

MANAGEMENT OF THE

BULLETIN 132-2020 | JULY 2024

CALIFORNIA STATE WATER PROJECT



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Governor, State of California

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Secretary for Natural Resources
California Natural Resources Agency

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Publishing Information

Cover photo shows an aerial view of the Tehachapi Afterbay, which conveys water from the San Joaquin Valley to Southern California via the Tehachapi Crossing Tunnels, in Kern County in January 2019.

Photo provided by the Public Affairs Office Photography Unit.

Copies of this document are available for \$25.00 per book from:

California Department of Water Resources
Attn: Publications Office
P.O. Box 942836
Sacramento, CA 94236-0001
(916) 653-1097

If you need this publication in alternate form, contact the Public Affairs Office, 1-800-272-8869.

Printed on recycled paper 

Bulletin 132-20

Management of the California State Water Project

Covers Calendar Year 2019 Activities



Published July 2024

Gavin Newsom *Governor*
State of California

Wade Crowfoot *Secretary for Natural Resources*
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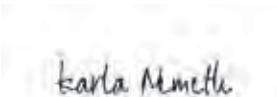
Foreword

Bulletin 132-20, Management of the California State Water Project, continues the Bulletin 132 annual series begun in 1963. Bulletin 132-20 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, 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 Contractors' Statements of Charges. Appendix B was previously printed and distributed to SWP 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, 2019, through December 31, 2019. Appendix B includes data used to document the redetermination of water charges to be paid by SWP water contractors during calendar year 2021; the information is based on established data about the SWP, both known and projected, as of June 2020.

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 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:

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Acronyms and Abbreviations

Symbols

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

A

af acre-feet acre feet acre-feet
AVEK Antelope Valley-East Kern Water

B

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

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
CVP Central Valley Project
CWC California Water Code
CWF California WaterFix

D

D-1641 State Water Resources Control Board, Water Right Decision 1641
DCA Design and Construction Authority
Delta Sacramento-San Joaquin Delta
Delta Fish Agreement Delta Pumping Plant Fish Protection Agreement
DFW Department of Fish and Wildlife
DO dissolved oxygen
DOE Division of Engineering
DSC Delta Stewardship Council
DSOD Division of Safety of Dams

DSRB Director's Safety Review Board

DSS Dam Safety Services

DWR Department of Water Resources

E

EBrPD East Bay Regional Park District

EC electrical conductivity

EIR environmental impact report

ESA Endangered Species Act

F

FERC Federal Energy Regulatory Commission

FRFH Feather River Fish Hatchery

FRP Fish Restoration Program

G

GHG greenhouse gas

L

LADPR Los Angeles County Department of Parks and Recreation

LADWP Los Angeles Department of Water and Power

LiDAR Light Detection and Ranging

M

maf million acre-feet

MeHg methylmercury

Metropolitan Metropolitan Water District of Southern California

mg/L milligrams per liter

MIDS Morrow Island Distribution System

mS/cm millisiemens per centimeter

MW megawatts

MWh megawatt hours megawatt hours

MWT McCormack-Williamson Tract

N

NDOI Net Delta Outflow Index

NEPA National Environmental Policy Act

NOAA Fisheries National Marine Fisheries Service

NTU nephelometric turbidity units

O

OMP&R operations, maintenance, power, and replacement

OM&R operations, maintenance, and replacement

P

PAO Public Affairs Office

PG&E Pacific Gas & Electric Company

PM&Es protection, mitigation, and enhancement measures

R

Reclamation U.S. 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

San Joaquin Valley 60-20-20 Index San Joaquin Valley Water Year

Hydrologic Classification

SBA South Bay Aqueduct

SCE Southern California Edison

SDIP South Delta Improvements Program

SJR San Joaquin 4 Rivers

SRR Sacramento River Region

State Water Board State Water Resources Control Board

Substitute Environmental Document Substitute Environmental Document

SWP State Water Project

T

TLR Tulare Lake Region

U

USFWS U.S. Fish and Wildlife Service

W

WECC Western Electricity Coordinating Council

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.

Full Name	Abbreviation
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
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
Santa Clarita Valley Water Agency	Santa Clarita
Solano County Water Agency	Solano
Tulare Lake Basin Water Storage District	Tulare
Ventura County Watershed Protection District	Ventura



State Water Project Highlights

People enjoy swimming and boating at Castaic Lagoon at Castaic Lake State Recreation Area in Los Angeles County.



The annual Bulletin 132 series began in 1963 and reported the first deliveries of water by the new State Water Project (SWP). Bulletin 132-20, Management of the California State Water Project, continues this series as the fifty-eighth edition. It reports on SWP planning, construction, finance, management, and operations during calendar year 2019. 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.

SWP Allocations

On October 1, 2018, SWP Contractors submitted initial requests for 2019 totaling 4.17 million acre-feet (maf). DWR approved delivery of 0.42 maf on November 30, 2018, resulting in initial Table A amounts of 10 percent of SWP Contractor requests. DWR increased the 2019 Table A amounts to 3.13 maf, for a final allocation of 75 percent, on June 19, 2019.

Yearly Activities Summary

2019 Precipitation and Water Storage

Precipitation and Mountain Snowpack in Water Year 2018–2019

Water year 2018–2019 was an above average year for precipitation and mountain snowpack. This was a significant change from last year, which had below average precipitation and mountain snowpack. California received precipitation at 131 percent of average in water year 2018–2019 compared to 73, 164, and 105 percent of average in water years 2017–2018, 2016–2017, and 2015–2016, respectively. Of the three major Sierra regions, the Tulare Lake region had the highest percent of average runoff (167 percent). The highest percent of average April 1 snow water content was in

the central Sierra region (164 percent) as measured by snow sensors.

River Runoff

Statewide river runoff totaled 137 percent of average in the 2018–2019 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 7-4. As shown, the water year runoff totals for these areas ranged from 139 to 167 percent of average.

Water Supply Indices

The Sacramento Valley 40-30-30 Index and the San Joaquin Valley 60-20-20 Index were both “wet,” based on observed data for water year 2018–2019.

Water Year 2018–2019 Statewide Storage Totals

Monthly storage totals for the major Sierra Nevada reservoirs are shown in Table 7-5. Water year 2018–2019 began at 97 percent of average reservoir storage. Storage decreased slightly to 93 percent of average by the end of December. Thereafter, storage increased to 111 percent of average by the end of March. During the traditional snowmelt season, April–July, the percent of average storage increased to 125 percent of average.

2019 Storage Totals in Major SWP Reservoirs

End-of-year storage on December 31, 2019, in major SWP reservoirs and the State's share of joint-use reservoirs was 3.5 maf or 67 percent of maximum storage, compared to 2.5 maf or 47 percent of maximum storage at the end of 2018. The average end-of-month total storage in major SWP reservoirs for 2019 was 4.0 maf.

Diversions from the Delta

In 2019, the SWP diverted 2,968,427 acre-feet (af) at Banks Pumping Plant. This amount was all SWP diversions. There was no pumping for the Cross Valley Canal, and there was no water wheeled for the Central Valley Project.

Maximum daily Sacramento-San Joaquin Delta (Delta) exports occurred on February 20 at 23,651 af. Combined SWP and Central Valley Project monthly Delta exports in 2019 varied from a low of 167,207 af in May to a high of 678,028 af on July 1. Delta exports totaled approximately 5.2 maf in 2019.

For more information, see Chapter 7, Water Supply.

2019 Water Deliveries

A total of 4,169,825 af of SWP and non-SWP water was delivered to 29 SWP Contractors and 23 other agencies. The portion delivered to SWP Contractors was 3,049,508 af; the portion delivered to non-SWP Contractors was 1,120,317 af.

SWP

The 3,049,508 af delivered to SWP Contractors was categorized as follows:

- 1,926,579 af Table A water
- 387,807 af of transfers and exchanges of Table A water among SWP Contractors
- no delivery under Turn-Back Water Pool Program and Multiyear Water Pool Program water

- 253,508 af of 2019 carryover water
- 246,108 af of Article 21 water
- 28,651 af of water bank recovery
- 42,519 af of backup water delivery
- 5,062 af of settlement water
- 24,673 af of local water
- 9,002 af of permit water
- 120,929 af of other non-SWP programs
- 4,668 af of SWP Contracted Supply

Non-SWP

The 1,120,317 af portion delivered to 23 non-SWP agencies was categorized accordingly:

- 957 af of SWP water for parks and recreation
- 22,974 af of other non-SWP programs
- 1,005,676 af of regulated delivery of local supply
- 5 af for parks and recreation
- 461 af for fish and wildlife
- 65,950 af for Cross Valley Canal Contractors
- 23,108 af for Kern National Wildlife Refuge
- 1,186 af for annual contracts

For more information, see Chapter 8, Water Contracts and Deliveries.

Power Resources

Energy used at the 29 SWP pumping and generating plants—excluding Castaic Powerplant, which is owned and operated by Los Angeles Department of Water and Power (LADWP)—totaled 12.49 million megawatt hours (MWh). To meet SWP energy needs, DWR purchased 1.59 million MWh of energy at a cost of \$39.75 million. This included 0.39 million MWh from four renewable energy electric utilities at a cost of \$16.71 million and 1.20 million MWh of long-term energy at a cost of \$23.04 million. Additional associated energy costs totaled \$247.57 million, including transmission

costs. The total cost of energy-related costs for 2019 was \$287.32 million.

Greenhouse Gas Management

In 2019, DWR reported its calendar year 2018 pump load, generation, energy imports, 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 continued to implement plans to further reduce its sulfur hexafluoride emissions. DWR continued to work with the California Air Resources Board to ensure that the new greenhouse gas regulations will not have significant impacts on SWP operation. DWR also reported its 2018 greenhouse gas emissions to The Climate Registry. DWR procured compliance instruments to meet its contractual obligation for the Lodi Energy Center's Cap-and-Trade Program compliance cost.

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 9, 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 August 1, 2016, DWR filed two preliminary application documents

and notices of intent with FERC for the relicensing of South SWP Hydropower and requested 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 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.

For more information about hydropower relicensing activities, see Chapter 9, Power Resources.

State Water Project Power Generation and Consumption in 2019

Power Generation and Consumption	Megawatt Hours
Energy generation by SWP facilities	4,471,447
Energy sources and firm purchases under agreements and exchanges	3,642,370
Total Energy Available to the SWP	8,113,817
Energy sales	(398,420)
Net SWP Power Consumption¹	7,715,395

¹Totals may not sum as expected due to rounding.

Long-term Purchase Agreements

DWR contracts for the energy output of five hydroelectric plants totaling 30 megawatts owned and operated by The Metropolitan Water District of Southern California. The contract was effective on November 1, 2017, and terminated September 30, 2019. On September 9, 2019, DWR and Metropolitan executed a new agreement under which DWR receives the output of four small hydroelectric plants totaling 29 megawatts starting on October 1, 2019. DWR also receives renewable energy credits from these four hydroelectric plants. The agreement's termination date is September 30, 2022.

Financial Analysis

In 2019, 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 SWP Contractors. In 2019,

the SWP handled approximately \$1.2 billion in revenues and \$1.2 billion in expenses. The 2019 Income Statement for the State Water Project sidebar presents a summary of the year's revenues and expenses. For detailed information, see Chapter 13, Financial Analysis.

Engineering, Construction, and Real Estate

In 2019, 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 Dam service and emergency spillways; and habitat restoration projects.

DWR worked on 27 construction contracts in various SWP construction divisions in 2019. Contract projects included pipeline repair, control system upgrades, fire systems

modernization, equipment refurbishments and upgrades, seismic upgrades of bridges, and maintenance facility improvements at dam and reservoir sites.

In 2019, DWR processed a net total of \$13.02 million in payments 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 11, Engineering, Construction, and Real Estate.

Delta Resources and Environmental Issues

Invasive Species

In 2019, 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. Mussel inspections also occurred when facilities were dewatered for maintenance and inspection purposes. Mussel inspections were also conducted in the series of tunnels that convey water from Edmonston Pumping Plant through the Tehachapi Mountains. This includes Tunnel 1, Tunnel 2, Tunnel 3, and the Carly V. Porter Tunnel. In the SWP East Branch, Myrick Siphon and a section of the Santa Ana Pipeline at the Devil Canyon Powerplant afterbays were inspected. No mussels were observed during the inspections.

California WaterFix

In his State of the State address delivered February 12, 2019, the Governor announced that he did "not support (California) WaterFix

as currently configured" but does "support a single tunnel." On April 29, 2019, the Governor issued Executive Order N-10-19, directing several agencies to, among other things, "inventory and assess ... current planning to modernize conveyance through the Bay Delta with a new single tunnel project." The Governor's announcement and executive order led to DWR's withdrawal of all approvals and environmental compliance documentation associated with California WaterFix.

In 2019, DWR took formal steps to withdraw proposed permits for the California WaterFix project and begin a renewed environmental review and planning process for a smaller, single tunnel project that will protect a critical source of water supplies for California.

Delta Conveyance Design and Construction Authority

The Delta Conveyance Design and Construction Authority is a joint powers authority created by the public water agencies that have committed to design and construction of a modernized Delta conveyance project. The joint exercise of powers agreement with the Delta Conveyance Design and Construction Authority was amended in June 2019 to include initial design and engineering work to support DWR's environmental review process.

In 2019, the Delta Conveyance Design and Construction Authority formed a Stakeholder Engagement Committee. This committee, appointed by the Delta Conveyance Design and Construction Authority Board of Directors, consisted of up to 16 public members representing various Delta stakeholder groups (e.g., agricultural, recreation, business, environment, etc.), with the addition of up to five ex officio members from various State and local agencies. The committee was a formal advisory body to the

2019 Income Statement for the State Water Project

Revenues	Thousands of Dollars
Water Contract Payments	1,274,497
Revenue Bond Cover Adjustments	(62,159)
Rate Management Adjustments	(40,479)
Other Revenues	35,237
Total Operating Revenues	1,207,173
Expenses	
Project Operations, Maintenance, Power, and Replacement	824,382
Deposits to Reserves	(485)
Water Bond Principal	164,519
Water Bond Interest	124,511
Total Operating Expenses and Debt Service	1,202,673
Net System Revenues	4,500

Delta Conveyance Design and Construction Authority Board of Directors, which provided a forum for input on the preliminary design of the proposed Delta Conveyance Project and optional concepts related to reducing possible construction-related localized Delta impacts and improving the effectiveness of mitigation.

San Joaquin River Restoration Program

The 2019 water year was classified as wet, and 556,500 acre-feet of water was released from Friant Dam to support fish and their habitat in the San Joaquin River. This marked the third straight year restoration flows were continuously released, connecting Friant Dam flows to the Delta. However,

flow constraints due to seepage restrictions continue to limit flows on the San Joaquin River, and about 365,800 acre-feet of unreleased restoration flows were sold back to federal water contractors for mostly irrigation uses.

For the first time in over 65 years, threatened Central Valley spring-run Chinook salmon adults have completed their life cycle and returned to the San Joaquin River. This is the first recorded time San Joaquin River Restoration Program fish have migrated out of the system as juveniles and returned as adults years later. A total of 23 returning adult spring-run Chinook salmon were captured during 2019 monitoring and rescue efforts. Twenty of the captured fish

were tagged and released into the river reach below Friant Dam. Another 114 adult spring-run brood stock were also released into the river to assess spawning activity.

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

Recreation

Annual recreation attendance at SWP facilities surpassed five million in 2019, a number not reached since 2003. Since 1962, approximately 261,866,800 recreation days have been spent at the SWP recreation facilities.

Lake Perris State Recreation Area supported 923,700 recreation days in 2019. The last year Lake Perris experienced attendance this high was in 2005, with 1,020,700 recreation days. Attendance increased 7.7 percent from 2018's 857,500 recreation days. This may be a result of the lake level returning to normal after DWR completed the Perris Dam Seismic Remediation Project in April 2018, which consisted of earthquake retrofitting repairs, and gradually refilled the reservoir.

DWR is investing more than \$30 million in several early implementations of Lake Oroville's Settlement Agreement Recreation Management Plan projects, which will enhance visitor access and experiences at the Lake Oroville State Recreation Area.

SWP Milestones through the Decades

50 Years Ago—1969

At the end of 1969, 90 percent of the "1973 Project facilities" (those facilities required to fulfill initial water delivery commitments) were either completed or under contract. The Carley V. Porter Tunnel—the longest and southernmost tunnel of the Tehachapi Crossing—was "holed through" on October 23, 1969.

Edward Hyatt and Thermalito Powerplants were declared fully operational on July 20, 1969, thus triggering guaranteed minimum payments by three major California utilities of \$16.15 million annually.

40 Years Ago—1979

Culminating more than four years of effort, the California Legislature passed a major water management program for the SWP—Senate Bill 200, introduced by Senator Ruben Ayala, Chairperson of the Senate Agriculture and Water Resources Committee—incorporating the basic recommendations of Bulletin 76, *Delta Water Facilities*. The legislation provides strong Delta and San Francisco Bay guarantees, along with a comprehensive plan for meeting the water needs of the SWP through the year 2000.

30 Years Ago—1989

On October 17, 1989, a strong earthquake struck Northern California along the San Andreas fault between Santa Cruz and San Jose. According to the U.S. Geological Survey, the Loma Prieta earthquake, as the tremor was called, registered magnitude 7.1 on the Richter scale. Damage to the affected area was extensive. A gubernatorial state of emergency was proclaimed for the counties of Alameda, Contra Costa, San Benito, Santa Clara, Monterey, San Mateo, Marin, San Francisco, and Santa Cruz, and for the City of Isleton (in Sacramento County) as well. Despite the destruction of structures from Watsonville to San Francisco, SWP facilities were unharmed by the Loma Prieta earthquake.

20 Years Ago—1999

Water year 1998–1999 was the fifth wet year in a row for Northern California, but less so than the previous very wet year. Surface temperature patterns in the Pacific switched from El Niño to La Niña, and California precipitation followed a typical La Niña pattern of dry in Southern California and above average in the northern part of the

State. The north to south gradient in annual precipitation, snowpack, and runoff in the southern Sierra Nevada was one of the steepest in California history.

Construction of Phase I of the East Branch Extension for San Bernardino and Riverside counties started on February 26, 1999, with the issuance of a Notice to Begin Work. The official groundbreaking ceremony took place on August 23, 1999.

Deliveries to Southern California continued despite repairs to both the East and West Branches of the California Aqueduct during 1999. About \$4.2 million worth of work to repair damage to canal lining and pipeline sections on the West Branch near Gorman and on the East Branch near Lancaster was completed in May 1999.

10 Years Ago—2009

The Division of Safety of Dams turned 80 on August 14, 2009. Since 1929, many dam projects have been built in California under the authority of DSOD. They evaluate proposed modifications to existing dams, as well as the design and construction of new jurisdictional dams, and they continue to take a leadership role in dam safety.

On June 12, 2008, the Governor proclaimed a state of emergency for nine Central Valley counties due to the drought. In 2009, with California in its third consecutive year of drought, the Governor proclaimed a state of emergency on February 27, 2009, for the entire State as the severe drought conditions continued, and the impacts were felt well beyond the Central Valley.

In 2009, DWR published *Using Future Climate Projections to Support Water Resources Decision Making in California*. This report documents work over the last several years on climate change impacts on SWP operations.



Chapter 1

The State Water Project

Phantom Falls, also known as Coal Canyon Falls, drops 164 feet into Coal Canyon at North Table Mountain Ecological Reserve in Butte 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 14 provide more detail on significant events and specific topics related to the management of the SWP in calendar year 2019. At the end of the Bulletin, Appendix B presents data and computations used to determine the SWP Contractors' Statements of Charges for 2021.

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 two 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 six 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 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 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 U.S. 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 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 U.S. 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,



Figure 1-1 Names and Locations of Primary SWP Storage and Water Delivery Facilities, December 31, 2019

and Chrisman—before reaching the foot of the Tehachapi Mountains.

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

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

For more information on financing, see Chapter 13, 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 U.S. 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 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; Castaic Lake Water Agency's SWP Water Supply Contract was transferred to Santa Clarita Valley Water Agency effective November 2, 2018. Therefore, only 29 SWP

Contractors have contracts with DWR as of December 31, 2019.

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

Table 1-2 Physical Characteristics of Primary Dams

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

and the Monterey Amendment, the current combined maximum annual Table A amount by 2021 totals 4,172,786 af (see Appendix B, Table B-4 for details).

Figure 1-2 (located at the end of the chapter) shows the name and location of each SWP 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 Contractor.

For more information about existing SWP Water Supply Contracts and annual water deliveries, see Chapter 8, 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 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

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.

of origin would influence the final schedule for SWP facilities.

Demands for SWP water are expected to increase 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 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

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
<i>Subtotal</i>	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
<i>Subtotal</i>	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
<i>Subtotal</i>	9.7	23.4	137.1	9.8	180.0
Total	24.1	417.4	240.2	23.3	705.0

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 11, Engineering, Construction, and Real Estate. Information about prior construction activities can be found in previous issues of Bulletin 132.

Climate Change

Climate change has 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 U.S. 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.

