,380	0	0	8,780	8,780
2034	0	0	10,380	10,380	0	0	10,380	10,380	0	0	8,780	8,780
2035	0	0	10,380	10,380	0	0	10,380	10,380	0	0	8,780	8,780

[c] Citrus Pump Station began operation during calendar year 2017. For projected deliveries south of Greenspot Pump Station, flow is assumed to be through Citrus Pump Station.

TABLE B-6 Annual Water Quantities Conveyed through Each Pumping and Power Recovery Plant of Project Transportation Facilities (acre-feet)

Sheet 9 of 10

	CALIFORNIA AQUEDUCT (continued)											
	WEST BRANCH											
	Oso Pumping Plant						Warne Powerplant					
				Deliveries						Deliveries		
Calendar Year	Initial Fill Water	Operational Losses	Reservoir Storage Changes	Water Supply	Recreation	Total	Initial Fill Water	Operational Losses	Reservoir Storage Changes	Water Supply	Recreation	Total
	[97]	[98]	[99]	[100]	[101]	[102]	[103]	[104]	[105]	[106]	[107]	[108]
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	2,444	133	0	0	0	2,577	0	0	0	0	0	0
1972	63,883	6,557	(6,405)	71,991	6,481	142,507	0	0	0	0	0	0
1973	124,461	16,995	4,029	155,317	1,075	301,877	0	0	0	0	0	0
1974	160,860	12,702	(4,146)	209,172	2,064	380,652	0	0	0	0	0	0
1975	93,352	23,008	7,704	374,306	3,288	501,658	0	0	0	0	0	0
1976	56,954	15,845	(136,116)	420,708	1,429	358,820	0	0	0	0	0	0
1977	0	4,407	(98,685)	122,447	(20)	28,149	0	0	0	0	0	0
1978	45,105	9,061	52,774	171,139	176	278,255	0	0	0	0	0	0
1979	0	25,355	(18,781)	145,598	0	152,172	0	0	0	0	0	0
1980	0	24,576	(140,168)	165,931	481	50,820	0	0	0	0	0	0
1981	0	15,254	59,637	283,264	3,179	361,334	0	0	0	0	0	0
1982	0	23,824	61,685	360,878	2,126	448,513	0	24,468	61,169	360,878	2,126	448,641
1983	0	23,601	(74,308)	166,995	6,111	122,399	0	20,780	(74,308)	166,995	6,111	119,578
1984	0	12,461	(138,146)	272,101	3,750	150,166	0	13,572	(139,219)	275,212	2,208	151,773
1985	0	28,257	142,219	403,097	3,728	577,301	0	29,286	141,492	403,097	874	574,749
1986	0	22,387	25,288	393,203	1,777	442,655	0	21,579	25,288	393,203	1,777	441,847
1987	0	18,164	(10,252)	433,452	5,698	447,062	0	20,885	(10,252)	433,452	5,698	449,783
1988	0	20,461	(30,848)	507,169	3,389	500,171	0	23,253	(31,453)	507,169	3,389	502,358
1989	0	27,914	(40,463)	611,681	6,083	605,215	0	27,131	(40,463)	611,681	6,083	604,432
1990	0	33,666	(9,176)	791,355	7,491	823,336	0	34,208	(9,176)	791,355	7,491	823,878
1991	0	16,460	70,754	263,909	4,166	355,289	0	16,908	70,754	263,909	4,166	355,737
1992	0	8,238	(75,008)	435,661	1,572	370,463	0	9,638	(75,008)	435,661	1,572	371,863
1993	0	2,674	(124,283)	451,263	1,233	330,887	0	1,922	(124,283)	451,257	1,233	330,129
1994	0	18,688	(91,606)	490,819	2,488	420,389	0	23,151	(91,606)	490,819	2,488	424,852
1995	0	21,775	14,330	157,629	1,242	194,976	0	15,860	14,330	157,629	1,242	189,061
1996	0	30,121	26,848	286,066	2,363	345,398	0	21,191	26,848	286,066	2,363	336,468
1997	0	30,468	1,892	323,212	1,569	357,141	0	23,437	1,892	323,201	1,569	350,099
1998	0	26,851	(122,848)	208,916	1,222	114,141	0	26,864	(122,848)	208,909	1,222	114,147
1999	0	25,690	5,679	357,664	2,883	391,916	0	21,822	8,120	357,664	2,883	390,489
2000	0	33,658	18,198	668,126	3,767	723,749	0	27,237	18,198	668,126	3,767	717,328
2001	0	24,551	(22,308)	477,315	759	480,317	0	17,404	(22,308)	477,315	759	473,170
2002	0	44,692	41,944	779,284	3,471	869,391	0	35,058	41,944	779,284	3,471	859,757
2003	0	39,495	(27,394)	735,699	10,290	758,090	0	28,167	(27,394)	735,699	10,290	746,762
2004	0	41,947	(14,046)	850,007	478	878,386	0	31,034	(14,046)	850,007	478	867,473
2005	0	38,154	(109,664)	577,251	475	506,216	0	29,111	(109,664)	577,251	475	497,173
2006	0	38,534	(128,775)	616,546	406	526,711	0	23,453	(128,775)	616,546	406	511,630
2007	0	46,921	123,287	760,750	202	931,160	0	29,978	123,287	760,750	202	914,217
2008	0	36,204	(9,613)	531,832	247	558,670	0	36,744	(9,613)	531,832	247	559,210
2009	0	33,295	4,893	631,969	195	670,352	0	30,564	4,893	631,969	195	667,621
2010	0	27,788	41,267	412,240	240	481,535	0	26,930	41,267	412,240	240	480,677
2011	0	29,227	(17,411)	411,366	242	423,424	0	29,363	(17,411)	411,366	242	423,560
2012	0	42,913	14,802	593,774	388	651,877	0	28,769	14,802	593,750	388	637,709
2013	0	49,029	(4,336)	612,912	294	657,899	0	30,918	(4,336)	612,865	294	639,741
2014	0	27,005	(10,841)	305,533	91	321,788	0	17,555	(10,841)	305,533	91	312,338
2015	0	32,430	(25,883)	466,081	80	472,708	0	22,165	(25,883)	466,081	80	462,443
2016	0	34,186	(70,824)	544,471	818	508,651	0	28,991	(70,824)	544,471	818	503,456
2017	0	38,989	75,514	417,074	65	531,642	0	37,047	75,514	416,564	65	529,190
2018	0	16,798	(7,000)	403,219	5,380	418,397	0	14,888	(7,000)	403,219	5,380	416,487
2019	**0**	**17,405**	**(7,000)**	**455,382**	**5,380**	**471,167**	**0**	**15,495**	**(7,000)**	**454,766**	**5,380**	**468,641**
2020	0	17,385	8,000	413,127	5,380	443,892	0	15,475	8,000	412,448	5,380	441,303
2021	0	14,823	11,842	413,190	5,380	445,235	0	12,913	11,842	412,448	5,380	442,583
2022	0	14,823	(49)	413,190	5,380	433,344	0	12,913	(49)	412,448	5,380	430,692
2023	0	14,815	(333)	413,190	5,380	433,052	0	12,905	(333)	412,448	5,380	430,400
2024	0	14,752	(10,020)	413,190	5,380	423,302	0	12,842	(10,020)	412,448	5,380	420,650
2025	0	14,731	(894)	413,190	5,380	432,407	0	12,821	(894)	412,448	5,380	429,755
2026	0	14,778	11,278	413,190	5,380	444,626	0	12,868	11,278	412,448	5,380	441,974
2027	0	14,760	(11,638)	413,190	5,380	421,692	0	12,850	(11,638)	412,448	5,380	419,040
2028	0	14,800	8,285	413,190	5,380	441,655	0	12,890	8,285	412,448	5,380	439,003
2029	0	14,733	(8,133)	413,190	5,380	425,170	0	12,823	(8,133)	412,448	5,380	422,518
2030	0	14,822	12,228	413,190	5,380	445,620	0	12,912	12,228	412,448	5,380	442,968
2031	0	14,668	(66,669)	413,190	5,380	366,569	0	12,758	(66,669)	412,448	5,380	363,917
2032	0	14,361	41,046	413,190	5,380	473,977	0	12,451	41,046	412,448	5,380	471,325
2033	0	14,577	(56,723)	413,190	5,380	376,424	0	12,667	(56,723)	412,448	5,380	373,772
2034	0	14,154	41,005	413,190	5,380	473,729	0	12,244	41,005	412,448	5,380	471,077
2035	0	13,371	(193,440)	413,190	5,380	238,501	0	11,461	(193,440)	412,448	5,380	235,849

TABLE B-6 Annual Water Quantities Conveyed through Each Pumping and Power Recovery Plant of Project Transportation Facilities (acre-feet)

	CALIFORNIA AQUEDUCT (continued)													
	WEST BRANCH (continued)						COASTAL BRANCH							
	Castaic Powerplant						Las Perillas and Badger Hill Pumping Plants				Devil's Den, Bluestone, and Polonio Pass Pumping Plants			
				Deliveries										
Calendar Year	Initial Fill Water	Operational Losses	Reservoir Storage Changes	Water Supply	Recreation	Total	Initial Fill Water	Operational Losses	Water Supply Delivery	Total	Initial Fill Water	Operational Losses	Water Supply Delivery	Total
	[109]	[110]	[111]	[112]	[113]	[114]	[115]	[116]	[117]	[118]	[119]	[120]	[121]	[122]
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	210	873	79,039	80,122	0	0	0	0
1969	0	0	0	0	0	0	0	1,042	62,064	63,106	0	0	0	0
1970	0	0	0	0	0	0	0	638	83,649	84,287	0	0	0	0
1971	0	0	0	0	0	0	0	3,455	110,971	114,426	0	0	0	0
1972	57,364	1,788	(6,162)	71,938	6,481	131,409	0	1,745	121,755	123,500	0	0	0	0
1973	37,198	6,430	4,542	155,297	1,075	204,542	0	5,479	78,645	84,124	0	0	0	0
1974	82,364	1,772	(950)	209,136	541	292,863	0	7,344	78,174	85,518	0	0	0	0
1975	90,460	5,002	(1,534)	374,280	1,563	469,771	0	5,819	85,216	91,035	0	0	0	0
1976	55,990	(7,695)	(132,036)	420,684	1,429	338,372	0	6,562	90,058	96,620	0	0	0	0
1977	0	(1,485)	(102,532)	122,447	(20)	18,410	0	5,777	40,579	46,356	0	0	0	0
1978	45,105	(2,264)	129,523	171,139	176	343,679	0	9,085	92,604	101,689	0	0	0	0
1979	0	(2,339)	(20,400)	145,598	0	122,859	0	10,896	123,155	134,051	0	0	0	0
1980	0	991	(118,026)	165,931	481	49,377	0	9,449	111,379	120,828	0	0	0	0
1981	0	(44,416)	47,244	283,264	2,704	288,796	0	13,232	109,754	122,986	0	0	0	0
1982	0	(60,135)	59,069	360,878	1,187	360,999	0	7,984	95,776	103,760	0	0	0	0
1983	0	(33,418)	(46,904)	166,995	2,618	89,291	0	5,710	100,518	106,228	0	0	0	0
1984	0	(29,618)	(139,545)	275,212	2,201	108,250	0	5,740	126,387	132,127	0	0	0	0
1985	0	(4,622)	135,007	403,097	844	534,326	0	7,563	120,823	128,386	0	0	0	0
1986	0	(6,664)	21,520	393,203	623	408,682	0	8,719	131,599	140,318	0	0	0	0
1987	0	(519)	(6,241)	433,452	2,734	429,426	0	11,363	128,080	139,443	0	0	0	0
1988	0	12,650	(28,498)	507,169	1,359	492,680	0	12,831	120,969	133,800	0	0	0	0
1989	0	634	(40,154)	611,681	3,161	575,322	0	11,454	116,801	128,255	0	0	0	0
1990	0	(14,012)	(15,101)	786,519	3,419	760,825	0	13,022	109,802	122,824	0	0	0	0
1991	0	(871)	89,637	262,921	2,283	353,970	0	5,802	1,496	7,298	0	0	0	0
1992	0	(609)	(71,795)	435,661	1,543	364,800	0	7,893	79,635	87,528	0	0	0	0
1993	0	21,959	(77,428)	451,257	1,211	396,999	0	9,282	94,921	104,203	0	0	0	0
1994	0	5,205	(95,738)	490,819	2,465	402,751	0	8,515	87,158	95,673	0	0	0	0
1995	0	20,400	75,863	157,629	1,223	255,115	0	6,986	94,536	101,522	0	0	0	0
1996	0	(5,621)	19,088	286,066	2,362	301,895	0	9,663	114,630	124,293	0	0	0	0
1997	0	11,119	(1,802)	323,201	1,566	334,084	527	8,343	110,428	119,298	527	0	8,538	9,065
1998	0	24,544	(57,726)	208,909	1,222	176,949	0	8,415	109,400	117,815	0	0	22,210	22,210
1999	0	(3,670)	6,280	357,664	2,865	363,139	0	2,453	120,061	122,514	0	303	23,880	24,183
2000	0	(19,645)	9,320	665,926	1,556	657,157	0	(429)	120,313	119,884	0	0	26,703	26,703
2001	0	(5,949)	(16,588)	477,315	746	455,524	0	(742)	87,915	87,173	0	0	23,229	23,229
2002	0	10,071	35,623	776,136	305	822,135	0	638	99,783	100,421	0	(151)	31,991	31,840
2003	0	9,075	(17,034)	725,781	356	718,178	0	161	101,113	101,274	0	284	31,421	31,705
2004	0	9,120	(11,440)	845,960	456	844,096	0	492	104,144	104,636	0	480	33,870	34,350
2005	0	21,155	(61,490)	577,251	472	537,388	0	1,484	103,178	104,662	0	573	27,595	28,168
2006	0	4,173	(121,607)	616,546	396	499,508	0	1,994	115,433	117,427	0	2,034	27,484	29,518
2007	0	(1,664)	117,880	758,860	196	875,272	0	3,355	131,590	134,945	0	293	31,516	31,809
2008	0	498	(14,279)	529,852	211	516,282	0	3,696	107,239	110,935	0	(30)	21,795	21,765
2009	0	(2,825)	9,194	628,819	164	635,352	0	2,242	102,509	104,751	0	(3,078)	19,253	16,175
2010	0	(4,135)	40,284	409,090	207	445,446	0	4,265	106,590	110,855	0	272	21,532	21,804
2011	0	(9,084)	(22,531)	408,846	221	377,452	0	3,994	113,647	117,641	0	533	24,869	25,402
2012	0	10,210	16,335	590,600	375	617,520	0	7,411	109,383	116,794	0	589	23,418	24,007
2013	0	13,114	(3,811)	610,623	196	620,122	0	7,637	110,714	118,351	0	295	21,699	21,994
2014	0	4,742	(11,327)	305,533	47	298,995	0	6,636	94,369	101,005	0	4,018	19,963	23,981
2015	0	4,268	(25,001)	465,451	63	444,781	0	5,458	94,227	99,685	0	378	15,111	15,489
2016	0	5,995	(68,486)	542,581	795	480,885	0	6,851	119,233	126,084	0	827	31,381	32,208
2017	0	17,918	75,020	413,886	34	506,858	0	7,192	132,194	139,386	0	7,332	32,585	39,917
2018	0	9,202	(5,000)	399,600	2,330	406,132	0	802	71,238	72,040	0	212	23,383	23,595
2019	**0**	**9,809**	**(5,000)**	**452,876**	**2,330**	**460,015**	**0**	**802**	**94,980**	**95,782**	**0**	**212**	**39,987**	**40,199**
2020	0	9,789	10,000	410,558	2,330	432,677	0	802	94,994	95,796	0	212	40,001	40,213
2021	0	6,628	11,842	410,558	2,330	431,358	0	802	95,094	95,896	0	212	40,101	40,313
2022	0	6,628	(49)	410,558	2,330	419,467	0	802	95,142	95,944	0	212	40,149	40,361
2023	0	6,620	(333)	410,558	2,330	419,175	0	802	95,142	95,944	0	212	40,149	40,361
2024	0	6,557	(10,020)	410,558	2,330	409,425	0	802	95,142	95,944	0	212	40,149	40,361
2025	0	6,536	(894)	410,558	2,330	418,530	0	802	95,142	95,944	0	212	40,149	40,361
2026	0	6,583	11,278	410,558	2,330	430,749	0	802	95,142	95,944	0	212	40,149	40,361
2027	0	6,565	(11,638)	410,558	2,330	407,815	0	802	95,142	95,944	0	212	40,149	40,361
2028	0	6,605	8,285	410,558	2,330	427,778	0	802	95,142	95,944	0	212	40,149	40,361
2029	0	6,538	(8,133)	410,558	2,330	411,293	0	802	95,142	95,944	0	212	40,149	40,361
2030	0	6,627	12,228	410,558	2,330	431,743	0	802	95,142	95,944	0	212	40,149	40,361
2031	0	6,473	(66,669)	410,558	2,330	352,692	0	802	95,142	95,944	0	212	40,149	40,361
2032	0	6,166	41,046	410,558	2,330	460,100	0	802	95,142	95,944	0	212	40,149	40,361
2033	0	6,382	(56,723)	410,558	2,330	362,547	0	802	95,142	95,944	0	212	40,149	40,361
2034	0	5,959	41,005	410,558	2,330	459,852	0	802	95,142	95,944	0	212	40,149	40,361
2035	0	5,176	(193,440)	410,558	2,330	224,624	0	802	95,142	95,944	0	212	40,149	40,361

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[a]	Allowance for Future Price Escalation[b]	Costs of Construction of Delivery Structures[c]	Costs of Requested Excess Capacity and Future Enlargement[d]	Capital Cost Component of Delta Water Charge[e]	Capital Cost Component of Transportation Water Charge[f]	Water Supply and Power Total		
	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]
CONSERVATION FACILITIES									
Upper Feather Division									
Frenchman Dam and Lake	180	0	0	0	604	0	784	2,884	3,668
Grizzly Valley Dam and Lake Davis	65	0	0	0	55	0	120	8,957	9,077
Antelope Dam and Lake	1	0	0	0	0	0	1	5,873	5,874
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
Total, Upper Feather Division	***246***	***0***	***0***	***0***	***659***	***0***	***905***	***18,470***	***19,375***
Oroville Division									
Multipurpose Facilities	3,152	0	0	0	1,658,087	0	1,661,239	112,633	1,773,872
Specific Power Facilities	230	0	0	0	289,719	0	289,949	847	290,796
Total, Oroville Division	***3,382***	***0***	***0***	***0***	***1,947,806***	***0***	***1,951,188***	***113,480***	***2,064,668***
California Aqueduct									
North San Joaquin Division	1,210	0	0	0	111,965	0	113,175	4,221	117,396
San Luis Division	13,152	0	0	0	192,841	0	205,993	6,217	212,210
Total, California Aqueduct	***14,362***	***0***	***0***	***0***	***304,806***	***0***	***319,168***	***10,438***	***329,606***
Delta Facilities	37,311	0	0	0	754,001	0	791,312	36,479	827,791
Planning and Preoperation	5,302	0	0	0	109,646	0	114,948	0	114,948
TOTAL, CONSERVATION FACILIITES	**60,603**	**0**	**0**	**0**	**3,116,918**	**0**	**3,177,521**	**178,868**	**3,356,389**
TRANSPORTATION FACILITIES									
Upper Feather Division									
Grizzly Valley Pipeline	0	0	315	0	0	342	656	0	656
North Bay Aqueduct	266	0	676	0	0	125,877	126,818	0	126,818
South Bay Aqueduct	1,791	0	3,642	0	0	381,304	386,737	23,743	410,480
California Aqueduct									
North San Joaquin Division	2,462	0	108	0	0	264,345	266,915	9,395	276,310
San Luis Division	9,201	0	0	0	0	194,134	203,336	8,889	212,225
South San Joaquin Division	386	0	4,789	2,065	0	421,329	428,569	18,167	446,736
Tehachapi Division	27	0	0	5,230	0	399,657	404,914	20,959	425,873
Mojave Division	918	0	2,095	0	0	366,512	369,525	40,888	410,412
Santa Ana Division	1,184	0	6,068	5,331	0	424,373	436,956	98,708	535,664
West Branch	37,592	0	455	37	0	603,169	641,254	41,191	682,445
Coastal Branch	(279)	0	213	0	0	518,028	517,961	0	517,961
Total, California Aqueduct	***51,491***	***0***	***13,728***	***12,663***	***0***	***3,191,547***	***3,269,430***	***238,197***	***3,507,626***
TOTAL, TRANSPORTATION FACILITIES	**53,548**	**0**	**18,361**	**12,663**	**0**	**3,699,069**	**3,783,641**	**261,940**	**4,045,581**
East Branch Enlargement	0	0	0	0	0	462,031	462,031	0	462,031
East Branch Extension	0	0	0	0	0	418,831	418,831	0	418,831
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	101,703	101,703
Off-Aqueduct Power Generation Facilities	0	0	0	0	0	491,574	491,574	0	491,574
Small Hydro Power Generation Facilities	0	0	0	0	14,095	107,852	121,947	0	121,947
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	316,038	316,038
Davis-Grunsky	0	0	0	0	0	0	0	130,000	130,000
TOTAL THROUGH 2035	**114,151**	**0**	**18,361**	**12,663**	**3,165,699**	**5,210,066**	**8,520,940**	**988,548**	**9,509,488**

[a] Miscellaneous project receipts that are applied for accounting purposes to reduce the capital costs of the particular facilities.
[b] These allowances are included for planning the future financial program, but not for determining current water charges.
[c] See Table B-8.
[d] See Table B-9.
[e] See Table B-13.
[f] See Table B-10. Mojave Division total reduced by $86,221,179 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 State Water Project Water Contractors	Calendar Year Capital Costs[a]						
	1952-2015	2016	2017	2018	2019	2020	Total
	[1]	[2]	[3]	[4]	[5]	[6]	[7]
FEATHER RIVER AREA							
County of Butte	261,979	0	0	0	0	0	261,979
Plumas County Flood Control and Water Conservation District	8,723	0	0	0	0	0	8,723
Thermalito Irrigation District[b]	43,939	0	0	0	0	0	43,939
Subtotal	*314,641*	*0*	*0*	*0*	*0*	*0*	*314,641*
NORTH BAY AREA							
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
Subtotal	*675,703*	*0*	*0*	*0*	*0*	*0*	*675,703*
SOUTH BAY AREA							
Alameda County Flood Control and Water Conservation District, Zone 7	1,911,350	0	0	0	0	0	1,911,350
Alameda County Water District	630,576	0	0	0	0	0	630,576
Santa Clara Valley Water District	33,531	0	0	0	0	0	33,531
San Francisco Water Department[b]	1,066,680	0	0	0	0	0	1,066,680
Subtotal	*3,642,137*	*0*	*0*	*0*	*0*	*0*	*3,642,137*
CENTRAL COASTAL AREA							
San Luis Obispo County Flood Control and Water Conservation District	41,418	13,323	3,267	0	0	0	58,008
Santa Barbara County Flood Control and Water Conservation District	67,058	0	0	0	0	0	67,058
Subtotal	*108,476*	*13,323*	*3,267*	*0*	*0*	*0*	*125,066*
SAN JOAQUIN VALLEY AREA							
Castaic Lake Water Agency	82,567	0	0	0	0	0	82,567
County of Kings	35,391	623	19,267	50,000	0	0	105,281
Dudley Ridge Water District	325,947	10,952	8,271	0	0	0	345,170
Empire West Side Irrigation District	6,358	0	0	0	0	0	6,358
Green Valley Water District[b]	5,292	0	0	0	0	0	5,292
Kern County Water Agency	4,029,416	87	0	25,000	0	0	4,054,503
Oak Flat Water District	97,643	0	0	0	0	0	97,643
Tracy Golf and Country Club[b]	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[b]	3,342	0	0	0	0	0	3,342
Del Puerto Water District[b]	0	0	0	20,000	0	0	20,000
Subtotal	*4,870,371*	*11,662*	*27,538*	*95,000*	*0*	*0*	*5,004,571*
SOUTHERN CALIFORNIA AREA							
Antelope Valley-East Kern Water Agency	1,503,331	82,962	28,490	50,000	0	0	1,664,783
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	309,054	0	0	0	0	0	309,054
Palmdale Water District	34,173	0	0	0	0	0	34,173
San Bernardino Valley Municipal Water District	960,685	0	0	0	0	0	960,685
San Gabriel Valley Municipal Water District	131,052	0	0	0	0	0	131,052
San Gorgonio Pass Water Agency	125,485	13,638	0	20,000	0	0	159,123
The Metropolitan Water District of Southern California	4,817,610	0	0	0	0	0	4,817,610
Ventura County Flood Control District	79,699	0	0	0	0	0	79,699
Subtotal	*8,423,356*	*96,600*	*28,490*	*70,000*	*0*	*0*	*8,618,446*
TOTAL	**18,034,684**	**121,585**	**59,295**	**165,000**	**0**	**0**	**18,380,564**

[a] Approximate only, not to be construed as invoice amounts.
[b] Not an SWP water contractor.

Table B-9 Capital Costs of Requested Excess Peaking Capacity (in dollars unless otherwise indicated)

Calendar Year	Total Advance Payments and Credits for Excess Capacity	Total Incremental Costs for Excess Capacity	Overpayment (+) or Underpayment (-)[a]	Annual Surplus Money Investment Fund Interest Rate[b]		Net Over- or Underpayment With Interest[c]
				January–June	July–December	
	[1]	[2]	[3]	[4]	[5]	[6]
			THE METROPOLITAN WATER DISTRICT OF SOUTHERN CALIFORNIA			
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
Total	**11,339,011**	**12,514,776**	**(1,175,765)**	**—**	**—**	**10,461,314**
			SAN GABRIEL VALLEY MUNICIPAL WATER DISTRICT			
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
Total	**139,245**	**138,552**	**693**	**—**	**—**	**86,133**
			ANTELOPE VALLEY-EAST KERN WATER AGENCY			
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
Total	**55,682**	**37,407**	**18,275**	**—**	**—**	**134,869**

[a] Overpayment or underpayment for each calendar year—column [1] minus column [2].

[b] Interest rates shown are annual rates. Interest is credited daily at applicable rates on funds deposited in the State's Surplus Money Investment Fund.

[c] 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)

Reach Number	ANNUAL REQUIRED ADVANCE OF FUNDS — Incremental Costs and Advance Payments by Calendar Year													Reach Total
	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[d]													
	0	8,056,000	9,094,963	1,523,252	8,310,651	3,426,736	1,086,045	(4,244,807)	(14,381,396)				(356,668)	12,514,776
	2. Interest Credits-Amendment 2[e]													
									(1,532,433)				(10,104,646)	(11,637,079)
28J														
	3. Advance Payments Applied to Incremental Costs Amendment 5[f]													
	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[g]													
										(2,721,803)				(2,721,803)
	5. Net Required Advance of Funds												[h]	
	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[d]													
			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												[h]	
			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[d]													
				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												[h]	
				85,495	52,625	101,648	34,062	(12,794)	(205,354)	0		0	(134,869)	(79,187)

[d] Actual payments are shown for 1965 through 1976 with 1981 adjusted to reflect overpayments and underpayments without interest for prior years.
[e] Interest for overpayments and underpayments under provisions of Amendment 2 of the contract.
[f] Actual payments are shown for 1965 through 1973 with 1974 adjusted to reflect overpayments and underpayments without interest for prior years.
[g] Interest for overpayments and underpayments under provisions of Amendment 5 of the contract.
[h] Amounts in excess of incremental costs, under the provisions of the contract, reduce the Transportation Charge capital cost component of the agency's Statement of Charges for January 1981.

TABLE B-10 Capital Costs of Each Aqueduct Reach to be Reimbursed through Capital Cost Component of Transportation Charge (in dollars)

Sheet 1 of 8

Calendar Year	UPPER FEATHER DIVISION	NORTH BAY AQUEDUCT					SOUTH BAY AQUEDUCT			
		Reach 1	Reach 2	Reach 3A	Reach 3B	Total	Reach 1	Reach 2	Reach 4	Reach 5
	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]
1952	0	0	0	0	0	0	97	34	30	57
1953	0	0	0	0	0	0	477	166	144	297
1954	0	0	0	0	0	0	1,466	508	437	959
1955	0	0	0	0	0	0	1,944	674	560	1,266
1956	0	0	0	0	0	0	18,789	6,515	5,090	12,545
1957	0	13,290	3,391	0	9,953	26,634	45,090	15,639	12,285	33,218
1958	2	19,202	5,011	0	25,798	50,011	195,985	80,961	7,714	21,930
1959	14	7,517	2,118	0	17,653	27,288	496,140	148,516	24,945	17,118
1960	28	8,797	4,292	0	4,838	17,927	1,130,378	67,351	71,779	68,028
1961	10	1,551	10,318	0	2,526	14,395	3,273,247	180,596	307,885	74,398
1962	32	217	(1,751)	0	414	(1,120)	1,548,884	203,535	695,446	35,102
1963	51	2,510	(1,063)	0	983	2,430	480,716	69,182	2,284,291	206,587
1964	7,791	39,879	12,046	0	21,934	73,859	2,549,118	15,903	181,900	264,410
1965	3,139	72,793	17,900	0	170,361	261,054	807,505	153,454	85,425	447,830
1966	(48)	59,615	12,972	0	438,949	511,536	898,074	149,529	142,096	1,690,200
1967	47	47,257	11,597	0	1,551,023	1,609,877	607,614	50,423	293,304	3,496,284
1968	51,573	70,586	19,560	0	831,158	921,304	965,119	19,543	89,300	2,931,101
1969	234,232	63,650	23,628	0	46,428	133,706	455,173	9,618	3,860	896,727
1970	16,227	59,090	42,733	0	9,415	111,238	52,481	3,380	10,517	154,358
1971	27,204	20,819	31,516	0	8,480	60,815	24,505	4,645	5,035	20,395
1972	9	15,538	12,952	0	10,058	38,548	26,918	825	2,945	26,090
1973	25	18,488	29,018	0	39,878	87,384	24,468	4,010	6,016	12,708
1974	45	67,352	29,978	0	134,332	231,662	17,108	1,192	1,765	65,587
1975	21	62,855	73,112	0	45,091	181,058	57,619	561	1,165	7,291
1976	51	52,419	75,611	218	13,168	141,416	104,242	2,846	8,915	12,701
1977	28	53,274	65,662	2,240	23,138	144,314	176,062	3,625	3,225	16,158
1978	38	61,936	57,158	2,955	28,987	151,036	264,581	4,494	3,668	14,028
1979	23	316,620	91,367	3,953	62,240	474,180	111,106	17,151	8,515	31,725
1980	26	422,804	111,600	19,910	96,125	650,439	368,942	17,708	8,249	38,045
1981	34	430,992	147,295	(10,752)	43,157	610,692	(145,428)	3,600	6,533	12,448
1982	11	934,812	357,720	(7,165)	134,408	1,419,775	(44,778)	18,971	7,451	37,824
1983	19	1,091,091	1,076,627	2,628	517,615	2,687,961	429,225	73,925	38,185	72,415
1984	26	1,875,968	2,317,661	3,290	1,068,363	5,265,282	506,951	36,354	9,610	92,846
1985	29	2,248,491	7,849,886	27,815	3,416,370	13,542,562	34,103	2,822	5,034	27,138
1986	31	16,420,238	10,020,277	1,309,599	1,819,349	29,569,463	85,732	14,715	17,144	13,982
1987	32	11,873,826	7,214,307	1,628,932	1,670,596	22,387,661	126,377	15,693	27,881	32,931
1988	55	3,287,756	1,648,431	1,015,971	686,821	6,638,979	290,505	36,744	51,786	25,078
1989	44	1,056,583	950,985	224,567	374,886	2,607,021	130,609	16,848	35,518	12,582
1990	63	493,522	537,881	145,694	71,938	1,249,035	275,732	32,387	99,251	40,263
1991	54	76,599	17,130	24,846	70,542	189,117	1,153,109	26,900	53,613	21,889
1992	42	56,492	6,525	18,333	37,778	119,128	401,906	53,036	61,799	51,386
1993	30	104,317	24,579	40,129	82,032	251,057	313,476	55,679	79,149	39,293
1994	14	68,065	13,463	27,107	45,909	154,544	(211,712)	29,017	362,585	36,350
1995	3	26,002	5,920	7,337	20,617	59,876	265,751	42,516	48,189	21,436
1996	0	14,790	3,334	6,614	14,606	39,344	139,573	13,049	25,751	10,677
1997	3	67,264	35,545	38,585	(13,571)	127,823	203,476	31,135	36,986	16,906
1998	7	15,410	6,392	6,797	10,396	38,995	67,974	6,120	14,731	4,616
1999	2	71,950	35,515	33,879	32,613	173,957	162,161	25,329	35,716	24,347
2000	24	29,992	8,327	11,710	4,156	54,185	100,654	15,688	24,144	19,652
2001	20	10,597	3,904	3,892	1,954	20,347	436,756	4,272	118,836	4,207
2002	14	27,018	18,971	15,254	4,614	65,857	3,068,535	5,648	329,244	64,425
2003	0	14,733	9,243	4,658	46,313	74,947	4,465,569	200,125	199,457	360,387
2004	0	23,929	2,214	2,341	145,290	173,774	1,257,335	120,340	131,702	99,547
2005	0	89,369	216	9	33,947	123,541	1,224,486	119,298	260,893	(81)
2006	5	28,222	237	90	879,428	907,978	1,234,636	68,374	259,542	523
2007	0	61,330	1	0	3,219,041	3,280,372	3,406,319	15,183	70,776	1,884
2008	4	75,107	6,065	5,318	7,878,424	7,964,914	6,248,064	35,890	169,891	5,098
2009	6	26,191	154	0	1,188,559	1,214,905	10,200,386	1,397,365	1,834,913	1,815
2010	(2)	4,652	(45)	(1)	395,328	399,934	7,061,360	104,208	468,313	14,865,982
2011	0	57,075	12	0	175,912	232,999	10,255,032	1,863,342	4,089,221	3,416,710
2012	0	585,216	3	15,163	311,585	911,967	7,800,110	1,379,855	3,102,674	104,555
2013	0	870,300	27	67,533	394,181	1,332,041	2,392,878	1,228,777	1,071,752	328,413
2014	0	781,566	3	109,243	355,488	1,246,300	(122,873)	(1,111,982)	(319,804)	127,441
2015	0	263,641	2	81,504	109,412	454,560	1,779,546	117,701	716,517	127,708
2016	0	142,630	1,260	61,753	45,733	251,375	273,581	105,271	407,238	71,071
2017	0	65,152	859	51,855	7,251	125,117	102,450	2,021	313,018	43,559
2018	0	209,999	4,776	145,670	60,232	420,677	312,613	19,123	28,552	112,068
2019	**0**	**192,312**	**6,777**	**103,118**	**60,413**	**362,620**	**4,569,262**	**248,482**	**42,553**	**68,204**
2020	0	300,977	87,855	167,606	64,268	620,706	389,482	171,930	85,490	85,032
2021	0	53,280	5,389	15,199	12,013	85,881	144,151	393,742	21,279	9,891
2022	0	0	0	0	0	0	0	0	0	0
2023	0	0	0	0	0	0	0	0	0	0
2024	0	0	0	0	0	0	0	0	0	0
2025	0	0	0	0	0	0	0	0	0	0
2026	0	0	0	0	0	0	0	0	0	0
2027	0	0	0	0	0	0	0	0	0	0
2028	0	0	0	0	0	0	0	0	0	0
2029	0	0	0	0	0	0	0	0	0	0
2030	0	0	0	0	0	0	0	0	0	0
2031	0	0	0	0	0	0	0	0	0	0
2032	0	0	0	0	0	0	0	0	0	0
2033	0	0	0	0	0	0	0	0	0	0
2034	0	0	0	0	0	0	0	0	0	0
2035	0	0	0	0	0	0	0	0	0	0
TOTAL	**341,139**	**45,685,516**	**33,166,449**	**5,435,399**	**29,090,895**	**113,378,259**	**85,488,922**	**8,272,076**	**18,709,619**	**31,109,642**

TABLE B-10 Capital Costs of Each Aqueduct Reach to be Reimbursed through Capital Cost Component of Transportation Charge (in dollars)

Calendar Year	SOUTH BAY AQUEDUCT (continued)					CALIFORNIA AQUEDUCT NORTH SAN JOAQUIN DIVISION			
	Reach 6	Reach 7	Reach 8	Reach 9	Total	Reach 1	Reach 2A	Reach 2B	Subtotal
	[11]	[12]	[13]	[14]	[15]	[16]	[17]	[18]	[19]
1952	8	66	72	132	496	4,012	3,279	1,499	8,790
1953	38	327	336	640	2,425	10,559	8,589	3,964	23,112
1954	123	1,005	1,003	1,954	7,455	13,796	11,163	5,179	30,138
1955	160	1,293	1,149	2,454	9,500	7,370	5,952	2,760	16,082
1956	1,559	11,959	11,043	28,372	95,872	9,880	5,020	2,398	17,298
1957	3,659	28,675	27,385	563,114	729,065	11,953	5,456	2,612	20,021
1958	2,243	17,872	17,385	560,904	904,994	18,585	17,191	7,994	43,770
1959	357	3,200	3,568	149,874	843,718	123,170	100,306	45,510	268,986
1960	1,102	2,944	4,498	359,749	1,705,829	191,408	102,136	48,968	342,512
1961	4,726	18,325	22,765	(1,367)	3,880,575	153,765	195,947	42,843	392,555
1962	17,295	160,939	178,242	209,042	3,048,485	612,258	491,225	168,218	1,271,701
1963	265,414	1,250,386	939,832	129,902	5,626,310	1,993,284	1,525,734	684,095	4,203,113
1964	100,603	1,716,371	2,327,770	2,947,522	10,103,597	4,674,280	2,369,858	700,074	7,744,212
1965	42,345	368,476	637,266	1,921,844	4,464,145	5,877,189	6,873,699	2,975,719	15,726,607
1966	17,663	34,915	140,350	777,887	3,850,714	8,553,362	14,112,820	5,677,099	28,343,281
1967	(41,567)	137,856	147,183	379,764	5,070,861	9,678,607	10,672,113	6,646,739	26,997,459
1968	84,553	2,130	68,057	253,152	4,412,955	6,392,664	891,681	1,303,186	8,587,531
1969	4,279	11,572	162,300	32,000	1,575,529	3,542,767	792,259	443,924	4,778,950
1970	2,487	6,820	20,086	(15,718)	234,411	2,236,607	149,692	115,578	2,501,877
1971	4,350	6,923	17,750	39,084	122,687	98,138	215,512	69,410	383,060
1972	1,084	203	4,800	32,199	95,064	159,608	43,721	7,744	211,073
1973	288	989	7,449	9,693	65,621	105,581	25,496	22,418	153,495
1974	527	6,020	30,628	11,433	134,260	177,700	16,627	45,707	240,034
1975	126	679	1,086	3,464	71,991	239,144	14,680	169,676	423,500
1976	701	3,529	8,362	26,186	167,482	641,860	45,533	65,943	753,336
1977	270	1,310	8,651	24,938	234,239	274,381	20,283	22,568	317,232
1978	231	1,204	1,631	17,123	306,960	801,265	36,221	9,714	847,200
1979	1,367	1,721	2,134	7,322	181,041	1,051,792	59,695	26,106	1,137,593
1980	1,321	1,718	2,182	7,102	445,267	4,173,603	96,760	38,789	4,309,152
1981	308	1,462	1,398	5,077	(114,602)	(502,921)	1,487,516	38,451	1,023,046
1982	716	1,561	1,746	6,074	29,565	700,738	46,501	22,308	769,547
1983	407	5,721	8,143	23,367	651,388	706,104	84,435	211,619	1,002,158
1984	269	1,853	1,667	13,301	662,851	1,559,539	41,352	48,478	1,649,369
1985	402	1,657	2,129	6,750	80,035	677,955	24,812	19,404	722,171
1986	1,119	2,744	3,313	12,234	150,983	398,788	63,830	35,420	498,038
1987	1,496	3,081	3,560	21,842	232,861	799,672	88,945	41,659	930,276
1988	5,706	6,689	7,603	33,728	457,839	2,898,156	(128,051)	(56,448)	2,713,657
1989	2,641	3,878	4,755	14,489	221,320	6,898,872	346,589	173,993	7,419,454
1990	5,092	19,899	36,584	87,796	597,004	13,483,785	112,002	2,446,232	16,042,019
1991	1,942	5,059	7,357	31,682	1,301,551	13,914,632	133,121	114,981	14,162,734
1992	1,184	2,042	2,250	35,464	609,067	6,260,482	241,456	239,437	6,741,375
1993	3,618	6,028	8,873	42,200	548,316	2,542,869	257,330	200,072	3,000,271
1994	2,897	4,781	5,346	89,991	319,255	1,145,666	148,396	88,357	1,382,419
1995	11,556	3,635	14,769	24,750	432,602	1,462,211	217,940	131,995	1,812,146
1996	3,092	2,271	2,699	12,522	209,634	874,227	74,153	41,215	989,595
1997	1,454	4,141	3,655	20,589	318,342	2,064,446	146,851	84,303	2,295,600
1998	363	1,134	(6,005)	5,776	94,709	729,475	33,695	16,670	779,840
1999	1,533	3,304	12,727	31,634	296,751	2,208,776	88,951	90,639	2,388,366
2000	2,406	4,944	5,331	10,755	183,575	(706,517)	57,503	40,185	(608,829)
2001	91,721	68,849	404,226	1,190,653	2,319,521	371,407	91,792	8,926	472,124
2002	229,409	453,259	1,107,580	2,977,939	8,236,039	833,187	44,543	22,639	900,369
2003	67,216	509,964	477,926	1,409,228	7,689,872	228,767	22,779	13,565	265,112
2004	3,193	3,100	39,326	3,276,907	4,931,451	892,456	15,333	77,640	985,430
2005	5,341	5,271	4,848	731,512	2,351,567	294,112	40,135	98,505	432,751
2006	1,286	1,342	1,352	15,393	1,582,447	422,511	15,048	177,980	615,539
2007	7,470	7,471	7,471	10,731	3,527,304	490,384	58,152	121,987	670,522
2008	8,415	8,730	8,932	12,419	6,497,439	1,202,812	39,742	85,604	1,328,158
2009	3,042	3,187	3,266	4,591	13,448,565	553,705	40,289	29,613	623,608
2010	732	716	711	1,006	22,503,029	181,161	8,175	2,311	191,646
2011	6,513	7,659	6,472	9,164	19,654,113	813,521	51,565	3,937	869,023
2012	51,903	117,364	68,876	393,352	13,018,689	1,570,134	226,476	75,111	1,871,721
2013	130,731	137,199	384,922	875,282	6,549,953	6,957,464	800,204	237,566	7,995,234
2014	102,374	121,005	107,609	207,301	(888,929)	5,789,004	3,238,636	167,361	9,195,000
2015	26,053	37,802	38,192	62,844	2,906,365	5,857,605	930,778	373,501	7,161,884
2016	1,764	2,488	2,147	14,246	877,805	2,721,640	894,583	411,576	4,027,799
2017	635	787	547	101,561	564,577	7,156,099	695,464	146,201	7,997,763
2018	3,286	4,074	2,855	44,929	527,500	7,832,913	1,558,980	50,029	9,441,922
2019	**4,882**	**6,052**	**4,217**	**2,136,259**	**7,079,911**	**10,236,136**	**1,572,536**	**66,976**	**11,875,648**
2020	13,721	17,124	17,899	5,105,028	5,885,706	8,072,443	1,544,883	4,434,707	14,052,033
2021	2,513	3,097	2,287	13,444,491	14,021,451	4,804,103	785,827	31,433	5,621,363
2022	0	0	0	0	0	0	0	0	0
2023	0	0	0	0	0	0	0	0	0
2024	0	0	0	0	0	0	0	0	0
2025	0	0	0	0	0	0	0	0	0
2026	0	0	0	0	0	0	0	0	0
2027	0	0	0	0	0	0	0	0	0
2028	0	0	0	0	0	0	0	0	0
2029	0	0	0	0	0	0	0	0	0
2030	0	0	0	0	0	0	0	0	0
2031	0	0	0	0	0	0	0	0	0
2032	0	0	0	0	0	0	0	0	0
2033	0	0	0	0	0	0	0	0	0
2034	0	0	0	0	0	0	0	0	0
2035	0	0	0	0	0	0	0	0	0
TOTAL	**1,327,714**	**5,401,850**	**7,614,524**	**41,034,624**	**198,958,970**	**177,227,105**	**55,151,893**	**30,022,572**	**262,401,570**

TABLE B-10 Capital Costs of Each Aqueduct Reach to be Reimbursed through Capital Cost Component of Transportation Charge (in dollars)

Sheet 3 of 8

Calendar Year	CALIFORNIA AQUEDUCT (continued)									
	SAN LUIS DIVISION						SOUTH SAN JOAQUIN DIVISION			
	Reach 3	Reach 4	Reach 5	Reach 6	Reach 7	Subtotal	Reach 8C	Reach 8D	Reach 9	Reach 10A
	[20]	[21]	[22]	[23]	[24]	[25]	[26]	[27]	[28]	[29]
1952	2,492	3,549	3,987	1,010	1,390	12,428	13	727	1,109	695
1953	6,999	10,144	10,986	2,834	3,869	34,832	45	2,671	4,185	2,569
1954	8,704	12,545	13,693	3,520	4,766	43,228	50	2,719	4,026	2,821
1955	4,273	6,055	6,813	1,728	2,325	21,194	19	888	1,100	1,097
1956	3,295	5,600	5,857	1,445	3,556	19,753	98	3,850	4,376	4,428
1957	3,543	6,115	6,357	1,565	3,998	21,578	234	10,604	13,209	13,269
1958	11,927	19,393	22,037	5,509	7,512	66,378	375	19,033	25,073	25,086
1959	21,979	37,358	39,689	9,813	19,679	128,518	436	20,578	25,697	25,787
1960	207,025	45,419	41,044	12,074	37,633	343,195	1,673	44,565	25,290	47,492
1961	184,443	292,639	170,559	38,338	70,068	756,047	3,949	75,726	30,852	68,505
1962	495,836	549,984	252,698	22,397	26,967	1,347,882	6,131	159,481	62,375	57,705
1963	2,772,189	2,034,351	2,498,712	66,353	30,647	7,402,252	5,861	161,252	81,343	52,585
1964	4,348,311	4,932,301	1,053,227	161,422	251,461	10,746,722	4,014	90,622	117,907	124,014
1965	3,860,997	5,688,252	2,869,931	1,072,111	667,768	14,159,059	15,049	491,042	564,036	622,257
1966	2,312,372	8,527,843	5,765,798	4,230,221	7,708,334	28,544,568	201,274	5,197,322	2,539,278	2,800,056
1967	(44,527)	2,062,305	6,942,522	222,885	6,675,398	15,858,583	212,285	4,982,844	3,363,650	3,652,342
1968	119,884	395,689	973,956	179,917	461,031	2,130,477	64,234	611,192	940,074	1,025,969
1969	(6,065)	126,946	98,492	107,486	160,668	487,527	58,960	116,146	85,130	145,111
1970	32,387	(20,243)	105,385	(827,457)	1,215,966	506,038	23,011	106,810	84,116	74,366
1971	99,945	230,624	305,227	26,995	341,010	1,003,801	8,813	33,099	23,088	15,595
1972	15,990	90,852	17,053	14,621	281,343	419,859	10,818	13,349	16,603	19,736
1973	6,753	103,707	41,549	13,810	41,427	207,246	5,145	11,089	13,249	14,283
1974	6,618	117,165	55,978	16,199	71,796	267,756	5,434	24,433	16,567	22,111
1975	18,921	107,275	23,671	8,797	152,574	311,238	5,424	15,960	12,966	15,865
1976	17,485	79,554	13,041	5,138	41,687	156,905	19,931	76,280	62,164	76,202
1977	35,707	84,669	9,412	4,028	9,655	143,471	21,096	70,005	97,952	75,628
1978	8,539	428,395	7,006	3,536	6,994	454,470	7,584	40,453	17,395	48,754
1979	(35,394)	543,225	19,463	9,485	(242,253)	294,526	10,474	6,181	6,227	241
1980	66,622	3,450,695	191,307	75,209	185,384	3,969,217	2,158	17,492	17,706	18,165
1981	28,491	(2,244,127)	(44,017)	(15,456)	918,984	(1,356,125)	1,151	9,642	9,541	10,309
1982	100,629	(1,616,569)	20,184	10,359	3,525,738	2,040,341	2,469	8,283	6,956	8,237
1983	75,639	33,881	11,785	6,638	1,811,638	1,939,581	7,955	13,782	11,090	14,488
1984	31,748	87,083	26,712	12,754	3,053,662	3,211,959	26,489	9,959	6,268	7,533
1985	53,251	56,732	13,685	6,934	582,910	713,512	7,220	9,762	7,688	9,215
1986	73,979	201,509	50,668	19,223	1,282,469	1,627,848	8,902	25,011	20,503	22,335
1987	(7,829)	116,268	40,009	15,946	518,349	682,743	12,744	18,927	56,042	16,704
1988	(149,385)	224,154	(406,398)	(137,353)	923,622	454,640	9,833	(119,741)	(60,639)	(159,357)
1989	39,652	594,894	232,852	80,090	575,855	1,523,343	5,279	91,501	278,061	70,153
1990	39,270	259,895	79,589	29,606	461,219	869,579	5,814	41,345	2,016,434	34,841
1991	4,916,134	397,959	98,847	35,860	511,519	5,960,319	4,588	43,140	41,348	36,888
1992	(757,001)	545,729	211,854	74,544	396,398	471,524	3,546	103,695	109,225	103,321
1993	110,233	724,929	186,271	70,815	720,283	1,812,531	15,016	101,634	90,929	90,291
1994	1,151,976	288,018	63,862	27,812	710,770	2,242,438	6,770	42,455	40,696	65,737
1995	285,776	441,479	130,761	58,640	1,914,186	2,830,842	12,548	49,963	43,251	435,909
1996	31,942	(110,471)	34,529	12,219	588,712	556,931	6,444	29,863	27,050	253,433
1997	73,224	513,793	(277,781)	42,881	5,016,215	5,368,332	11,497	49,111	43,799	73,458
1998	19,692	304,115	34,319	16,542	2,819,556	3,194,224	2,562	11,115	8,955	14,618
1999	18,187	158,902	100,061	41,691	1,901,382	2,220,222	5,706	25,179	23,510	47,359
2000	101,618	373,699	78,036	36,186	1,139,073	1,728,613	3,922	23,591	29,281	43,459
2001	(10,513)	(47,112)	519,031	(3,546)	61,595	519,455	2,280	17,030	21,196	42,731
2002	12,237	24,434	6,079,343	3,454	(1,812,639)	4,306,829	3,627	44,010	20,221	87,805
2003	8,864	79,647	(5,377,004)	7,923	6,118,421	837,852	2,130	18,793	16,716	22,946
2004	(16,126)	(14,365)	(50,563)	(2,487)	147,468	63,927	22,520	5,980	3,879	5,493
2005	261	11,360	129,470	3,529	2,533,886	2,678,506	26,301	11,593	6,323	7,316
2006	1,421	27,658	(10,639)	1,444	(28,549)	(8,664)	6,106	2,942	1,621	1,872
2007	2	87,855	39,476	7,718	34,608	169,659	13,352	21,920	11,909	13,807
2008	14,780	16,097	46,719	13,920	2,107,019	2,198,535	9,017	13,020	7,277	8,919
2009	610	216,166	44,901	4,909	(44,365)	222,221	2,362	15,880	8,710	10,301
2010	(75)	1,560,318	130,846	609	(355,963)	1,335,734	(4)	1,773	956	1,111
2011	7,037	644,158	481,685	1,297	78,291	1,212,468	1	6,354	1,748	13,984
2012	44,540	213,896	2,999	29,658	170,358	461,451	1,139	114,545	36,447	73,710
2013	810,117	299,508	906,259	120,865	215,316	2,352,064	42,393	383,194	323,185	342,033
2014	843,003	317,107	461,093	67,178	207,794	1,896,174	20,475	181,707	136,459	158,996
2015	(624,058)	145,444	228,671	15,444	153,006	(81,492)	46,037	141,597	95,579	123,549
2016	238,925	1,504,796	2,389,576	161,532	382,567	4,677,396	41,047	187,181	88,578	142,425
2017	88,632	1,039,667	1,891,237	144,299	2,360,402	5,524,237	36,562	100,275	64,914	123,212
2018	270,502	4,234,278	3,831,262	95,654	1,865,563	10,297,259	149,709	342,952	259,331	839,474
2019	**115,595**	**6,261,715**	**1,651,132**	**95,685**	**770,625**	**8,894,752**	**104,380**	**232,518**	**140,593**	**934,530**
2020	131,322	8,616,955	3,663,461	145,494	2,726,763	15,283,995	444,586	1,921,848	1,317,229	2,249,258
2021	73,234	2,838,113	320,578	43,624	64,327	3,339,876	151,077	1,077,752	974,868	2,077,395
2022	0	0	0	0	0	0	0	0	0	0
2023	0	0	0	0	0	0	0	0	0	0
2024	0	0	0	0	0	0	0	0	0	0
2025	0	0	0	0	0	0	0	0	0	0
2026	0	0	0	0	0	0	0	0	0	0
2027	0	0	0	0	0	0	0	0	0	0
2028	0	0	0	0	0	0	0	0	0	0
2029	0	0	0	0	0	0	0	0	0	0
2030	0	0	0	0	0	0	0	0	0	0
2031	0	0	0	0	0	0	0	0	0	0
2032	0	0	0	0	0	0	0	0	0	0
2033	0	0	0	0	0	0	0	0	0	0
2034	0	0	0	0	0	0	0	0	0	0
2035	0	0	0	0	0	0	0	0	0	0
TOTAL	**22,834,786**	**59,401,972**	**39,630,811**	**6,895,124**	**65,371,685**	**194,134,378**	**1,980,141**	**17,837,496**	**14,604,471**	**17,532,533**

TABLE B-10 Capital Costs of Each Aqueduct Reach to be Reimbursed through Capital Cost Component of Transportation Charge (in dollars)

Sheet 4 of 8

Calendar Year	CALIFORNIA AQUEDUCT (continued)									
	SOUTH SAN JOAQUIN DIVISION (continued)									
	Reach 11B	Reach 12D	Reach 12E	Reach 13B	Reach 14A	Reach 14B	Reach 14C	Reach 15A	Reach 16A	Subtotal
	[30]	[31]	[32]	[33]	[34]	[35]	[36]	[37]	[38]	[39]
1952	1,279	1,980	995	1,663	794	212	212	1,911	4,440	16,030
1953	4,790	7,480	3,745	6,236	2,599	733	741	7,016	16,513	59,323
1954	4,855	7,565	3,792	6,319	2,880	810	817	7,073	16,601	60,328
1955	1,557	2,404	1,211	2,025	1,183	325	327	2,253	5,223	19,612
1956	6,223	9,233	4,737	8,054	7,026	1,638	1,584	9,939	21,754	82,940
1957	18,772	29,082	14,615	24,411	15,651	3,834	3,864	26,871	62,657	237,073
1958	48,191	78,564	39,087	61,715	33,726	12,330	11,813	49,499	133,083	537,575
1959	67,246	107,781	53,836	86,478	64,824	22,102	21,828	70,838	205,748	773,179
1960	66,317	77,936	39,867	63,517	84,363	23,260	22,305	73,305	204,788	774,678
1961	46,073	88,274	51,457	28,015	242,753	91,290	65,565	150,205	206,305	1,148,969
1962	56,056	69,189	44,851	49,179	208,180	61,489	47,608	133,653	171,396	1,127,293
1963	91,914	173,985	86,405	67,733	425,626	104,436	77,970	102,072	481,941	1,913,123
1964	333,621	291,013	174,469	86,271	1,093,795	684,005	485,033	571,173	1,778,952	5,834,889
1965	1,053,029	1,524,848	1,044,851	196,487	3,385,205	1,655,024	1,436,258	476,830	1,268,176	13,733,092
1966	3,709,779	673,429	466,228	418,141	4,916,319	974,862	724,354	1,829,852	2,896,274	27,347,168
1967	4,636,627	1,881,333	1,244,265	1,238,428	2,788,299	525,653	400,183	1,721,304	3,442,021	30,089,234
1968	1,323,302	4,726,074	3,145,775	8,343,706	10,210,266	1,330,361	1,405,117	7,522,015	7,578,498	48,226,583
1969	229,185	706,272	529,080	3,704,065	15,112,041	1,223,457	1,134,395	9,523,012	13,136,056	45,702,910
1970	85,151	70,725	72,798	320,797	11,031,255	987,213	738,955	8,836,897	13,890,751	36,322,845
1971	45,006	43,988	42,624	339,078	2,925,191	193,255	36,514	3,275,227	7,903,937	14,885,415
1972	32,657	43,939	24,748	81,937	1,388,348	101,784	20,165	1,003,380	3,025,555	5,783,019
1973	16,448	9,980	16,320	25,090	680,834	19,584	13,469	798,805	1,472,313	3,096,609
1974	14,951	19,555	32,240	29,582	524,504	30,735	16,333	778,696	1,031,843	2,546,984
1975	13,479	10,793	13,678	25,827	269,197	25,164	21,048	370,265	489,545	1,289,211
1976	54,217	37,464	59,842	105,332	507,519	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	8,661	16,743	9,057	9,223	34,427	16,975	302	17,919	66,302	216,862
2010	937	1,943	957	920	3,103	1,955	(34)	1,212	6,625	21,454
2011	1,753	3,487	1,747	1,758	40,339	3,484	10	13,658	134,210	222,531
2012	33,065	62,348	34,901	34,973	393,561	64,937	3,511	494,940	686,555	2,034,633
2013	196,084	263,911	240,567	240,749	1,246,859	349,608	127,458	1,544,197	1,678,853	6,979,091
2014	98,155	149,649	112,143	112,254	867,288	175,751	46,203	632,842	1,189,256	3,881,178
2015	80,934	97,658	101,657	109,082	825,914	119,583	58,535	671,279	829,782	3,301,185
2016	76,003	71,923	129,771	14,321,724	872,281	102,756	57,483	1,480,952	1,360,422	18,932,546
2017	61,302	73,211	78,742	269,837	1,346,798	83,869	42,416	812,468	974,601	4,068,207
2018	755,841	919,489	220,026	262,846	4,475,182	269,858	182,716	1,884,950	1,106,372	11,668,746
2019	**947,200**	**1,244,511**	**159,280**	**289,744**	**2,173,770**	**256,125**	**98,675**	**1,891,441**	**1,381,621**	**9,854,388**
2020	702,297	5,337,215	643,110	656,259	4,321,134	661,760	373,728	3,707,676	6,420,692	28,756,792
2021	542,480	820,827	1,493,589	2,839,786	9,038,442	2,449,680	505,935	7,301,683	13,044,998	42,318,512
2022	0	0	0	0	0	0	0	0	0	0
2023	0	0	0	0	0	0	0	0	0	0
2024	0	0	0	0	0	0	0	0	0	0
2025	0	0	0	0	0	0	0	0	0	0
2026	0	0	0	0	0	0	0	0	0	0
2027	0	0	0	0	0	0	0	0	0	0
2028	0	0	0	0	0	0	0	0	0	0
2029	0	0	0	0	0	0	0	0	0	0
2030	0	0	0	0	0	0	0	0	0	0
2031	0	0	0	0	0	0	0	0	0	0
2032	0	0	0	0	0	0	0	0	0	0
2033	0	0	0	0	0	0	0	0	0	0
2034	0	0	0	0	0	0	0	0	0	0
2035	0	0	0	0	0	0	0	0	0	0
TOTAL	**16,110,447**	**20,345,507**	**11,620,855**	**35,316,073**	**91,922,115**	**13,709,189**	**8,680,651**	**67,437,732**	**104,677,457**	**421,774,667**

TABLE B-10 Capital Costs of Each Aqueduct Reach to be Reimbursed through Capital Cost Component of Transportation Charge (in dollars)

Sheet 5 of 8

Calendar Year	CALIFORNIA AQUEDUCT (continued)									
	TEHACHAPI DIVISION			MOJAVE DIVISION						
	Reach 17E	Reach 17F	Subtotal	Reach 18A	Reach 19	Reach 19C	Reach 20A	Reach 20B	Reach 21	Reach 22A
	[40]	[41]	[42]	[43]	[44]	[45]	[46]	[47]	[48]	[49]
1952	9,703	4,072	13,775	4,090	1,520	0	2,561	892	5,788	35
1953	31,337	13,284	44,621	12,610	4,685	0	7,246	3,402	17,846	71
1954	46,243	20,010	66,253	16,642	6,184	0	9,506	4,548	23,558	369
1955	25,880	11,362	37,242	5,612	2,086	0	2,529	2,213	7,947	178
1956	47,487	17,609	65,096	6,038	2,244	0	2,440	2,655	8,542	216
1957	119,673	49,130	168,803	22,348	8,304	0	9,035	9,826	31,616	800
1958	164,056	72,091	236,147	37,917	14,166	123	15,391	16,752	53,569	1,397
1959	151,389	57,883	209,272	38,620	23,450	1,102	23,605	18,604	56,724	1,844
1960	203,222	45,323	248,545	21,356	26,093	5,318	40,523	37,179	43,893	11,029
1961	387,819	85,558	473,377	35,664	32,281	2,262	34,918	37,102	21,532	14,517
1962	353,119	82,610	435,729	68,508	266,284	1,841	10,323	10,730	8,197	4,186
1963	1,191,633	124,757	1,316,390	37,379	435,881	4,137	39,706	40,865	26,670	17,081
1964	1,866,000	775,005	2,641,005	95,693	706,369	8,564	43,342	71,116	33,912	22,793
1965	2,574,824	2,284,869	4,859,693	121,060	716,092	9,156	108,519	343,506	91,095	65,689
1966	5,537,412	9,323,517	14,860,929	366,116	1,644,699	13,373	159,282	1,311,628	160,388	178,538
1967	26,239,390	12,398,708	38,638,098	1,312,022	903,880	24,103	645,078	1,718,942	498,257	367,961
1968	33,363,479	7,416,464	40,779,943	136,804	7,109,653	71,388	1,889,601	2,291,691	1,141,929	1,145,768
1969	40,368,425	6,883,206	47,251,631	213,805	2,465,641	7,423	5,939,151	5,626,284	2,358,737	1,515,147
1970	35,446,706	6,786,231	42,232,937	2,211,077	1,210,665	6,217	3,652,478	5,304,372	3,232,911	2,081,810
1971	20,141,395	6,835,303	26,976,698	1,496,843	284,738	6,994	1,074,759	1,091,123	825,070	432,464
1972	10,002,935	34,791	10,037,726	129,417	409,903	3,620	471,963	635,507	484,772	324,865
1973	3,090,140	36,207	3,126,347	23,931	75,638	2,539	88,416	83,840	63,774	36,179
1974	4,798,348	152,494	4,950,842	28,399	205,581	2,703	138,673	118,639	103,545	54,198
1975	2,144,178	411,404	2,555,582	44,774	70,652	5,066	68,157	169,294	167,240	19,453
1976	1,124,357	174,629	1,298,986	121,043	84,593	6,786	59,967	102,909	44,896	24,732
1977	655,047	31,512	686,559	261,400	133,767	7,521	117,878	120,160	71,389	49,445
1978	1,900,843	27,956	1,928,799	553,014	57,150	5,872	51,615	68,838	32,855	18,183
1979	2,099,385	61,381	2,160,766	626,615	339,536	10,831	37,085	36,225	18,948	10,675
1980	17,433,610	6,046	17,439,656	1,130,429	1,073,430	3,604	308,188	284,545	133,526	121,171
1981	(3,848,206)	6,908	(3,841,298)	1,218,824	845,702	4,498	48,625	32,214	13,223	6,466
1982	11,370,112	6,054	11,376,166	6,968,683	746,900	3,920	33,869	77,988	13,158	14,459
1983	8,862,914	8,269	8,871,183	10,909,386	64,660	2,596	40,793	58,714	25,900	10,363
1984	3,227,937	31,701	3,259,638	8,340,371	309,491	3,124	17,505	35,378	845,423	6,052
1985	1,926,289	10,460	1,936,749	5,264,156	227,986	3,885	68,422	(232,549)	(481,017)	1,945,477
1986	1,381,955	33,788	1,415,743	2,049,111	2,069,663	4,261	2,331,707	(2,046,222)	(1,334,975)	3,260,280
1987	671,183	13,807	684,990	1,347,722	(6,453)	4,684	562,540	(344,829)	55,519	64,264
1988	1,408,760	(49,734)	1,359,026	847,954	(104,961)	13,409	(159,892)	(147,290)	(70,564)	351,489
1989	504,715	64,660	569,375	376,980	207,150	50,953	31,173	60,657	30,217	534,658
1990	783,219	25,218	808,437	202,065	(402,573)	61,192	(637,062)	(403,413)	(635,623)	(97,841)
1991	691,578	33,405	724,983	273,021	22,218	81,545	(188,732)	(18,809)	(147,369)	(17,234)
1992	741,986	24,369	766,355	620,962	384,568	86,644	225,398	338,098	(263,897)	75,210
1993	1,223,402	35,370	1,258,772	1,131,166	248,287	72,746	110,869	180,598	133,941	49,144
1994	806,213	16,681	822,894	998,126	164,096	60,147	51,340	114,273	65,260	26,546
1995	1,538,497	19,443	1,557,940	390,433	157,481	45,990	92,925	121,499	66,503	30,918
1996	2,571,039	10,797	2,581,836	91,593	69,281	22,188	35,656	48,699	44,953	17,787
1997	1,009,249	18,265	1,027,514	135,402	92,607	13,590	65,433	39,973	55,881	27,865
1998	925,574	6,843	932,417	47,486	36,170	4,164	29,900	27,626	20,285	12,816
1999	662,144	12,166	674,310	113,232	49,150	5,329	171,935	58,392	37,660	17,874
2000	408,352	14,333	422,685	120,267	90,145	936	83,478	75,230	44,857	20,181
2001	266,815	10,891	277,706	65,580	186,973	2,223	343,775	121,907	77,799	54,526
2002	247,986	9,586	257,572	35,787	(139,334)	1,374	(111,675)	(82,663)	(7,369)	(43,431)
2003	189,022	12,339	201,361	84,434	(19,049)	0	(11,367)	(7,564)	(3,238)	(3,009)
2004	372,622	4,637	377,259	19,723	17,430	0	18,763	12,619	13,744	5,414
2005	2,264,602	6,587	2,271,188	27,020	18,910	0	25,134	18,874	25,074	6,335
2006	5,855,349	2,353	5,857,702	7,062	4,978	0	6,373	4,511	5,983	1,500
2007	3,829,554	11,915	3,841,469	49,382	35,729	0	47,637	35,725	47,634	11,908
2008	640,715	7,591	648,306	20,474	19,644	0	28,901	19,526	25,456	6,477
2009	9,982,682	9,158	9,991,840	22,893	25,186	0	33,292	24,677	32,865	8,223
2010	11,125,921	725	11,126,646	24,906	2,833	0	3,861	2,980	3,984	994
2011	4,980,108	1,812	4,981,920	4,507	5,253	0	6,981	5,212	6,947	1,737
2012	875,243	32,877	908,120	95,936	114,523	0	152,679	114,484	152,651	38,158
2013	704,335	156,471	860,806	234,199	314,887	0	419,827	314,845	419,785	104,949
2014	3,010,683	79,990	3,090,674	1,077,259	203,219	0	270,945	203,188	270,922	67,726
2015	9,052,843	37,215	9,090,057	708,309	91,309	0	1,520,944	91,309	121,745	30,436
2016	3,269,487	22,186	3,291,674	110,663	35,846	0	641,765	30,678	38,755	11,825
2017	2,661,615	26,763	2,688,377	259,186	56,531	0	57,189	52,315	69,017	18,747
2018	5,244,688	48,283	5,292,971	288,150	294,431	0	389,056	273,004	360,141	97,702
2019	**4,270,015**	**2,283,015**	**6,553,030**	**561,637**	**356,722**	**0**	**470,354**	**324,611**	**427,024**	**118,245**
2020	8,642,533	213,167	8,855,700	1,021,813	37,916	0	69,811	19,832	19,066	12,459
2021	16,131,750	257,872	16,389,622	88,787	30,270	0	86,061	20,620	16,998	10,302
2022	0	0	0	0	0	0	0	0	0	0
2023	0	0	0	0	0	0	0	0	0	0
2024	0	0	0	0	0	0	0	0	0	0
2025	0	0	0	0	0	0	0	0	0	0
2026	0	0	0	0	0	0	0	0	0	0
2027	0	0	0	0	0	0	0	0	0	0
2028	0	0	0	0	0	0	0	0	0	0
2029	0	0	0	0	0	0	0	0	0	0
2030	0	0	0	0	0	0	0	0	0	0
2031	0	0	0	0	0	0	0	0	0	0
2032	0	0	0	0	0	0	0	0	0	0
2033	0	0	0	0	0	0	0	0	0	0
2034	0	0	0	0	0	0	0	0	0	0
2035	0	0	0	0	0	0	0	0	0	0
TOTAL	**342,003,514**	**57,801,649**	**399,805,163**	**55,433,873**	**25,280,938**	**759,941**	**22,538,124**	**19,240,304**	**10,413,441**	**13,438,791**

TABLE B-10 Capital Costs of Each Aqueduct Reach to be Reimbursed through Capital Cost Component of Transportation Charge (in dollars)

Calendar Year	CALIFORNIA AQUEDUCT (continued)									
	MOJAVE DIVISION (continued)				SANTA ANA DIVISION					
	Reach 22B	Reach 23	Reach 24	Subtotal	Reach 25	Reach 26A	Reach 28G[a]	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	350,573
1985	608,583	966,160	51,634	8,422,737	5,555	62,571	17,816	11,481	54,070	151,493
1986	1,097,122	230,510	51,994	7,713,451	9,927	114,561	31,564	25,037	86,794	267,883
1987	3,631,282	146,850	91,223	5,552,802	4,908	27,208	17,141	8,005	45,528	102,790
1988	552,546	558,557	197,761	2,039,009	7,358	161,957	41,892	21,113	90,784	323,104
1989	4,161,037	1,496,776	433,072	7,382,673	8,092	(2,297,399)	28,708	12,619	51,556	(2,196,424)
1990	8,794,258	1,394,698	344,367	8,620,068	176,854	(1,657,576)	27,478	12,817	55,408	(1,385,019)
1991	7,985,326	3,624,824	139,105	11,753,895	202,286	(1,316,160)	142,139	15,524	62,794	(893,417)
1992	4,849,560	8,364,426	127,829	14,808,798	333,934	(1,878,502)	34,185	13,422	69,479	(1,427,482)
1993	2,094,764	15,390,366	159,211	19,571,092	1,506,787	3,979,221	44,300	27,047	162,854	5,720,209
1994	933,021	8,082,401	81,869	10,577,079	2,104,588	2,493,097	16,351	11,673	54,581	4,680,290
1995	1,096,953	5,924,175	123,653	8,050,530	3,310,564	500,791	35,402	28,202	164,254	4,039,213
1996	1,736,686	2,181,669	96,339	4,344,851	19,019,751	(100,474)	76,723	73,629	344,747	19,414,376
1997	809,666	(342,563)	102,390	1,000,244	7,645,602	(662,524)	50,662	20,720	268,293	7,322,753
1998	273,139	3,392,776	36,135	3,880,497	993,619	1,613,505	10,268	8,970	479,138	3,105,500
1999	1,006,721	2,208,657	123,472	3,792,421	224,119	843,638	84,683	45,293	324,223	1,521,955
2000	724,837	1,251,684	83,871	2,495,486	129,156	1,285,637	64,095	41,331	114,224	1,634,443
2001	550,843	342,964	26,780	1,773,369	73,031	447,282	20,193	13,635	88,656	642,797
2002	270,386	269,139	71,793	264,008	54,815	1,753,554	53,787	12,619	196,949	2,071,724
2003	382,025	146,659	30,255	599,147	86,731	350,997	1,096,665	2,482,179	179,466	4,196,038
2004	262,810	48,570	12,285	411,358	13,577	275,709	1,736,308	856,587	24,559	2,906,739
2005	62,967	104,838	144,149	433,303	16,962	120,279	2,049,655	410,021	270,894	2,867,810
2006	15,163	294,318	577,859	917,747	21,932	16,665	2,302,259	406,071	2,544,382	5,291,309
2007	151,063	919,040	69,935	1,368,052	12,905	55,918	(246)	1,099,958	3,664,344	4,832,879
2008	346,638	3,113,899	2,019,852	5,600,869	2,481	82,555	835,530	899,508	682,829	2,502,902
2009	940,063	448,123	1,834,293	3,369,615	2,907	260,913	4,202,482	976,816	2,819,007	8,262,125
2010	2,207,072	26,729	1,373,244	3,646,603	(15)	119,952	43,378	930,155	3,865,713	4,959,184
2011	5,924,592	6,284	99,888	6,061,401	4	35,402	1,173,977	571	1,955,675	3,165,630
2012	10,149,651	95,175	28,760	10,942,016	8,715	477,006	2,750,751	214,702	2,760,048	6,211,222
2013	6,331,413	334,524	74,035	8,548,463	36,624	1,113,282	3,313,512	1,342,565	6,139,955	11,945,937
2014	2,576,361	184,199	28,491	4,882,310	15,952	2,420,591	79,084	64,672	3,933,527	6,513,827
2015	1,890,532	120,722	15,298	4,590,604	10,156	1,200,361	19,721	20,406	20,412,533	21,663,177
2016	678,408	162,124	14,072	1,724,136	1,685	994,199	5,407	3,186	40,342,559	41,347,036
2017	796,712	(246,138)	8,659	1,072,219	130,913	(270,930)	3,410	1,488	19,544,251	19,409,132
2018	1,282,756	1,085,997	1,495,823	5,567,060	496,688	3,130,923	100,690	174,007	14,855,649	18,757,957
2019	**4,262,869**	**1,719,525**	**3,797,708**	**12,038,695**	**122,944**	**4,261,455**	**229,205**	**1,196,512**	**26,851,376**	**32,661,492**
2020	3,723,650	1,460,731	51,253	6,416,531	16,882	2,299,405	97,278	6,009,490	21,979,416	30,402,471
2021	2,024,471	932,965	49,193	3,259,667	9,658	2,841,868	54,800	1,612,683	6,186,762	10,705,771
2022	0	0	0	0	0	0	0	0	0	0
2023	0	0	0	0	0	0	0	0	0	0
2024	0	0	0	0	0	0	0	0	0	0
2025	0	0	0	0	0	0	0	0	0	0
2026	0	0	0	0	0	0	0	0	0	0
2027	0	0	0	0	0	0	0	0	0	0
2028	0	0	0	0	0	0	0	0	0	0
2029	0	0	0	0	0	0	0	0	0	0
2030	0	0	0	0	0	0	0	0	0	0
2031	0	0	0	0	0	0	0	0	0	0
2032	0	0	0	0	0	0	0	0	0	0
2033	0	0	0	0	0	0	0	0	0	0
2034	0	0	0	0	0	0	0	0	0	0
2035	0	0	0	0	0	0	0	0	0	0
TOTAL	**168,729,790**	**74,470,744**	**63,357,601**	**453,663,547**	**61,563,057**	**63,889,653**	**44,494,162**	**42,411,230**	**234,694,579**	**447,052,681**

[a] 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	1,931,357	16,656	22,763	1,463,455	395	46,904	3,481,529	19,419	17,140	2,357
2010	864,327	1,982	24,650	231,950	(54)	16,969	1,139,825	633,614	3,110	0
2011	426,178	3,476	3,867	40,720	15	3,492	477,747	894,062	39,626	0
2012	615,441	76,325	91,531	55,362	18,910	79,163	936,732	337,039	271,933	0
2013	182,443	231,925	230,217	172,032	51,955	257,967	1,126,538	840,207	1,113,962	0
2014	300,223	264,332	332,856	96,090	39,531	1,677,183	2,710,216	1,316,201	1,327,525	0
2015	154,787	112,785	473,011	48,982	27,813	3,378,758	4,196,137	812,626	1,259,985	0
2016	177,114	128,685	287,933	30,648	32,746	2,427,910	3,085,035	1,178,776	918,450	0
2017	246,134	85,822	1,720,855	224,133	23,432	1,769,226	4,069,601	1,084,529	716,886	0
2018	385,162	1,850,155	683,847	2,709,225	136,705	3,513,587	9,278,681	1,532,919	365,317	0
2019	**1,488,418**	**2,220,122**	**741,316**	**3,714,227**	**121,898**	**9,949,266**	**18,235,247**	**2,447,908**	**661,006**	**0**
2020	262,816	1,520,063	3,033,481	1,191,638	23,107	9,561,803	15,592,908	3,560,067	1,012,144	0
2021	257,453	2,415,588	2,389,915	2,279,288	16,160	59,664,784	67,023,188	2,879,233	2,262,996	0
2022	0	0	0	0	0	0	0	0	0	0
2023	0	0	0	0	0	0	0	0	0	0
2024	0	0	0	0	0	0	0	0	0	0
2025	0	0	0	0	0	0	0	0	0	0
2026	0	0	0	0	0	0	0	0	0	0
2027	0	0	0	0	0	0	0	0	0	0
2028	0	0	0	0	0	0	0	0	0	0
2029	0	0	0	0	0	0	0	0	0	0
2030	0	0	0	0	0	0	0	0	0	0
2031	0	0	0	0	0	0	0	0	0	0
2032	0	0	0	0	0	0	0	0	0	0
2033	0	0	0	0	0	0	0	0	0	0
2034	0	0	0	0	0	0	0	0	0	0
2035	0	0	0	0	0	0	0	0	0	0
TOTAL	**47,452,771**	**40,910,291**	**137,658,330**	**77,185,429**	**78,259,155**	**229,529,510**	**610,995,486**	**38,236,503**	**144,436,323**	**171,415,834**

TABLE B-10 Capital Costs of Each Aqueduct Reach to be Reimbursed through Capital Cost Component of Transportation Charge (in dollars)

Sheet 8 of 8

Calendar Year	CALIFORNIA AQUEDUCT (continued)						GRAND TOTAL
	COASTAL BRANCH (continued)					Total	
	Reach 34	Reach 35	Reach 37	Reach 38	Subtotal		
	[70]	[71]	[72]	[73]	[74]	[75]	[76]
1952	0	0	0	0	0	98,857	99,353
1953	0	0	0	0	0	309,387	311,812
1954	0	0	0	0	0	394,688	402,143
1955	0	0	0	0	0	159,842	169,342
1956	0	0	0	0	0	255,679	351,551
1957	0	0	0	0	0	708,753	1,464,452
1958	0	0	0	0	0	1,331,616	2,286,623
1959	7,441	8,236	0	0	92,837	2,096,392	2,967,412
1960	8,507	14,265	0	0	127,626	2,937,049	4,660,833
1961	1,501	3,931	0	0	37,101	4,650,264	8,545,244
1962	524	1,689	0	0	20,132	5,827,774	8,875,171
1963	880	2,943	0	0	38,592	18,981,487	24,610,278
1964	1,687	5,639	0	0	349,707	31,550,813	41,736,060
1965	2,118	7,060	0	0	792,379	57,936,405	62,664,743
1966	1,736	5,764	0	0	2,302,279	124,748,128	129,110,330
1967	1,891	6,213	0	0	6,356,854	187,465,580	194,146,365
1968	1,324	4,369	0	0	2,744,057	192,593,079	197,978,911
1969	907	2,905	0	0	454,158	182,530,023	184,473,490
1970	851	2,787	0	0	297,200	206,720,774	207,082,650
1971	1,315	3,804	0	0	201,795	158,414,033	158,624,739
1972	522	1,660	0	0	151,115	68,228,670	68,362,291
1973	542	1,758	0	0	200,947	45,110,823	45,263,853
1974	463	1,405	0	0	211,533	24,036,199	24,402,166
1975	2,255	6,656	0	0	109,505	21,065,768	21,318,838
1976	5,088	14,988	0	0	287,240	17,183,961	17,492,910
1977	1,834	5,387	0	0	1,006,999	15,165,801	15,544,382
1978	1,302	3,852	0	0	141,448	18,661,117	19,119,151
1979	1,505	4,433	0	0	153,071	31,202,118	31,857,362
1980	1,152	3,449	0	0	569,707	73,891,101	74,986,833
1981	1,427	4,261	0	0	(131,952)	15,246,649	15,742,773
1982	588	1,787	0	0	(110,455)	38,256,580	39,705,931
1983	794	2,398	0	0	155,794	34,705,281	38,044,649
1984	986	2,959	0	0	86,587	24,454,091	30,382,250
1985	2,111	6,263	0	0	99,522	14,914,930	28,537,556
1986	17,458	51,279	0	0	374,229	13,435,351	43,155,828
1987	92,506	272,968	0	0	1,481,230	11,711,428	34,331,982
1988	99,456	293,612	0	0	1,718,193	11,026,370	18,123,243
1989	77,283	228,038	0	0	1,283,764	30,302,112	33,130,497
1990	103,785	277,889	0	0	1,615,709	32,589,619	34,435,721
1991	123,603	363,889	0	0	2,287,385	38,320,942	39,811,664
1992	566,230	240,553	102,051	74,162	3,882,392	34,312,996	35,041,233
1993	1,345,211	688,935	268,937	358,367	13,333,466	53,122,384	53,921,787
1994	8,915,445	2,363,238	678,753	1,315,559	50,802,227	73,751,564	74,225,377
1995	23,975,738	20,849,939	7,029,108	7,117,197	168,287,941	191,033,090	191,525,571
1996	26,475,298	18,790,572	7,213,823	6,616,310	157,333,165	187,776,347	188,025,325
1997	10,456,863	4,149,105	545,378	798,606	41,615,744	62,137,369	62,583,537
1998	3,368,320	952,615	192,567	280,779	11,557,715	27,083,446	27,217,157
1999	2,616,574	356,318	36,680	51,648	10,654,402	24,085,343	24,556,053
2000	2,746,120	17,830	0	0	6,091,222	13,504,773	13,742,557
2001	3,960	(1,112)	0	0	668,039	5,130,617	7,470,505
2002	77,266	13,119	0	0	442,204	9,921,954	18,223,863
2003	25,734	6,272	0	0	149,540	7,090,347	14,855,165
2004	3,142	1,942	0	0	66,873	5,724,375	10,829,600
2005	526	327	0	0	(192,669)	9,654,977	12,130,085
2006	4	18,012	0	0	68,949	16,031,812	18,522,243
2007	0	152	0	0	113,088	13,670,587	20,478,263
2008	24	14,163	0	0	101,277	15,861,831	30,324,188
2009	19	19,626	0	0	58,560	26,226,360	40,889,836
2010	(6)	(5,643)	0	0	631,075	23,052,168	45,955,128
2011	2	1,568	0	0	935,257	17,925,976	37,813,089
2012	96	1,455	0	0	610,523	23,976,419	37,907,075
2013	209	1,590	0	0	1,955,967	41,764,102	49,646,096
2014	114	1,113	0	0	2,644,952	34,814,330	35,171,702
2015	1,286	0	0	0	2,073,897	51,995,449	55,356,373
2016	2,899	0	0	0	2,100,124	79,185,746	80,314,927
2017	2,412	0	0	0	1,803,827	46,633,363	47,323,058
2018	0	0	0	0	1,898,236	72,202,832	73,151,009
2019	**0**	**0**	**0**	**0**	**3,108,914**	**103,222,166**	**110,664,697**
2020	0	0	0	0	4,572,211	123,932,641	130,439,053
2021	0	0	0	0	5,142,229	153,800,228	167,907,560
2022	0	0	0	0	0	0	0
2023	0	0	0	0	0	0	0
2024	0	0	0	0	0	0	0
2025	0	0	0	0	0	0	0
2026	0	0	0	0	0	0	0
2027	0	0	0	0	0	0	0
2028	0	0	0	0	0	0	0
2029	0	0	0	0	0	0	0
2030	0	0	0	0	0	0	0
2031	0	0	0	0	0	0	0
2032	0	0	0	0	0	0	0
2033	0	0	0	0	0	0	0
2034	0	0	0	0	0	0	0
2035	0	0	0	0	0	0	0
TOTAL	**81,148,826**	**50,100,223**	**16,067,297**	**16,612,628**	**518,017,635**	**3,307,845,127**	**3,620,523,495**

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	919,507	254,331	658,043	414,242	2,246,122	3,810,261	541,683	440,845	549,043
2001	314	1,072,602	229,536	456,017	181,422	1,939,577	2,907,864	272,655	289,843	390,435
2002	3,627	1,586,248	415,635	410,985	398,645	2,811,513	3,853,092	341,500	466,141	537,905
2003	393	1,776,808	545,849	567,701	354,209	3,244,568	2,347,693	365,740	575,369	963,063
2004	455	1,601,515	635,339	738,083	818,164	3,793,101	3,338,899	510,171	746,544	697,984
2005	452	1,059,791	322,691	767,313	412,453	2,562,248	3,309,594	262,581	427,595	807,600
2006	3,900	785,569	233,531	602,287	431,930	2,053,317	3,478,756	377,973	754,004	590,976
2007	(8)	1,080,641	232,024	467,676	275,613	2,055,954	5,023,565	691,561	588,653	789,988
2008	3,578	822,767	217,089	526,554	602,554	2,168,964	5,218,517	679,927	744,352	927,102
2009	88	1,229,747	276,665	619,451	554,226	2,680,089	4,041,198	678,768	715,061	1,362,532
2010	25	2,671,470	111,843	1,104,059	275,902	4,163,273	4,490,592	578,352	804,401	717,655
2011	63	2,639,193	584,094	1,238,782	415,731	4,877,801	5,165,637	838,752	874,823	501,962
2012	(24)	2,614,246	143,283	1,452,281	1,125,801	5,335,612	5,308,657	1,113,987	749,898	834,825
2013	277	3,328,826	133,879	477,153	372,095	4,311,952	6,182,970	1,217,989	685,078	1,105,322
2014	111	4,063,034	175,314	610,308	547,951	5,396,607	7,343,672	626,781	640,018	1,306,798
2015	114	2,878,937	250,596	1,223,965	1,083,105	5,436,603	8,537,557	662,926	631,236	854,579
2016	5,401	4,842,863	320,666	606,701	1,019,625	6,789,855	6,940,028	682,893	666,073	1,209,500
2017	111	2,611,857	404,264	702,973	842,276	4,561,370	7,372,818	1,210,568	1,762,157	1,286,133
2018	382	4,551,478	421,295	1,121,965	1,284,230	7,378,968	9,825,013	1,176,927	1,350,444	896,417
2019	**375**	**4,281,151**	**395,982**	**1,056,291**	**1,208,702**	**6,942,126**	**9,361,605**	**1,197,947**	**1,391,600**	**1,718,560**
2020	371	4,320,185	399,648	1,065,768	1,219,580	7,005,181	9,158,748	1,249,792	1,405,873	1,675,723
2021	380	4,428,115	409,698	1,092,155	1,249,879	7,179,847	9,542,940	1,220,304	1,396,465	1,444,535
2022	384	4,472,396	413,795	1,103,077	1,262,378	7,251,646	9,638,369	1,232,507	1,410,430	1,458,981
2023	387	4,517,120	417,933	1,114,108	1,275,002	7,324,163	9,734,753	1,244,832	1,424,534	1,473,570
2024	391	4,562,291	422,113	1,125,249	1,287,752	7,397,405	9,832,100	1,257,281	1,438,780	1,488,306
2025	395	4,607,914	426,334	1,136,501	1,300,629	7,471,378	9,930,421	1,269,853	1,453,167	1,503,189
2026	399	4,653,993	430,597	1,147,866	1,313,635	7,546,091	10,029,725	1,282,552	1,467,699	1,518,221
2027	403	4,700,533	434,903	1,159,345	1,326,772	7,621,553	10,130,023	1,295,378	1,482,376	1,533,403
2028	407	4,747,538	439,252	1,170,938	1,340,040	7,697,768	10,231,323	1,308,331	1,497,200	1,548,737
2029	411	4,795,014	443,645	1,182,648	1,353,440	7,774,747	10,333,636	1,321,415	1,512,172	1,564,225
2030	415	4,842,964	448,081	1,194,474	1,366,974	7,852,493	10,436,972	1,334,629	1,527,294	1,579,867
2031	419	4,891,393	452,562	1,206,419	1,380,644	7,931,018	10,541,342	1,347,975	1,542,567	1,595,666
2032	424	4,940,307	457,088	1,218,483	1,394,450	8,010,328	10,646,756	1,361,455	1,557,992	1,611,622
2033	428	4,989,711	461,658	1,230,668	1,408,395	8,090,432	10,753,223	1,375,069	1,573,572	1,627,739
2034	432	5,039,608	466,275	1,242,975	1,422,479	8,171,337	10,860,755	1,388,820	1,589,308	1,644,016
2035	437	5,090,004	470,938	1,255,404	1,436,704	8,253,050	10,969,363	1,402,708	1,605,201	1,660,456
TOTAL	**94,246**	**127,820,230**	**16,032,001**	**36,414,037**	**39,904,089**	**220,170,357**	**326,296,755**	**40,788,234**	**48,246,976**	**49,463,698**

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	5,577,354	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	135,741	87,477	185,352	640,391	6,390,795	12,609,887	900,319	643,835	14,154,042
2001	112,954	188,920	197,678	1,047,945	5,408,295	17,554,493	1,378,254	753,349	19,686,097
2002	143,673	171,046	500,788	2,780,034	8,794,180	14,389,040	859,538	618,090	15,866,667
2003	77,999	97,782	247,719	987,204	5,662,570	16,518,135	1,742,176	753,175	19,013,487
2004	156,564	179,006	205,095	453,634	6,287,896	13,885,738	1,210,241	678,472	15,774,451
2005	143,052	202,176	135,131	223,699	5,511,428	12,444,177	1,941,010	872,985	15,258,172
2006	144,002	120,668	74,912	378,425	5,919,716	13,744,562	1,920,589	1,253,825	16,918,976
2007	78,619	115,030	67,398	242,106	7,596,920	11,989,478	1,701,918	626,862	14,318,259
2008	171,798	156,628	233,859	235,527	8,367,709	15,567,498	1,453,682	808,639	17,829,819
2009	84,717	141,922	114,597	619,772	7,758,566	13,696,234	1,067,680	864,349	15,628,263
2010	52,326	572,894	23,825	453,466	7,693,511	12,838,962	2,054,895	1,410,729	16,304,585
2011	82,640	77,126	58,547	472,662	8,072,150	16,658,357	2,810,835	1,444,068	20,913,259
2012	56,146	133,309	61,977	2,498,758	10,757,557	15,618,095	1,328,359	1,310,388	18,256,842
2013	82,457	175,232	98,865	1,184,314	10,732,225	16,734,643	1,742,375	2,418,943	20,895,961
2014	185,640	169,734	58,025	2,041,750	12,372,419	23,453,265	2,746,781	1,988,828	28,188,874
2015	121,705	193,798	144,134	3,165,167	14,311,102	24,861,557	1,641,828	1,915,689	28,419,074
2016	137,194	302,460	76,196	8,925,319	18,939,664	24,453,601	2,618,982	2,189,292	29,261,875
2017	93,246	144,997	138,897	4,945,041	16,953,855	24,794,307	873,184	898,561	26,566,052
2018	156,086	275,277	180,442	1,614,708	15,475,314	25,583,715	2,232,321	1,920,905	29,736,941
2019	**161,181**	**284,226**	**134,433**	**1,543,143**	**15,792,695**	**24,260,610**	**2,144,425**	**1,851,109**	**28,256,144**
2020	162,726	286,940	135,631	1,552,790	15,628,223	24,637,150	2,288,230	1,974,078	28,899,458
2021	161,598	284,969	151,671	1,585,915	15,788,397	25,075,431	2,243,876	1,934,518	29,253,825
2022	163,214	287,819	153,187	1,601,774	15,946,281	25,326,185	2,266,314	1,953,863	29,546,362
2023	164,846	290,697	154,719	1,617,792	16,105,743	25,579,447	2,288,977	1,973,401	29,841,825
2024	166,495	293,604	156,266	1,633,970	16,266,802	25,835,241	2,311,867	1,993,135	30,140,243
2025	168,160	296,540	157,829	1,650,310	16,429,469	26,093,594	2,334,986	2,013,067	30,441,647
2026	169,841	299,506	159,407	1,666,813	16,593,764	26,354,530	2,358,336	2,033,197	30,746,063
2027	171,540	302,501	161,001	1,683,481	16,759,703	26,618,075	2,381,919	2,053,529	31,053,523
2028	173,255	305,526	162,612	1,700,316	16,927,300	26,884,256	2,405,738	2,074,065	31,364,059
2029	174,987	308,581	164,238	1,717,319	17,096,573	27,153,098	2,429,796	2,094,805	31,677,699
2030	176,737	311,667	165,880	1,734,492	17,267,538	27,424,629	2,454,094	2,115,753	31,994,476
2031	178,505	314,784	167,539	1,751,837	17,440,215	27,698,875	2,478,635	2,136,911	32,314,421
2032	180,290	317,931	169,214	1,769,355	17,614,615	27,975,864	2,503,421	2,158,280	32,637,565
2033	182,093	321,111	170,906	1,787,049	17,790,762	28,255,623	2,528,455	2,179,863	32,963,941
2034	183,914	324,322	172,615	1,804,919	17,968,669	28,538,179	2,553,740	2,201,662	33,293,581
2035	185,753	327,565	174,342	1,822,969	18,148,357	28,823,561	2,579,277	2,223,678	33,626,516
TOTAL	**5,559,536**	**10,156,070**	**7,720,505**	**70,060,034**	**558,291,808**	**935,006,304**	**98,599,424**	**78,014,949**	**1,111,620,678**

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	657,282	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	708,286	5,827,739	1,028,615	525,016	871,632	8,961,288	103,886	465,559	511,640	921,482
2001	(566,076)	7,151,927	850,787	372,374	677,824	8,486,836	58,346	553,100	602,903	870,228
2002	1,074,504	5,158,928	663,437	249,531	731,367	7,877,767	54,621	729,615	416,199	1,308,232
2003	1,033,869	6,035,487	744,447	301,820	617,486	8,733,109	62,399	676,784	645,931	819,094
2004	619,555	6,864,923	679,549	337,720	578,318	9,080,065	35,365	474,152	334,451	604,816
2005	553,163	5,984,035	984,716	401,930	799,290	8,723,134	28,347	403,804	296,577	898,100
2006	(87,156)	6,141,765	1,589,523	635,646	903,423	9,183,201	46,880	532,825	792,184	483,241
2007	1,136,814	7,698,042	1,963,423	688,095	935,375	12,421,749	242,800	856,692	536,331	633,720
2008	897,413	10,657,442	2,158,029	666,622	973,648	15,353,153	72,316	458,284	663,185	950,417
2009	971,059	8,137,791	1,233,547	511,333	1,151,130	12,004,860	36,810	769,885	478,030	933,543
2010	1,009,057	9,613,539	1,575,479	558,994	1,296,461	14,053,529	66,908	742,929	549,791	726,021
2011	1,233,349	7,637,052	2,867,856	602,285	1,664,068	14,004,609	12,939	600,234	794,909	1,163,655
2012	1,685,006	10,875,738	2,404,223	638,859	1,234,274	16,838,100	36,212	662,427	808,064	815,001
2013	1,832,983	11,576,979	2,888,774	1,357,689	3,283,105	20,939,530	39,562	617,062	614,271	1,017,663
2014	1,353,667	11,570,973	2,564,975	787,970	1,300,685	17,578,270	3,977	1,130,051	250,776	1,955,779
2015	1,169,232	11,871,631	2,433,580	860,389	2,076,054	18,410,886	6,990	568,184	266,780	1,453,957
2016	1,605,463	12,364,666	2,097,450	699,255	2,048,725	18,815,558	87,559	231,831	263,057	1,131,349
2017	1,053,590	9,913,175	2,054,904	772,667	2,681,198	16,475,534	37,393	505,388	377,956	1,180,337
2018	1,653,906	12,052,384	2,435,834	835,033	2,464,024	19,441,181	55,090	469,491	325,713	1,373,334
2019	**1,646,832**	**12,783,640**	**2,421,757**	**832,115**	**2,466,689**	**20,151,033**	**55,056**	**464,632**	**320,670**	**1,373,186**
2020	1,689,517	12,963,827	2,315,929	792,829	2,349,861	20,111,963	54,159	458,471	316,940	1,350,536
2021	1,680,052	12,725,950	2,415,085	828,193	2,451,127	20,100,407	55,316	468,840	324,319	1,379,342
2022	1,696,853	12,853,209	2,439,236	836,475	2,475,638	20,301,411	55,869	473,528	327,562	1,393,135
2023	1,713,821	12,981,741	2,463,628	844,840	2,500,394	20,504,424	56,428	478,264	330,838	1,407,067
2024	1,730,959	13,111,558	2,488,264	853,288	2,525,398	20,709,467	56,992	483,046	334,146	1,421,137
2025	1,748,269	13,242,674	2,513,147	861,821	2,550,652	20,916,563	57,562	487,877	337,488	1,435,349
2026	1,765,752	13,375,101	2,538,278	870,439	2,576,159	21,125,729	58,137	492,756	340,863	1,449,702
2027	1,783,409	13,508,852	2,563,661	879,143	2,601,920	21,336,985	58,719	497,683	344,271	1,464,199
2028	1,801,243	13,643,940	2,589,298	887,935	2,627,939	21,550,355	59,306	502,660	347,714	1,478,841
2029	1,819,256	13,780,380	2,615,191	896,814	2,654,219	21,765,860	59,899	507,687	351,191	1,493,630
2030	1,837,448	13,918,184	2,641,343	905,782	2,680,761	21,983,518	60,498	512,763	354,703	1,508,566
2031	1,855,823	14,057,365	2,667,756	914,840	2,707,569	22,203,353	61,103	517,891	358,250	1,523,652
2032	1,874,381	14,197,939	2,694,434	923,989	2,734,644	22,425,387	61,714	523,070	361,833	1,538,888
2033	1,893,125	14,339,918	2,721,378	933,229	2,761,991	22,649,641	62,331	528,301	365,451	1,554,277
2034	1,912,056	14,483,318	2,748,592	942,561	2,789,611	22,876,138	62,954	533,584	369,105	1,569,820
2035	1,931,177	14,628,151	2,776,078	951,986	2,817,507	23,104,899	63,584	538,919	372,796	1,585,518
TOTAL	**58,517,789**	**476,688,345**	**91,587,148**	**34,458,270**	**92,030,138**	**753,281,689**	**4,632,090**	**30,788,215**	**24,956,267**	**58,961,467**

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	405,494	328,900	649,652	564,437	5,942,037	341,230	140,009	5,370,216	12,465,033	28,209,574
2001	415,298	895,341	520,889	660,008	4,700,135	(133,493)	(94,172)	6,003,710	15,778,861	30,831,154
2002	380,410	296,713	958,335	860,292	5,941,389	31,558	251,205	5,589,127	11,451,902	28,269,598
2003	339,986	236,306	691,422	613,937	6,164,628	(137,397)	18,246	6,989,179	11,502,301	28,622,818
2004	245,238	176,391	624,811	585,891	7,238,227	(139,901)	(165,858)	8,913,604	14,633,859	33,561,046
2005	211,328	118,730	849,764	466,735	6,234,813	(183,109)	(192,435)	5,882,666	13,847,844	28,863,166
2006	191,089	54,312	764,501	503,066	5,099,043	(180,678)	(181,955)	8,393,769	13,754,727	30,253,005
2007	258,735	292,778	552,331	551,758	6,688,386	(434,017)	(342,590)	10,912,268	8,494,040	29,243,231
2008	429,480	238,276	425,883	726,423	11,118,650	(265,097)	(205,984)	13,040,684	10,924,977	38,577,495
2009	413,937	212,063	623,250	551,946	7,838,443	591,305	(46,797)	8,761,740	13,345,657	34,509,810
2010	446,495	116,201	423,670	703,625	7,870,491	(150,554)	(50,292)	6,648,805	9,689,372	27,783,464
2011	622,782	312,712	874,072	1,583,641	8,799,824	(232,312)	(42,712)	6,236,874	15,905,176	36,631,794
2012	794,472	280,677	1,049,579	3,228,016	11,218,739	391,304	448,165	8,878,838	12,828,372	41,439,866
2013	485,821	456,919	903,366	830,633	11,798,777	276,954	165,142	9,579,777	14,515,461	41,301,408
2014	113,145	74,899	558,751	332,673	15,025,863	207,755	328,876	10,326,814	15,913,245	46,222,606
2015	690,447	301,465	643,705	862,944	11,093,434	107,552	208,818	11,937,855	16,408,290	44,550,419
2016	636,028	68,616	1,286,913	839,513	10,191,735	(56,132)	(335,877)	12,320,710	18,890,749	45,556,050
2017	631,896	77,041	966,061	607,882	8,053,548	(119,856)	646,243	10,977,502	16,181,805	40,123,195
2018	678,752	112,742	1,050,464	917,446	11,690,048	392,118	490,786	12,407,323	15,661,468	45,624,775
2019	**678,214**	**106,895**	**1,051,575**	**911,670**	**11,228,901**	**387,871**	**488,809**	**12,479,419**	**16,490,286**	**46,037,184**
2020	667,182	106,953	1,033,854	898,442	12,691,647	382,099	480,845	12,612,135	15,954,245	47,007,508
2021	681,463	109,952	1,055,751	918,278	11,988,901	391,237	491,681	12,624,622	16,195,686	46,685,388
2022	688,278	111,051	1,066,308	927,461	12,108,790	395,149	496,598	12,750,868	16,357,643	47,152,240
2023	695,161	112,162	1,076,972	936,735	12,229,878	399,100	501,564	12,878,377	16,521,220	47,623,766
2024	702,112	113,283	1,087,741	946,103	12,352,177	403,091	506,580	13,007,161	16,686,432	48,100,001
2025	709,133	114,416	1,098,619	955,564	12,475,698	407,122	511,645	13,137,233	16,853,296	48,581,002
2026	716,225	115,560	1,109,605	965,119	12,600,455	411,194	516,762	13,268,605	17,021,829	49,066,812
2027	723,387	116,716	1,120,701	974,770	12,726,460	415,306	521,929	13,401,291	17,192,047	49,557,479
2028	730,621	117,883	1,131,908	984,518	12,853,725	419,459	527,149	13,535,304	17,363,968	50,053,056
2029	737,927	119,062	1,143,227	994,363	12,982,262	423,653	532,420	13,670,657	17,537,608	50,553,586
2030	745,306	120,252	1,154,659	1,004,307	13,112,084	427,890	537,744	13,807,363	17,712,984	51,059,119
2031	752,759	121,455	1,166,206	1,014,350	13,243,205	432,169	543,122	13,945,437	17,890,113	51,569,712
2032	760,287	122,670	1,177,868	1,024,494	13,375,637	436,490	548,553	14,084,891	18,069,015	52,085,410
2033	767,890	123,896	1,189,647	1,034,738	13,509,394	440,855	554,039	14,225,740	18,249,705	52,606,264
2034	775,569	125,135	1,201,543	1,045,086	13,644,488	445,264	559,579	14,367,998	18,432,202	53,132,327
2035	783,324	126,387	1,213,559	1,055,537	13,780,933	449,716	565,175	14,511,678	18,616,524	53,663,650
TOTAL	**27,256,277**	**11,456,268**	**42,504,255**	**41,990,169**	**465,374,717**	**15,773,197**	**16,198,499**	**479,647,930**	**683,838,792**	**1,903,378,144**

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	23,227,369	244,410	23,471,779	1,870,490	737,293	1,378,795	1,434,507	972,081	165,502
2001	24,052,191	617,689	24,669,880	2,438,339	2,543,535	1,838,032	1,521,485	1,068,195	474,308
2002	20,727,872	472,353	21,200,225	1,398,669	800,734	757,147	584,168	1,156,409	282,326
2003	20,832,780	283,154	21,115,934	3,732,959	677,475	710,041	624,601	469,225	279,922
2004	26,586,558	245,847	26,832,405	1,821,744	1,375,487	1,322,272	1,044,918	1,054,543	413,437
2005	16,373,205	1,498,514	17,871,718	2,840,486	1,501,877	1,540,619	879,549	677,058	353,179
2006	14,723,341	272,779	14,996,120	4,459,214	1,309,366	1,198,599	2,918,565	961,576	756,960
2007	15,890,226	345,330	16,235,555	5,903,193	1,629,372	1,796,185	1,821,839	829,668	654,505
2008	23,011,938	318,813	23,330,750	2,269,446	1,372,708	1,261,450	828,988	499,998	709,363
2009	22,756,256	156,849	22,913,104	2,555,915	1,546,920	1,347,555	1,172,918	781,196	540,899
2010	14,662,660	262,473	14,925,133	3,375,039	1,603,246	2,605,567	1,725,432	785,115	694,913
2011	18,662,153	139,193	18,801,346	2,546,382	1,774,149	2,316,508	2,217,791	625,147	579,891
2012	21,030,692	220,006	21,250,698	5,066,346	1,482,594	1,617,207	2,717,411	1,814,454	659,207
2013	33,829,306	263,486	34,092,792	5,818,211	1,664,033	1,292,802	3,047,346	1,399,983	530,656
2014	38,024,177	220,374	38,244,551	3,927,706	2,611,798	1,355,184	2,955,825	620,535	752,950
2015	27,052,892	145,906	27,198,798	4,657,811	2,077,268	2,849,274	867,866	2,591,772	1,110,380
2016	27,116,582	128,437	27,245,018	4,285,629	2,274,365	1,426,207	1,214,816	875,647	281,257
2017	27,072,004	158,603	27,230,607	4,244,598	2,652,177	1,583,881	1,273,537	718,156	387,599
2018	27,448,753	146,792	27,595,545	4,369,716	2,446,057	1,922,757	1,165,675	1,012,545	407,124
2019	**29,759,736**	**145,086**	**29,904,822**	**4,262,939**	**2,361,688**	**1,863,163**	**1,117,183**	**980,111**	**387,104**
2020	29,172,789	143,227	29,316,016	4,246,803	2,342,606	1,849,256	1,106,406	972,683	382,683
2021	29,081,697	146,485	29,228,182	4,336,085	2,407,285	1,897,176	1,141,052	998,330	396,226
2022	29,372,514	147,950	29,520,464	4,379,445	2,431,357	1,916,148	1,152,462	1,008,314	400,188
2023	29,666,239	149,430	29,815,669	4,423,240	2,455,671	1,935,309	1,163,987	1,018,397	404,190
2024	29,962,901	150,924	30,113,825	4,467,472	2,480,228	1,954,662	1,175,627	1,028,581	408,232
2025	30,262,530	152,433	30,414,963	4,512,147	2,505,030	1,974,209	1,187,383	1,038,867	412,314
2026	30,565,155	153,958	30,719,113	4,557,268	2,530,080	1,993,951	1,199,257	1,049,255	416,438
2027	30,870,807	155,497	31,026,304	4,602,841	2,555,381	2,013,890	1,211,249	1,059,748	420,602
2028	31,179,515	157,052	31,336,567	4,648,870	2,580,935	2,034,029	1,223,362	1,070,345	424,808
2029	31,491,310	158,623	31,649,933	4,695,358	2,606,744	2,054,370	1,235,595	1,081,049	429,056
2030	31,806,223	160,209	31,966,432	4,742,312	2,632,812	2,074,913	1,247,951	1,091,859	433,347
2031	32,124,285	161,811	32,286,096	4,789,735	2,659,140	2,095,662	1,260,431	1,102,778	437,680
2032	32,445,528	163,429	32,608,957	4,837,632	2,685,731	2,116,619	1,273,035	1,113,806	442,057
2033	32,769,984	165,063	32,935,047	4,886,009	2,712,588	2,137,785	1,285,765	1,124,944	446,477
2034	33,097,683	166,714	33,264,397	4,934,869	2,739,714	2,159,163	1,298,623	1,136,193	450,942
2035	33,428,660	168,381	33,597,041	4,984,217	2,767,111	2,180,755	1,311,609	1,147,555	455,452
TOTAL	**1,326,306,277**	**12,002,872**	**1,338,309,150**	**168,398,424**	**87,959,011**	**92,184,899**	**66,521,172**	**46,864,825**	**21,082,002**

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	9,524,751	1,711,065	1,514,074	19,308,557	353,556	4,194,994	842,570	1,003,213	1,124,399	7,518,730
2001	7,695,659	1,891,901	31,234	19,502,687	296,461	2,442,119	1,667,660	810,577	5,658,124	10,874,941
2002	11,246,902	1,693,570	934,872	18,854,797	509,111	3,398,320	1,250,266	422,611	2,236,036	7,816,343
2003	13,350,815	2,095,918	(452,530)	21,488,425	368,521	3,729,470	545,107	375,520	1,281,528	6,300,147
2004	10,500,182	2,128,188	1,087,045	20,747,817	427,774	5,435,324	1,238,040	439,722	3,578,697	11,119,557
2005	7,608,361	2,414,926	2,241,009	20,057,064	452,675	5,608,440	1,518,256	683,607	(1,905,129)	6,357,849
2006	10,121,217	1,924,426	577,622	24,227,546	301,178	5,207,646	638,263	320,547	5,199,034	11,666,667
2007	10,026,904	2,957,031	651,519	26,270,214	226,920	8,081,851	823,384	705,270	3,274,818	13,112,242
2008	14,693,673	2,415,378	1,008,799	25,059,804	306,047	6,670,861	808,740	780,110	4,569,421	13,135,178
2009	12,250,766	3,494,124	1,519,948	25,210,240	509,167	7,248,647	629,994	681,317	2,770,474	11,839,599
2010	12,897,723	3,226,278	2,497,311	29,410,624	605,860	6,523,919	472,877	422,032	3,549,069	11,573,757
2011	13,499,682	4,104,748	3,061,328	30,725,626	432,297	5,570,801	884,689	565,634	4,861,039	12,314,460
2012	13,587,939	2,845,790	4,726,633	34,517,579	244,671	6,338,892	1,708,415	546,612	4,049,676	12,888,267
2013	14,561,580	3,501,521	3,614,880	35,431,015	439,182	7,911,823	857,872	733,760	2,337,670	12,280,307
2014	17,922,000	4,318,384	2,881,931	37,346,313	315,307	9,088,565	1,171,972	330,406	9,663,041	20,569,292
2015	19,333,404	4,539,084	2,745,617	40,772,477	177,698	11,928,905	823,243	496,622	2,370,618	15,797,086
2016	21,103,777	5,114,695	4,335,701	40,912,095	487,100	10,856,132	610,519	633,055	2,678,429	15,265,235
2017	17,580,741	5,277,664	4,858,413	38,576,765	571,950	9,435,686	1,448,271	653,065	(4,237,735)	7,871,238
2018	17,966,582	5,247,119	4,258,551	38,796,126	480,584	14,123,319	2,233,428	1,742,926	8,107,571	26,687,828
2019	**17,636,540**	**5,184,535**	**4,181,490**	**37,974,753**	**823,687**	**14,090,730**	**1,242,023**	**745,358**	**6,955,278**	**23,857,076**
2020	17,551,969	5,166,741	4,639,306	38,258,453	1,269,578	14,069,059	1,317,636	741,776	4,246,108	21,644,157
2021	17,895,548	5,251,460	4,403,380	38,726,542	866,530	14,235,313	1,613,673	1,087,454	6,500,682	24,303,652
2022	18,074,503	5,303,974	4,447,414	39,113,805	875,195	14,377,666	1,629,810	1,098,328	6,565,689	24,546,688
2023	18,255,248	5,357,014	4,491,888	39,504,944	883,947	14,521,442	1,646,108	1,109,312	6,631,346	24,792,155
2024	18,437,801	5,410,584	4,536,807	39,899,994	892,786	14,666,657	1,662,569	1,120,405	6,697,659	25,040,076
2025	18,622,179	5,464,690	4,582,175	40,298,994	901,714	14,813,323	1,679,195	1,131,609	6,764,636	25,290,477
2026	18,808,400	5,519,337	4,627,996	40,701,982	910,731	14,961,457	1,695,986	1,142,925	6,832,282	25,543,381
2027	18,996,484	5,574,530	4,674,276	41,109,001	919,839	15,111,071	1,712,946	1,154,354	6,900,605	25,798,815
2028	19,186,449	5,630,276	4,721,019	41,520,093	929,037	15,262,182	1,730,076	1,165,898	6,969,611	26,056,804
2029	19,378,314	5,686,578	4,768,229	41,935,293	938,327	15,414,804	1,747,377	1,177,557	7,039,307	26,317,372
2030	19,572,097	5,743,444	4,815,912	42,354,647	947,711	15,568,952	1,764,850	1,189,332	7,109,700	26,580,545
2031	19,767,818	5,800,879	4,864,071	42,778,194	957,188	15,724,641	1,782,499	1,201,226	7,180,797	26,846,351
2032	19,965,496	5,858,887	4,912,711	43,205,974	966,760	15,881,888	1,800,324	1,213,238	7,252,605	27,114,815
2033	20,165,151	5,917,476	4,961,839	43,638,034	976,427	16,040,707	1,818,327	1,225,370	7,325,131	27,385,962
2034	20,366,803	5,976,651	5,011,457	44,074,415	986,191	16,201,114	1,836,510	1,237,624	7,398,383	27,659,822
2035	20,570,471	6,036,417	5,061,572	44,515,159	996,053	16,363,125	1,854,875	1,250,000	7,472,367	27,936,420
TOTAL	**718,765,630**	**168,350,034**	**144,988,109**	**1,515,114,108**	**25,243,471**	**467,787,786**	**58,616,504**	**46,850,365**	**201,053,460**	**799,551,586**

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 2E	Reach 3A	Reach 3B	Reach 4A	Reach 4B	Subtotal
	[59]	[60]	[61]	[62]	[63]	[64]	[65]	[66]	[67]	[68]	[69]
1961	0	0	0	0	0	0	0	0	0	0	0
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	0	0	0	0	0	0	0	0	0	0	0
2002	0	0	0	0	0	0	0	0	0	0	0
2003	1,022	84,351	375,153	2,329	0	0	627,038	360	93,305	33,614	1,217,171
2004	10,740	40,841	509,089	2,340	0	0	276,019	337	13,434	71,444	924,242
2005	9,849	15,079	526,273	4,153	0	0	496,547	9,036	27,330	216,418	1,304,685
2006	10,215	10,235	547,652	9,253	57,553	0	403,157	1,274	14,842	72,655	1,126,834
2007	27,124	9,821	657,894	5,083	125,317	0	616,360	58,543	39,200	138,358	1,677,699
2008	77,266	33,507	849,804	1,330	208,975	0	1,320,481	93,096	76,668	231,149	2,892,276
2009	79,970	15,365	1,001,173	919	230,886	0	1,015,588	24,880	140,919	231,789	2,741,489
2010	53,052	6,924	806,984	15,658	261,397	0	1,261,486	9,349	162,803	356,240	2,933,893
2011	21,407	5,387	700,551	4,440	117,224	0	1,102,193	10,973	75,147	545,213	2,582,534
2012	5,707	15,611	750,192	15,693	171,100	0	1,604,944	26,651	18,388	198,585	2,806,871
2013	1,121	6,020	603,687	171,472	293,188	0	1,621,779	4,281	6,155	183,657	2,891,361
2014	8,278	9,524	829,103	104,882	167,033	0	1,838,660	3,984	2,439	322,654	3,286,556
2015	(140)	7,978	823,483	11,282	89,609	0	1,509,154	105,460	19,697	387,881	2,954,404
2016	1,046	12,051	740,900	106,298	34,201	0	1,850,391	34,936	7,323	481,210	3,268,356
2017	1,248	9,056	1,083,444	162,475	34,073	1,564,417	1,923,863	56,987	60,572	310,724	5,206,859
2018	428	9,993	895,288	90,624	92,087	1,627,086	2,922,145	69,114	31,200	524,047	6,262,012
2019	**498**	**10,395**	**983,772**	**105,649**	**90,128**	**1,604,546**	**3,147,042**	**80,936**	**36,394**	**578,058**	**6,637,418**
2020	496	10,381	981,175	105,194	89,264	1,594,605	3,258,409	80,597	36,238	575,313	6,731,672
2021	479	10,359	962,946	101,494	91,398	1,624,833	3,140,291	77,651	34,957	564,730	6,609,138
2022	484	10,462	972,576	102,509	92,312	1,641,082	3,171,694	78,427	35,307	570,378	6,675,231
2023	488	10,567	982,301	103,534	93,235	1,657,493	3,203,411	79,212	35,660	576,081	6,741,982
2024	493	10,672	992,124	104,569	94,167	1,674,068	3,235,445	80,004	36,016	581,842	6,809,400
2025	498	10,779	1,002,046	105,615	95,109	1,690,808	3,267,799	80,804	36,377	587,661	6,877,496
2026	503	10,887	1,012,066	106,671	96,060	1,707,716	3,300,477	81,612	36,740	593,537	6,946,269
2027	508	10,996	1,022,187	107,738	97,021	1,724,793	3,333,482	82,428	37,108	599,473	7,015,734
2028	513	11,106	1,032,409	108,815	97,991	1,742,041	3,366,817	83,252	37,479	605,467	7,085,890
2029	518	11,217	1,042,733	109,903	98,971	1,759,462	3,400,485	84,085	37,854	611,522	7,156,750
2030	524	11,329	1,053,160	111,002	99,961	1,777,056	3,434,490	84,926	38,232	617,637	7,228,317
2031	529	11,442	1,063,692	112,112	100,960	1,794,827	3,468,835	85,775	38,614	623,814	7,300,600
2032	534	11,557	1,074,329	113,234	101,970	1,812,775	3,503,523	86,633	39,001	630,052	7,373,608
2033	539	11,672	1,085,072	114,366	102,989	1,830,903	3,538,558	87,499	39,391	636,352	7,447,341
2034	545	11,789	1,095,923	115,510	104,019	1,849,212	3,573,944	88,374	39,784	642,716	7,521,816
2035	550	11,907	1,106,882	116,665	105,060	1,867,704	3,609,684	89,258	40,182	649,143	7,597,035
TOTAL	**317,030**	**479,259**	**29,166,063**	**2,552,811**	**3,533,258**	**32,545,427**	**77,344,191**	**1,920,733**	**1,424,755**	**14,549,411**	**163,832,939**

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
	[70]	[71]	[72]	[73]	[74]	[75]	[76]
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	5,446,494	780,366	4,265,642	2,349,816	170,222	1,524,046	14,536,587
2001	5,905,961	1,526,938	5,136,328	4,375,496	240,595	(923,056)	16,262,262
2002	5,322,898	1,489,777	4,065,555	4,477,074	(53,068)	3,470,537	18,772,772
2003	4,454,323	1,314,151	3,721,548	3,350,502	(628,046)	951,874	13,164,353
2004	8,912,349	1,376,812	3,481,196	5,121,099	(616,073)	1,506,356	19,781,738
2005	5,758,956	2,597,096	7,383,506	(596,347)	2,649,206	(1,245,748)	16,546,669
2006	6,924,796	2,294,423	5,115,005	3,564,757	(560,871)	(4,265,028)	13,073,082
2007	5,706,724	2,717,988	10,418,432	7,823,255	354,474	12,027,219	39,048,092
2008	8,315,632	835,023	16,214,113	7,457,091	(117,379)	426,956	33,131,435
2009	7,875,287	891,682	8,682,523	5,661,639	246,215	2,846,044	26,203,391
2010	10,050,373	789,726	8,844,554	6,210,352	429,116	5,290,005	31,614,126
2011	6,949,755	935,186	9,613,636	8,042,828	43,741	(263,404)	25,321,741
2012	7,482,164	2,948,418	9,428,975	6,245,684	107,660	6,627,431	32,840,332
2013	8,802,647	3,778,344	12,292,179	7,206,544	401,260	3,666,057	36,147,032
2014	10,762,433	3,091,692	7,290,264	7,257,071	394,691	5,416,667	34,212,818
2015	9,344,174	3,734,027	7,575,125	8,863,244	295,772	312,759	30,125,101
2016	11,606,360	3,657,788	8,213,468	8,693,063	1,256,478	(5,362,596)	28,064,562
2017	10,080,176	2,128,889	8,809,945	9,183,176	(229,899)	16,238,327	46,210,613
2018	11,739,690	3,225,599	8,848,600	9,666,030	681,474	5,496,031	39,657,424
2019	**12,235,510**	**3,398,323**	**9,231,657**	**8,653,759**	**706,707**	**4,977,421**	**39,203,377**
2020	14,173,776	4,676,548	10,618,388	9,664,974	799,684	7,810,996	47,744,366
2021	12,843,488	3,804,491	9,661,877	9,421,537	736,581	6,155,764	42,623,738
2022	12,971,923	3,842,536	9,758,496	9,515,752	743,947	6,217,322	43,049,976
2023	13,101,642	3,880,962	9,856,081	9,610,909	751,386	6,279,495	43,480,475
2024	13,232,659	3,919,771	9,954,642	9,707,019	758,900	6,342,290	43,915,281
2025	13,364,985	3,958,969	10,054,188	9,804,089	766,489	6,405,713	44,354,433
2026	13,498,635	3,998,559	10,154,730	9,902,130	774,154	6,469,770	44,797,978
2027	13,633,622	4,038,544	10,256,277	10,001,151	781,895	6,534,468	45,245,957
2028	13,769,958	4,078,930	10,358,840	10,101,162	789,714	6,599,812	45,698,416
2029	13,907,657	4,119,719	10,462,428	10,202,174	797,612	6,665,810	46,155,400
2030	14,046,734	4,160,916	10,567,053	10,304,196	805,588	6,732,469	46,616,956
2031	14,187,201	4,202,525	10,672,723	10,407,238	813,644	6,799,793	47,083,124
2032	14,329,073	4,244,550	10,779,451	10,511,310	821,780	6,867,791	47,553,955
2033	14,472,364	4,286,996	10,887,245	10,616,423	829,998	6,936,469	48,029,495
2034	14,617,088	4,329,866	10,996,117	10,722,587	838,298	7,005,834	48,509,790
2035	14,763,259	4,373,165	11,106,079	10,829,813	846,681	7,075,892	48,994,889
TOTAL	**465,992,677**	**122,866,074**	**383,813,280**	**323,703,850**	**34,652,615**	**199,467,434**	**1,530,495,930**

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[a]	Reach 33A	Reach 33B	Reach 34	Reach 35	Subtotal		
	[77]	[78]	[79]	[80]	[81]	[82]	[83]	[84]
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	2,879,294	2,533,879	20,786	253,538	109,328	5,796,825	121,957,382	130,594,805
2001	3,114,729	2,233,473	14,426	151,374	57,878	5,571,880	135,885,738	143,233,923
2002	3,174,176	2,686,500	49,511	189,458	81,857	6,181,501	124,839,671	136,448,991
2003	3,333,349	2,780,276	44,211	200,986	85,015	6,443,837	126,099,281	135,006,812
2004	3,535,885	2,673,184	69,895	240,426	109,830	6,629,220	144,450,542	154,531,993
2005	3,837,238	2,979,942	120,379	292,354	137,878	7,367,791	122,350,247	130,424,375
2006	2,521,833	3,183,041	56,543	154,568	78,445	5,994,429	127,439,862	135,416,795
2007	3,220,680	2,947,724	24,929	13,664	15,094	6,222,091	158,549,133	168,201,999
2008	5,645,631	4,241,709	10,299	5,521	3,997	9,907,157	179,217,067	189,757,319
2009	5,222,360	3,732,949	20,503	8,770	8,179	8,992,761	160,043,518	170,482,262
2010	6,455,972	6,377,898	77,603	19,136	21,693	12,952,302	161,551,413	173,408,222
2011	6,179,411	5,763,020	39,858	13,760	12,291	12,008,340	173,303,709	186,253,723
2012	5,329,096	6,433,912	24,824	11,518	8,939	11,808,288	192,646,843	208,739,988
2013	5,970,991	7,968,174	54,228	26,376	22,836	14,042,605	218,022,010	233,066,464
2014	7,907,403	4,182,998	15,209	7,392	15,843	12,128,845	237,778,123	255,547,261
2015	10,297,350	6,621,660	(1,296)	7,644	22,009	16,947,367	225,175,612	244,923,430
2016	4,935,247	10,570,919	(5,127)	2,323	12,418	15,515,780	223,904,529	249,639,448
2017	5,741,122	14,660,128	(1,040)	4,313	12,872	20,417,395	228,678,257	250,193,593
2018	6,451,199	10,610,060	0	0	0	17,061,259	250,863,091	273,717,755
2019	**6,299,494**	**10,807,885**	**0**	**0**	**0**	**17,107,379**	**249,129,186**	**271,864,382**
2020	6,266,866	10,488,010	0	0	0	16,754,876	256,468,469	279,102,244
2021	6,402,578	10,741,672	0	0	0	17,144,250	254,675,122	277,643,746
2022	6,466,604	10,849,089	0	0	0	17,315,693	257,221,870	280,420,181
2023	6,531,270	10,957,580	0	0	0	17,488,850	259,794,090	283,224,383
2024	6,596,582	11,067,156	0	0	0	17,663,738	262,392,025	286,056,623
2025	6,662,548	11,177,827	0	0	0	17,840,375	265,015,950	288,917,192
2026	6,729,174	11,289,605	0	0	0	18,018,779	267,666,106	291,806,360
2027	6,796,465	11,402,501	0	0	0	18,198,966	270,342,764	294,724,423
2028	6,864,430	11,516,526	0	0	0	18,380,956	273,046,196	297,671,671
2029	6,933,074	11,631,692	0	0	0	18,564,766	275,776,659	300,648,390
2030	7,002,405	11,748,009	0	0	0	18,750,414	278,534,424	303,654,870
2031	7,072,429	11,865,489	0	0	0	18,937,918	281,319,769	306,691,421
2032	7,143,153	11,984,144	0	0	0	19,127,297	284,132,968	309,758,335
2033	7,214,585	12,103,985	0	0	0	19,318,570	286,974,295	312,855,917
2034	7,286,731	12,225,025	0	0	0	19,511,756	289,844,042	315,984,480
2035	7,359,598	12,347,275	0	0	0	19,706,873	292,742,482	319,144,326
TOTAL	**267,516,616**	**301,269,012**	**653,771**	**1,948,140**	**992,543**	**572,380,082**	**9,687,964,305**	**10,466,520,716**

[a] 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[a] (in dollars)

Sheet 1 of 4

	NORTH BAY AQUEDUCT				SOUTH BAY AQUEDUCT	CALIFORNIA AQUEDUCT		
Calendar Year	Reach 1 Barker Slough Pumping Plant	Reach 3A Cordelia Pumping Plant (Solano)	Reach 3B Cordelia Pumping Plant (Napa)[b]	Total	Reach 1 South Bay and Del Valle Pumping Plants[c]	Reach 1 Banks Pumping Plant	Reach 4 Dos Amigos Pumping Plant	Reach 14A 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	32,592	26,104	11,921	70,617	422,816	6,881,085	2,368,056	1,639,887
2000	58,200	42,262	14,978	115,441	903,391	7,901,803	3,012,840	2,925,486
2001	356,682	247,499	211,786	815,967	4,022,683	23,537,500	9,608,845	14,398,956
2002	190,460	104,564	61,470	356,494	2,324,926	17,025,395	6,894,223	8,423,374
2003	181,041	118,387	97,762	397,190	2,568,901	21,144,026	8,873,171	10,393,208
2004	251,516	139,241	107,251	498,008	2,555,185	21,511,700	9,305,291	12,251,722
2005	285,238	147,895	149,083	582,216	2,835,209	28,306,243	12,456,894	11,506,677
2006	235,576	116,793	147,726	500,095	2,771,407	23,393,438	10,503,663	11,273,023
2007	451,874	228,029	257,003	936,906	4,242,890	25,193,715	10,890,726	16,129,285
2008	424,387	196,005	302,382	922,774	3,337,945	17,301,200	6,127,107	11,219,442
2009	218,875	103,270	163,059	485,204	2,487,645	9,220,733	4,051,527	6,862,717
2010	260,461	112,286	215,361	588,108	2,374,996	21,169,149	9,474,295	10,605,705
2011	270,494	116,080	228,389	614,963	3,410,623	35,600,954	15,174,317	14,431,689
2012	272,316	123,869	189,889	586,075	3,532,616	27,406,358	12,000,700	13,708,777
2013	435,434	207,880	322,606	965,920	5,449,526	22,787,118	8,715,028	12,299,118
2014	361,603	185,037	446,274	992,914	4,111,104	11,284,270	3,531,410	7,011,558
2015	389,916	239,568	359,506	988,990	5,766,805	16,944,298	5,359,264	9,921,372
2016	274,430	157,084	253,749	685,264	4,344,930	29,363,627	11,632,304	15,649,147
2017	295,426	184,157	185,005	664,588	3,571,553	44,826,506	21,446,728	22,447,771
2018	602,187	137,098	537,381	1,276,666	6,641,567	33,413,650	13,245,858	16,414,734
2019	**677,664**	**618,045**	**647,274**	**1,942,983**	**5,010,806**	**36,324,900**	**15,082,213**	**18,637,306**
2020	658,777	630,854	629,234	1,918,865	5,032,771	38,078,818	14,525,927	17,926,510
2021	541,062	575,650	838,467	1,955,179	5,229,729	41,662,301	16,205,010	20,306,872
2022	547,635	611,780	873,147	2,032,562	5,248,768	37,564,052	16,515,308	20,743,828
2023	553,303	618,113	882,186	2,053,602	5,303,104	21,700,360	16,795,959	21,157,804
2024	550,728	615,236	878,079	2,044,043	5,278,419	44,690,844	16,506,754	20,677,042
2025	552,233	616,916	880,477	2,049,626	5,292,836	40,478,168	16,718,088	21,034,322
2026	552,292	616,982	880,572	2,049,846	5,293,402	31,738,708	16,463,326	20,573,485
2027	552,490	617,205	880,889	2,050,584	5,295,311	34,282,602	16,763,889	21,113,257
2028	552,715	617,455	881,247	2,051,417	5,297,462	30,118,168	16,558,467	20,737,522
2029	552,555	617,277	880,993	2,050,825	5,295,934	31,273,098	16,703,398	21,002,182
2030	551,381	615,965	879,120	2,046,466	5,284,675	39,739,491	16,460,232	20,582,709
2031	551,839	616,477	879,851	2,048,167	5,289,070	44,135,767	17,331,429	22,174,855
2032	552,350	617,048	880,665	2,050,063	5,293,961	32,364,617	16,062,243	19,861,068
2033	552,492	617,207	880,892	2,050,591	5,295,328	38,129,727	17,330,022	22,159,935
2034	551,994	616,650	880,097	2,048,741	5,290,551	33,719,113	16,155,017	20,029,769
2035	552,224	616,907	880,464	2,049,595	5,292,755	50,801,132	18,533,375	24,500,823
TOTAL	**15,744,206**	**13,664,591**	**19,176,676**	**48,585,473**	**174,837,532**	**1,169,341,731**	**506,423,857**	**620,048,914**

[a] Excludes extra peaking costs assigned directly to contractors. Refer to Appendix B text discussion of Table B-17 under "Project Water Charges."