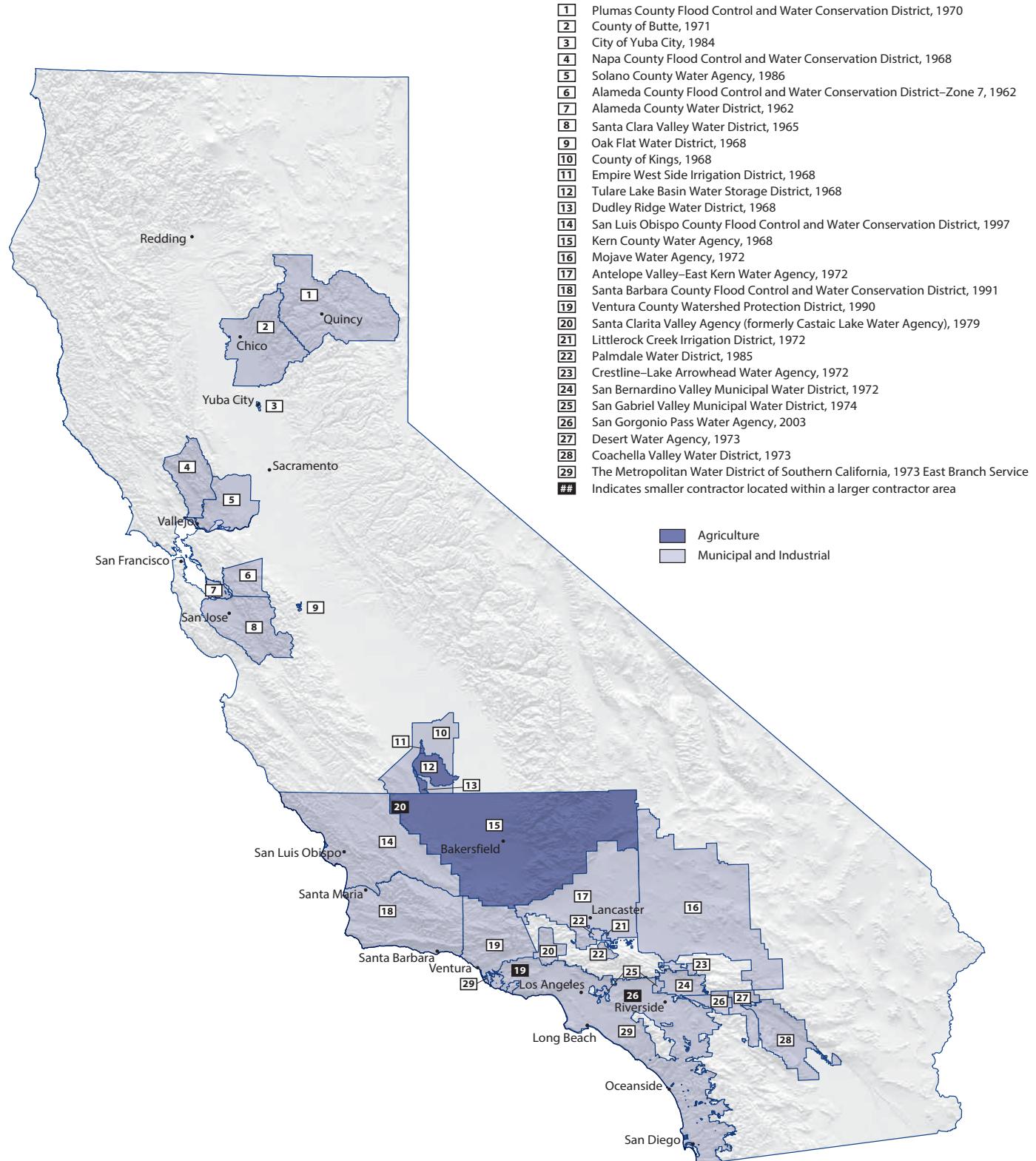


Figure 1-2 Names, Locations, and First Year of Service of SWP Contractors, December 31, 2019

Table 1-6 SWP Contractors, by Area, as of December 31, 2019

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	52,968	9,600	10,081,039	10,133	4,713,051,974	71,070
County of Butte	125,180	27,500	15,375,128	1,049,280	23,551,726,257	231,256
Plumas County Flood Control and WCD	13,495	2,700	3,114,751	1,676,056 ^a	2,401,991,425	19,517
Subtotal	191,643	39,800	28,570,918	2,735,469	30,666,769,656	321,843
North Bay Area						
Napa County Flood Control and WCD	376,825	29,025	167,156,405	510,010	41,712,637,219	139,099
Solano County Water Agency	957,613	47,756	222,689,453	581,760	52,336,931,797	445,458
Subtotal	1,334,438	76,781	389,845,858	1,091,770	94,049,569,016	584,557
South Bay Area						
Alameda County Flood Control and WCD-Zone 7	1,798,639	80,619	483,633,993	275,900	61,116,475,735	261,261
Alameda County Water District	1,414,376	42,000	179,555,969	66,943	75,529,575,914	356,160
Santa Clara Valley Water District	4,565,289	100,000	545,778,287	835,098	516,068,803,614	1,954,286
Subtotal	7,778,304	222,619	1,208,968,249	1,177,941	652,714,855,263	2,571,707
San Joaquin Valley Area						
County of Kings	174,693	9,305	15,204,374	893,300	9,125,193,927	149,942
Dudley Ridge Water District	2,523,846	45,350	124,645,702	37,600	119,761,915	36
Empire West Side Irrigation District	128,570	3,000	6,352,927	7,500	b	12
Kern County Water Agency	39,974,016	982,730	2,816,342,725	5,224,000	9,382,528,227	893,119
Oak Flat Water District	221,202	5,700	10,583,017	4,500	b	10
Santa Clarita Valley Water Agency ⁴	409,606			8,700 ^c	4,532,936	0
Tulare Lake Basin Water Storage District	5,096,417	87,471	238,435,303	189,519	194,000,000	23
Subtotal	48,528,350	1,133,556	3,211,564,048	6,365,119	18,826,017,005	1,043,142
Central Coastal Area						
San Luis Obispo County Flood Control and WCD	91,441	25,000	129,541,964	2,122,240	45,457,307,011	279,083
Santa Barbara County Flood Control and WCD	474,971	45,486	883,670,352	193,391	36,056,569,190	390,066
Subtotal	566,412	70,486	1,013,212,316	2,315,631	81,513,876,201	669,149
Southern California Area						
Antelope Valley-East Kern Water Agency	2,334,938	144,844	729,968,742	1,525,120	29,299,405,611	470,543
Coachella Valley Water District	1,716,446	138,350	791,961,838	639,857	61,209,789,634	290,000
Crestline-Lake Arrowhead Water Agency	67,708	5,800	36,986,209	54,900	2,755,274,108	29,000
Desert Water Agency	1,383,445	55,750	406,527,7942	208,000	16,075,753,025	89,317
Littlerock Creek Irrigation District	21,066	2,300	9,065,385	10,355	414,200,000	2,900
The Metropolitan WD of Southern California	39,979,392	1,911,500	14,170,468,570	3,316,072 ^d	2,901,129,926,343	18,963,000
Mojave Water Agency	500,898	85,800	420,860,473	3,136,000	35,761,893,294	480,941
Palmdale Water District	305,721	21,300	115,854,789	119,680	1,414,494,581	114,533
San Bernardino Valley Municipal Water District	1,158,875	102,600	944,090,689	225,577	48,717,699,229	661,546
San Gabriel Valley Municipal Water District	488,560	28,800	223,095,137	18,297	16,850,589,307	197,636
San Gorgonio Pass Water Agency	96,621	17,300	269,362,511	140,800	9,382,528,227	91,260
Santa Clarita Valley Water Agency ⁴	1,261,545	95,200	484,609,401	125,057 ^c	43,409,583,907	282,460
Ventura County Watershed Protection District	94,156	20,000	93,061,053	308,252	50,463,927,012	472,776
Subtotal	49,409,371	2,629,544	18,695,912,591	9,827,967	3,216,885,064,278	22,145,912
Total	107,808,518	4,172,786	24,551,005,158	23,513,897^e	4,094,656,151,419	27,336,310

¹ All water delivered to SWP 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.⁴ Castaic Lake Water Agency's SWP Water Supply Contact was transferred to Santa Clarita Valley Water Agency effective November 2, 2018.^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 Santa Clarita Valley 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

Clifton Court Forebay is located in between the city of Byron and Discovery Bay.

Significant Events in 2019

Jn 2019, Little Baja and Manzo Ranch, two new fish release sites completed in 2018, could not be put into service because of delays in acquiring an encroachment permit from the levee reclamation district.

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

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 Delta Conveyance Project (see Chapter 3, Environmental Programs) 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).

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. In November 2019, the DSC released a preliminary draft of an amendment to Chapter Four (*Protect, Restore, and Enhance the Delta Ecosystem*), referred to as the Ecosystem Amendment, for public review and comment. For more information, see the sidebar, Delta Stewardship Council. Additional information about the *Delta Plan* is also 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 (USFWS) BiOp for delta smelt (*Hypomesus transpacificus*) in December 2008; a Department of Fish and Wildlife (DFW) incidental take permit for longfin smelt (*Spirinchus thaleichthys*) in February 2009; and a National Marine Fisheries Service (NOAA Fisheries) BiOp for steelhead (*Oncorhynchus mykiss*), Chinook salmon (*Oncorhynchus tshawytscha*), and green sturgeon (*Acipenser medirostris*) in June 2009. Some of the requirements in these documents were implemented immediately, while others needed development of studies and projects before being implemented.

In 2019, efforts continued under the SWP Delta Compliance Program to develop and implement studies and construct projects to address regulatory requirements under the USFWS and NOAA Fisheries BiOps and the DFW 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

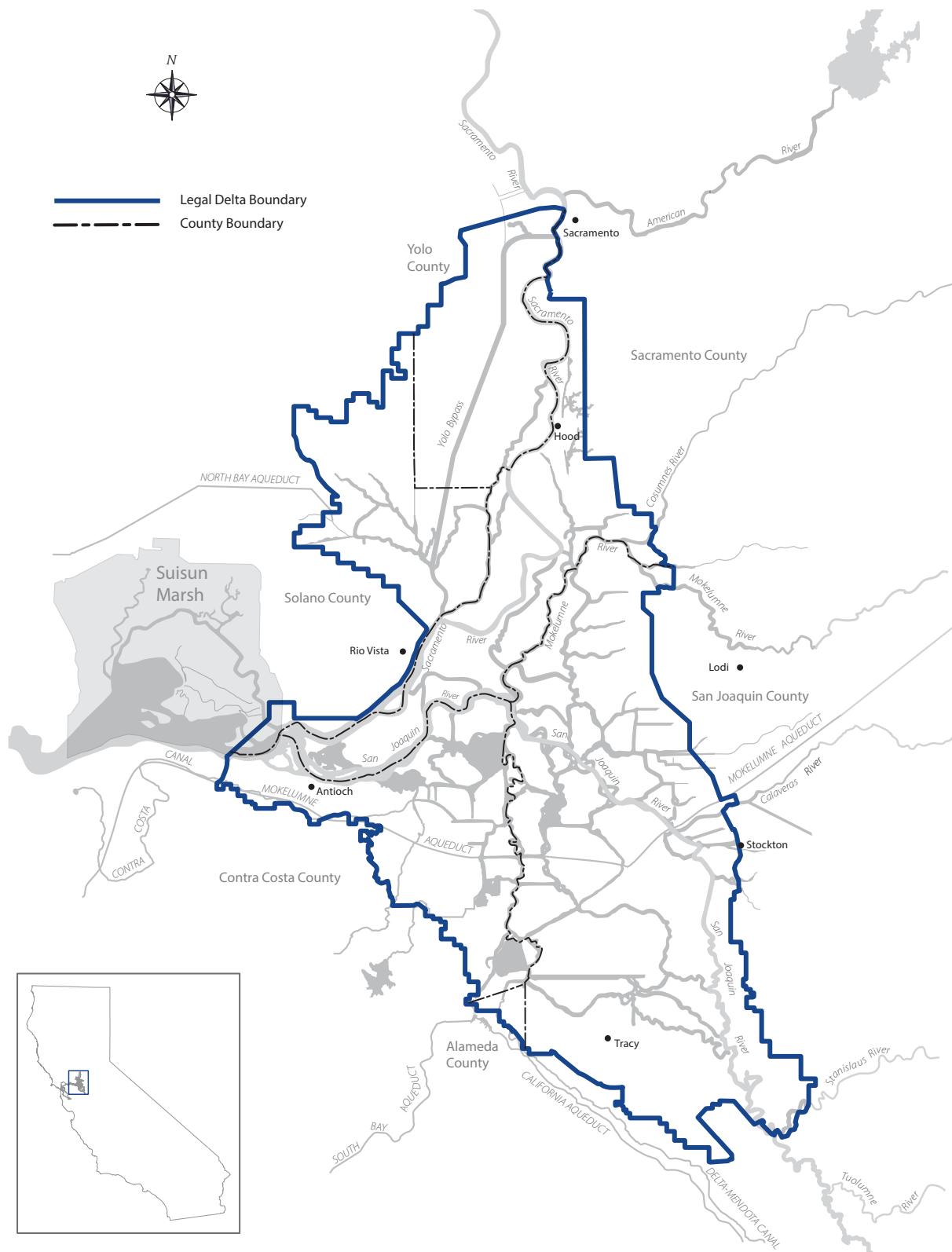


Figure 2-1 The Sacramento-San Joaquin Delta

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.

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. The requirements include the following:

- reduce prescreen loss of federal Endangered Species Act-protected Chinook salmon and steelhead in the Clifton Court Forebay to no more than 40 percent (prescreen loss is the loss of fish as they move across the forebay that presumably results from predation by fish and birds)
- reduce predation by 50 percent at the fish release sites
- implement fish release site studies to develop methods to reduce predation following release of salvaged fish
- identify salvage deficiencies and recommend 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 Fish Science Building includes a small laboratory, fish rearing tanks, an office, and an area to store study gear and equipment. In 2019, the 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, Little Baja and Manzo Ranch, approximately a half-mile apart, were completed in 2018 on Sherman Island. This will allow more time 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 Little Baja and Manzo Ranch was completed in 2014, all permits were obtained, and construction was initiated in fall 2015 and completed in 2018. The construction of the new fish release sites included a fish release system, as well as levee improvements and county road realignment by the local reclamation district.

During 2019, both fish release facilities could not be put into service due to delays in acquiring an encroachment permit from the levee reclamation district. In compliance with NOAA Fisheries BiOp Reasonable and Prudent Alternative Action IV.4.3(3), monitoring was implemented to evaluate the effectiveness in the reduction of predation through modified rotational use of release sites. The results of a 2017 pilot study were reported in Tracy Fish Facility Improvement Program *Tracy Technical Bulletin 2019-2*, titled "Exploring Methods to Measure Fish Predation at Sacramento-San Joaquin Delta Release Sites." In 2019, field implementation of a full-scale study using baited tethers was completed in collaboration with U.S. Bureau of Reclamation.

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 Chinook salmon and steelhead. This strategy involved constructing a fishing pier to provide improved access to anglers.

Because of changes made to Bay Delta Conservation Plan Conservation Measure 1 in 2014, the proposed fishing pier project was indefinitely suspended. The related companion predator study initiated in 2013 continued in 2019. The study was to establish a baseline for the demographics and behavior of predatory fish in Clifton Court Forebay, to provide information to help refine proposed predator management efforts in the forebay, and to identify other potential management actions for limiting predation on listed fish species. The study included predatory fish sampling, biotelemetry, gut content genetics, creel surveys, avian studies, and bioenergetics modeling. Data collection efforts as part of the study ended in December 2018. Data analysis and drafting of the final technical memo were conducted throughout 2019.

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 Clifton Court 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 Clifton Court Forebay. In 2018, DWR completed electrofishing in Clifton Court Forebay. In 2019, DWR conducted the first year of the two-year predatory fish relocation study. The study is to determine the effectiveness of several commercial-type fishing methods and gears, as well as needed improvements to

maximize predatory fish capture. DWR also continued work on two interim measures:

- (1) controlling aquatic weeds
- (2) implementing operational changes to limit take 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 Salvage Efficiency and Loss Monitoring

The Skinner Evaluation and Improvement Study monitors salvage efficiency and fish losses associated with operating the Clifton Court Forebay and the Skinner Fish Facility. The study evaluates the following factors:

- fish losses through Clifton Court Forebay
- fish losses through the primary louvers, secondary louvers, and holding tanks at the Skinner Fish Facility, as well as hydraulics within the Skinner Fish Facility
- fish behavior and movement patterns as the fish are entrained and guided through the forebay and facility

During 2019, the study team conducted mark-recapture investigations using tagged Chinook salmon and steelhead to evaluate losses in Clifton Court Forebay and salvage efficiency at the Skinner Fish Facility. These data were also used, in part, to evaluate the performance of predator relocation efforts in Clifton Court Forebay. In 2019, data analysis and a draft report were completed for the 2018 project year.

Furthermore, DWR worked with the University of California, Davis, to develop fish culture methods for longfin smelt with the aim of establishing a source of fish for use in experiments to determine salvage effectiveness at the Skinner Fish Facility for this species as required in the 2009 incidental take permit from DFW. DWR also worked with the University of California, Davis, to conduct a green sturgeon

laboratory study to develop surrogate estimates for salvage efficiency using a physical model of a louver guidance system at various flow rates, bypass ratios, and water temperatures, and to examine the risk of predation on juvenile green sturgeon by common predatory species in the Delta.

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 U.S. Bureau of 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.

In October 2019, the USFWS and NOAA Fisheries released a new BiOp where the installation of a barrier at Georgiana Slough is not required but recommended to be installed.

Salmon Protection Technology Study

Ongoing work under this program for planning and design for a multiyear barrier implementation program in the Sacramento River continued in 2019. The intended purpose of the project is to boost salmonid populations, maintain ongoing compliance with the 2009 BiOp 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.

Project design elements included the installation and operation of a bioacoustic fish fence in the Sacramento River at the divergence of Georgiana Slough for five years and the installation and operation

of a floating fish guidance structure at Steamboat Slough for two years. Similar to previous studies, the bioacoustic fish fence would operate as a behavioral deterrent to prevent emigrating Sacramento River juvenile salmonids from entering Georgiana Slough during the period when wild juvenile salmonids are present. Alternatively, the floating fish guidance structure would be experimentally operated to guide fish from the Sacramento River into Steamboat Slough during the same period, where survival may be increased.

This project will provide the basis for DWR to recommend future actions, beyond the Salmon Protection Technology Study, that are intended to continue improving 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 the U.S. Bureau of Reclamation identified the following SDIP project objectives and purposes:

- reduce 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)

- maintain 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)
- increase water deliveries and delivery reliability to SWP and CVP water contractors south of the Delta (SDIP Stage 2)
- provide 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:

- construct and operate 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
- construct and operate 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
- dredge various channels in the South Delta, including Middle and Old rivers, to improve conveyance; and dredge areas surrounding agricultural diversions to improve their function
- extend 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.

The U.S. Bureau of 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 USFWS BiOp, issued in December 2008, concluded that coordinated operations of the CVP and SWP would jeopardize delta smelt. The USFWS provided a reasonable and prudent alternative under which SDIP could move forward.

The NOAA Fisheries BiOp, issued in June 2009, concluded that CVP and SWP operations would jeopardize a number of anadromous species, in particular Chinook salmon. NOAA Fisheries provided no reasonable and prudent alternative for SDIP. DWR initiated discussion with NOAA Fisheries in late 2009 to establish what actions could lead to a reasonable and prudent alternative under which SDIP could move forward.

Program Status

This program was originally scheduled for implementation as one of the components of Stage 1 of the CALFED Bay-Delta Program to address local and SWP water supply problems in the South Delta. Construction of the permanent operable gates and the channel dredging were proposed to be implemented under Stage 1 of the SDIP. Stage 2 of the SDIP, which would have included increasing diversions, is currently being re-evaluated because of regulatory changes since 2008. Because of DWR requirements included in the NOAA Fisheries Biological Opinion and Conference Opinions on the Long-Term Operations of the Central Valley Project and State Water Project issued June 4, 2009, all SDIP related work was delayed until completion of the Temporary Barriers salmonid effects study. This study report, *Effects of South Delta Agricultural Barriers on Emigrating Juvenile Salmonids*, was released November 2018. The report

recommends permanent operable barriers as a preferred alternative over the temporary rock barriers. Permanent operable barriers would provide improved fish passage and reduce yearly ongoing construction impacts. In 2019, DWR conducted a reconnaissance level assessment of previous SDIP work and additional project concepts. From this completed analysis, DWR will make recommendations for potential continuation of SDIP or identify if the project could be reformulated and still address some of the original project goals, while minimizing issues identified in the NOAA Fisheries Biological Opinion and Conference Opinions on the Long-Term Operations of the Central Valley Project and State Water Project.

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 eight 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. These are referred to as the agricultural barriers. 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. This barrier is referred to as the fish barrier. 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 2019, all three agricultural barriers were installed. The installation of the barrier in Middle River was completed on July 3, in Grant Line Canal on July 31, and in Old River near Tracy on August 2.

On July 31, the Middle River barrier weir crest was raised by one foot to provide additional water level protection upstream of the barrier. By September 15, a notch was excavated in the weirs of both the Middle River and the Old River near Tracy barriers and the flashboard structure at the Grant Line Canal barrier was adjusted to allow for passage of salmon migrating up the river.

The Head of Old River barrier was not installed in the spring due to high flows on the San Joaquin River nor in the fall due to predicted flows of the tributary rivers and projected cooler weather conditions.

Barrier removal started with the breaching of the Old River near Tracy barrier on October 28, followed by the Grant Line Canal barrier on November 11, and Middle River barrier on November 21. All barriers were completely removed from the channels by November 27.

DWR started the development of an adaptive management plan for the South Delta Temporary Barriers Project to comply with the requirement set by the NOAA Fisheries in the 2018 BiOp for the South Delta Temporary Barriers Project to avoid or minimize construction-related impacts associated

with the implementation of the South Delta Temporary Barriers Project upon juvenile Sacramento River winter-run Chinook salmon, Central Valley spring-run Chinook salmon, California Central Valley steelhead, and Southern distinct population segment of North American green sturgeon.