[b] Costs for the period 1968 through 1987 are for an interim facility.

[c] 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[a] (in dollars)

	CALIFORNIA AQUEDUCT (continued)						
	Reach 15A	Reach 16A	Reach 17E	Reach 18A	Reach 22B	Reach 23	Reach 24
Calendar Year	Wheeler Ridge Pumping Plant	Chrisman Pumping Plant	Edmonston Pumping Plant	Alamo Pumping Plant	Pearblossom Pumping Plant	Mojave Siphon Powerplant	Silverwood Lake[d]
	[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	1,349,435	3,454,259	13,349,865	(2,851,993)	1,933,516	(2,533,429)	76,199
2000	2,995,367	6,892,863	24,868,765	(5,070,499)	3,889,138	(4,371,978)	0
2001	14,749,926	33,210,381	122,677,209	(3,276,174)	18,689,339	(3,621,886)	919,165
2002	8,731,692	19,721,183	72,471,745	(4,919,131)	10,667,928	(5,247,076)	95,265
2003	10,814,071	24,634,664	90,645,519	(3,362,477)	14,524,245	(6,610,346)	231,996
2004	12,863,080	29,368,759	107,972,655	(6,248,061)	16,993,152	(7,691,613)	0
2005	11,769,639	26,675,193	94,388,290	(5,791,742)	17,552,651	(6,359,950)	0
2006	11,447,243	26,082,690	81,840,266	(4,022,339)	15,985,964	(6,347,742)	0
2007	16,657,505	37,657,877	125,592,420	(2,976,651)	19,486,841	(5,872,118)	0
2008	12,277,333	24,908,362	77,920,768	(3,305,736)	10,680,902	(3,203,162)	321,113
2009	7,293,452	15,756,149	71,001,293	(3,096,612)	9,125,019	(2,225,065)	2,053
2010	10,772,730	24,318,543	88,899,186	(4,913,035)	16,724,848	(5,543,596)	0
2011	14,469,641	32,457,315	113,767,599	(6,340,454)	23,163,495	(7,675,700)	496,271
2012	13,789,849	31,188,907	109,332,475	(2,424,628)	17,309,699	(8,836,129)	0
2013	12,504,631	28,309,182	99,559,612	(1,989,602)	12,072,704	(4,750,469)	0
2014	7,223,495	16,344,578	57,165,296	(1,305,981)	5,108,873	(1,023,443)	137,144
2015	10,905,343	24,522,507	88,668,561	(2,190,877)	8,926,990	(2,009,231)	856,133
2016	16,403,288	36,754,799	135,732,857	(7,658,800)	23,406,352	(8,562,398)	0
2017	23,255,530	51,065,045	189,517,023	(14,211,320)	39,166,025	(21,146,203)	624,619
2018	17,416,982	39,075,872	141,353,629	(8,633,909)	24,701,866	(9,813,143)	0
2019	**18,136,525**	**41,362,910**	**151,174,855**	**(10,094,010)**	**29,571,231**	**(14,257,234)**	**0**
2020	17,376,325	39,623,580	144,793,509	(10,016,857)	28,837,388	(14,295,110)	0
2021	19,700,766	44,859,000	163,911,215	(9,782,300)	28,770,958	(12,864,905)	0
2022	20,145,823	45,880,832	167,676,526	(9,872,448)	29,409,624	(12,994,232)	0
2023	20,570,225	46,856,301	171,274,978	(10,025,802)	30,237,314	(13,233,713)	0
2024	20,060,734	45,678,995	166,908,688	(10,658,665)	28,767,606	(12,623,386)	0
2025	20,440,941	46,558,128	170,171,238	(11,014,504)	29,934,701	(13,121,745)	0
2026	19,942,598	45,402,970	165,873,768	(10,745,365)	29,114,512	(12,744,657)	0
2027	20,525,404	46,753,605	170,897,318	(10,954,671)	29,765,462	(13,037,773)	0
2028	20,117,863	45,808,463	167,379,445	(10,842,092)	29,432,537	(12,879,862)	0
2029	20,404,751	46,473,722	169,855,305	(10,895,805)	29,588,500	(12,955,131)	0
2030	19,956,245	45,435,911	166,001,127	(10,793,571)	29,213,435	(12,811,985)	0
2031	21,686,460	49,450,154	180,949,029	(11,236,513)	30,596,760	(13,435,684)	0
2032	19,177,277	43,631,000	159,289,384	(10,426,197)	28,147,259	(12,301,550)	0
2033	21,666,962	49,403,720	180,771,687	(11,318,398)	30,886,051	(13,551,988)	0
2034	19,359,273	44,052,629	160,856,985	(10,583,706)	28,606,768	(12,519,642)	0
2035	24,269,869	55,466,995	203,443,010	(11,453,059)	31,288,130	(13,743,941)	0
TOTAL	**618,233,715**	**1,392,325,145**	**5,033,000,669**	**(289,433,074)**	**853,729,861**	**(350,629,726)**	**6,198,641**

[a] Excludes extra peaking costs assigned directly to contractors. Refer to Appendix B text discussion of Table B-17 under "Project Water Charges."

[d] 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[a] (in dollars)

Sheet 3 of 4

Calendar Year	CALIFORNIA AQUEDUCT (continued)							
	Reach 26A Devil Canyon Powerplant	Reach EBX2B Greenspot Pump Station	Reach EBX2E Citrus Pump Station	Reach EBX3A Crafton Hills Pump Station	Reach EBX4B Cherry Valley Pump Station	Reach 28J Lake Perris[d]	Reach 29A Oso Pumping Plant	Reach 29G Warne Powerplant
	[16]	[17]	[18]	[19]	[20]	[21]	[22]	[23]
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	(3,024)	0	0	0	0	0	79,315	0
1973	(461,268)	0	0	0	0	0	122,787	0
1974	(546,156)	0	0	0	0	0	157,511	0
1975	(1,095,523)	0	0	0	0	0	314,636	0
1976	(1,566,056)	0	0	0	0	0	326,967	0
1977	(1,222,866)	0	0	0	0	0	75,335	0
1978	(3,085,094)	0	0	0	0	0	89,383	0
1979	(3,466,481)	0	0	0	0	0	102,584	0
1980	(3,318,152)	0	0	0	0	0	236,768	0
1981	(3,842,971)	0	0	0	0	0	444,280	0
1982	(2,736,072)	0	0	0	0	0	539,245	(783,626)
1983	(5,478,830)	0	0	0	0	0	214,069	(1,488,439)
1984	(7,350,989)	0	0	0	0	0	484,239	(4,088,209)
1985	(10,748,103)	0	0	0	0	0	874,069	(5,930,176)
1986	(11,484,996)	0	0	0	0	0	1,269,590	(5,579,301)
1987	(10,814,483)	0	0	0	0	53,242	1,323,472	(6,292,822)
1988	(14,495,967)	0	0	0	0	0	1,421,372	(6,994,588)
1989	(18,688,631)	0	0	0	0	0	2,046,005	(8,368,716)
1990	(20,911,839)	0	0	0	0	147,163	2,857,442	(11,011,193)
1991	(4,884,013)	0	0	0	0	0	535,456	(3,604,791)
1992	(9,513,281)	0	0	0	0	(61,233)	686,984	(5,272,726)
1993	(7,502,549)	0	0	0	0	0	51,327	(3,380,473)
1994	(11,815,745)	0	0	0	0	80,824	1,210,469	(5,835,219)
1995	(9,742,248)	0	0	0	0	0	151,109	(1,179,155)
1996	(12,358,465)	0	0	0	0	0	895,929	(4,248,531)
1997	(13,293,791)	0	0	0	0	111,776	897,657	(4,797,589)
1998	(10,108,555)	0	0	0	0	0	(27,767)	(746,113)
1999	(14,952,833)	0	0	0	0	(41,318)	680,911	(5,341,364)
2000	(25,522,757)	0	0	0	0	(110,900)	1,206,908	(9,464,490)
2001	(19,510,278)	0	0	0	0	0	6,074,627	(7,614,510)
2002	(24,676,763)	0	0	0	0	0	3,806,295	(10,286,903)
2003	(27,490,216)	0	0	0	0	1,149,466	4,337,249	(9,899,070)
2004	(31,246,167)	78,555	0	68,914	7,290	0	5,407,923	(11,835,098)
2005	(28,682,474)	69,542	0	48,909	2,544	5,151,512	3,422,443	(6,683,632)
2006	(34,389,659)	123,158	0	144,035	16,226	0	2,547,697	(6,870,988)
2007	(28,529,045)	248,626	0	256,313	11,163	589,895	6,194,316	(9,522,236)
2008	(16,403,544)	243,110	0	327,193	7,446	0	4,426,718	(7,184,125)
2009	(13,474,182)	360,373	0	391,267	7,529	418,666	4,329,801	(6,578,744)
2010	(24,427,811)	313,550	0	431,074	19,508	0	3,283,919	(5,697,650)
2011	(31,980,782)	372,514	0	500,595	33,173	0	3,283,485	(5,505,320)
2012	(23,571,258)	451,941	0	551,906	49,825	231,168	5,178,288	(8,230,796)
2013	(14,097,814)	487,316	0	570,219	41,037	0	6,307,681	(8,740,718)
2014	(3,836,008)	316,588	0	439,511	16,538	0	4,408,034	(4,122,547)
2015	(6,410,003)	343,151	0	458,322	15,059	766,123	6,819,003	(6,280,593)
2016	(21,855,057)	695,764	0	770,743	48,431	0	6,048,359	(6,658,921)
2017	(37,596,036)	368,581	1,044,647	1,228,044	85,618	7,899,346	5,145,837	(5,788,402)
2018	(20,488,496)	193,919	368,373	475,300	203,707	0	5,705,780	(5,910,313)
2019	**(27,150,003)**	**0**	**493,004**	**433,397**	**76,993**	**0**	**4,036,151**	**(4,843,780)**
2020	(27,229,123)	0	398,559	410,931	73,002	0	3,944,733	(4,851,864)
2021	(24,509,282)	0	531,845	467,541	83,059	0	5,645,110	(6,067,495)
2022	(24,273,530)	0	538,305	473,220	84,068	0	5,801,492	(6,165,053)
2023	(24,935,466)	0	543,878	478,119	84,938	0	5,865,501	(6,169,236)
2024	(24,659,693)	0	541,346	475,894	84,543	0	5,972,671	(6,313,045)
2025	(24,542,322)	0	542,824	477,193	84,774	0	5,862,875	(6,178,495)
2026	(24,795,356)	0	542,883	477,244	84,783	0	5,702,365	(6,007,682)
2027	(24,657,502)	0	543,078	477,417	84,813	0	6,014,660	(6,336,481)
2028	(24,841,874)	0	543,299	477,610	84,848	0	5,745,127	(6,049,121)
2029	(24,592,671)	0	543,142	477,473	84,823	0	5,966,161	(6,284,322)
2030	(24,670,955)	0	541,987	476,457	84,643	0	5,680,265	(5,994,201)
2031	(24,739,554)	0	542,438	476,854	84,713	0	6,910,964	(7,296,277)
2032	(24,127,573)	0	542,940	477,295	84,792	0	5,349,812	(5,634,291)
2033	(25,405,603)	0	543,080	477,418	84,814	0	6,737,992	(7,103,901)
2034	(24,046,699)	0	542,590	476,987	84,737	0	5,349,164	(5,636,529)
2035	(25,663,482)	0	542,816	477,186	84,772	0	10,629,349	(11,258,217)
TOTAL	**(1,074,518,019)**	**4,666,686**	**10,431,034**	**14,650,580**	**1,984,209**	**16,385,731**	**207,209,900**	**(336,008,077)**

[a] Excludes extra peaking costs assigned directly to contractors. Refer to Appendix B text discussion of Table B-17 under "Project Water Charges."

[d] 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[a] (in dollars)

Sheet 4 of 4

Calendar Year	CALIFORNIA AQUEDUCT (continued) Reach 29H Pyramid Lake[d]	Reach 29J Castaic Powerplant	Reach 30 Castaic Lake[d]	Reach 31A Las Perillas and Badger Hill Pumping Plants	Reach 33A Devil's Den, Bluestone, and Polonio Pass Pumping Plants	Total	Grand Total
	[24]	[25]	[26]	[27]	[28]	[29]	[30]
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	164,612	235,962	(3,259,953)	(2,766,520)
2000	0	(17,958,033)	0	229,350	378,042	(8,198,096)	(7,179,264)
2001	988,149	(13,495,346)	2,379,745	1,070,732	2,140,040	202,926,420	207,765,070
2002	0	(18,455,025)	0	544,053	1,351,160	86,147,416	88,828,837
2003	833,202	(16,903,355)	963,704	636,922	1,525,171	126,441,150	129,407,241
2004	222,007	(21,110,644)	685,188	672,547	1,778,968	141,056,166	144,109,359
2005	4,755,989	(12,763,664)	4,548,906	846,063	1,714,250	162,934,283	166,351,708
2006	529,634	(11,822,176)	6,080,660	851,002	1,427,165	128,792,960	132,064,462
2007	0	(19,017,327)	0	1,306,516	2,313,454	196,611,274	201,791,070
2008	0	(14,961,833)	1,324,015	1,129,223	1,735,661	124,891,191	129,151,910
2009	408,125	(15,570,055)	0	695,228	1,211,003	90,190,277	93,163,126
2010	0	(10,738,810)	0	902,260	1,484,505	137,078,369	140,041,473
2011	0	(11,102,175)	1,993,071	1,112,193	2,128,379	196,380,259	200,405,845
2012	186,637	(15,133,885)	0	1,006,881	2,018,726	176,215,442	180,334,132
2013	77,125	(15,520,329)	462,378	1,361,261	2,053,312	162,508,790	168,924,236
2014	0	(7,773,330)	2,173,471	1,561,991	2,108,704	100,770,151	105,874,169
2015	197,775	(11,048,588)	4,978,960	1,588,270	1,929,398	155,261,236	162,017,031
2016	422,634	(11,849,796)	10,668,258	1,511,695	3,006,062	235,529,347	240,559,541
2017	0	(10,665,326)	0	1,593,867	2,540,285	322,848,186	327,084,327
2018	0	(9,845,372)	0	1,032,834	3,238,367	242,149,638	250,067,871
2019	**0**	**(8,008,100)**	**0**	**1,244,510**	**3,605,756**	**255,826,624**	**262,780,413**
2020	0	(8,027,118)	0	1,204,084	3,487,152	246,260,446	253,212,082
2021	0	(9,553,059)	0	765,784	5,046,113	285,178,533	292,363,441
2022	0	(9,706,326)	0	775,768	5,113,520	287,710,777	294,992,107
2023	0	(9,713,088)	0	783,799	5,166,455	277,438,326	284,795,032
2024	0	(9,944,394)	0	780,150	5,142,406	292,088,490	299,410,952
2025	0	(9,728,057)	0	782,281	5,156,451	293,656,861	300,999,323
2026	0	(9,452,102)	0	782,365	5,157,003	278,110,848	285,454,096
2027	0	(9,983,653)	0	782,647	5,158,863	288,192,935	295,538,830
2028	0	(9,517,749)	0	782,965	5,160,957	278,816,573	286,165,452
2029	0	(9,899,229)	0	782,739	5,159,470	283,687,606	291,034,365
2030	0	(9,430,341)	0	781,075	5,148,500	286,401,024	293,732,165
2031	0	(11,544,020)	0	781,724	5,152,783	312,021,882	319,359,119
2032	0	(8,849,128)	0	782,447	5,157,548	269,588,943	276,932,967
2033	0	(11,230,223)	0	782,650	5,158,878	305,522,823	312,868,742
2034	0	(8,853,900)	0	781,944	5,154,226	273,528,726	280,868,018
2035	0	(18,125,773)	0	782,269	5,156,373	345,731,627	353,073,977
TOTAL	**8,205,443**	**(628,547,863)**	**30,224,785**	**38,855,669**	**120,716,984**	**7,973,496,793**	**8,196,919,798**

[a] Excludes extra peaking costs assigned directly to contractors. Refer to Appendix B text discussion of Table B-17 under "Project Water Charges."

[d] 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[a,f]	Total
				Application of Oroville Power Revenues to:			
	Capital Costs[a]	Capital Cost Credits[b]	Operating Costs[c]	Capital Costs[d]	Operating Costs[e]		
	[1]	[2]	[3]	[4]	[5]	[6]	[7]
1952	171,322	0	0	0	0	0	171,322
1953	312,190	0	0	0	0	0	312,190
1954	308,624	0	0	0	0	0	308,624
1955	194,645	0	0	0	0	0	194,645
1956	1,357,077	0	0	0	0	0	1,357,077
1957	6,210,709	0	0	0	0	0	6,210,709
1958	9,510,916	0	0	0	0	0	9,510,916
1959	11,390,586	0	0	0	0	0	11,390,586
1960	14,463,274	(4,850,000)	0	0	0	0	9,613,274
1961	18,729,965	(431,527)	0	0	0	0	18,298,438
1962	9,099,967	(479,280)	0	0	0	0	8,620,687
1963	73,098,107	(478,743)	(14,000)	0	0	0	72,605,364
1964	62,629,003	(751,330)	(14,000)	0	0	107,780	61,971,453
1965	71,048,877	(763,541)	(14,000)	0	0	551,850	70,823,186
1966	125,376,541	(748,649)	(14,000)	0	0	1,081,023	125,694,915
1967	94,481,603	(812,145)	(13,446)	0	0	1,189,212	94,845,224
1968	39,986,145	(431,574)	1,303,821	(951,000)	0	793,399	40,700,791
1969	5,367,865	(259,015)	2,890,772	(11,007,000)	0	601,867	(2,405,511)
1970	4,208,411	(203,733)	4,818,634	(14,650,000)	(1,500,000)	516,659	(6,810,029)
1971	3,956,703	(193,631)	6,026,480	(14,650,000)	(1,500,000)	408,754	(5,951,694)
1972	4,662,255	(196,361)	5,393,011	(14,650,000)	(1,500,000)	287,374	(6,003,721)
1973	4,090,078	(136,997)	6,135,774	(14,650,000)	(1,500,000)	203,384	(5,857,761)
1974	6,852,718	(137,503)	6,944,723	(17,950,000)	(1,500,000)	201,907	(5,588,155)
1975	8,343,833	(234,567)	7,697,390	(14,650,000)	(1,500,000)	146,188	(197,156)
1976	6,189,618	(204,944)	7,067,037	(14,650,000)	(1,500,000)	205,234	(2,893,055)
1977	21,554,452	(150,214)	10,547,977	(14,650,000)	(1,500,000)	857,419	16,659,634
1978	8,031,393	(64,566)	12,851,158	(14,650,000)	(1,500,000)	2,131,286	6,799,271
1979	9,751,861	0	9,547,014	(14,650,000)	(1,500,000)	2,131,884	5,280,759
1980	11,345,574	0	13,258,298	(14,650,000)	(1,500,000)	3,638,851	12,092,723
1981	11,921,267	0	10,326,538	(14,650,000)	(1,500,000)	4,597,474	10,695,279
1982	17,479,059	0	16,154,872	(14,650,000)	(1,500,000)	4,594,682	22,078,613
1983	12,763,378	0	22,251,331	(34,705,000)	(8,735,000)	3,751,993	(4,673,298)
1984	9,367,268	0	22,700,224	(14,650,000)	(10,348,000)	2,979,126	10,048,618
1985	12,538,173	0	23,462,283	(14,650,000)	(8,198,000)	2,069,024	15,221,480
1986	21,586,488	0	26,479,379	(14,650,000)	(9,107,000)	1,602,419	25,911,286
1987	32,734,633	0	23,479,839	(14,650,000)	(9,451,000)	1,762,179	33,875,651
1988	33,028,679	0	25,832,491	(14,650,000)	(8,677,000)	1,808,899	37,343,069
1989	11,075,132	0	28,442,946	(14,650,000)	(8,102,000)	2,678,007	19,444,085
1990	28,764,328	0	37,430,776	(14,650,000)	(8,498,000)	1,436,712	44,483,816
1991	37,462,303	0	76,586,450	(14,650,000)	(9,487,000)	1,727,664	91,639,417
1992	29,169,134	0	32,280,229	(14,650,000)	(8,526,000)	1,707,822	39,981,185
1993	22,366,873	0	36,884,103	(14,650,000)	(8,768,000)	1,708,490	37,541,465
1994	14,709,626	0	41,193,693	(14,650,000)	(7,484,000)	2,134,392	35,903,711
1995	15,120,856	0	46,162,374	(14,650,000)	(4,976,939)	2,042,481	43,698,773
1996	11,009,355	0	50,885,567	(14,650,000)	(5,503,289)	2,448,692	44,190,325
1997	15,287,610	0	51,788,497	(14,650,000)	(5,740,515)	1,699,730	48,385,322
1998	3,873,303	0	54,726,293	(14,650,000)	(8,155,000)	1,193,198	36,987,794
1999	7,774,924	0	56,095,722	(14,650,000)	(9,198,000)	9,686	40,032,332
2000	10,856,245	0	56,042,129	(14,688,338)	(10,297,482)	13,491	41,926,045
2001	10,957,200	0	75,778,041	(16,223,803)	(14,328,482)	23,866	56,206,821
2002	20,398,833	0	67,977,990	(19,498,891)	(20,826,560)	24,426	48,075,797
2003	23,667,699	0	77,724,424	(20,605,664)	(29,982,088)	9,833	50,814,204
2004	21,661,748	0	91,159,331	(17,530,688)	(35,845,422)	7,548	59,452,517
2005	6,620,119	0	104,208,826	(15,354,462)	(22,004,805)	0	73,469,678
2006	11,457,149	0	102,710,667	(15,210,585)	(21,412,577)	0	77,544,654
2007	8,701,187	0	87,284,908	(14,734,855)	(17,033,961)	0	64,217,279
2008	7,374,885	0	104,568,566	(14,968,129)	(19,570,602)	0	77,404,720
2009	7,616,085	0	114,584,614	(15,959,419)	(20,921,647)	0	85,319,632
2010	8,255,279	0	123,285,803	(15,958,194)	(20,222,025)	0	95,360,863
2011	13,244,699	0	127,415,892	(15,958,715)	(19,207,013)	0	105,494,863
2012	28,044,068	0	126,912,660	(16,032,565)	(22,105,563)	0	116,818,600
2013	101,202,581	0	136,064,841	(16,034,532)	(20,672,157)	0	200,560,733
2014	83,040,032	0	148,137,564	(15,841,275)	(18,597,043)	0	196,739,278
2015	41,610,622	0	151,029,059	(20,657,953)	(17,587,782)	0	154,393,946
2016	85,053,952	0	192,778,939	(20,646,145)	(16,898,173)	0	240,288,573
2017	136,147,591	0	155,777,569	(21,005,256)	(19,503,596)	0	251,416,308
2018	172,371,573	0	204,631,273	(23,621,266)	(24,680,238)	0	328,701,342
2019	**165,442,571**	**0**	**194,951,427**	**(30,131,957)**	**(25,524,823)**	**0**	**304,737,218**
2020	152,477,454	0	198,178,210	(36,623,319)	(25,799,153)	0	288,233,193
2021	88,793,832	0	206,499,022	(38,519,769)	(26,328,355)	0	230,444,730
2022	419,425	0	190,049,006	(41,966,076)	(26,584,236)	0	121,918,120
2023	419,425	0	189,317,067	(44,597,237)	(26,842,676)	0	118,296,580
2024	419,425	0	208,024,721	(44,267,199)	(27,103,700)	0	137,073,247
2025	419,425	0	194,331,941	(44,503,810)	(27,367,334)	0	122,880,222
2026	419,425	0	198,908,180	(44,332,386)	(27,633,605)	0	127,361,614
2027	419,425	0	197,116,356	(44,325,677)	(27,902,538)	0	125,307,566
2028	419,425	0	200,307,898	(44,337,995)	(28,174,161)	0	128,215,167
2029	419,425	0	203,276,743	(44,212,103)	(28,448,500)	0	131,035,565
2030	419,425	0	213,330,796	(50,838,808)	(28,725,582)	0	134,185,831
2031	419,425	0	210,283,869	(50,833,954)	(29,005,435)	0	130,863,906
2032	419,425	0	208,333,219	(51,005,194)	(29,288,087)	0	128,459,363
2033	419,425	0	209,478,964	(50,983,016)	(29,573,565)	0	129,341,809
2034	419,425	0	217,394,043	(50,975,614)	(29,861,898)	0	136,975,956
2035	419,425	0	217,216,809	(50,952,271)	(30,153,114)	0	136,530,849
TOTAL	**2,191,624,053**	**(11,528,320)**	**6,482,647,616**	**(1,568,750,121)**	**(1,024,468,718)**	**57,085,905**	**6,126,610,416**

[a] Reimbursed through the capital cost component of the Delta Water Charge.
[b] Negotiated settlements as to the magnitude of SWP planning costs from 1952 through 1978.
[c] Reimbursed through the minimum OMP&R component of the Delta Water Charge. Credits for Gianelli Pumping-Generating Plant power generation are reflected in these net costs.
[d] Revenues credited through the capital cost component of the Delta Water Charge.
[e] Revenues credited through the minimum OMP&R component of the Delta Water Charge.
[f] 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)

Calendar Year	NORTH BAY AREA			SOUTH BAY AREA				CENTRAL COASTAL AREA		
	Napa	Solano[a]	Total	Alameda-Zone 7	Alameda County	Santa Clara	Total	San Luis Obispo	Santa Barbara	Total
	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]
1952	0	0	0	83	114	410	608	122	224	346
1953	0	0	0	323	479	1,808	2,610	336	620	956
1954	0	0	0	819	1,306	5,150	7,275	421	777	1,199
1955	0	0	0	977	1,570	6,297	8,844	211	390	601
1956	0	0	0	8,844	14,459	63,816	87,120	227	418	645
1957	15,199	11,436	26,634	21,564	35,240	649,596	706,401	291	536	827
1958	33,420	16,591	50,011	67,764	71,717	733,414	872,896	720	1,328	2,048
1959	20,697	6,591	27,288	154,255	143,730	493,050	791,035	10,636	69,139	79,775
1960	9,097	8,830	17,927	296,492	275,610	1,018,661	1,590,763	15,255	99,794	115,048
1961	6,950	7,445	14,395	853,506	802,675	1,914,709	3,570,890	10,163	36,681	46,843
1962	(194)	(926)	(1,120)	545,123	615,141	1,686,041	2,846,306	17,281	39,570	56,851
1963	1,319	1,111	2,430	657,426	1,281,271	3,243,838	5,182,534	68,821	140,841	209,662
1964	38,393	35,466	73,859	712,650	1,747,783	7,251,800	9,712,233	138,614	282,003	420,617
1965	198,833	62,221	261,054	360,779	606,025	3,414,457	4,381,262	250,706	497,152	747,859
1966	461,619	49,917	511,536	592,714	592,598	2,245,215	3,430,528	587,951	1,117,486	1,705,437
1967	1,569,498	40,379	1,609,877	796,995	803,951	2,401,862	4,002,808	936,412	1,762,694	2,699,106
1968	859,613	61,691	921,304	736,470	696,075	1,997,924	3,430,469	351,131	675,220	1,026,351
1969	74,388	59,318	133,706	269,698	293,275	764,950	1,327,923	76,966	164,583	241,550
1970	43,361	67,877	111,238	58,676	61,200	135,569	255,445	47,891	109,224	157,115
1971	26,763	34,052	60,815	12,086	18,227	84,089	114,402	28,638	80,715	109,353
1972	19,643	18,905	38,548	12,293	12,763	63,610	88,666	19,289	50,230	69,519
1973	56,510	30,874	87,384	10,494	12,136	39,380	62,010	23,010	56,178	79,189
1974	165,830	65,832	231,662	15,722	24,402	73,119	113,243	25,037	61,383	86,420
1975	91,824	89,234	181,058	16,730	15,806	41,394	73,930	14,740	61,416	76,156
1976	57,765	83,651	141,416	34,004	34,663	109,610	178,277	33,638	130,440	164,078
1977	64,167	80,147	144,314	46,229	45,115	133,375	224,720	108,324	264,720	373,044
1978	69,319	81,717	151,036	71,234	66,008	174,898	312,140	21,415	103,822	125,237
1979	191,273	282,907	474,180	45,468	42,943	110,665	199,077	22,941	125,669	148,610
1980	264,433	386,006	650,439	134,522	124,352	304,614	563,488	103,258	462,895	566,153
1981	227,606	383,086	610,692	(33,738)	(29,856)	(65,637)	(129,231)	(15,416)	(135,240)	(150,656)
1982	549,164	870,611	1,419,775	7,876	8,321	27,065	43,262	4,102	(58,882)	(54,780)
1983	1,254,900	1,433,061	2,687,961	138,413	131,515	339,246	609,175	32,196	110,287	142,483
1984	2,547,878	2,750,040	5,297,918	152,992	140,971	351,921	645,884	35,448	107,723	143,171
1985	7,143,123	6,443,613	13,586,736	19,776	19,245	53,491	92,512	17,424	78,896	96,319
1986	10,565,937	16,926,630	27,492,567	32,034	31,581	88,070	151,684	44,135	306,452	350,588
1987	7,979,832	12,599,507	20,579,339	50,153	48,675	138,959	237,787	126,995	1,342,116	1,469,110
1988	2,312,909	4,343,513	6,656,422	116,181	112,294	302,461	530,935	156,473	1,479,545	1,636,018
1989	1,224,538	1,553,352	2,777,890	108,320	102,804	260,092	471,217	152,173	1,210,940	1,363,112
1990	443,002	824,055	1,267,057	224,283	224,188	625,213	1,073,684	222,208	1,559,457	1,781,665
1991	99,848	89,269	189,117	413,426	383,368	946,246	1,743,040	298,398	2,184,088	2,482,487
1992	57,045	62,083	119,128	182,231	169,968	442,055	794,255	361,210	3,504,755	3,865,965
1993	122,423	128,634	251,057	129,344	125,312	342,416	597,071	1,170,649	11,997,953	13,168,602
1994	71,274	83,270	154,544	46,042	58,050	229,649	333,741	4,260,734	46,401,596	50,662,331
1995	30,605	29,271	59,876	97,808	97,063	257,484	452,355	12,268,787	155,255,850	167,524,637
1996	20,275	19,069	39,344	49,854	48,056	127,493	225,403	11,284,548	145,409,410	156,693,959
1997	20,039	107,784	127,823	82,598	78,996	209,517	371,111	3,184,506	38,158,718	41,343,224
1998	17,423	21,572	38,995	27,302	24,121	63,057	114,480	883,110	10,563,359	11,446,469
1999	67,602	106,355	173,957	74,165	73,552	208,296	356,013	928,738	9,596,058	10,524,796
2000	16,252	37,932	54,185	27,445	28,844	80,346	136,635	488,160	5,529,102	6,017,261
2001	6,598	13,750	20,347	140,394	270,055	1,856,845	2,267,294	72,358	539,206	611,564
2002	19,917	45,940	65,857	809,721	1,193,494	5,886,086	7,889,301	69,122	387,295	456,418
2003	54,235	20,712	74,947	1,157,357	1,331,716	4,620,228	7,109,301	19,610	118,117	137,728
2004	153,240	20,534	173,774	360,395	346,065	4,106,509	4,812,969	12,286	52,406	64,692
2005	60,543	62,997	123,541	358,153	339,995	1,541,971	2,240,119	(1,979)	(161,490)	(163,469)
2006	887,892	20,086	907,978	349,395	329,656	801,023	1,480,075	8,438	65,059	73,497
2007	3,237,236	43,135	3,280,372	793,095	732,240	1,756,072	3,281,407	16,262	84,170	100,432
2008	7,903,036	61,877	7,964,914	1,466,734	1,352,530	3,236,019	6,055,283	28,452	99,415	127,867
2009	1,196,389	18,516	1,214,905	2,984,936	2,797,462	6,670,882	12,453,281	8,700	49,599	58,300
2010	396,691	3,243	399,934	3,858,678	3,511,644	8,785,770	16,156,093	75,709	136,242	211,951
2011	192,850	40,149	232,999	4,038,267	3,836,600	9,247,564	17,122,431	109,860	232,486	342,346
2012	485,208	426,760	911,967	2,717,470	2,649,415	6,713,706	12,080,591	76,346	336,174	412,520
2013	652,391	679,649	1,332,041	1,160,446	1,251,281	3,887,891	6,299,619	259,660	1,274,653	1,534,313
2014	587,364	658,937	1,246,300	(252,836)	(174,519)	(198,598)	(625,953)	334,653	1,564,639	1,899,292
2015	187,630	266,930	454,560	549,919	547,698	1,373,792	2,471,409	252,257	1,364,376	1,616,633
2016	88,532	162,844	251,375	175,579	175,128	433,685	784,392	266,572	1,148,758	1,415,330
2017	26,910	98,207	125,117	146,187	144,347	446,786	737,320	261,474	995,300	1,256,774
2018	124,369	296,308	420,677	157,805	146,899	398,295	702,998	309,688	831,673	1,141,361
2019	**120,071**	**242,549**	**362,620**	**1,009,776**	**925,277**	**4,343,310**	**6,278,364**	**440,467**	**1,283,664**	**1,724,131**
2020	187,311	433,395	620,706	211,357	206,010	5,599,370	6,016,737	653,178	1,926,322	2,579,500
2021	29,890	55,991	85,881	155,021	143,773	13,787,506	14,086,300	588,399	2,698,210	3,286,608
2022	0	0	0	0	0	0	0	0	0	0
2023	0	0	0	0	0	0	0	0	0	0
2024	0	0	0	0	0	0	0	0	0	0
2025	0	0	0	0	0	0	0	0	0	0
2026	0	0	0	0	0	0	0	0	0	0
2027	0	0	0	0	0	0	0	0	0	0
2028	0	0	0	0	0	0	0	0	0	0
2029	0	0	0	0	0	0	0	0	0	0
2030	0	0	0	0	0	0	0	0	0	0
2031	0	0	0	0	0	0	0	0	0	0
2032	0	0	0	0	0	0	0	0	0	0
2033	0	0	0	0	0	0	0	0	0	0
2034	0	0	0	0	0	0	0	0	0	0
2035	0	0	0	0	0	0	0	0	0	0
TOTAL	**55,709,695**	**54,066,489**	**109,776,185**	**30,828,298**	**32,374,469**	**119,485,476**	**182,688,243**	**42,680,533**	**456,024,605**	**498,705,138**

Note: Allocated capital costs as a result of permanent water transfers under the Monterey Amendment are not reflected in this table.

[a] 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)

	SAN JOAQUIN VALLEY AREA									
				Kern						
Calendar Year	Dudley Ridge	Empire[b]	Future Contractor San Joaquin Valley	Municipal and Industrial	Municipal and Industrial[c]	Agricultural	Kings	Oak Flat	Tulare	Total
	[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	93,258	4,801	18,852	163,537	25,021	1,835,443	4,909	1,470	190,549	2,337,839
2003	19,993	1,020	5,083	37,987	5,481	435,030	1,038	422	40,670	546,724
2004	18,558	958	4,113	34,437	4,911	374,948	980	1,518	37,972	478,394
2005	56,091	2,902	9,832	96,815	14,744	1,025,877	2,964	561	114,896	1,324,682
2006	10,670	551	1,947	30,110	2,812	197,248	564	732	21,841	266,475
2007	15,261	772	4,166	36,509	4,188	324,461	789	921	30,898	417,965
2008	62,504	3,233	11,391	104,213	16,434	1,151,588	3,304	2,079	128,030	1,482,775
2009	15,005	764	3,218	48,244	4,067	302,002	782	996	30,490	405,567
2010	27,175	1,409	36,027	67,589	7,106	847,559	1,442	317	55,738	1,044,363
2011	36,668	1,898	50,584	71,528	9,661	1,181,522	1,941	1,449	75,133	1,430,383
2012	42,554	2,101	23,353	90,014	11,882	1,139,946	2,149	3,019	85,122	1,400,140
2013	187,114	9,352	70,303	385,659	53,496	4,595,517	9,566	13,022	376,622	5,700,651
2014	197,108	10,063	95,832	366,806	53,569	4,667,168	10,296	15,319	401,027	5,817,187
2015	125,247	6,369	59,689	255,917	34,316	3,042,780	6,515	11,412	254,317	3,796,562
2016	157,523	8,002	82,973	512,231	42,771	6,272,486	8,183	6,108	319,678	7,409,955
2017	238,466	12,287	90,278	427,658	63,575	5,282,650	12,564	13,171	487,483	6,628,133
2018	355,438	18,131	130,350	742,312	103,045	8,802,282	18,541	15,808	722,862	10,908,768
2019	**369,097**	**18,945**	**178,570**	**765,854**	**107,627**	**9,363,055**	**19,376**	**19,847**	**753,030**	**11,595,402**
2020	560,855	27,298	263,264	1,397,668	169,380	15,832,026	27,917	16,183	1,113,942	19,408,532
2021	178,696	8,256	171,934	781,849	66,019	9,469,488	8,444	9,398	345,922	11,040,006
2022	0	0	0	0	0	0	0	0	0	0
2023	0	0	0	0	0	0	0	0	0	0
2024	0	0	0	0	0	0	0	0	0	0
2025	0	0	0	0	0	0	0	0	0	0
2026	0	0	0	0	0	0	0	0	0	0
2027	0	0	0	0	0	0	0	0	0	0
2028	0	0	0	0	0	0	0	0	0	0
2029	0	0	0	0	0	0	0	0	0	0
2030	0	0	0	0	0	0	0	0	0	0
2031	0	0	0	0	0	0	0	0	0	0
2032	0	0	0	0	0	0	0	0	0	0
2033	0	0	0	0	0	0	0	0	0	0
2034	0	0	0	0	0	0	0	0	0	0
2035	0	0	0	0	0	0	0	0	0	0
TOTAL	**8,377,147**	**84,882**	**3,178,605**	**19,401,292**	**2,451,015**	**220,534,308**	**427,549**	**392,306**	**16,848,301**	**271,695,405**

[b] 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.

[c] Costs related to maximum annual Table A of 15,000 acre-feet under Amendment 18 of the water supply contract with Kern County Water Agency.

TABLE B-14 Capital Costs of Transportation Facilities Allocated to Each Contractor (in dollars)

Sheet 3 of 4

Calendar Year	SOUTHERN CALIFORNIA AREA									
	AVEK	Castaic Lake[d]	Coachella	Crestline	Desert	Littlerock	Mojave	Palmdale	San Bernardino	San Gabriel
	[21]	[22]	[23]	[24]	[25]	[26]	[27]	[28]	[29]	[30]
1952	3,158	1,042	850	254	1,402	70	1,695	418	6,079	1,550
1953	10,026	3,327	2,668	799	4,401	222	5,318	1,328	19,058	4,852
1954	12,742	4,193	3,465	1,031	5,714	285	6,908	1,691	24,608	6,290
1955	5,411	1,881	1,374	401	2,267	115	2,756	715	9,229	2,377
1956	9,775	3,590	2,196	612	3,622	191	4,449	1,267	13,138	3,438
1957	26,306	9,255	6,343	1,816	10,461	540	12,767	3,450	40,646	10,534
1958	49,204	17,599	11,581	3,290	19,099	991	23,360	6,414	72,708	18,898
1959	70,247	29,740	15,869	4,616	26,171	1,347	31,759	9,030	98,596	25,519
1960	84,552	38,760	22,068	6,797	36,395	1,547	43,260	10,772	147,170	37,469
1961	126,542	54,262	34,613	12,530	57,086	2,245	63,709	16,437	236,164	57,707
1962	198,558	85,352	43,719	13,861	72,102	3,344	84,709	24,943	253,435	64,330
1963	580,138	255,252	116,797	33,149	192,624	9,828	234,926	73,256	610,277	160,624
1964	1,094,365	501,858	209,462	55,445	345,446	18,442	429,605	137,769	1,026,066	276,118
1965	1,908,076	947,523	385,533	103,757	635,825	32,819	786,986	244,587	1,913,090	512,862
1966	3,960,302	2,150,972	812,655	215,858	1,340,235	69,325	1,664,584	517,269	3,943,586	1,062,417
1967	4,976,538	4,100,531	1,077,422	296,069	1,776,892	88,301	2,182,240	653,250	5,821,681	1,550,239
1968	5,924,474	3,998,942	1,350,742	368,156	2,227,646	107,350	2,738,009	783,940	7,982,824	2,122,940
1969	5,822,708	3,079,426	1,690,259	539,851	2,787,631	121,303	3,256,507	865,455	10,898,185	2,769,647
1970	5,032,959	3,277,778	2,050,788	695,345	3,382,251	106,381	3,872,367	736,775	13,795,809	3,457,109
1971	2,577,507	2,146,954	1,071,523	338,581	1,767,179	48,337	2,087,223	347,057	8,137,053	1,987,120
1972	973,436	283,257	331,759	92,079	547,138	19,134	668,550	134,360	2,691,137	697,957
1973	354,407	914,303	158,579	82,223	261,557	6,304	238,094	46,102	1,760,570	403,582
1974	451,450	280,861	259,175	74,113	427,433	8,143	518,453	59,145	1,617,394	425,927
1975	253,438	246,492	193,632	52,821	319,337	4,954	392,110	33,995	1,533,664	407,913
1976	237,539	255,238	136,751	37,235	225,529	4,245	277,807	31,002	962,280	255,901
1977	199,554	371,469	91,384	25,858	150,711	3,757	183,609	26,834	591,445	155,537
1978	302,111	470,176	78,573	22,226	129,584	5,233	157,815	38,654	428,989	111,769
1979	357,678	938,985	81,807	21,795	134,915	5,965	166,931	44,410	403,569	108,408
1980	1,867,517	1,777,294	423,755	113,166	698,855	32,435	864,104	240,899	2,040,757	548,085
1981	(158,728)	610,795	(47,102)	(8,865)	(77,678)	(2,576)	(102,568)	(19,588)	(143,875)	(43,557)
1982	1,557,934	861,928	298,770	78,903	492,728	26,237	613,587	196,672	1,421,407	388,261
1983	2,062,512	521,349	396,033	115,678	653,134	34,699	803,945	259,939	2,126,313	581,672
1984	1,518,361	295,783	297,559	85,097	490,731	27,272	606,124	188,562	1,546,628	423,408
1985	896,226	158,810	217,115	62,532	358,064	13,104	441,299	107,533	1,116,949	305,291
1986	841,555	104,860	221,194	58,152	364,790	9,038	454,702	93,309	1,048,625	286,302
1987	333,052	105,625	166,099	43,992	273,928	5,566	340,485	40,716	783,725	213,202
1988	259,234	174,155	65,831	22,723	108,570	3,384	128,339	26,743	429,498	113,644
1989	1,045,999	434,394	323,138	97,036	532,920	16,777	649,616	125,344	1,375,722	372,048
1990	678,053	374,313	332,566	97,789	548,468	7,335	672,344	67,179	1,509,745	409,710
1991	831,687	401,961	367,196	120,925	605,579	11,966	733,443	92,625	1,979,364	540,210
1992	633,272	356,952	270,826	131,328	446,647	9,556	501,634	76,760	2,093,387	573,386
1993	634,283	332,089	222,347	171,095	366,700	10,194	353,470	73,955	3,848,084	1,046,752
1994	467,409	165,607	132,599	93,839	218,685	7,255	218,494	53,209	2,347,599	637,733
1995	459,990	293,308	132,690	78,390	218,835	7,436	232,377	54,544	1,960,100	530,656
1996	299,764	206,742	110,520	44,965	182,270	4,885	211,872	35,808	4,024,655	972,829
1997	438,898	249,699	103,382	24,640	170,497	7,397	214,534	54,452	2,892,626	397,103
1998	234,379	202,650	62,492	41,136	103,063	3,989	106,009	29,551	3,683,353	303,255
1999	268,224	175,939	89,312	40,069	147,294	4,812	167,592	35,399	4,662,112	235,054
2000	139,035	77,889	54,795	23,903	90,369	2,665	103,194	19,150	10,482,917	171,107
2001	130,754	44,790	50,816	15,641	83,805	2,989	102,254	20,949	18,225,132	96,254
2002	199,807	121,849	40,293	12,884	66,452	3,001	80,478	22,664	9,283,598	133,675
2003	76,592	42,072	24,945	7,688	41,140	1,245	50,028	9,409	4,032,931	54,302
2004	81,688	46,992	23,476	6,416	38,716	1,445	48,028	10,585	2,099,566	42,507
2005	232,323	126,137	47,108	14,116	77,691	4,011	93,862	29,628	989,790	71,539
2006	334,422	246,722	68,325	25,180	112,684	5,626	126,956	42,114	2,017,180	113,701
2007	258,891	182,329	57,769	22,068	95,272	4,567	111,771	33,367	2,134,671	108,623
2008	159,067	175,464	70,874	60,890	116,900	2,792	83,144	20,471	3,374,236	263,890
2009	577,477	339,521	153,560	60,337	253,262	9,826	275,417	73,122	4,779,860	271,508
2010	644,764	340,756	193,723	62,817	319,495	10,809	371,033	81,051	5,464,064	285,792
2011	341,088	219,260	230,769	59,398	380,581	5,742	474,797	42,964	7,766,777	287,921
2012	257,613	144,365	343,375	87,824	566,289	5,062	708,509	35,082	12,009,741	445,112
2013	789,946	377,704	348,815	91,411	575,262	15,285	718,195	106,713	34,509,949	488,498
2014	875,295	463,423	248,206	64,409	409,340	15,980	512,246	114,774	30,956,905	409,695
2015	1,060,376	530,808	271,969	69,820	448,527	20,067	561,547	148,294	17,643,119	387,061
2016	1,347,481	699,779	273,837	70,586	451,610	23,485	566,177	175,530	19,800,860	382,436
2017	786,433	520,659	167,792	40,709	276,722	13,486	349,589	99,903	6,651,575	192,085
2018	1,513,741	977,704	350,818	111,560	578,578	27,143	688,349	196,855	5,900,272	660,908
2019	**1,579,958**	**1,321,726**	**477,085**	**171,001**	**786,832**	**28,600**	**896,269**	**206,517**	**4,726,391**	**939,673**
2020	2,759,687	1,821,825	611,120	165,812	1,007,856	46,346	1,256,005	347,493	3,726,060	897,138
2021	3,124,842	3,443,362	628,699	166,351	1,036,846	52,474	1,293,870	393,531	3,521,269	920,755
2022	0	0	0	0	0	0	0	0	0	0
2023	0	0	0	0	0	0	0	0	0	0
2024	0	0	0	0	0	0	0	0	0	0
2025	0	0	0	0	0	0	0	0	0	0
2026	0	0	0	0	0	0	0	0	0	0
2027	0	0	0	0	0	0	0	0	0	0
2028	0	0	0	0	0	0	0	0	0	0
2029	0	0	0	0	0	0	0	0	0	0
2030	0	0	0	0	0	0	0	0	0	0
2031	0	0	0	0	0	0	0	0	0	0
2032	0	0	0	0	0	0	0	0	0	0
2033	0	0	0	0	0	0	0	0	0	0
2034	0	0	0	0	0	0	0	0	0	0
2035	0	0	0	0	0	0	0	0	0	0
TOTAL	**68,044,102**	**44,538,407**	**19,166,077**	**6,023,981**	**31,608,959**	**1,214,125**	**37,819,625**	**8,914,103**	**315,882,084**	**33,158,259**

[d] Costs from Table B-10 allocated to Castaic Lake Water Agency are reduced herein by $14,088 in1978 in accordance with a letter of agreement with the agency.

TABLE B-14 Capital Costs of Transportation Facilities Allocated to Each Contractor (in dollars)

Calendar Year	SOUTHERN CALIFORNIA AREA (continued)				FEATHER RIVER AREA					
	San Gorgonio	Metropolitan[e]	Ventura	Total	Yuba City	Butte	Plumas	Total	South Bay Area Future Contractor	Grand 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	4,622,213	9,063,618	54,504	19,566,143	0	0	2	2	34,616	32,822,429
2000	11,737,688	5,393,221	24,010	28,319,941	0	0	24	24	16,912	35,219,423
2001	21,171,124	2,988,800	13,047	42,946,356	0	0	20	20	68,013	46,451,811
2002	10,459,310	5,787,234	39,607	26,250,853	0	0	14	14	382,151	37,382,432
2003	4,493,890	5,783,732	13,689	14,631,665	0	0	0	0	590,294	23,090,658
2004	2,216,475	4,555,521	15,942	9,187,357	0	0	0	0	156,414	14,873,600
2005	770,161	7,322,277	42,941	9,821,584	0	0	0	0	123,949	13,470,406
2006	1,780,989	13,867,322	90,203	18,831,425	0	0	5	5	120,330	21,679,785
2007	2,115,573	11,723,751	65,425	16,914,077	0	0	0	0	266,740	24,260,993
2008	2,811,765	11,885,796	60,480	19,085,769	0	0	4	4	493,279	35,209,891
2009	4,253,220	22,108,510	122,280	33,277,900	0	0	6	6	1,018,818	48,428,777
2010	5,295,499	18,059,829	107,451	31,237,085	0	0	(2)	(2)	6,354,636	55,404,059
2011	8,034,505	12,727,507	55,576	30,626,884	0	0	0	0	2,566,258	52,321,302
2012	12,375,165	17,420,517	42,735	44,441,389	0	0	0	0	1,004,833	60,251,441
2013	38,758,009	28,351,615	110,781	105,242,183	0	0	0	0	546,046	120,654,854
2014	35,045,545	21,851,728	126,201	91,093,748	0	0	0	0	(16,925)	99,413,650
2015	19,408,804	41,016,634	162,974	81,730,001	0	0	0	0	277,916	90,347,080
2016	21,977,655	64,404,402	216,631	110,390,470	0	0	0	0	98,270	120,349,792
2017	7,150,085	35,027,869	152,133	51,429,039	0	0	0	0	74,309	60,250,693
2018	2,441,613	51,483,158	298,308	65,229,007	0	0	0	0	98,584	78,501,396
2019	**1,286,199**	**78,393,479**	**384,524**	**91,198,254**	**0**	**0**	**0**	**0**	**427,816**	**111,586,587**
2020	868,053	88,314,422	538,004	102,359,820	0	0	0	0	113,968	131,099,264
2021	689,654	123,217,053	1,053,376	139,542,082	0	0	0	0	63,123	168,104,000
2022	0	0	0	0	0	0	0	0	0	0
2023	0	0	0	0	0	0	0	0	0	0
2024	0	0	0	0	0	0	0	0	0	0
2025	0	0	0	0	0	0	0	0	0	0
2026	0	0	0	0	0	0	0	0	0	0
2027	0	0	0	0	0	0	0	0	0	0
2028	0	0	0	0	0	0	0	0	0	0
2029	0	0	0	0	0	0	0	0	0	0
2030	0	0	0	0	0	0	0	0	0	0
2031	0	0	0	0	0	0	0	0	0	0
2032	0	0	0	0	0	0	0	0	0	0
2033	0	0	0	0	0	0	0	0	0	0
2034	0	0	0	0	0	0	0	0	0	0
2035	0	0	0	0	0	0	0	0	0	0
TOTAL	**240,628,362**	**2,100,234,547**	**14,569,942**	**2,921,802,573**	**0**	**0**	**341,139**	**341,139**	**22,187,497**	**4,007,196,181**

[e] Costs from Table B-10 allocated to The Metropolitan Water District of Southern California are reduced herein by $16,425,374 in 1972 under provisions of Amendment 7 to its water supply contract.

TABLE B-15 Capital Cost Component of Transportation Charge for Each Contractor (in dollars)[a,b,c]

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	508,056	361,935	1,309,946	2,179,937	104,160	208,037	312,197
1969	165,289	0	165,289	610,463	397,386	1,411,701	2,419,550	122,043	242,426	364,469
1970	169,077	0	169,077	644,899	412,322	1,450,660	2,507,881	125,963	250,808	376,771
1971	171,286	0	171,286	651,920	415,439	1,457,564	2,524,923	128,402	256,371	384,773
1972	172,649	0	172,649	653,636	416,368	1,461,847	2,531,850	129,861	260,482	390,343
1973	173,649	31,366	205,015	655,156	417,018	1,465,086	2,537,260	130,843	263,040	393,883
1974	176,527	32,938	209,466	656,308	417,636	1,467,092	2,541,035	132,015	265,901	397,916
1975	184,973	36,291	221,264	658,917	418,879	1,470,816	2,548,611	133,290	269,028	402,318
1976	189,650	40,836	230,485	660,385	419,684	1,472,924	2,552,992	134,041	272,155	406,196
1977	192,592	45,096	237,688	663,242	421,449	1,478,507	2,563,197	135,754	278,799	414,553
1978	195,860	49,178	245,038	667,063	423,747	1,485,299	2,576,109	141,271	292,281	433,552
1979	199,390	53,340	252,730	672,599	427,108	1,494,207	2,593,915	142,362	297,569	439,930
1980	209,132	67,748	276,880	676,631	429,296	1,499,843	2,605,769	143,530	303,969	447,499
1981	222,599	87,408	310,007	687,055	435,629	1,515,357	2,638,041	148,789	327,544	476,333
1982	234,191	106,918	341,110	685,187	434,108	1,512,014	2,631,310	148,004	320,657	468,660
1983	262,160	151,259	413,419	686,716	434,532	1,513,393	2,634,640	148,213	317,658	465,870
1984	326,072	224,245	550,317	697,993	441,230	1,530,671	2,669,894	149,853	323,275	473,127
1985	455,836	364,305	820,141	710,661	448,410	1,548,594	2,707,665	151,658	328,761	480,419
1986	819,636	692,479	1,512,115	712,804	449,390	1,551,318	2,713,513	152,545	332,779	485,324
1987	1,360,688	1,559,243	2,919,931	715,638	451,007	1,555,828	2,722,474	154,805	348,472	503,277
1988	1,771,651	2,208,121	3,979,772	720,093	453,514	1,562,985	2,736,592	161,346	417,591	578,937
1989	1,891,484	2,433,160	4,324,645	729,151	459,332	1,578,655	2,767,138	169,453	494,247	663,699
1990	1,955,330	2,514,151	4,469,481	737,379	464,692	1,592,216	2,794,287	177,387	557,384	734,771
1991	1,978,582	2,557,403	4,535,985	754,487	476,459	1,625,032	2,855,978	189,050	639,235	828,285
1992	1,983,860	2,562,121	4,545,981	785,086	496,722	1,675,047	2,956,855	204,822	754,678	959,500
1993	1,986,897	2,565,427	4,552,324	799,445	505,773	1,698,585	3,003,804	224,056	941,300	1,165,356
1994	1,993,467	2,572,330	4,565,797	809,876	512,498	1,716,961	3,039,335	286,878	1,585,162	1,872,040
1995	1,997,323	2,576,836	4,574,159	814,352	515,639	1,729,387	3,059,377	517,412	4,095,799	4,613,211
1996	1,998,994	2,578,433	4,577,427	822,256	520,936	1,743,439	3,086,632	1,187,010	12,569,247	13,756,257
1997	2,000,110	2,579,484	4,579,594	826,306	523,583	1,750,461	3,100,350	1,808,545	20,578,178	22,386,724
1998	2,001,225	2,585,478	4,586,703	833,036	527,976	1,762,113	3,123,126	1,985,644	22,700,288	24,685,933
1999	2,002,204	2,586,690	4,588,893	835,265	529,331	1,765,656	3,130,252	2,035,260	23,293,767	25,329,027
2000	2,006,043	2,592,730	4,598,773	997,900	533,508	1,777,485	3,308,894	2,088,005	23,838,744	25,926,748
2001	2,327,544	2,783,915	5,111,459	1,133,386	535,165	1,782,101	3,450,652	2,116,046	24,156,352	26,272,398
2002	2,327,983	2,784,755	5,112,738	1,147,788	550,866	1,890,059	3,588,713	2,120,253	24,187,702	26,307,955
2003	2,329,327	2,787,564	5,116,892	1,232,987	621,150	2,236,683	4,090,820	2,124,324	24,210,510	26,334,833
2004	2,333,011	2,788,858	5,121,869	1,367,222	700,643	2,512,474	4,580,339	2,125,494	24,217,560	26,343,054
2005	2,343,559	2,790,196	5,133,755	1,404,015	721,599	2,761,150	4,886,764	2,126,238	24,220,734	26,346,972
2006	2,347,811	2,794,429	5,142,239	1,439,532	742,505	2,855,962	5,037,999	2,126,116	24,210,804	26,336,921
2007	2,410,846	2,795,799	5,206,645	1,474,704	763,106	2,906,021	5,143,830	2,126,644	24,214,870	26,341,514
2008	2,644,661	2,798,796	5,443,457	1,555,206	809,662	3,017,673	5,382,542	2,127,678	24,220,221	26,347,899
2009	3,226,036	2,803,121	6,029,157	1,706,851	897,252	3,227,237	5,831,340	2,129,520	24,226,659	26,356,180
2010	3,315,791	2,804,457	6,120,248	2,023,603	1,081,998	3,667,787	6,773,388	2,130,095	24,229,935	26,360,030
2011	3,346,179	2,804,696	6,150,876	2,742,622	1,318,810	4,260,266	8,321,698	2,135,200	24,239,123	26,374,323
2012	3,361,302	2,807,722	6,169,025	3,264,320	1,583,384	4,897,983	9,745,688	2,142,776	24,255,155	26,397,931
2013	3,400,407	2,840,565	6,240,972	3,403,731	1,664,841	5,007,350	10,075,922	2,148,169	24,278,899	26,427,068
2014	3,454,377	2,893,938	6,348,314	3,478,970	1,690,262	5,123,884	10,293,117	2,160,289	24,349,603	26,509,892
2015	3,504,325	2,946,827	6,451,152	3,378,016	1,588,247	4,739,755	9,706,018	2,178,159	24,451,794	26,629,953
2016	3,500,193	2,968,632	6,468,825	3,448,271	1,599,411	4,671,276	9,718,957	2,184,748	24,531,171	26,715,918
2017	3,481,488	2,982,273	6,463,761	3,408,851	1,583,105	4,591,289	9,583,245	2,175,925	24,565,276	26,741,201
2018	3,393,208	2,990,677	6,383,885	3,315,493	1,554,000	4,505,609	9,375,102	2,149,680	24,557,141	26,706,822
2019	**3,355,567**	**3,017,081**	**6,372,648**	**3,240,290**	**1,531,059**	**4,437,775**	**9,209,124**	**2,158,171**	**24,593,581**	**26,751,752**
2020	3,363,419	3,039,713	6,403,132	3,435,078	1,598,209	4,784,134	9,817,421	2,193,328	24,699,079	26,892,407
2021	3,380,782	3,081,740	6,462,522	3,472,838	1,614,202	5,296,640	10,383,681	2,251,479	24,872,207	27,123,685
2022	3,382,554	3,087,533	6,470,087	3,504,757	1,627,279	6,635,408	11,767,443	2,307,337	25,130,930	27,438,267
2023	3,381,411	3,054,000	6,435,411	3,503,348	1,626,629	6,680,610	11,810,587	2,337,467	25,281,860	27,619,327
2024	3,378,131	3,052,367	6,430,497	3,502,285	1,626,011	6,680,059	11,808,355	2,339,620	25,285,133	27,624,753
2025	3,368,515	3,048,790	6,417,305	3,499,949	1,624,768	6,676,335	11,801,053	2,341,694	25,288,186	27,629,880
2026	3,363,172	3,044,036	6,407,207	3,498,476	1,623,963	6,674,227	11,796,666	2,344,552	25,291,716	27,636,268
2027	3,359,800	3,039,601	6,399,401	3,495,488	1,622,198	6,668,645	11,786,330	2,346,765	25,292,317	27,639,082
2028	3,356,060	3,035,342	6,391,402	3,491,479	1,619,900	6,661,852	11,773,231	2,341,248	25,278,834	27,620,083
2029	3,352,023	3,030,974	6,382,997	3,485,482	1,616,538	6,652,944	11,754,964	2,340,158	25,273,547	27,613,704
2030	3,340,866	3,015,512	6,356,378	3,481,285	1,614,351	6,647,308	11,742,944	2,338,989	25,267,146	27,606,136
2031	3,325,450	2,994,446	6,319,895	3,469,803	1,608,018	6,631,794	11,709,614	2,333,730	25,243,571	27,577,302
2032	3,312,153	2,973,501	6,285,654	3,472,319	1,609,538	6,635,137	11,716,994	2,334,515	25,250,459	27,584,974
2033	3,280,093	2,926,050	6,206,143	3,471,078	1,609,114	6,633,758	11,713,951	2,334,307	25,253,458	27,587,764
2034	3,206,997	2,849,434	6,056,430	3,458,655	1,602,416	6,616,481	11,677,552	2,332,667	25,247,841	27,580,508
2035	3,058,854	2,703,132	5,761,985	3,444,808	1,595,237	6,598,557	11,638,602	2,330,862	25,242,355	27,573,216
TOTAL	**141,243,468**	**138,615,482**	**279,858,951**	**124,958,944**	**63,516,313**	**227,952,036**	**416,427,293**	**91,729,955**	**983,578,669**	**1,075,308,625**

[a] Unadjusted for prior overpayments or underpayments of charges.
[b] Determined at the current Project Interest Rate of 4.610 percent per annum.
[c] Reflects the transfers of permanent aqueduct capacity among contractors.