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,

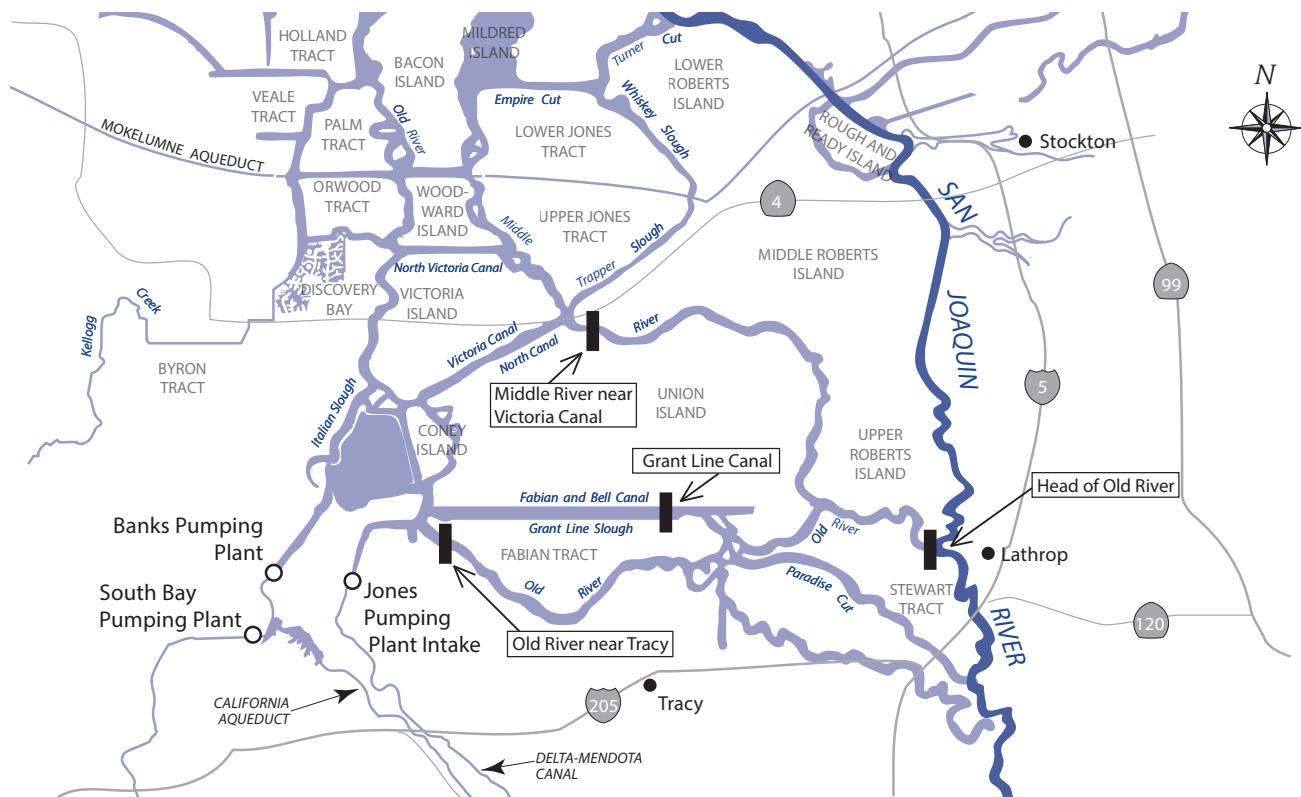


Figure 2-2 Temporary Barrier Locations in the South Delta

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, including flood emergency response grant funding; and emergency materials transfer facilities in Stockton and Rio Vista.

The Delta Flood Emergency Response Grant Program improves local flood emergency response in California and

contributes to increased public safety and improved regional self-reliance. Two rounds of funding have been solicited with \$5 million awarded in 2014 and \$10 million awarded in 2017. In 2019, the Delta Flood Emergency Preparedness, Response, and Recovery Program managed 12 Delta Flood Emergency Response grant agreements. Grantees include the five Delta counties and seven local maintaining agencies (a local maintaining agency is responsible for operation and/or maintenance of flood risk facilities and activities over a specific jurisdiction and can include reclamation districts, levee districts, cities, counties, and joint powers authorities).

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 \$230 million of State funding to more than 70 islands in the Delta. In fiscal year 2019–2020, the program expects to reimburse up to \$10 million to local agencies for eligible levee maintenance and rehabilitation work. 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, it may provide up to 100 percent of the cost in some cases.

Levee restoration projects, habitat projects, and other special projects are expected to be conducted on various Delta islands and tracts in fiscal year 2019–2020. The program plans to release a multi-benefit projects solicitation package once Proposition 1 funds are available.

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 (Alternative 1-A for the Group I actions and the No Action Alternative for the Group II actions [for details, see Bulletin 132-11]). The project will create tidal, subtidal aquatic, and floodplain riparian terrestrial habitats benefiting a number of special status species such as Sacramento splittail (*Pogonichthys macrolepidotus*) and Chinook salmon. The project, as proposed, will provide a nearly contiguous 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 California EcoRestore.

Two project elements are proposed for implementation: MWT and Grizzly Slough. The MWT element, being constructed and permitted in two phases, 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.) The Grizzly Slough element consists of breaching the Grizzly Slough levee upstream of MWT to help attenuate peak flood flows and maximize nearly 500 acres of floodplain habitat on the DWR-owned property.

Project Status

As a response to The Nature Conservancy request, DWR accepted land ownership of the MWT. The implementation of the MWT Phase A Project: tower levee and re-sloped levees continued in 2019. Landside internal levees were re-sloped to prepare the island for flooding. The widened and re-sloped wildlife friendly levees are designed with benches for riparian planting to enhance wildlife values and provide protection from wind-wave action when the island is flooded. Hydraulic modeling iterations also progressed to inform decisions on breach width sizes to support the project design for the MWT Phase B Project: breaches, weirs and restoration.

Grizzly Slough planning, permitting, and design work continued in 2019 to account for changes imposed by a Pacific Gas & Electric Company gas line easement. Additional surveying and borrow site (a location where earth is excavated for use as fill at another location) investigations were pursued to support relocating the setback levee. Additional permit discussions were conducted with the USFWS, and a Central Valley Flood Protection Plan encroachment permit application was prepared. The modified 65 percent design accommodated the previously planned project features and enhanced the ability to manage the wildlife-friendly agricultural area.

Dutch Slough Tidal Marsh Restoration Project

The Dutch Slough Tidal Marsh Restoration Project will restore a 1,187-acre site in the western Delta city of Oakley. The project site consists of three leveed parcels that will be restored to tidal marsh, riparian woodland, open water, managed marsh, and upland habitats. See Bulletin 132-18 for additional background information.

Project Status

Dutch Slough currently sits along a high-grade slope, with site elevations ranging from six feet above sea level to six feet below sea level. In 2018, DWR began smoothing the grade of that slope by excavating soil from higher elevations and moving it to lower elevations. Once the grading and channel excavation are complete, DWR will plant native plants, including about 50,000 tule plugs. Following two years of plant growth, in about 2021, DWR will breach the levees, allowing water from the Delta channels to flow in and out with the daily tides.

In 2018, groundbreaking on two of the three parcels (Emerson and Gilbert) took place. Activities included major site grading to bring the site to proper elevations for tidal influence as described above. Grading work continued for all of 2019 and initiation of revegetation activities on approximately 700 acres of the Emerson and Gilbert parcels started just before the close of the year. Tidal marsh restoration on the Burroughs parcel is still in the planning phase and is estimated to start construction in 2020 now 2024.

West Delta Program/Delta Islands

DWR owns approximately 13,000 acres on Sherman and Twitchell islands, located in the western Delta. One of DWR's program objectives is mitigation of subsidence

through various wetland restoration projects. DWR's 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 2,300 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 2019, work continued in partnership with the Sherman Island Reclamation District (Reclamation District 341) under a \$10.5 million grant from DFW's 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. In 2019, it provided funding for 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. Specifically, 100 percent design and specifications were completed and will likely go out to bid in early spring 2020. All permits were completed, including California Environmental Quality Act certification, 401 certification, 404 permit, 1600 permit, and Delta Stewardship Council Consistency Determination. Stormwater General Permit documents have been completed and are expected to be approved and obtained prior to commencing construction.

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

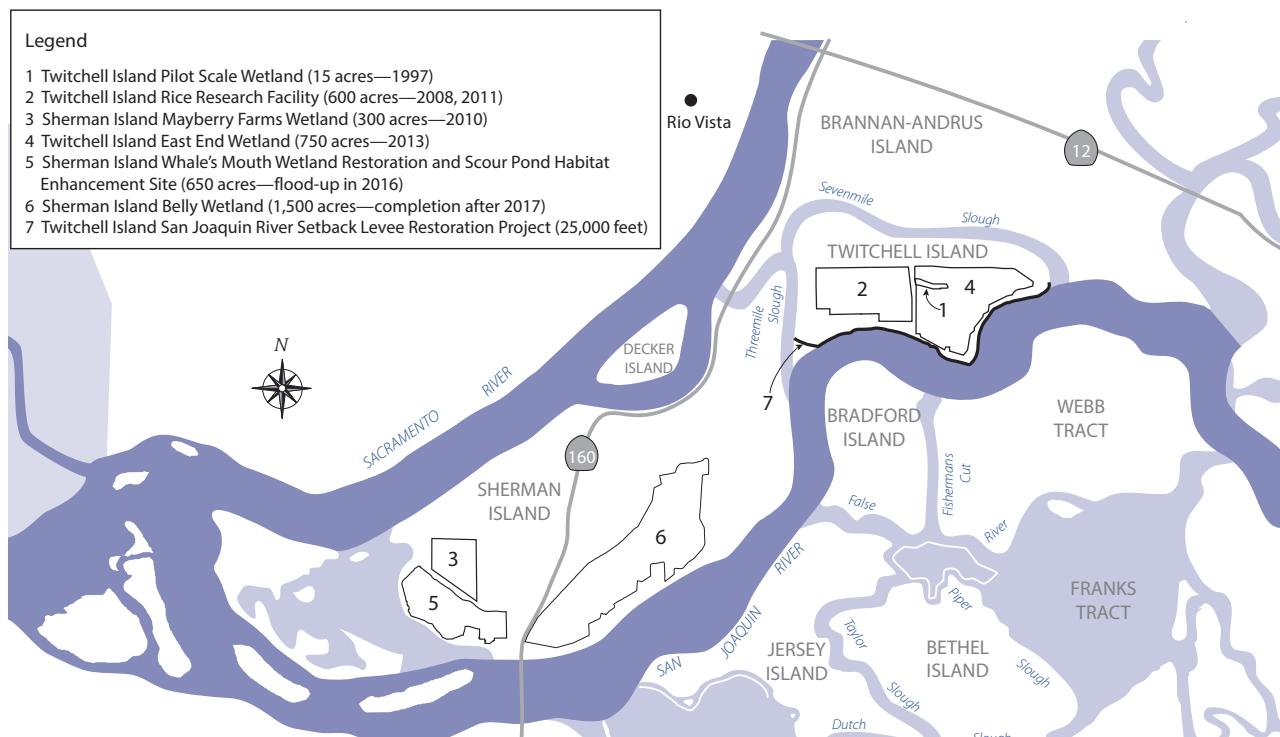


Figure 2-3 Selected West Delta Program Projects

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 2018, data collected in the West Delta contributed to the adoption of a greenhouse gas protocol by the American Carbon Registry allowing for wetland projects to sell carbon credits for their net increase in carbon sequestration on peat soils. In 2019, both Sherman and Twitchell islands were registered under the greenhouse gas protocol and all greenhouse gas credits were verified per the American Carbon Registry protocol. This carbon protocol is under consideration for adoption by the California Air Resources Board.

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.



Chapter 3

Environmental Programs

Old Christmas trees are anchored on the shore of Lake Oroville near Bidwell Canyon Marina in Butte County.

Significant Events in 2019

The Department of Water Resources (DWR) withdrew all California WaterFix approvals made in compliance with the California Environmental Quality Act (CEQA), federal Endangered Species Act (ESA), and California Endangered Species Act (CESA), as well as the water rights petition in front of the State Water Resources Control Board (State Water Board).

DWR began environmental permitting, engineering, and stakeholder engagement to pursue a single tunnel solution to modernize Sacramento-San Joaquin Delta (Delta) conveyance. The Delta Conveyance Design and Construction Authority (DCA) joint exercise of powers agreement was amended to include engineering and design activities to support environmental planning for Delta conveyance.

On October 21, 2019, the U.S. Fish and Wildlife Service (USFWS) *Biological Opinion for the Reinitiation of Consultation on the Coordinated Operations of the Central Valley Project and State Water Project* and the National Marine Fisheries Service (NOAA Fisheries) *Biological Opinion on Long-Term Operation of the Central Valley Project and the State Water Project* were issued. They included incidental take statements for delta smelt, winter-run Chinook salmon, spring-run Chinook salmon, green sturgeon, and steelhead.

For the first time in over 65 years, threatened Central Valley spring-run Chinook salmon adults completed their life cycle and returned to the San Joaquin River. This is the first recorded time San Joaquin River Restoration Program fish have migrated out of the system as juveniles and returned as adults years later.

DWR completed construction work on the Winter Island and Tule Red projects. The projects enhanced an estimated 992 acres of tidal wetlands in Solano and Contra Costa counties creditable toward DWR's mitigation requirements for delta smelt.

Information in this chapter was contributed by the Division of Integrated Science and Engineering (formerly the Division of Environmental Services), the Division of Operations and Maintenance, the Division of Regional Assistance (formerly 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 naturally reproducing, self-sustaining Chinook salmon (*Oncorhynchus tshawytscha*) fishery in the river, while reducing or avoiding adverse water supply impacts from restoration flows.

The 2019 water year was classified as wet, and 556,500 acre-feet of water was released from Friant Dam to support fish and their

habitat in the San Joaquin River. This marked the third straight year restoration flows were continuously released, connecting Friant Dam flows to the Sacramento-San Joaquin Delta (Delta). However, flow constraints because of seepage restrictions continued to limit flows on the San Joaquin River, and about 365,800 acre-feet of unreleased restoration flows were sold back to federal water contractors for mostly irrigation uses.

For the first time in over 65 years, threatened Central Valley spring-run Chinook salmon adults completed their life cycle and returned to the San Joaquin River. This is the first recorded time San Joaquin River Restoration Program fish have migrated out of the system as juveniles and returned as adults years later. A total of 23 returning adult spring-run Chinook salmon were captured during 2019 monitoring and rescue efforts. Twenty of the captured fish were tagged and released into the river reach below Friant Dam. Another 114 adult spring-run brood stock were also released into the river to assess spawning activity.

In addition to these translocated and released fish, as many as 300 to 500 adult spring-run Chinook salmon made their way volitionally and without assistance into the spawning reach of the river below Friant Dam. These fish were able to move upstream into their spawning grounds because of flood control releases that occurred from mid-March through early April, and again from mid-May through mid-July 2019, allowing them to navigate several existing partial barriers on their way up the river. Though the actual numbers of volitional

fish are unknown, the estimates were made based on the detection of 209 spring-run Chinook salmon redds (fish nests) located in the river.

In order to continue to establish a stable spring-run population, approximately 225,000 spring-run Chinook salmon juveniles were released into the San Joaquin River as part of the San Joaquin River Restoration Program's reintroduction strategy. These juveniles were hatched and raised in the Interim Salmon Conservation and Research Facility as well as the Salmon Incubation and Research Facility, both located about one mile downstream of Friant Dam. A subset of the juveniles were tagged with acoustic transmitters and others received a photonic mark as part of a mark-recapture study.

To reestablish Chinook salmon in the San Joaquin River, the San Joaquin River Restoration Program also continued taking actions identified in the implementation framework (*Funding Constrained Framework for Implementation*, 2018) to provide volitional fish passage and sufficient flows:

- Alternative analysis neared completion for two Stage 1 projects, (1) the Mendota Pool Bypass and Reach 2B Improvements Project and (2) the Arroyo Canal Fish Screen and Sack Dam Fish Passage Project, that will provide improved fish passage and fish habitat.
- Several elements of the Eastside Bypass Improvements Project to remove fish passage barriers and increase restoration flows continued. As part of this project, one of two weirs in the Merced National Wildlife Refuge was removed in 2019 to improve fish passage for adult salmon and many other native fish in the Eastside Bypass. A levee improvement project was also advertised for construction in late 2019. This project will improve flow capacity in the Eastside Bypass for conveying restoration flows.

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

Lower Yuba River Accord

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

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 (DFW), and several environmental groups, with U.S. Fish and Wildlife Service (USFWS) and National Marine Fisheries Service (NOAA Fisheries) signing a letter of support (but not signatory to the Agreement).

In 2019, the Sacramento Valley Water Year Hydrologic Classification was wet. Because of the wet water supply index classification, there were no Component 1 water deliveries. Additionally, there were no Component 2, 3, or 4 water deliveries.

For more information about the Lower Yuba River Accord, see Chapter 8, Water Contracts and Deliveries.

Oroville Facilities

The Federal Energy Regulatory Commission (FERC) is the United States federal agency that, among other things, licenses

non-federal hydropower projects. This section covers environmental activities related to licensing and relicensing of the Oroville Facilities. For more information about other aspects of FERC licensing and Oroville Facilities relicensing in particular, see Chapter 9, Power Resources.

Existing FERC License Activities for 2019

Invasive Plant Management

During 2019, 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.

During restoration monitoring efforts along the Feather River, a new aquatic invasive species, alligator weed (*Alternanthera philoxeroides*), was discovered in the Feather River near the Thermalito Afterbay River Outlet. This alligator weed population was the first known north of Sacramento.

Feather River Fish Hatchery

DWR's Oroville Field Division provides funding to DFW for the fish production of approximately 2 million spring-run Chinook salmon, 6 million fall-run Chinook salmon, and 400,000 steelhead (*Oncorhynchus mykiss*) each year at the Feather River Fish Hatchery (FRFH) in Oroville. This fish production is mitigation for the loss of spawning habitat resulting from the construction of Oroville Dam and its associated facilities, and it contributes to major sport and commercial fisheries in ocean and inland areas. In addition, DWR funds the fish production of approximately 50,000 steelhead for the Delta Pumping Plant Fish Protection Agreement (Delta Fish Agreement) and up to a maximum

of approximately 150,000 inland Chinook salmon for the Lake Oroville recreational fishery.

Spring-Run Chinook Salmon. Between March 13 and April 22, a total of 1,848,342 spring-run Chinook salmon were planted in the Feather River at Boyd's Pump Boat Launch (River Mile [RM] 22.3), near the City of Live Oak (RM 41.5), and at Gridley Boat Ramp (RM 50).

Fall-Run Chinook Salmon. From April through May, a total of 6,478,063 juvenile fall-run Chinook salmon were released in the Feather River, San Pablo Bay/Mare Island Strait, and San Francisco Bay.

Inland Chinook Salmon. A portion of eggs collected during the fall-run Chinook salmon spawning period were triploid, which is a naturally occurring genetic anomaly that results in a fish with three sets of chromosomes instead of the usual two (a diploid fish). Triploid fish are sterile and unable to reproduce. The triploid eggs were retained for the DFW Inland Chinook Salmon Program as well as the DWR Lake Oroville cold water fishery. This is the first year eggs were triploid for Lake Oroville, which allows the resulting fish to grow larger in size as they are not putting energy into reproduction; it also mitigates for potential escapement. A total of 125,400 fingerlings were released in Lake Oroville in May at the Bidwell Canyon boat launch. Early release of these fish in May, rather than between the months of September and November at yearling size, occurred because the facilities' water supply was shut down for the routine five-year raw water pipe inspection.

Central Valley Steelhead. During January, February, and May, a total of 493,642 steelhead were released into the Feather River and Thermalito Afterbay at yearling size. Of those fish, 459,992 were planted in the Feather River at Boyd's Pump Boat Launch (RM 22.3) to meet mitigation

requirements, and 33,650 surplus juvenile steelhead were planted in the Thermalito Afterbay at the Wilbur Road boat ramp and the Monument Hill boat ramp to support the recreational fishery. Additionally, 195 male adult steelhead (kelts) were planted in the Thermalito Afterbay to contribute to the recreational fishery.

Lake Oroville and Thermalito Afterbay Habitat Improvement Program

In 2019, the habitat improvement program continued at Lake Oroville and Thermalito Afterbay. Approximately 1,190 recycled Christmas trees were collected by the Boy Scouts and delivered to DWR by a local waste management company. The California Conservation Corps bundled the trees together to create 77 habitat structures and anchored them in the lake bed near the Bidwell Canyon boat ramp and Thermalito Afterbay. Nearly 300 willow trees were also planted within the fluctuation zone at Lake Oroville and along the shoreline of the Thermalito Afterbay.

This habitat improvement program is designed to increase micro-cover for young-of-year and juvenile fish. It also provides fish with shade, spawning areas, and places to rest; creates places for fish to escape from predators; and can increase productivity, all of which can help improve the recreational fishery. The structures also provide food for fish and other aquatic species by creating a home for larval aquatic insects. This cover can additionally serve as cover for wildlife—such as avian species, reptiles, and amphibians—when the reservoir's water levels fall below the location of the structures.

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 lake bed stability and erosion
- flood storage capacity
- power generation
- streamflow requirements (downstream of the lake)

The 2019 low point for the Lake Oroville reservoir surface elevation was reached on January 1 at 668.76 feet, and the high point of 895.99 feet was reached on June 28. The full pool elevation of Lake Oroville is approximately 900 feet.