TABLE B-15 Capital Cost Component of Transportation Charge for Each Contractor (in dollars)[a,b,c]

	SAN JOAQUIN VALLEY AREA									
				Kern						
Calendar Year	Dudley Ridge	Empire	Future Contractor San Joaquin Valley	Municipal and Industrial	Municipal and Industrial[d]	Agricultural	Kings	Oak Flat	Tulare	Total
	[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	81,826	1,969	48,950	335,771	48,966	445,917	9,407	5,039	69,012	1,046,857
1969	81,969	5,906	57,418	392,005	52,536	915,770	10,158	5,477	261,118	1,782,356
1970	89,837	5,906	59,224	423,404	53,922	1,113,851	10,446	5,696	193,233	1,955,519
1971	102,426	5,906	60,329	444,522	54,712	1,479,386	10,612	6,134	205,627	2,369,654
1972	114,442	5,906	60,945	454,227	55,075	2,215,251	10,694	11,756	634,346	3,562,641
1973	125,887	5,906	61,370	458,449	55,248	2,554,956	10,736	6,792	245,355	3,524,699
1974	191,062	5,906	61,890	460,485	55,349	2,861,172	10,770	7,604	407,249	4,061,486
1975	232,061	5,906	62,452	462,798	55,490	3,426,894	10,812	7,834	485,945	4,750,192
1976	176,934	5,906	62,720	464,655	55,679	3,694,165	10,853	8,849	347,634	4,827,394
1977	173,952	5,906	63,362	467,359	55,965	4,047,742	10,914	8,106	332,384	5,165,690
1978	185,969	0	65,796	469,216	56,156	4,499,406	11,019	8,544	356,608	5,652,715
1979	220,553	5,906	66,111	471,978	56,491	4,940,547	11,086	8,763	401,345	6,182,780
1980	234,607	5,906	66,399	474,721	56,828	5,391,250	11,157	12,488	403,931	6,657,287
1981	234,607	5,906	67,986	491,115	58,770	5,900,321	11,565	9,421	428,155	7,207,846
1982	234,607	5,906	67,996	488,835	58,707	6,370,176	11,552	9,859	451,816	7,699,455
1983	245,479	5,906	68,332	493,076	59,377	6,905,088	11,685	8,259	53,790	7,850,993
1984	258,068	5,906	68,950	498,702	60,083	7,247,643	11,834	10,516	352,727	8,514,429
1985	270,084	5,906	69,678	506,586	61,243	7,717,484	12,069	10,735	256,606	8,910,392
1986	282,101	5,906	69,966	508,983	61,587	7,841,863	12,141	11,173	547,588	9,341,308
1987	294,117	5,906	70,471	512,652	62,116	8,658,131	12,251	11,392	571,249	10,198,285
1988	306,133	5,906	70,832	515,513	62,526	9,101,186	12,334	11,831	594,910	10,681,170
1989	318,150	5,906	71,717	519,169	63,150	9,420,787	12,501	12,269	619,135	11,042,784
1990	165,083	5,906	73,153	537,527	65,389	9,752,843	12,936	12,488	667,584	11,292,910
1991	305,624	5,906	75,796	566,573	69,966	9,752,843	13,762	12,488	667,584	11,470,543
1992	330,166	5,906	78,990	597,260	74,817	9,752,843	14,756	12,488	667,584	11,534,810
1993	330,166	5,906	80,482	610,123	76,657	9,752,843	15,124	12,488	667,584	11,551,373
1994	330,166	5,906	82,105	619,494	77,936	9,752,843	15,397	12,488	667,584	11,563,919
1995	330,166	5,906	83,398	626,231	78,890	9,752,843	15,608	12,488	667,584	11,573,114
1996	305,390	5,906	87,367	635,384	80,221	9,417,418	15,961	12,488	667,584	11,227,720
1997	305,390	5,906	90,231	639,177	80,707	9,348,407	16,133	12,488	667,584	11,166,022
1998	305,389	5,906	92,940	652,602	82,732	9,096,237	16,588	12,488	667,584	10,932,467
1999	305,389	5,906	94,237	659,509	83,778	9,096,237	16,823	12,488	667,584	10,941,952
2000	305,389	5,906	95,750	667,629	85,008	8,448,457	17,096	12,488	667,584	10,305,308
2001	305,389	5,906	96,315	670,255	85,354	8,310,936	17,172	12,488	667,584	10,171,398
2002	328,560	5,906	96,772	672,352	85,648	8,310,936	17,237	12,488	626,987	10,156,885
2003	328,560	5,906	97,882	681,983	87,121	8,310,936	17,536	12,488	624,671	10,167,083
2004	328,560	5,906	98,185	684,250	87,449	8,298,338	46,548	12,488	538,410	10,100,134
2005	328,560	5,906	98,434	686,336	87,746	8,298,338	46,611	12,488	538,410	10,102,828
2006	328,560	5,906	99,039	692,288	88,653	8,298,338	48,561	12,488	536,645	10,110,478
2007	328,560	5,906	99,161	694,170	88,828	8,298,338	48,597	12,488	536,645	10,112,693
2008	328,560	5,906	99,425	696,491	89,095	8,298,338	48,652	12,488	536,645	10,115,600
2009	328,560	5,906	100,163	703,240	90,159	8,298,338	48,870	12,488	536,645	10,124,369
2010	288,505	5,906	100,376	706,426	90,427	8,117,798	48,924	12,488	496,119	9,866,970
2011	288,505	5,906	102,805	710,984	90,907	8,117,798	49,097	12,488	496,119	9,874,609
2012	288,505	5,906	106,293	715,917	91,573	8,117,798	49,340	12,488	496,119	9,883,939
2013	288,505	5,906	107,943	722,275	92,412	8,117,798	49,534	12,488	496,119	9,892,979
2014	277,101	5,906	110,313	750,222	96,289	8,117,798	50,335	12,488	487,719	9,908,170
2015	259,935	5,906	114,147	713,262	90,995	8,117,798	51,275	12,488	487,719	9,853,525
2016	259,935	5,906	112,718	676,928	85,839	8,117,798	51,885	12,488	487,719	9,811,216
2017	259,935	5,906	105,074	604,508	71,952	8,117,798	52,699	12,488	487,719	9,718,078
2018	284,712	5,906	89,786	537,077	62,550	8,511,737	44,480	12,488	487,719	10,036,456
2019	**284,712**	**5,906**	**92,419**	**544,062**	**67,756**	**8,511,737**	**45,540**	**12,488**	**487,719**	**10,052,339**
2020	261,823	5,906	106,454	580,606	75,918	8,511,737	47,355	12,488	487,719	10,090,006
2021	261,823	5,906	129,771	689,138	90,840	8,511,737	50,363	12,488	487,719	10,239,785
2022	261,823	5,906	145,903	755,594	96,909	8,511,737	51,599	12,488	487,719	10,329,677
2023	261,823	5,906	153,836	768,613	97,513	8,511,737	51,556	12,488	487,719	10,351,192
2024	261,823	5,906	154,906	772,587	97,571	8,511,737	51,523	12,488	487,719	10,356,259
2025	261,823	5,906	155,944	773,943	97,430	8,511,737	51,481	12,488	487,719	10,358,471
2026	261,823	5,906	157,401	774,850	97,241	8,511,737	51,440	12,488	487,719	10,360,605
2027	261,823	5,906	158,635	775,202	96,955	8,511,737	51,379	12,488	487,719	10,361,844
2028	261,823	5,906	156,201	773,345	96,764	8,511,737	51,273	12,488	487,719	10,357,256
2029	261,823	5,906	155,886	770,583	96,429	8,511,737	51,207	12,488	487,719	10,353,778
2030	261,823	5,906	155,598	767,840	96,092	8,511,737	51,136	12,488	487,719	10,350,339
2031	261,823	5,906	154,011	751,446	94,151	8,511,737	50,727	12,488	487,719	10,330,008
2032	261,823	5,906	154,000	753,726	94,213	8,511,737	50,741	12,488	487,719	10,332,353
2033	261,823	5,906	153,664	749,485	93,543	8,511,737	50,608	12,488	487,719	10,326,973
2034	261,823	5,906	153,047	743,859	92,837	8,511,737	50,459	12,488	487,719	10,319,874
2035	261,823	5,906	152,318	735,975	91,678	8,511,737	50,224	12,488	487,719	10,309,867
TOTAL	**17,676,576**	**391,765**	**6,729,217**	**42,343,349**	**5,313,621**	**503,549,286**	**2,062,742**	**772,985**	**33,420,123**	**612,259,665**

[a] Unadjusted for prior overpayments or underpayments of charges.
[b] Determined at the current Project Interest Rate of 4.610 percent per annum.
[c] Reflects the transfers of permanent aqueduct capacity among contractors.
[d] Charges under Amendment 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)[a,b,c]

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	420,927	206,952	38,551	245,877	11,781	312,091	87,293	729,849	194,527
1969	1,003,797	625,937	318,583	57,301	368,426	17,249	468,846	127,219	1,136,415	302,649
1970	1,312,832	783,338	451,031	84,796	520,243	23,427	652,441	171,297	1,691,461	443,708
1971	1,581,850	951,320	595,102	120,210	700,914	28,845	865,464	208,821	2,394,083	619,778
1972	1,720,363	1,062,767	671,098	137,454	795,465	31,306	982,044	226,497	2,808,504	720,983
1973	1,772,377	1,078,164	696,065	142,143	825,044	32,281	1,020,164	233,340	2,945,564	756,530
1974	1,791,355	1,125,604	707,278	146,331	839,031	32,602	1,034,432	235,688	3,035,230	777,084
1975	1,815,881	1,141,525	724,295	150,105	861,611	33,017	1,064,073	238,700	3,117,604	798,777
1976	1,829,760	1,154,843	736,112	152,796	878,290	33,269	1,085,623	240,431	3,195,714	819,552
1977	1,842,615	1,168,851	744,718	154,692	890,124	33,485	1,101,521	242,010	3,244,723	832,585
1978	1,853,320	1,189,061	750,463	156,009	898,031	33,676	1,112,728	243,377	3,274,845	840,506
1979	1,869,355	1,214,267	756,140	157,141	904,987	33,943	1,122,804	245,346	3,296,693	846,199
1980	1,888,324	1,263,378	762,012	158,251	912,220	34,247	1,133,392	247,607	3,317,247	851,720
1981	1,987,339	1,355,349	796,384	164,015	950,529	35,899	1,183,767	259,877	3,421,183	879,634
1982	1,978,809	1,387,799	789,720	163,563	945,667	35,768	1,178,476	258,879	3,413,856	877,416
1983	2,061,590	1,433,226	809,319	167,582	971,692	37,104	1,213,071	268,895	3,486,248	897,190
1984	2,171,231	1,460,745	834,564	173,473	1,006,034	38,871	1,253,174	282,134	3,594,542	926,815
1985	2,251,676	1,477,152	851,720	177,807	1,031,452	40,260	1,286,299	291,738	3,673,311	948,379
1986	2,299,323	1,486,571	863,875	180,992	1,049,921	40,927	1,319,461	297,214	3,730,198	963,927
1987	2,344,046	1,493,298	876,261	183,970	1,068,826	41,390	1,335,886	301,992	3,783,895	978,588
1988	2,362,143	1,500,002	885,509	186,235	1,083,080	41,677	1,355,105	304,089	3,824,257	989,568
1989	2,376,030	1,509,940	889,631	187,412	1,088,857	41,852	1,363,053	305,475	3,846,509	995,456
1990	2,432,706	1,533,536	912,986	192,472	1,118,024	42,727	1,400,388	312,010	3,918,238	1,014,854
1991	2,469,661	1,553,183	932,659	197,604	1,147,282	43,112	1,436,495	315,536	3,997,480	1,036,359
1992	2,514,880	1,574,429	953,475	203,996	1,179,589	43,744	1,475,782	320,432	4,102,102	1,064,912
1993	2,549,874	1,593,436	969,784	210,989	1,203,773	44,253	1,503,189	324,519	4,213,571	1,095,444
1994	2,585,113	1,611,258	983,985	220,171	1,223,934	44,800	1,522,995	328,488	4,420,076	1,151,617
1995	2,611,217	1,620,218	992,587	225,248	1,236,069	45,193	1,535,343	331,367	4,547,097	1,186,123
1996	2,637,094	1,636,226	1,001,843	229,526	1,248,440	45,599	1,548,769	334,344	4,654,074	1,215,084
1997	2,654,359	1,647,613	1,010,118	232,003	1,258,944	45,868	1,561,245	336,316	4,875,746	1,268,666
1998	2,679,335	1,661,500	1,017,568	233,373	1,268,786	46,279	2,086,726	339,344	5,036,613	1,290,750
1999	2,692,811	1,672,885	1,022,130	235,684	1,274,800	46,503	2,094,000	341,005	5,243,553	1,307,788
2000	2,708,447	2,826,842	1,028,194	237,960	1,283,376	46,776	2,104,755	405,954	5,508,323	1,321,137
2001	2,716,761	2,832,783	1,032,076	239,333	1,288,723	46,930	2,111,597	407,158	6,110,494	1,330,966
2002	2,742,037	2,836,076	1,035,440	240,242	1,293,682	47,103	2,118,047	408,432	7,170,115	1,336,562
2003	2,753,975	2,844,591	1,038,552	241,001	1,297,752	47,280	2,123,698	409,867	7,716,814	1,344,434
2004	2,758,711	2,847,814	1,097,766	241,460	1,300,295	47,354	2,127,195	410,486	7,957,548	1,347,676
2005	2,763,823	2,851,743	6,718,481	241,849	2,061,704	47,442	2,130,744	411,202	8,084,691	1,350,250
2006	2,778,495	2,862,495	6,787,488	242,717	2,075,530	47,688	2,138,445	413,249	8,145,551	1,354,649
2007	2,800,293	2,888,106	6,916,767	244,290	2,099,752	48,040	2,151,170	416,446	8,271,611	1,361,754
2008	2,817,432	2,906,765	7,041,564	245,693	2,122,376	48,330	2,161,632	418,961	8,407,335	1,368,660
2009	2,827,928	2,922,588	7,133,365	249,637	2,141,770	48,511	2,167,726	420,368	8,625,849	1,385,750
2010	2,867,833	2,958,973	7,522,982	253,621	2,243,161	49,160	2,234,705	426,225	8,941,515	1,403,681
2011	2,913,440	2,995,246	7,697,261	257,857	2,287,084	49,889	2,269,515	432,844	9,309,991	1,422,953
2012	2,938,633	3,016,637	7,845,043	261,954	2,331,427	50,285	2,306,918	436,355	9,845,592	1,442,809
2013	2,924,360	3,030,127	8,032,429	268,157	2,379,518	50,643	2,359,367	439,108	10,642,119	1,461,146
2014	2,973,639	3,028,535	8,350,272	270,411	2,453,610	50,608	2,382,760	438,612	13,111,861	1,488,365
2015	2,983,970	3,039,796	8,504,268	272,385	2,486,316	50,859	2,417,191	440,266	15,365,656	1,504,822
2016	2,968,682	3,038,093	9,022,819	272,458	2,558,301	50,727	2,421,491	439,426	16,622,089	1,508,403
2017	2,872,686	2,968,932	9,950,528	267,057	2,653,659	49,057	2,380,055	427,184	17,990,121	1,484,596
2018	2,677,033	2,733,859	10,199,000	255,318	2,623,009	45,666	2,266,449	398,921	18,239,215	1,421,398
2019	**2,495,088**	**2,540,160**	**10,358,940**	**246,068**	**2,583,394**	**42,511**	**2,148,189**	**371,353**	**18,335,138**	**1,369,561**
2020	2,330,634	2,453,923	10,890,387	233,744	2,586,382	38,870	2,077,041	340,549	18,199,396	1,311,866
2021	2,325,942	2,414,675	11,400,129	213,711	2,582,175	37,751	1,981,860	333,430	17,842,412	1,219,016
2022	2,504,697	2,670,274	11,126,151	212,672	2,557,694	40,401	2,045,092	358,410	17,771,000	1,207,503
2023	2,452,684	2,662,550	10,422,391	207,982	2,436,427	42,061	1,999,695	350,373	17,633,940	1,171,956
2024	2,433,706	2,603,676	10,305,823	203,794	2,408,209	43,307	1,983,159	347,562	17,544,274	1,151,402
2025	2,409,179	2,585,812	10,190,569	200,020	2,372,360	44,136	1,951,389	343,986	17,461,900	1,129,709
2026	2,395,301	2,567,564	10,086,700	197,330	2,343,247	45,018	1,928,673	341,967	17,383,790	1,108,934
2027	2,382,445	2,549,052	10,010,348	195,433	2,322,261	46,085	1,912,234	340,155	17,334,781	1,095,901
2028	2,371,740	2,521,216	9,973,131	194,116	2,310,103	45,893	1,901,373	338,638	17,304,659	1,087,979
2029	2,355,706	2,482,903	9,940,801	192,984	2,299,547	45,627	1,890,987	336,425	17,282,810	1,082,287
2030	2,336,737	2,405,689	9,914,214	191,874	2,289,516	45,323	1,880,088	333,911	17,262,256	1,076,766
2031	2,237,722	2,262,636	9,775,603	186,111	2,237,128	43,671	1,818,092	319,749	17,158,320	1,048,852
2032	2,246,251	2,211,131	9,788,406	186,562	2,242,819	43,802	1,829,320	321,381	17,165,648	1,051,070
2033	2,163,470	2,138,580	9,706,875	182,544	2,208,428	42,466	1,791,909	310,716	17,093,255	1,031,296
2034	2,053,829	2,096,344	9,594,319	176,652	2,162,293	40,699	1,743,831	296,727	16,984,962	1,001,671
2035	1,973,385	2,074,622	9,510,393	172,318	2,127,856	39,310	1,710,147	286,830	16,906,192	980,107
TOTAL	**160,756,108**	**139,451,689**	**315,701,080**	**13,666,724**	**110,354,206**	**2,844,494**	**114,944,522**	**22,379,638**	**605,637,161**	**74,906,424**

[a] Unadjusted for prior overpayments or underpayments of charges.
[b] Determined at the current Project Interest Rate of 4.610 percent per annum.
[c] Reflects the transfers of permanent aqueduct capacity among contractors.

TABLE B-15 Capital Cost Component of Transportation Charge for Each Contractor (in dollars)[a,b,c]

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		
	[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	17,535,717	0	0	564	564	0	21,196,780
1969	187,059	21,857,456	202,599	26,673,536	0	0	3,191	3,191	0	31,408,390
1970	275,010	28,992,595	257,859	35,660,038	0	0	15,121	15,121	0	40,684,407
1971	385,025	37,242,413	316,307	46,010,133	0	0	15,947	15,947	0	51,476,716
1972	448,055	44,062,125	353,935	54,020,595	0	0	17,332	17,332	0	60,695,411
1973	470,185	46,299,581	357,342	56,628,777	0	0	17,333	17,333	0	63,306,968
1974	483,259	48,322,678	372,112	58,902,684	0	0	17,334	17,334	0	66,129,922
1975	496,722	49,285,084	376,511	60,103,905	0	0	17,337	17,337	0	68,043,626
1976	509,650	50,137,295	380,788	61,154,121	0	0	17,338	17,338	0	69,188,527
1977	517,741	50,827,166	385,097	61,985,329	0	0	17,340	17,340	0	70,383,797
1978	522,656	51,426,581	390,742	62,691,996	0	0	17,342	17,342	0	71,616,752
1979	526,178	52,230,344	399,649	63,603,045	0	0	17,344	17,344	0	73,089,744
1980	529,583	53,637,412	417,136	65,152,529	0	0	17,345	17,345	0	75,157,309
1981	546,787	56,667,437	449,812	68,698,012	0	0	17,346	17,346	0	79,347,585
1982	545,445	57,465,063	461,234	69,501,693	0	0	17,348	17,348	0	80,659,575
1983	557,607	59,037,472	477,333	71,418,330	0	0	17,348	17,348	0	82,800,600
1984	575,830	60,313,580	486,863	73,117,854	0	0	17,349	17,349	0	85,342,971
1985	589,089	61,144,629	492,117	74,255,628	0	0	17,351	17,351	0	87,191,594
1986	598,648	61,666,346	494,977	74,992,381	0	0	17,352	17,352	0	89,061,993
1987	607,664	62,094,710	496,758	75,607,284	0	0	17,354	17,354	0	91,968,605
1988	614,418	62,452,912	498,619	76,097,616	0	0	17,355	17,355	0	94,091,442
1989	618,059	62,796,236	501,579	76,520,089	0	0	17,358	17,358	0	95,335,713
1990	629,934	63,762,459	509,566	77,779,900	0	0	17,360	17,360	0	97,088,709
1991	643,118	64,677,355	516,147	78,965,992	0	0	17,364	17,364	0	98,674,146
1992	660,626	65,776,353	523,154	80,393,474	0	0	17,367	17,367	0	100,407,987
1993	679,343	66,905,041	529,383	81,822,600	0	0	17,369	17,369	0	102,112,826
1994	714,062	68,486,622	535,055	83,828,176	0	0	17,370	17,370	0	104,886,638
1995	735,431	69,373,540	537,812	84,977,244	0	0	17,371	17,371	0	108,814,476
1996	753,512	70,251,056	541,753	86,097,320	0	0	17,371	17,371	0	118,762,726
1997	812,976	71,530,953	544,467	87,779,275	0	0	17,371	17,371	0	129,029,337
1998	919,464	72,283,436	548,490	89,411,665	0	0	0	0	0	132,739,892
1999	1,100,324	72,917,423	552,184	90,501,090	0	0	0	0	0	134,491,213
2000	1,362,827	73,432,162	555,279	92,822,032	0	0	0	0	0	136,961,755
2001	2,037,076	73,741,965	556,658	94,452,520	0	0	0	0	0	139,458,426
2002	3,267,979	73,915,736	557,417	96,968,868	0	0	0	0	0	142,135,159
2003	3,883,914	74,256,539	559,749	98,518,167	0	0	17,375	17,375	0	144,245,170
2004	4,152,164	74,601,782	560,566	99,450,819	0	0	17,375	17,375	0	145,613,592
2005	4,286,386	68,499,909	561,532	100,009,755	0	0	17,375	17,375	0	146,497,450
2006	4,333,741	68,876,841	564,172	100,621,061	0	0	17,375	17,375	0	147,266,074
2007	4,445,041	69,605,880	569,809	101,818,959	0	0	17,376	17,376	0	148,641,017
2008	4,579,551	70,216,830	573,969	102,909,098	0	0	17,376	17,376	0	150,215,972
2009	4,761,640	70,888,202	577,886	104,151,221	0	0	17,376	17,376	0	152,509,643
2010	5,042,526	72,113,606	585,961	106,643,949	0	0	17,376	17,376	0	155,781,961
2011	5,399,634	73,157,328	593,207	108,786,251	0	0	17,376	17,376	0	159,525,132
2012	5,953,698	73,889,550	597,040	110,915,939	0	0	17,376	17,376	0	163,129,898
2013	6,819,613	74,246,181	600,058	113,252,827	0	0	17,376	17,376	0	165,907,144
2014	9,623,224	75,382,413	598,708	120,153,017	0	0	17,376	17,376	0	173,229,887
2015	12,225,190	75,925,119	599,721	125,815,558	0	0	16,972	16,972	0	178,473,178
2016	13,698,450	76,766,861	596,567	129,964,368	0	0	16,812	16,812	0	182,696,097
2017	15,406,486	76,998,879	579,002	134,028,242	0	0	16,814	16,814	0	186,551,342
2018	15,944,157	72,862,959	526,337	130,193,320	0	0	16,812	16,812	0	182,712,397
2019	**16,085,129**	**69,475,686**	**482,442**	**126,533,660**	**0**	**0**	**14,185**	**14,185**	**0**	**178,933,708**
2020	16,111,284	68,605,030	461,295	125,640,402	0	0	2,256	2,256	0	178,845,625
2021	16,081,791	67,903,701	452,754	124,789,345	0	0	1,429	1,429	0	179,000,448
2022	16,085,941	73,440,938	517,735	130,538,508	0	0	44	44	0	186,544,026
2023	16,063,812	71,973,965	558,227	127,976,061	0	0	43	43	0	184,192,622
2024	16,050,737	70,070,452	558,575	125,704,676	0	0	42	42	0	181,924,583
2025	16,037,274	69,219,552	565,033	124,510,919	0	0	40	40	0	180,717,667
2026	16,024,346	68,471,828	570,657	123,465,352	0	0	39	39	0	179,666,137
2027	16,016,256	67,858,852	577,539	122,641,343	0	0	36	36	0	178,828,036
2028	16,011,340	67,295,163	571,895	121,927,247	0	0	35	35	0	178,069,253
2029	16,007,818	66,521,651	562,988	121,002,536	0	0	33	33	0	177,108,012
2030	16,004,414	65,138,097	545,501	119,424,385	0	0	32	32	0	175,480,214
2031	15,987,209	62,226,390	512,825	115,814,307	0	0	30	30	0	171,751,156
2032	15,988,551	61,421,797	501,403	114,998,142	0	0	29	29	0	170,918,146
2033	15,976,390	59,919,685	485,304	113,050,917	0	0	28	28	0	168,885,777
2034	15,958,166	58,742,682	475,774	111,327,948	0	0	27	27	0	166,962,340
2035	15,944,908	57,987,421	470,520	110,184,009	0	0	26	26	0	165,467,705
TOTAL	**418,185,067**	**4,309,645,923**	**33,953,514**	**6,322,426,548**	**0**	**0**	**781,778**	**781,778**	**0**	**8,707,062,859**

[a] Unadjusted for prior overpayments or underpayments of charges.
[b] Determined at the current Project Interest Rate of 4.610 percent per annum.
[c] Reflects the transfers of permanent aqueduct capacity among contractors.

TABLE B-16A Minimum OMP&R Component of Transportation Charge for Each Contractor (in dollars)

Sheet 1 of 4

	NORTH BAY AREA			SOUTH BAY AREA				CENTRAL COASTAL AREA		
Calendar Year	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	775,919	1,493,379	2,269,298	2,174,141	1,295,595	3,754,193	7,223,929	699,789	3,084,077	3,783,866
2001	651,209	1,444,040	2,095,249	4,194,363	1,038,206	3,544,596	8,777,165	723,649	2,906,725	3,630,374
2002	1,096,940	1,871,456	2,968,396	8,256,339	1,356,061	6,055,048	15,667,449	754,997	3,285,166	4,040,163
2003	1,168,611	2,247,438	3,416,049	4,901,790	1,057,275	3,547,976	9,507,041	803,484	3,440,305	4,243,789
2004	1,618,197	2,345,860	3,964,058	2,574,388	1,276,799	3,528,163	7,379,350	799,132	3,354,306	4,153,438
2005	916,728	1,796,605	2,713,333	2,391,493	1,129,780	2,947,359	6,468,631	848,861	3,682,079	4,530,940
2006	817,723	1,387,066	2,204,789	2,485,268	1,206,342	3,274,583	6,966,193	747,560	3,625,353	4,372,913
2007	775,013	1,514,946	2,289,959	3,227,583	1,569,911	4,009,243	8,806,737	828,252	3,591,215	4,419,467
2008	1,052,673	1,424,907	2,477,579	3,633,531	1,769,182	4,490,696	9,893,409	1,250,964	5,329,868	6,580,832
2009	1,122,122	1,795,006	2,917,128	3,283,922	1,489,957	4,215,133	8,989,012	1,090,347	4,541,851	5,632,198
2010	1,192,986	3,194,425	4,387,411	3,137,667	1,538,621	4,237,362	8,913,650	1,404,724	6,199,923	7,604,647
2011	1,571,378	3,660,628	5,232,006	3,520,645	1,698,478	4,537,477	9,756,601	1,448,737	6,561,645	8,010,382
2012	2,065,693	3,562,938	5,628,631	3,713,091	1,772,704	6,750,296	12,236,090	1,443,849	7,248,718	8,692,567
2013	1,508,680	3,072,461	4,581,141	4,220,785	1,993,558	5,971,866	12,186,208	1,691,411	8,792,406	10,483,817
2014	1,938,760	3,783,200	5,721,960	4,744,270	2,195,511	7,314,084	14,253,865	1,535,989	5,814,382	7,350,370
2015	2,171,574	3,621,737	5,793,312	5,738,295	2,118,602	8,246,274	16,103,171	2,034,079	8,471,279	10,505,358
2016	2,679,499	4,383,951	7,063,450	5,142,242	1,913,022	13,523,018	20,578,282	1,873,693	10,989,575	12,863,269
2017	1,859,097	2,908,835	4,767,932	5,935,807	2,265,309	10,387,393	18,588,509	2,322,787	14,733,032	17,055,819
2018	2,911,912	4,767,959	7,679,871	6,734,760	2,610,537	7,871,431	17,216,728	2,044,159	11,331,753	13,375,913
2019	**2,744,958**	**4,493,769**	**7,238,728**	**6,970,636**	**2,629,341**	**7,865,221**	**17,465,198**	**2,044,164**	**11,472,738**	**13,516,902**
2020	2,743,805	4,491,769	7,235,574	6,896,945	2,606,083	7,818,322	17,321,349	1,989,793	11,145,033	13,134,826
2021	2,811,144	4,602,236	7,413,379	6,936,110	2,641,473	7,930,174	17,507,758	2,031,585	11,402,903	13,434,488
2022	2,839,255	4,648,258	7,487,514	7,005,472	2,667,888	8,009,475	17,682,835	2,051,901	11,516,932	13,568,833
2023	2,867,648	4,694,741	7,562,389	7,075,526	2,694,567	8,089,570	17,859,663	2,072,420	11,632,101	13,704,522
2024	2,896,325	4,741,689	7,638,013	7,146,282	2,721,513	8,170,466	18,038,261	2,093,145	11,748,422	13,841,567
2025	2,925,287	4,789,105	7,714,393	7,217,744	2,748,728	8,252,171	18,218,642	2,114,076	11,865,906	13,979,982
2026	2,954,540	4,836,996	7,791,536	7,289,922	2,776,215	8,334,693	18,400,829	2,135,217	11,984,565	14,119,782
2027	2,984,086	4,885,366	7,869,452	7,362,821	2,803,977	8,418,040	18,584,839	2,156,569	12,104,410	14,260,979
2028	3,013,927	4,934,219	7,948,146	7,436,449	2,832,017	8,502,221	18,770,687	2,178,135	12,225,455	14,403,589
2029	3,044,066	4,983,563	8,027,629	7,510,814	2,860,337	8,587,243	18,958,394	2,199,916	12,347,710	14,547,626
2030	3,074,506	5,033,398	8,107,904	7,585,922	2,888,941	8,673,115	19,147,977	2,221,915	12,471,187	14,693,102
2031	3,105,251	5,083,731	8,188,983	7,661,782	2,917,830	8,759,847	19,339,459	2,244,134	12,595,899	14,840,033
2032	3,136,304	5,134,569	8,270,873	7,738,399	2,947,008	8,847,444	19,532,851	2,266,576	12,721,858	14,988,433
2033	3,167,667	5,185,915	8,353,582	7,815,783	2,976,478	8,935,919	19,728,180	2,289,241	12,849,076	15,138,317
2034	3,199,344	5,237,775	8,437,118	7,893,941	3,006,243	9,025,278	19,925,462	2,312,134	12,977,567	15,289,701
2035	3,231,338	5,290,152	8,521,489	7,972,880	3,036,306	9,115,532	20,124,718	2,335,255	13,107,342	15,442,597
TOTAL	**87,022,665**	**141,728,498**	**228,751,164**	**223,884,509**	**97,057,589**	**303,521,359**	**624,463,457**	**68,989,446**	**341,609,431**	**410,598,876**

TABLE B-16A Minimum OMP&R Component of Transportation Charge for Each Contractor (in dollars)

Sheet 2 of 4

	SAN JOAQUIN VALLEY AREA								
				Kern					
Calendar Year	Dudley Ridge	Empire	Future Contractor San Joaquin Valley	Municipal and Industrial	Agricultural	Kings	Oak Flat	Tulare	Total
	[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	384,704	21,155	206,915	1,023,474	9,953,977	21,656	22,822	844,517	12,479,220
2001	463,709	25,514	231,713	1,211,557	11,265,338	26,105	31,783	1,018,354	14,274,074
2002	426,218	21,572	223,769	1,080,828	10,227,640	22,080	25,646	813,668	12,841,421
2003	494,752	25,202	242,078	1,177,971	11,268,413	25,794	30,739	944,655	14,209,603
2004	442,084	22,638	244,298	1,124,290	10,636,869	61,698	25,464	731,713	13,289,054
2005	427,271	21,928	257,146	1,013,649	10,307,500	59,685	24,396	708,154	12,819,729
2006	464,654	23,764	196,433	1,110,062	10,331,800	71,752	26,404	766,014	12,990,882
2007	526,631	26,706	234,939	1,268,181	11,676,574	82,393	27,123	863,593	14,706,140
2008	627,411	32,342	372,300	1,529,653	15,127,650	101,753	32,605	1,039,573	18,863,288
2009	514,807	26,168	337,168	1,264,205	12,740,443	83,941	26,766	845,462	15,838,961
2010	501,429	29,133	406,671	1,319,453	13,177,370	94,478	27,763	870,344	16,426,641
2011	602,595	35,290	403,887	1,642,358	15,527,898	111,614	39,527	1,051,631	19,414,799
2012	571,194	33,360	361,883	1,612,347	15,269,179	104,157	31,103	994,979	18,978,203
2013	651,032	38,148	411,916	1,714,627	16,652,804	118,151	30,981	1,136,580	20,754,239
2014	686,267	41,448	520,397	1,828,381	18,760,061	131,639	43,902	1,218,310	23,230,404
2015	649,807	42,378	641,948	1,822,402	19,560,868	137,518	44,321	1,240,767	24,140,007
2016	663,786	43,615	374,509	1,863,825	17,789,167	130,954	45,333	1,274,106	22,185,295
2017	596,164	38,894	402,255	1,613,114	16,422,517	119,637	42,864	1,138,658	20,374,102
2018	681,409	44,557	454,221	1,901,074	18,906,112	136,653	46,540	1,303,532	23,474,098
2019	**735,544**	**43,899**	**444,675**	**1,887,790**	**19,516,474**	**134,538**	**44,181**	**1,284,294**	**24,091,395**
2020	684,547	44,441	444,576	1,837,525	19,797,099	135,988	45,059	1,300,074	24,289,310
2021	689,280	44,742	452,303	1,847,348	19,897,367	137,084	45,713	1,308,926	24,422,762
2022	696,173	45,189	456,826	1,865,821	20,096,340	138,455	46,170	1,322,016	24,666,989
2023	703,135	45,641	461,394	1,884,479	20,297,303	139,839	46,632	1,335,236	24,913,659
2024	710,166	46,098	466,008	1,903,324	20,500,275	141,238	47,098	1,348,588	25,162,794
2025	717,268	46,559	470,668	1,922,357	20,705,279	142,650	47,569	1,362,074	25,414,424
2026	724,441	47,024	475,375	1,941,581	20,912,332	144,077	48,045	1,375,695	25,668,568
2027	731,685	47,494	480,128	1,960,996	21,121,454	145,518	48,525	1,389,452	25,925,253
2028	739,002	47,969	484,930	1,980,606	21,332,669	146,973	49,010	1,403,346	26,184,506
2029	746,392	48,449	489,779	2,000,413	21,545,996	148,442	49,500	1,417,380	26,446,351
2030	753,856	48,934	494,677	2,020,417	21,761,456	149,927	49,995	1,431,553	26,710,814
2031	761,394	49,423	499,623	2,040,621	21,979,071	151,426	50,495	1,445,869	26,977,923
2032	769,008	49,917	504,620	2,061,027	22,198,861	152,940	51,000	1,460,328	27,247,702
2033	776,698	50,416	509,666	2,081,637	22,420,850	154,470	51,510	1,474,931	27,520,179
2034	784,465	50,921	514,763	2,102,454	22,645,059	156,014	52,025	1,489,680	27,795,381
2035	792,310	51,430	519,910	2,123,478	22,871,509	157,575	52,546	1,504,577	28,073,334
TOTAL	**28,834,294**	**1,706,937**	**18,229,380**	**74,998,742**	**802,620,609**	**4,430,319**	**1,755,342**	**54,709,787**	**987,285,411**

TABLE B-16A Minimum OMP&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	1,272,345
1996	3,093,678	1,966,634	862,720	228,008	1,422,789	56,813	1,817,427	423,444	4,707,473	1,256,549
1997	3,250,394	1,810,292	918,428	281,067	1,514,687	59,547	1,853,224	446,127	5,705,741	1,477,757
1998	3,876,512	2,050,254	1,070,517	299,639	1,765,491	73,835	3,207,848	561,246	6,076,375	1,634,942
1999	3,832,428	2,108,765	1,114,208	311,154	1,837,547	75,908	3,226,793	549,879	6,454,799	1,738,148
2000	3,754,814	3,382,326	1,036,009	291,775	1,708,586	68,491	3,000,971	595,130	5,876,356	1,572,153
2001	4,461,346	3,773,156	1,111,786	298,240	1,833,547	80,861	3,287,877	700,113	5,761,358	1,556,933
2002	3,640,157	3,495,707	1,017,608	282,351	1,678,238	62,563	2,999,667	549,514	5,628,813	1,510,431
2003	4,067,155	3,392,356	1,123,306	298,428	1,852,545	68,043	3,294,891	608,571	6,599,226	1,603,982
2004	4,445,363	4,032,309	1,441,872	322,934	1,908,976	76,808	3,426,245	676,950	7,222,184	1,765,191
2005	3,834,679	3,548,174	5,894,144	289,387	2,247,118	66,837	2,910,013	581,713	6,801,965	1,600,286
2006	4,077,303	3,238,431	8,417,246	307,925	2,810,527	74,585	3,150,050	639,491	7,009,515	1,689,633
2007	4,477,859	4,391,326	8,626,637	328,193	2,899,956	78,689	3,337,623	682,010	8,091,859	1,891,216
2008	4,923,178	5,290,763	9,720,553	371,956	3,295,485	81,968	4,110,128	745,782	9,327,889	2,038,589
2009	4,548,987	4,472,656	8,685,586	355,018	2,992,678	77,710	3,711,468	688,814	9,048,215	1,987,300
2010	4,160,819	4,303,138	9,305,073	360,334	3,205,883	73,337	3,785,526	623,164	8,935,201	1,963,578
2011	4,891,247	4,716,657	10,752,625	411,592	3,648,153	85,893	4,332,623	763,512	9,486,520	2,160,279
2012	5,445,330	5,157,238	11,313,711	455,592	3,934,707	97,351	4,579,701	835,664	10,776,340	2,365,421
2013	6,337,419	6,000,028	11,873,657	491,393	4,287,363	111,669	5,189,532	970,040	11,788,851	2,633,970
2014	6,950,782	6,409,539	15,354,589	528,378	5,008,783	116,395	5,841,981	1,040,059	12,785,543	2,863,147
2015	6,453,529	6,005,052	13,236,596	523,937	4,714,950	110,351	6,007,035	938,019	12,812,427	2,955,260
2016	6,407,539	5,708,432	12,900,454	540,059	4,589,735	104,751	5,467,161	932,038	13,102,391	2,974,004
2017	5,887,570	5,849,767	9,989,929	502,080	3,963,980	98,757	5,014,352	859,131	13,790,717	2,751,773
2018	6,510,919	6,233,761	15,739,038	525,651	4,902,818	107,330	5,502,271	949,726	15,440,621	3,036,096
2019	**6,599,840**	**6,306,861**	**14,785,382**	**524,866**	**4,776,708**	**108,491**	**5,519,373**	**962,333**	**15,617,196**	**3,045,082**
2020	6,503,303	6,645,593	13,988,444	525,470	4,676,665	108,757	5,606,367	946,637	15,738,797	3,080,424
2021	6,514,879	6,401,092	14,982,709	527,028	4,831,910	109,221	5,649,117	949,409	15,691,958	3,083,713
2022	6,580,028	6,465,103	15,132,536	532,298	4,880,229	110,313	5,705,608	958,903	15,848,877	3,114,550
2023	6,645,828	6,529,754	15,283,861	537,621	4,929,032	111,416	5,762,664	968,492	16,007,366	3,145,695
2024	6,712,286	6,595,051	15,436,700	542,997	4,978,322	112,530	5,820,291	978,177	16,167,438	3,177,152
2025	6,779,409	6,661,002	15,591,067	548,427	5,028,105	113,655	5,878,494	987,959	16,329,113	3,208,924
2026	6,847,203	6,727,612	15,746,977	553,911	5,078,386	114,792	5,937,279	997,838	16,492,404	3,241,013
2027	6,915,675	6,794,888	15,904,447	559,450	5,129,170	115,940	5,996,651	1,007,816	16,657,328	3,273,423
2028	6,984,832	6,862,837	16,063,492	565,045	5,180,462	117,099	6,056,618	1,017,895	16,823,902	3,306,157
2029	7,054,681	6,931,465	16,224,127	570,695	5,232,266	118,270	6,117,184	1,028,074	16,992,141	3,339,219
2030	7,125,227	7,000,780	16,386,367	576,402	5,284,589	119,453	6,178,356	1,038,354	17,162,062	3,372,611
2031	7,196,480	7,070,787	16,550,231	582,166	5,337,435	120,647	6,240,140	1,048,738	17,333,683	3,406,337
2032	7,268,444	7,141,495	16,715,734	587,988	5,390,809	121,854	6,302,541	1,059,225	17,507,020	3,440,400
2033	7,341,129	7,212,910	16,882,891	593,868	5,444,717	123,073	6,365,566	1,069,818	17,682,089	3,474,805
2034	7,414,540	7,285,039	17,051,720	599,806	5,499,165	124,303	6,429,222	1,080,516	17,858,911	3,509,553
2035	7,488,686	7,357,890	17,222,237	605,805	5,554,156	125,546	6,493,514	1,091,321	18,037,501	3,544,648
TOTAL	**267,413,383**	**233,799,789**	**442,441,371**	**21,142,995**	**173,375,048**	**4,599,043**	**213,500,658**	**38,808,661**	**549,380,826**	**119,363,741**

TABLE B-16A Minimum OMP&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 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	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	964,297	82,505,333	636,095	105,392,336	0	0	0	0	0	131,148,648
2001	950,095	92,945,584	709,090	117,469,986	0	0	0	0	0	146,246,848
2002	922,155	85,413,719	657,483	107,858,407	0	0	0	0	0	143,375,836
2003	1,514,531	82,357,577	621,295	107,401,907	0	0	3,425	3,425	0	138,781,813
2004	1,435,491	99,543,042	761,679	127,059,044	0	0	3,455	3,455	0	155,848,398
2005	1,587,021	74,184,438	652,293	104,198,067	0	0	3,452	3,452	0	130,734,153
2006	1,456,925	76,402,019	601,104	109,874,754	0	0	3,905	3,905	0	136,413,436
2007	1,835,577	105,198,667	864,101	142,703,712	0	0	3,517	3,517	0	172,929,532
2008	2,492,600	113,707,817	982,367	157,089,074	0	0	5,035	5,035	0	194,909,218
2009	2,387,547	99,961,167	829,011	139,746,160	0	0	844	844	0	173,124,303
2010	2,578,487	98,291,257	792,511	138,378,309	0	0	1,071	1,071	0	175,711,729
2011	2,657,076	105,536,513	849,612	150,292,301	0	0	2,754	2,754	0	192,708,842
2012	2,638,103	118,664,443	957,669	167,221,269	0	0	1,093	1,093	0	212,757,854
2013	2,717,402	132,931,302	1,124,395	186,457,020	0	0	289	289	0	234,462,715
2014	3,089,541	145,664,746	1,169,763	206,823,244	0	0	116	116	0	257,379,959
2015	3,098,949	131,828,685	1,047,258	189,732,048	0	0	117	117	0	246,274,013
2016	3,287,873	131,261,678	1,059,972	188,336,086	0	0	5,402	5,402	0	251,031,783
2017	3,555,756	135,179,886	1,139,154	188,582,852	0	0	113	113	0	249,369,327
2018	4,298,992	148,889,895	1,163,922	213,301,040	0	0	382	382	0	275,048,032
2019	**4,473,102**	**147,937,015**	**1,180,946**	**211,837,195**	**0**	**0**	**375**	**375**	**0**	**274,149,793**
2020	4,516,323	153,506,160	1,277,873	217,120,814	0	0	371	371	0	279,102,244
2021	4,463,162	150,441,587	1,219,196	214,864,979	0	0	380	380	0	277,643,746
2022	4,507,795	151,946,000	1,231,388	217,013,626	0	0	384	384	0	280,420,181
2023	4,552,872	153,465,461	1,243,702	219,183,763	0	0	387	387	0	283,224,383
2024	4,598,400	155,000,115	1,256,139	221,375,597	0	0	391	391	0	286,056,623
2025	4,644,385	156,550,117	1,268,700	223,589,356	0	0	395	395	0	288,917,192
2026	4,690,827	158,115,617	1,281,387	225,825,246	0	0	399	399	0	291,806,360
2027	4,737,737	159,696,771	1,294,201	228,083,497	0	0	403	403	0	294,724,423
2028	4,785,114	161,293,741	1,307,143	230,364,336	0	0	407	407	0	297,671,671
2029	4,832,965	162,906,678	1,320,214	232,667,979	0	0	411	411	0	300,648,390
2030	4,881,294	164,535,745	1,333,417	234,994,658	0	0	415	415	0	303,654,870
2031	4,930,108	166,181,102	1,346,751	237,344,605	0	0	419	419	0	306,691,421
2032	4,979,410	167,842,913	1,360,218	239,718,052	0	0	424	424	0	309,758,335
2033	5,029,203	169,521,342	1,373,820	242,115,230	0	0	428	428	0	312,855,917
2034	5,079,495	171,216,557	1,387,559	244,536,386	0	0	432	432	0	315,984,480
2035	5,130,290	172,928,723	1,401,434	246,981,750	0	0	437	437	0	319,144,326
TOTAL	**138,302,204**	**6,016,706,196**	**48,315,175**	**8,267,149,089**	**0**	**0**	**108,238**	**108,238**	**8,748,370**	**10,527,104,606**

TABLE B-16B Minimum OMP&R Component of Transportation Charge for Each Contractor for Off-Aqueduct Power Facilities[a,b,c] (in dollars)

Sheet 1 of 4

Calendar Year	NORTH BAY AREA			SOUTH BAY AREA				CENTRAL COASTAL AREA		
	Napa	Solano	Total	Alameda-Zone 7	Alameda County	Santa Clara	Total	San Luis Obispo	Santa Barbara	Total
	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]
1971	0	0	0	0	0	0	0	0	0	0
1972	0	0	0	0	0	0	0	0	0	0
1973	0	0	0	0	0	0	0	0	0	0
1974	0	0	0	0	0	0	0	0	0	0
1975	0	0	0	0	0	0	0	0	0	0
1976	0	0	0	0	0	0	0	0	0	0
1977	0	0	0	0	0	0	0	0	0	0
1978	0	0	0	0	0	0	0	0	0	0
1979	0	0	0	0	0	0	0	0	0	0
1980	0	0	0	0	0	0	0	0	0	0
1981	0	0	0	0	0	0	0	0	0	0
1982	0	0	0	0	0	0	0	0	0	0
1983	10,070	0	10,070	47,473	31,446	863,937	942,856	0	0	0
1984	29,957	0	29,957	157,280	77,388	2,040,188	2,274,856	0	0	0
1985	54,709	0	54,709	458,427	582,679	2,696,450	3,737,556	0	0	0
1986	45,887	0	45,887	312,938	365,147	2,595,765	3,273,850	0	0	0
1987	90,385	0	90,385	622,029	674,111	2,306,079	3,602,219	0	0	0
1988	115,970	114,196	230,166	616,865	804,606	2,116,236	3,537,707	0	0	0
1989	64,584	138,240	202,824	407,353	396,069	1,389,347	2,192,769	0	0	0
1990	77,126	138,805	215,931	535,269	514,372	1,490,250	2,539,891	0	0	0
1991	35,178	245,181	280,359	355,578	477,883	1,065,488	1,898,949	0	165,930	165,930
1992	74,573	230,716	305,289	405,244	529,119	1,183,466	2,117,829	0	0	0
1993	89,214	247,977	337,191	841,383	256,930	1,552,562	2,650,875	0	0	0
1994	111,942	229,598	341,540	501,812	559,683	1,395,238	2,456,733	0	0	0
1995	96,842	235,605	332,447	833,227	492,578	796,524	2,122,329	0	0	0
1996	63,698	205,414	269,112	367,297	304,845	1,189,291	1,861,433	711	105	816
1997	48,518	193,255	241,773	455,751	294,951	1,220,497	1,971,199	44,788	298,986	343,774
1998	82,317	251,217	333,534	380,321	380,282	1,103,662	1,864,265	198,376	1,028,220	1,226,596
1999	58,017	195,562	253,579	559,900	446,655	1,039,572	2,046,127	147,204	791,946	939,150
2000	28,759	128,393	157,152	374,808	237,138	748,820	1,360,766	82,628	474,268	556,896
2001	81,666	157,196	238,862	396,340	233,205	673,431	1,302,976	134,574	595,294	729,868
2002	40,236	127,750	167,986	383,365	229,280	519,819	1,132,464	91,639	583,933	675,572
2003	37,618	92,735	130,353	301,657	180,804	643,729	1,126,190	78,771	477,048	555,819
2004	50,289	128,180	178,469	447,802	210,093	546,342	1,204,237	92,836	662,110	754,946
2005	53,455	149,328	202,783	452,896	265,252	772,420	1,490,568	106,901	587,036	693,937
2006	59,239	127,708	186,947	476,295	277,304	798,098	1,551,697	109,498	605,502	715,000
2007	82,724	182,954	265,678	445,250	246,862	740,211	1,432,323	103,331	759,114	862,445
2008	200,185	304,502	504,687	861,568	428,737	1,074,975	2,365,280	184,501	997,507	1,182,008
2009	167,186	237,569	404,755	708,409	418,456	1,279,442	2,406,307	209,684	853,143	1,062,827
2010	186,503	221,486	407,989	876,092	407,548	1,266,270	2,549,910	203,422	963,122	1,166,544
2011	121,673	145,499	267,172	685,604	372,699	1,174,038	2,232,341	147,645	829,034	976,679
2012	130,199	185,005	315,204	830,163	319,227	1,135,648	2,285,038	186,059	920,215	1,106,274
2013	114,869	172,310	287,179	609,808	327,688	1,046,787	1,984,283	121,826	607,752	729,578
2014	97,013	94,810	191,823	317,446	235,476	541,866	1,094,788	83,501	442,785	526,286
2015	35,066	47,874	82,940	140,365	92,557	306,876	539,798	38,476	155,225	193,701
2016	4,534	8,280	12,814	30,111	17,686	63,625	111,422	5,487	33,137	38,624
2017	3,193	6,276	9,469	20,539	13,681	45,856	80,076	3,450	19,720	23,170
2018	3,907	6,977	10,884	22,043	15,059	51,010	88,112	3,886	21,078	24,964
2019	**6,596**	**12,686**	**19,282**	**41,198**	**27,529**	**91,149**	**159,876**	**7,719**	**39,468**	**47,187**
2020	21,403	25,357	46,760	82,398	42,663	109,297	234,358	56,163	120,593	176,755
2021	402	491	893	1,511	785	2,054	4,350	1,109	2,266	3,376
2022	402	491	893	1,511	785	2,054	4,350	1,109	2,266	3,376
2023	402	491	893	1,511	785	2,054	4,350	1,109	2,266	3,376
2024	402	491	893	1,511	785	2,054	4,350	1,109	2,266	3,376
2025	402	491	893	1,511	785	2,054	4,350	1,109	2,266	3,376
2026	402	491	893	1,511	785	2,054	4,350	1,109	2,266	3,376
2027	402	491	893	1,511	785	2,054	4,350	1,109	2,266	3,376
2028	402	491	893	1,511	785	2,054	4,350	1,109	2,266	3,376
2029	402	491	893	1,511	785	2,054	4,350	1,109	2,266	3,376
2030	402	491	893	1,511	785	2,054	4,350	1,109	2,266	3,376
2031	402	491	893	1,511	785	2,054	4,350	1,109	2,266	3,376
2032	402	491	893	1,511	785	2,054	4,350	1,109	2,266	3,376
2033	402	491	893	1,511	785	2,054	4,350	1,109	2,266	3,376
2034	402	491	893	1,511	785	2,054	4,350	1,109	2,266	3,376
2035	402	491	893	1,511	785	2,054	4,350	1,109	2,266	3,376
TOTAL	**2,681,333**	**4,996,006**	**7,677,339**	**16,384,963**	**11,799,469**	**39,705,071**	**67,889,502**	**2,459,714**	**13,066,266**	**15,525,979**

[a] 1983 through 2017 changes are debt service only and do not include bond cover.

[b] 2009 through 2020 charges include Reid Gardner separation costs that are allocated to SWP water contractors based on theoretical energy use over the facility service life, 1983–2013.

[c] 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-16B Minimum OMP&R Component of Transportation Charge for Each Contractor for Off-Aqueduct Power Facilities[a,b,c] (in dollars)

Sheet 2 of 4

Calendar Year	SAN JOAQUIN VALLEY AREA							
			Kern					
	Dudley Ridge	Empire	Municipal and Industrial	Agricultural	Kings	Oak Flat	Tulare	Total
	[11]	[12]	[13]	[14]	[15]	[16]	[17]	[18]
1971	0	0	0	0	0	0	0	0
1972	0	0	0	0	0	0	0	0
1973	0	0	0	0	0	0	0	0
1974	0	0	0	0	0	0	0	0
1975	0	0	0	0	0	0	0	0
1976	0	0	0	0	0	0	0	0
1977	0	0	0	0	0	0	0	0
1978	0	0	0	0	0	0	0	0
1979	0	0	0	0	0	0	0	0
1980	0	0	0	0	0	0	0	0
1981	0	0	0	0	0	0	0	0
1982	0	0	0	0	0	0	0	0
1983	159,191	0	34,366	2,964,185	13,174	9,673	3,733	3,184,322
1984	389,518	0	816,103	9,095,509	26,774	33,576	49,601	10,411,081
1985	527,952	59,322	1,053,957	11,978,046	38,810	42,297	1,253,257	14,953,641
1986	552,172	12,858	885,988	11,788,714	40,659	38,275	872,008	14,190,674
1987	450,941	24,936	1,192,388	10,448,063	39,134	37,538	911,938	13,104,938
1988	425,261	31,146	1,130,988	9,910,050	35,851	26,779	850,225	12,410,300
1989	331,852	17,226	607,908	7,400,983	22,959	24,306	754,007	9,159,241
1990	219,381	7,731	428,482	5,216,562	12,089	12,046	344,943	6,241,234
1991	13,048	3,111	570,942	146,276	0	1,354	30,685	765,416
1992	244,630	13,395	706,155	5,788,599	18,587	15,716	480,903	7,267,985
1993	471,706	25,543	1,202,455	11,405,212	37,276	36,803	1,159,908	14,338,903
1994	262,029	15,161	901,463	6,786,208	19,257	19,061	567,521	8,570,700
1995	626,214	16,830	1,486,494	12,489,555	41,275	36,377	1,051,178	15,747,923
1996	407,919	13,446	1,226,968	9,219,091	28,668	24,001	1,691,135	12,611,228
1997	423,144	(6)	794,476	7,471,645	(31)	22,025	137,304	8,848,557
1998	471,993	4,597	837,228	8,366,817	127	25,458	175,371	9,881,591
1999	360,554	19,182	874,948	7,723,883	24,159	20,065	1,749,925	10,772,716
2000	193,895	5,762	392,659	4,215,772	11,530	9,847	667,127	5,496,592
2001	200,485	6,563	113,854	2,948,087	7,528	11,821	287,409	3,575,747
2002	153,306	4,540	308,554	2,797,916	9,223	10,767	299,940	3,584,246
2003	125,188	3,901	301,142	2,626,386	10,030	7,904	287,531	3,362,082
2004	168,005	12,193	457,106	2,914,113	30,989	10,807	278,204	3,871,417
2005	315,142	14,807	358,007	5,609,958	76,490	11,047	540,681	6,926,132
2006	287,977	13,112	401,503	5,488,668	38,075	11,559	432,313	6,673,207
2007	189,684	8,758	242,253	3,662,405	24,280	10,224	365,975	4,503,579
2008	184,682	7,887	381,864	3,930,067	31,949	11,276	282,379	4,830,104
2009	181,200	8,817	63,082	4,518,839	28,827	11,595	314,621	5,126,981
2010	250,194	27,117	96,128	5,774,210	40,474	16,580	488,098	6,692,801
2011	362,592	11,506	290,168	7,797,111	39,939	11,233	338,448	8,850,997
2012	139,042	16,387	281,108	5,881,018	53,747	16,121	654,940	7,042,363
2013	174,617	9,247	247,481	4,100,710	25,730	11,818	300,486	4,870,089
2014	121,811	4,353	114,780	2,211,296	10,098	7,131	151,394	2,620,863
2015	57,355	2,365	89,264	1,214,150	5,119	3,182	93,155	1,464,590
2016	14,059	654	23,321	308,938	1,447	850	26,898	376,167
2017	11,535	486	20,054	244,269	1,116	690	21,719	299,869
2018	12,452	528	21,660	258,640	1,208	752	23,474	318,714
2019	**22,745**	**972**	**40,658**	**480,968**	**2,213**	**1,382**	**43,232**	**592,170**
2020	19,386	1,221	65,478	453,617	3,868	1,583	35,615	580,769
2021	364	23	1,231	8,609	73	30	669	10,998
2022	364	23	1,231	8,609	73	30	669	10,998
2023	364	23	1,231	8,609	73	30	669	10,998
2024	364	23	1,231	8,609	73	30	669	10,998
2025	364	23	1,231	8,609	73	30	669	10,998
2026	364	23	1,231	8,609	73	30	669	10,998
2027	364	23	1,231	8,609	73	30	669	10,998
2028	364	23	1,231	8,609	73	30	669	10,998
2029	364	23	1,231	8,609	73	30	669	10,998
2030	364	23	1,231	8,609	73	30	669	10,998
2031	364	23	1,231	8,609	73	30	669	10,998
2032	364	23	1,231	8,609	73	30	669	10,998
2033	364	23	1,231	8,609	73	30	669	10,998
2034	364	23	1,231	8,609	73	30	669	10,998
2035	364	23	1,231	8,609	73	30	669	10,998
TOTAL	**9,528,323**	**425,999**	**19,079,892**	**205,765,664**	**853,738**	**603,965**	**18,027,321**	**254,284,902**

[a] 1983 through 2017 charges are debt service only and do not include bond cover.

[b] 2009 through 2020 charges include Reid Gardner separation costs that are allocated to SWP water contractors based on theoretical energy use over the facility service life, 1983–2013.

[c] 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-16B Minimum OMP&R Component of Transportation Charge for Each Contractor for Off-Aqueduct Power Facilities[a,b,c] (in dollars)

Sheet 3 of 4

Calendar Year	SOUTHERN CALIFORNIA AREA									
	AVEK	Castaic Lake	Coachella	Crestline	Desert	Littlerock	Mojave	Palmdale	San Bernardino	San Gabriel
	[19]	[20]	[21]	[22]	[23]	[24]	[25]	[26]	[27]	[28]
1971	0	0	0	0	0	0	0	0	0	0
1972	0	0	0	0	0	0	0	0	0	0
1973	0	0	0	0	0	0	0	0	0	0
1974	0	0	0	0	0	0	0	0	0	0
1975	0	0	0	0	0	0	0	0	0	0
1976	0	0	0	0	0	0	0	0	0	0
1977	0	0	0	0	0	0	0	0	0	0
1978	0	0	0	0	0	0	0	0	0	0
1979	0	0	0	0	0	0	0	0	0	0
1980	0	0	0	0	0	0	0	0	0	0
1981	0	0	0	0	0	0	0	0	0	0
1982	0	0	0	0	0	0	0	0	0	0
1983	1,083,881	411,247	565,798	35,432	894,572	1,250	0	0	233,134	28,548
1984	2,499,848	1,122,640	1,427,428	102,114	2,263,172	77	0	0	502,967	693,074
1985	3,749,257	1,572,025	2,032,672	170,137	3,230,451	0	0	157,601	884,188	601,583
1986	3,159,857	1,694,487	2,097,408	173,460	3,340,188	15,873	0	301,486	739,563	1,088,901
1987	3,167,759	1,694,698	1,991,841	190,149	3,230,424	95,994	1,786	258,719	1,951,799	1,091,691
1988	2,688,113	1,776,471	1,940,156	187,156	3,194,137	30,395	846	126,639	2,000,664	839,774
1989	2,357,669	1,348,806	1,326,863	132,076	2,218,516	50,948	13,206	493,424	1,257,332	792,087
1990	2,528,625	1,335,341	1,463,452	115,746	2,413,745	110,678	0	545,342	1,192,997	1,054,762
1991	1,048,414	531,160	1,022,405	125,256	1,686,304	65,111	473,291	488,207	540,119	796,531
1992	2,760,199	1,548,472	1,124,775	55,985	1,855,065	22,891	1,130,876	367,996	362,232	853,047
1993	3,559,487	1,332,392	2,256,338	29,498	3,721,492	60,615	1,101,799	640,919	425,969	1,406,255
1994	3,963,982	1,450,328	1,345,145	74,879	2,218,411	88,549	1,371,116	678,876	871,358	1,452,741
1995	4,324,009	1,901,361	2,498,462	44,237	4,120,837	43,892	881,146	636,541	75,278	1,397,623
1996	3,572,856	1,507,542	4,652,945	77,384	7,674,388	31,691	760,763	723,670	458,246	1,201,941
1997	3,411,379	1,468,949	4,294,703	42,135	4,319,206	24,319	891,191	648,652	625,340	1,175,556
1998	3,977,988	1,599,394	7,554,910	16,624	6,174,031	30,365	508,248	657,806	166,952	827,650
1999	3,696,973	1,694,851	3,195,685	71,662	3,678,076	18,305	501,486	710,674	815,001	1,375,575
2000	2,372,130	994,396	1,420,806	40,083	1,954,947	0	374,972	257,146	617,664	508,258
2001	2,680,895	1,418,179	460,256	53,460	759,169	0	213,385	445,872	1,339,699	119,363
2002	1,668,457	1,384,832	567,521	74,145	936,215	0	140,035	529,674	2,414,011	841,746
2003	1,445,146	1,353,956	411,258	44,506	678,236	0	405,376	277,984	780,631	624,561
2004	1,813,317	1,677,090	554,874	71,974	760,283	0	465,965	368,929	2,072,770	449,963
2005	2,047,638	1,443,555	1,721,141	32,667	1,987,091	0	542,366	400,828	1,568,493	566,063
2006	2,845,985	1,617,750	5,071,235	26,843	2,093,821	0	1,417,777	442,278	1,533,665	681,916
2007	2,990,954	1,864,667	3,225,680	77,880	1,331,802	0	2,023,088	710,515	2,639,102	177,256
2008	3,547,772	3,303,503	4,059,802	74,029	2,237,582	1,845	2,200,333	1,052,126	3,410,480	629,597
2009	3,350,539	3,010,931	4,067,070	79,671	1,633,327	3,263	2,559,670	1,152,062	3,948,007	1,025,723
2010	4,321,133	2,663,067	7,385,867	31,714	2,730,993	177	3,304,241	810,142	4,668,858	1,673,291
2011	4,952,954	1,811,301	5,605,548	13,018	2,290,872	407	309,065	551,068	2,185,513	1,468,910
2012	5,401,397	2,619,529	8,864,502	48,852	3,451,280	495	848,848	1,072,349	7,388,666	1,677,958
2013	2,563,236	2,266,914	3,520,765	77,123	1,425,559	3,270	475,946	512,798	1,986,377	591,150
2014	1,148,978	1,191,895	1,021,712	56,389	644,953	3,804	273,011	348,413	787,781	231,637
2015	530,003	545,173	828,767	25,589	460,870	2,214	205,015	131,952	568,141	185,603
2016	153,406	94,339	165,508	3,945	121,267	746	46,118	29,017	118,424	48,184
2017	120,731	69,220	111,815	2,877	96,134	658	29,936	21,152	71,234	34,512
2018	129,820	77,659	128,915	3,388	106,027	749	30,936	22,269	76,777	37,292
2019	**241,243**	**139,551**	**224,491**	**6,149**	**192,221**	**1,462**	**62,654**	**42,920**	**140,581**	**68,574**
2020	522,920	357,828	590,440	24,753	237,926	8,299	365,036	112,936	437,869	122,910
2021	9,531	6,725	11,096	465	4,471	156	5,566	2,214	8,229	2,310
2022	9,531	6,725	11,096	465	4,471	156	5,566	2,214	8,229	2,310
2023	9,531	6,725	11,096	465	4,471	156	5,566	2,214	8,229	2,310
2024	9,531	6,725	11,096	465	4,471	156	5,566	2,214	8,229	2,310
2025	9,531	6,725	11,096	465	4,471	156	5,566	2,214	8,229	2,310
2026	9,531	6,725	11,096	465	4,471	156	5,566	2,214	8,229	2,310
2027	9,531	6,725	11,096	465	4,471	156	5,566	2,214	8,229	2,310
2028	9,531	6,725	11,096	465	4,471	156	5,566	2,214	8,229	2,310
2029	9,531	6,725	11,096	465	4,471	156	5,566	2,214	8,229	2,310
2030	9,531	6,725	11,096	465	4,471	156	5,566	2,214	8,229	2,310
2031	9,531	6,725	11,096	465	4,471	156	5,566	2,214	8,229	2,310
2032	9,531	6,725	11,096	465	4,471	156	5,566	2,214	8,229	2,310
2033	9,531	6,725	11,096	465	4,471	156	5,566	2,214	8,229	2,310
2034	9,531	6,725	11,096	465	4,471	156	5,566	2,214	8,229	2,310
2035	9,531	6,725	11,096	465	4,471	156	5,566	2,214	8,229	2,310
TOTAL	**96,541,922**	**53,996,371**	**90,965,403**	**2,519,963**	**82,430,661**	**720,681**	**24,013,023**	**16,762,189**	**51,981,316**	**28,476,455**

[a] 1983 through 2017 charges are debt service only and do not include bond cover.

[b] 2009 through 2020 charges include Reid Gardner separation costs that are allocated to SWP water contractors based on theoretical energy use over the facility service life, 1983–2013.

[c] 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-16B Minimum OMP&R Component of Transportation Charge for Each Contractor for Off-Aqueduct Power Facilities[a,b,c] (in dollars)

Sheet 4 of 4

Calendar Year	SOUTHERN CALIFORNIA AREA (continued)				FEATHER RIVER AREA				
	San Gorgonio	Metropolitan	Ventura	Total	Yuba City	Butte	Plumas	Total	Total State Water Project[c]
	[29]	[30]	[31]	[32]	[33]	[34]	[35]	[36]	[37]
1971	0	0	0	0	0	0	0	0	0
1972	0	0	0	0	0	0	0	0	0
1973	0	0	0	0	0	0	0	0	0
1974	0	0	0	0	0	0	0	0	0
1975	0	0	0	0	0	0	0	0	0
1976	0	0	0	0	0	0	0	0	0
1977	0	0	0	0	0	0	0	0	0
1978	0	0	0	0	0	0	0	0	0
1979	0	0	0	0	0	0	0	0	0
1980	0	0	0	0	0	0	0	0	0
1981	0	0	0	0	0	0	0	0	0
1982	0	0	0	0	0	0	0	0	0
1983	0	12,791,358	0	16,045,220	0	0	0	0	20,182,468
1984	0	39,229,567	0	47,840,887	0	0	0	0	60,556,781
1985	0	77,446,523	0	89,844,437	0	0	0	0	108,590,343
1986	0	77,581,287	0	90,192,510	0	0	0	0	107,702,921
1987	0	68,939,195	0	82,614,055	0	0	0	0	99,411,597
1988	0	79,936,309	0	92,720,660	0	0	0	0	108,898,833
1989	0	68,311,546	0	78,302,473	0	0	0	0	89,857,307
1990	0	83,964,409	277,885	95,002,982	0	0	0	0	104,000,038
1991	0	54,214,229	132,209	61,123,236	0	0	0	0	64,233,890
1992	0	72,401,054	0	82,482,592	0	0	0	0	92,173,695
1993	0	55,312,615	0	69,847,379	0	0	0	0	87,174,348
1994	0	72,838,621	0	86,354,006	0	0	0	0	97,722,979
1995	0	40,862,813	0	56,786,199	0	0	0	0	74,988,898
1996	0	36,536,259	401	57,198,086	0	0	0	0	71,940,675
1997	0	37,121,379	108,559	54,131,368	0	0	0	0	65,536,671
1998	0	30,341,609	149,170	52,004,747	0	0	0	0	65,310,733
1999	0	42,257,580	106,226	58,122,094	0	0	0	0	72,133,666
2000	0	43,977,877	123,318	52,641,597	0	0	0	0	60,213,003
2001	0	49,405,276	84,868	56,980,422	0	0	0	0	62,827,875
2002	0	45,412,974	153,549	54,123,159	0	0	0	0	59,683,427
2003	3,303	41,917,356	129,134	48,071,447	0	0	0	0	53,245,891
2004	44,648	58,676,035	170,851	67,126,699	0	0	0	0	73,135,768
2005	41,448	56,220,579	61,131	66,633,000	0	0	0	0	75,946,420
2006	265,078	60,701,335	70,268	76,767,951	0	0	0	0	85,894,802
2007	248,328	61,354,857	119,861	76,763,990	0	0	0	0	83,828,015
2008	616,986	72,144,765	300,729	93,579,549	0	0	0	0	102,461,628
2009	819,589	71,530,603	313,357	93,493,812	0	0	0	0	102,494,682
2010	1,048,807	88,263,837	322,003	117,224,130	0	0	0	0	128,041,374
2011	954,501	80,381,761	225,564	100,750,482	0	0	0	0	113,077,671
2012	1,225,982	78,031,475	299,385	110,930,718	0	0	0	0	121,679,597
2013	679,437	49,351,291	144,019	63,597,885	0	0	0	0	71,469,014
2014	284,110	24,242,063	30,070	30,264,816	0	0	0	0	34,698,576
2015	90,577	14,384,861	27,465	17,986,230	0	0	0	0	20,267,259
2016	18,721	3,266,601	7,114	4,073,390	0	0	0	0	4,612,417
2017	8,590	2,393,010	5,415	2,965,284	0	0	0	0	3,377,868
2018	9,412	2,538,567	5,515	3,167,326	0	0	0	0	3,610,000
2019	**16,791**	**4,734,971**	**9,877**	**5,881,485**	**0**	**0**	**0**	**0**	**6,700,000**
2020	109,089	6,752,036	19,316	9,661,358	0	0	0	0	10,700,000
2021	2,037	127,218	364	180,383	0	0	0	0	200,000
2022	2,037	127,218	364	180,383	0	0	0	0	200,000
2023	2,037	127,218	364	180,383	0	0	0	0	200,000
2024	2,037	127,218	364	180,383	0	0	0	0	200,000
2025	2,037	127,218	364	180,383	0	0	0	0	200,000
2026	2,037	127,218	364	180,383	0	0	0	0	200,000
2027	2,037	127,218	364	180,383	0	0	0	0	200,000
2028	2,037	127,218	364	180,383	0	0	0	0	200,000
2029	2,037	127,218	364	180,383	0	0	0	0	200,000
2030	2,037	127,218	364	180,383	0	0	0	0	200,000
2031	2,037	127,218	364	180,383	0	0	0	0	200,000
2032	2,037	127,218	364	180,383	0	0	0	0	200,000
2033	2,037	127,218	364	180,383	0	0	0	0	200,000
2034	2,037	127,218	364	180,383	0	0	0	0	200,000
2035	2,037	127,218	364	180,383	0	0	0	0	200,000
TOTAL	**6,515,956**	**1,867,676,753**	**3,402,715**	**2,326,003,407**	**0**	**0**	**0**	**0**	**2,671,381,130**

[a] 1983 through 2017 charges are debt service only and do not include bond cover.

[b] 2009 through 2020 charges include Reid Gardner separation costs that are allocated to SWP water contractors based on theoretical energy use over the facility service life, 1983–2013.

[c] 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&R Component of Transportation Charge (in dollars per acre-foot)

	NORTH BAY AQUEDUCT						SOUTH BAY AQUEDUCT		CALIFORNIA AQUEDUCT	
	Reach 1		Reach 3A		Reach 3B		Reach 1		Reach 1	
	Barker Slough Pumping Plant		Cordelia Pumping Plant Solano		Cordelia Pumping Plant Napa[a]		South Bay and Del Valle Pumping Plants[b]		Banks Pumping Plant	
Calendar Year	Unit Rate	Cumulative Unit Rate	Unit Rate	Cumulative Unit Rate	Unit Rate	Cumulative Unit Rate	Unit Rate	Cumulative Unit Rate	Unit Rate	Cumulative Unit Rate
	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]
1961	0	0	0	0	0	0	0	0	0	0
1962	0	0	0	0	0	0	4.1511341	4.1511341	0	0
1963	0	0	0	0	0	0	4.5639383	4.5639383	0	0
1964	0	0	0	0	0	0	3.5452154	3.5452154	0	0
1965	0	0	0	0	0	0	4.1911773	4.1911773	0	0
1966	0	0	0	0	0	0	3.5074573	3.5074573	0	0
1967	0	0	0	0	0	0	3.9306767	4.1752198	0.2445431	0.2445431
1968	0	0	0	0	5.7570017	5.7570017	3.3315620	4.8750942	1.5435322	1.5435322
1969	0	0	0	0	3.1823595	3.1823595	3.6949019	4.8016170	1.1067151	1.1067151
1970	0	0	0	0	3.7584301	3.7584301	4.4256141	5.3721490	0.9465349	0.9465349
1971	0	0	0	0	4.2082507	4.2082507	3.8714396	4.7522833	0.8808437	0.8808437
1972	0	0	0	0	3.9577735	3.9577735	4.3250690	5.2281686	0.9030996	0.9030996
1973	0	0	0	0	3.8103903	3.8103903	5.2455409	6.1841801	0.9386391	0.9386391
1974	0	0	0	0	3.5878850	3.5878850	6.3321503	7.2293909	0.8972406	0.8972406
1975	0	0	0	0	2.1606725	2.1606725	3.7365711	4.8327731	1.0962020	1.0962020
1976	0	0	0	0	2.9283909	2.9283909	4.5191527	5.7132795	1.1941268	1.1941268
1977	0	0	0	0	2.7516411	2.7516411	4.7630172	6.5309908	1.7679736	1.7679736
1978	0	0	0	0	3.5949619	3.5949619	5.2086183	6.8200210	1.6114026	1.6114026
1979	0	0	0	0	2.4747752	2.4747752	4.9524184	7.0944849	2.1420665	2.1420665
1980	0	0	0	0	2.9737588	2.9737588	4.5186576	5.8810391	1.3623815	1.3623815
1981	0	0	0	0	2.6488168	2.6488168	4.3834851	6.4541818	2.0706967	2.0706967
1982	0	0	0	0	10.0222589	10.0222589	5.6383622	7.4005197	1.7621575	1.7621575
1983	0	0	0	0	1.0240490	1.0240490	0.8686401	1.7143948	0.8457546	0.8457546
1984	0	0	0	0	1.6496750	1.6496750	2.7674018	3.9368186	1.1694168	1.1694168
1985	0	0	0	0	2.5224065	2.5224065	3.6942206	5.2987621	1.6045415	1.6045415
1986	0	0	0	0	4.4049446	4.4049446	7.2799222	10.5919298	3.3120077	3.3120077
1987	0	0	0	0	3.5386715	3.5386715	6.4837861	9.2276309	2.7438448	2.7438448
1988	1.1782643	1.1782643	0	1.1782643	4.4547478	5.6330121	6.1750026	8.8623074	2.6873049	2.6873049
1989	1.2715449	1.2715449	2.5423866	3.8139316	4.2807103	5.5522552	8.1617218	11.6840191	3.5222973	3.5222973
1990	2.0026083	2.0026083	4.2324041	6.2350124	5.8753602	7.8779685	11.7200790	15.8516543	4.1315753	4.1315753
1991	1.2486830	1.2486830	2.6246433	3.8733263	3.8057971	5.0544801	7.5402615	11.2354099	3.6951485	3.6951485
1992	0.7094386	0.7094386	1.4175705	2.1270091	2.3509123	3.0603509	4.0600958	6.3925272	2.3324315	2.3324315
1993	-0.3464574	-0.3464574	-0.6048649	-0.9513223	-1.0200530	-1.3665104	-1.4929934	-1.2571378	0.2358556	0.2358556
1994	1.4600287	1.4600287	2.6570107	4.1170394	4.2975560	5.7575847	7.9510779	11.2405895	3.2895116	3.2895116
1995	0.7544766	0.7544766	1.2974265	2.0519031	2.2753763	3.0298529	3.2312761	5.2610469	2.0297708	2.0297708
1996	1.6427835	1.6427835	2.7704025	4.4131859	4.7993051	6.4420886	8.0186492	11.3633990	3.3447498	3.3447498
1997	1.7801484	1.7801484	3.0246843	4.8048327	5.0575904	6.8377388	9.6521246	12.6148370	2.9627125	2.9627125
1998	-0.3253238	-0.3253238	-0.5570754	-0.8823992	-0.9104311	-1.2357549	-1.8866894	-1.7684350	0.1182544	0.1182544
1999	0.8136316	0.8136316	1.3344157	2.1480473	2.2476094	3.0612409	4.1251508	6.5396327	2.4144819	2.4144819
2000	1.3866159	1.3866159	1.9633803	3.3499962	3.0210750	4.4076910	6.3105300	8.6058809	2.2953510	2.2953510
2001	8.1191305	8.1191305	12.5398434	20.6589739	22.6630508	30.7821813	42.1952424	54.9383080	12.7430656	12.7430656
2002	4.1919307	4.1919307	5.3026984	9.4946291	8.9411156	13.1330463	18.1280636	24.2060285	6.0779649	6.0779649
2003	4.3522704	4.3522704	7.0890449	11.4413153	12.8010554	17.1533258	19.2857696	26.0112488	6.7254792	6.7254792
2004	4.9185632	4.9185632	6.4207890	11.3393522	12.6192952	17.5378585	19.8727176	27.1452671	7.2725495	7.2725495
2005	6.2706237	6.2706237	7.7072771	13.9779008	18.6144338	24.8850574	25.9514011	34.0659018	8.1145007	8.1145007
2006	5.4399330	5.4399330	6.2619983	11.7019313	18.2806670	23.7206000	22.8767223	29.6918224	6.8151001	6.8151001
2007	7.7565590	7.7565590	8.2045346	15.9610936	22.7900532	30.5466123	31.6227665	40.8504831	9.2277166	9.2277166
2008	7.7709467	7.7709467	10.0846311	17.8555778	22.0074178	29.7783644	28.6366495	41.0205231	12.3838736	12.3838736
2009	5.2294947	5.2294947	6.6742086	11.9037033	14.3323038	19.5617984	21.2143060	27.1183523	5.9040464	5.9040464
2010	6.0245942	6.0245942	8.7805865	14.8051807	16.7634973	22.7880915	24.7906703	34.2260486	9.4353782	9.4353782
2011	6.8812208	6.8812208	9.0461425	15.9273633	20.2561960	27.1374169	29.9716826	40.8044387	10.8327561	10.8327561
2012	6.9372889	6.9372889	9.6127053	16.5499942	19.2585233	26.1958123	31.5254526	42.0508548	10.5254021	10.5254021
2013	8.9952676	8.9952676	10.7132447	19.7085123	25.8539894	34.8492571	36.5445195	49.6133451	13.0688255	13.0688255
2014	10.6847144	10.6847144	14.9633810	25.6480955	31.5990944	42.2838088	45.1194476	64.7065891	19.5871415	19.5871415
2015	11.1293250	11.1293250	15.6365838	26.7659087	32.2918809	43.4212059	47.7585237	68.4634839	20.7049602	20.7049602
2016	8.4186223	8.4186223	12.2254121	20.6440344	28.3613725	36.7799948	36.4443356	51.3603756	14.9160400	14.9160400
2017	8.0960863	8.0960863	12.6786485	20.7747349	22.5587843	30.6548706	40.1357613	53.6896791	13.5539178	13.5539178
2018	13.4308820	13.4308820	7.3776032	20.8084852	33.9363005	47.3671825	48.6148527	69.4878689	20.8730163	20.8730163
2019	**14.7097572**	**14.7097572**	**28.6596337**	**43.3693908**	**37.1676234**	**51.8773806**	**39.9805820**	**54.9244021**	**14.9438201**	**14.9438201**
2020	14.2997832	14.2997832	27.8608842	42.1606673	36.1317451	50.4315283	40.0268069	55.6984953	15.6716884	15.6716884
2021	11.7446010	11.7446010	24.2124080	35.9570090	48.1462687	59.8908697	40.9696043	58.1154026	17.1457983	17.1457983
2022	11.8872723	11.8872723	24.5064893	36.3937617	50.1376579	62.0249302	41.4624143	56.9213045	15.4588902	15.4588902
2023	12.0103209	12.0103209	24.7601747	36.7704956	50.6566590	62.6669799	41.8916389	50.8220781	8.9304392	8.9304392
2024	11.9544232	11.9544232	24.6449287	36.5993519	50.4208381	62.3752614	41.6966365	60.0884452	18.3918087	18.3918087
2025	11.9870772	11.9870772	24.7122256	36.6993028	50.5585534	62.5456306	41.8105216	58.4686702	16.6581486	16.6581486
2026	11.9883565	11.9883565	24.7148694	36.7032259	50.5640069	62.5523634	41.8149944	54.8765565	13.0615621	13.0615621
2027	11.9926713	11.9926713	24.7238023	36.7164736	50.5822044	62.5748757	41.8300778	55.9385391	14.1084613	14.1084613
2028	11.9975499	11.9975499	24.7338167	36.7313666	50.6027555	62.6003053	41.8470639	54.2417186	12.3946548	12.3946548
2029	11.9940807	11.9940807	24.7266864	36.7207671	50.5881745	62.5822552	41.8349956	54.7049435	12.8699478	12.8699478
2030	11.9685820	11.9685820	24.6741308	36.6427127	50.4805970	62.4491790	41.7460527	58.1002102	16.3541575	16.3541575
2031	11.9785343	11.9785343	24.6946403	36.6731745	50.5226177	62.5011519	41.7807767	59.9441522	18.1633755	18.1633755
2032	11.9896141	11.9896141	24.7175132	36.7071273	50.5693456	62.5589596	41.8194135	55.1385586	13.3191451	13.3191451
2033	11.9927147	11.9927147	24.7238824	36.7165971	50.5823766	62.5750912	41.8302082	57.5218929	15.6916847	15.6916847
2034	11.9818951	11.9818951	24.7015703	36.6834653	50.5367394	62.5186344	41.7924767	55.6690432	13.8765665	13.8765665
2035	11.9868821	11.9868821	24.7118651	36.6987471	50.5578071	62.5446892	41.8098848	62.7162854	20.9064006	20.9064006

[a] For the period 1968 through 1987, rates are for an interim facility.

[b] 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&R Component of Transportation Charge (in dollars per acre-foot)

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	Unit Rate	Cumulative Unit Rate	Unit Rate	Cumulative Unit Rate	Unit Rate	Cumulative Unit Rate	Unit Rate	Cumulative Unit Rate
	[11]	[12]	[13]	[14]	[15]	[16]	[17]	[18]	[19]	[20]
1961	0	0	0	0	0	0	0	0	0	0
1962	0	0	0	0	0	0	0	0	0	0
1963	0	0	0	0	0	0	0	0	0	0
1964	0	0	0	0	0	0	0	0	0	0
1965	0	0	0	0	0	0	0	0	0	0
1966	0	0	0	0	0	0	0	0	0	0
1967	0	0	0	0	0	0	0	0	0	0
1968	1.0732031	2.6167353	0	0	0	0	0	0	0	0
1969	0.7028165	1.8095316	0	0	0	0	0	0	0	0
1970	0.7813430	1.7278778	0.3333333	2.0612111	0	0	0	0	0	0
1971	0.4125312	1.2933749	1.1407617	2.4341366	0.7218469	3.1559834	0	0	0	0
1972	0.5662758	1.4693754	0.8894941	2.3588694	0.8040021	3.1628715	1.8113853	4.9742569	7.3206022	12.2948591
1973	0.5996892	1.5383283	0.8469026	2.3852309	1.0302066	3.4154375	1.8458304	5.2612679	7.4512435	12.7125113
1974	0.5736894	1.4709300	0.8122890	2.2832190	0.9665911	3.2498101	1.7739395	5.0237496	6.9004732	11.9242227
1975	0.4606980	1.5569000	0.7554447	2.3123448	0.8894108	3.2017555	1.8682537	5.0700092	6.9962702	12.0662794
1976	0.5163828	1.7105095	0.9081491	2.6186586	0.9640628	3.5827214	2.1499640	5.7326854	7.9384515	13.6711369
1977	0.6138931	2.3818668	0.9835371	3.3654038	1.2303967	4.5958005	2.7357728	7.3315733	9.9990004	17.3305737
1978	0.4545898	2.0659925	0.9044582	2.9704506	0.9762058	3.9466564	1.8872449	5.8339014	7.0810192	12.9149206
1979	0.6587934	2.8008600	1.0519199	3.8527798	1.1976258	5.0504056	2.6012890	7.6516946	9.6345625	17.2862572
1980	0.8021465	2.1645280	1.3516057	3.5161337	1.5041463	5.0202800	3.1923433	8.2126233	10.9860288	19.1986521
1981	1.0923907	3.1630874	1.2409168	4.4040042	1.3219771	5.7259813	2.9592932	8.6852745	9.9649551	18.6502296
1982	0.8326785	2.5948359	1.2041660	3.7990019	1.3723736	5.1713756	2.8986491	8.0700247	10.2096358	18.2796606
1983	0.3647859	1.2105406	0.7590265	1.9695670	0.8857383	2.8553053	1.7623405	4.6176458	5.5086367	10.1262825
1984	0.6581523	1.8275691	1.0533611	2.8809302	1.2188270	4.0997572	2.5407768	6.6405340	8.2344665	14.8750006
1985	0.8726163	2.4771579	1.4204831	3.8976409	1.6516291	5.5492701	3.4695783	9.0188484	11.8181234	20.8369718
1986	1.3996542	4.7116618	2.3713282	7.0829901	2.7567970	9.8397871	5.9534613	15.7932484	20.6010240	36.3942724
1987	1.2912643	4.0351091	2.2344385	6.2695476	2.5459999	8.8155474	5.3141190	14.1296664	17.7628277	31.8924941
1988	1.1947837	3.8820886	2.1129991	5.9950877	2.4017135	8.3968012	5.0055748	13.4023759	16.6001692	30.0025452
1989	1.4935226	5.0158199	2.6947446	7.7105645	3.0084211	10.7189856	6.5499538	17.2689394	22.1795336	39.4484730
1990	1.8962463	6.0278216	3.3080372	9.3358588	3.7483036	13.0841624	8.6832678	21.7674302	31.0405219	52.8079521
1991	1.0437991	4.7389476	2.1132495	6.8521971	2.4154810	9.2676780	5.6823745	14.9500525	20.4744695	35.4245220
1992	0.9002103	3.2326417	1.4836761	4.7163178	1.7077297	6.4240475	3.5445788	9.9686263	12.0459599	22.0145862
1993	0.1605206	0.3963762	-0.1405164	0.2558598	-0.1312944	0.1245654	-0.7754796	-0.6509143	-3.5828989	-4.2338132
1994	1.4208578	4.7103693	2.5100856	7.2204549	2.8029168	10.0233717	6.0772944	16.1006661	21.5000984	37.6007645
1995	0.7974861	2.8272569	1.3474564	4.1747133	1.4945529	5.6692662	3.1250716	8.7943378	10.7461772	19.5405149
1996	1.6726383	5.0173881	2.5952092	7.6125973	2.8425227	10.4551200	6.3087407	16.7638607	22.6420778	39.4059385
1997	1.2769880	4.2397005	2.5012144	6.7409148	2.6893394	9.4302542	6.2890095	15.7192637	23.0714697	38.7907334
1998	-0.2195574	-0.1013030	-0.4232465	-0.5245494	-0.4504610	-0.9750105	-1.0585256	-2.0335361	-3.8077856	-5.8413217
1999	0.8634492	3.2779311	1.4586807	4.7366118	1.3440477	6.0806594	3.5713752	9.6520347	14.2047038	23.8567384
2000	0.9235333	3.2188842	1.6219853	4.8408695	1.7828715	6.6237410	4.2029220	10.8266630	15.3882971	26.2149601
2001	6.0480040	18.7910696	11.1462381	29.9373077	12.2218485	42.1591562	28.2483594	70.4075156	105.7300557	176.1375712
2002	2.6241935	8.7021584	4.6014533	13.3036118	5.0195728	18.3231845	11.6145173	29.9377018	43.1577241	73.0954260
2003	3.1186984	9.8441776	5.5847107	15.4288883	6.0840848	21.5129731	14.1510704	35.6640435	52.6131846	88.2772280
2004	3.3307184	10.6032678	5.8667696	16.4700374	6.3726502	22.8426876	14.8454678	37.6881554	55.1910093	92.8791647
2005	3.8324365	11.9469372	6.8775620	18.8244992	7.4553008	26.2798000	17.3347915	43.6145915	62.0851423	105.6997338
2006	3.1144731	9.9295732	5.7859182	15.7154914	6.2267827	21.9422740	14.5539032	36.4961773	46.2558624	82.7520396
2007	4.5130560	13.7407726	8.0770771	21.8178497	8.7444274	30.5622771	20.2730047	50.8352818	68.5883222	119.4236041
2008	4.7889984	17.1728720	8.9147973	26.0876693	10.3633292	36.4509985	21.6282064	58.0792049	68.9930047	127.0722095
2009	3.0962388	9.0002851	5.6814008	14.6816859	6.2898604	20.9715463	13.8657241	34.8372704	63.6363983	98.4736687
2010	4.1050461	13.5404244	7.0464886	20.5869130	7.6449947	28.2319077	17.4954802	45.7273879	64.9312455	110.6586334
2011	4.5738107	15.4065668	8.0445944	23.4511612	8.6662772	32.1174384	19.9431610	52.0605994	70.8511904	122.9117898
2012	4.7358069	15.2612091	8.2165288	23.4777379	8.9908548	32.4685927	20.7063420	53.1749347	73.7261402	126.9010749
2013	5.6389664	18.7077920	9.6738257	28.3816177	10.5400320	38.9216497	24.4328389	63.3544885	87.5484851	150.9029736
2014	8.3737065	27.9608479	13.6990777	41.6599256	15.1323336	56.7922593	34.5892829	91.3815422	125.9535884	217.3351305
2015	7.7456305	28.4505907	14.0635317	42.5141223	15.4646014	57.9787238	35.0051985	92.9839223	130.0281871	223.0121093
2016	6.4751937	21.3912338	11.5242406	32.9154744	12.6748140	45.5902883	28.6740946	74.2643829	107.7920740	182.0564569
2017	6.2546889	19.8086067	11.0522932	30.8608999	12.2712124	43.1321123	27.6093385	70.7414508	104.1802621	174.9217129
2018	8.9750162	29.8480324	15.3122521	45.1602845	16.9159324	62.0762170	38.8428540	100.9190709	143.8163395	244.7354105
2019	**6.5554519**	**21.4992720**	**11.5954556**	**33.0947275**	**12.5366354**	**45.6313629**	**29.1107287**	**74.7420916**	**108.2429819**	**182.9850736**
2020	6.3174634	21.9891518	11.1976373	33.1867891	12.1031342	45.2899233	28.1040624	73.3939857	104.4964420	177.8904276
2021	7.0532772	24.1990756	12.6845093	36.8835848	13.7221775	50.6057623	31.8174209	82.4231832	118.2935536	200.7167368
2022	7.1848766	22.6437668	12.9574500	35.6012169	14.0321737	49.6333906	32.5421822	82.1755728	121.0109518	203.1865246
2023	7.3069717	16.2374109	13.2160365	29.4534474	14.3277820	43.7812294	33.2340587	77.0152881	123.6079289	200.6232170
2024	7.1811551	25.5729637	12.9157325	38.4886962	13.9729066	52.4616028	32.3990242	84.8606269	120.4568082	205.3174351
2025	7.2730945	23.9312431	13.1389043	37.0701474	14.2377317	51.3078791	33.0225723	84.3304515	122.8113674	207.1418189
2026	7.1622621	20.2238242	12.8510468	33.0748710	13.8906208	46.9654918	32.2032460	79.1687378	119.7099140	198.8786517
2027	7.2930202	21.4014815	13.1882106	34.5896922	14.2965631	48.8862553	33.1612190	82.0474742	123.3353744	205.3828486
2028	7.2036524	19.5983072	12.9535108	32.5518180	14.0126987	46.5645166	32.4908527	79.0553693	120.7965508	199.8519201
2029	7.2667040	20.1366518	13.1188286	33.2554804	14.2125246	47.4680050	32.9627047	80.4307096	122.5833606	203.0140703
2030	7.1609161	23.5150736	12.8568085	36.3718820	13.9001263	50.2720083	32.2266099	82.4986183	119.8018285	202.3004467
2031	7.5399248	25.7033003	13.8513286	39.5546289	15.1052736	54.6599024	35.0738169	89.7337194	130.5896223	220.3233417
2032	6.9877737	20.3069187	12.4060419	32.7129606	13.3575522	46.0705128	30.9464296	77.0169424	114.9580109	191.9749533
2033	7.5393127	23.2309974	13.8420088	37.0730062	15.0916924	52.1646987	35.0408828	87.2055814	130.4616362	217.6672176
2034	7.0281341	20.9047006	12.5114193	33.4161199	13.4843176	46.9004375	31.2454810	78.1459185	116.0893377	194.2352562
2035	8.0628233	28.9692240	15.3042242	44.2734482	16.9046962	61.1781444	39.3414192	100.5195635	146.8233675	247.3429310

TABLE B-17 Unit Variable OMP&R Component of Transportation Charge (in dollars per acre-foot)

Sheet 3 of 5

Calendar Year	CALIFORNIA AQUEDUCT (continued)							
	Reach 18A Alamo Powerplant		Reach 22B Pearblossom Pumping Plant		Reach 23 Mojave Siphon Powerplant		Reach 26A Devil Canyon Powerplant	
	Unit Rate	Cumulative Unit Rate	Unit Rate	Cumulative Unit Rate	Unit Rate	Cumulative Unit Rate	Unit Rate	Cumulative Unit Rate
	[21]	[22]	[23]	[24]	[25]	[26]	[27]	[28]
1961	0	0	0	0	0	0	0	0
1962	0	0	0	0	0	0	0	0
1963	0	0	0	0	0	0	0	0
1964	0	0	0	0	0	0	0	0
1965	0	0	0	0	0	0	0	0
1966	0	0	0	0	0	0	0	0
1967	0	0	0	0	0	0	0	0
1968	0	0	0	0	0	0	0	0
1969	0	0	0	0	0	0	0	0
1970	0	0	0	0	0	0	0	0
1971	0	0	0	0	0	0	0	0
1972	0	0	1.9331104	14.2279695	0	0	-2.3717647	11.8562048
1973	0	0	3.8751940	16.5877053	0	0	-8.9027252	7.6849801
1974	0	0	3.1602116	15.0844343	0	0	-5.3440968	9.7403376
1975	0	0	3.0210558	15.0873353	0	0	-5.7803309	9.3070043
1976	0	0	3.7579009	17.4290378	0	0	-6.6439666	10.7850713
1977	0	0	3.0796474	20.4102211	0	0	-12.0911833	8.3190378
1978	0	0	4.0233030	16.9382236	0	0	-8.2569506	8.6812730
1979	0	0	5.0776468	22.3639040	0	0	-9.7140035	12.6499005
1980	0	0	4.3918283	23.5904804	0	0	-8.3797007	15.2107797
1981	0	0	3.9973528	22.6475824	0	0	-6.7528590	15.8947235
1982	0	0	3.6829998	21.9626604	0	0	-6.9238898	15.0387706
1983	0	0	1.7205305	11.8468130	0	0	-23.7923457	-11.9455328
1984	0	0	2.4763871	17.3513877	0	0	-29.2940447	-11.9426570
1985	0	0	3.4967556	24.3337274	0	0	-30.7672356	-6.4335082
1986	-2.3583180	34.0359544	5.9864597	40.0224141	0	0	-29.2499580	10.7724561
1987	-2.5482255	29.3442686	5.0535029	34.3977715	0	0	-29.7006534	4.6971181
1988	-1.3847067	28.6178385	4.7392460	33.3570844	0	0	-29.0334518	4.3236326
1989	-1.1019487	38.3465243	6.4066114	44.7531357	0	0	-28.3706997	16.3824360
1990	-1.0673268	51.7406253	8.9787944	60.7194197	0	0	-28.8797266	31.8396931
1991	-1.5206590	33.9038630	6.0785417	39.9824047	0	0	-30.3294563	9.6529484
1992	-2.6080003	19.4065859	3.6219501	23.0285360	0	0	-29.7938993	-6.7653633
1993	-0.1885524	-4.4223656	-1.0192774	-5.4416430	0	0	-30.6629489	-36.1045919
1994	-0.1279266	37.4728379	6.4513573	43.9241952	0	0	-30.4781656	13.4460296
1995	-3.4425314	16.0979836	3.3643070	19.4622905	0	0	-30.3517624	-10.8894719
1996	-5.9839345	33.4220040	6.6794995	40.1015035	-2.3423415	37.7591620	-29.5900574	8.1691046
1997	-4.7847600	34.0059734	6.8397922	40.8457656	-3.8632009	36.9825646	-30.6066647	6.3758999
1998	-5.0614104	-10.9027321	-1.3239652	-12.2266973	-3.7700558	-15.9967531	-30.4293072	-46.4260603
1999	-4.8990186	18.9577198	3.8823748	22.8400946	-5.1563836	17.6837110	-30.2385322	-12.5548211
2000	-5.3488706	20.8660895	4.5542443	25.4203338	-5.1804371	20.2398967	-30.2852311	-10.0453343
2001	-4.6452108	171.4923604	29.6368741	201.1292345	-5.7699537	195.3592808	-30.9018397	164.4574412
2002	-5.4660286	67.6293974	12.9716072	80.6010046	-6.4072101	74.1937944	-30.1661590	44.0276354
2003	-3.3142156	84.9630124	15.4234144	100.3864268	-7.1779336	93.2084932	-30.3892607	62.8192325
2004	-5.5767140	87.3024508	16.2222541	103.5247049	-7.4292488	96.0954561	-30.2389380	65.8565181
2005	-5.5017080	100.1980258	17.9086202	118.1066460	-6.6110924	111.4955536	-30.2939296	81.2016240
2006	-3.1387155	79.6133242	13.4604250	93.0737492	-5.4976224	87.5761267	-29.8005787	57.7755480
2007	-2.7809944	116.6426096	20.0909768	136.7335865	-6.1785168	130.5550697	-30.0961198	100.4589500
2008	-5.4028716	121.6693379	19.4989873	141.1683252	-6.0198040	135.1485212	-30.7631237	104.3853975
2009	-6.3446584	92.1290104	21.4368392	113.5658495	-5.4878092	108.0780404	-33.3163094	74.7617309
2010	-5.1343883	105.5242451	18.8714995	124.3957445	-6.4564845	117.9392600	-28.6783430	89.2609170
2011	-5.2103711	117.7014187	20.8533599	138.5547786	-7.1272044	131.4275743	-29.9982569	101.4293174
2012	-2.7221204	124.1789545	21.7639531	145.9429076	-11.4254128	134.5174948	-30.6216868	103.8958080
2013	-3.7638094	147.1391642	25.9018094	173.0409736	-10.3251093	162.7158643	-30.7664075	131.9494568
2014	-8.1801225	209.1550080	38.4692668	247.6242748	-7.8617556	239.7625192	-29.6636049	210.0989143
2015	-9.0636991	213.9484102	40.1781852	254.1265954	-9.3774506	244.7491448	-29.6064491	215.1426957
2016	-9.7494405	172.3070164	31.8288351	204.1358514	-11.8730252	192.2628263	-30.7102289	161.5525974
2017	-10.1360866	164.7856263	30.7227639	195.5083902	-16.8926233	178.6157669	-30.2238617	148.3919052
2018	-14.8948589	229.8405515	47.6746671	277.5152186	-19.1521935	258.3630252	-40.1913326	218.1716925
2019	**-10.7241279**	**172.2609457**	**35.8978285**	**208.1587742**	**-18.0652654**	**190.0935089**	**-35.2857275**	**154.8077813**
2020	-10.3000680	167.5903596	33.3347453	200.9251050	-17.2162410	183.7088640	-33.5848142	150.1240498
2021	-10.0595301	190.6572067	33.2579552	223.9151619	-15.4978126	208.4173493	-30.2152140	178.2021353
2022	-10.1522333	193.0342913	33.9962250	227.0305163	-15.6536079	211.3769084	-29.9245772	181.4523312
2023	-10.3099331	190.3132839	34.9529976	225.2662815	-15.9421009	209.3241806	-30.7406163	178.5835643
2024	-10.9607315	194.3567036	33.2540806	227.6107842	-15.2068652	212.4039190	-30.4006412	182.0032778
2025	-11.3266556	195.8151633	34.6031906	230.4183539	-15.8072175	214.6111364	-30.2559459	184.3551905
2026	-11.0498893	187.8287624	33.6550884	221.4838508	-15.3529552	206.1308956	-30.5678877	175.5630079
2027	-11.2651271	194.1177215	34.4075582	228.5252798	-15.7060594	212.8192203	-30.3979402	182.4212801
2028	-11.1493567	188.7025634	34.0227111	222.7252745	-15.5158313	207.2094432	-30.6252353	176.5842079
2029	-11.2045924	191.8094778	34.2029977	226.0124755	-15.6065039	210.4059717	-30.3180165	180.0879552
2030	-11.0994610	191.2009857	33.7694389	224.9704246	-15.4340626	209.5363621	-30.4145251	179.1218369
2031	-11.5549561	208.7683856	35.3685011	244.1368867	-16.1854065	227.9514802	-30.4990939	197.4523863
2032	-10.7216758	181.2532775	32.5369861	213.7902636	-14.8191629	198.9711008	-29.7446399	169.2264609
2033	-11.6391615	206.0280561	35.7029085	241.7309646	-16.3255127	225.4054519	-31.3202046	194.0852473
2034	-10.8836489	183.3516073	33.0681587	216.4197660	-15.0818895	201.3378766	-29.6449381	171.6929384
2035	-11.7776386	235.5652925	36.1676941	271.7329865	-16.5567514	255.1762351	-31.6381197	223.5381154

TABLE B-17 Unit Variable OMP&R Component of Transportation Charge (in dollars per acre-foot)

Calendar Year	CALIFORNIA AQUEDUCT (continued)							
	Reach EBX2B Greenspot Pump Station[c]		Reach EBX2E Citrus Pump Station		Reach EBX3A Crafton Hills Pump Station		Reach EBX4B Cherry Valley Pump Station	
	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	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	0	0
1995	0	0	0	0	0	0	0	0
1996	0	0	0	0	0	0	0	0
1997	0	0	0	0	0	0	0	0
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	20.6831806	86.5396987	0.0000000	0.0000000	21.4551370	107.9948357	8.6683948	116.6632305
2005	18.8666468	100.0682708	0.0000000	0.0000000	17.9350642	118.0033350	3.6760116	121.6793465
2006	15.8402264	73.6157744	0.0000000	0.0000000	20.8988523	94.5146267	20.1063569	114.6209836
2007	20.4327334	120.8916834	0.0000000	0.0000000	28.3594988	149.2511821	63.0683616	212.3195437
2008	16.8732690	121.2586665	0.0000000	0.0000000	23.8339809	145.0926474	7.1457486	152.2383960
2009	17.5432149	92.3049458	0.0000000	0.0000000	23.7664326	116.0713784	3.9665543	120.0379327
2010	17.0453906	106.3063076	0.0000000	0.0000000	24.2475942	130.5539018	3.4314037	133.9853055
2011	18.0954829	119.5248002	0.0000000	0.0000000	25.1719928	144.6967930	3.5708095	148.2676025
2012	18.9963112	122.8921192	0.0000000	0.0000000	26.7733351	149.6654543	4.5254714	154.1909257
2013	23.7021163	155.6515731	0.0000000	0.0000000	32.5356185	188.1871916	4.3448904	192.5320820
2014	32.1637956	242.2627099	0.0000000	0.0000000	46.4206559	288.6833658	3.2787530	291.9621187
2015	35.0475539	250.1902496	0.0000000	0.0000000	48.7110479	298.9012975	4.3261505	303.2274481
2016	30.3880145	191.9406119	0.0000000	0.0000000	40.0448215	231.9854334	4.4777265	236.4631599
2017	55.1602664	203.5521716	32.8888052	181.2807104	38.6627050	219.9434154	5.7284966	225.6719120
2018	16.1585535	234.3302460	32.6513916	250.8230841	42.1290551	292.9521392	21.1533749	314.1055141
2019	**0.0000000**	**154.8077813**	**47.4955684**	**202.3033497**	**41.7530829**	**244.0564326**	**7.6004936**	**251.6569262**
2020	0.0000000	150.1240498	38.3968208	188.5208706	39.5887283	228.1095989	7.3516616	235.4612605
2021	0.0000000	178.2021353	51.2374759	229.4396112	45.0424856	274.4820968	8.5363823	283.0184791
2022	0.0000000	181.4523312	51.8598266	233.3121578	45.5895954	278.9017532	8.8214061	287.7231593
2023	0.0000000	178.5835643	52.3967245	230.9802888	46.0615607	277.0418495	9.1037513	286.1456008
2024	0.0000000	182.0032778	52.1527938	234.1560716	45.8472062	280.0032778	9.2599124	289.2631902
2025	0.0000000	184.3551905	52.2951830	236.6503735	45.9723507	282.6227242	9.4931691	292.1158933
2026	0.0000000	175.5630079	52.3008671	227.8638750	45.9772640	273.8411390	9.6563781	283.4975171
2027	0.0000000	182.4212801	52.3196532	234.7409333	45.9939306	280.7348639	9.6597950	290.3946589
2028	0.0000000	176.5842079	52.3409441	228.9251520	46.0125241	274.9376761	9.6637813	284.6014574
2029	0.0000000	180.0879552	52.3258189	232.4137741	45.9993256	278.4130997	9.6609339	288.0740336
2030	0.0000000	179.1218369	52.2145472	231.3363841	45.9014451	277.2378292	9.6404328	286.8782620
2031	0.0000000	197.4523863	52.2579961	249.7103824	45.9396917	295.6500741	9.6484055	305.2984796
2032	0.0000000	169.2264609	52.3063584	221.5328193	45.9821773	267.5149966	9.6574032	277.1723998
2033	0.0000000	194.0852473	52.3198459	246.4050932	45.9940270	292.3991202	9.6599089	302.0590291
2034	0.0000000	171.6929384	52.2726397	223.9655781	45.9525048	269.9180829	9.6511390	279.5692219
2035	0.0000000	223.5381154	52.2944123	275.8325277	45.9716763	321.8042040	9.6551253	331.4593293

[c] Citrus Pump Station began operation during 2017. No planned water deliveries are scheduled for 2019–2035 at Reach EBX-R2C, so no costs or rates are shown. All deliveries through Crafton and Cherry Valley Pump Stations (2019–2035) are assumed to flow through Citrus Pump Station.

TABLE B-17 Unit Variable OMP&R Component of Transportation Charge (in dollars per acre-foot)

Calendar Year	CALIFORNIA AQUEDUCT (continued)									
	Reach 29A Oso Pumping Plant		Reach 29G Warne Powerplant		Reach 29J Castaic Powerplant		Reach 31A Las Perillas and Badger Hill Pumping Plants		Reach 33A Devil's Den, Bluestone, and Polonio Pass Pumping Plants	
	Unit Rate	Cumulative Unit Rate	Unit Rate	Cumulative Unit Rate	Unit Rate	Cumulative Unit Rate	Unit Rate	Cumulative Unit Rate	Unit Rate	Cumulative Unit Rate
	[37]	[38]	[39]	[40]	[41]	[42]	[43]	[44]	[45]	[46]
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	1.5014866	4.1182219	0	0
1969	0	0	0	0	0	0	1.2624066	3.0719381	0	0
1970	0	0	0	0	0	0	1.6309699	3.3588477	0	0
1971	0	0	0	0	0	0	1.4985537	2.7919286	0	0
1972	1.1017349	13.3965941	0	0	-2.9350830	10.4615111	1.9517720	3.4211474	0	0
1973	0.7905574	13.5030687	0	0	-6.8099448	6.6931239	1.5374531	3.0757814	0	0
1974	0.7530214	12.6772442	0	0	-7.4013274	5.2759168	1.5168982	2.9878282	0	0
1975	0.8405850	12.9068644	0	0	-6.5604921	6.3463723	1.1130304	2.6699305	0	0
1976	0.7771828	14.4483197	0	0	-6.7213324	7.7269873	1.5685447	3.2790543	0	0
1977	0.6152458	17.9458194	0	0	-30.4985994	-12.5527800	1.7573375	4.1392043	0	0
1978	0.5222831	13.4372037	0	0	-9.0130187	4.4241850	1.9429506	4.0089431	0	0
1979	0.7045701	17.9908273	0	0	-19.0478097	-1.0569824	1.5600341	4.3608941	0	0
1980	1.4269064	20.6255585	0	0	-20.5438586	0.0816999	1.5124754	3.6770034	0	0
1981	1.5684309	20.2186605	0	0	-10.0059379	10.2127225	1.5414199	4.7045073	0	0
1982	1.4942585	19.7739190	-2.1714430	17.6024760	-9.5987314	8.0037446	1.7581649	4.3530008	0	0
1983	1.2818887	11.4081712	-8.9130752	2.4950960	-39.8193120	-37.3242160	0.1782765	1.3888171	0	0
1984	1.7796296	16.6546302	-15.0246012	1.6300290	-17.3126964	-15.6826674	0.8546712	2.6822403	0	0
1985	2.1683838	23.0053556	-14.7115359	8.2938197	-38.9450629	-30.6512432	1.2014351	3.6785929	0	0
1986	3.2288411	39.6231134	-14.1893653	25.4337481	-28.1596224	-2.7258742	2.2635886	6.9752505	0	0
1987	3.1272967	35.0197908	-14.8696165	20.1501743	-27.0536484	-6.9034741	1.9135072	5.9486162	0	0
1988	2.9878581	32.9904032	-14.7032843	18.2871189	-25.6857024	-7.3985835	1.7733386	5.6554272	0	0
1989	3.5262089	42.9746819	-14.4231503	28.5515316	-25.3986130	3.1529186	2.4159040	7.4317239	0	0
1990	3.6810660	56.4890182	-14.1850383	42.3039798	-26.0776142	16.2263657	3.7962150	9.8240367	0	0
1991	2.1853025	37.6098245	-14.7118704	22.8979541	-25.0234633	-2.1255092	2.4131016	7.1520492	0	0
1992	1.9048343	23.9194204	-14.6199430	9.2994774	-25.1951357	-15.8956583	1.2766372	4.5092789	0	0
1993	0.1569728	-4.0768404	-10.3386607	-14.4155011	-21.1218973	-35.5373984	-1.1726172	-0.7762411	0	0
1994	3.0638504	40.6646149	-14.7696788	25.8949361	-26.7437304	-0.8487943	2.3645104	7.0748798	0	0
1995	1.5724835	21.1129984	-12.2705974	8.8424010	-25.6907993	-16.8483983	2.5750402	5.4022971	0	0
1996	3.1318961	42.5378346	-14.8515762	27.6862584	-29.5639188	-1.8776604	2.5837041	7.6010922	0	0
1997	2.7928728	41.5836062	-14.9272063	26.6563999	-27.1541858	-0.4977859	2.7029648	6.9426653	24.4572499	31.3999152
1998	-0.3226129	-6.1639346	-8.6695834	-14.8335180	-22.2303491	-37.0638671	-0.5072304	-0.6085333	-4.1828906	-4.7914239
1999	1.9037719	25.7605103	-14.9340263	10.8264840	-27.0443818	-16.2178978	1.3710724	4.6490034	9.8811650	14.5301684
2000	1.8064079	28.0213680	-14.1657261	13.8556418	-26.9670096	-13.1113678	1.9062744	5.1251586	14.1572786	19.2824372
2001	13.3506231	189.4881943	-16.7349304	172.7532639	-29.2914159	143.4618480	12.1791731	30.9702427	92.1279543	123.0981970
2002	4.8843487	77.9797747	-13.2004543	64.7793204	-23.7780808	41.0012396	5.4523577	14.1545162	42.2356428	56.3901590
2003	6.1234197	94.4006477	-13.9757172	80.4249305	-23.8496317	56.5752988	6.2991083	16.1432859	48.5398663	64.6831522
2004	6.4691088	99.3482735	-14.1574758	85.1907977	-25.2967499	59.8940478	6.4578566	17.0611245	52.5234071	69.5845316
2005	7.3193726	113.0191064	-14.2938796	98.7252268	-24.7472457	73.9779811	8.2000327	20.1469699	62.1217478	82.2687176
2006	5.2231416	87.9751813	-14.0865037	73.8886776	-23.8861273	50.0025503	7.3722622	17.3018354	51.9271194	69.2289548
2007	8.1423808	127.5659848	-12.5169061	115.0490788	-25.0603889	89.9886899	9.9286839	23.6694565	73.4057069	97.0751634
2008	8.5531678	135.6253773	-13.8809446	121.7444327	-29.0198140	92.7246187	10.5299618	27.7028337	79.6357472	107.3385809
2009	6.8982347	105.3719035	-10.4812488	94.8906546	-24.7607898	70.1298649	6.7821158	15.7824009	62.8994557	78.6818566
2010	7.9660377	118.6246711	-13.8211960	104.8034751	-26.2504816	78.5529935	8.4647687	22.0051931	68.9441487	90.9493418
2011	8.4444168	131.3562066	-14.1584994	117.1977072	-28.7386599	88.4590473	9.7863850	25.1929518	85.5836266	110.7765784
2012	8.7435493	135.6446241	-13.8982775	121.7463467	-25.6245942	96.1217525	9.2050916	24.4663006	86.2040277	110.6703283
2013	10.3646562	161.2676298	-14.3636831	146.9039467	-25.5768325	121.3271142	12.2952899	31.0030818	94.6270547	125.6301365
2014	14.9828153	232.3179458	-14.0124517	218.3054941	-26.4213846	191.8841096	16.5519478	44.5127957	105.6306372	150.1434329
2015	15.4907628	238.5028721	-14.2676550	224.2352171	-25.0847717	199.1504454	16.8557817	45.3063723	127.6816690	172.9880413
2016	12.7697612	194.8262180	-14.0588274	180.7673907	-24.9945598	155.7728309	12.6784917	34.0697254	95.7924177	129.8621431
2017	12.3379461	187.2596590	-13.8955888	173.3640702	-25.7687520	147.5953182	12.0570305	31.8656372	77.9587301	109.8243673
2018	14.1505723	258.8859828	-14.6578237	244.2281591	-24.6380684	219.5900907	14.4983620	44.3463945	138.4923501	182.8387445
2019	**8.8632205**	**191.8482940**	**-10.6511488**	**181.1971453**	**-17.6827647**	**163.5143806**	**13.1028690**	**34.6021410**	**90.1732133**	**124.7753542**
2020	9.5484758	187.4389034	-11.7635774	175.6753260	-19.5517280	156.1235980	12.6753727	34.6645245	87.1766096	121.8411341
2021	13.6622615	214.3789983	-14.7109333	199.6680650	-23.2684754	176.3995896	8.0529115	32.2519870	125.8350904	158.0870775
2022	14.0407367	217.2272613	-14.9474683	202.2797930	-23.6417907	178.6380023	8.1537876	30.7975545	127.3635688	158.1611233
2023	14.1956509	214.8188679	-14.9576092	199.8612587	-23.6582597	176.2029990	8.2382015	24.4756124	128.6820446	153.1576569
2024	14.4550227	219.7724578	-15.3062808	204.4661770	-24.2216548	180.2445223	8.1998457	33.7728094	128.0830505	161.8558599
2025	14.1892962	221.3311151	-14.9800584	206.3510567	-23.6947196	182.6563371	8.2222442	32.1534873	128.4328684	160.5863557
2026	13.8008304	212.6794821	-14.5659134	198.1135687	-23.0225746	175.0909941	8.2231302	28.4469544	128.4466193	156.8935736
2027	14.5566456	219.9394943	-15.3631038	204.5763905	-24.3172787	180.2591118	8.2260902	29.6275718	128.4929511	158.1205229
2028	13.9043235	213.7562436	-14.6663850	199.0898587	-23.1824708	175.9073879	8.2294359	27.8277431	128.5451054	156.3728485
2029	14.4392667	217.4533369	-15.2366408	202.2166961	-24.1116455	178.1050506	8.2270595	28.3637113	128.5080647	156.8717761
2030	13.7473430	216.0477898	-14.5332281	201.5145616	-22.9695699	178.5449918	8.2095702	31.7246437	128.2348307	159.9594744
2031	16.7258743	237.0492160	-17.6901739	219.3590421	-28.1178791	191.2411630	8.2163971	33.9196973	128.3414930	162.2611904
2032	12.9475840	204.9225372	-13.6606100	191.2619273	-21.5539035	169.7080238	8.2239953	28.5309140	128.4601967	156.9911107
2033	16.3072493	233.9744669	-17.2237487	216.7507182	-27.3535597	189.3971585	8.2261215	31.4571189	128.4933228	159.9504417
2034	12.9460156	207.1812717	-13.6660355	193.5152362	-21.5655276	171.9497086	8.2187005	29.1234011	128.3774436	157.5008446
2035	25.7250871	273.0680181	-27.2960878	245.7719304	-44.1491159	201.6228145	8.2221192	37.1913431	128.4309110	165.6222541

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[a] (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	16,237	54,380	70,617	258,207	193,717	444,579	896,503	54,386	292,594	346,980
2000	21,853	93,587	115,441	375,486	237,544	749,863	1,362,894	76,397	438,502	514,899
2001	287,659	528,307	815,967	1,675,681	989,109	2,451,313	5,116,103	527,230	2,332,218	2,859,448
2002	90,290	266,205	356,494	1,067,734	640,899	1,453,943	3,162,576	245,579	1,558,398	1,803,978
2003	131,103	266,087	397,190	1,076,990	647,811	2,301,219	4,026,020	288,034	1,744,375	2,032,409
2004	141,816	356,192	498,008	1,325,729	624,583	1,614,003	3,564,314	289,820	2,067,009	2,356,828
2005	189,098	393,118	582,216	1,483,817	849,101	2,494,389	4,827,307	349,724	1,920,481	2,270,205
2006	182,260	317,835	500,095	1,300,605	736,680	2,176,188	4,213,472	291,385	1,611,304	1,902,689
2007	332,074	604,832	936,906	1,610,876	899,784	2,704,487	5,215,147	366,556	2,692,865	3,059,421
2008	395,194	527,580	922,774	1,567,658	767,723	1,941,320	4,276,701	365,166	1,974,279	2,339,444
2009	213,095	272,109	485,204	843,028	500,952	1,551,726	2,895,706	299,058	1,215,680	1,514,738
2010	282,401	305,707	588,108	1,351,451	627,717	1,947,360	3,926,527	341,697	1,616,625	1,958,321
2011	306,596	308,367	614,963	1,751,565	950,336	2,966,408	5,668,310	423,056	2,515,108	2,938,164
2012	259,069	327,006	586,075	1,778,803	675,039	2,423,152	4,876,994	436,484	2,155,194	2,591,678
2013	436,032	529,888	965,920	2,150,625	1,098,028	3,137,312	6,385,966	462,445	2,263,604	2,726,048
2014	598,226	394,688	992,914	1,540,339	1,199,081	2,163,009	4,902,429	478,735	2,497,816	2,976,551
2015	485,175	503,815	988,990	1,471,183	935,488	3,126,961	5,533,632	594,174	2,015,418	2,609,591
2016	330,020	355,244	685,264	2,351,998	787,707	4,038,793	7,178,498	545,291	3,867,409	4,412,700
2017	251,899	412,689	664,588	2,318,180	904,961	3,979,358	7,202,499	312,450	3,327,346	3,639,796
2018	750,059	526,607	1,276,666	2,168,230	1,197,345	5,975,602	9,341,177	526,941	3,748,377	4,275,318
2019	**903,445**	**1,039,538**	**1,942,983**	**2,489,623**	**1,275,798**	**3,295,464**	**7,060,884**	**1,584,148**	**3,405,244**	**4,989,392**
2020	878,265	1,040,600	1,918,865	2,525,645	1,308,002	3,341,910	7,175,557	1,548,601	3,325,166	4,873,767
2021	1,043,000	912,180	1,955,179	2,641,519	1,433,237	3,486,924	7,561,680	2,025,095	4,314,354	6,339,450
2022	1,080,164	952,398	2,032,562	2,581,953	1,366,547	3,415,278	7,363,778	2,033,636	4,316,375	6,350,011
2023	1,091,345	962,257	2,053,602	2,285,391	1,212,239	3,049,325	6,546,955	1,969,301	4,179,826	6,149,127
2024	1,086,265	957,778	2,044,043	2,733,961	1,445,888	3,605,307	7,785,156	2,081,143	4,417,208	6,498,351
2025	1,089,232	960,394	2,049,626	2,655,501	1,405,026	3,508,120	7,568,648	2,064,819	4,382,562	6,447,382
2026	1,089,349	960,496	2,049,846	2,481,170	1,314,277	3,292,593	7,088,040	2,017,338	4,281,783	6,299,120
2027	1,089,741	960,843	2,050,584	2,533,118	1,341,268	3,356,312	7,230,698	2,033,114	4,315,267	6,348,381
2028	1,090,184	961,233	2,051,417	2,450,509	1,298,297	3,254,503	7,003,310	2,010,642	4,267,571	6,278,214
2029	1,089,870	960,955	2,050,825	2,473,291	1,310,119	3,282,297	7,065,707	2,017,057	4,281,188	6,298,245
2030	1,087,552	958,913	2,046,465	2,637,440	1,395,647	3,486,013	7,519,099	2,056,759	4,365,454	6,422,213
2031	1,088,458	959,710	2,048,167	2,728,354	1,442,796	3,596,649	7,767,799	2,086,354	4,428,270	6,514,625
2032	1,089,464	960,598	2,050,063	2,492,949	1,320,525	3,308,314	7,121,788	2,018,592	4,284,444	6,303,036
2033	1,089,745	960,846	2,050,591	2,610,937	1,381,656	3,451,314	7,443,906	2,056,643	4,365,208	6,421,850
2034	1,088,762	959,979	2,048,741	2,518,946	1,334,026	3,340,143	7,193,115	2,025,146	4,298,356	6,323,501
2035	1,089,216	960,379	2,049,595	2,864,914	1,513,631	3,762,977	8,141,522	2,129,571	4,519,997	6,649,568
TOTAL	**24,309,256**	**24,289,765**	**48,599,021**	**76,811,240**	**42,404,406**	**124,364,503**	**243,580,148**	**41,050,788**	**113,744,614**	**154,795,403**

[a] 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[a] (in dollars)

	SAN JOAQUIN VALLEY AREA								
				Kern					
Calendar Year	Dudley Ridge	Empire	Future Contractor San Joaquin Valley	Municipal and Industrial	Agricultural	Kings	Oak Flat	Tulare	Total
	[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	195,683	10,411	0	473,993	4,043,627	13,112	11,761	956,653	5,705,239
2000	194,868	5,791	0	150,870	4,259,519	11,588	10,347	638,347	5,271,330
2001	787,383	25,556	0	156,315	11,851,444	29,314	45,773	1,119,234	14,015,019
2002	425,666	12,227	0	183,569	8,013,811	24,836	29,691	839,776	9,529,575
2003	453,639	14,136	0	493,523	9,967,581	36,345	28,691	1,041,918	12,035,833
2004	520,408	37,769	0	1,406,548	8,941,409	95,991	33,665	861,595	11,897,384
2005	977,603	45,805	0	836,724	17,643,647	236,621	34,032	1,672,595	21,447,026
2006	715,724	32,589	0	990,662	13,742,307	94,629	28,910	1,074,449	16,679,269
2007	620,190	28,636	0	772,081	12,112,916	79,441	32,915	1,196,588	14,842,766
2008	380,791	16,263	0	758,437	7,719,917	65,875	24,582	582,229	9,548,095
2009	190,974	9,306	0	65,765	5,122,594	30,520	11,767	331,245	5,762,172
2010	403,800	44,128	0	144,050	9,139,391	65,692	27,419	785,452	10,609,933
2011	934,979	29,504	0	711,347	19,662,042	103,335	29,411	852,586	22,323,203
2012	279,494	34,216	0	550,599	11,940,391	113,009	33,765	1,362,176	14,313,651
2013	505,971	29,315	0	633,866	12,200,417	86,898	36,854	825,609	14,318,930
2014	522,667	14,428	0	217	7,070,850	35,080	29,772	249,646	7,922,660
2015	442,589	17,753	0	496,056	9,281,943	34,966	22,299	493,219	10,788,826
2016	447,248	38,975	0	276,066	13,413,665	78,292	27,669	906,710	15,188,624
2017	1,078,882	33,635	0	843,386	25,598,029	152,173	39,211	1,198,364	28,943,681
2018	828,248	52,294	0	1,443,597	13,470,755	167,253	58,298	1,597,513	17,617,959
2019	**614,191**	**38,699**	**0**	**2,030,438**	**14,166,362**	**122,428**	**51,108**	**1,128,346**	**18,151,573**
2020	628,186	39,580	0	2,049,924	14,315,782	125,085	53,597	1,154,057	18,366,211
2021	691,319	43,558	0	2,270,451	15,517,074	136,577	58,639	1,270,040	19,987,658
2022	646,887	40,759	0	2,168,848	14,775,238	127,912	52,869	1,188,413	19,000,926
2023	463,870	29,227	0	1,714,005	11,522,045	92,161	30,542	852,188	14,704,039
2024	730,568	46,031	0	2,379,676	16,282,167	144,274	62,900	1,342,146	20,987,763
2025	683,668	43,076	0	2,270,069	15,482,123	135,113	56,971	1,255,983	19,927,003
2026	577,754	36,403	0	1,987,753	13,504,036	114,414	44,671	1,061,407	17,326,438
2027	611,398	38,523	0	2,088,306	14,185,118	120,990	48,251	1,123,214	18,215,799
2028	559,884	35,277	0	1,946,769	13,202,838	110,923	42,390	1,028,578	16,926,660
2029	575,264	36,246	0	1,993,256	13,516,447	113,928	44,015	1,056,832	17,335,989
2030	671,779	42,327	0	2,227,386	15,206,124	132,787	55,931	1,234,142	19,570,475
2031	734,292	46,266	0	2,430,779	16,551,150	145,005	62,119	1,348,986	21,318,598
2032	580,128	36,552	0	1,974,179	13,452,031	114,879	45,551	1,065,768	17,269,088
2033	663,663	41,816	0	2,250,538	15,271,456	131,204	53,666	1,219,232	19,631,575
2034	597,205	37,628	0	2,022,303	13,783,307	118,215	47,458	1,097,141	17,703,258
2035	827,593	52,145	0	2,734,234	18,554,934	163,240	71,500	1,520,392	23,924,036
TOTAL	**25,267,751**	**1,392,083**	**0**	**55,230,557**	**542,673,205**	**3,905,390**	**1,725,503**	**45,127,333**	**675,321,821**