FERC Relicensing Activities

Oroville FERC USFWS BiOp

Various species conservation measures identified in the USFWS 2007 BiOp for the Oroville Facilities relicensing project continued to be implemented on SWP lands within the FERC project boundary. Monitoring associated with these measures includes an annual vernal pool survey (644 mapped vernal pools and/or other vernal 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. From the seven active bald eagle nesting territories in the area, a total of eight young bald eagles were successfully fledged in 2019. In addition, habitat management activities within the Oroville Wildlife Area were coordinated through DFW. These activities included providing nesting and foraging 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 2019 was compiled by DWR and submitted to USFWS.

Fuel Load Management Plan

In 2012, DWR's Oroville Field Division developed a fuel load management plan to increase public safety and reduce wildfire risk by decreasing hazardous fuel loads within the FERC project boundary. Hazardous fuel loading refers to dead and overgrown live vegetation that has accumulated over time within a wildland area. When fire enters these areas, it can burn these surface and ladder fuels at a rapid rate, turning a ground fire into a crown fire, which can cause extreme fire behavior. Reducing fuel loads can modify fire behavior, which can reduce fire intensity and duration, giving firefighters a better chance of suppressing a fire.

The fuel load management plan was developed in coordination with federal and State agencies as well as local fire management and land and resource management agencies. It identifies fuel load reduction treatments to provide land and resource managers with a strategic approach to minimize the severity of wildfire within the FERC project boundary. Fuel load reduction treatment types include mechanical and manual thinning, prescribed and pile burning, lop and scatter, chipping, diskng, mowing, weed eating, grazing, and herbicide application. The plan identifies ten treatment zones within the FERC project boundary, which encompasses approximately 2,925 acres. Recommended treatment metrics and target levels were given for each treatment zone. Monitoring of treatments is tracked, compared against performance criteria, and used in the adaptive management of the treatment zones.

Since 2012, DWR has treated or re-treated approximately 880 acres using the various treatment methods mentioned above. In 2019, DWR—with local partners California

Department of Forestry and Fire Protection, Butte County Fire Safe Council, California Department of Parks and Recreation, California Conservation Corps, and Butte County Sheriff's Office—treated or re-treated approximately 180 acres within the FERC project boundary.

In November 2018, the Camp Fire burned through Butte County, including the northern portion of Lake Oroville. Over 153,000 acres were burned, communities were devastated, and unfortunately lives were lost. To date, this fire is the deadliest and most destructive wildfire in California history. Over 40 percent of the West Branch Feather River watershed and over three percent of the North Fork Feather River watershed were burned. In September 2019, the Walker Fire began burning in the Plumas National Forest. It burned over 54,000 acres and over four percent of the North Fork Feather River watershed.

With the increase in wildfires throughout California, more emphasis is being put toward fuels reduction projects and management. DWR will continue treating areas identified in the fuel load management plan and will use adaptive management strategies to improve treatment techniques. DWR will also focus treatments within burn scar areas (the burned land surfaces caused by a wildfire). These treatments will involve removing hazardous trees, removing burnt underbrush, and minimizing regrowth that occurs after a wildfire burns through an area.

Devil Canyon Project and South SWP Hydropower Facilities

This section covers environmental activities related to licensing and relicensing of the Devil Canyon Project and South SWP Hydropower facilities. For more information about other aspects of FERC licensing, and Devil Canyon Project and South

SWP Hydropower facilities relicensing in particular, see Chapter 9, Power Resources.

Relicensing Biological Studies

During 2019, DWR completed numerous studies in support of the relicensing applications for both the Devil Canyon Project and South SWP Hydropower.

Study results supplemented existing and readily available information by providing current data on species and biological processes, which informed DWR's license applications and will inform FERC's consideration and preparation of a National Environmental Policy Act document and related relicensing decisions. The study data also helped in the development of protection, mitigation, and enhancement measures (PM&Es) for various resources including State- and federally-listed species and their designated critical habitats.

Relicensing Protection, Mitigation, and Enhancement Measures (PM&Es)

PM&Es are operations and maintenance activities that DWR proposes to undertake as conditions of the new licenses for the Devil Canyon Project and South SWP Hydropower. The purposes of the PM&Es are to (1) protect resources against impacts from continued operations and maintenance activities, (2) mitigate any such impacts that would otherwise result from the proposed new licenses, and (3) enhance resources that could be affected by operations and maintenance of the proposed new licenses.

During 2019, DWR began drafting numerous proposed PM&Es for both the Devil Canyon Project and South SWP Hydropower relicensing applications. The PM&Es were conceptualized and drafted with input from local, State, and federal resource agencies, Native American tribes, and other entities.

The following PM&Es were drafted for the Devil Canyon Project:

- aquatic invasive species management plan
- erosion and sediment control plan
- fire prevention and response plan
- hazardous materials management plan
- historic properties management plan
- integrated vegetation management plan
- project safety plan
- recreation management plan
- Silverwood Lake fish stocking measure
- Silverwood Lake minimum pool and water surface elevation measure
- transportation system management plan
- visual resources management plan

Authoring the PM&Es for the South SWP Hydropower relicensing was performed subsequent to the Devil Canyon Project effort. While the subject matter for the South SWP Hydropower PM&Es was very similar to that for the Devil Canyon Project, it was not sufficiently finalized to list in this report.

Relicensing Cultural and Tribal Resources Studies

As part of the relicensing of the Devil Canyon Project and South SWP Hydropower, DWR continued to conduct cultural and tribal resources studies to inventory and evaluate historic properties within the areas of potential effects. DWR also continued to conduct outreach and consultation with 36 Native American tribes and tribal interests. This consultation is a continuation of an effort that began in 2017 under Section 106 of the National Historic Preservation Act of 1966. Consultation with the State Historic Preservation Officer under Section 106 is ongoing.

Information related to studies, PM&Es, and relicensing applications for the Devil Canyon Project and South SWP Hydropower can be found on the DWR website by

searching for "Devil Canyon Project relicensing" and "South SWP Hydropower relicensing," respectively.

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. Both species are currently present in California.

The Aquatic Nuisance Species Program, under the Division of Operations and Maintenance, has conducted mussel surveillance monitoring, implemented management and prevention measures, and conducted public outreach. See Bulletin 132-18 for more information.

Applied Studies

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 and microscopic analyses) for veligers (the free floating larval stage) and settlement plates (see Bulletin 132-10).

In 2019, DWR and two collaborating water agencies, Santa Clara Valley Water District and The Metropolitan Water District of Southern California, sampled 16 locations in the SWP for veligers (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. Mussel inspections also occurred when facilities were dewatered for maintenance and inspection purposes. Mussel inspections were also conducted in the series of tunnels that convey water from Edmonston Pumping Plant through the Tehachapi Mountains. This includes Tunnel 1, Tunnel 2, Tunnel 3, and the Carly V. Porter Tunnel. In the SWP East Branch, Myrick Siphon and a section of the Santa Ana Pipeline at the Devil Canyon Powerplant afterbays were inspected. No mussels were observed during the inspections.

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, including the *Quagga and Zebra Mussel Vector Management Plan for the State Water Project*, the *Quagga and Zebra Mussel Rapid Response Plan for the State Water Project*, and SWP facility vulnerability assessments and management plans.

To prevent the introduction of quagga and zebra mussels from infested watercraft, 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). Inspection programs at other SWP reservoirs at risk for mussel infestation are funded and conducted by other agencies.

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 to launch; otherwise, they fail inspection and must wait seven to eight days before returning. At San

Luis Reservoir State Recreation Area, 13,176 vessels were inspected during 2019. Of those vessels, 293 failed the inspection because of the presence of water. At Pyramid Lake, 9,275 vessels were inspected, with 705 failures. At Castaic Lake, 29,243 vessels were inspected, and 1,063 failed the inspection. One of these failures was because of the potential presence of adult quagga mussel shells on watercraft at Castaic Lake. The species identification could not be confirmed because the shells were discarded by the inspector. The remaining failures were the result of the presence of wet equipment or standing water.

Quagga Mussels in the SWP

West Branch. In December 2016, quagga mussels were discovered in the West Branch of the SWP (see Bulletin 132-17). DFW classified Pyramid Lake and Elderberry Forebay as “infested” with quagga mussels, and Castaic Lake was initially declared as “presumed infested” because it is downstream of Pyramid Lake and Elderberry Forebay. This designation was removed from Castaic Lake in 2018 because there continued to be no evidence of quagga mussels in the lake.

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. During 2018, DWR went through three cycles of draft submittal and revisions, with version five of the control plan submitted to DFW in December 2018. Castaic Lake was removed from the control plan because it was not infested with quagga mussels. Version five of the control plan addressed shear stress through the Pyramid Dam stream release structure and low calcium conditions in Pyramid Lake as control measures for quagga mussels. In September 2019, DWR received a letter from DFW stating that version five of the control

plan was noncompliant and requested DWR conduct shear stress analysis for Pyramid Dam spillway releases. Version six of the control plan will address this request.

Monitoring for adult and veliger mussels continued in Castaic and Pyramid lakes throughout 2019 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 2019. Additionally, adult mussels were not found on any of the settlement plates deployed in the lakes. On January 24, 2019, a quagga mussel surface survey of Pyramid Lake was conducted while the lake was at its low winter elevation, which allowed for the search of shoreline and docks that are normally underwater. No mussels were found during the survey. A remotely-operated underwater vehicle video inspection of the stream release intake structure trash racks was conducted in Pyramid Lake on November 14, 2019. No mussels were observed during the inspection.

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 (see Bulletin 132-18). Inadequate calcium may be the reason no further mussels were discovered in Pyramid Lake and no veligers have been detected. Calcium concentrations gradually increased to levels suitable to support quagga mussels during 2018 and remained at suitable levels through June 2019. In July 2019, calcium declined below the threshold for veliger survival and remained there for the remainder of the year. DWR will continue to monitor calcium concentrations in the lake.

California WaterFix Ends and Delta Conveyance Project Begins

In his State of the State address delivered February 12, 2019, the Governor announced that he did “not support [California] WaterFix as currently configured” but does “support a single tunnel.” On April 29, 2019, the Governor issued Executive Order N-10-19, directing several agencies to, among other things, “inventory and assess . . . current planning to modernize conveyance through the Bay Delta with a new single tunnel project.” The Governor’s announcement and executive order led to DWR’s withdrawal of all approvals and environmental compliance documentation associated with California WaterFix.

In 2019, DWR took formal steps to withdraw proposed permits for the California WaterFix project and begin a renewed environmental review and planning process for a smaller, single tunnel project that will protect a critical source of water supplies for California.

California Environmental Quality Act and National Environmental Policy Act Environmental Compliance Process

On May 2, 2019, DWR withdrew the approval of the California WaterFix project and rescinded the accompanying notice of determination that was filed pursuant to the requirements of the California Environmental Quality Act (CEQA). DWR began environmental permitting, engineering, and stakeholder engagement to pursue a single tunnel solution to modernize Delta conveyance.

Clean Water Act

On May 2, 2019, DWR withdrew the application for Section 401 certification for California WaterFix.

On May 3, 2019, DWR withdrew the Section 404 permit application for a U.S. Army Corps of Engineers individual permit for the California WaterFix project, in addition to any other California WaterFix project applications or agreements associated with the U.S. Army Corps of Engineers authorities.

Change Petition Hearing

On May 2, 2019, DWR and the U.S. Bureau of Reclamation (Reclamation) jointly withdrew the pending petition for change in points of diversion and rediversion for the SWP and CVP.

CESA and ESA

On May 2, 2019, DWR notified DFW that DWR was no longer pursuing the authorizations that were requested in its application for the California WaterFix incidental take permit pursuant to the requirements of Section 208(b) of CESA and requested that DFW rescind the incidental take permit for California WaterFix that DFW issued on July 26, 2017. In addition, Reclamation and DWR jointly requested NOAA Fisheries and USFWS to withdraw BiOps for California WaterFix.

Tribal Outreach and Engagement

DWR hosted tribal informational meetings on September 11, 2019, for the California tribal community, and on November 12, 2019, for invited Delta tribes. The purpose of these meetings included providing updates and discussing the status and next steps related to Delta water conveyance, such as future CEQA and Assembly Bill 52 (Gatto et al.; Chapter 532, Statutes of 2014) requirements.

Delta Conveyance Design and Construction Authority

The Delta Conveyance Design and Construction Authority (DCA) is a joint powers authority created by the public

water agencies that have committed to the design and construction of a modernized Delta conveyance project. The joint exercise of powers agreement with the DCA was amended in June 2019 to include initial design and engineering work to support DWR's environmental review process.

In 2019, the DCA formed a Stakeholder Engagement Committee. This committee, appointed by the DCA Board of Directors, consisted of up to 16 public members representing various Delta stakeholder groups (e.g., agricultural, recreation, business, environment, etc.), with the addition of up to five ex officio members from various State and local agencies. The committee was a formal advisory body to the DCA Board of Directors, which provided a forum for input on the preliminary design of the proposed Delta Conveyance Project and optional concepts related to reducing possible construction-related localized Delta impacts and improving the effectiveness of mitigation.

Biological Opinions for CVP/SWP Operations

USFWS and NOAA Fisheries issued BiOps in 2008 and 2009, respectively, on CVP and SWP operations that included 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 CVP and SWP. For more information about the federal litigation, see Bulletins 132-12 through 132-16.

For information about the Annual Science Review required by the 2009 NOAA Fisheries BiOp, see Bulletins 132-14 through 132-19.

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 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.

USFWS and NOAA Fisheries Biological Opinions

On October 21, 2019, the USFWS and NOAA Fisheries issued separate BiOps (*Biological Opinion for the Reinitiation of Consultation on the Coordinated Operations of the Central Valley Project and State Water Project* and *Biological Opinion on Long-Term Operation of the Central Valley Project and the State Water Project*, respectively). The BiOps incorporated new science to optimize water deliveries, reliability, and power production while protecting listed species and their critical habitats. They also included incidental take statements for delta smelt (*Hypomesus transpacificus*), winter-run Chinook salmon, spring-run Chinook salmon, green sturgeon (*Acipenser medirostris*), and steelhead, as well as reasonable and prudent measures to minimize the effects of incidental take.

Delta Operations for Delta Smelt and Longfin Smelt

The Smelt Working Group is an interagency team of experts on delta smelt and longfin

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.

smelt (*Spirinchus thaleichthys*) 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.

The 2019 water year (October 1, 2018 through September 30, 2019) was a wet year

in terms of precipitation. The USFWS issued one determination on February 6 initiating Component 2, Action 3 of the 2008 BiOp to protect larval and juvenile delta smelt, requiring that Old Middle River flows remain more positive than -5,000 cubic feet per second (cfs) on a 14-day running average, with a simultaneous five-day running average no more negative than -6,250 cfs. The Smelt Working Group also made a recommendation under Component 1, Action 2 to reduce the risk of adult delta smelt entrainment. However, the USFWS

ultimately did not implement this action for water year 2019.

Fish Restoration Program

Pursuant to the USFWS and NOAA Fisheries BiOps and the DFW longfin smelt incidental take permit (see Bulletin 132-11), DWR and DFW's Fish Restoration Program (FRP) continued to make progress toward fulfilling its restoration requirements. See Bulletins 132-17 through 132-19 for additional information about the projects summarized below.

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 draft environmental impact report (EIR) was released for public comment in August 2016. DWR's response to comments and finalization of the EIR had been delayed while DWR negotiated with Local Agencies of the North Delta (a coalition of reclamation and water districts in the northern geographic area of the Delta) and Reclamation. In the process of negotiations and further design refinement, additional information related to some of the impacts were added, resulting in the need to partially recirculate the draft EIR. DWR did a partial recirculation for public review in early 2019 and certified the final EIR in August 2019. The final EIR was challenged by Reclamation District 501. DWR and Reclamation District 501 are currently working on reaching a settlement agreement.

DWR submitted all permit applications, received some of the permits, and is awaiting the remaining permits. A Statement of Consistency has not yet been submitted to the Delta Stewardship Council.

At the end of 2019, work on Prospect Island was paused. DWR North Central Region Office continued to conduct hydrologic monitoring from an existing network of 29 monitoring wells (20 on Prospect Island and nine on Ryer Island), three surface water stations, two Ryer Island drainage ditch stations, and the Hastings Tract East Station (for local precipitation).

DWR continued to clear vegetation on the Miner Slough levee, using a combination of boom mowers and goat herds, to facilitate levee inspections. Priority levee repair sites were monitored to ensure they not become critical, and small repairs were conducted as needed.

Decker Island

Decker Island is located in the Delta along the Sacramento River at Horseshoe Bend. The project site was an established emergent wetland with muted tidal connectivity to Horseshoe Bend to the south that transitioned to upland habitat in the north. The project enhanced up to 140 acres of tidal wetland, associated high marsh, and riparian habitats. Construction of the restoration project was completed in 2018. The FRP monitoring program began post-project monitoring in 2019.

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. Prior to tidal restoration in 2022, Bradmoor Island will be managed to control *Phragmites australis*, an invasive tall emergent plant. Ponds on-site may be flooded to encourage native species growth or drawn down to spray and mow *P. australis* as needed. 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 (Property 604) is located in eastern Suisun Marsh, adjacent to the Blacklock restoration project and across Nurse Slough from the Bradmoor Island tidal habitat restoration project. DWR acquired the 260-acre property in April 2017. 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. Restoration is anticipated to be completed by fall 2021.

Chipps Island

Chipps Island is at the western boundary of the Delta and is the southernmost portion of Suisun Marsh. Chipps Island comprises three main parcels: north, east, and west. In September 2017, DWR acquired the north and east parcels. The western parcel is owned by The Metropolitan Water District of Southern California. DWR began surveys for restoration planning in 2017. A digital elevation model was created in the summer and a preliminary wetland delineation report was completed in December 2018. Five restoration designs were modeled for hydrodynamics and particle tracking in September and October 2018. Restoration designs will be further developed in 2020.

As part of the acquisition negotiation, DWR agreed to remediate three notices of violations issued to the previous landowner. Remediation includes removal of floating docks, removal of a shipping container, and mitigation for construction of an internal levee. The floating docks were removed in December 2017. In September 2019, DWR attempted to remove the shipping container. During exploration of the site, DWR discovered that the shipping container was

embedded in the levee. Because of concerns that the removal would cause an unintended levee failure, DWR left the shipping container intact and will incorporate its removal into the larger restoration construction plans. Mitigation for construction of the internal levee is being incorporated into restoration designs.

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. Construction began on September 3, 2019, and concluded on September 25, 2019. Work included removing the water control structures on the north and south ends of the main central channel of the island, as well as widening the southern breach to allow and increase unrestricted tidal exchange to the interior of the island. Construction activities also included widening a channel on the eastern side of the island to further increase tidal exchange, as well as removing old structures and debris on the southern side of the project area. Upon completion of construction activities, the north and south breach locations were seeded with native plant species along the remaining levee to promote growth of native plants.

Tule Red

Tule Red is adjacent to Grizzly Bay within the Suisun Marsh. The vast majority of the site is a managed marsh, with the northern end being tidal marsh. The project converted roughly 420 acres of existing managed wetlands to tidal habitat. Restoration activities included grading, revegetation, and other associated activities on the landside of a natural interior berm. Following a period of one year to allow revegetation of disturbed soils, the site was breached to allow the site to become fully tidal. In mid-September 2016, the

contractor started construction of the initial restoration activities.

The contractor completed Phase I of construction in 2018, which included earthwork to construct the tidal channel network, a series of tidal pannes and basins, and the habitat berm. Revegetation of the disturbed soils occurred in fall 2018. Phase II of construction, including demolishing the clubhouse and breaching the natural berm to allow full daily tidal exchange with the interior of the project site, was completed in October 2019.

Lookout Slough

The FRP is partnering with an environmental restoration contractor to restore approximately 3,000 acres of managed wetland and cattle grazing land to tidal and subtidal marsh to benefit delta smelt and other native fish species. The project site is located within the Cache Slough Complex and Yolo Bypass near Liberty Island, in Solano County. In addition to ecosystem benefits, the project will also provide flood benefits by expanding flood conveyance and storage for the Yolo Bypass. This will be accomplished by building a new protective levee along the west and north edges of the site, allowing for breaching of the existing levee along the Yolo Bypass.

The CEQA notice of preparation was released in April 2019, and the draft EIR was released on December 16, 2019. DWR and the contractor participated in pre-application meetings with all permitting agencies throughout 2019, and all permit applications were drafted by December 2019. Permit applications are expected to be submitted in January 2020.

Lower Yolo Ranch

Lower Yolo Ranch is located within the Cache Slough Complex at the southern end of the Yolo Bypass floodway. The Lower Yolo Ranch restoration project is expected

to yield approximately 1,732 acres of delta smelt habitat credit toward the USFWS BiOp and the DFW incidental take permit and 2,147 acres toward the NOAA Fisheries BiOp. The newly created tidal marsh habitat will be connected to adjacent tidal marshes and open water to create greater food web productivity for the benefit of listed fish species as well as other native fish and wildlife.

The property is currently managed as irrigated pasture for cattle grazing and is owned by Westlands Water District. An interagency contract and purchase agreement between Westlands Water District and DWR outlines how Westlands Water District will complete the restoration. Restoration construction is planned to begin in 2020. In 2019, the project obtained its ESA Section 7 BiOps from USFWS and NOAA Fisheries. Westlands Water District has submitted applications for all remaining permits and consultations are ongoing.