[a] 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[a] (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	1,309,467	(448,290)	(633,767)	20,018	(729,435)	6,484	180,423	263,297	(161,631)	(222,717)
2000	1,743,925	(360,679)	(425,149)	24,166	(584,980)	0	283,085	189,047	(184,824)	(152,086)
2001	10,748,924	4,442,763	1,496,563	206,495	2,468,506	0	850,559	1,788,151	4,356,149	388,120
2002	3,940,517	1,972,925	737,683	162,410	1,216,924	0	332,521	1,250,873	3,146,998	1,094,131
2003	5,100,245	3,152,927	907,298	145,685	1,496,291	0	1,429,259	981,068	1,640,399	1,377,877
2004	5,218,767	3,252,013	1,018,471	192,767	1,395,500	0	1,344,202	1,061,772	3,812,245	825,907
2005	5,994,948	3,011,986	3,452,612	89,977	3,986,107	0	1,580,568	1,173,519	2,654,327	1,135,524
2006	6,399,637	2,246,864	6,996,619	56,136	2,888,777	0	3,152,067	994,530	2,151,175	940,817
2007	9,366,901	4,237,414	7,356,408	230,821	3,037,276	0	6,174,449	2,222,474	6,072,123	404,247
2008	5,837,227	3,786,945	4,832,779	114,606	2,615,304	3,042	3,538,824	1,734,396	4,051,276	752,827
2009	4,115,006	2,595,637	3,413,684	96,616	1,365,374	3,869	3,228,792	1,413,078	3,432,975	861,232
2010	6,172,008	2,756,232	7,526,376	42,104	2,783,423	0	4,663,414	1,157,495	4,812,730	1,712,024
2011	11,069,348	2,825,582	9,156,937	62,297	3,689,897	0	660,947	1,270,854	3,592,835	2,392,819
2012	10,468,373	3,715,759	12,155,752	83,939	4,685,805	0	1,612,558	2,074,315	10,293,129	2,291,734
2013	7,511,055	5,758,807	8,471,106	222,595	2,743,361	0	1,261,341	1,554,820	4,731,906	1,220,796
2014	3,660,043	5,124,972	2,564,169	295,529	640,592	0	846,425	1,757,883	2,527,300	252,001
2015	2,741,365	5,414,748	7,818,224	306,650	2,413,256	0	2,202,815	1,248,541	5,754,985	1,239,201
2016	6,742,721	4,928,821	10,862,349	208,413	3,536,871	0	4,418,300	1,811,981	10,764,011	2,599,058
2017	16,422,854	7,351,965	12,344,361	52,513	4,694,526	0	6,594,528	2,283,599	13,226,653	3,272,932
2018	11,952,858	11,828,043	27,084,425	616,196	9,802,890	158,590	1,825,427	1,800,111	7,959,169	3,406,751
2019	**14,982,576**	**9,082,117**	**12,850,594**	**661,525**	**5,178,320**	**237,720**	**10,391,838**	**3,235,061**	**9,544,081**	**2,675,078**
2020	14,578,085	8,674,862	12,461,797	639,307	5,021,649	231,275	10,039,100	3,147,347	9,255,070	2,594,144
2021	16,586,857	9,787,649	14,792,559	725,292	5,960,861	263,107	11,253,017	3,580,542	10,970,123	3,079,333
2022	16,793,789	9,908,122	15,062,358	735,592	6,069,580	266,387	11,410,223	3,625,184	11,170,206	3,135,496
2023	16,557,549	9,761,261	14,824,222	728,448	5,973,620	262,632	11,313,949	3,574,083	10,993,604	3,085,924
2024	16,909,622	10,002,624	15,108,092	739,166	6,088,010	268,212	11,447,774	3,650,019	11,204,122	3,145,017
2025	17,036,445	10,132,324	15,303,324	746,847	6,166,681	270,225	11,581,625	3,677,409	11,348,906	3,185,658
2026	16,341,886	9,707,910	14,573,485	717,336	5,872,583	259,204	11,129,685	3,527,424	10,807,659	3,033,729
2027	16,889,154	9,995,137	15,142,790	740,611	6,101,992	267,882	11,485,937	3,645,531	11,229,854	3,152,240
2028	16,417,975	9,751,671	14,658,255	721,089	5,906,742	260,410	11,190,694	3,543,834	10,870,524	3,051,375
2029	16,688,422	9,873,878	14,949,101	732,213	6,023,942	264,697	11,358,330	3,602,182	11,086,215	3,111,920
2030	16,634,949	9,904,849	14,868,904	729,187	5,991,625	263,857	11,307,801	3,590,755	11,026,740	3,095,225
2031	18,164,210	10,609,052	16,390,523	793,271	6,604,782	288,100	12,281,214	3,920,670	12,155,169	3,411,977
2032	15,769,560	9,411,368	14,047,489	692,419	5,660,625	250,130	10,743,033	3,403,937	10,417,581	2,924,233
2033	17,925,810	10,502,486	16,111,016	784,411	6,492,152	284,319	12,154,844	3,869,207	11,947,888	3,353,793
2034	15,952,036	9,536,115	14,252,231	700,656	5,743,129	253,025	10,873,786	3,443,343	10,569,417	2,966,854
2035	20,499,864	11,187,832	18,555,899	888,013	7,477,350	325,080	13,695,290	4,423,916	13,761,006	3,862,739
TOTAL	**443,063,389**	**244,388,939**	**384,630,612**	**16,517,758**	**165,071,670**	**5,025,712**	**242,221,148**	**91,986,863**	**285,434,856**	**79,348,714**

[a] 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[a] (in dollars)

Sheet 4 of 4

Calendar Year	SOUTHERN CALIFORNIA AREA (continued)				FEATHER RIVER AREA					
	San Gorgonio	Metropolitan	Ventura	Total	Yuba City	Butte	Plumas	Total	South Bay Area Future Contractor	Grand 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	(9,194,693)	(30,003)	(9,640,848)	0	0	0	0	0	(2,621,509)
2000	0	(14,982,560)	6,226	(14,443,828)	0	0	0	0	0	(7,179,265)
2001	0	157,946,899	265,404	184,958,532	0	0	0	0	0	207,765,068
2002	0	59,841,457	279,778	73,976,216	0	0	0	0	0	88,828,838
2003	7,287	94,319,451	358,003	110,915,789	0	0	0	0	0	129,407,240
2004	98,114	107,156,248	416,820	125,792,825	0	0	0	0	0	144,109,361
2005	84,202	113,938,011	123,173	137,224,954	0	0	0	0	0	166,351,708
2006	420,559	82,429,250	92,505	108,768,937	0	0	0	0	0	132,064,462
2007	598,467	137,718,921	317,330	177,736,829	0	0	0	0	0	201,791,069
2008	719,125	83,668,920	409,627	112,064,898	0	0	0	0	0	129,151,911
2009	750,014	60,878,165	350,866	82,505,306	0	0	0	0	0	93,163,126
2010	1,095,272	89,834,714	402,792	122,958,584	0	0	0	0	0	140,041,474
2011	1,552,923	132,160,509	426,258	168,861,206	0	0	0	0	0	200,405,845
2012	1,697,642	108,387,593	499,135	157,965,735	0	0	0	0	0	180,334,132
2013	1,818,466	108,825,141	407,979	144,527,372	0	0	0	0	0	168,924,235
2014	1,472,402	69,920,453	17,845	89,079,614	0	0	0	0	0	105,874,168
2015	1,055,473	111,685,780	214,954	142,095,991	0	0	0	0	0	162,017,030
2016	2,557,586	164,149,785	514,558	213,094,454	0	0	0	0	0	240,559,540
2017	3,339,218	214,878,226	2,172,390	286,633,764	0	0	0	0	0	327,084,328
2018	3,024,836	136,887,287	1,005,734	217,352,319	0	0	0	0	0	249,863,439
2019	**2,610,299**	**158,500,857**	**685,516**	**230,635,582**	**0**	**0**	**0**	**0**	**0**	**262,780,414**
2020	2,440,780	151,289,878	504,387	220,877,681	0	0	0	0	0	253,212,081
2021	2,932,183	176,015,831	572,118	256,519,474	0	0	0	0	0	292,363,441
2022	2,979,068	178,509,299	579,525	260,244,830	0	0	0	0	0	294,992,108
2023	2,960,632	174,733,119	572,266	255,341,310	0	0	0	0	0	284,795,032
2024	2,990,977	179,956,576	585,431	262,095,640	0	0	0	0	0	299,410,953
2025	3,018,398	181,947,166	591,656	265,006,664	0	0	0	0	0	300,999,322
2026	2,927,254	173,224,763	567,735	252,690,651	0	0	0	0	0	285,454,095
2027	2,998,841	179,457,743	585,655	261,693,368	0	0	0	0	0	295,538,831
2028	2,938,701	174,024,103	570,482	253,905,854	0	0	0	0	0	286,165,453
2029	2,974,751	177,039,131	578,818	258,283,599	0	0	0	0	0	291,034,365
2030	2,962,372	177,219,671	577,976	258,173,911	0	0	0	0	0	293,732,163
2031	3,153,561	193,311,684	625,719	281,709,932	0	0	0	0	0	319,359,121
2032	2,861,598	167,458,179	548,843	244,188,993	0	0	0	0	0	276,932,968
2033	3,119,917	190,156,226	618,753	277,320,821	0	0	0	0	0	312,868,744
2034	2,886,487	169,866,746	555,576	247,599,402	0	0	0	0	0	280,868,017
2035	3,425,100	213,520,064	687,101	312,309,254	0	0	0	0	0	353,073,976
TOTAL	**70,472,502**	**5,031,387,702**	**18,416,647**	**7,077,966,511**	**0**	**0**	**0**	**0**	**0**	**8,200,262,904**

[a] B-18 includes Extra Peaking Charges for additional power shown in Table 9.

TABLE B-19 Total Transportation Charge for Each Contractor[a] (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	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	664,013	603,483	1,985,220	3,252,716	115,961	229,807	345,768
1969	254,715	0	254,715	787,733	539,340	2,083,253	3,410,327	185,156	358,861	544,017
1970	277,547	0	277,547	823,579	532,567	2,202,767	3,558,913	200,150	387,675	587,825
1971	227,474	0	227,474	788,833	552,113	2,169,897	3,510,843	202,413	392,912	595,325
1972	224,978	0	224,978	830,880	678,520	2,320,421	3,829,821	209,057	406,589	615,646
1973	221,091	31,366	252,457	796,293	549,393	2,338,620	3,684,305	206,557	402,724	609,281
1974	240,498	32,938	273,437	820,242	564,593	2,506,358	3,891,193	208,545	407,090	615,635
1975	237,459	36,291	273,750	870,410	605,731	2,409,923	3,886,064	225,895	439,873	665,768
1976	271,292	40,836	312,127	961,323	734,812	2,500,506	4,196,640	228,976	447,299	676,275
1977	293,627	45,096	338,723	925,689	713,558	2,476,399	4,115,646	238,699	468,721	707,420
1978	273,870	49,178	323,048	981,276	692,587	2,785,987	4,459,850	245,331	484,259	729,590
1979	289,479	53,340	342,819	1,046,686	736,358	2,813,578	4,596,623	243,110	483,437	726,547
1980	310,846	67,748	378,594	1,164,949	866,372	3,028,204	5,059,525	269,858	537,074	806,932
1981	347,781	87,408	435,189	1,130,900	879,357	2,917,582	4,927,839	288,997	586,257	875,254
1982	438,335	106,918	545,254	1,169,047	850,483	3,262,104	5,281,634	290,049	582,757	872,806
1983	354,787	151,259	506,046	1,180,896	900,363	3,795,446	5,876,705	319,214	633,181	952,395
1984	467,336	224,245	691,581	1,473,223	1,097,480	5,737,801	8,308,505	351,620	695,559	1,047,179
1985	736,074	364,305	1,100,379	1,923,926	1,789,369	6,551,546	10,264,841	394,593	776,994	1,171,586
1986	1,084,728	692,479	1,777,207	1,751,385	1,528,732	6,863,230	10,143,347	385,545	762,684	1,148,229
1987	1,773,801	1,559,243	3,333,044	2,241,507	2,011,876	6,675,355	10,928,738	385,289	812,310	1,197,599
1988	2,231,563	2,333,792	4,565,355	2,243,383	2,210,523	6,368,850	10,822,756	420,153	978,621	1,398,774
1989	2,397,272	3,326,436	5,723,708	2,159,868	1,872,030	5,916,714	9,948,612	414,224	1,162,723	1,576,947
1990	2,746,135	3,433,320	6,179,455	2,579,351	2,261,914	6,668,440	11,509,705	487,609	1,234,409	1,722,018
1991	2,748,636	3,682,311	6,430,947	1,758,979	1,621,188	4,527,928	7,908,095	491,419	1,476,387	1,967,806
1992	2,554,528	3,528,958	6,083,486	2,080,160	2,003,328	5,385,858	9,469,346	551,042	1,491,156	2,042,198
1993	2,592,888	3,504,240	6,097,128	2,885,402	2,011,222	6,511,865	11,408,489	610,115	1,675,438	2,285,553
1994	2,718,329	3,537,459	6,255,788	2,912,153	2,642,460	7,314,515	12,869,127	767,900	2,473,449	3,241,348
1995	2,649,273	3,509,935	6,159,208	3,040,514	2,289,027	5,893,667	11,223,208	995,341	4,977,122	5,972,462
1996	2,699,210	3,891,715	6,590,926	2,589,656	2,137,443	6,675,492	11,402,590	1,837,384	13,766,531	15,603,915
1997	2,641,891	3,631,175	6,273,066	2,662,913	2,007,332	6,551,469	11,221,714	2,294,917	21,860,553	24,155,470
1998	2,538,764	3,478,062	6,016,827	2,269,309	2,064,166	6,296,050	10,629,525	2,976,896	26,690,793	29,667,689
1999	2,689,826	3,843,209	6,533,034	2,897,314	2,455,120	8,385,576	13,738,011	3,032,745	27,479,837	30,512,582
2000	2,832,574	4,308,089	7,140,663	3,922,335	2,303,786	7,030,361	13,256,482	2,946,818	27,835,591	30,782,409
2001	3,348,078	4,913,458	8,261,536	7,399,769	2,795,685	8,451,441	18,646,896	3,501,499	29,990,590	33,492,089
2002	3,555,449	5,050,166	8,605,615	10,855,225	2,777,107	9,918,869	23,551,201	3,212,468	29,615,200	32,827,668
2003	3,666,659	5,393,824	9,060,484	7,513,424	2,507,040	8,729,606	18,750,070	3,294,613	29,872,238	33,166,850
2004	4,143,314	5,619,090	9,762,404	5,715,141	2,812,117	8,200,982	16,728,241	3,307,281	30,300,985	33,608,266
2005	3,502,840	5,129,247	8,632,087	5,732,221	2,965,732	8,975,318	17,673,270	3,431,724	30,410,329	33,842,054
2006	3,407,032	4,627,038	8,034,070	5,701,700	2,962,830	9,104,831	17,769,362	3,274,559	30,052,963	33,327,522
2007	3,600,657	5,098,531	8,699,189	6,758,413	3,479,663	10,359,961	20,598,037	3,424,783	31,258,064	34,682,847
2008	4,292,713	5,055,785	9,348,497	7,617,963	3,775,305	10,524,664	21,917,932	3,928,308	32,521,875	36,450,183
2009	4,728,439	5,107,805	9,836,244	6,542,211	3,306,616	10,273,538	20,122,365	3,728,609	30,837,333	34,565,943
2010	4,977,681	6,526,075	11,503,757	7,388,812	3,655,884	11,118,779	22,163,475	4,079,938	33,009,604	37,089,542
2011	5,345,825	6,919,191	12,265,016	8,700,436	4,340,324	12,938,189	25,978,949	4,154,638	34,144,910	38,299,548
2012	5,816,263	6,882,671	12,698,935	9,586,377	4,350,354	15,207,079	29,143,809	4,209,169	34,579,282	38,788,451
2013	5,459,987	6,615,225	12,075,212	10,384,948	5,084,116	15,163,315	30,632,379	4,423,850	35,942,661	40,366,512
2014	6,088,376	7,166,635	13,255,012	10,081,026	5,320,330	15,142,843	30,544,198	4,258,514	33,104,585	37,363,099
2015	6,196,141	7,120,253	13,316,394	10,727,859	4,734,894	16,419,866	31,882,619	4,844,888	35,093,715	39,938,603
2016	6,514,246	7,716,107	14,230,353	10,972,621	4,317,826	22,296,712	37,587,159	4,609,219	39,421,292	44,030,511
2017	5,595,678	6,310,072	11,905,751	11,683,377	4,767,056	19,003,896	35,454,329	4,814,612	42,645,374	47,459,986
2018	7,059,086	8,292,220	15,351,306	12,240,526	5,376,942	18,403,652	36,021,119	4,724,667	39,658,350	44,383,017
2019	**7,010,566**	**8,563,074**	**15,573,640**	**12,741,747**	**5,463,726**	**15,689,609**	**33,895,082**	**5,794,202**	**39,511,031**	**45,305,234**
2020	7,006,892	8,597,439	15,604,332	12,940,065	5,554,958	16,053,662	34,548,685	5,787,884	39,289,871	45,077,755
2021	7,235,328	8,596,646	15,831,974	13,051,978	5,689,698	16,715,792	35,457,468	6,309,269	40,591,730	46,900,999
2022	7,302,375	8,688,680	15,991,056	13,093,692	5,662,500	18,062,215	36,818,407	6,393,983	40,966,504	47,360,486
2023	7,340,806	8,711,489	16,052,296	12,865,776	5,534,220	17,821,559	36,221,554	6,380,297	41,096,054	47,476,351
2024	7,361,123	8,752,324	16,113,447	13,384,038	5,794,197	18,457,886	37,636,122	6,515,016	41,453,030	47,968,046
2025	7,383,437	8,798,779	16,182,216	13,374,705	5,779,307	18,438,680	37,592,693	6,521,699	41,538,921	48,060,620
2026	7,407,463	8,842,019	16,249,482	13,271,078	5,715,240	18,303,567	37,289,885	6,498,215	41,560,330	48,058,545
2027	7,434,029	8,886,301	16,320,331	13,392,938	5,768,228	18,445,051	37,606,217	6,537,557	41,714,261	48,251,818
2028	7,460,574	8,931,285	16,391,859	13,379,948	5,751,000	18,420,630	37,551,578	6,531,134	41,774,127	48,305,261
2029	7,486,361	8,975,983	16,462,344	13,471,098	5,787,780	18,524,538	37,783,416	6,558,240	41,904,710	48,462,951
2030	7,503,327	9,008,313	16,511,640	13,706,157	5,899,724	18,808,489	38,414,370	6,618,773	42,106,054	48,724,826
2031	7,519,561	9,038,378	16,557,939	13,861,449	5,969,429	18,990,344	38,821,222	6,665,328	42,270,006	48,935,335
2032	7,538,323	9,069,159	16,607,482	13,705,178	5,877,857	18,792,948	38,375,983	6,620,792	42,259,027	48,879,819
2033	7,537,908	9,073,302	16,611,210	13,899,308	5,968,034	19,023,045	38,890,387	6,681,300	42,470,008	49,151,308
2034	7,495,505	9,047,678	16,543,183	13,873,052	5,943,471	18,983,955	38,800,478	6,671,056	42,526,030	49,197,085
2035	7,379,809	8,954,153	16,333,962	14,284,113	6,145,959	19,479,120	39,909,192	6,796,797	42,871,960	49,668,757
TOTAL	**255,256,723**	**309,629,751**	**564,886,474**	**442,039,655**	**214,777,777**	**695,542,969**	**1,352,360,400**	**204,229,903**	**1,451,998,980**	**1,656,228,883**

[a] Capital charges repaid through bond debt service prior to 2017 exclude bond cover; 2018 and after includes both bond debt service and bond cover.

TABLE B-19 Total Transportation Charge for Each Contractor[a] (in dollars)

	SAN JOAQUIN VALLEY AREA								
				Kern					
Calendar Year	Dudley Ridge	Empire	Future Contractor San Joaquin Valley	Municipal and Industrial	Agricultural	Kings	Oak Flat	Tulare	Total
	[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	188,609	9,108	54,588	445,439	1,564,925	13,770	11,872	212,283	2,500,593
1969	184,222	8,242	87,576	525,094	2,434,283	12,625	10,900	369,847	3,632,790
1970	206,624	15,009	94,675	573,998	2,966,211	12,790	13,449	303,191	4,185,946
1971	203,520	15,967	95,695	605,889	3,891,603	17,763	14,775	458,920	5,304,131
1972	226,673	16,835	98,788	631,615	5,096,208	15,220	21,385	1,112,809	7,219,533
1973	209,824	12,906	97,550	639,250	5,044,949	15,483	12,119	421,315	6,453,396
1974	292,994	12,875	98,460	698,247	5,361,897	15,590	13,247	618,190	7,111,501
1975	362,164	13,820	106,703	715,606	6,510,385	16,620	14,945	752,903	8,493,145
1976	314,289	14,366	108,084	774,291	6,876,984	16,993	16,678	582,171	8,703,856
1977	276,112	11,476	112,554	797,859	7,068,656	18,457	14,416	528,289	8,827,819
1978	365,601	4,441	115,521	890,945	8,543,544	18,921	18,482	523,181	10,480,636
1979	397,388	14,213	114,253	896,194	9,690,038	20,202	25,427	974,310	12,132,024
1980	419,251	12,563	125,950	888,893	10,269,408	20,749	25,031	758,814	12,520,659
1981	482,742	30,404	134,169	1,079,315	11,739,217	24,939	23,512	931,400	14,445,699
1982	477,251	13,554	135,057	1,004,667	12,594,502	22,955	23,004	770,014	15,041,004
1983	651,015	15,148	149,202	1,027,258	15,828,487	39,971	29,658	430,923	18,171,663
1984	924,237	15,562	164,505	2,063,179	23,975,545	54,427	60,286	802,716	28,060,458
1985	1,113,301	88,123	184,905	2,350,593	28,305,307	69,483	70,829	2,184,290	34,366,832
1986	1,278,057	34,579	180,445	2,365,159	30,880,247	80,769	76,716	2,211,460	37,107,432
1987	1,137,150	51,374	179,872	2,804,776	29,715,580	78,018	74,976	2,271,680	36,313,426
1988	1,123,275	62,169	193,735	2,750,424	29,649,927	74,168	60,879	2,230,531	36,145,107
1989	1,159,312	49,851	187,913	2,435,635	29,727,464	67,048	69,370	2,475,152	36,171,745
1990	874,301	35,013	221,392	2,541,316	27,859,206	51,058	49,812	1,904,509	33,536,605
1991	598,813	23,918	220,282	2,055,250	18,058,598	27,930	27,581	1,265,074	22,277,446
1992	969,525	39,754	241,455	2,369,788	26,356,719	55,795	51,635	1,942,214	32,026,886
1993	1,181,815	54,281	264,959	2,799,482	31,870,888	72,889	70,318	2,675,802	38,990,434
1994	1,036,905	44,407	306,359	2,808,829	29,746,699	60,460	58,085	2,151,732	36,213,475
1995	1,533,593	47,265	304,297	3,499,611	36,870,254	88,875	80,908	2,805,842	45,230,646
1996	1,361,996	48,897	389,203	3,560,139	36,838,295	86,092	74,556	4,351,733	46,710,911
1997	1,403,525	26,054	276,681	3,107,763	33,005,931	36,715	69,416	1,705,810	39,631,895
1998	1,247,409	35,009	381,847	2,654,434	29,762,625	41,835	60,712	1,836,054	36,019,924
1999	1,245,794	56,667	369,935	3,072,927	31,970,536	75,744	66,227	4,218,468	41,076,298
2000	1,078,856	38,614	302,665	2,319,641	26,877,725	61,870	55,504	2,817,574	33,552,449
2001	1,756,967	63,539	328,028	2,237,334	34,375,805	80,120	101,866	3,092,581	42,036,238
2002	1,333,750	44,245	320,541	2,330,951	29,350,303	73,376	78,592	2,580,371	36,112,128
2003	1,402,140	49,145	339,960	2,741,740	32,173,316	89,704	79,822	2,898,774	39,774,601
2004	1,459,057	78,506	342,484	3,759,643	30,790,729	235,227	82,423	2,409,922	39,157,990
2005	2,048,575	88,446	355,581	2,982,461	41,859,443	419,407	81,963	3,459,840	51,295,716
2006	1,796,914	75,371	295,472	3,283,168	37,861,113	253,017	79,361	2,809,421	46,453,836
2007	1,665,064	70,006	334,099	3,065,514	35,750,233	234,711	82,751	2,962,801	44,165,178
2008	1,521,444	62,398	471,726	3,455,540	35,075,973	248,229	80,951	2,440,826	43,357,087
2009	1,215,541	50,198	437,331	2,186,452	30,680,214	192,159	62,616	2,027,973	36,852,483
2010	1,443,928	106,284	507,047	2,356,485	36,208,769	249,569	84,250	2,640,013	43,596,345
2011	2,188,671	82,206	506,692	3,445,764	51,104,849	303,984	92,659	2,738,784	60,463,608
2012	1,278,235	89,869	468,177	3,251,544	41,208,387	320,253	93,478	3,508,214	50,218,156
2013	1,620,125	82,616	519,859	3,410,660	41,071,729	280,313	92,141	2,758,794	49,836,237
2014	1,607,846	66,135	630,710	2,789,889	36,160,005	227,151	93,294	2,107,068	43,682,098
2015	1,409,686	68,402	756,095	3,211,979	38,174,759	228,878	82,290	2,314,860	46,246,948
2016	1,385,027	89,150	487,226	2,925,979	39,629,568	262,578	86,341	2,695,433	47,561,302
2017	1,946,516	78,921	507,328	3,153,014	50,382,612	325,625	95,253	2,846,461	59,335,730
2018	1,806,822	103,285	544,007	3,965,959	41,147,245	349,594	118,078	3,412,237	51,447,227
2019	**1,657,193**	**89,475**	**537,094**	**4,570,704**	**42,675,541**	**304,719**	**109,159**	**2,943,592**	**52,887,476**
2020	1,593,943	91,149	551,031	4,609,450	43,078,236	312,296	112,727	2,977,465	53,326,296
2021	1,642,787	94,229	582,074	4,899,007	43,934,786	324,097	116,869	3,067,355	54,661,204
2022	1,605,248	91,877	602,729	4,888,402	43,391,923	318,039	111,557	2,998,817	54,008,591
2023	1,429,193	80,798	615,230	4,465,840	40,339,694	283,630	89,691	2,675,812	49,979,888
2024	1,702,922	98,058	620,913	5,154,388	45,302,787	337,108	122,516	3,179,122	56,517,814
2025	1,663,123	95,564	626,612	5,065,030	44,707,748	329,317	117,057	3,106,446	55,710,896
2026	1,564,382	89,356	632,775	4,802,655	42,936,713	310,004	105,233	2,925,490	53,366,609
2027	1,605,270	91,946	638,763	4,922,691	43,826,918	317,959	109,294	3,001,054	54,513,894
2028	1,561,074	89,175	641,130	4,798,715	43,055,853	309,242	103,918	2,920,312	53,479,419
2029	1,583,843	90,624	645,665	4,861,912	43,582,789	313,650	106,033	2,962,600	54,147,116
2030	1,687,822	97,190	650,274	5,112,965	45,487,925	333,922	118,444	3,154,083	56,642,626
2031	1,757,874	101,618	653,634	5,318,227	47,050,567	347,231	125,132	3,283,244	58,637,526
2032	1,611,324	92,399	658,620	4,884,375	44,171,238	318,632	109,069	3,014,484	54,860,141
2033	1,702,549	98,161	663,330	5,176,434	46,212,651	336,354	117,694	3,182,552	57,489,725
2034	1,643,858	94,478	667,809	4,962,683	44,948,711	324,761	112,001	3,075,210	55,829,512
2035	1,882,090	109,503	672,229	5,686,595	49,946,788	371,111	136,563	3,513,357	62,318,236
TOTAL	**81,306,944**	**3,916,784**	**24,958,597**	**196,966,161**	**2,054,608,765**	**11,252,189**	**4,857,795**	**151,284,564**	**2,529,151,799**

[a] Capital charges repaid through bond debt service prior to 2017 exclude bond cover; 2018 and after includes both bond debt service and bond cover.

TABLE B-19 Total Transportation Charge for Each Contractor[a] (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	479,413	218,649	41,509	265,168	12,870	336,472	95,466	782,163	208,927
1969	1,090,136	726,906	334,105	61,226	394,024	18,693	501,193	138,063	1,205,834	321,755
1970	1,420,639	907,346	470,423	89,700	552,223	25,231	692,832	184,837	1,778,187	467,573
1971	1,760,670	1,092,170	627,331	128,360	754,065	31,837	932,463	231,280	2,538,219	659,414
1972	2,084,699	1,312,963	777,838	181,206	971,501	42,404	1,196,591	274,599	3,388,734	865,095
1973	2,177,324	1,329,897	920,218	183,713	1,184,696	43,482	1,263,483	287,315	3,971,543	946,686
1974	2,241,780	1,390,115	938,860	193,283	1,212,205	45,212	1,297,387	292,071	3,998,510	990,064
1975	2,419,858	1,459,593	983,580	206,040	1,280,804	48,490	1,367,181	304,281	4,159,094	1,088,341
1976	2,773,862	1,455,628	1,032,075	215,084	1,356,888	51,463	1,411,134	313,685	4,299,592	1,141,598
1977	2,717,286	1,525,606	929,532	226,032	1,194,916	47,348	1,484,384	329,365	4,553,831	1,197,216
1978	3,035,392	1,611,557	1,111,606	231,040	1,470,658	47,118	1,485,920	321,681	4,460,167	1,208,720
1979	3,589,381	1,647,279	1,180,841	237,955	1,569,175	48,396	1,615,076	332,472	4,422,382	1,152,375
1980	4,136,480	1,730,091	1,271,861	259,401	1,730,656	53,348	1,736,132	360,461	4,835,652	1,269,447
1981	4,469,204	1,985,020	1,355,504	271,181	1,850,802	77,806	1,862,381	391,869	5,224,182	1,357,680
1982	4,031,426	2,077,868	1,403,332	280,313	1,936,175	55,961	2,058,288	406,891	5,410,876	1,565,182
1983	5,224,176	2,341,449	1,997,502	333,081	2,880,959	69,381	2,135,143	494,688	6,020,929	1,556,652
1984	7,262,706	3,383,999	3,084,372	445,339	4,608,046	75,773	2,365,369	553,321	7,049,449	2,331,849
1985	8,979,937	3,769,579	3,882,496	540,388	5,883,196	79,232	2,477,608	759,052	7,740,359	2,378,394
1986	8,880,068	4,338,336	4,308,841	577,474	6,571,197	102,400	2,588,267	1,000,062	7,857,569	3,047,741
1987	8,897,753	4,180,168	4,164,707	604,982	6,418,841	211,809	2,622,093	1,026,398	9,224,608	3,034,142
1988	8,373,323	4,244,580	4,163,832	615,999	6,482,143	124,667	2,677,804	779,820	9,505,259	2,828,998
1989	8,750,651	4,125,281	3,808,646	586,595	5,952,262	170,570	2,626,098	1,442,627	8,944,266	2,930,395
1990	10,040,074	4,566,529	4,487,886	620,394	7,014,185	289,349	2,824,832	1,639,830	9,795,019	3,678,107
1991	6,542,001	3,535,461	2,996,131	567,450	4,550,559	175,137	3,584,774	1,294,608	8,921,839	3,035,638
1992	8,644,005	4,493,027	3,068,616	470,165	4,667,984	121,335	4,386,728	1,129,578	8,573,361	2,980,091
1993	9,028,570	4,124,442	3,267,678	472,817	4,993,632	157,747	4,266,291	1,347,511	9,505,683	3,320,012
1994	11,216,190	4,736,654	3,313,737	554,651	5,066,159	225,809	5,260,181	1,698,990	10,209,083	4,076,706
1995	10,817,875	4,994,493	4,087,603	509,163	6,340,703	155,561	4,348,408	1,527,248	9,443,228	3,715,377
1996	11,187,158	5,182,573	7,025,782	553,232	11,183,947	150,612	4,416,003	1,867,203	9,869,329	3,807,422
1997	11,437,950	4,949,294	6,588,591	579,281	7,422,990	144,833	4,720,256	1,869,307	11,268,380	4,037,862
1998	9,956,830	4,577,761	5,663,864	546,645	5,928,447	146,074	5,756,613	1,474,029	11,192,751	3,321,115
1999	11,531,679	5,028,211	4,698,256	638,518	6,060,988	147,200	6,002,702	1,864,854	12,351,722	4,198,794
2000	10,579,316	6,842,885	3,059,860	593,984	4,361,929	115,267	5,763,783	1,447,277	11,817,519	3,249,463
2001	20,607,925	12,466,881	4,100,681	797,527	6,349,945	127,791	6,463,417	3,341,294	17,567,700	3,395,382
2002	11,991,168	9,689,540	3,358,252	759,148	5,125,059	109,666	5,590,269	2,738,493	18,359,937	4,782,871
2003	13,366,520	10,743,830	3,480,415	729,620	5,324,825	115,323	7,253,224	2,277,490	16,737,070	4,950,854
2004	14,236,159	11,809,226	4,112,984	829,136	5,365,054	124,162	7,363,606	2,518,137	21,064,747	4,388,736
2005	14,641,088	10,855,458	17,786,378	653,880	10,282,020	114,279	7,163,690	2,567,262	19,109,476	4,652,123
2006	16,101,421	9,965,540	27,272,588	633,620	9,868,655	122,273	9,858,339	2,489,548	18,839,906	4,667,014
2007	19,636,007	13,381,513	26,125,492	881,184	9,368,785	126,729	13,686,329	4,031,445	25,074,694	3,834,473
2008	17,125,608	15,287,976	25,654,698	806,284	10,270,747	135,185	12,010,917	3,951,265	25,196,979	4,789,674
2009	14,842,460	13,001,813	23,299,705	780,942	8,133,149	133,354	11,667,657	3,674,322	25,055,045	5,260,005
2010	17,521,793	12,681,411	31,740,297	687,773	10,963,460	122,675	13,987,886	3,017,027	27,358,304	6,752,574
2011	23,826,988	12,348,786	33,212,372	744,764	11,916,006	136,189	7,572,150	3,018,278	24,574,859	7,444,961
2012	24,253,733	14,509,163	40,179,007	850,336	14,403,219	148,131	9,348,025	4,418,683	38,303,727	7,777,921
2013	19,336,070	17,055,875	31,897,958	1,059,268	10,835,801	165,582	9,286,186	3,476,766	29,149,253	5,907,062
2014	14,733,442	15,754,941	27,290,741	1,150,707	8,747,938	170,806	9,344,176	3,584,967	29,212,485	4,835,151
2015	12,708,866	15,004,768	30,387,855	1,128,561	10,075,392	163,424	10,832,055	2,758,778	34,501,208	5,884,886
2016	16,272,349	13,769,685	32,951,130	1,024,876	10,806,174	156,224	12,353,069	3,212,462	40,606,915	7,129,649
2017	25,303,841	16,239,884	32,396,633	824,527	11,408,300	148,472	14,018,871	3,591,066	45,078,724	7,543,813
2018	21,270,630	20,873,322	53,151,378	1,400,552	17,434,744	312,335	9,625,084	3,171,027	41,715,783	7,901,537
2019	**24,318,746**	**18,068,689**	**38,219,408**	**1,438,608**	**12,730,644**	**390,183**	**18,122,054**	**4,611,667**	**43,636,997**	**7,158,296**
2020	23,934,942	18,132,206	37,931,068	1,423,274	12,522,622	387,200	18,087,545	4,547,470	43,631,132	7,109,345
2021	25,437,210	18,610,141	41,186,493	1,466,496	13,379,418	410,234	18,889,560	4,865,595	44,512,722	7,384,371
2022	25,888,046	19,050,223	41,332,141	1,481,026	13,511,976	417,257	19,166,490	4,944,710	44,798,311	7,459,859
2023	25,665,593	18,960,289	40,541,570	1,474,516	13,343,550	416,266	19,081,874	4,895,162	44,643,138	7,405,885
2024	26,065,146	19,208,076	40,861,711	1,486,422	13,479,012	424,205	19,256,790	4,977,971	44,924,063	7,475,880
2025	26,234,566	19,385,862	41,096,056	1,495,759	13,571,618	428,172	19,417,075	5,011,567	45,148,147	7,526,600
2026	25,593,921	19,009,809	40,418,259	1,469,041	13,298,687	419,170	19,001,203	4,869,443	44,692,081	7,385,985
2027	26,196,807	19,345,802	41,068,682	1,495,960	13,557,895	430,063	19,400,389	4,995,716	45,230,192	7,523,873
2028	25,784,079	19,142,448	40,705,974	1,480,715	13,401,778	423,558	19,154,251	4,902,581	45,007,313	7,447,822
2029	26,108,340	19,294,971	41,125,125	1,496,357	13,560,227	428,750	19,372,068	4,968,895	45,369,394	7,535,736
2030	26,106,445	19,318,043	41,180,581	1,497,928	13,570,202	428,789	19,371,811	4,965,234	45,459,288	7,546,912
2031	27,607,943	19,949,201	42,727,453	1,562,013	14,183,816	452,575	20,345,011	5,291,371	46,655,401	7,869,476
2032	25,293,787	18,770,719	40,562,724	1,467,435	13,298,724	415,942	18,880,460	4,786,757	45,098,478	7,418,014
2033	27,439,941	19,860,701	42,711,878	1,561,288	14,149,768	450,013	20,317,886	5,251,954	46,731,461	7,862,203
2034	25,429,937	18,924,222	40,909,366	1,477,580	13,409,058	418,183	19,052,405	4,822,799	45,421,520	7,480,388
2035	29,971,466	20,627,069	45,299,626	1,666,601	15,163,834	490,092	21,904,518	5,804,280	48,712,928	8,389,804
TOTAL	**967,774,803**	**671,636,787**	**1,233,738,465**	**53,847,439**	**531,231,585**	**13,189,930**	**594,679,352**	**169,937,351**	**1,492,434,159**	**302,095,333**

[a] Capital charges repaid through bond debt service prior to 2017 exclude bond cover; 2018 and after includes both bond debt service and bond cover.

TABLE B-19 Total Transportation Charge for Each Contractor[a] (in dollars)

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	18,784,638	0	0	564	564	46,945	25,059,852
1969	198,764	23,153,064	215,209	28,358,973	0	0	3,191	3,191	52,963	36,256,975
1970	289,633	30,617,164	273,605	37,769,392	0	0	15,121	15,121	69,744	46,464,488
1971	409,327	39,958,997	342,425	49,466,559	0	0	16,001	16,001	55,532	59,175,865
1972	537,186	52,948,599	422,304	65,003,719	0	0	17,372	17,372	80,412	76,991,481
1973	587,963	57,273,225	435,655	70,605,199	0	0	17,334	17,334	54,219	81,676,192
1974	611,428	61,776,466	455,565	75,442,947	0	0	17,477	17,477	76,783	87,428,973
1975	644,621	66,756,784	478,403	81,197,071	0	0	18,406	18,406	84,547	94,618,750
1976	668,315	68,485,047	475,587	83,679,958	0	0	17,477	17,477	106,717	97,693,051
1977	696,515	66,234,179	507,063	81,643,273	0	0	18,232	18,232	98,618	95,749,730
1978	709,040	72,934,779	523,177	89,150,854	0	0	17,381	17,381	100,786	105,262,144
1979	712,866	72,666,594	526,405	89,701,196	0	0	20,579	20,579	119,352	107,639,140
1980	777,981	79,926,555	571,232	98,659,299	0	0	17,761	17,761	178,812	117,621,582
1981	806,031	91,261,394	636,404	111,549,456	0	0	21,193	21,193	185,347	132,439,977
1982	853,400	93,144,741	670,375	113,894,827	0	0	28,423	28,423	173,894	135,837,841
1983	952,131	101,787,700	803,591	126,597,382	0	0	19,276	19,276	220,926	152,344,392
1984	1,072,639	137,507,077	868,967	170,608,906	0	0	21,114	21,114	225,959	208,963,703
1985	1,120,854	172,916,230	908,769	211,436,092	0	0	20,239	20,239	340,322	258,700,290
1986	1,149,714	193,242,026	937,311	234,601,005	0	0	20,139	20,139	279,227	285,076,586
1987	1,172,015	178,764,439	908,034	221,229,988	0	0	19,742	19,742	345,116	273,367,653
1988	1,208,206	190,243,523	904,868	232,153,022	0	0	17,900	17,900	365,207	285,468,121
1989	1,194,911	193,235,261	932,599	234,700,162	0	0	19,158	19,158	422,329	288,562,660
1990	1,297,621	239,540,417	1,486,755	287,280,998	0	0	18,148	18,148	474,284	340,721,213
1991	1,354,921	179,950,983	1,141,118	217,650,620	0	0	21,018	21,018	214,683	256,470,614
1992	1,349,184	196,166,977	1,025,285	237,076,337	0	0	18,014	18,014	443,676	287,159,942
1993	1,507,550	169,493,328	1,068,135	212,553,397	0	0	20,999	20,999	599,571	271,955,572
1994	1,497,753	209,282,955	1,008,952	258,147,820	0	0	19,649	19,649	609,966	317,357,174
1995	1,520,622	173,420,265	1,061,324	221,941,867	0	0	20,277	20,277	534,971	291,082,639
1996	1,527,165	181,404,029	1,103,254	239,277,710	0	0	25,378	25,378	571,857	320,183,287
1997	1,730,348	186,736,527	1,216,560	242,702,177	0	0	24,820	24,820	428,638	324,437,780
1998	1,920,021	168,571,967	1,237,386	220,293,503	0	0	0	0	465,095	303,092,563
1999	2,167,221	192,300,888	1,266,033	248,257,065	0	0	0	0	584,116	340,701,106
2000	2,327,124	184,932,812	1,320,919	236,412,137	0	0	0	0	0	321,144,140
2001	2,987,171	374,039,724	1,616,021	453,861,459	0	0	0	0	0	556,298,217
2002	4,190,134	264,583,886	1,648,226	332,926,649	0	0	0	0	0	434,023,260
2003	5,409,035	292,850,922	1,668,182	364,907,309	0	0	20,800	20,800	0	465,680,114
2004	5,730,417	339,977,107	1,909,916	419,429,387	0	0	20,830	20,830	0	518,707,119
2005	5,999,057	312,842,936	1,398,129	408,065,776	0	0	20,827	20,827	0	519,529,730
2006	6,476,303	288,409,445	1,328,049	396,032,703	0	0	21,281	21,281	0	501,638,774
2007	7,127,413	373,878,325	1,871,102	499,023,491	0	0	20,893	20,893	0	607,189,633
2008	8,408,262	339,738,331	2,266,692	465,642,619	0	0	22,411	22,411	0	576,738,729
2009	8,718,789	303,258,138	2,071,120	419,896,499	0	0	18,220	18,220	0	521,291,753
2010	9,765,091	348,503,413	2,103,268	485,204,972	0	0	18,448	18,448	0	599,576,537
2011	10,564,135	391,236,111	2,094,641	528,690,239	0	0	20,130	20,130	0	665,717,490
2012	11,515,425	378,973,061	2,353,230	547,033,662	0	0	18,469	18,469	0	677,901,482
2013	12,034,917	365,353,915	2,276,451	507,835,103	0	0	17,665	17,665	0	640,763,108
2014	14,469,277	315,209,675	1,816,387	446,320,691	0	0	17,492	17,492	0	571,182,590
2015	16,470,189	333,824,446	1,889,398	475,629,827	0	0	17,088	17,088	0	607,031,480
2016	19,562,630	375,444,925	2,178,211	535,468,298	0	0	22,214	22,214	0	678,899,837
2017	22,310,050	429,450,001	3,895,961	612,210,142	0	0	16,927	16,927	0	766,382,864
2018	23,277,397	361,178,708	2,701,509	564,014,005	0	0	17,194	17,194	0	711,233,868
2019	**23,185,320**	**380,648,529**	**2,358,781**	**574,887,922**	**0**	**0**	**14,560**	**14,560**	**0**	**722,563,914**
2020	23,177,476	380,153,104	2,262,871	573,300,255	0	0	2,627	2,627	0	721,859,951
2021	23,479,173	394,488,336	2,244,431	596,354,181	0	0	1,809	1,809	0	749,207,635
2022	23,574,841	404,023,455	2,329,012	607,977,347	0	0	428	428	0	762,156,315
2023	23,579,353	400,299,763	2,374,559	602,681,517	0	0	430	430	0	752,412,037
2024	23,642,151	405,154,360	2,400,509	609,356,296	0	0	433	433	0	767,592,159
2025	23,702,094	407,844,052	2,425,753	613,287,322	0	0	435	435	0	770,834,181
2026	23,644,465	399,939,425	2,420,143	602,161,633	0	0	438	438	0	757,126,592
2027	23,754,871	407,140,584	2,457,760	612,598,592	0	0	439	439	0	769,291,290
2028	23,737,192	402,740,225	2,449,883	606,377,819	0	0	442	442	0	762,106,377
2029	23,817,572	406,594,678	2,462,384	612,134,497	0	0	444	444	0	768,990,767
2030	23,850,117	407,020,730	2,457,257	612,773,338	0	0	447	447	0	773,067,247
2031	24,072,915	421,846,394	2,485,658	635,049,227	0	0	449	449	0	798,001,697
2032	23,831,596	396,850,107	2,410,828	599,085,571	0	0	453	453	0	757,809,449
2033	24,127,546	419,724,471	2,478,241	632,667,352	0	0	456	456	0	794,810,437
2034	23,926,185	399,953,203	2,419,273	603,644,119	0	0	459	459	0	764,014,837
2035	24,502,335	444,563,426	2,559,418	669,655,397	0	0	463	463	0	837,886,007
TOTAL	**633,475,729**	**17,225,416,573**	**104,088,050**	**23,993,545,555**	**0**	**0**	**890,016**	**890,016**	**8,748,370**	**30,105,811,498**

[a] Capital charges repaid through bond debt service prior to 2017 exclude bond cover; 2018 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 2018 at 4.610 percent per annum)

Procedure	Capital Cost Component		Minimum Operation, Maintenance, Power and Replacement Component[a]		Total Delta Water Rate	
	[1]		[2]		[3]	
Commencing in 2019						
Total Costs of "Initial" Project Conservation Facilities to be Reimbursed and Project Water Table A Amounts During the Project Repayment Period	$9,555.41[b]	510.08 af	$8,465.30[c]	510.08 af	$18,020.70	510.08 af
Less, Project Power Revenues to be Realized During the Project Repayment Period	($4,857.81)		($4,700.13)		($9,557.94)	
Less, Delta Water Charges Paid and Project Water Table A Amounts, Prior to 2019	($3,519.78)[d]	(461.64) af	($1,548.22)	(461.64) af	($5,068.00)	(461.64) af
TOTAL	$1,177.82	48.45 af	$2,216.94	48.45 af	$3,394.76	48.45 af
Rate Applicable in 2019	$24.31 per acre-foot		$45.76 per acre-foot		$70.07 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[a]		Total Delta Water Rate	
	[4]		[5]		[6]	
Commencing in 2019						
Total Costs of "Initial" Project Conservation Facilities to be Reimbursed and Project Water Table A Amounts during the Project Repayment Period	$9,534.11[b]	510.08 af	$8,430.27[c]	510.08 af	$17,964.39	510.08 af
Less, Project Power Revenues to be Realized During the Project Repayment Period	($4,857.81)		($4,700.13)		($9,557.94)	
Less, Delta Water Charges Paid and Project Water Table A Amounts, Prior to 2019	($3,519.78)[d]	(461.64) af	($1,548.22)	(461.64) af	($5,068.00)	(461.64) af
TOTAL	$1,156.52	48.45 af	$2,181.92	48.45 af	$3,338.44	48.45 af
Rate Applicable in 2019	$23.87 per acre-foot		$45.04 per acre-foot		$68.91 per acre-foot	

[a] 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.

[b] 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.

[c] Includes conservation power costs and credits at San Luis Reservoir.

[d] Applying all Delta Water Charges paid prior to 1970 to reimburse Capital costs (the charge was not divided into components until 1970).

TABLE B-20B Delta Water Rates by Facility (in dollars per acre-foot)

Item	Capital Cost Component	Minimum Operation, Maintenance, Power and Replacement Component	Total Delta Water Rate
	[1]	[2]	[3]
Initial Conservation Facilities			
Oroville Division			
Water Supply and Power Costs[a]	116.79	76.81	193.60
Less, Oroville Power Revenues	-69.89	-31.96	-101.84
Subtotal	*46.90*	*44.85*	*91.75*
Delta Facilities[b]	37.87	62.17	100.04
California Aqueduct portion			
Reach1	7.16	12.94	20.10
Reach 2A	4.04	1.62	5.65
Reach 2B	2.04	1.15	3.19
Reach 3	1.43	0.62	2.05
Subtotal	*14.67*	*16.33*	*31.00*
San Luis Facilities	21.75	18.71	40.45
Planning and Preoperating Costs through 2017	5.72	0.00	5.72
45,000 acre-feet Relinquished Costs	0.44	0.72	1.16
Less, Capital Cost Credits	-2.77	0.00	-2.77
Less, Delta Water Charges paid prior to 2019	-100.27	-97.02	-197.29
Rate Applicable in 2019	24.31	45.76	70.07

[a] Includes revenue received from non-SWP water contractors.

[b] Includes: 1. Delta Facility planning costs; 2. Delta Studies costs; and 3. Suisun Marsh Facilities Costs.

TABLE B-21 Total Delta Water Charge for Each Contractor (in dollars)

Sheet 1 of 4

	NORTH BAY AREA			SOUTH BAY AREA				CENTRAL COASTAL AREA		
Calendar Year	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]
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	952,222	1,732,510	2,684,732
2011	1,216,921	1,993,865	3,210,786	3,380,086	1,760,920	4,192,667	9,333,673	1,048,166	1,907,076	2,955,242
2012	1,270,523	2,083,876	3,354,399	3,528,968	1,838,483	4,377,339	9,744,790	1,094,335	1,991,077	3,085,412
2013	1,344,704	2,207,862	3,552,566	3,735,010	1,945,825	4,632,915	10,313,750	1,158,229	2,107,328	3,265,557
2014	1,276,099	2,097,420	3,373,519	3,544,457	1,846,552	4,396,552	9,787,561	1,099,138	1,999,815	3,098,953
2015	1,736,721	2,857,498	4,594,219	4,823,867	2,513,086	5,983,536	13,320,489	1,495,884	2,721,671	4,217,555
2016	2,075,875	3,415,521	5,491,396	5,765,891	3,003,850	7,152,025	15,921,766	1,788,006	3,253,170	5,041,176
2017	1,999,142	3,289,270	5,288,412	5,552,760	2,892,816	6,887,657	15,333,233	1,721,914	3,132,919	4,854,833
2018	2,016,381	3,317,632	5,334,013	5,600,640	2,917,760	6,947,047	15,465,447	1,736,761	3,159,934	4,896,695
2019	**2,033,904**	**3,346,465**	**5,380,369**	**5,649,314**	**2,943,117**	**7,007,422**	**15,599,853**	**1,751,856**	**3,187,396**	**4,939,252**
2020	2,033,904	3,346,465	5,380,369	5,649,314	2,943,117	7,007,422	15,599,853	1,751,856	3,187,396	4,939,252
2021	2,033,904	3,346,465	5,380,369	5,649,314	2,943,117	7,007,422	15,599,853	1,751,856	3,187,396	4,939,252
2022	2,033,904	3,346,465	5,380,369	5,649,314	2,943,117	7,007,422	15,599,853	1,751,856	3,187,396	4,939,252
2023	2,033,904	3,346,465	5,380,369	5,649,314	2,943,117	7,007,422	15,599,853	1,751,856	3,187,396	4,939,252
2024	2,033,904	3,346,465	5,380,369	5,649,314	2,943,117	7,007,422	15,599,853	1,751,856	3,187,396	4,939,252
2025	2,033,904	3,346,465	5,380,369	5,649,314	2,943,117	7,007,422	15,599,853	1,751,856	3,187,396	4,939,252
2026	2,033,904	3,346,465	5,380,369	5,649,314	2,943,117	7,007,422	15,599,853	1,751,856	3,187,396	4,939,252
2027	2,033,904	3,346,465	5,380,369	5,649,314	2,943,117	7,007,422	15,599,853	1,751,856	3,187,396	4,939,252
2028	2,033,904	3,346,465	5,380,369	5,649,314	2,943,117	7,007,422	15,599,853	1,751,856	3,187,396	4,939,252
2029	2,033,904	3,346,465	5,380,369	5,649,314	2,943,117	7,007,422	15,599,853	1,751,856	3,187,396	4,939,252
2030	2,033,904	3,346,465	5,380,369	5,649,314	2,943,117	7,007,422	15,599,853	1,751,856	3,187,396	4,939,252
2031	2,033,904	3,346,465	5,380,369	5,649,314	2,943,117	7,007,422	15,599,853	1,751,856	3,187,396	4,939,252
2032	2,033,904	3,346,465	5,380,369	5,649,314	2,943,117	7,007,422	15,599,853	1,751,856	3,187,396	4,939,252
2033	2,033,904	3,346,465	5,380,369	5,649,314	2,943,117	7,007,422	15,599,853	1,751,856	3,187,396	4,939,252
2034	2,033,904	3,346,465	5,380,369	5,649,314	2,943,117	7,007,422	15,599,853	1,751,856	3,187,396	4,939,252
2035	2,033,904	3,346,465	5,380,369	5,649,314	2,943,117	7,007,422	15,599,853	1,751,856	3,187,396	4,939,252
TOTAL	**56,470,736**	**99,142,918**	**155,613,654**	**169,347,662**	**96,234,673**	**235,550,282**	**501,132,617**	**54,257,518**	**99,337,057**	**153,594,575**

TABLE B-21 Total Delta Water Charge for Each Contractor (in dollars)

	SAN JOAQUIN VALLEY AREA								
				Kern					
Calendar Year	Dudley Ridge	Empire	Future Contractor San Joaquin Valley	Municipal and Industrial	Agricultural	Kings	Oak Flat	Tulare	Total
	[11]	[12]	[13]	[14]	[15]	[16]	[17]	[18]	[19]
1964	0	0	0	0	0	0	0	0	0
1965	0	0	0	0	0	0	0	0	0
1966	0	0	0	0	0	0	0	0	0
1967	0	0	0	0	0	0	0	0	0
1968	40,695	10,469	0	0	165,522	3,177	8,073	98,608	326,544
1969	61,267	3,281	0	0	337,686	4,200	8,805	102,478	517,717
1970	104,405	19,950	0	0	964,915	8,645	17,290	228,095	1,343,300
1971	129,596	21,720	0	0	1,377,772	9,412	20,272	264,260	1,823,032
1972	160,756	24,113	0	0	2,175,835	11,253	43,131	905,057	3,320,145
1973	195,541	26,664	0	386,638	2,373,167	13,333	27,553	373,307	3,396,203
1974	224,202	27,909	0	446,545	2,781,595	13,954	29,770	445,138	3,969,113
1975	329,688	27,413	0	481,560	3,041,048	14,620	33,702	827,591	4,755,622
1976	414,245	29,388	0	549,549	3,931,785	15,673	35,966	877,151	5,853,757
1977	312,532	28,195	0	569,545	4,071,218	15,977	40,289	626,210	5,663,966
1978	342,208	31,588	0	674,939	4,950,959	20,006	41,065	666,516	6,727,281
1979	395,523	34,294	0	772,757	5,901,986	22,863	45,725	771,613	7,944,761
1980	555,341	37,679	0	881,371	6,984,026	27,272	70,658	933,481	9,489,828
1981	740,789	54,204	0	1,351,487	11,140,730	41,556	77,692	1,373,168	14,779,626
1982	782,396	57,248	0	1,518,993	12,703,436	47,707	85,873	1,530,443	16,726,096
1983	543,462	38,004	0	1,057,789	9,141,315	35,471	58,273	78,506	10,952,820
1984	580,379	13,572	0	1,333,200	9,741,623	39,893	61,770	756,132	12,526,569
1985	667,740	42,441	0	1,540,611	11,403,920	48,100	69,320	644,383	14,416,515
1986	745,447	45,362	0	1,714,679	12,925,113	55,946	77,115	1,469,725	17,033,387
1987	762,180	44,485	0	1,766,065	13,410,817	59,314	77,108	1,503,601	17,623,570
1988	827,669	46,411	0	1,916,790	14,707,763	61,882	83,540	1,633,680	19,277,735
1989	921,621	49,728	0	2,125,033	16,312,361	66,304	92,825	1,821,693	21,389,565
1990	964,288	50,136	0	1,998,766	17,276,959	66,848	95,259	1,980,383	22,432,639
1991	1,023,374	53,208	0	2,121,239	18,335,590	70,944	101,096	2,101,729	23,807,180
1992	1,169,299	60,795	0	2,727,688	20,646,125	81,061	115,511	2,401,419	27,201,898
1993	1,172,060	60,939	0	2,734,129	20,694,874	81,252	115,784	2,407,089	27,266,127
1994	1,123,198	58,398	0	2,156,809	20,295,455	77,865	110,957	2,306,739	26,129,421
1995	1,202,009	62,497	0	2,803,995	21,223,694	83,328	118,743	2,468,598	27,962,864
1996	534,818	69,191	0	2,756,635	19,492,814	81,921	102,219	2,426,904	25,464,502
1997	1,208,521	67,162	0	3,047,908	22,148,973	90,576	129,072	2,683,338	29,375,550
1998	1,216,671	77,807	0	2,726,511	22,070,376	91,188	129,942	2,820,148	29,132,643
1999	1,258,233	69,974	0	2,819,648	22,824,299	94,303	134,381	2,793,715	29,994,553
2000	1,278,056	70,943	0	3,223,279	21,220,235	95,788	136,498	2,837,730	28,862,529
2001	1,278,336	71,058	0	2,864,700	21,110,372	95,809	136,528	2,838,352	28,395,155
2002	1,393,975	72,121	0	3,272,056	21,060,431	97,237	138,564	2,711,156	28,745,540
2003	1,364,640	70,550	0	3,203,191	20,617,243	95,192	135,648	2,654,103	28,140,567
2004	1,494,892	77,810	0	3,508,929	22,585,122	104,277	148,595	2,897,005	30,816,630
2005	1,480,284	77,153	0	3,474,640	22,307,136	232,331	147,143	2,739,621	30,458,308
2006	1,541,884	80,380	0	3,619,232	23,235,418	242,000	153,266	2,587,428	31,459,608
2007	1,563,559	81,479	0	3,670,110	23,562,051	253,717	155,421	2,615,486	31,901,823
2008	1,599,401	83,191	0	3,754,239	24,102,160	259,533	158,984	2,675,439	32,632,947
2009	1,747,923	90,846	0	4,102,863	26,340,321	283,634	173,747	2,923,885	35,663,219
2010	1,917,507	113,466	0	5,126,760	32,304,300	354,417	217,107	3,386,937	43,420,494
2011	2,110,714	123,965	0	5,643,329	35,559,263	390,127	238,982	3,728,203	47,794,583
2012	2,203,684	129,358	0	5,891,899	37,125,531	407,312	249,508	3,892,417	49,899,709
2013	2,332,348	136,898	0	6,235,904	39,293,142	431,093	264,076	4,119,681	52,813,142
2014	2,125,733	129,639	0	5,917,760	37,288,481	409,099	250,603	3,845,708	49,967,023
2015	2,713,534	176,957	0	8,053,840	50,748,164	556,768	341,062	5,233,858	67,824,183
2016	3,243,443	211,761	0	9,626,626	60,658,473	665,496	407,666	6,255,949	81,069,414
2017	3,123,553	203,580	0	9,270,786	58,416,281	640,896	392,596	6,024,702	78,072,394
2018	3,150,486	205,003	0	9,350,725	58,919,991	646,423	395,981	6,076,651	78,745,260
2019	**3,177,866**	**206,735**	**0**	**9,431,990**	**59,432,048**	**652,040**	**399,423**	**6,129,462**	**79,429,564**
2020	2,897,569	206,735	0	9,431,990	59,432,048	652,040	399,423	6,129,462	79,149,267
2021	2,897,569	206,735	0	9,431,990	59,432,048	652,040	399,423	6,129,462	79,149,267
2022	2,897,569	206,735	0	9,431,990	59,432,048	652,040	399,423	6,129,462	79,149,267
2023	2,897,569	206,735	0	9,431,990	59,432,048	652,040	399,423	6,129,462	79,149,267
2024	2,897,569	206,735	0	9,431,990	59,432,048	652,040	399,423	6,129,462	79,149,267
2025	2,897,569	206,735	0	9,431,990	59,432,048	652,040	399,423	6,129,462	79,149,267
2026	2,897,569	206,735	0	9,431,990	59,432,048	652,040	399,423	6,129,462	79,149,267
2027	2,897,569	206,735	0	9,431,990	59,432,048	652,040	399,423	6,129,462	79,149,267
2028	2,897,569	206,735	0	9,431,990	59,432,048	652,040	399,423	6,129,462	79,149,267
2029	2,897,569	206,735	0	9,431,990	59,432,048	652,040	399,423	6,129,462	79,149,267
2030	2,897,569	206,735	0	9,431,990	59,432,048	652,040	399,423	6,129,462	79,149,267
2031	2,897,569	206,735	0	9,431,990	59,432,048	652,040	399,423	6,129,462	79,149,267
2032	2,897,569	206,735	0	9,431,990	59,432,048	652,040	399,423	6,129,462	79,149,267
2033	2,897,569	206,735	0	9,431,990	59,432,048	652,040	399,423	6,129,462	79,149,267
2034	2,897,569	206,735	0	9,431,990	59,432,048	652,040	399,423	6,129,462	79,149,267
2035	2,897,569	206,735	0	9,431,990	59,432,048	652,040	399,423	6,129,462	79,149,267
TOTAL	**107,913,075**	**7,064,878**	**0**	**305,135,577**	**2,002,352,682**	**18,801,673**	**13,290,945**	**216,566,063**	**2,671,124,893**

TABLE B-21 Total Delta Water Charge for Each Contractor (in dollars)