Yolo Bypass Program

Yolo Bypass Salmonid Habitat Restoration and Fish Passage Project (“Big Notch Project”). The goal of this project is to improve fish passage and increase juvenile fisheries rearing habitat in the Yolo Bypass (the largest contiguous floodplain remaining in the Central Valley) and lower Sacramento River basin. Providing fish access to the food-rich floodplain will expand survival rates for native fish on their migratory journey to the Pacific Ocean. The project will also allow adult salmon, steelhead, and sturgeon (*Acipenseridae sp.*) to more easily access the Sacramento River and reduces the likelihood of fish getting stranded in the Yolo Bypass.

In 2019, DWR received the USFWS and NOAA Fisheries BiOps. DWR also executed the National Historic Preservation Act of 1966 Section 106 programmatic agreement entered into with Reclamation and the California State Historic Preservation Office.

Decision documents complying with both the National Environmental Policy Act and CEQA were issued; the final EIR analyzed six action alternatives as well as the No Project Alternative.

Design began on the selected alternative (Alternative 1, East Side Gated Notch), in which increased flows of up to 6,000 cfs from the Sacramento River would enter the Yolo Bypass through a gated notch on the east side of Fremont Weir, a 1.8-mile concrete wall that provides flood protection to Sacramento and surrounding areas. The 100-foot-wide gateway, or “big notch,” would open each winter, allowing juvenile salmon to move from the Sacramento River onto the floodplain and then back into the Sacramento River at Cache Slough. The gated notch functions by creating an opening in Fremont Weir that is deeper than the weir, with gates to control water going through the facility into the Yolo Bypass. The operational period would be from November 1 to March 15.

Fremont Weir Adult Fish Passage

Modification Project. With construction completed in late 2018, DWR first operated this fish passage structure in 2019. Heavy precipitation in 2019 caused the Sacramento River to overtop the Fremont Weir on four separate occasions; the upgraded fish passage structure operated for a total of 39 days during this period. A sonar imaging camera, capable of remotely monitoring fish passage, provided valuable monitoring data on fish behavior and passage success through the new passageway. The sonar camera recorded the successful passage of several thousand fish during an 11-day monitoring effort, including the first documented volitional passage of sturgeon (more than 70 individuals).

Wallace Weir Fish Rescue Facility. The Wallace Weir Fish Rescue Facility operated for the first time in August 2019. This facility rescued 593 salmonids from being lost to

agricultural drainage canals. Special-status fishes recovered at this facility included three threatened Central Valley spring-run Chinook salmon and 17 threatened Central Valley steelhead trout. The facility was also the flow source for the 2019 North Delta Food Subsidy Study (initially referred to as the North Delta Flow Action Study in early 2019), which investigated management options to improve the prey base for delta smelt.

Agricultural Road Crossing 4 Fish Passage Project.

DWR modeled multiple fish passage concepts for Agricultural Road Crossing 4 and selected Concept 2 as the most beneficial alternative given the adjacent landowner’s water impoundment and operational constraints. This design included a series of operable gates and a small fish ladder.

Fish Restoration Program (FRP) Requests for Proposals

The FRP continued 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 restoration projects will ultimately result in creditable acres that will be applied to DWR’s mitigation requirement.

Yolo Flyway Farms. The Yolo Flyway Farms tidal habitat restoration project was acquired through the request for proposals

FRP issued in 2016. The project will restore approximately 294 acres of seasonal wetland and cattle grazing land to tidal and subtidal marsh. The project site is located within the Cache Slough Complex near Little Holland Tract, Liberty Island, and Prospect Island, and is directly adjacent to the Lower Yolo Ranch property.

Construction activities began on August 2, 2018, and were completed by September 28, 2018. Construction included excavating the large channel and breach in the southern region of the property, the smaller northern channel and breach, and adjacent benches to each. An internal road and field berm were removed to allow water to move more freely around the site. Construction also included removing and disposing of approximately 70 concrete and metal duck blinds and culverts. Following earthwork, all disturbed areas were disked to reduce compaction and seeded with native vegetation. Salvaged tule rhizomes were planted along the intertidal bench. In 2019, monitoring and land management activities began to support development of tidal marsh habitat at the site.

Wings Landing. DWR entered into an agreement with a contractor in 2017 to complete the Wings Landing tidal habitat restoration project, which was designed to restore a managed duck club to a tidally influenced marsh system in Solano County. The project site is located in north-central Suisun Marsh, a mile south of Suisun City, within the Suisun Marsh Plan Region 1. The entire 267-acre site will be permanently protected and is expected to achieve approximately 257 acres of credit from the regulatory agencies for delta smelt, longfin smelt, and salmonids. Restoration of the project site will benefit listed species and native California tidal marsh ecosystems through habitat protection, creation, and enhancement, as well as support food web productivity.

In 2019, CEQA and permit applications were finalized and submitted. Construction is anticipated to begin in either summer 2020 or 2021.

Monitoring and Research

With the support of and in collaboration with DWR, the DFW FRP Monitoring Team is committed to the objective of science-based monitoring of fishes and their food web in sites restored through the FRP. Monitoring-related activities in 2019 included planning, coordination and consultation, pre-project monitoring, and the first year of post-construction monitoring for Yolo Flyway Farms and Decker Island.

The DFW FRP Monitoring Team led the Interagency Ecological Program Tidal Wetland Monitoring Project Work Team, a forum for collaboration and sharing new scientific techniques and studies that may be useful for restoration monitoring.

In 2019, the DFW FRP Monitoring Team continued pre-project monitoring at future FRP restoration sites and their comparison sites in the Cache Slough Complex, the confluence of the Sacramento and San Joaquin rivers, and in Suisun Marsh and Grizzly Bay. It also collected the first post-construction monitoring data at Decker Island and North Delta Berms, as well as at Yolo Flyway Farms. Both pre- and post-construction monitoring consisted of extensive lower trophic level sampling at all sites in the spring. Sites in the Cache Slough Complex and the confluence of the Sacramento and San Joaquin rivers were sampled for the same metrics in the fall. Sondes were also installed on a semi-permanent basis inside Decker Island and Yolo Flyway Farms to record post-restoration water quality conditions.

DFW is conducting a multiyear study comparing shallow wetland or wetland-adjacent invertebrate communities with those in deeper adjacent channels.

In addition to the ongoing monitoring efforts, FRP is conducting research in Suisun Marsh and the Delta investigating the effectiveness of restoration techniques to deter invasive plant establishment. The following projects were awarded grants through the Delta Conservancy's Ecosystem Restoration and Water Quality Grant Program (Proposition 1; Water Quality, Supply, and Infrastructure Improvement Act of 2014):

- The Blacklock Restoration: Phragmites Control Project was awarded a grant in May 2019 and received all necessary permits to begin study actions in October 2019. Monitoring is expected to continue for two years.
- The revegetation studies that compare methods of active revegetation of native plant species moved forward at the Dutch Slough and Bradmoor Island restoration sites. Installation of the experimental treatments was completed at Bradmoor Island in September 2018 and at Dutch

Slough in October 2018. Monitoring began in December 2018 at Dutch Slough and in early 2019 at Bradmoor Island. Monitoring will continue for approximately three years.

Decisions on Endangered Species

Table 3-1 lists fish species of concern found in the Delta. No status changes were made in 2019.

Trends in Fish Abundance

Abundance indices for longfin smelt and delta smelt are computed using the DFW's fall midwater trawl sampling conducted every year from September through December. Index calculations are based on average catch per trawl for 100 core index stations, which are partitioned into 14 geographic areas. The average monthly

Table 3-1 Special Status Delta Fish Species

Common Name	Scientific Name	ESA Listing	CESA Listing
delta smelt	<i>Hypomesus transpacificus</i>	threatened ¹ (3/5/1993)	endangered (1/20/2010)
longfin smelt (San Francisco Bay-Delta DPS)	<i>Spirinchus thaleichthys</i>	candidate ² (4/2/2012)	threatened (4/5/2009)
Chinook salmon (Sacramento River winter-run ESU)	<i>Oncorhynchus tshawytscha</i>	endangered (2/3/1994)	endangered (9/22/1989)
Chinook salmon (Central Valley spring-run ESU)	<i>Oncorhynchus tshawytscha</i>	threatened (11/15/1999)	threatened (2/5/1999)
Chinook salmon (Central Valley fall-/late fall-run ESU)	<i>Oncorhynchus tshawytscha</i>	none	none
steelhead (Central Valley DPS)	<i>Oncorhynchus mykiss</i>	threatened (5/18/1998)	none
green sturgeon (southern DPS)	<i>Acipenser medirostris</i>	threatened (6/6/2006)	none
Sacramento splittail	<i>Pogonichthys macrolepidotus</i>	none	species of concern
Pacific lamprey	<i>Entosphenus tridentata</i>	none	species of concern
river lamprey	<i>Lampetra ayresii</i>	none	species of concern

ESA = federal Endangered Species Act

CESA = California Endangered Species Act

DPS = distinct population segment

ESU = evolutionarily significant unit

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.

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. The fall abundance index serves as an indicator for adult longfin and delta smelt populations over a long period of time.

The fall midwater trawl abundance index for longfin smelt is shown on Figure 3-1. The index for 2019 was 44, lower than the index in 2018 and consistent with the low abundances that have persisted since the early 2000s.

Figure 3-2 shows the fall midwater trawl abundance index for delta smelt. In 2019, the index remained at zero, continuing the low catch observed in the past few years.

Figure 3-3 shows estimates of returning adult winter-run Chinook salmon from 1970 through 2019. 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 2019 was 8,128, which was a 208 percent increase from the 2018 escapement estimate.

Figure 3-4 shows estimates of returning adult spring-run Chinook salmon from 1985 through 2019. 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

2019 was 3,867 for the FRFH and 20,056 for the other streams combined. The 2019 escapement estimate was 2.3 times higher than the 2016 parent stock estimate for the FRFH and was higher than the 2018 FRFH escapement estimate. For naturally spawned fish in Battle, Clear, Mill, Deer, and Butte creeks, the 2019 estimate was 2.5 times higher than the 2016 parent stock estimate.

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

Scientific Efforts in the Upper San Francisco Estuary

Some of the scientific studies and synthesis efforts conducted in 2019 to enhance DWR's knowledge of fish abundance, distribution, and response to management actions are listed below:

- research synthesis and directed study evaluating the effects of fall and/or spring outflow actions on delta smelt habitat, condition, and survival
- research synthesis on the status of native cypriniform fishes in the Delta and their associations with environmental factors
- research synthesis on spatial and temporal community patterns for early life stage fishes in the upper San Francisco estuary (the Delta and Suisun Bay)
- continuation of a study examining the effect of Suisun Marsh Salinity Control Gates operation on delta smelt habitat

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,

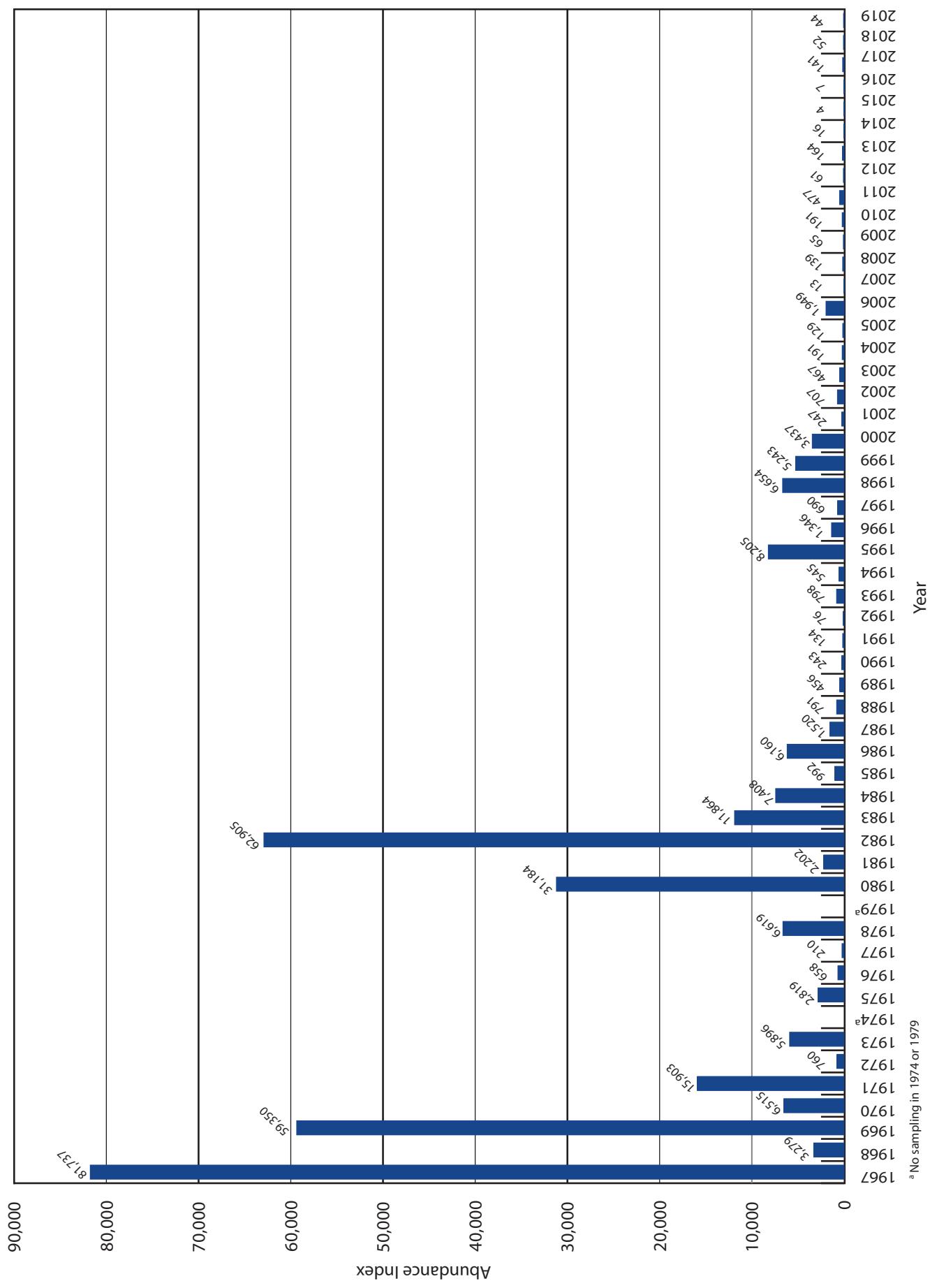
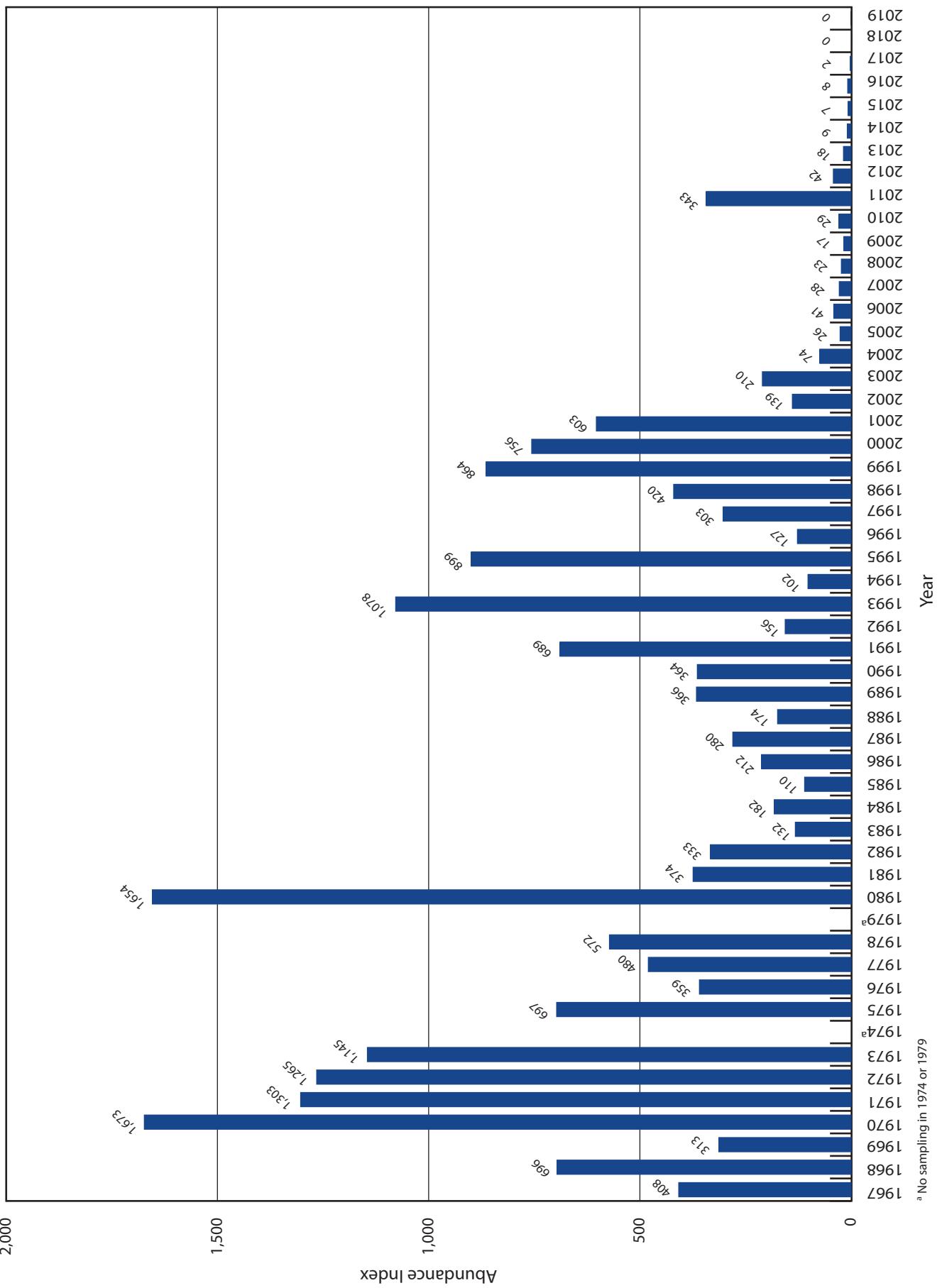