Sheet 3 of 4

Calendar Year	SOUTHERN CALIFORNIA AREA									
	AVEK	Castaic	Coachella	Crestline	Desert	Littlerock	Mojave	Palmdale	San Bernardino	San Gabriel
	[20]	[21]	[22]	[23]	[24]	[25]	[26]	[27]	[28]	[29]
1964	0	0	0	0	0	0	0	0	0	0
1965	0	0	0	0	0	0	0	0	0	0
1966	0	0	0	0	0	0	0	0	0	0
1967	0	0	0	0	0	0	0	0	0	0
1968	0	13,060	0	0	0	0	0	0	0	0
1969	0	17,804	0	0	0	0	0	0	0	0
1970	0	37,905	0	0	0	0	0	0	0	0
1971	0	48,508	0	0	0	0	0	0	0	0
1972	160,756	74,751	41,797	4,662	64,303	1,367	67,518	13,021	369,739	85,202
1973	222,207	107,163	51,552	7,279	79,994	2,577	95,104	26,131	54,908	14,338
1974	279,090	143,266	59,539	10,791	93,030	3,721	121,869	39,631	465,150	114,427
1975	319,822	166,307	63,964	13,250	100,515	4,752	140,722	50,989	479,733	119,705
1976	431,018	207,673	74,449	17,045	117,550	6,269	174,366	67,591	538,772	137,142
1977	469,922	226,502	79,144	19,079	122,180	6,861	189,848	77,255	540,410	139,097
1978	600,180	274,819	97,313	24,428	147,413	9,687	236,913	98,345	631,768	165,313
1979	720,173	320,077	115,033	29,836	171,470	11,889	284,640	117,285	714,457	189,760
1980	857,818	376,845	134,920	35,949	210,736	14,256	337,177	138,590	811,952	215,694
1981	1,355,100	592,631	218,713	57,637	343,292	22,946	534,813	211,396	1,237,658	330,644
1982	1,551,434	664,082	254,298	66,408	400,739	26,335	313,057	235,100	1,341,923	364,482
1983	1,110,994	472,521	184,283	47,759	291,367	19,002	434,517	163,925	943,775	252,096
1984	450,405	509,602	202,914	52,247	321,718	20,719	472,282	174,500	1,003,760	266,383
1985	565,881	591,346	240,344	61,540	381,970	24,474	551,734	200,605	1,152,983	308,405
1986	635,066	659,259	275,347	70,160	438,498	27,822	625,994	223,785	1,285,253	350,799
1987	652,450	676,176	288,131	73,104	467,095	29,064	648,002	228,654	1,319,729	364,779
1988	711,641	742,582	319,496	80,756	525,996	32,024	711,641	248,146	1,438,752	402,232
1989	2,083,593	830,453	362,565	91,333	605,021	36,301	803,932	276,155	1,607,864	454,180
1990	2,207,667	869,029	386,049	96,930	636,731	38,438	848,974	289,119	1,696,277	481,308
1991	2,454,678	961,298	409,704	102,869	675,746	40,793	900,994	306,835	1,819,725	510,800
1992	2,804,695	1,098,371	468,125	117,538	772,102	46,610	1,029,469	350,587	2,079,203	583,636
1993	2,811,318	1,100,964	469,230	117,815	773,925	46,720	1,031,900	351,415	2,084,113	585,014
1994	2,694,116	1,055,065	449,668	112,905	741,661	44,772	988,880	336,766	1,997,227	560,625
1995	2,883,156	1,129,097	481,220	120,826	793,702	47,914	1,058,269	360,394	2,137,369	599,963
1996	2,834,460	1,110,027	473,093	118,785	780,296	47,104	1,040,394	354,307	2,101,269	589,830
1997	3,133,957	1,227,316	523,081	131,336	862,744	52,082	1,150,325	391,745	2,323,295	652,153
1998	3,155,093	1,235,593	526,609	132,222	868,562	52,433	1,728,006	394,387	2,338,963	656,551
1999	3,262,870	1,277,800	544,598	136,739	898,233	54,224	1,787,034	407,859	2,418,863	678,979
2000	3,314,278	2,279,763	553,178	138,893	912,384	55,078	1,815,190	510,073	2,456,972	689,676
2001	3,315,004	2,280,263	553,299	138,924	912,584	55,090	1,815,587	510,185	2,457,510	689,827
2002	3,437,351	2,314,256	561,548	140,995	926,188	55,912	1,842,654	517,791	2,494,146	700,112
2003	3,365,016	2,265,555	549,731	138,028	906,698	54,735	1,803,877	506,894	2,441,659	685,379
2004	3,686,201	2,481,798	602,201	151,202	993,241	59,960	1,976,053	555,277	2,674,711	750,797
2005	3,650,179	2,457,547	596,316	149,725	983,535	59,374	1,956,744	549,850	2,648,574	743,459
2006	3,802,076	2,559,814	3,256,234	155,955	1,344,440	61,844	2,038,171	572,732	2,758,791	774,397
2007	3,855,524	2,595,798	3,302,008	158,148	1,363,339	62,714	2,066,822	580,783	2,797,573	785,284
2008	3,943,904	2,655,301	3,377,700	161,772	1,394,591	64,151	2,114,200	594,096	2,861,701	803,284
2009	4,310,140	2,901,877	3,691,358	176,795	1,524,095	70,109	2,310,528	649,264	3,127,443	877,878
2010	5,385,764	3,626,059	5,269,593	220,916	2,123,453	87,605	3,153,757	811,293	3,907,916	1,096,959
2011	5,928,431	3,991,418	5,800,554	243,174	2,337,412	96,432	3,471,528	893,038	4,301,676	1,207,488
2012	6,189,558	4,167,227	6,056,050	253,886	2,440,367	100,679	3,624,437	932,373	4,491,150	1,260,674
2013	6,550,942	4,410,535	6,409,638	268,709	2,582,850	106,557	3,836,054	986,811	4,753,371	1,334,279
2014	6,368,143	4,185,518	6,082,630	255,000	2,451,078	101,120	3,640,346	936,466	4,510,863	1,266,208
2015	8,666,793	5,696,327	8,278,222	347,045	3,335,822	137,621	5,133,874	1,274,493	6,139,108	1,723,258
2016	10,359,280	6,808,728	9,894,827	414,817	3,987,255	164,497	6,136,437	1,523,381	7,337,978	2,059,784
2017	9,976,357	6,557,049	9,529,073	399,484	3,839,869	158,416	5,909,610	1,467,071	7,066,735	1,983,645
2018	10,062,381	6,613,589	9,611,239	402,928	3,872,979	159,782	5,960,566	1,479,721	7,127,671	2,000,749
2019	**10,149,831**	**6,671,066**	**9,694,768**	**406,431**	**3,906,638**	**161,170**	**6,012,368**	**1,492,581**	**7,189,615**	**2,018,138**
2020	10,149,831	6,671,066	9,694,768	406,431	3,906,638	161,170	6,292,665	1,492,581	7,189,615	2,018,138
2021	10,149,831	6,671,066	9,694,768	406,431	3,906,638	161,170	6,292,665	1,492,581	7,189,615	2,018,138
2022	10,149,831	6,671,066	9,694,768	406,431	3,906,638	161,170	6,292,665	1,492,581	7,189,615	2,018,138
2023	10,149,831	6,671,066	9,694,768	406,431	3,906,638	161,170	6,292,665	1,492,581	7,189,615	2,018,138
2024	10,149,831	6,671,066	9,694,768	406,431	3,906,638	161,170	6,292,665	1,492,581	7,189,615	2,018,138
2025	10,149,831	6,671,066	9,694,768	406,431	3,906,638	161,170	6,292,665	1,492,581	7,189,615	2,018,138
2026	10,149,831	6,671,066	9,694,768	406,431	3,906,638	161,170	6,292,665	1,492,581	7,189,615	2,018,138
2027	10,149,831	6,671,066	9,694,768	406,431	3,906,638	161,170	6,292,665	1,492,581	7,189,615	2,018,138
2028	10,149,831	6,671,066	9,694,768	406,431	3,906,638	161,170	6,292,665	1,492,581	7,189,615	2,018,138
2029	10,149,831	6,671,066	9,694,768	406,431	3,906,638	161,170	6,292,665	1,492,581	7,189,615	2,018,138
2030	10,149,831	6,671,066	9,694,768	406,431	3,906,638	161,170	6,292,665	1,492,581	7,189,615	2,018,138
2031	10,149,831	6,671,066	9,694,768	406,431	3,906,638	161,170	6,292,665	1,492,581	7,189,615	2,018,138
2032	10,149,831	6,671,066	9,694,768	406,431	3,906,638	161,170	6,292,665	1,492,581	7,189,615	2,018,138
2033	10,149,831	6,671,066	9,694,768	406,431	3,906,638	161,170	6,292,665	1,492,581	7,189,615	2,018,138
2034	10,149,831	6,671,066	9,694,768	406,431	3,906,638	161,170	6,292,665	1,492,581	7,189,615	2,018,138
2035	10,149,831	6,671,066	9,694,768	406,431	3,906,638	161,170	6,292,665	1,492,581	7,189,615	2,018,138
TOTAL	**320,134,009**	**203,074,436**	**256,581,634**	**13,176,951**	**117,331,615**	**5,222,722**	**185,609,817**	**47,359,987**	**235,513,893**	**65,915,020**

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 Gorgonio	Metropolitan	Ventura	Total	Yuba City	Butte	Plumas	Total		
	[30]	[31]	[32]	[33]	[34]	[35]	[36]	[37]	[38]	[39]
1964	0	0	0	0	0	0	0	0	0	0
1965	0	0	0	0	0	0	0	0	0	0
1966	0	0	0	0	0	0	0	0	0	0
1967	0	0	0	0	0	0	0	0	0	241,150
1968	0	0	0	13,060	0	1,050	875	1,925	0	583,631
1969	0	0	0	17,804	0	1,225	929	2,154	0	827,578
1970	0	0	0	37,905	0	3,848	1,995	5,843	0	2,160,886
1971	0	0	0	48,508	0	4,546	3,186	7,732	0	2,696,792
1972	0	2,043,211	0	2,926,327	0	4,929	3,778	8,707	0	7,206,052
1973	0	2,317,893	0	2,979,146	0	7,059	4,444	11,503	0	7,456,998
1974	0	4,231,933	0	5,562,447	0	8,336	4,931	13,267	0	10,683,514
1975	0	5,073,286	0	6,533,045	0	9,416	5,117	14,533	0	12,440,851
1976	0	6,422,167	0	8,194,042	0	7,004	5,780	12,784	0	15,299,760
1977	0	7,104,278	0	8,974,576	0	16,917	5,827	22,744	0	15,869,924
1978	0	9,016,389	0	11,302,568	0	12,635	6,844	19,479	0	19,425,531
1979	0	10,935,192	0	13,609,812	0	16,575	7,773	24,348	0	23,095,855
1980	84,294	13,102,796	12,396	16,333,423	0	19,834	8,801	28,635	0	27,557,096
1981	140,930	20,910,099	36,136	25,991,995	0	21,682	13,370	35,052	0	43,335,911
1982	167,929	23,998,560	57,248	29,441,595	0	16,117	14,694	30,811	0	49,027,703
1983	124,148	17,203,307	50,672	21,298,366	0	15,202	10,134	25,336	0	34,186,736
1984	138,982	18,766,458	64,344	22,444,314	20,590	15,442	10,681	46,713	0	37,051,405
1985	166,935	22,050,974	84,882	26,382,073	24,050	16,976	12,166	53,192	0	43,235,458
1986	195,056	25,089,658	120,965	29,997,662	31,753	18,145	13,457	63,355	0	49,817,447
1987	207,598	26,095,043	148,284	31,198,109	37,071	17,794	13,642	68,507	0	51,663,899
1988	233,604	28,781,238	201,116	34,429,224	46,722	18,565	14,852	80,139	0	57,062,086
1989	268,530	32,505,376	265,215	40,190,518	61,184	19,891	16,576	97,651	0	65,617,116
1990	289,119	33,616,369	334,242	41,790,252	63,506	20,055	17,381	100,942	0	68,658,631
1991	306,835	35,676,185	354,722	44,521,184	170,267	21,283	19,155	210,705	0	73,265,317
1992	350,587	40,763,329	405,303	50,869,555	194,545	24,318	22,697	241,560	0	83,873,685
1993	351,415	40,859,579	406,260	50,989,668	195,005	24,376	23,563	242,944	0	84,237,281
1994	336,766	39,156,173	389,323	48,863,947	186,875	23,360	23,360	233,595	0	80,866,329
1995	360,394	41,903,674	416,641	52,292,619	199,987	24,999	26,040	251,026	0	86,725,209
1996	0	41,195,923	409,604	51,055,092	196,610	24,576	26,624	247,810	0	83,007,946
1997	0	45,548,810	447,746	56,444,590	214,918	27,173	30,223	272,314	0	93,062,361
1998	0	45,855,992	450,529	57,394,940	107,459	27,356	31,537	166,352	0	93,159,618
1999	47,152	47,422,430	466,491	59,403,272	226,327	28,291	33,820	288,438	0	96,994,387
2000	71,841	48,169,576	478,942	61,445,844	229,892	69,207	35,708	334,807	0	98,699,723
2001	95,809	48,180,135	479,047	61,483,264	229,942	83,833	37,187	350,962	0	98,781,493
2002	97,237	48,898,394	486,188	62,472,772	233,371	85,083	39,185	357,639	0	100,275,854
2003	118,989	47,869,376	475,957	61,181,894	228,460	83,293	39,743	351,496	0	98,210,650
2004	156,416	52,438,419	521,386	67,047,662	250,266	92,048	0	342,314	0	107,579,616
2005	167,795	51,925,988	516,291	66,405,377	247,820	717,290	0	965,110	0	107,188,794
2006	188,222	51,397,939	537,776	69,448,391	258,133	32,606	8,699	299,438	0	110,967,023
2007	204,501	52,120,469	545,336	70,438,299	268,738	33,950	19,600	322,288	0	112,569,420
2008	482,528	53,315,217	557,837	72,326,282	274,736	794,785	56,138	1,125,659	0	116,229,451
2009	527,337	58,266,144	609,638	79,042,606	292,626	844,842	63,417	1,200,885	0	127,004,742
2010	658,937	72,806,845	761,778	99,910,875	365,653	1,054,033	81,825	1,501,511	0	158,911,895
2011	725,331	80,142,822	838,533	109,977,837	414,001	1,185,940	92,561	1,692,502	0	174,964,623
2012	757,280	83,672,846	875,468	114,821,995	424,826	1,216,951	100,037	1,741,814	0	182,648,119
2013	801,494	88,558,170	926,583	121,525,993	444,760	1,274,052	109,975	1,828,787	0	193,299,795
2014	760,603	84,040,101	879,310	115,477,386	431,273	1,235,416	108,033	1,774,722	0	183,479,164
2015	1,035,151	114,375,290	1,196,707	157,339,711	574,420	1,645,472	153,363	2,373,255	0	249,669,412
2016	1,237,301	136,710,965	1,430,405	188,065,655	686,595	1,966,807	190,584	2,843,986	0	298,433,393
2017	1,191,565	131,657,554	1,377,531	181,113,959	703,970	2,016,581	183,222	2,903,773	0	287,566,604
2018	1,201,839	132,792,806	1,389,410	182,675,660	671,729	1,924,226	184,502	2,780,457	0	289,897,532
2019	**1,212,284**	**133,946,873**	**1,401,484**	**184,263,247**	**702,796**	**2,013,218**	**186,062**	**2,902,076**	**0**	**292,514,361**
2020	1,212,284	133,946,873	1,401,484	184,543,544	672,713	1,927,041	186,062	2,785,816	0	292,398,101
2021	1,212,284	133,946,873	1,401,484	184,543,544	672,713	1,927,041	186,062	2,785,816	0	292,398,101
2022	1,212,284	133,946,873	1,401,484	184,543,544	672,713	1,927,041	186,062	2,785,816	0	292,398,101
2023	1,212,284	133,946,873	1,401,484	184,543,544	672,713	1,927,041	186,062	2,785,816	0	292,398,101
2024	1,212,284	133,946,873	1,401,484	184,543,544	672,713	1,927,041	186,062	2,785,816	0	292,398,101
2025	1,212,284	133,946,873	1,401,484	184,543,544	672,713	1,927,041	186,062	2,785,816	0	292,398,101
2026	1,212,284	133,946,873	1,401,484	184,543,544	672,713	1,927,041	186,062	2,785,816	0	292,398,101
2027	1,212,284	133,946,873	1,401,484	184,543,544	672,713	1,927,041	186,062	2,785,816	0	292,398,101
2028	1,212,284	133,946,873	1,401,484	184,543,544	672,713	1,927,041	186,062	2,785,816	0	292,398,101
2029	1,212,284	133,946,873	1,401,484	184,543,544	672,713	1,927,041	186,062	2,785,816	0	292,398,101
2030	1,212,284	133,946,873	1,401,484	184,543,544	672,713	1,927,041	186,062	2,785,816	0	292,398,101
2031	1,212,284	133,946,873	1,401,484	184,543,544	672,713	1,927,041	186,062	2,785,816	0	292,398,101
2032	1,212,284	133,946,873	1,401,484	184,543,544	672,713	1,927,041	186,062	2,785,816	0	292,398,101
2033	1,212,284	133,946,873	1,401,484	184,543,544	672,713	1,927,041	186,062	2,785,816	0	292,398,101
2034	1,212,284	133,946,873	1,401,484	184,543,544	672,713	1,927,041	186,062	2,785,816	0	292,398,101
2035	1,212,284	133,946,873	1,401,484	184,543,544	672,713	1,927,041	186,062	2,785,816	0	292,398,101
TOTAL	**34,859,278**	**4,402,082,219**	**43,831,470**	**5,930,693,051**	**20,674,284**	**49,721,264**	**5,101,085**	**75,496,633**	**0**	**9,487,655,423**

TABLE B-22 Water System Revenue Bond Surcharge for Each Contractor[a] (in dollars)

Sheet 1 of 4

Calendar Year	NORTH BAY AREA			SOUTH BAY AREA				CENTRAL COASTAL AREA		
	Napa	Solano	Total	Alameda-Zone 7	Alameda County	Santa Clara	Total	San Luis Obispo	Santa Barbara	Total
	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]
1971	0	0	0	0	0	0	0	0	0	0
1972	0	0	0	0	0	0	0	0	0	0
1973	0	0	0	0	0	0	0	0	0	0
1974	0	0	0	0	0	0	0	0	0	0
1975	0	0	0	0	0	0	0	0	0	0
1976	0	0	0	0	0	0	0	0	0	0
1977	0	0	0	0	0	0	0	0	0	0
1978	0	0	0	0	0	0	0	0	0	0
1979	0	0	0	0	0	0	0	0	0	0
1980	0	0	0	0	0	0	0	0	0	0
1981	0	0	0	0	0	0	0	0	0	0
1982	0	0	0	0	0	0	0	0	0	0
1983	0	0	0	0	0	0	0	0	0	0
1984	0	0	0	0	0	0	0	0	0	0
1985	0	0	0	0	0	0	0	0	0	0
1986	0	0	0	0	0	0	0	0	0	0
1987	0	0	0	0	0	0	0	0	0	0
1988	29,131	40,505	69,636	25,436	30,176	100,035	155,647	13,126	24,392	37,518
1989	48,804	69,621	118,425	43,343	51,681	170,303	265,327	26,828	49,634	76,462
1990	41,166	60,482	101,648	38,407	51,185	149,440	239,032	27,956	51,795	79,751
1991	63,389	92,401	155,790	62,470	81,991	235,712	380,173	44,887	83,709	128,596
1992	84,320	126,227	210,547	89,247	115,208	325,629	530,084	61,137	113,925	175,062
1993	90,152	137,473	227,625	98,432	125,174	347,457	571,063	67,725	126,662	194,387
1994	91,785	141,222	233,007	102,021	126,216	352,415	580,652	81,420	159,156	240,576
1995	108,311	181,787	290,098	126,001	149,377	416,956	692,334	131,675	270,726	402,401
1996	132,305	232,343	364,648	158,514	180,787	505,042	844,343	242,654	534,449	777,103
1997	135,556	237,492	373,048	171,263	187,162	522,127	880,552	141,810	846,617	988,427
1998	130,346	228,366	358,712	164,682	179,971	502,065	846,718	136,361	814,087	950,448
1999	182,507	316,416	498,923	227,072	248,031	691,830	1,166,933	188,835	1,124,110	1,312,945
2000	238,571	364,418	602,989	260,766	284,875	794,730	1,340,371	218,359	1,364,019	1,582,378
2001	234,773	358,616	593,389	561,965	280,341	782,078	1,624,384	214,883	1,342,304	1,557,187
2002	257,520	391,851	649,371	610,230	288,977	806,174	1,705,381	221,503	1,383,661	1,605,164
2003	268,151	408,027	676,178	635,422	300,907	839,455	1,775,784	230,647	1,440,782	1,671,429
2004	268,425	408,444	676,869	636,070	301,214	840,312	1,777,596	230,883	1,442,252	1,673,135
2005	253,413	385,602	639,015	610,756	284,369	793,318	1,688,443	217,970	1,361,594	1,579,564
2006	274,219	417,261	691,480	660,900	307,716	858,451	1,827,067	235,866	1,473,385	1,709,251
2007	177,891	270,066	447,957	441,730	197,505	550,975	1,190,210	152,478	975,872	1,128,350
2008	254,590	386,862	641,452	773,686	288,283	803,089	1,865,058	223,659	1,369,892	1,593,551
2009	285,324	434,158	719,482	687,665	320,178	893,215	1,901,058	245,418	1,533,052	1,778,470
2010	273,015	415,428	688,443	657,998	306,365	854,681	1,819,044	234,831	1,466,914	1,701,745
2011	294,866	448,677	743,543	710,662	330,884	923,085	1,964,631	253,625	1,584,318	1,837,943
2012	383,092	455,983	839,075	753,264	330,355	933,048	2,016,667	229,311	1,456,050	1,685,361
2013	416,223	495,679	911,902	820,192	360,039	1,013,496	2,193,727	249,613	1,583,700	1,833,313
2014	454,438	541,511	995,949	894,353	392,064	1,103,675	2,390,092	271,760	1,722,805	1,994,565
2015	436,482	520,709	957,191	854,027	375,378	1,053,325	2,282,730	260,767	1,649,215	1,909,982
2016	435,356	520,887	956,243	851,748	374,332	1,047,728	2,273,808	260,376	1,644,453	1,904,829
2017	401,057	480,649	881,706	843,557	345,672	966,381	2,155,610	240,390	1,517,572	1,757,962
2018	776,986	934,577	1,711,563	1,522,713	669,079	1,869,953	4,061,745	465,832	2,954,217	3,420,049
2019	**1,037,357**	**1,250,754**	**2,288,111**	**2,037,780**	**897,587**	**2,508,924**	**5,444,291**	**622,710**	**3,934,711**	**4,557,421**
2020	1,042,607	1,257,084	2,299,691	2,048,093	902,130	2,521,622	5,471,845	625,862	3,954,624	4,580,486
2021	1,057,348	1,274,857	2,332,205	2,077,049	914,884	2,557,273	5,549,206	634,710	4,010,536	4,645,246
2022	1,050,348	1,266,417	2,316,765	2,063,299	908,827	2,540,343	5,512,469	630,508	3,983,985	4,614,493
2023	1,087,866	1,311,654	2,399,520	2,137,000	941,291	2,631,084	5,709,375	653,030	4,126,293	4,779,323
2024	1,062,444	1,281,002	2,343,446	2,087,061	919,294	2,569,599	5,575,954	637,770	4,029,867	4,667,637
2025	1,014,486	1,223,178	2,237,664	1,992,852	877,798	2,453,609	5,324,259	608,981	3,847,961	4,456,942
2026	968,309	1,167,501	2,135,810	1,902,141	837,842	2,341,925	5,081,908	581,261	3,672,809	4,254,070
2027	1,017,053	1,226,273	2,243,326	1,997,895	880,019	2,459,818	5,337,732	610,522	3,857,698	4,468,220
2028	891,869	1,075,337	1,967,206	1,751,984	771,701	2,157,050	4,680,735	535,376	3,382,872	3,918,248
2029	924,125	1,114,228	2,038,353	1,815,347	799,611	2,235,063	4,850,021	554,738	3,505,219	4,059,957
2030	721,140	869,488	1,590,628	1,416,605	623,976	1,744,131	3,784,712	432,890	2,735,296	3,168,186
2031	720,377	868,568	1,588,945	1,415,106	623,316	1,742,285	3,780,707	432,432	2,732,402	3,164,834
2032	721,162	869,514	1,590,676	1,416,648	623,995	1,744,184	3,784,827	432,903	2,735,380	3,168,283
2033	720,217	868,374	1,588,591	1,414,791	623,177	1,741,897	3,779,865	432,335	2,731,793	3,164,128
2034	720,174	868,323	1,588,497	1,414,707	623,140	1,741,794	3,779,641	432,310	2,731,632	3,163,942
2035	719,138	867,074	1,586,212	1,412,673	622,244	1,739,289	3,774,206	431,688	2,727,703	3,159,391
TOTAL	**22,998,184**	**29,163,366**	**52,161,550**	**45,495,623**	**21,256,324**	**59,476,070**	**126,228,017**	**15,112,611**	**92,166,100**	**107,278,711**

[a] 1988 through 2017 charges are debt service only and do not include bond cover; 2018 charges and after include bond cover.

TABLE B-22 Water System Revenue Bond Surcharge for Each Contractor[a] (in dollars)

	SAN JOAQUIN VALLEY AREA								
				Kern					
Calendar Year	Dudley Ridge	Empire	Future Contractor San Joaquin Valley	Municipal and Industrial	Agricultural	Kings	Oak Flat	Tulare	Total
	[11]	[12]	[13]	[14]	[15]	[16]	[17]	[18]	[19]
1971	0	0	0	0	0	0	0	0	0
1972	0	0	0	0	0	0	0	0	0
1973	0	0	0	0	0	0	0	0	0
1974	0	0	0	0	0	0	0	0	0
1975	0	0	0	0	0	0	0	0	0
1976	0	0	0	0	0	0	0	0	0
1977	0	0	0	0	0	0	0	0	0
1978	0	0	0	0	0	0	0	0	0
1979	0	0	0	0	0	0	0	0	0
1980	0	0	0	0	0	0	0	0	0
1981	0	0	0	0	0	0	0	0	0
1982	0	0	0	0	0	0	0	0	0
1983	0	0	0	0	0	0	0	0	0
1984	0	0	0	0	0	0	0	0	0
1985	0	0	0	0	0	0	0	0	0
1986	0	0	0	0	0	0	0	0	0
1987	0	0	0	0	0	0	0	0	0
1988	33,986	1,657	0	67,288	726,501	2,228	2,851	66,748	901,259
1989	59,273	2,785	0	116,689	1,251,452	3,733	4,927	116,736	1,555,595
1990	53,349	2,419	0	287,811	947,351	3,248	4,367	109,118	1,407,663
1991	82,252	3,731	0	359,380	1,564,983	5,035	6,771	168,217	2,190,369
1992	112,566	5,127	0	452,691	2,153,423	6,927	9,285	230,217	2,970,236
1993	119,670	5,459	0	272,449	2,491,672	7,381	9,894	244,813	3,151,338
1994	118,265	5,379	0	244,671	2,485,820	7,300	9,766	241,933	3,113,134
1995	139,226	6,340	0	317,885	2,894,181	8,599	11,490	284,798	3,662,519
1996	169,333	7,703	0	354,341	2,722,240	10,461	13,978	346,367	3,624,423
1997	165,364	7,980	0	366,285	2,673,847	10,826	14,465	357,986	3,596,753
1998	159,011	7,672	0	352,211	2,571,110	10,410	13,909	344,232	3,458,555
1999	218,784	10,373	0	485,897	3,371,115	14,376	19,166	476,017	4,595,728
2000	251,339	11,735	0	557,296	3,620,348	16,500	21,990	546,406	5,025,614
2001	247,338	11,547	0	548,424	3,461,158	16,238	21,640	537,707	4,844,052
2002	273,542	11,904	0	565,321	3,496,023	16,737	22,306	521,659	4,907,492
2003	284,834	12,395	0	588,659	3,640,346	17,428	23,227	543,193	5,110,082
2004	285,125	12,408	0	589,259	3,644,059	17,446	23,251	543,748	5,115,296
2005	269,179	11,714	0	556,305	3,431,851	39,485	21,951	488,483	4,818,968
2006	291,279	12,676	0	601,979	3,713,614	42,726	23,753	528,589	5,214,616
2007	187,144	8,113	0	383,463	2,314,841	34,088	15,230	285,915	3,228,794
2008	271,383	11,832	0	563,171	3,478,837	41,080	22,094	445,805	4,834,202
2009	303,076	13,189	0	626,357	3,864,004	46,037	24,715	497,108	5,374,486
2010	257,209	12,620	0	599,335	3,631,924	44,051	23,648	440,950	5,009,737
2011	277,794	13,630	0	647,304	3,922,606	47,577	25,542	476,242	5,410,695
2012	271,192	12,709	0	666,489	5,450,478	40,125	23,964	510,822	6,975,779
2013	286,050	13,814	0	724,170	5,680,875	43,592	26,041	521,112	7,295,654
2014	302,692	15,056	0	790,204	6,189,586	47,573	28,404	561,312	7,934,827
2015	278,438	14,506	0	758,484	5,949,402	45,814	27,366	540,099	7,614,109
2016	278,950	14,593	0	759,888	5,962,338	46,008	27,523	541,874	7,631,174
2017	258,290	13,525	0	701,525	5,532,979	43,005	25,472	506,783	7,081,579
2018	500,847	26,202	0	1,357,207	10,705,138	82,310	49,399	973,302	13,694,405
2019	**675,964**	**35,286**	**0**	**1,823,266**	**14,432,630**	**110,548**	**66,447**	**1,314,843**	**18,458,984**
2020	679,385	35,465	0	1,832,493	14,505,673	111,107	66,783	1,321,497	18,552,403
2021	688,990	35,966	0	1,858,402	14,710,757	112,678	67,727	1,340,181	18,814,701
2022	684,429	35,728	0	1,846,099	14,613,369	111,932	67,279	1,331,309	18,690,145
2023	708,877	37,004	0	1,912,041	15,135,360	115,931	69,682	1,378,863	19,357,758
2024	692,311	36,139	0	1,867,360	14,781,666	113,221	68,054	1,346,641	18,905,392
2025	661,061	34,508	0	1,783,068	14,114,430	108,111	64,982	1,285,854	18,052,014
2026	630,971	32,937	0	1,701,906	13,471,967	103,190	62,024	1,227,325	17,230,320
2027	662,734	34,595	0	1,787,580	14,150,144	108,384	65,146	1,289,108	18,097,691
2028	581,161	30,337	0	1,567,555	12,408,469	95,044	57,128	1,130,438	15,870,132
2029	602,179	31,434	0	1,624,248	12,857,241	98,481	59,194	1,171,322	16,444,099
2030	469,910	24,530	0	1,267,481	10,033,143	76,850	46,192	914,040	12,832,146
2031	469,413	24,504	0	1,266,140	10,022,527	76,768	46,143	913,073	12,818,568
2032	469,925	24,531	0	1,267,520	10,033,449	76,852	46,193	914,068	12,832,538
2033	469,309	24,498	0	1,265,858	10,020,293	76,751	46,133	912,870	12,815,712
2034	469,281	24,497	0	1,265,783	10,019,702	76,747	46,130	912,816	12,814,956
2035	468,606	24,462	0	1,263,963	10,005,292	76,636	46,064	911,503	12,796,526
TOTAL	**16,891,286**	**847,214**	**0**	**43,463,201**	**328,860,214**	**2,467,575**	**1,589,686**	**32,614,042**	**426,733,218**

[a] 1988 through 2017 charges are debt service only and do not include bond cover; 2018 charges and after include bond cover.

TABLE B-22 Water System Revenue Bond Surcharge for Each Contractor[a] (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	915,850	1,073,158	67,263	523,945	18,453	731,452	154,732	1,323,822	351,925
2013	1,186,869	996,745	1,172,413	73,154	570,092	20,052	795,549	168,130	1,438,513	382,372
2014	1,345,233	1,085,473	1,276,763	79,660	621,395	21,838	866,523	183,142	1,568,301	416,868
2015	1,288,246	1,039,717	1,228,651	76,255	595,985	20,924	868,542	175,577	1,500,551	398,955
2016	1,287,598	1,037,955	1,232,122	76,009	595,354	20,895	867,266	175,457	1,495,424	397,690
2017	1,186,800	957,063	1,209,316	70,025	549,319	19,257	799,852	161,746	1,377,995	366,493
2018	2,295,675	1,849,307	2,219,292	135,462	1,064,379	37,239	1,548,497	312,825	2,664,966	708,792
2019	**3,072,197**	**2,472,366**	**2,964,868**	**181,204**	**1,423,133**	**49,834**	**2,071,831**	**418,552**	**3,563,713**	**947,829**
2020	3,087,745	2,484,879	2,979,873	182,121	1,430,335	50,086	2,082,316	420,670	3,581,749	952,626
2021	3,131,400	2,520,010	3,022,003	184,696	1,450,558	50,794	2,111,757	426,618	3,632,388	966,094
2022	3,110,670	2,503,327	3,001,997	183,473	1,440,955	50,458	2,097,776	423,794	3,608,341	959,699
2023	3,221,783	2,592,746	3,109,228	190,027	1,492,426	52,260	2,172,709	438,931	3,737,231	993,979
2024	3,146,494	2,532,157	3,036,570	185,586	1,457,550	51,039	2,121,936	428,674	3,649,897	970,751
2025	3,004,463	2,417,857	2,899,501	177,209	1,391,757	48,735	2,026,153	409,324	3,485,143	926,932
2026	2,867,706	2,307,801	2,767,521	169,143	1,328,407	46,517	1,933,926	390,692	3,326,505	884,740
2027	3,012,066	2,423,975	2,906,837	177,657	1,395,278	48,859	2,031,280	410,360	3,493,961	929,277
2028	2,641,325	2,125,619	2,549,048	155,790	1,223,540	42,845	1,781,259	359,851	3,063,906	814,897
2029	2,736,852	2,202,496	2,641,239	161,425	1,267,791	44,394	1,845,681	372,865	3,174,717	844,369
2030	2,135,702	1,718,717	2,061,090	125,968	989,321	34,643	1,440,276	290,965	2,477,389	658,903
2031	2,133,442	1,716,898	2,058,909	125,834	988,274	34,606	1,438,752	290,657	2,474,768	658,206
2032	2,135,767	1,718,769	2,061,153	125,972	989,351	34,644	1,440,320	290,974	2,477,465	658,923
2033	2,132,966	1,716,515	2,058,450	125,806	988,053	34,599	1,438,432	290,592	2,474,216	658,059
2034	2,132,841	1,716,414	2,058,328	125,799	987,995	34,597	1,438,347	290,575	2,474,070	658,020
2035	2,129,773	1,713,946	2,055,368	125,618	986,574	34,547	1,436,278	290,157	2,470,512	657,074
TOTAL	**72,442,370**	**61,847,144**	**63,435,103**	**4,351,301**	**32,739,888**	**1,196,524**	**49,161,437**	**9,927,220**	**85,853,468**	**22,777,292**

[a] 1988 through 2017 charges are debt service only and do not include bond cover; 2018 charges and after include bond cover.

TABLE B-22 Water System Revenue Bond Surcharge for Each Contractor[a] (in dollars)

Sheet 4 of 4

Calendar Year	SOUTHERN CALIFORNIA AREA (continued)				FEATHER RIVER AREA					
	San Gorgonio	Metropolitan	Ventura	Total	Yuba City	Butte	Plumas	Total	South Bay Area Future Contractor	Grand Total
	[30]	[31]	[32]	[33]	[34]	[35]	[36]	[37]	[38]	[39]
1971	0	0	0	0	0	0	0	0	0	0
1972	0	0	0	0	0	0	0	0	0	0
1973	0	0	0	0	0	0	0	0	0	0
1974	0	0	0	0	0	0	0	0	0	0
1975	0	0	0	0	0	0	0	0	0	0
1976	0	0	0	0	0	0	0	0	0	0
1977	0	0	0	0	0	0	0	0	0	0
1978	0	0	0	0	0	0	0	0	0	0
1979	0	0	0	0	0	0	0	0	0	0
1980	0	0	0	0	0	0	0	0	0	0
1981	0	0	0	0	0	0	0	0	0	0
1982	0	0	0	0	0	0	0	0	0	0
1983	0	0	0	0	0	0	0	0	0	0
1984	0	0	0	0	0	0	0	0	0	0
1985	0	0	0	0	0	0	0	0	0	0
1986	0	0	0	0	0	0	0	0	0	0
1987	0	0	0	0	0	0	0	0	0	0
1988	24,019	2,642,354	18,118	3,150,527	1,336	552	853	2,741	0	4,317,328
1989	42,040	4,587,641	34,565	5,564,840	0	918	1,454	2,372	0	7,583,021
1990	38,023	4,037,980	34,994	4,917,308	2,535	800	1,283	4,618	0	6,750,020
1991	59,122	6,259,893	54,115	7,642,536	9,945	1,243	2,027	13,215	0	10,510,679
1992	80,131	8,435,312	72,892	10,351,553	13,671	1,710	2,806	18,187	0	14,255,669
1993	84,371	8,885,273	76,858	10,904,435	14,608	1,827	3,026	19,461	0	15,068,309
1994	85,698	8,926,755	76,794	10,959,041	14,409	1,801	3,070	19,280	0	15,145,690
1995	101,792	10,539,430	90,436	12,943,054	16,958	2,119	3,705	22,782	0	18,013,188
1996	124,074	12,810,359	109,783	15,730,703	20,640	2,579	4,620	27,839	0	21,369,059
1997	28,259	13,168,230	112,960	16,102,652	21,382	2,674	4,872	28,928	0	21,970,360
1998	27,174	12,662,268	108,619	15,483,941	20,562	2,571	4,685	27,818	0	21,126,192
1999	53,545	17,454,651	149,123	21,587,353	28,348	3,543	6,765	38,656	0	29,200,538
2000	70,117	19,805,800	168,259	25,135,976	32,271	9,794	7,996	50,061	0	33,737,389
2001	69,001	19,490,499	165,580	24,751,444	31,757	9,638	7,869	49,264	0	33,419,720
2002	71,126	20,091,004	170,682	25,534,301	32,736	9,935	8,112	50,783	0	34,452,492
2003	74,063	20,920,403	177,728	26,588,412	34,087	10,345	8,446	52,878	0	35,874,763
2004	74,138	20,941,743	177,910	26,615,534	34,121	10,356	8,456	52,933	0	35,911,363
2005	69,992	19,770,593	167,960	25,127,082	32,213	9,776	7,983	49,972	0	33,903,044
2006	75,738	20,330,228	181,750	27,239,381	34,858	10,579	8,638	54,075	0	36,735,870
2007	45,192	12,752,863	116,415	17,507,615	22,362	7,007	5,579	34,948	0	23,537,874
2008	250,631	19,303,204	173,561	26,204,054	32,180	9,751	7,973	49,904	0	35,188,221
2009	78,805	21,153,536	189,110	28,342,483	36,270	11,008	8,988	56,266	0	38,172,245
2010	75,405	20,240,944	180,952	27,252,635	34,705	10,532	8,600	53,837	0	36,525,441
2011	81,440	21,860,932	195,434	29,433,805	37,482	11,375	9,289	58,146	0	39,448,763
2012	215,055	22,686,017	191,051	29,343,657	35,313	101,156	12,344	148,813	0	41,009,352
2013	233,662	23,602,562	207,636	30,847,749	38,359	109,882	13,628	161,869	0	43,244,214
2014	254,740	25,718,327	226,122	33,664,385	41,861	119,916	15,370	177,147	0	47,156,965
2015	243,775	24,614,514	216,476	32,268,168	40,374	115,656	15,317	171,347	0	45,203,527
2016	242,979	24,546,439	215,981	32,191,169	40,634	116,401	15,914	172,949	0	45,130,172
2017	223,908	22,620,590	198,956	29,741,320	37,618	107,762	14,712	160,092	0	41,778,269
2018	433,001	43,719,334	384,082	57,372,851	72,958	208,994	28,526	310,478	0	80,571,091
2019	**579,030**	**58,478,538**	**513,433**	**76,736,528**	**98,105**	**281,030**	**38,239**	**417,374**	**0**	**107,902,709**
2020	581,960	58,774,497	516,031	77,124,888	98,602	282,452	38,433	419,487	0	108,448,800
2021	590,188	59,605,459	523,327	78,215,292	99,996	286,446	38,976	425,418	0	109,982,068
2022	586,281	59,210,866	519,863	77,697,500	99,334	284,549	38,718	422,601	0	109,253,973
2023	607,223	61,325,884	538,432	80,472,859	102,882	294,713	40,101	437,696	0	113,156,531
2024	593,033	59,892,775	525,850	78,592,312	100,478	287,826	39,164	427,468	0	110,512,209
2025	566,264	57,189,246	502,113	75,044,697	95,942	274,834	37,396	408,172	0	105,523,748
2026	540,489	54,586,094	479,258	71,628,799	91,575	262,324	35,694	389,593	0	100,720,500
2027	567,697	57,333,956	503,384	75,234,587	96,185	275,529	37,491	409,205	0	105,790,761
2028	497,822	50,276,985	441,425	65,974,312	84,346	241,616	32,876	358,838	0	92,769,471
2029	515,826	52,095,333	457,389	68,360,377	87,396	250,354	34,065	371,815	0	96,124,622
2030	402,525	40,652,573	356,924	53,344,996	68,200	195,364	26,583	290,147	0	75,010,815
2031	402,099	40,609,561	356,546	53,288,552	68,128	195,157	26,555	289,840	0	74,931,446
2032	402,537	40,653,814	356,935	53,346,624	68,202	195,370	26,583	290,155	0	75,013,103
2033	402,009	40,600,506	356,466	53,276,669	68,112	195,114	26,549	289,775	0	74,914,740
2034	401,986	40,598,114	356,445	53,273,531	68,108	195,102	26,547	289,757	0	74,910,324
2035	401,407	40,539,729	355,933	53,196,916	68,010	194,822	26,509	289,341	0	74,802,592
TOTAL	**12,269,392**	**1,407,003,608**	**12,304,656**	**1,835,309,403**	**2,330,154**	**5,214,802**	**823,385**	**8,368,341**	**0**	**2,556,079,240**

[a] 1988 through 2017 charges are debt service only and do not include bond cover; 2018 charges and after include bond cover.

TABLE B-23 Total Transportation and Delta Water Charge for Each Contractor[a] (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	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	683,169	633,184	2,178,465	3,494,818	115,961	229,807	345,768
1969	254,715	0	254,715	818,057	583,436	2,298,736	3,700,230	185,156	358,861	544,017
1970	277,547	0	277,547	904,487	640,297	2,787,967	4,332,751	200,150	387,675	587,825
1971	227,474	0	227,474	846,153	675,193	2,807,017	4,328,363	202,413	392,912	595,325
1972	224,978	0	224,978	930,548	822,397	3,027,749	4,780,694	209,057	406,589	615,646
1973	221,091	31,366	252,457	917,173	716,492	3,120,787	4,754,451	206,557	402,724	609,281
1974	240,498	32,938	273,437	957,926	746,932	3,325,022	5,029,880	208,545	407,090	615,635
1975	237,459	36,291	273,750	1,016,614	793,055	3,214,046	5,023,715	225,895	439,873	665,768
1976	271,292	40,836	312,127	1,129,812	943,464	3,362,542	5,435,817	228,976	447,299	676,275
1977	293,627	45,096	338,723	1,098,620	922,203	3,303,461	5,324,284	238,699	468,721	707,420
1978	273,870	49,178	323,048	1,187,654	935,818	3,712,581	5,836,053	245,331	484,259	729,590
1979	289,479	53,340	342,819	1,284,457	1,009,566	3,819,533	6,113,557	243,110	483,437	726,547
1980	310,846	86,073	396,919	1,437,666	1,173,798	4,119,071	6,730,535	282,254	540,553	822,807
1981	347,781	112,848	460,629	1,546,464	1,349,125	4,507,566	7,403,155	307,065	596,671	903,736
1982	438,335	141,835	580,171	1,627,035	1,369,536	4,941,393	7,937,964	328,215	682,545	1,010,760
1983	354,787	163,294	518,081	1,497,599	1,260,138	4,910,241	7,667,978	357,218	702,083	1,059,301
1984	467,336	246,698	714,034	1,807,810	1,478,394	6,870,249	10,156,454	409,529	801,057	1,210,586
1985	736,074	386,306	1,122,380	2,305,896	2,225,097	7,796,485	12,327,478	500,696	969,931	1,470,626
1986	1,120,086	714,246	1,834,332	2,174,763	2,014,104	8,193,845	12,382,712	536,751	1,038,031	1,574,782
1987	1,773,801	1,582,227	3,356,028	2,671,531	2,505,662	7,980,255	13,157,448	570,644	1,148,974	1,719,618
1988	2,349,572	2,524,763	4,874,335	2,732,933	2,774,430	7,830,285	13,337,648	673,071	1,439,620	2,112,691
1989	2,548,764	3,701,385	6,250,149	2,717,064	2,515,471	7,578,850	12,811,385	772,570	1,814,759	2,587,329
1990	2,900,024	3,848,934	6,748,958	3,152,545	2,929,775	8,355,392	14,437,712	933,367	2,046,370	2,979,737
1991	2,941,321	4,170,227	7,111,548	2,424,477	2,384,246	6,430,834	11,239,557	979,709	2,366,841	3,346,550
1992	2,797,727	4,144,993	6,942,720	2,898,952	2,927,115	7,656,940	13,483,007	1,118,807	2,526,861	3,645,668
1993	2,855,497	4,172,491	7,027,988	3,755,728	2,977,354	8,849,995	15,583,077	1,185,665	2,726,057	3,911,722
1994	2,987,938	4,225,291	7,213,229	3,792,821	3,586,255	9,613,545	16,992,620	1,335,974	3,518,042	4,854,015
1995	2,961,322	4,405,219	7,366,541	4,041,461	3,313,350	8,393,828	15,748,639	1,647,817	6,195,415	7,843,231
1996	3,045,021	4,898,210	7,943,232	3,649,299	3,178,398	9,228,554	16,056,250	2,592,043	15,232,542	17,824,585
1997	3,028,005	4,734,808	7,762,813	3,875,809	3,145,550	9,338,016	16,359,375	3,002,832	23,737,164	26,739,996
1998	2,936,062	4,588,897	7,524,960	3,482,649	3,201,607	9,077,806	15,762,062	3,254,940	28,393,640	31,648,580
1999	3,163,021	5,083,084	8,246,104	4,208,866	3,693,329	11,434,972	19,337,168	3,810,971	29,676,309	33,487,280
2000	3,462,081	5,621,291	9,083,372	5,811,503	3,594,439	10,219,800	19,625,742	3,763,854	30,288,867	34,052,721
2001	4,079,263	6,369,954	10,449,217	9,830,017	4,082,024	11,628,753	25,540,795	4,315,191	32,422,390	36,737,581
2002	4,325,897	6,567,446	10,893,343	13,361,589	4,087,080	13,155,985	30,604,654	4,041,707	32,104,599	36,146,306
2003	4,445,869	6,914,543	11,360,413	10,005,078	3,807,457	11,948,846	25,761,381	4,120,206	32,395,489	36,515,694
2004	4,981,354	7,258,161	12,239,515	8,384,617	4,208,242	11,648,225	24,241,085	4,189,896	32,929,025	37,118,921
2005	4,329,982	6,734,742	11,064,724	8,424,121	4,334,313	12,350,092	25,108,525	4,295,058	32,946,124	37,241,183
2006	4,287,594	6,316,300	10,603,894	8,530,348	4,399,876	12,652,162	25,582,387	4,182,645	32,749,412	36,932,057
2007	4,402,276	6,659,844	11,062,121	9,398,365	4,822,374	13,637,615	27,858,354	4,258,932	33,474,193	37,733,125
2008	5,194,394	6,764,887	11,959,280	10,640,259	5,235,045	14,116,935	29,992,239	4,849,262	35,160,455	40,009,717
2009	5,730,850	6,988,512	12,719,362	9,687,296	4,907,034	14,214,943	28,809,273	4,736,074	33,756,884	38,492,959
2010	6,356,225	8,750,953	15,107,179	11,117,496	5,561,981	15,782,346	32,461,823	5,266,991	36,209,028	41,476,019
2011	6,857,612	9,361,733	16,219,345	12,791,184	6,432,128	18,053,941	37,277,253	5,456,429	37,636,304	43,092,733
2012	7,469,878	9,422,530	16,892,409	13,868,609	6,519,192	20,517,466	40,905,266	5,532,815	38,026,409	43,559,224
2013	7,220,914	9,318,766	16,539,680	14,940,150	7,389,980	20,809,726	43,139,856	5,831,692	39,633,689	45,465,382
2014	7,818,913	9,805,566	17,624,480	14,519,836	7,558,946	20,643,070	42,721,851	5,629,412	36,827,205	42,456,617
2015	8,369,344	10,498,460	18,867,804	16,405,753	7,623,358	23,456,727	47,485,838	6,601,539	39,464,601	46,066,140
2016	9,025,477	11,652,515	20,677,992	17,590,260	7,696,008	30,496,465	55,782,733	6,657,601	44,318,915	50,976,516
2017	7,995,877	10,079,991	18,075,869	18,079,694	8,005,544	26,857,934	52,943,172	6,776,916	47,295,865	54,072,781
2018	9,852,453	12,544,429	22,396,882	19,363,879	8,963,781	27,220,652	55,548,311	6,927,260	45,772,501	52,699,761
2019	**10,081,827**	**13,160,293**	**23,242,120**	**20,428,841**	**9,304,430**	**25,205,955**	**54,939,226**	**8,168,768**	**46,633,138**	**54,801,907**
2020	10,083,403	13,200,988	23,284,392	20,637,472	9,400,205	25,582,706	55,620,383	8,165,602	46,431,891	54,597,493
2021	10,326,580	13,217,968	23,544,548	20,778,341	9,547,699	26,280,487	56,606,527	8,695,835	47,789,662	56,485,497
2022	10,386,627	13,301,562	23,688,190	20,806,305	9,514,444	27,609,980	57,930,729	8,776,347	48,137,885	56,914,231
2023	10,462,576	13,369,608	23,832,185	20,652,090	9,418,628	27,460,065	57,530,782	8,785,183	48,409,743	57,194,926
2024	10,457,471	13,379,791	23,837,262	21,120,413	9,656,608	28,034,907	58,811,929	8,904,642	48,670,293	57,574,935
2025	10,431,827	13,368,422	23,800,249	21,016,871	9,600,222	27,899,711	58,516,805	8,882,536	48,574,278	57,456,814
2026	10,409,676	13,355,985	23,765,661	20,822,533	9,496,199	27,652,914	57,971,646	8,831,332	48,420,535	57,251,867
2027	10,484,986	13,459,039	23,944,026	21,040,147	9,591,364	27,912,291	58,543,802	8,899,935	48,759,355	57,659,290
2028	10,386,347	13,353,087	23,739,434	20,781,246	9,465,818	27,585,102	57,832,166	8,818,366	48,344,395	57,162,761
2029	10,444,390	13,436,676	23,881,066	20,935,759	9,530,508	27,767,023	58,233,290	8,864,834	48,597,325	57,462,160
2030	10,258,371	13,224,266	23,482,637	20,772,076	9,466,817	27,560,042	57,798,935	8,803,519	48,028,746	56,832,264
2031	10,273,842	13,253,411	23,527,253	20,925,869	9,535,862	27,740,051	58,201,782	8,849,616	48,189,804	57,039,421
2032	10,293,389	13,285,138	23,578,527	20,771,140	9,444,969	27,544,554	57,760,663	8,805,551	48,181,803	56,987,354
2033	10,292,029	13,288,141	23,580,170	20,963,413	9,534,328	27,772,364	58,270,105	8,865,491	48,389,197	57,254,688
2034	10,249,583	13,262,466	23,512,049	20,937,073	9,509,728	27,733,171	58,179,972	8,855,222	48,445,058	57,300,279
2035	10,132,851	13,167,692	23,300,543	21,346,100	9,711,320	28,225,831	59,283,251	8,980,341	48,787,059	57,767,400
TOTAL	**334,725,643**	**437,936,035**	**772,661,678**	**656,882,940**	**332,268,774**	**990,569,321**	**1,979,721,034**	**273,600,032**	**1,643,502,137**	**1,917,102,169**

[a] Capital charges repaid through bond debt service prior to 2017 exclude bond cover; capital charges for 2018 and after include both bond debt service and bond cover.

TABLE B-23 Total Transportation and Delta Water Charge for Each Contractor[a] (in dollars)

Calendar Year	SAN JOAQUIN VALLEY AREA								
				Kern					
	Dudley Ridge	Empire	Future Contractor San Joaquin Valley	Municipal and Industrial	Agricultural	Kings	Oak Flat	Tulare	Total
	[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	229,304	19,577	54,588	445,439	1,730,447	16,947	19,945	310,891	2,827,137
1969	245,489	11,523	87,576	525,094	2,771,969	16,825	19,705	472,325	4,150,507
1970	311,029	34,959	94,675	573,998	3,931,126	21,435	30,739	531,286	5,529,246
1971	333,116	37,687	95,695	605,889	5,269,375	27,175	35,047	723,180	7,127,163
1972	387,429	40,948	98,788	631,615	7,272,043	26,473	64,516	2,017,866	10,539,678
1973	405,365	39,570	97,550	1,025,888	7,418,116	28,816	39,672	794,622	9,849,599
1974	517,196	40,784	98,460	1,144,792	8,143,492	29,544	43,017	1,063,328	11,080,614
1975	691,852	41,233	106,703	1,197,166	9,551,433	31,240	48,647	1,580,494	13,248,767
1976	728,534	43,754	108,084	1,323,840	10,808,769	32,666	52,644	1,459,322	14,557,613
1977	588,644	39,671	112,554	1,367,404	11,139,874	34,434	54,705	1,154,499	14,491,785
1978	707,809	36,029	115,521	1,565,884	13,494,503	38,927	59,547	1,189,697	17,207,917
1979	792,911	48,507	114,253	1,668,951	15,592,024	43,065	71,152	1,745,923	20,076,785
1980	974,592	50,242	125,950	1,770,264	17,253,434	48,021	95,689	1,692,295	22,010,487
1981	1,223,531	84,608	134,169	2,430,802	22,879,947	66,495	101,204	2,304,568	29,225,325
1982	1,259,647	70,802	135,057	2,523,660	25,297,938	70,662	108,877	2,300,457	31,767,100
1983	1,194,477	53,152	149,202	2,085,047	24,969,802	75,442	87,931	509,429	29,124,483
1984	1,504,616	29,134	164,505	3,396,379	33,717,168	94,320	122,056	1,558,848	40,587,027
1985	1,781,041	130,564	184,905	3,891,204	39,709,227	117,583	140,149	2,828,673	48,783,347
1986	2,023,504	79,941	180,445	4,079,838	43,805,360	136,715	153,831	3,681,185	54,140,819
1987	1,899,330	95,859	179,872	4,570,841	43,126,397	137,332	152,084	3,775,281	53,936,996
1988	1,984,930	110,237	193,735	4,734,502	45,084,191	138,278	147,270	3,930,959	56,324,101
1989	2,140,206	102,364	187,913	4,677,357	47,291,277	137,085	167,122	4,413,581	59,116,905
1990	1,891,938	87,568	221,392	4,827,893	46,083,516	121,154	149,438	3,994,010	57,376,907
1991	1,704,439	80,857	220,282	4,535,869	37,959,171	103,909	135,448	3,535,020	48,274,995
1992	2,251,390	105,676	241,455	5,550,167	49,156,267	143,783	176,431	4,573,850	62,199,020
1993	2,473,545	120,679	264,959	5,806,060	55,057,434	161,522	195,996	5,327,704	69,407,899
1994	2,278,368	108,184	306,359	5,210,309	52,527,974	145,625	178,808	4,700,404	65,456,030
1995	2,874,828	116,102	304,297	6,621,491	60,988,129	180,802	211,141	5,559,238	76,856,029
1996	2,066,147	125,791	389,203	6,671,115	59,053,349	178,474	190,753	7,125,004	75,799,836
1997	2,777,410	101,196	276,681	6,521,956	57,828,751	138,117	212,953	4,747,134	72,604,198
1998	2,623,091	120,488	381,847	5,733,156	54,404,111	143,433	204,563	5,000,434	68,611,122
1999	2,722,811	137,014	369,935	6,378,472	58,165,950	184,423	219,774	7,488,200	75,666,579
2000	2,608,251	121,292	302,665	6,100,216	51,718,308	174,158	213,992	6,201,710	67,440,592
2001	3,282,641	146,144	328,028	5,650,458	58,947,335	192,167	260,034	6,468,640	75,275,445
2002	3,001,267	128,270	320,541	6,168,328	53,906,757	187,350	239,462	5,813,186	69,765,160
2003	3,051,614	132,090	339,960	6,533,590	56,430,905	202,324	238,697	6,096,070	73,025,250
2004	3,239,074	168,724	342,484	7,857,831	57,019,910	356,950	254,269	5,850,675	75,089,916
2005	3,798,038	177,313	355,581	7,013,406	67,598,430	691,223	251,057	6,687,944	86,572,992
2006	3,630,077	168,427	295,472	7,504,379	64,810,145	537,743	256,380	5,925,438	83,128,060
2007	3,415,767	159,598	334,099	7,119,087	61,627,125	522,516	253,402	5,864,202	79,295,795
2008	3,392,228	157,421	471,726	7,772,950	62,656,970	548,842	262,029	5,562,070	80,824,236
2009	3,266,540	154,233	437,331	6,915,672	60,884,539	521,830	261,078	5,448,966	77,890,188
2010	3,618,644	232,370	507,047	8,082,580	72,144,993	648,037	325,005	6,467,900	92,026,576
2011	4,577,179	219,801	506,692	9,736,397	90,586,718	741,688	357,183	6,943,229	113,668,886
2012	3,753,111	231,936	468,177	9,809,932	83,784,396	767,690	366,950	7,911,453	107,093,644
2013	4,238,523	233,328	519,859	10,370,734	86,045,746	754,998	382,258	7,399,587	109,945,033
2014	4,036,271	210,830	630,710	9,497,853	79,638,072	683,823	372,301	6,514,088	101,583,948
2015	4,401,658	259,865	756,095	12,024,303	94,872,325	831,460	450,718	8,088,817	121,685,240
2016	4,907,420	315,504	487,226	13,312,493	106,250,379	974,082	521,530	9,493,256	136,261,890
2017	5,328,359	296,026	507,328	13,125,325	114,331,872	1,009,526	513,321	9,377,946	144,489,703
2018	5,458,155	334,490	544,007	14,673,891	110,772,374	1,078,327	563,458	10,462,190	143,886,892
2019	**5,511,023**	**331,496**	**537,094**	**15,825,960**	**116,540,219**	**1,067,307**	**575,029**	**10,387,897**	**150,776,024**
2020	5,170,897	333,349	551,031	15,873,933	117,015,957	1,075,443	578,933	10,428,424	151,027,966
2021	5,229,346	336,930	582,074	16,189,399	118,077,591	1,088,815	584,019	10,536,998	152,625,172
2022	5,187,246	334,340	602,729	16,166,491	117,437,340	1,082,011	578,259	10,459,588	151,848,003
2023	5,035,639	324,537	615,230	15,809,871	114,907,102	1,051,601	558,796	10,184,137	148,486,913
2024	5,292,802	340,932	620,913	16,453,738	119,516,501	1,102,369	589,993	10,655,225	154,572,473
2025	5,221,753	336,807	626,612	16,280,088	118,254,226	1,089,468	581,462	10,521,762	152,912,177
2026	5,092,922	329,028	632,775	15,936,551	115,840,728	1,065,234	566,680	10,282,277	149,746,196
2027	5,165,573	333,276	638,763	16,142,261	117,409,110	1,078,383	573,863	10,419,624	151,760,852
2028	5,039,804	326,247	641,130	15,798,260	114,896,370	1,056,326	560,469	10,180,212	148,498,818
2029	5,083,591	328,793	645,665	15,918,150	115,872,078	1,064,171	564,650	10,263,384	149,740,482
2030	5,055,301	328,455	650,274	15,812,436	114,953,116	1,062,812	564,059	10,197,585	148,624,039
2031	5,124,856	332,857	653,634	16,016,357	116,505,142	1,076,039	570,698	10,325,779	150,605,361
2032	4,978,818	323,665	658,620	15,583,885	113,636,735	1,047,524	554,685	10,058,014	146,841,946
2033	5,069,427	329,394	663,330	15,874,282	115,664,992	1,065,145	563,250	10,224,884	149,454,704
2034	5,010,708	325,710	667,809	15,660,456	114,400,461	1,053,548	557,554	10,117,488	147,793,735
2035	5,248,265	340,700	672,229	16,382,548	119,384,128	1,099,787	582,050	10,554,322	154,264,029
TOTAL	**206,111,305**	**11,828,876**	**24,958,597**	**545,564,939**	**4,385,821,661**	**32,521,437**	**19,738,426**	**400,464,669**	**5,627,009,910**

[a] Capital charges repaid through bond debt service prior to 2017 exclude bond cover; capital charges for 2018 and after include both bond debt service and bond cover.

TABLE B-23 Total Transportation and Delta Water Charge for Each Contractor[a] (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	492,473	218,649	41,509	265,168	12,870	336,472	95,466	782,163	208,927
1969	1,090,136	744,710	334,105	61,226	394,024	18,693	501,193	138,063	1,205,834	321,755
1970	1,420,639	945,251	470,423	89,700	552,223	25,231	692,832	184,837	1,778,187	467,573
1971	1,760,670	1,140,678	627,331	128,360	754,065	31,837	932,463	231,280	2,538,219	659,414
1972	2,245,455	1,387,714	819,635	185,868	1,035,804	43,771	1,264,109	287,620	3,758,473	950,297
1973	2,399,531	1,437,060	971,770	190,992	1,264,690	46,059	1,358,587	313,446	4,026,451	961,024
1974	2,520,870	1,533,381	998,399	204,074	1,305,235	48,933	1,419,256	331,702	4,463,660	1,104,491
1975	2,739,680	1,625,900	1,047,544	219,290	1,381,319	53,242	1,507,903	355,270	4,638,827	1,208,046
1976	3,204,880	1,663,301	1,106,524	232,129	1,474,438	57,732	1,585,500	381,276	4,838,364	1,278,740
1977	3,187,208	1,752,108	1,008,676	245,111	1,317,096	54,209	1,674,232	406,620	5,094,241	1,336,313
1978	3,635,572	1,886,376	1,208,919	255,468	1,618,071	56,805	1,722,833	420,026	5,091,935	1,374,033
1979	4,309,554	1,967,356	1,295,874	267,791	1,740,645	60,285	1,899,716	449,757	5,136,839	1,342,135
1980	4,994,298	2,106,936	1,406,781	295,350	1,941,392	67,604	2,073,309	499,051	5,647,604	1,485,141
1981	5,824,304	2,577,651	1,574,217	328,818	2,194,094	100,752	2,397,194	603,265	6,461,840	1,688,324
1982	5,582,860	2,741,950	1,657,630	346,721	2,336,914	82,296	2,371,345	641,991	6,752,799	1,929,664
1983	6,335,170	2,813,970	2,181,785	380,840	3,172,326	88,383	2,569,660	658,613	6,964,704	1,808,748
1984	7,713,111	3,893,601	3,287,286	497,586	4,929,764	96,492	2,837,651	727,821	8,053,209	2,598,232
1985	9,545,818	4,360,925	4,122,840	601,928	6,265,166	103,706	3,029,342	959,657	8,893,342	2,686,799
1986	9,515,134	4,997,595	4,584,188	647,634	7,009,695	130,222	3,214,261	1,223,847	9,142,822	3,398,540
1987	9,550,203	4,856,344	4,452,838	678,086	6,885,936	240,873	3,270,095	1,255,052	10,544,337	3,398,921
1988	9,149,230	5,044,273	4,510,360	704,411	7,052,631	158,845	3,445,441	1,044,206	11,095,193	3,271,137
1989	11,039,912	5,054,454	4,218,204	691,191	6,635,387	210,634	3,527,168	1,746,763	10,811,990	3,453,679
1990	12,432,751	5,523,366	4,916,384	729,229	7,720,886	331,172	3,761,133	1,953,905	11,722,946	4,221,266
1991	9,293,533	4,637,130	3,471,782	688,867	5,335,009	221,166	4,621,391	1,640,084	11,104,874	3,642,610
1992	11,850,715	5,825,819	3,626,099	612,895	5,587,383	174,998	5,600,010	1,532,325	11,144,101	3,694,099
1993	12,264,759	5,472,482	3,830,889	617,198	5,922,476	211,904	5,491,552	1,753,971	12,107,175	4,042,324
1994	14,334,329	6,038,941	3,857,907	694,421	5,963,596	278,012	6,443,252	2,090,724	12,731,704	4,776,753
1995	14,201,115	6,414,588	4,680,553	661,811	7,318,575	212,244	5,636,207	1,952,494	12,204,445	4,480,933
1996	14,628,006	6,645,732	7,634,303	710,651	12,187,480	208,356	5,734,575	2,300,206	12,730,931	4,599,073
1997	15,198,058	6,539,386	7,251,237	750,419	8,515,792	207,887	6,157,360	2,342,198	14,400,157	4,897,487
1998	13,714,014	6,162,192	6,324,675	717,140	7,018,227	209,057	7,760,380	1,946,444	14,309,132	4,177,167
1999	15,620,657	6,785,481	5,427,378	827,907	7,263,387	215,899	8,432,551	2,379,773	15,812,151	5,154,973
2000	14,833,919	10,273,613	3,823,491	793,089	5,621,219	186,831	8,315,130	2,079,248	15,466,029	4,255,999
2001	24,848,284	15,879,786	4,861,082	995,705	7,603,913	199,105	9,003,442	3,987,060	21,197,778	4,397,025
2002	16,403,333	13,171,335	4,133,283	961,222	6,403,149	182,302	8,179,681	3,395,355	22,062,779	5,804,406
2003	17,746,592	14,225,123	4,252,442	931,249	6,597,952	187,473	9,834,687	2,929,196	20,437,322	5,970,925
2004	18,938,452	15,508,002	4,937,708	1,044,004	6,725,098	201,554	10,118,038	3,218,374	24,999,335	5,474,566
2005	19,250,535	14,461,925	18,592,772	863,710	11,611,845	190,110	9,855,283	3,253,965	22,947,470	5,711,879
2006	20,941,523	13,768,602	31,742,467	854,615	11,714,381	201,926	12,691,692	3,210,369	22,885,771	5,783,677
2007	24,157,746	16,798,110	30,463,896	1,081,055	11,086,667	200,856	16,273,998	4,707,778	28,698,199	4,839,484
2008	22,068,945	19,110,808	30,189,838	1,029,980	12,144,057	216,511	14,882,803	4,689,370	29,426,352	5,918,027
2009	20,232,662	17,197,286	28,253,856	1,025,411	10,178,830	221,992	14,805,568	4,477,673	29,521,684	6,494,009
2010	23,941,024	17,545,258	38,293,274	973,443	13,611,021	228,011	17,966,124	3,975,758	32,547,641	8,190,295
2011	30,871,600	17,677,059	40,399,027	1,057,875	14,819,472	251,770	11,934,147	4,070,555	30,260,514	9,020,484
2012	31,534,225	19,592,240	47,308,215	1,171,485	17,367,531	267,263	13,703,914	5,505,788	44,118,699	9,390,520
2013	27,073,881	22,463,155	39,480,009	1,401,131	13,988,743	292,191	13,917,789	4,631,707	35,341,137	7,623,713
2014	22,446,818	21,025,932	34,650,134	1,485,367	11,820,411	293,764	13,851,045	4,704,575	35,291,649	6,518,227
2015	22,663,905	21,740,812	39,894,728	1,551,861	14,007,199	321,969	16,834,471	4,208,848	42,140,867	8,007,099
2016	27,919,227	21,616,368	44,078,079	1,515,702	15,388,783	341,616	19,356,772	4,911,300	49,440,317	9,587,123
2017	36,466,998	23,753,996	43,135,022	1,294,036	15,797,488	326,145	20,728,333	5,219,883	53,523,454	9,893,951
2018	33,628,686	29,336,218	64,981,909	1,938,942	22,372,102	509,356	17,134,147	4,963,573	51,508,420	10,611,078
2019	**37,540,774**	**27,212,121**	**50,879,044**	**2,026,243**	**18,060,415**	**601,187**	**26,206,253**	**6,522,800**	**54,390,325**	**10,124,263**
2020	37,172,518	27,288,151	50,605,709	2,011,826	17,859,595	598,456	26,462,526	6,460,721	54,402,496	10,080,109
2021	38,718,441	27,801,217	53,903,264	2,057,623	18,736,614	622,198	27,293,982	6,784,794	55,334,725	10,368,603
2022	39,148,547	28,224,616	54,028,906	2,070,930	18,859,569	628,885	27,556,931	6,861,085	55,596,267	10,437,696
2023	39,037,207	28,224,101	53,345,566	2,070,974	18,742,614	629,696	27,547,248	6,826,674	55,569,984	10,418,002
2024	39,361,471	28,411,299	53,593,049	2,078,439	18,843,200	636,414	27,671,391	6,899,226	55,763,575	10,464,769
2025	39,388,860	28,474,785	53,690,325	2,079,399	18,870,013	638,077	27,735,893	6,913,472	55,822,905	10,471,670
2026	38,611,458	27,988,676	52,880,548	2,044,615	18,533,732	626,857	27,227,794	6,752,716	55,208,201	10,288,863
2027	39,358,704	28,440,843	53,670,287	2,080,048	18,859,811	640,092	27,724,334	6,898,657	55,913,768	10,471,288
2028	38,575,235	27,939,133	52,949,790	2,042,936	18,531,956	627,573	27,228,175	6,755,013	55,260,834	10,280,857
2029	38,995,023	28,168,533	53,461,132	2,064,213	18,734,656	634,314	27,510,414	6,834,341	55,733,726	10,398,243
2030	38,391,978	27,707,826	52,936,439	2,030,327	18,466,161	624,602	27,104,752	6,748,780	55,126,292	10,223,953
2031	39,891,216	28,337,165	54,481,130	2,094,278	19,078,728	648,351	28,076,428	7,074,609	56,319,784	10,545,820
2032	37,579,385	27,160,554	52,318,645	1,999,838	18,194,713	611,756	26,613,445	6,570,312	54,765,558	10,095,075
2033	39,722,738	28,248,282	54,465,096	2,093,525	19,044,459	645,782	28,048,983	7,035,127	56,395,292	10,538,400
2034	37,712,609	27,311,702	52,662,462	2,009,810	18,303,691	613,950	26,783,417	6,605,955	55,085,205	10,156,546
2035	42,251,070	29,012,081	57,049,762	2,198,650	20,057,046	685,809	29,633,461	7,587,018	58,373,055	11,065,016
TOTAL	**1,360,351,182**	**936,558,367**	**1,553,755,202**	**71,375,691**	**681,303,088**	**19,609,176**	**829,450,606**	**227,224,558**	**1,813,801,520**	**390,787,645**

[a] Capital charges repaid through bond debt service prior to 2017 exclude bond cover; capital charges for 2018 and after include both bond debt service and bond cover.

TABLE B-23 Total Transportation and Delta Water Charge for Each Contractor[a] (in dollars)

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	18,797,698	0	1,050	1,439	2,489	46,945	25,643,483
1969	198,764	23,153,064	215,209	28,376,777	0	1,225	4,120	5,345	52,963	37,084,553
1970	289,633	30,617,164	273,605	37,807,297	0	3,848	17,116	20,964	69,744	48,625,374
1971	409,327	39,958,997	342,425	49,515,067	0	4,546	19,187	23,733	55,532	61,872,657
1972	537,186	54,991,810	422,304	67,930,046	0	4,929	21,150	26,079	80,412	84,197,533
1973	587,963	59,591,118	435,655	73,584,345	0	7,059	21,778	28,837	54,219	89,133,190
1974	611,428	66,008,399	455,565	81,005,394	0	8,336	22,408	30,744	76,783	98,112,487
1975	644,621	71,830,070	478,403	87,730,116	0	9,416	23,523	32,939	84,547	107,059,601
1976	668,315	74,907,214	475,587	91,874,000	0	7,004	23,257	30,261	106,717	112,992,811
1977	696,515	73,338,457	507,063	90,617,849	0	16,917	24,059	40,976	98,618	111,619,654
1978	709,040	81,951,168	523,177	100,453,422	0	12,635	24,225	36,860	100,786	124,687,675
1979	712,866	83,601,786	526,405	103,311,008	0	16,575	28,352	44,927	119,352	130,734,995
1980	862,275	93,029,351	583,628	114,992,722	0	19,834	26,562	46,396	178,812	145,178,678
1981	946,961	112,171,493	672,540	137,541,451	0	21,682	34,563	56,245	185,347	175,775,888
1982	1,021,329	117,143,301	727,623	143,336,422	0	16,117	43,117	59,234	173,894	184,865,544
1983	1,076,279	118,991,007	854,263	147,895,748	0	15,202	29,410	44,612	220,926	186,531,128
1984	1,211,621	156,273,535	933,311	193,053,220	20,590	15,442	31,795	67,827	225,959	246,015,108
1985	1,287,789	194,967,204	993,651	237,818,165	24,050	16,976	32,405	73,431	340,322	301,935,748
1986	1,344,770	218,331,684	1,058,276	264,598,667	31,753	18,145	33,596	83,494	279,227	334,894,033
1987	1,379,613	204,859,482	1,056,318	252,428,097	37,071	17,794	33,384	88,249	345,116	325,031,552
1988	1,465,829	221,667,115	1,124,102	269,732,773	48,058	19,117	33,605	100,780	365,207	346,847,535
1989	1,505,481	230,328,278	1,232,379	280,455,520	61,184	20,809	37,188	119,181	422,329	361,762,797
1990	1,624,763	277,194,766	1,855,991	333,988,558	66,041	20,855	36,812	123,708	474,284	416,129,864
1991	1,720,878	221,887,061	1,549,955	269,814,340	180,212	22,526	42,200	244,938	214,683	340,246,610
1992	1,779,902	245,365,618	1,503,480	298,297,445	208,216	26,028	43,517	277,761	443,676	385,289,296
1993	1,943,336	219,238,180	1,551,253	274,447,500	209,613	26,203	47,588	283,404	599,571	371,261,162
1994	1,920,217	257,365,883	1,475,069	317,970,808	201,284	25,161	46,079	272,524	609,966	413,369,193
1995	1,982,808	225,863,369	1,568,401	287,177,540	216,945	27,118	50,022	294,085	534,971	395,821,036
1996	1,651,239	235,410,311	1,622,641	306,063,505	217,250	27,155	56,622	301,027	571,857	424,560,292
1997	1,758,607	245,453,567	1,777,266	315,249,419	236,300	29,847	59,915	326,062	428,638	439,470,501
1998	1,947,195	227,090,227	1,796,534	293,172,384	128,021	29,927	36,222	194,170	465,095	417,378,373
1999	2,267,918	257,177,969	1,881,647	329,247,690	254,675	31,834	40,585	327,094	584,116	466,896,031
2000	2,469,082	252,908,188	1,968,120	322,993,957	262,163	79,001	43,704	384,868	0	453,581,252
2001	3,151,981	441,710,358	2,260,648	540,096,167	261,699	93,471	45,056	400,226	0	688,499,430
2002	4,358,497	333,573,284	2,305,096	420,933,722	266,107	95,018	47,297	408,422	0	568,751,606
2003	5,602,087	361,640,701	2,321,867	452,677,615	262,547	93,638	68,989	425,174	0	599,765,527
2004	5,960,971	413,357,269	2,609,212	513,092,583	284,387	102,404	29,286	416,077	0	662,198,098
2005	6,236,844	384,539,517	2,082,380	499,598,235	280,033	727,066	28,810	1,035,909	0	660,621,568
2006	6,740,263	360,137,612	2,047,575	492,720,475	292,991	43,185	38,618	374,794	0	649,341,667
2007	7,377,106	438,751,657	2,532,853	586,969,405	291,100	40,957	46,072	378,129	0	743,296,927
2008	9,141,421	412,356,752	2,998,090	564,172,955	306,916	804,536	86,522	1,197,974	0	728,156,401
2009	9,324,931	382,677,818	2,869,868	527,281,588	328,896	855,850	90,625	1,275,371	0	686,468,740
2010	10,499,433	441,551,202	3,045,998	612,368,482	400,358	1,064,565	108,873	1,573,796	0	795,013,873
2011	11,370,906	493,239,865	3,128,608	668,101,881	451,483	1,197,315	121,980	1,770,778	0	880,130,876
2012	12,487,760	485,331,924	3,419,749	691,199,314	460,139	1,318,107	130,850	1,909,096	0	901,558,953
2013	13,070,073	477,514,647	3,410,670	660,208,845	483,119	1,383,934	141,268	2,008,321	0	877,307,117
2014	15,484,620	424,968,103	2,921,819	595,462,462	473,134	1,355,332	140,895	1,969,361	0	801,818,719
2015	17,749,115	472,814,250	3,302,581	665,237,706	614,794	1,761,128	185,768	2,561,690	0	901,904,419
2016	21,042,910	536,702,329	3,824,597	755,725,122	727,229	2,083,208	228,712	3,039,149	0	1,022,463,402
2017	23,725,523	583,728,145	5,472,448	823,065,421	741,588	2,124,343	214,861	3,080,792	0	1,095,727,737
2018	24,912,237	537,690,848	4,475,001	804,062,516	744,687	2,133,220	230,222	3,108,129	0	1,081,702,491
2019	**24,976,634**	**573,073,940**	**4,273,698**	**835,887,697**	**800,901**	**2,294,248**	**238,861**	**3,334,010**	**0**	**1,122,980,984**
2020	24,971,720	572,874,474	4,180,386	834,968,687	771,315	2,209,493	227,122	3,207,930	0	1,122,706,852
2021	25,281,645	588,040,668	4,169,242	859,113,017	772,709	2,213,487	226,847	3,213,043	0	1,151,587,804
2022	25,373,406	597,181,194	4,250,359	870,218,391	772,047	2,211,590	225,208	3,208,845	0	1,163,808,389
2023	25,398,860	595,572,520	4,314,475	867,697,920	775,595	2,221,754	226,593	3,223,942	0	1,157,966,669
2024	25,447,468	598,994,008	4,327,843	872,492,152	773,191	2,214,867	225,659	3,213,717	0	1,170,502,469
2025	25,480,642	598,980,171	4,329,350	872,875,563	768,655	2,201,875	223,893	3,194,423	0	1,168,756,030
2026	25,397,238	588,472,392	4,300,885	858,333,976	764,288	2,189,365	222,194	3,175,847	0	1,150,245,193
2027	25,534,852	598,421,413	4,362,628	872,376,723	768,898	2,202,570	223,992	3,195,460	0	1,167,480,152
2028	25,447,298	586,964,083	4,292,792	856,895,675	757,059	2,168,657	219,380	3,145,096	0	1,147,273,949
2029	25,545,682	592,636,884	4,321,257	865,038,418	760,109	2,177,395	220,571	3,158,075	0	1,157,513,490
2030	25,464,926	581,620,176	4,215,665	850,661,878	740,913	2,122,405	213,092	3,076,410	0	1,140,476,163
2031	25,687,298	596,402,828	4,243,688	872,881,323	740,841	2,122,198	213,066	3,076,105	0	1,165,331,244
2032	25,446,417	571,450,794	4,169,247	836,975,739	740,915	2,122,411	213,098	3,076,424	0	1,125,220,653
2033	25,741,839	594,271,850	4,236,191	870,487,565	740,825	2,122,155	213,067	3,076,047	0	1,162,123,278
2034	25,540,455	574,498,190	4,177,202	841,461,194	740,821	2,122,143	213,068	3,076,032	0	1,131,323,262
2035	26,116,026	619,050,028	4,316,835	907,395,857	740,723	2,121,863	213,034	3,075,620	0	1,205,086,700
TOTAL	**680,604,399**	**23,034,502,400**	**160,224,176**	**31,759,548,009**	**23,004,438**	**54,936,066**	**6,814,486**	**84,754,990**	**8,748,370**	**42,149,546,161**

[a] Capital charges repaid through bond debt service prior to 2017 exclude bond cover; capital charges for 2018 and after include both bond debt service and bond cover.

TABLE B-24 Equivalent Unit Charge for Water Supply for Each Contractor[a] (in dollars per acre-foot)

Project Service Area and SWP Water 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	144.54	15.12	159.66
Butte	0.00	0.00	0.00	0.00	0.00	610.76	55.89	666.65
Plumas	45.02	5.10	0.00	0.00	50.12	89.94	12.73	152.79
Feather River Area	9.40	1.06	0.00	0.00	10.46	247.83	24.65	282.94
NORTH BAY AREA								
Napa	1,467.80	33.58	4.90	18.16	1,524.45	45.22	18.57	1,588.24
Solano	847.08	32.33	5.33	11.19	895.92	50.88	14.59	961.39
North Bay Area	1,076.93	32.79	5.18	13.77	1,128.66	48.79	16.06	1,193.51
SOUTH BAY AREA								
Alameda-Zone 7	52.33	64.33	9.14	20.55	146.36	46.54	10.45	203.35
Alameda County	30.80	34.76	7.45	13.51	86.52	31.97	5.42	123.91
Santa Clara	26.00	25.54	6.57	11.22	69.34	20.68	3.67	93.68
South Bay Area	31.11	33.41	7.13	13.13	84.77	26.76	5.07	116.60
SAN JOAQUIN VALLEY AREA								
Kings	6.54	9.08	3.83	8.18	27.62	38.17	4.35	70.14
Dudley Ridge	5.61	5.76	3.33	4.91	19.61	20.99	2.38	42.98
Empire	2.42	5.43	2.54	4.55	14.95	23.91	1.99	40.85
Kern	10.19	11.37	5.09	6.85	33.50	26.44	3.18	63.12
Oak Flat	2.32	3.00	2.05	3.06	10.43	22.68	2.01	35.12
Tulare	5.84	5.95	3.26	4.75	19.80	22.19	2.47	44.45
San Joaquin Valley Area	9.43	10.45	4.78	6.51	31.17	25.74	3.06	59.96
CENTRAL COASTAL AREA								
San Luis Obispo	462.35	311.56	14.83	118.03	906.78	228.48	58.90	1,194.16
Santa Barbara	1,123.36	322.87	20.44	97.20	1,563.86	105.97	85.17	1,754.99
Central Coastal Area	990.42	320.59	19.31	101.39	1,431.71	130.61	79.88	1,642.20
SOUTHERN CALIFORNIA AREA	59.06	57.89	33.34	66.23	216.52	56.77	10.78	284.08
AVEK	63.50	63.19	25.81	44.15	196.65	49.62	13.71	259.98
Castaic Lake	87.56	98.06	44.19	77.95	307.76	54.29	12.88	374.93
Coachella	168.13	156.27	35.88	79.47	439.75	85.37	23.00	548.12
Crestline	54.95	56.42	53.08	44.20	208.65	34.00	8.14	250.79
Desert	104.41	101.39	31.82	62.66	300.29	96.68	18.13	415.09
Littlerock	187.03	207.53	32.45	140.87	567.87	152.45	36.12	756.44
Mojave	63.25	65.37	41.01	99.83	269.46	68.31	11.82	349.59
Palmdale	295.44	224.77	31.51	79.23	630.94	97.06	27.90	755.90
San Bernardino	125.67	120.40	48.36	49.60	344.03	60.84	16.71	421.58
San Gabriel	1,734.89	657.84	35.85	230.98	2,659.56	163.27	48.05	2,870.88
San Gorgonio								
Metropolitan	93.63	78.44	39.81	41.95	253.82	50.28	12.89	317.00
Ventura	498.82	419.84	36.14	102.92	1,057.72	295.85	75.41	1,428.98
Southern California Area	98.67	83.34	39.35	47.05	268.41	53.06	13.43	334.90
ALL AREAS	66.40	46.65	20.61	25.78	159.44	39.02	8.37	206.84

[a] 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[a] (in dollars per acre-foot)

	Unit Cost of Reach[b]						Cumulative Unit Costs from the Delta					
Aqueduct Reach	Capital Costs	Water System Revenue Bond Surcharge[c]	Minimum OMP&R	Off-Aqueduct Costs	Variable OMP&R	Total	Capital Costs	Water System Revenue Bond Surcharge[c]	Minimum OMP&R	Off-Aqueduct Costs	Variable OMP&R	Total
	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]	[12]
NBA												
1	46.16	20.55	17.13	2.52	1.40	87.76	46.16	20.55	17.13	2.52	1.40	87.76
2	49.12	21.87	7.48	0.00	0.00	78.47	95.28	42.42	24.61	2.52	1.40	166.23
3A	8.75	3.90	14.89	4.55	2.26	34.35	104.03	46.32	39.50	7.07	3.66	200.58
3B	56.32	25.08	33.65	3.84	5.02	123.91	151.60	67.50	58.26	6.36	6.42	290.14
SBA												
1	8.07	3.59	20.07	5.62	5.23	42.58	10.32	4.59	24.02	8.36	7.68	54.97
2	0.76	0.34	2.27	0.00	0.00	3.37	11.08	4.93	26.29	8.36	7.68	58.34
4	2.54	1.13	3.87	0.00	0.00	7.54	13.62	6.06	30.16	8.36	7.68	65.88
5	5.33	2.37	3.03	0.00	0.00	10.73	18.95	8.43	33.19	8.36	7.68	76.61
6	0.31	0.14	0.32	0.00	0.00	0.77	19.26	8.57	33.51	8.36	7.68	77.38
7	2.36	1.05	0.58	0.00	0.00	3.99	21.62	9.62	34.09	8.36	7.68	81.37
8	3.20	1.42	0.97	0.00	0.00	5.59	24.82	11.04	35.06	8.36	7.68	86.96
9	6.62	2.95	3.64	0.00	0.00	13.21	31.44	13.99	38.70	8.36	7.68	100.17
CA												
1	2.25	1.00	3.95	2.74	2.45	12.39	2.25	1.00	3.95	2.74	2.45	12.39
2A	1.44	0.64	0.78	0.00	0.00	2.86	3.69	1.64	4.73	2.74	2.45	15.25
2B	0.74	0.33	0.39	0.00	0.00	1.46	4.43	1.97	5.12	2.74	2.45	16.71
3	0.64	0.28	0.29	0.00	0.00	1.21	5.07	2.25	5.41	2.74	2.45	17.92
4	1.02	0.45	1.96	1.30	1.11	5.84	6.09	2.70	7.37	4.04	3.56	23.76
5	0.78	0.35	0.39	0.00	0.00	1.52	6.87	3.05	7.76	4.04	3.56	25.28
6	0.20	0.09	0.19	0.00	0.00	0.48	7.07	3.14	7.95	4.04	3.56	25.76
7	1.17	0.52	0.47	0.00	0.00	2.16	8.24	3.66	8.42	4.04	3.56	27.92
8C	0.02	0.01	0.08	0.00	0.00	0.11	8.26	3.67	8.50	4.04	3.56	28.03
8D	0.45	0.20	0.38	0.00	0.00	1.03	8.71	3.87	8.88	4.04	3.56	29.06
9	0.38	0.17	0.35	0.00	0.00	0.90	9.09	4.04	9.23	4.04	3.56	29.96
10A	0.40	0.18	0.46	0.00	0.00	1.04	9.49	4.22	9.69	4.04	3.56	31.00
11B	0.59	0.26	0.29	0.00	0.00	1.14	10.08	4.48	9.98	4.04	3.56	32.14
12D	0.56	0.25	0.26	0.00	0.00	1.07	10.64	4.73	10.24	4.04	3.56	33.21
12E	0.39	0.17	0.45	0.00	0.00	1.01	11.03	4.90	10.69	4.04	3.56	34.22
13B	0.84	0.37	0.51	0.00	0.00	1.72	11.87	5.27	11.20	4.04	3.56	35.94
14A	3.25	1.45	3.96	2.31	2.08	13.05	15.12	6.72	15.16	6.35	5.64	48.99
14B	0.51	0.23	0.49	0.00	0.00	1.23	15.63	6.95	15.65	6.35	5.64	50.22
14C	0.43	0.19	0.36	0.00	0.00	0.98	16.06	7.14	16.01	6.35	5.64	51.20
15A	2.41	1.07	4.13	2.83	2.26	12.70	18.47	8.21	20.14	9.18	7.90	63.90
16A	3.99	1.78	6.40	6.15	5.28	23.60	22.46	9.99	26.54	15.33	13.18	87.50
17E	13.45	5.99	17.97	21.53	19.48	78.42	35.91	15.98	44.51	36.86	32.66	165.92
17F	3.49	1.55	0.22	0.00	0.00	5.26	39.40	17.53	44.73	36.86	32.66	171.18
18A	3.13	1.39	2.16	0.00	-2.05	4.63	42.53	18.92	46.89	36.86	30.61	175.81
19	2.31	1.03	1.31	0.00	0.00	4.65	44.84	19.95	48.20	36.86	30.61	180.46
19C	2.51	1.12	0.00	0.00	0.00	3.63	47.35	21.07	48.20	36.86	30.61	184.09
20A	1.84	0.82	2.16	0.00	0.00	4.82	49.19	21.89	50.36	36.86	30.61	188.91
20B	2.23	0.99	1.42	0.00	0.00	4.64	51.42	22.88	51.78	0.00	30.61	156.69
21	1.13	0.50	0.99	0.00	0.00	2.62	52.55	23.38	52.77	0.00	30.61	159.31
22A	1.17	0.52	0.51	0.00	0.00	2.20	53.72	23.90	53.28	0.00	30.61	161.51
22B	11.53	5.13	13.91	6.42	6.42	43.41	65.25	29.03	67.19	6.42	37.03	204.92
23	3.17	1.41	0.96	0.00	-2.61	2.93	68.42	30.44	68.15	6.42	34.42	207.85
24	6.14	2.73	2.70	0.00	0.00	11.57	74.56	33.17	70.85	6.42	34.42	219.42
25	4.48	1.99	0.15	0.00	0.00	6.62	79.04	35.16	71.00	6.42	34.42	226.04
26A	4.90	2.18	9.01	0.00	-17.81	(1.72)	83.94	37.34	80.01	6.42	16.61	224.32
28G	9.12	4.06	3.41	0.00	0.00	16.59	93.06	41.40	83.42	6.42	16.61	240.91
28H	8.78	3.91	3.58	0.00	0.00	16.27	101.84	45.31	87.00	6.42	16.61	257.18
28J	98.47	43.84	49.71	0.00	0.00	192.02	200.31	89.15	136.71	6.42	16.61	449.20
EBX												
1	N/A	0.00	0.16	0.00	0.00	0.16	N/A	37.34	80.17	6.42	16.61	140.54
2A	N/A	0.00	1.36	0.00	0.00	1.36	N/A	37.34	81.53	6.42	16.61	141.90
2B	N/A	0.00	63.03	11.18	13.74	87.95	N/A	37.34	144.57	17.60	30.35	229.85
2C	N/A	0.00	4.67	0.00	0.00	4.67	N/A	37.34	149.24	17.60	30.35	234.53
2D	N/A	0.00	9.24	0.00	0.00	9.24	N/A	37.34	158.48	17.60	30.35	243.77
2E	N/A	0.00	57.87	0.00	18.97	76.83	N/A	37.34	216.35	17.60	49.31	320.60
3A	N/A	0.00	162.41	8.67	34.59	205.67	N/A	37.34	378.76	26.27	83.91	526.28
3B	N/A	0.00	6.36	0.00	0.00	6.36	N/A	37.34	385.12	26.27	83.91	532.63
4A	N/A	0.00	6.32	0.00	0.00	6.32	N/A	37.34	391.43	26.27	83.91	538.95
4B	N/A	0.00	59.70	1.09	7.74	68.52	N/A	37.34	451.13	27.36	91.64	607.47
WB												
29A	4.57	2.03	10.32	2.89	2.29	22.10	43.97	19.56	55.05	39.75	34.95	193.28
29F	3.33	1.48	1.24	0.00	0.00	6.05	47.30	21.04	56.29	39.75	34.95	199.33
29G	11.07	4.93	5.87	0.00	-8.24	13.63	58.37	25.97	62.16	39.75	26.71	212.96
29H	6.89	3.07	5.56	0.00	0.00	15.52	65.26	29.04	67.72	39.75	26.71	228.48
29J	11.55	5.14	1.60	0.00	-15.40	2.89	76.81	34.18	69.32	39.75	11.31	231.37
30	18.54	8.25	4.99	0.00	0.00	31.78	95.35	42.43	74.31	39.75	11.31	263.15
CB												
31A	8.39	3.74	23.57	2.11	1.97	39.78	17.10	7.61	32.45	6.15	5.53	68.84
33A	313.39	139.53	44.45	15.03	25.73	538.13	330.49	147.14	76.90	21.18	31.26	606.97
34	223.91	99.69	1.24	0.00	0.00	324.84	554.40	246.83	78.14	21.18	31.26	931.81
35	0.00	0.00	0.00	0.00	0.00	0.00	554.40	246.83	78.14	21.18	31.26	931.81

[a] 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.

[b] 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.

[c] The Water System Revenue Bond (WSRB) Surcharge equivalent unit rate is calculated by multiplying Column 1 by the ratio of the 2019 WSRB surcharge to the sum of the Transportation Capital and the Capital component of the Delta Water Charge.

TABLE B-26 Capital Costs of Each Aqueduct Reach to be Reimbursed through the Capital Cost Component of the East Branch Enlargement Transportation Charge Phase 1 and Phase 2 (in dollars)

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]
1952	0	0	0	0	0	0	0	0
1953	0	0	0	0	0	0	0	0
1954	0	0	0	0	0	0	0	0
1955	0	0	0	0	0	0	0	0
1956	0	0	0	0	0	0	0	0
1957	0	0	0	0	0	0	0	0
1958	0	0	0	0	0	0	0	0
1959	0	0	0	0	0	0	0	0
1960	0	0	0	0	0	0	0	0
1961	0	0	0	0	0	0	0	0
1962	0	0	0	0	0	0	0	0
1963	0	0	0	0	0	0	0	0
1964	0	0	0	0	0	0	0	0
1965	0	0	0	0	0	0	0	0
1966	0	0	0	0	0	0	0	0
1967	0	0	0	0	0	0	0	0
1968	0	0	0	0	0	0	0	0
1969	0	0	0	0	0	0	0	0
1970	0	0	0	0	0	0	0	0
1971	0	0	0	0	0	0	0	0
1972	0	0	0	0	0	0	0	0
1973	0	0	0	0	0	0	0	0
1974	0	0	0	0	0	0	0	0
1975	0	0	0	0	0	0	0	0
1976	0	0	0	0	0	0	0	0
1977	0	0	0	0	0	0	0	0
1978	0	0	0	0	0	0	0	0
1979	117,000	0	0	0	0	0	0	0
1980	200,000	0	0	0	0	0	0	74,000
1981	135,000	0	0	0	0	0	0	385,000
1982	1,503,000	0	0	0	0	0	0	1,586,000
1983	2,260,000	0	0	0	0	0	0	2,965,000
1984	735,000	0	0	0	0	0	796,000	1,380,000
1985	93,000	435,000	75,000	544,000	859,000	703,000	970,000	146,000
1986	784,000	4,477,000	3,144,000	2,234,000	1,569,000	1,203,000	1,808,000	34,000
1987	11,000	951,000	1,076,000	666,000	399,000	47,000	16,421,000	43,000
1988	1,000	125,000	1,681,000	1,730,000	2,024,000	40,000	13,326,000	70,000
1989	0	206,000	2,089,000	2,174,000	2,510,000	61,000	11,242,000	229,000
1990	1,000	577,000	903,000	735,000	928,000	194,000	20,131,000	887,000
1991	1,000	280,000	413,000	333,000	422,000	93,000	20,702,000	1,215,000
1992	0	40,000	41,000	39,000	35,000	13,000	9,599,000	3,719,000
1993	0	19,000	16,000	19,000	12,000	6,000	2,319,000	19,654,000
1994	0	2,000	3,000	2,000	4,000	3,000	803,000	3,173,000
1995	0	0	0	0	0	0	223,000	1,465,000
1996	0	0	0	0	0	0	6,014,000	478,000
1997	0	0	0	0	0	0	404,000	1,327,000
1998	0	0	0	0	0	0	0	0
1999	0	0	0	0	0	0	0	0
2000	0	0	0	0	0	0	0	0
2001	0	0	0	0	0	0	0	0
2002	0	0	0	0	0	0	0	0
2003	0	0	0	0	0	0	0	0
2004	0	0	0	0	0	0	0	0
2005	0	0	0	0	0	0	0	0
2006	0	4,366	0	22,095	37,971	0	67,871	0
2007	0	34,564	0	174,915	300,601	0	537,312	0
2008	0	67,077	0	339,450	583,367	0	1,042,743	0
2009	0	90,089	0	455,906	783,502	0	1,400,476	0
2010	0	21,120	0	106,881	183,682	0	328,324	0
2011	0	16,403	0	83,011	142,660	0	254,998	0
2012	0	26,143	0	132,299	227,364	0	406,404	0
2013	0	690	0	3,492	6,002	0	10,728	0
2014	0	4,290	0	21,708	37,307	0	66,685	0
2015	0	3,519	0	17,808	30,604	0	54,704	0
2016	0	0	0	0	0	0	0	0
2017	0	0	0	0	0	0	0	0
2018	0	0	0	0	0	0	0	0
2019	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
2020	0	0	0	0	0	0	0	0
2021	0	0	0	0	0	0	0	0
2022	0	0	0	0	0	0	0	0
2023	0	0	0	0	0	0	0	0
2024	0	0	0	0	0	0	0	0
2025	0	0	0	0	0	0	0	0
2026	0	0	0	0	0	0	0	0
2027	0	0	0	0	0	0	0	0
2028	0	0	0	0	0	0	0	0
2029	0	0	0	0	0	0	0	0
2030	0	0	0	0	0	0	0	0
2031	0	0	0	0	0	0	0	0
2032	0	0	0	0	0	0	0	0
2033	0	0	0	0	0	0	0	0
2034	0	0	0	0	0	0	0	0
2035	0	0	0	0	0	0	0	0
TOTAL	**5,841,000**	**7,380,261**	**9,441,000**	**9,833,565**	**11,095,061**	**2,363,000**	**108,928,245**	**38,830,000**

TABLE B-26 Capital Costs of Each Aqueduct Reach to be Reimbursed through the Capital Cost Component of the East Branch Enlargement Transportation Charge Phase 1 and Phase 2 (in dollars)

Sheet 2 of 2

Calendar Year	CALIFORNIA AQUEDUCT (continued)							GRAND TOTAL
	MOJAVE DIVISION (continued)			SANTA ANA DIVISION				
	Reach 23C	Reach 24	Total	Reach 25	Reach 26A	Reach 26B	Total	
	[9]	[10]	[11]	[12]	[13]	[14]	[15]	[16]
1952	0	0	0	0	0	0	0	0
1953	0	0	0	0	0	0	0	0
1954	0	0	0	0	0	0	0	0
1955	0	0	0	0	0	0	0	0
1956	0	0	0	0	0	0	0	0
1957	0	0	0	0	0	0	0	0
1958	0	0	0	0	0	0	0	0
1959	0	0	0	0	0	0	0	0
1960	0	0	0	0	0	0	0	0
1961	0	0	0	0	0	0	0	0
1962	0	0	0	0	0	0	0	0
1963	0	0	0	0	0	0	0	0
1964	0	0	0	0	0	0	0	0
1965	0	0	0	0	0	0	0	0
1966	0	0	0	0	0	0	0	0
1967	0	0	0	0	0	0	0	0
1968	0	0	0	0	0	0	0	0
1969	0	0	0	0	0	0	0	0
1970	0	0	0	0	0	0	0	0
1971	0	0	0	0	0	0	0	0
1972	0	0	0	0	0	0	0	0
1973	0	0	0	0	0	0	0	0
1974	0	0	0	0	0	0	0	0
1975	0	0	0	0	0	0	0	0
1976	0	0	0	0	0	0	0	0
1977	0	0	0	0	0	0	0	0
1978	0	0	0	0	0	0	0	0
1979	0	0	117,000	0	0	0	0	117,000
1980	0	0	274,000	0	0	0	0	274,000
1981	0	0	520,000	0	0	0	0	520,000
1982	0	0	3,089,000	0	0	0	0	3,089,000
1983	0	0	5,225,000	0	0	0	0	5,225,000
1984	0	0	2,911,000	0	0	0	0	2,911,000
1985	0	0	3,825,000	0	528,000	89,000	617,000	4,442,000
1986	25,000	0	15,278,000	0	1,926,000	154,000	2,080,000	17,358,000
1987	178,000	0	19,792,000	0	3,699,000	437,000	4,136,000	23,928,000
1988	632,000	0	19,629,000	0	5,667,000	3,329,000	8,996,000	28,625,000
1989	1,130,000	0	19,641,000	0	40,879,000	1,650,000	42,529,000	62,170,000
1990	2,066,000	0	26,422,000	0	29,853,000	1,650,000	31,503,000	57,925,000
1991	4,980,000	0	28,439,000	0	26,027,000	999,000	27,026,000	55,465,000
1992	11,920,000	0	25,406,000	0	15,317,000	299,000	15,616,000	41,022,000
1993	16,303,000	0	38,348,000	0	4,878,000	0	4,878,000	43,226,000
1994	7,081,000	0	11,071,000	0	3,151,000	0	3,151,000	14,222,000
1995	5,350,000	0	7,038,000	0	2,137,000	0	2,137,000	9,175,000
1996	1,706,000	0	8,198,000	0	9,181,000	0	9,181,000	17,379,000
1997	1,905,000	0	3,636,000	0	175,000	0	175,000	3,811,000
1998	28,000	0	28,000	0	0	0	0	28,000
1999	0	0	0	0	0	0	0	0
2000	0	0	0	0	0	0	0	0
2001	0	0	0	0	0	0	0	0
2002	0	0	0	0	0	0	0	0
2003	0	0	0	0	0	0	0	0
2004	0	0	0	0	0	0	0	0
2005	0	0	0	0	0	0	0	0
2006	0	0	132,302	0	0	0	0	132,302
2007	0	0	1,047,392	0	0	0	0	1,047,392
2008	0	0	2,032,638	0	0	0	0	2,032,638
2009	0	0	2,729,973	0	0	0	0	2,729,973
2010	0	0	640,008	0	0	0	0	640,008
2011	0	0	497,072	0	0	0	0	497,072
2012	0	0	792,210	0	0	0	0	792,210
2013	0	0	20,913	0	0	0	0	20,913
2014	0	0	129,990	0	0	0	0	129,990
2015	0	0	106,635	0	0	0	0	106,635
2016	0	0	0	0	0	0	0	0
2017	0	0	0	0	0	0	0	0
2018	0	0	0	0	0	0	0	0
2019	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
2020	0	0	0	0	0	0	0	0
2021	0	0	0	0	0	0	0	0
2022	0	0	0	0	0	0	0	0
2023	0	0	0	0	0	0	0	0
2024	0	0	0	0	0	0	0	0
2025	0	0	0	0	0	0	0	0
2026	0	0	0	0	0	0	0	0
2027	0	0	0	0	0	0	0	0
2028	0	0	0	0	0	0	0	0
2029	0	0	0	0	0	0	0	0
2030	0	0	0	0	0	0	0	0
2031	0	0	0	0	0	0	0	0
2032	0	0	0	0	0	0	0	0
2033	0	0	0	0	0	0	0	0
2034	0	0	0	0	0	0	0	0
2035	0	0	0	0	0	0	0	0
TOTAL	**53,304,000**	**0**	**247,016,132**	**0**	**143,418,000**	**8,607,000**	**152,025,000**	**399,041,132**

TABLE B-27 Minimum OMP&R Costs of Each Aqueduct Reach to be Reimbursed through Minimum OMP&R Component of the East Branch Enlargement Transportation Charge Phase 1 and Phase 2 (in dollars)

Sheet 1 of 2

Calendar Year	CALIFORNIA AQUEDUCT							
	MOJAVE DIVISION							
	Reach 18A	Reach 19	Reach 20A	Reach 20B	Reach 21	Reach 22A	Reach 22B	Reach 23B
	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]
1971	0	0	0	0	0	0	0	0
1972	0	0	0	0	0	0	0	0
1973	0	0	0	0	0	0	0	0
1974	0	0	0	0	0	0	0	0
1975	0	0	0	0	0	0	0	0
1976	0	0	0	0	0	0	0	0
1977	0	0	0	0	0	0	0	0
1978	0	0	0	0	0	0	0	0
1979	0	0	0	0	0	0	0	0
1980	0	0	0	0	0	0	0	0
1981	0	0	0	0	0	0	0	0
1982	0	0	0	0	0	0	0	0
1983	0	0	0	0	0	0	0	0
1984	0	0	0	0	0	0	0	0
1985	0	0	0	0	0	0	0	0
1986	0	0	0	0	0	0	0	0
1987	0	0	0	0	0	0	0	0
1988	0	0	0	0	0	0	0	0
1989	0	0	0	0	0	0	0	0
1990	0	0	0	0	0	0	0	0
1991	0	0	0	0	0	0	0	0
1992	0	0	0	0	0	0	0	0
1993	0	0	0	0	0	0	0	0
1994	0	0	0	0	0	0	1,048,625	0
1995	0	0	0	0	0	0	953,814	0
1996	0	0	0	0	0	0	1,171,411	0
1997	0	0	0	0	0	0	1,110,038	0
1998	0	0	0	0	0	0	1,213,002	0
1999	1,229	517	646	409	383	169	668,466	0
2000	4,452	1,875	2,340	1,484	1,386	614	1,310,774	0
2001	347	146	183	116	108	48	1,034,428	0
2002	1,639	690	861	546	510	226	1,533,205	0
2003	0	0	0	0	0	0	1,818,330	0
2004	2,132	27,868	18,579	18,731	10,355	8,528	1,473,712	0
2005	1,243	16,250	10,833	10,922	6,038	4,973	1,028,465	0
2006	3,279	42,860	28,573	28,807	15,926	13,116	1,466,629	0
2007	0	0	0	0	0	0	1,411,048	0
2008	0	0	0	0	0	0	2,067,783	0
2009	(4)	(46)	(31)	(31)	(17)	(14)	1,723,893	0
2010	(1)	(8)	(5)	(5)	(3)	(2)	1,815,029	0
2011	0	0	0	0	0	0	1,899,757	0
2012	4	54	36	36	20	17	1,912,307	0
2013	0	0	0	0	0	0	1,993,644	0
2014	231	3,023	2,015	2,032	1,123	925	2,460,894	0
2015	(697)	(9,108)	(6,072)	(6,122)	(3,385)	(2,787)	2,625,360	0
2016	0	0	0	0	0	0	2,889,342	0
2017	0	0	0	0	0	0	2,407,001	0
2018	0	0	0	0	0	0	2,351,488	0
2019	**0**	**0**	**0**	**0**	**0**	**0**	**2,322,869**	**0**
2020	0	0	0	0	0	0	2,314,714	0
2021	0	0	0	0	0	0	2,314,714	0
2022	0	0	0	0	0	0	2,314,714	0
2023	0	0	0	0	0	0	2,314,714	0
2024	0	0	0	0	0	0	2,314,714	0
2025	0	0	0	0	0	0	2,314,714	0
2026	0	0	0	0	0	0	2,314,714	0
2027	0	0	0	0	0	0	2,314,714	0
2028	0	0	0	0	0	0	2,314,714	0
2029	0	0	0	0	0	0	2,314,714	0
2030	0	0	0	0	0	0	2,314,714	0
2031	0	0	0	0	0	0	2,314,714	0
2032	0	0	0	0	0	0	2,314,714	0
2033	0	0	0	0	0	0	2,314,714	0
2034	0	0	0	0	0	0	2,314,714	0
2035	0	0	0	0	0	0	2,314,714	0
TOTAL	**13,855**	**84,122**	**57,959**	**56,926**	**32,445**	**25,812**	**80,746,738**	**0**

TABLE B-27 Minimum OMP&R Costs of Each Aqueduct Reach to be Reimbursed through Minimum OMP&R Component of the East Branch Enlargement Transportation Charge Phase 1 and Phase 2 (in dollars)

Sheet 2 of 2

Calendar Year	CALIFORNIA AQUEDUCT (continued)							GRAND TOTAL
	MOJAVE DIVISION (continued)			SANTA ANA DIVISION				
	Reach 23C	Reach 24	Subtotal	Reach 25	Reach 26A[a]	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	735,392	0	2,058,318	0	1,406,680	0	1,406,680	3,464,998
2001	812,064	0	1,847,440	0	798,363	0	798,363	2,645,802
2002	727,222	0	2,264,899	0	1,130,735	0	1,130,735	3,395,634
2003	899,530	0	2,717,859	0	1,234,283	0	1,234,283	3,952,142
2004	913,367	0	2,473,273	0	1,806,947	0	1,806,947	4,280,220
2005	1,036,431	0	2,115,156	0	1,850,269	0	1,850,269	3,965,425
2006	838,336	0	2,437,527	0	1,762,361	0	1,762,361	4,199,888
2007	1,307,853	0	2,718,902	0	2,800,402	0	2,800,402	5,519,303
2008	1,068,289	0	3,136,072	0	2,733,101	0	2,733,101	5,869,174
2009	1,545,401	0	3,269,152	0	2,857,713	0	2,857,713	6,126,865
2010	1,426,937	0	3,241,942	0	2,398,789	0	2,398,789	5,640,731
2011	1,815,469	0	3,715,226	0	2,103,422	0	2,103,422	5,818,648
2012	1,258,656	0	3,171,131	0	2,315,503	0	2,315,503	5,486,634
2013	1,506,410	0	3,500,054	0	2,760,563	0	2,760,563	6,260,616
2014	1,857,662	0	4,327,905	0	3,224,852	0	3,224,852	7,552,757
2015	1,953,145	0	4,550,334	0	4,425,891	0	4,425,891	8,976,225
2016	2,200,830	0	5,090,172	0	3,923,708	0	3,923,708	9,013,880
2017	2,270,955	0	4,677,956	0	3,970,489	0	3,970,489	8,648,444
2018	2,257,512	0	4,609,000	0	4,967,927	0	4,967,927	9,576,927
2019	**2,601,506**	**0**	**4,924,375**	**0**	**5,416,872**	**0**	**5,416,872**	**10,341,247**
2020	2,738,954	0	5,053,668	0	6,226,936	0	6,226,936	11,280,604
2021	2,738,954	0	5,053,668	0	6,226,936	0	6,226,936	11,280,604
2022	2,738,954	0	5,053,668	0	6,226,936	0	6,226,936	11,280,604
2023	2,738,954	0	5,053,668	0	6,226,936	0	6,226,936	11,280,604
2024	2,738,954	0	5,053,668	0	6,226,936	0	6,226,936	11,280,604
2025	2,738,954	0	5,053,668	0	6,226,936	0	6,226,936	11,280,604
2026	2,738,954	0	5,053,668	0	6,226,936	0	6,226,936	11,280,604
2027	2,738,954	0	5,053,668	0	6,226,936	0	6,226,936	11,280,604
2028	2,738,954	0	5,053,668	0	6,226,936	0	6,226,936	11,280,604
2029	2,738,954	0	5,053,668	0	6,226,936	0	6,226,936	11,280,604
2030	2,738,954	0	5,053,668	0	6,226,936	0	6,226,936	11,280,604
2031	2,738,954	0	5,053,668	0	6,226,936	0	6,226,936	11,280,604
2032	2,738,954	0	5,053,668	0	6,226,936	0	6,226,936	11,280,604
2033	2,738,954	0	5,053,668	0	6,226,936	0	6,226,936	11,280,604
2034	2,738,954	0	5,053,668	0	6,226,936	0	6,226,936	11,280,604
2035	2,738,954	0	5,053,668	0	6,226,936	0	6,226,936	11,280,604
TOTAL	**74,743,274**	**0**	**155,761,131**	**0**	**162,140,040**	**0**	**162,140,040**	**317,901,171**

[a] Units 3 and 4 at Devil Canyon Powerplant were operational in 1993.

TABLE B-28 Capital Costs of East Branch Enlargement Transportation Facilities Allocated to Each Contractor Phase 1 and Phase 2 (in dollars)

Calendar Year	SOUTHERN CALIFORNIA AREA							Total
	AVEK	Coachella	Desert	Mojave	Palmdale	San Bernardino	Metropolitan	
	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]
1971	0	0	0	0	0	0	0	0
1972	0	0	0	0	0	0	0	0
1973	0	0	0	0	0	0	0	0
1974	0	0	0	0	0	0	0	0
1975	0	0	0	0	0	0	0	0
1976	0	0	0	0	0	0	0	0
1977	0	0	0	0	0	0	0	0
1978	0	0	0	0	0	0	0	0
1979	0	11,731	1,010	10,566	466	0	93,227	117,000
1980	0	28,241	4,708	27,495	797	0	212,759	274,000
1981	0	56,134	16,676	61,271	538	0	385,381	520,000
1982	0	326,180	76,872	337,913	5,988	0	2,342,047	3,089,000
1983	0	554,658	138,964	582,070	9,004	0	3,940,304	5,225,000
1984	0	306,514	68,842	314,468	2,928	0	2,218,248	2,911,000
1985	49,675	447,266	65,773	347,262	4,514	21,614	3,505,896	4,442,000
1986	185,353	1,757,633	236,324	1,363,586	41,900	78,842	13,694,362	17,358,000
1987	49,735	2,455,279	378,535	1,774,447	10,615	151,421	19,107,968	23,928,000
1988	124,534	2,689,959	500,466	1,712,431	13,783	231,982	23,351,845	28,625,000
1989	155,446	7,118,094	2,423,000	1,671,088	17,419	1,673,409	49,111,544	62,170,000
1990	62,786	6,459,229	1,943,918	2,234,452	8,680	1,222,053	45,993,882	57,925,000
1991	28,686	6,265,822	1,875,066	2,168,712	4,024	1,065,433	44,057,257	55,465,000
1992	2,911	4,826,764	1,610,921	1,359,335	471	627,012	32,594,586	41,022,000
1993	1,205	5,094,237	1,828,410	2,722,156	212	199,684	33,380,096	43,226,000
1994	273	1,726,376	631,816	478,543	27	128,988	11,255,977	14,222,000
1995	0	1,130,963	423,243	206,978	0	87,480	7,326,336	9,175,000
1996	0	2,025,987	645,296	606,205	0	375,830	13,725,682	17,379,000
1997	0	451,011	154,366	205,796	0	7,164	2,992,663	3,811,000
1998	0	3,551	1,293	0	0	0	23,156	28,000
1999	0	0	0	0	0	0	0	0
2000	0	0	0	0	0	0	0	0
2001	0	0	0	0	0	0	0	0
2002	0	0	0	0	0	0	0	0
2003	0	0	0	0	0	0	0	0
2004	0	0	0	0	0	0	0	0
2005	0	0	0	0	0	0	0	0
2006	1,368	13,170	1,134	11,862	103	0	104,665	132,302
2007	10,827	104,265	8,976	93,908	819	0	828,597	1,047,392
2008	21,011	202,344	17,420	182,243	1,589	0	1,608,031	2,032,638
2009	28,220	271,762	23,397	244,765	2,134	0	2,159,695	2,729,973
2010	6,616	63,711	5,485	57,382	500	0	506,314	640,008
2011	5,138	49,482	4,260	44,567	389	0	393,236	497,072
2012	8,189	78,862	6,789	71,028	619	0	626,723	792,210
2013	216	2,082	179	1,875	16	0	16,545	20,913
2014	1,344	12,940	1,114	11,655	102	0	102,835	129,990
2015	1,102	10,615	914	9,561	83	0	84,360	106,635
2016	0	0	0	0	0	0	0	0
2017	0	0	0	0	0	0	0	0
2018	0	0	0	0	0	0	0	0
2019	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
2020	0	0	0	0	0	0	0	0
2021	0	0	0	0	0	0	0	0
2022	0	0	0	0	0	0	0	0
2023	0	0	0	0	0	0	0	0
2024	0	0	0	0	0	0	0	0
2025	0	0	0	0	0	0	0	0
2026	0	0	0	0	0	0	0	0
2027	0	0	0	0	0	0	0	0
2028	0	0	0	0	0	0	0	0
2029	0	0	0	0	0	0	0	0
2030	0	0	0	0	0	0	0	0
2031	0	0	0	0	0	0	0	0
2032	0	0	0	0	0	0	0	0
2033	0	0	0	0	0	0	0	0
2034	0	0	0	0	0	0	0	0
2035	0	0	0	0	0	0	0	0
TOTAL	**744,635**	**44,544,862**	**13,095,167**	**18,913,620**	**127,720**	**5,870,912**	**315,744,217**	**399,041,133**

TABLE B-29 Capital Cost Component of East Branch Enlargement Facilities Transportation Charge for Each Contractor[a b] (in dollars)

Calendar Year	SOUTHERN CALIFORNIA AREA							Total
	AVEK	Coachella	Desert	Mojave	Palmdale	San Bernardino[c]	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	39,985	2,647,224	788,406	1,100,685	7,346	0	18,722,067	23,305,713
2015	44,642	2,955,568	880,238	1,228,892	8,202	0	20,902,785	26,020,327
2016	44,525	2,947,802	877,925	1,225,662	8,180	0	20,847,856	25,951,950
2017	46,442	3,031,854	901,411	1,264,149	8,450	0	21,448,686	26,700,992
2018	65,342	4,226,635	1,262,051	1,741,892	11,678	0	29,856,813	37,164,411
2019	**65,392**	**4,219,658**	**1,260,091**	**1,738,144**	**11,659**	**0**	**29,805,408**	**37,100,352**
2020	64,414	4,129,612	1,231,412	1,706,079	11,449	0	29,179,291	36,322,257
2021	65,452	4,221,341	1,260,295	1,739,777	11,670	0	29,819,225	37,117,760
2022	63,137	4,063,808	1,212,809	1,676,068	11,245	0	28,708,777	35,735,844
2023	52,478	3,347,124	997,913	1,382,637	9,287	0	23,649,509	29,438,948
2024	54,817	3,517,570	1,049,291	1,452,035	9,745	0	24,852,261	30,935,719
2025	62,744	4,013,226	1,195,955	1,660,190	11,143	0	28,361,325	35,304,583
2026	25,697	1,559,411	463,552	645,419	4,366	0	11,018,720	13,717,165
2027	26,250	1,598,458	475,499	660,660	4,467	0	11,292,836	14,058,170
2028	18,084	1,038,884	306,358	435,806	2,967	0	7,351,399	9,153,498
2029	18,519	1,084,988	320,892	452,926	3,077	0	7,673,564	9,553,966
2030	20,324	195,716	16,850	176,275	1,537	0	1,555,364	1,966,066
2031	20,250	195,011	16,789	175,640	1,531	0	1,549,763	1,958,984
2032	20,287	195,369	16,820	175,961	1,534	0	1,552,600	1,962,571
2033	20,260	195,104	16,797	175,722	1,532	0	1,550,491	1,959,906
2034	20,288	195,379	16,821	175,970	1,534	0	1,552,674	1,962,666
2035	20,295	195,450	16,827	176,034	1,535	0	1,553,240	1,963,381
TOTAL	**1,894,079**	**116,937,626**	**34,587,555**	**49,091,995**	**330,509**	**0**	**827,800,217**	**1,030,641,981**

[a] 1988 through 2017 charges are debt service only and do not include bond cover; 2018 charges and after include both debt service and bond cover.

[b] 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.

[c] 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	402,818	121,284	119,930	40	57,583	2,763,211	3,464,998
2001	10	307,323	89,527	93,873	3	32,682	2,122,384	2,645,802
2002	49	388,806	107,887	139,410	15	46,287	2,713,180	3,395,634
2003	0	451,900	123,861	164,862	0	50,526	3,160,993	3,952,142
2004	1,278	499,301	153,131	141,292	265	73,969	3,410,984	4,280,220
2005	745	471,965	156,985	97,723	154	75,742	3,162,111	3,965,425
2006	1,965	488,066	147,595	144,778	407	72,143	3,344,934	4,199,888
2007	0	659,081	223,648	127,935	0	114,636	4,394,003	5,519,303
2008	0	686,373	214,648	187,479	0	111,881	4,668,793	5,869,174
2009	(2)	727,870	240,418	156,287	0	116,982	4,885,310	6,126,865
2010	0	664,482	210,988	164,560	0	98,196	4,502,504	5,640,730
2011	0	685,242	213,734	172,245	0	86,105	4,661,322	5,818,648
2012	2	642,509	199,571	173,397	1	94,787	4,376,367	5,486,634
2013	0	737,911	235,717	180,757	0	113,005	4,993,224	6,260,614
2014	139	888,639	281,105	223,953	29	132,011	6,026,881	7,552,757
2015	(418)	1,064,211	351,393	235,524	(87)	181,177	7,144,424	8,976,224
2016	0	1,062,003	338,274	261,967	0	160,620	7,191,016	9,013,880
2017	0	1,028,206	339,855	218,235	0	162,535	6,899,614	8,648,445
2018	0	1,145,998	392,546	213,202	0	203,365	7,621,816	9,576,927
2019	**0**	**1,243,039**	**432,394**	**210,607**	**0**	**221,743**	**8,233,464**	**10,341,247**
2020	0	1,361,235	482,358	209,867	0	254,904	8,972,240	11,280,604
2021	0	1,361,235	482,358	209,867	0	254,904	8,972,240	11,280,604
2022	0	1,361,235	482,358	209,867	0	254,904	8,972,240	11,280,604
2023	0	1,361,235	482,358	209,867	0	254,904	8,972,240	11,280,604
2024	0	1,361,235	482,358	209,867	0	254,904	8,972,240	11,280,604
2025	0	1,361,235	482,358	209,867	0	254,904	8,972,240	11,280,604
2026	0	1,361,235	482,358	209,867	0	254,904	8,972,240	11,280,604
2027	0	1,361,235	482,358	209,867	0	254,904	8,972,240	11,280,604
2028	0	1,361,235	482,358	209,867	0	254,904	8,972,240	11,280,604
2029	0	1,361,235	482,358	209,867	0	254,904	8,972,240	11,280,604
2030	0	1,361,235	482,358	209,867	0	254,904	8,972,240	11,280,604
2031	0	1,361,235	482,358	209,867	0	254,904	8,972,240	11,280,604
2032	0	1,361,235	482,358	209,867	0	254,904	8,972,240	11,280,604
2033	0	1,361,235	482,358	209,867	0	254,904	8,972,240	11,280,604
2034	0	1,361,235	482,358	209,867	0	254,904	8,972,240	11,280,604
2035	0	1,361,235	482,358	209,867	0	254,904	8,972,240	11,280,604
TOTAL	**3,937**	**37,966,801**	**12,897,783**	**7,345,179**	**838**	**6,637,313**	**253,049,317**	**317,901,168**

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	3,648,927	1,088,052	1,469,625	9,048	57,583	25,720,797	32,043,195
2001	49,058	3,554,586	1,056,638	1,444,048	9,014	32,682	25,088,132	31,234,158
2002	47,943	3,559,654	1,052,240	1,457,812	8,814	46,287	25,138,498	31,311,248
2003	40,765	3,150,771	927,648	1,287,022	7,489	50,526	22,248,330	27,712,551
2004	45,477	3,425,523	1,024,629	1,357,982	8,385	73,969	24,106,221	30,042,186
2005	33,889	2,666,264	810,499	1,010,087	6,243	75,742	18,680,937	23,283,661
2006	48,944	3,598,342	1,073,908	1,437,995	9,038	72,143	25,341,860	31,582,230
2007	45,289	3,657,451	1,116,633	1,374,623	8,321	114,636	25,599,491	31,916,444
2008	42,491	3,499,491	1,052,461	1,357,141	7,806	111,881	24,564,121	30,635,392
2009	43,668	3,619,052	1,101,480	1,358,408	8,023	116,982	25,332,734	31,580,347
2010	44,839	3,633,101	1,095,113	1,398,878	8,238	98,196	25,497,588	31,775,953
2011	43,190	3,544,661	1,065,336	1,361,159	7,935	86,105	24,884,107	30,992,493
2012	43,706	3,535,958	1,061,308	1,376,460	8,030	94,787	24,839,826	30,960,075
2013	37,663	3,231,380	978,331	1,217,513	6,919	113,005	22,627,884	28,212,695
2014	40,124	3,535,863	1,069,511	1,324,638	7,375	132,011	24,748,948	30,858,470
2015	44,224	4,019,779	1,231,631	1,464,416	8,115	181,177	28,047,209	34,996,551
2016	44,525	4,009,805	1,216,199	1,487,629	8,180	160,620	28,038,872	34,965,830
2017	46,442	4,060,060	1,241,266	1,482,384	8,450	162,535	28,348,300	35,349,437
2018	65,342	5,372,633	1,654,597	1,955,094	11,678	203,365	37,478,629	46,741,338
2019	**65,392**	**5,462,697**	**1,692,485**	**1,948,751**	**11,659**	**221,743**	**38,038,872**	**47,441,599**
2020	64,414	5,490,847	1,713,770	1,915,946	11,449	254,904	38,151,531	47,602,861
2021	65,452	5,582,576	1,742,653	1,949,644	11,670	254,904	38,791,465	48,398,364
2022	63,137	5,425,043	1,695,167	1,885,935	11,245	254,904	37,681,017	47,016,448
2023	52,478	4,708,359	1,480,271	1,592,504	9,287	254,904	32,621,749	40,719,552
2024	54,817	4,878,805	1,531,649	1,661,902	9,745	254,904	33,824,501	42,216,323
2025	62,744	5,374,461	1,678,313	1,870,057	11,143	254,904	37,333,565	46,585,187
2026	25,697	2,920,646	945,910	855,286	4,366	254,904	19,990,960	24,997,769
2027	26,250	2,959,693	957,857	870,527	4,467	254,904	20,265,076	25,338,774
2028	18,084	2,400,119	788,716	645,673	2,967	254,904	16,323,639	20,434,102
2029	18,519	2,446,223	803,250	662,793	3,077	254,904	16,645,804	20,834,570
2030	20,324	1,556,951	499,208	386,142	1,537	254,904	10,527,604	13,246,670
2031	20,250	1,556,246	499,147	385,507	1,531	254,904	10,522,003	13,239,588
2032	20,287	1,556,604	499,178	385,828	1,534	254,904	10,524,840	13,243,175
2033	20,260	1,556,339	499,155	385,589	1,532	254,904	10,522,731	13,240,510
2034	20,288	1,556,614	499,179	385,837	1,534	254,904	10,524,914	13,243,270
2035	20,295	1,556,685	499,185	385,901	1,535	254,904	10,525,480	13,243,985
TOTAL	**1,898,016**	**154,904,427**	**47,485,338**	**56,437,174**	**331,347**	**6,637,313**	**1,080,849,534**	**1,348,543,149**

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^2)	square millimeters (mm^2)	645.16	0.00155
	square feet (ft^2)	square meters (m^2)	0.092903	10.764
	acres (ac)	hectares (ha)	0.40469	2.4710
	square miles (mi^2)	square kilometers (km^2)	2.590	0.3861
Volume	gallons (gal)	liters (L)	3.7854	0.26417
	million gallons (10^6 gal)	megaliters (ML)	3.7854	0.26417
	cubic feet (ft^3)	cubic meters (m^3)	0.028317	35.315
	cubic yards (yd^3)	cubic meters (m^3)	0.76455	1.308
	acre-feet (af)	thousand cubic meters ($m^3 \times 10^3$)	1.2335	0.8107
	acre-feet (af)	hectare-meters (ha - m)■	0.1234	8.107
	thousand acre-feet (taf)	million cubic meters ($m^3 \times 10^6$)	1.2335	0.8107
	thousand acre-feet (taf)	hectare-meters (ha - m)■	123.35	0.008107
	million acre-feet (maf)	billion cubic meters ($m^3 \times 10^9$)◆	1.2335	0.8107
	million acre-feet (maf)	cubic kilometers (km^3)	1.2335	0.8107
Flow	cubic feet per second (ft^3/s)	cubic meters per second (m^3/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 ($m^3 \times 10^3$/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

● When using "dual units," inches are normally converted to millimeters (rather than centimeters).

■ 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).

◆ 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).

OTHER COMMON CONVERSION FACTORS

1 cubic foot=7.48 gallons=62.4 pounds of water
1 cubic foot per second (cfs)=450 gallons per minute (gpm)
1 cfs=646,320 gallons per day=1.98 af a day
1 acre-foot=approximately 325,851 gallons=43,560 cubic feet
1 million gallons=3.07 acre-feet
1 million gallons per day (mgd)=1,120 af a year

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