Figure 3-1 Longfin Smelt Fall Midwater Trawl Abundance Index, 1967–2019

^a No sampling in 1974 or 1977



^a No sampling in 1974 or 1979

Figure 3-2 Delta Smelt Fall Midwater Trawl Abundance Index, 1967-2019

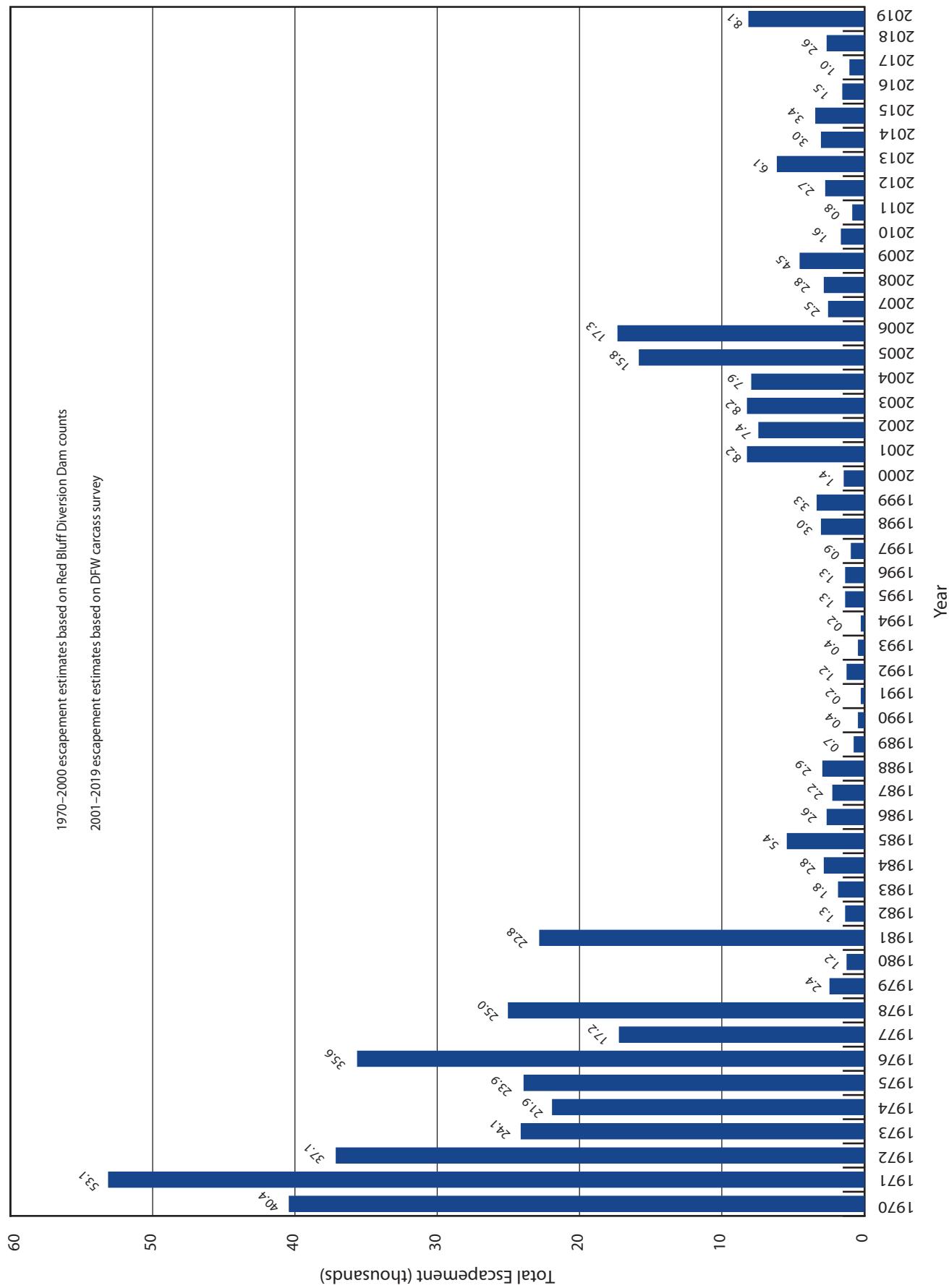
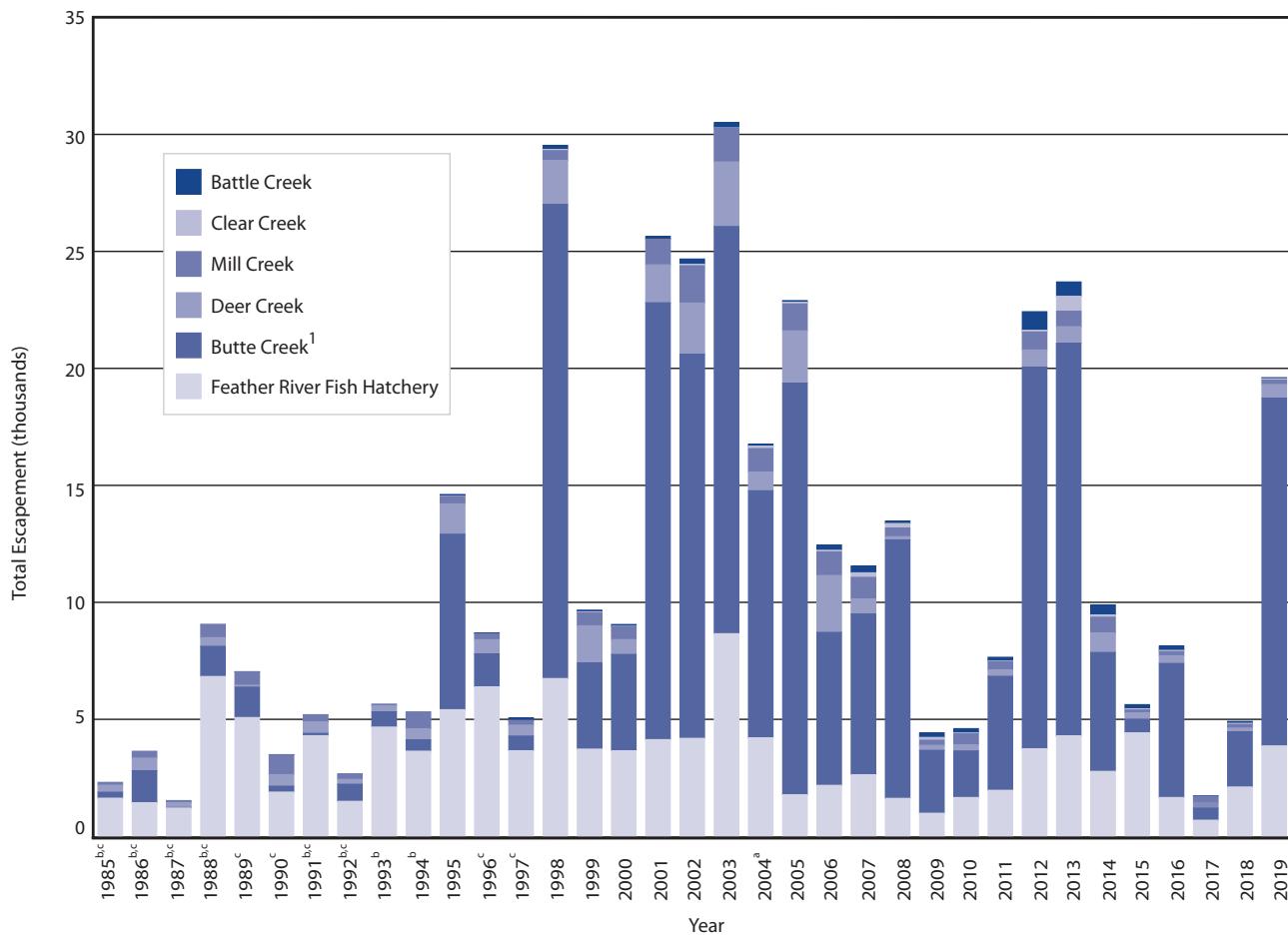


Figure 3-3 Estimated Total Adult Winter-run Chinook Salmon Escapement, 1970–2019



¹ From 1985–2000, Butte Creek estimates were based on snorkel surveys.

Since 2001, Butte Creek estimates have been based on carcass surveys.

^a In 2004, the Feather River Fish Hatchery ladder was only open September 15–30 instead of the typical 30 days.

^b Zero count or no data for Battle Creek

^c Zero count or no data for Clear Creek

Figure 3-4 Estimated Total Adult Spring-run Chinook Salmon Escapement, 1985–2019

in preparation for the FERC 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 in mind 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 radiotelemetry, salmon and steelhead spawning surveys, salmon

escapement surveys, spring-run Chinook salmon tagging, snorkel and beach seining surveys, green sturgeon studies, steelhead passive integrated transponder and acoustic tagging, and hatchery juvenile Chinook salmon movement and survival studies.

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

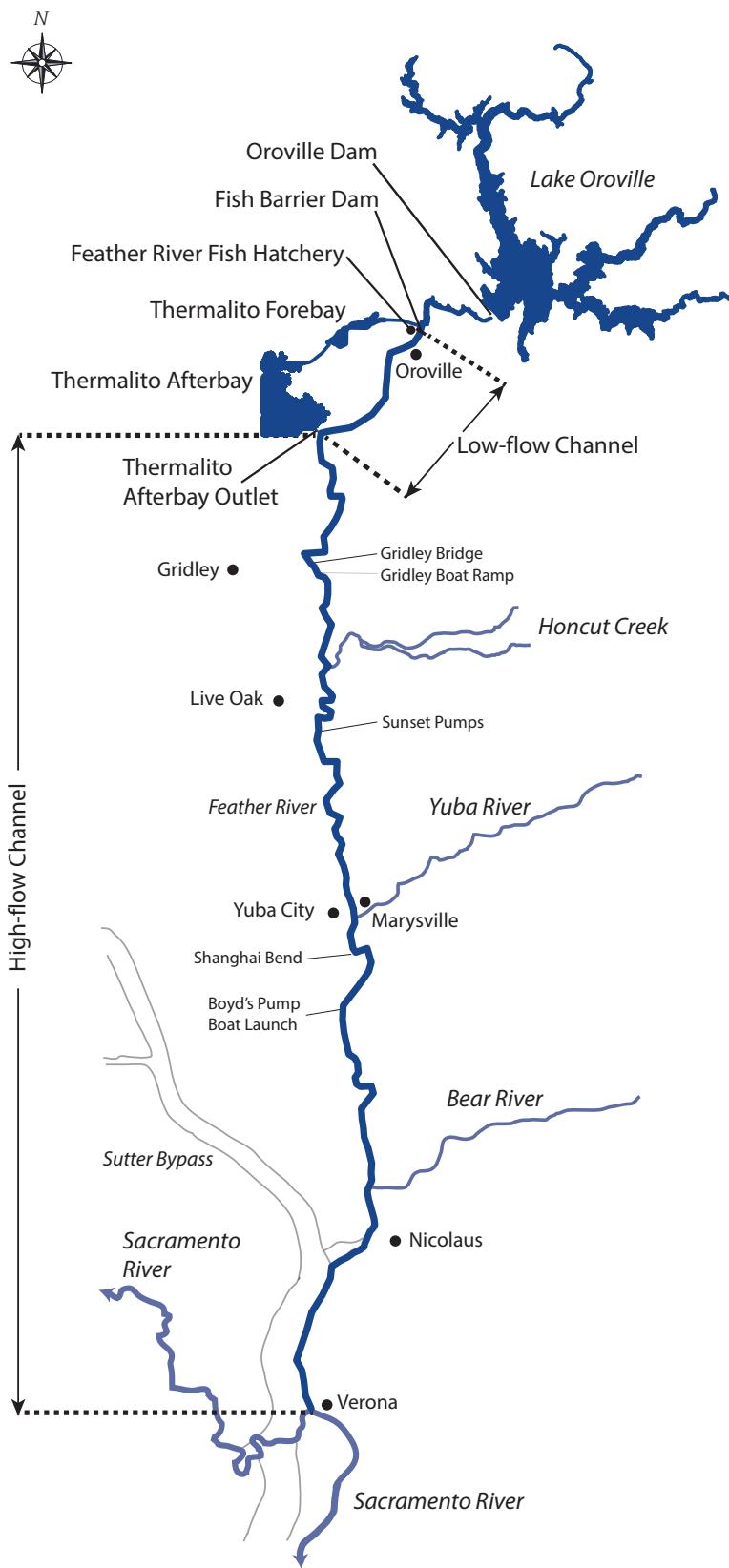


Figure 3-5 The Lower Feather River

Rotary Screw Traps

During the 2019 trapping season, rotary screw traps were fished for 154 days beginning in December 2018 through the end of June 2019. Rotary screw traps were used at two locations to assess the timing and general abundance of juvenile Chinook salmon, steelhead, and other fishes emigrating from the Feather River. In the low-flow channel, one rotary screw trap was stationed at the bottom of Eye Side Channel at RM 60.2, one mile above the Thermalito Afterbay Outlet. In the high-flow channel, two rotary screw traps were stationed in tandem at Herring Riffle, RM 45.7.

Although Chinook salmon and steelhead were the primary targets of trapping efforts, records were kept on all fish species caught. Twenty-four species were caught during the 2019 trapping season: 13 native and 11 non-native. Chinook salmon constituted 98 percent of the total catch. Of the total Chinook salmon captured during the 2019 trapping season, 393,209 (68.7 percent) were caught in the low-flow channel, and 179,420 (31.3 percent) were caught in the high-flow channel. A total of 48 wild young-of-the-year, one yearling, and four adult steelhead were captured in the low-flow channel, and a total of 11 wild young-of-the-year and two adult steelhead were captured in the high-flow channel.

During the 2019 trapping season, approximately 93.8 percent and 90.4 percent of the salmon measured from the low-flow channel and high-flow channel traps, respectively, had fork lengths of less than 50 millimeters, indicating that most Feather River salmon emigrate the upper river before smolting. Chinook salmon were captured as soon as the traps were deployed in December, peaking in February, and continuing into June. Separate fall-run Chinook salmon passage estimates were developed for the low-flow channel and the high-flow channel locations. The 2019 passage estimate was 10,730,000 in

the low-flow channel and 9,578,000 in the high-flow channel.

Based on 2018 adult escapement data, average fecundity, and the 2019 passage estimate, the egg-to-fry survival rate for fall-run Chinook salmon juveniles in the low-flow channel was 7.3 percent in 2019. The emigration index (per capita production) of juveniles was 356.

Salmon Escapement Survey

The Chinook salmon escapement survey provides information critical to the management and conservation of Feather River salmon populations. The primary purpose of the salmon escapement survey is to determine 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) collect biological samples (scale and otolith) for later analysis. The survey area covers 16 river miles of the lower Feather River from the Table Mountain Bridge in downtown Oroville to the East Gridley Road Bridge, near Gridley. The population estimate includes both naturally spawning fall- and spring-run Chinook salmon.

The 2019 escapement survey began on September 3 and ended on December 20. It resulted in an in-river spawning population estimate of 51,967 Chinook salmon—43,356 adults and 8,611 grilse (presumably 2-year-old salmon).

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

Operation of the Oroville Facilities for the last 50 years has resulted in the lack of recruitment of bed load material to the lower Feather River, resulting in degraded spawning habitat and increased competition for the remaining suitable spawning gravels on riffles by anadromous fish, particularly between spring-run and fall-run Chinook salmon. In 2014, the B105 Gravel Supplementation and Improvement Project was constructed to address this problem. In June and July 2014, 8,300 cubic yards of clean spawning gravel were added to the 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 placed during the B105 Gravel Supplementation and Improvement Project in 2014. Additionally, the high flows filled in a small side channel below the FRFH known as Moe's Side Channel. In June 2017, DWR initiated the 2017 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 2019, redd surveys were performed in the gravel supplementation project area to continue gathering information on how salmon responded to the new gravel. Spawning sites outside of the gravel supplementation project area in the low-flow channel and the high-flow channel were also surveyed to document use and provide

information for future gravel projects in the lower Feather River.

The 2019 Chinook salmon redd survey began on September 3 and finished on November 22 (12 survey weeks). Survey locations from Table Mountain Riffle (RM 66.9) to Lower Auditorium Riffle (RM 66.4) were inspected for newly completed redds once a week by foot and boat. Survey locations downstream of the gravel supplementation project area from RM 66.1 to RM 59.4 were surveyed every other week.

Spawning in the high-flow channel typically occurs later than in the low-flow channel. Therefore, redd surveys in the high-flow channel were conducted later than surveys conducted in the low-flow channel. High-flow channel surveys began on September 30 and ended on November 22. Four surveys were performed in the high-flow channel: September 30, October 11, November 1, and November 22.

Overall, 5,044 redds were identified within the survey areas of the Feather River. A total of 4,840 redds were mapped in the low-flow channel, and 204 redds were mapped in the high-flow channel. Fifty-eight percent of the low-flow channel redds were found in the gravel supplementation project area.

The survey conducted from October 28 through November 1, which covered all survey areas from Table Mountain Riffle at the uppermost extent of the low-flow channel downstream to Developing Riffle in the high-flow channel, revealed the highest number of redds ($n=1,155$). The locations with the largest number of redds were Lower Auditorium Riffle with 737 (15 percent) and Trailer Park Riffle with 567 (11 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 2.8 meters (9.2 feet) by 1.5 meters (4.9 feet), respectively.

Steelhead

Beginning in 2003, DWR began collecting information on steelhead redds in the lower Feather River below Oroville Dam. This information is 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 NOAA Fisheries 2004 operation criteria and plan BiOp.

In 2019, the steelhead redd survey was conducted from January 3 to February 28. Steelhead redd surveyors observed 71 steelhead redds and 46 adult steelhead associated with redds during sampling. Average redd length was 1.29 meters (4.23 feet), and average redd width was 0.75 meters (2.46 feet).

FRFH Spring-run Chinook Salmon Tagging

To better manage brood stock 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 2019, 6,052 Central Valley spring-run Chinook salmon were tagged at the FRFH. Tagging began on May 6 and ended on June 28. Hatchery spawning began in late September, and a total of 4,548 tagged fish were recaptured: 3,866 at the FRFH and 682 in the river escapement survey.

Snorkel Surveys

From 1999 to 2007, DWR conducted snorkel surveys focused on juvenile steelhead, while other species were also counted in the process. In 2010, DWR reinstated the lower Feather River snorkeling surveys with the following objectives:

- (1) Determine the relative abundance and distributions 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.

High flow and turbidity limited the number and extent of surveys conducted in 2019. There were no surveys conducted in April and June, and limited surveys were completed in March and May. In July and August, all 21 permanent sites from RM 67 to RM 49 were surveyed. A total of 7,745 juvenile Chinook salmon were identified during the 2019 snorkel surveys. A total of 500 juvenile steelhead (fork length \leq 200 millimeters) were identified as well as 62 yearling and adult steelhead. One Chinook salmon and 10 steelhead were observed in the high-flow channel downstream of the Thermalito Afterbay Outlet during the July and August surveys. The low abundance of salmonids in the high-flow channel in the summer months is consistent with observations from previous years.

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 has occurred in all years but 2010 through 2012 to further document the distribution and condition of steelhead and salmon in both the low-flow and high-flow channels during the primary emigration and rearing period (roughly December through July).

Although targeted at steelhead and salmon, beach seining is useful to augment rotary 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

- (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 in or emigrating from the lower Feather River.

Beach seining surveys were conducted from January through August 2019. A total of 169 seine hauls captured a total of 18,686 fish. Nearly 90 percent (n=16,812) of the catch were native fish. Juvenile fall-run Chinook salmon (n=13,080), Sacramento sucker (*Catostomus occidentalis*, n=1,484), Sacramento pikeminnow (*Ptychocheilus grandis*, n=762), and juvenile cypriniforms (minnows, n=821) were the most abundant species captured. Other salmonids captured included juvenile steelhead (n=117), juvenile spring-run Chinook salmon (n=161), and hatchery-origin juvenile Chinook salmon (n=78). The high-flow channel accounted for 55 percent of the overall catch.

Sturgeon Studies

Green Sturgeon

The data collected during green sturgeon studies in the lower Feather River relates to potential adult migration barriers, migration patterns, distribution, habitat preferences, annual abundance of adults, and identification of spawning and rearing areas. The data will assist DWR in making long-term management decisions concerning future monitoring programs, operational changes to the facilities, and/or habitat enhancement within the lower Feather River. This SWP project scope has not changed since the prior reporting year. Green sturgeon studies will expand once the FERC license is accepted and the new BiOp is in effect.

2019 Sonar Surveys

A total of 90 sonar surveys were completed from January 14 to December 30, 2019. Surveys were conducted at seven locations from the Bear River (RM 12) to the Fish Barrier Dam (RM 67). A total of 144 sturgeon detections occurred in the Feather River along with another 27 in the Bear River. Green sturgeon overwintering from 2018 below the Fish Barrier Dam continued to be detected into the 2019 survey season (n=37). The bulk of the remaining detections in 2019 occurred at the Thermalito Afterbay Outlet (n=58) and Sunset Pumps Rock Weir (RM 38.5; n=51). Surveys suggested that an estimated 8–10 adult sturgeon were present at the Thermalito Afterbay Outlet. However, there were likely additional fish in the survey area that were undetected due to high flow and turbidity. An estimated 7–10 sturgeon were detected at Sunset Pumps Rock Weir.

2019 Egg and Larval Surveys

Ten egg mats were deployed at the Thermalito Afterbay Outlet from April 29 to July 9. A total of 17 green sturgeon eggs were recovered on July 3. Sturgeon eggs were collected from egg mats set at 7.9 meters; during sampling, water temperature was 19.5°C, and flow was measured at 5,092 cfs. Larval sampling was also conducted at 14 locations between Thermalito Afterbay Outlet and the Bear River through August 15, but no green sturgeon larvae were collected in 2019.

2019 Sturgeon Angling/Telemetry

No sturgeon were acoustically tagged in 2019, although a total of 15 previously tagged sturgeon entered the lower Feather River system. Of those, nine were identified as white sturgeon (*Acipenser transmontanus*) and six as green sturgeon. The average date upon entering the Feather River was March 27 for the white sturgeon and March 26 for the green sturgeon. Two of the green sturgeon were detected passing Sunset Pumps Rock Weir when flows were at 12,000 cfs

on March 31 and April 2. They were later detected on the spawning grounds near the Thermalito Afterbay Outlet before leaving the Feather River on May 22 and July 4.

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.

Surveys between 2012–2016 have documented a highly infectious zone for *C. shasta* that begins at the top of the high-flow channel and extends approximately 14 river miles downstream. While infection can occur as early as January, peak prevalence of infection and disease severity tend to occur in March.

2019 Observations and Experiments

The following was observed:

- Prevalence of *C. shasta* infection was observed at 34 percent by histology and 45 percent by quantitative real-time polymerase chain reaction (qPCR) in natural Chinook salmon fry captured at the Herring (RM 46) rotary screw trap.
- Initial *C. shasta* infections were detected in late January and diseased fry observed in ≥50 percent of the weekly samples collected by mid-March.
- A unique observation was the occurrence of diseased fish from the low-flow channel at the Eye Side Channel rotary

screw trap (RM 60) in April. Longitudinal water samples from the Eye Side Channel trap to Boyd's Pump (RM 22.3) demonstrated peak spores per liter at Herring in the high-flow channel.

- Three sentinel groups of fish were exposed for either two or four days within the infectious zone in February and early March, then reared for a total of 21 days post-exposure in the lab prior to histological examination. The four-day exposure groups showed a 2.3–6.4 times greater prevalence of *C. shasta* infection than the two-day exposure group, although none of the fish progressed into a disease state.
- FRFH spring-run salmon smolts released in the Feather River and captured downstream in the Delta were assayed for *C. shasta* infection by qPCR. Prevalence of *C. shasta* infection was 39 percent for fish released on March 31 and 10 percent for fish released on April 2.

Steelhead Mark-Recapture Study

An abundance estimate of wild steelhead spawning in the Feather River is currently lacking. 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 in the Feather River (hatchery versus natural origin, size, etc.). Furthermore, FRFH data suggest that nearly all steelhead are of hatchery origin, potentially biasing critical population data. However, redd survey, snorkeling, and angling data demonstrate that steelhead also spawn in the upper river, but abundance data is difficult to gather. 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 2019, a mark-recapture study was initiated 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 22 and December 31, steelhead caught by hook and line were tagged with passive integrated transponder tags and then released back into the river. A total of 135 fish were captured, nine of which were subsequently recaptured. Of those 135 fish, 89 were of hatchery origin (65.9 percent), and 46 were of natural origin (34.1 percent). The average fork length was 48.7 centimeters (19.2 inches). A population estimate using a modified Cormack-Jolly-Seber model was originally planned for completion by the fall of 2020; however, it will be completed in a few more years after additional data has been collected.

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 (*Morone saxatilis*) 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, DWR and DFW 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 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 was 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, Amendment 4. Total expenditures were \$14.59 million for the Lump Sum Account.

Since 1986, DWR has spent \$84.54 million on mitigation projects developed under the Delta Fish Agreement. Mitigation fund expenditures through December 31, 2019, were \$69.96 million for the Annual Mitigation Account.

Climate Change

California continued experiencing the effects of climate change, with more extreme weather, a reduced snowpack, and changes in runoff patterns, all affecting the management of the State's water resources. Models project more precipitation falling as rain instead of snow, which will increase flood risk and create additional challenges for water supply reliability. These hydrologic changes will challenge current and future operation of the SWP.

Throughout 2019, DWR continued conducting research on potential future impacts of climate change; reducing, monitoring, and reporting greenhouse gas (GHG) emissions; developing plans, strategies, and actions to improve the resiliency of SWP facilities and operations; reviewing and consulting with external experts; and providing climate data and resources. DWR continues to, and remains committed to, contributing to statewide, national, and international efforts to mitigate the impacts of climate change by reducing GHG emissions from its operations and adapting to unavoidable climate change impacts. More information can be found in DWR's Climate Action Plan, available on DWR's website.

Completed in 2019

Data Development and Distribution

2019 Hydroclimate Report. DWR monitors statewide precipitation and temperatures for both near-term programmatic SWP decision-making and for long-term trends. This data is summarized into an annual hydroclimate report available on DWR's website (*Hydroclimate Report Water Year 2019*). For a summary of the 2019 water year, see Chapter 7, Water Supply.

Ongoing During 2019

Research

Atmospheric Rivers and Climate Change.

Atmospheric rivers are key physical drivers in year-to-year outcomes for California's water year. Characterizing atmospheric rivers as they pertain to benefitting water supply and impacting flood hazards has the potential to add flexibility to water management in California. Examining past and present atmospheric river events can contribute to better monitoring and prediction and inform management practices. During 2019, DWR continued its partnership with the National Oceanic and Atmospheric Administration Earth System Research Laboratories and the Center for Western Weather and Water Extremes to continue collecting atmospheric river event data and developing decision-support materials. This project aims to increase understanding of the role of atmospheric river events in the development of annual water supply and flood events and how they may differ under climate change. The work will culminate with a book documenting two decades of atmospheric research at DWR and is expected to be released in 2020.

Precipitation-phase Partitioning. The amounts of precipitation, whether snow or rain, determine the amount of water that can be stored and delivered by the SWP. Increasing rates of precipitation falling as rain rather than as snow has led to ongoing

research in partnership with the Desert Research Institute to estimate trends in precipitation partitioning between rain and snow over major water supply basins. The results of this research will be used to inform water management strategies and is expected to be published in 2020.

Planning

Statewide Flood Management Planning.

Work continued on developing projected climate scenarios for the 2022 update to the *Central Valley Flood Protection Plan*. The resulting scenarios will be used to inform system-wide planning.

Data Collection and Climate Services.

In 2019, DWR continued developing tools and partnerships related to California water management:

- Supporting updates to the California Climate Tracker at the Western Region Climate Center continued.
- In partnership with the National Oceanic and Atmospheric Administration Earth System Research Laboratories, work continued to advance sub-seasonal and seasonal forecasting with support for over 100 observing instruments for atmospheric rivers.
- The Advanced Quantitative Precipitation Information system project advanced with several additional local radar systems installed in support of forecast modeling for integrated water management.
- Work on the Bulletin 195 (*Rainfall Analysis for Drainage Design*) tool was temporarily paused pending assignment of new staff.
- Work continued with the Center for Western Weather and Water Extremes on developing new tools related to helping water managers with projecting atmospheric rivers and yielded additional data and decision-support products.
- Through funding from the Atmospheric Rivers: Research, Mitigation, and Climate

Forecasting Program (California Water Code Section 347; Chapter 682, Statutes of 2015 [Senate Bill 758, Block]), U.S. Air Force C-130 aircraft were deployed on atmospheric river reconnaissance missions, called “AR Recon,” that yielded data for operational weather forecast models. Dropsondes (instruments released from aircraft to obtain temperature, wind, and relative humidity) were used.

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 of 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 began updating its *Greenhouse Gas Emissions Reduction Plan* in 2019 to reflect new emissions reduction requirements for the years 2030 and 2045 per legislation and executive orders. This update is expected to be released in 2020.

DWR’s five-year average of GHG emissions spanning years 2013–2017 was 74 percent below 1990 levels and 65 percent below 2010 levels. 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 2017 emissions should be approximately 1.8 million metric tons of carbon dioxide equivalent 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 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.

The final guidance document, titled *Climate Action Plan Phase II: Climate Change Analysis Guidance*, was adopted in September 2018. A draft Water Resources Engineering Memorandum, codifying the guidance as a DWR planning policy, remains under circulation. A climate change vulnerability assessment and adaptation analysis specifically focused on the SWP was completed in 2019. The assessment results and final report are titled *Decision Scaling Climate Vulnerability Assessment for the California Department of Water Resources*.

Lastly, the Climate Change Program is conducting an alignment analysis of DWR climate change guidance. The analysis will examine climate change requirements, resources, and guidance issued by DWR with a goal of creating climate change planning consistency among projects and programs. An inventory of programs and projects that include climate change planning has been conducted. The next step will be creation of a draft summary of results and development of an alignment plan. This is expected to be completed in early 2020.

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.

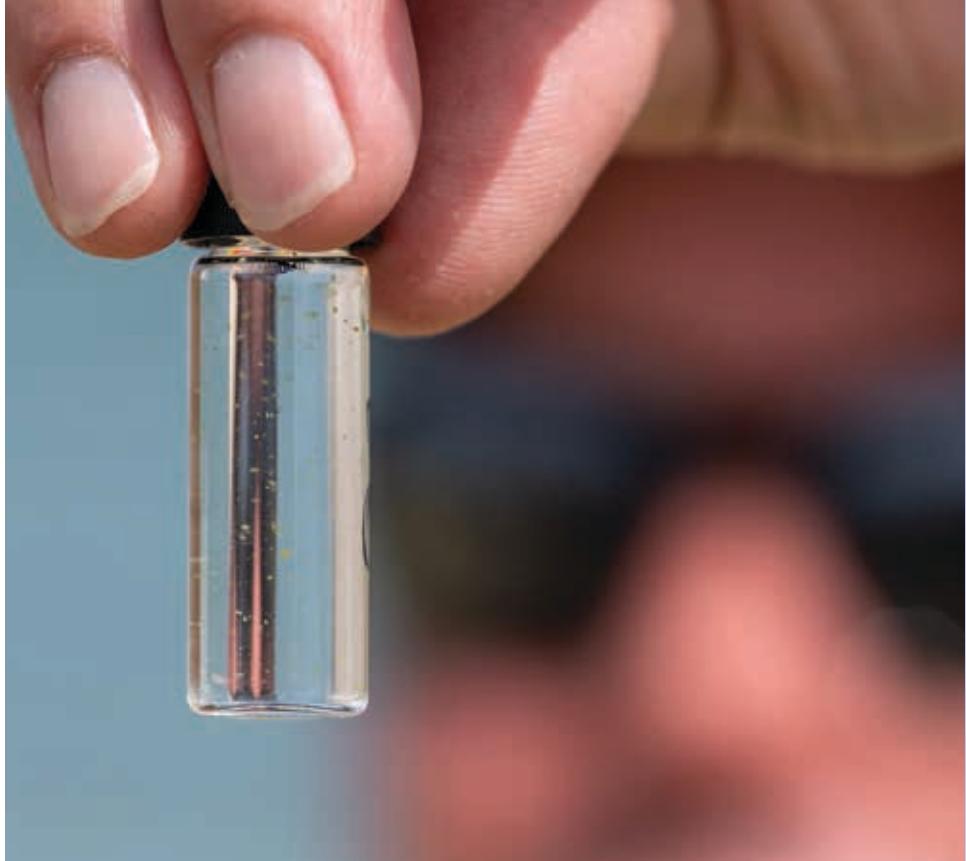
During 2019, the DWR vulnerability assessment was released.

A workgroup has been assigned for the development of the DWR Climate Change Adaptation Plan. A draft document is expected in 2020.

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 2019, DWR reported its 2018 GHG emissions to The Climate Registry. The reported emissions were verified by The Climate Registry and DWR received Climate Registered status.

In 2019, DWR submitted its annual report to the California Air Resources Board for emission year 2018. The report included energy generated and consumed by the SWP and sulfur hexafluoride emissions associated with the SWP's switchyard circuit breakers. DWR complied with the reporting deadlines as well as the emission limits required by the regulations. Additionally, DWR participated in the first year of emissions reporting as part of the Water-Energy Nexus Registry. Reporting emissions for year 2018, DWR reported the emissions per acre-foot of water delivered as part of this performance metric.



Chapter 4

Water Quality Programs

A water sample is collected for analysis near the Basalt Boat Ramp on the San Luis Reservoir. The green color in the sample is from an algae bloom.

Significant Events in 2019

*O*n February 25, 2019, the Office of Administrative Law approved amendments to the *Water Quality Control Plan for the San Francisco Bay/Sacramento-San Joaquin Delta Estuary* (Bay-Delta Plan) that had been adopted by the State Water Resources Control Board (State Water Board) on December 12, 2018. The amendments are now in effect.

This was the Department of Water Resources' (DWR) final year of providing funds to the Mercury Exposure Reduction Program.

The Bryte Chemical Laboratory upgraded its capability and capacity to detect and analyze trace levels of metals with the purchase of an inductively coupled argon plasma mass spectrometer in 2019. The fully automated and computer-controlled analytical instrument is equipped with a 120-position autosampler that generates highly stable, accurate, and reproducible data.

Information in this chapter was contributed by the Division of Integrated Science and Engineering, 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 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 adopted by the State Water Board. In July 2014, the Drinking Water Program 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 Water Supply Contracts. (See Chapter 8, 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 12, 2018 (Resolution No. 2018-0059).

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 6, 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.

2018–2019 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. The water quality control plans 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 12, 2018. 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 water quality control plan 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 2018 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 U.S. 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 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 2018–2019.

For a detailed discussion of water year 2018–2019, see Chapter 7, Water Supply.

Bay-Delta Plan Review

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

The water quality control plan 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 process of updating the Bay-Delta Plan is currently managed through two amendments administered by the State Water Board.

The first amendment is from State Water Board Resolution No. 2018-0059, in which the State Water Board adopted the amendments and final substitute environmental document finalizing the Lower San Joaquin River flow objectives and the revised southern Delta salinity objectives. The Office of Administrative Law approved

the amendments on February 25, 2019, and they are now in effect.

A second amendment is under consideration that focuses on the Sacramento River and its tributaries, Delta outflows, Delta eastside tributaries (including the Calaveras, Cosumnes, and Mokelumne rivers), and interior Delta flows.

SWP Operations to Meet Delta Water Quality Requirements

In 2019, DWR and the U.S. 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 of 1973 and the California Endangered Species Act of 1970 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.

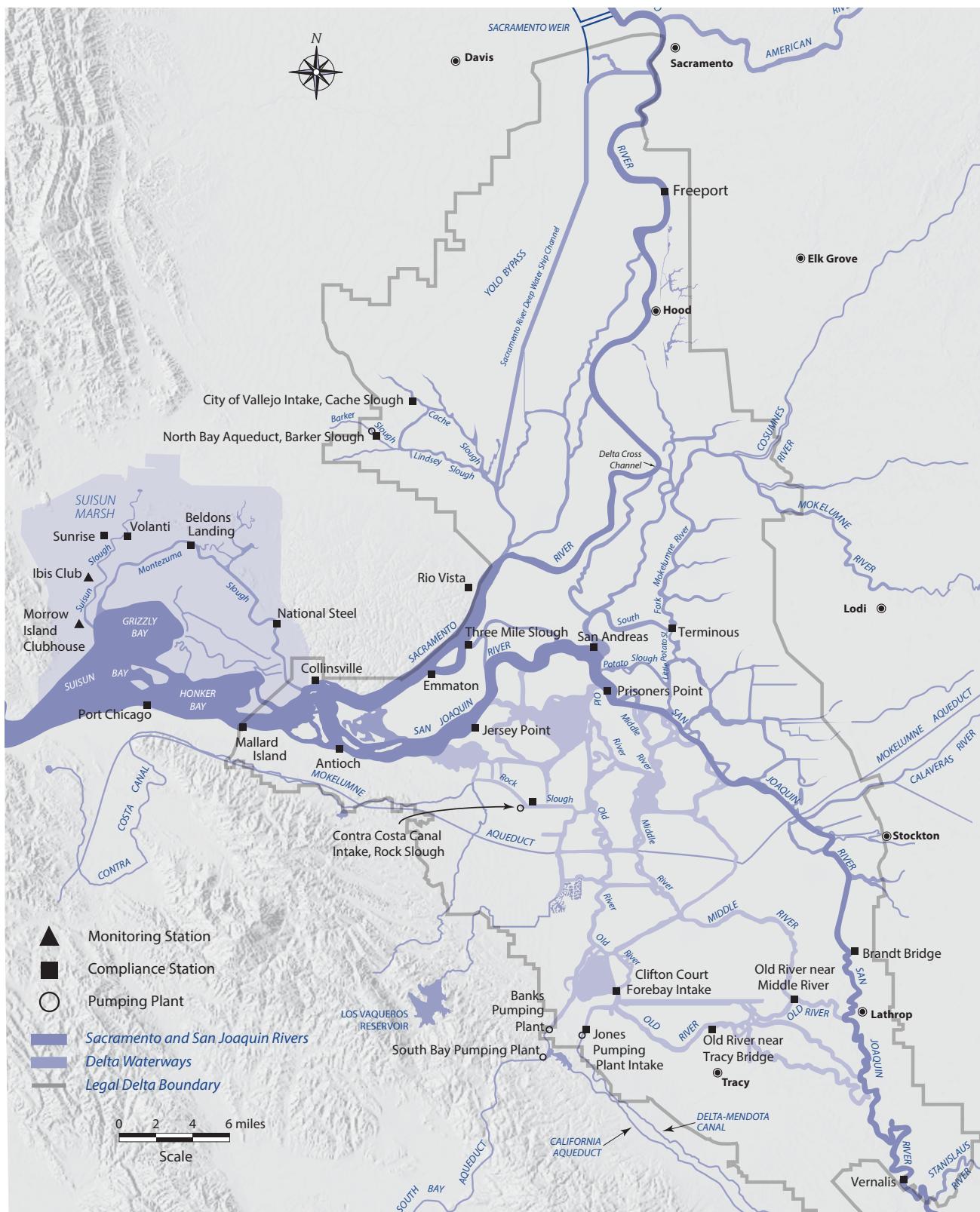


Figure 4-1 D-1641 Water Quality Compliance and Monitoring Stations in the Sacramento-San Joaquin Delta

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 2019, the gates were open for 162 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 (DFW).

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 2019.

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 2019, the objective of 240 days for a wet water year was met.

Agricultural Salinity Objectives

The Bay-Delta Plan contains agricultural salinity objectives (specified as electrical conductivity, or EC—see the 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, 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 water year objective was met at Terminous, San Andreas, and Emmaton. However, the objective was not met at Jersey Point for two days in 2019.

In the South Delta, salinity may be influenced by San Joaquin River flows, in-Delta diversions, and SWP exports. 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, and San Joaquin River at Brandt Bridge. However, the objective was not met at Old River near Tracy Road Bridge for 24 days. 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.

For a summary of State Water Board actions related to South Delta salinity objectives, see Bulletin 132-18.

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

two parts per thousand isohaline (two 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 7, 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 three-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 2019, in million acre-feet, was 2.83, 5.20, 5.89, 6.16, and 4.97, 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

27 days in June. The X2 habitat protection objective at Port Chicago was 29 days in March, 27 days in April, 29 days in May, and two days in June.

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 2018 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 2019, the monthly mean NDOI was highest in March, averaging 124,648 cfs. The lowest monthly mean NDOI occurred in November with 6,648 cfs, which was above the objective of 4,500 cfs. All monthly NDOI objectives were met in 2019.

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 2018–2019 was below normal, 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 seven-day running average could not be more than 1,000 cfs below the monthly standard. The actual mean monthly flows were 12,078 cfs in September; 13,559 cfs in October; 6,648 cfs

in November; and 14,116 cfs in December. The monthly and seven-day average Rio Vista flow requirements were met for calendar year 2019.

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 2018–2019. If the position of X2 is required to be at or west of Chipps Island, the required minimum monthly average Vernalis flow is 2,280 cfs from February to April 14 and May 16 to June. Otherwise, the Vernalis base-flow objective is 1,420 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.)

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 three-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 three-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 three-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 2019, the Delta was in excess conditions from January 8 to June 30, and November 27 to December 31, for a total of 209 days. Within this period, the 14-day export/inflow ratio averaged 17 percent, meeting both the 35 percent and 65 percent limitations for the year.

The Delta was in balanced conditions from January 1 to January 7, and from July 1 to November 26, for a total of 156 days. Within this period, the three-day export/inflow ratio averaged about 34 percent, meeting both the 35 percent and 65 percent limitations for the year.

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 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, now called the Division of Integrated Science and Engineering, to assist DWR in complying with the Central Valley Regional Water Quality Control Board's (Central Valley Water Board) Delta Mercury Control Program. The Delta Mercury Control Program was adopted in 2010 to address mercury and methylmercury (MeHg) water quality impairments in the Delta. Responsibilities include conducting wetlands, open water, and dredging studies required by regulation, as well as providing funds for a Mercury Exposure Reduction Program. For more background information about the program, see Bulletin 132-14.

Completed and continuing work in 2019 included the following:

- completion of a fourth and final tidal wetland control study to characterize mercury imports and exports in tidal wetlands
- drafting of a compliance report for the tidal wetland control study
- completion of final vegetation senescence mesocosm experiment to study internal production of MeHg in the flooded Yolo Bypass and to explore a best management practice to address this effect

- presentation of the Yolo Bypass and Delta mercury models to the Delta Mercury Tributaries Council
- continued collaboration between DWR and consultant to create a mercury model for the Delta and Yolo Bypass
- production of various public health educational materials to support public outreach for the Mercury Exposure Reduction Program

Tidal Wetlands

In 2019, DWR completed a year-long study of the fourth of four tidal wetlands, the Cosumnes River Tidal Wetland, owned by Westervelt Ecological Services. The wetland is east of Thornton and south of the Cosumnes River Preserve. DWR collected mercury data for three 25-hour tidal cycles. Water flow imports and exports were measured continuously using an acoustic Doppler current profiler. Water quality samples were collected only in January and July because of flooding that rendered the tidal wetland unmeasurable. An autosampler collected hourly water samples over the course of a full tidal cycle. In the laboratory, hourly samples were flow-weight composited into two sets of ebb tide and two sets of flood tide samples for each breach. Water samples were analyzed for total and dissolved mercury and MeHg, as well as other water quality parameters. Bryte Chemical Laboratory analyzed all samples except MeHg, which were analyzed by Moss Landing Marine Laboratories. The data collected during these events were entered by Bryte Chemical Laboratory into their Field and Laboratory Information Management System database, which was uploaded to DWR's Water Data Library. Loads were calculated from acoustic Doppler current profiler flow data and concentration data from composited water quality samples.

With field sampling complete, DWR analyzed the data and began working on a compliance report for the Central Valley Water Board,

which is expected to be submitted by April 3, 2020.

Open Water

Mesocosm Investigations

In 2019, DWR completed a third and final mesocosm study that focused on evaluating managed vegetation as a possible source of the observed internal production of MeHg in the flooded Yolo Bypass. As discussed in Bulletin 132-19, a laboratory experiment was completed in 2018 to evaluate vegetation decay and land use practices as a possible best management practice to reduce MeHg production. This was the second mesocosm study and was a follow-up to a study in 2017. Pasture vegetation was chosen because, based on land use maps developed for the Yolo Bypass mercury model, pasture is the largest managed land use in the Yolo Bypass. Both mesocosm experiments tested the following hypotheses:

- (1) Grazing land will lower MeHg releases to overlying flood water.
- (2) Disking land will lower MeHg releases to overlying flood water.
- (3) More vegetation results in more MeHg releases to overlying flood water.

This mesocosm experiment specifically tested two new hypotheses:

- (1) Cattle grazing of pasture as a land management practice will lower filtered MeHg production to overlying water during flood events more than un-grazed pasture by reducing the biomass of vegetation.
- (2) Disking of pastureland will lower filtered MeHg production to overlying water during flood events by removing emergent vegetation available for methylation.

Preliminary results confirm that pastureland is a significant internal source of MeHg to overlying water in the Yolo Bypass during

a flood event. Disking appears to decrease the production of filtered MeHg to overlying water the most, more than un-grazed or grazed pastureland, though grazing of pastureland may be a viable management practice. More research is needed to determine how effective grazing is at reducing MeHg during floods.

These data and this study will be included in a compliance document for the Central Valley Water Board, due August 31, 2020.

Modeling

To fulfill Phase 1 open water regulatory requirements, DWR is developing MeHg models for the Delta and the Yolo Bypass (see Bulletins 132-13 and 132-14). Data from the open water field studies provides some of the information for the development of the Yolo Bypass mercury model. DWR's Delta Simulation Model 2 is being used for mercury modeling in the Delta. The Dynamic Mercury Cycling Model is being used to model mercury in the Yolo Bypass. Additionally, the Bay-Delta Office has been funding a separate effort to modernize the Delta Simulation Model 2, via the development of the General Transport Model. The Mercury Monitoring and Evaluation Section helps fund the routines required in the General Transport Model for mercury modeling. Progress on developing both the Yolo Bypass and Delta mercury models was presented at the Delta Tributaries Mercury Council meeting on September 26, 2019.

Delta Mercury Model. In 2019, DWR made progress extending the Delta Simulation Model 2 to include mercury, suspended sediments, and bed sediment. The application of Delta Simulation Model 2 for mercury is known as DSM2-Hg. DWR linked the Delta mercury model with the Yolo Bypass mercury model by using the outputs from the Yolo Bypass mercury model as the Yolo Bypass input to the Delta mercury model. The bed sediment

module development and testing continued. Preliminary calibration of the mercury module was completed, and further refinements are in progress.

Yolo Bypass Mercury Model. In 2019, significant headway was made regarding the application of the Dynamic Mercury Cycling Model to simulate mercury in the Yolo Bypass. Data needed for model application from 1996–2012 were assembled, including improved estimates of external loads of total mercury and MeHg from major tributaries to the Yolo Bypass. The modeling approach was refined to better consider the effects of vegetation on mercury cycling in the Yolo Bypass, especially as a source of organic matter which affects MeHg production. The model calibration approach was also improved from performing manual calibration to using parameter estimation software, which repeatedly ran simulations with updated parameter values to improve the model fit to observations (model fit in statistics measures the differences between observed data and model-implied data). This was done in collaboration with the U.S. Geological Survey, which led the parameter estimation software effort.

Dredging

DWR was named in the Delta Mercury Control Program as a potential “discharger” for dredging. However, as discussed in Bulletin 132-14, no dredging activity was identified during the Phase I period of the regulation. Therefore, DWR was not required to submit control study work plans for dredging to the Central Valley Water Board. In 2019, the Mercury Monitoring and Evaluation Section continued to provide mercury guidance to DWR for proposed projects involving dredging or spoils usage.

Delta Mercury Exposure Reduction Program

Elevated concentrations of mercury in fish pose a human health threat. The objective

of the Delta Mercury Exposure Reduction Program, as part of the Delta Mercury Control Program, is to decrease mercury consumption of affected populations in the Delta and Yolo Bypass. DWR has provided funding for educational outreach to reduce human exposure to mercury from consumption of contaminated Delta fish. The Mercury Monitoring and Evaluation Section has provided up to \$20,000 per year of in-kind support for brochure and sign production. In 2019, DWR’s Public Affairs Office facilitated the production of place mats, stickers, and bookmarks using funding provided by the Mercury Monitoring and Evaluation Section. These items were provided to the Central Valley Water Board and Delta Conservancy, which worked with stakeholders to post them throughout the Delta compliance area. This was DWR’s final year of providing funds to the Mercury Exposure Reduction Program.

Statewide Mercury Control Policy and Mercury Control Program for Reservoirs

The State Water Board was developing a statewide mercury policy to control mercury in California’s waters. Regulatory delays originally pushed back the adoption date for this regulation from 2016 to 2017; however, in 2018, regional groups and the State Water Board indicated that the development of this regulation was in “controlled delay” as the State Water Board works through other issues on its agenda. Six DWR reservoirs or inland water bodies will be regulated under this new regulation: Castaic Lake, Lake Del Valle, Lake Oroville, Pyramid Lake, Silverwood Lake, and Thermalito Afterbay. Of the jointly owned or operated water bodies, it is unclear whether Reclamation or DWR will be responsible for O’Neill Forebay, San Luis Reservoir, and Los Banos Reservoir, and whether DWR or DFW will be responsible for Mile Long Pond.

In 2019, because the regulation's development was on hold, the Mercury Monitoring and Evaluation Section waited for a resumption of progress.

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.

Stockton Deep Water Ship Channel and Lower San Joaquin River Low Dissolved Oxygen

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 and fall Head of Old River barriers were not installed in 2019 because of high flows on the San Joaquin River.

Methods

In 2019, continuous DO concentration monitoring in the Stockton Deep Water Ship Channel was conducted remotely at Rough and Ready Island near the Port of Stockton aeration facility. Additional discrete monitoring conducted by boat was triggered if the daily mean DO concentration remained below 5.5 mg/L (December–August) or 6.5 mg/L (September–November) for three consecutive days. During discrete sampling, DO was measured at five stations along the San Joaquin River above and below the aeration facility.

Results

In 2019, because daily mean DO concentrations did not fall below objectives or trigger levels, discrete sampling by boat was not conducted. The overall daily mean range was 6.33 to 10.13 mg/L at the surface and 6.02 to 10.13 mg/L at the bottom. The daily mean range from September through November was 6.70 to 9.55 mg/L at the surface and 6.52 to 9.53 mg/L at the bottom.

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
- 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 2019. 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 184 species of benthic macrofauna were collected in 2019 at the 10 sampling sites. Of the 184 species, 10 represented more than 82 percent of all organisms collected:

- amphipods: *Americorophium spinicorne*, *Corophium alienense*, *Ampelisca abdita*, and *Gammarus daiberi*

- Asian clams: *Corbicula fluminea* and *Potamocorbula amurensis*
- sabellid polychaete: *Manayunkia speciosa*
- tubificid worms: *Limnodrilus hoffmeisteri* and *Varichaetadrilus angustipenis*
- Ostracod: *Cyprideis* sp. A.

Of the 10 dominant species, *Potamocorbula amurensis*, *Corophium alienense*, 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 seven species, *Gammarus daiberi*, *Manayunkia speciosa*, *Limnodrilus hoffmeisteri*, *Varichaetadrilus angustipenis*, *Cyprideis* sp. A, *Americorophium spinicorne*, 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 five 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 2019 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

- Franks 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 2019, 98.1 percent (153 samples) had chlorophyll *a* levels below 10 micrograms per liter ($\mu\text{g}/\text{L}$). Chlorophyll *a* levels below 10 $\mu\text{g}/\text{L}$ are considered limiting for zooplankton growth. The three samples with chlorophyll *a* concentrations above 10 $\mu\text{g}/\text{L}$ were all collected on the San Joaquin River in July, August, and September. The mean chlorophyll *a* concentration for all samples in 2019 was 2.40 $\mu\text{g}/\text{L}$; the median value was 1.69 $\mu\text{g}/\text{L}$. In 2018, the mean was slightly higher (4.13 $\mu\text{g}/\text{L}$), as was the median (2.23 $\mu\text{g}/\text{L}$). The maximum chlorophyll *a* concentration in 2019 was 38.10 $\mu\text{g}/\text{L}$, recorded in July on the San Joaquin River at Vernalis. It was much lower than the maximum in 2018 (71.87 $\mu\text{g}/\text{L}$). The minimum chlorophyll *a* concentration was 0.56 $\mu\text{g}/\text{L}$, recorded in June on Old River opposite Rancho del Rio.

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 2019 was 1.37 $\mu\text{g}/\text{L}$, and the median value was 0.91 $\mu\text{g}/\text{L}$. The maximum pheophytin *a* concentration was 13.55 $\mu\text{g}/\text{L}$, recorded in Franks Tract near Russo's Landing in February. The minimum pheophytin *a* concentration was 0.50 $\mu\text{g}/\text{L}$, recorded in both the Sacramento River at Greene's Landing in March and Suisun Bay at Bull's Head Point near Martinez in August.

Cyanobacteria and green algae constituted 99.1 percent of the organisms collected in 2019. Cyanobacteria alone constituted 97.8 percent because of the presence of small-celled but numerically dominant genera such as *Chroococcus* and *Eucapsis*.

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

- (1) cyanobacteria (class Cyanophyceae)
- (2) green algae (class Chlorophyceae)
- (3) centric diatoms
(class Coscinodiscophyceae)
- (4) pennate diatoms (classes Bacillariophyceae and Fragilarophyceae)
- (5) cryptophyte flagellates
(class Cryptophyceae)
- (6) chrysophyte flagellates
(class Chrysophyceae)

- (7) haptophyte flagellates (class Prymnesiophyceae)
- (8) dinoflagellates (class Dinophyceae)
- (9) euglenoid flagellates (class Euglenophyceae)
- (10) ciliates (class Ciliata)

The 10 most common genera collected were

- (1) *Eucapsis* (cyanobacterium);
- (2) *Chlorella* (green alga);
- (3) *Chroococcus* (cyanobacterium);
- (4) *Cyclotella* (centric diatom);
- (5) *Plagioselmis* (cryptophyte flagellate);
- (6) *Nitzschia* (pennate diatom);
- (7) *Skeletonema* (centric diatom);
- (8) *Aulacoseira* (centric diatom);
- (9) *Coccomyxa* (green alga); and
- (10) *Cocconeis* (pennate diatom).

One species of *Chroococcus*, *C. microscopicus*, was moved to a new genus, *Eucapsis*, in 2018. Other species of *Chroococcus* are retained in the genus, hence they are not combined with *Eucapsis*. The high numbers of *Eucapsis* compared to *Chroococcus* are due to this name change.

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. For additional constituents like pesticides, herbicides, and organic compounds, samples are sent to a third-party laboratory.

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), and fluorometry (a measurement of algal biomass). SWP 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 2019. Data for selected constituents are summarized below.

Specific Conductance

Specific conductance (also referred to as 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 ($\mu\text{S}/\text{cm}$) for potable water and over 50,000 $\mu\text{S}/\text{cm}$ for sea water. Mean annual EC was 88 $\mu\text{S}/\text{cm}$ at Thermalito Afterbay; 322 $\mu\text{S}/\text{cm}$ at the North Bay Aqueduct, Barker Slough Pumping Plant; and 306 $\mu\text{S}/\text{cm}$ at the Delta-Mendota Canal. Mean EC ranged from 262 to 398 $\mu\text{S}/\text{cm}$ 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 7.5 mg/L, while concentrations in the California Aqueduct and Delta-Mendota Canal ranged from 3.3 to 3.9 mg/L.

Bromide

Bromide is another parameter that has the potential to form trihalomethanes during water treatment. Bromide concentrations ranged from 0.04 mg/L at Thermalito

Afterbay to 0.17 mg/L at Tehachapi Afterbay (Check 41).

Turbidity

Turbidity monitoring is important because of the potential for elevated turbidity to increase the cost of water treatment. The North Bay Aqueduct, Barker Slough Pumping Plant and the Delta-Mendota Canal at McCabe Road exhibited the highest levels of turbidity with annual means of 21.8 nephelometric turbidity units (NTU) and 15.1 NTU, respectively. Other locations had mean turbidity values ranging from 2.7 to 10 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 at the head of the North Bay Aqueduct. Concentrations at Banks Pumping Plant and in the Delta-Mendota Canal at McCabe Road were 0.001 mg/L while concentrations south of O'Neill Forebay at Check 13 to Devil Canyon Powerplant were slightly higher at 0.002 mg/L (see Table 4-1). 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 2019, 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, excluding Thermalito Afterbay but including the East Branch Aqueduct at Check 66.

Table 4-1 Mean Water Quality at Selected SWP Grab Sample¹ Locations in 2019

Constituent	Units ²	Reporting Limit	California Aqueduct					
			North Bay Aqueduct, Barker Slough Pumping Plant	Thermalito Afterbay at Outlet	Delta-Mendota Canal Upstream of McCabe Road	Banks Pumping Plant	O'Neill Forebay Outlet (Check 13)	Kettleman City (Check 21)
Antimony	mg/L	0.001	<RL	<RL	<RL	<RL	<RL	<RL
Arsenic	mg/L	0.001	<RL	0.003	0.001	0.001	0.002	0.002
Beryllium	mg/L	0.001	<RL	<RL	<RL	<RL	<RL	<RL
Boron	mg/L	0.1	<RL	0.2	0.1	<RL	0.1	0.1
Bromide	mg/L	0.01 or 0.05	<RL	0.04	0.12	0.1	0.16	0.16
Calcium	mg/L	1	8	17	15	13	16	17
Chloride	mg/L	1, 5, or 10	1	22	38	32	52	54
Chromium	mg/L	0.001	<RL	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
Hardness	mg/L as CaCO ₃	1	36	98	72	64	80	79
Iron	mg/L	0.005	0.023	0.081	0.027	0.031	0.026	0.021
Lead	mg/L	0.001	<RL	<RL	<RL	<RL	<RL	<RL
Magnesium	mg/L	1	4	13	8	7	10	10
Manganese	mg/L	0.005	<RL	0.047	0.001	0.008	0.003	0.001
Nitrate + Nitrite	mg/L as N	0.05	0.01	0.23	0.7	0.42	0.51	0.49
Dissolved Organic Carbon	mg/L as C	0.5	NR	7.5	3.4	3.9	3.7	3.4
Ortho-Phosphate	mg/L as P	0.05	<RL	0.15	0.1	0.08	0.09	0.08
Selenium	mg/L	0.001	<RL	<RL	<RL	<RL	<RL	<RL
Sodium	mg/L	1	3	31	35	26	39	43
Sulfate	mg/L	1 or 10	2	31	27	19	27	27
Zinc	mg/L	0.005	<RL	<RL	<RL	<RL	<RL	<RL
Field Turbidity	NTU	0.1	2.7	21.8	15.1	7.2	7.5	10
Specific Conductance	µS/cm	1	88	322	306	262	359	340
Total Alkalinity	mg/L as CaCO ₃	1	42	98	59	53	62	61
Total Dissolved Solids	mg/L	1 or 2.5	58	185.7	169.5	146.1	201.4	199.8
Total Organic Carbon	mg/L as C	0.5	NR	7	3.3	3.6	3.4	3.6
Total Phosphorus	mg/L as P	0.01 or 0.05	0.01	0.22	0.11	0.09	0.1	0.09

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; mg/L as CaCO₃ = milligrams per liter as calcium carbonate; mg/L as C = milligrams per liter as carbon; mg/L as N = milligrams per liter as nitrogen; mg/L as P = milligrams per liter as phosphorous; µS/cm = microsiemens per centimeter; NTU = nephelometric turbidity unit; NR = No data recorded at this location; <RL = Value is less than lab's reporting limit.

The concentrations of the detected pesticides and herbicides ranged from 0.02 to 0.75 µg/L. In March, four locations reported detectable concentrations of simazine. Concentrations ranged from 0.02 to

0.03 µg/L. In June, the herbicide metolachlor was detected at Barker Slough Pumping Plant on the North Bay Aqueduct (0.07 µg/L) and at the O'Neill Forebay Outlet (Check 13) on the California Aqueduct (0.05 µg/L).

Table 4-2 Pesticides, Herbicides, and Other Organic Substances Detected in the SWP in 2019

Sampling Location ¹	Sampling Station ID Number	Sample Date	Chemical Detected ²	Concentration (micrograms per liter)
California Aqueduct at Banks Pumping Plant	KA000331	3/19/2019	none	--
		6/19/2019	none	--
		9/17/2019	2,4-D ³	0.75
California Aqueduct at O'Neill Forebay Outlet (Check 13)	KA007089	3/19/2019	none	--
		6/18/2019	Metolachlor	0.05
		9/17/2019	2,4-D ³	0.6
California Aqueduct near Kettleman City (Check 21)	KA017226	3/19/2019	Simazine	0.02
		6/18/2019	none	--
		9/17/2019	2,4-D ³	0.21
Teerink Pumping Plant	KA027813	3/19/2019	Simazine	0.02
		6/17/2019	none	--
		9/18/2019	2,4-D ³	0.22
California Aqueduct at Tehachapi Afterbay (Check 41)	KA030341	3/20/2019	Simazine	0.02
		6/19/2019	none	--
		9/18/2019	2,4-D ³	0.22
East Branch Aqueduct at Check 66	KA040341	3/20/2019	none	--
		6/19/2019	none	--
		9/23/2019	2,4-D ³	0.1
California Aqueduct at Devil Canyon Powerplant Second Afterbay	KA041323	3/20/2019	Simazine	0.03
		6/19/2019	none	--
		9/23/2019	2,4-D ³	0.11
North Bay Aqueduct, Barker Slough Pumping Plant	KG000000	3/19/2019	none	--
		6/19/2019	Metolachlor	0.07
		9/17/2019	Metolachlor	0.05
Delta-Mendota Canal upstream of McCabe Road	DMC06716	3/19/2019	none	--
		6/18/2019	Triclopyr	0.18
		9/17/2019	2,4-D ³	0.29

¹ Water at these locations was sampled in March, June, and September 2019.

² Only chemicals found above the minimum reporting limit are included in this table.

³ 2,4-D = dichlorophenoxyacetic acid

Additionally, triclopyr was detected in the Delta–Mendota Canal upstream of McCabe Road (0.18 µg/L). In September, the herbicide 2,4 dichlorophenoxyacetic acid (2,4-D) was detected at eight of the 12 sites sampled. The only sites without detections of 2,4-D were on the North Bay Aqueduct, South Bay Aqueduct, and at Clifton Court Forebay. The remaining sites ranged from 0.11 to 0.75 µg/L. Additionally in September, metolachlor was again detected at Barker Slough Pumping Plant (0.05 µg/L). The detected amounts of pesticides were below established maximum contaminant levels.

In addition to the March, June, and September samples, select volatile organic compounds were sampled monthly at Barker Slough Pumping Plant, the Clifton Court Forebay, Banks Pumping Plant, and South Bay Aqueduct at Check 7. As is typical for these samples, there were no detections for any compounds.

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, which are produced in water bodies by cyanobacteria. Geosmin and methylisoborneol 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 methylisoborneol 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 methylisoborneol. 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 associated with the elevated geosmin and/or methylisoborneol concentrations. In 2019, DWR applied aquatic algaecides to control taste- and odor-producing cyanobacteria in Patterson Reservoir, Silverwood Lake, and Lake Perris.

Cyanotoxin Monitoring

DWR routinely monitors cyanotoxins at SWP water quality monitoring stations. Samples are analyzed by microscopy for the presence of potentially toxigenic cyanobacteria, followed by cyanotoxin analysis if recommended based on the microscopy results. Monitoring results are shared with water contractors so that they may proactively make water treatment adjustments to remove cyanotoxins in their source water. During 2019, cyanotoxins were detected at water quality monitoring stations in San Luis Reservoir, Pyramid Lake, Castaic 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. Most non-SWP water originates as groundwater pumped into the California Aqueduct through turn-in structures in the southern San Joaquin Valley. Non-SWP water, including groundwater turn-ins, 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. Turn-in water is used for local redistribution or in transfers to other water contractors. Participants of an approved turn-in program can use available aqueduct capacity to move candidate waters from a point of availability to a point of need.

Turn-in Volumes

A total of 54,758 acre-feet of non-SWP turn-in water was admitted to the California Aqueduct during 2019 (Table 4-3). This water originated as excess surface water from several agencies in the San Luis and San Joaquin field divisions. Westlands Water District conveyed excess Kings River water through Mendota Pool and Lateral 7 (3,602 acre-feet). The Kern County Water Agency conveyed 5,114 acre-feet from the Friant-Kern Canal and the Kern River through the Cross Valley Canal. The Kern Water Bank Authority conveyed 40,181 acre-feet of Kern River water through the Kern Water Bank Canal. Arvin-Edison Water Storage District conveyed 5,861 acre-feet of Friant-Kern Canal water through the Arvin Canal.

Turn-in Water Quality

Turn-in water quality is highly dependent on the water's source. Turn-in waters originating as groundwater tend to be higher in concentration for arsenic, chromium, and nitrate compared to the California Aqueduct, while similar or lower in concentration for other constituents. Conversely, turn-in waters originating as surface waters (typically from Sierra Nevada reservoir releases) tend to be lower than the California Aqueduct for most constituents. However, on the path to the California Aqueduct, these waters can pick up additional sediment and constituents bound to sediment.

Monitoring in the California Aqueduct upstream and downstream of the turn-ins during 2019 showed water quality was almost always positively affected, with concentrations for most high-profile constituents decreasing after the turn-in locations and with only sporadic increases of arsenic, chromium, and organic carbon for a few sample pairs. The increases in these constituents are a concern because of their potential threat to human health. However, the lowering of other constituents, including disinfection by-product precursors such as

Table 4-3 Turn-ins to the California Aqueduct in 2019

Water Agency	Amount (acre-feet)
Arvin-Edison Water Storage District	5,861
Kern County Water Agency	5,114
Kern Water Bank Authority	40,181
Westlands Water District (Lateral 7)	3,602
Total	54,758

dissolved organic carbon, provided a net benefit to SWP Contractors because these parameters can increase both the cost of producing drinking water and the potential for creating harmful trihalomethanes during the treatment process.

San Joaquin Valley Agricultural Water Quality Programs

A number of programs conduct or support monitoring, research, training, or demonstration projects related to San Joaquin Valley agricultural water quality. For information about these programs, including the Agricultural Drainage Program and San Joaquin River Water Quality Grant Program, see the chapters about Local Assistance in Bulletins 132-94 through 132-18. (For a complete history, the phrase "local assistance" first appears in Bulletin 132-88, Chapter 3, SWP Administration Activities. Bulletins 132-90 and 132-91 also contain information about local assistance—see Assisting Local Water Supply Projects sections. Finally, Bulletins 132-92 and 132-93 each contain a chapter called Assisting Local Water Supply Projects.)

Municipal Water Quality Program Branch

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

Municipal Water Quality Investigations Program

The Municipal Water Quality Investigations Program conducts water quality monitoring in the Delta for municipal and industrial uses. Since its inception in 1983, the program has provided information and expertise to the SWP Contractors and other agencies delivering Delta-sourced drinking water. The program's data are used to identify long-term trends in water quality, to develop research and mitigation measures to reduce drinking water contaminants, and to provide advance notice to Delta water users of possible drinking water source problems.

Municipal Water Quality Investigations Discrete Monitoring and Special Studies

During 2019, the Municipal Water Quality Investigations Program continued collecting monthly discrete samples at key locations in the Delta region. Monthly monitoring occurred for the routine Delta Monitoring Program, the Delta Boundary Improvement Monitoring Project, and the Cache Slough Complex (Stage 2) Monitoring Project.

The Fluorescence of Dissolved Organic Matter (fDOM): Proof of Concept Study was completed in July 2019. The study showed that in certain conditions, fluorescent dissolved organic matter probes can be used as a proxy to measure organic carbon in place of more expensive organic carbon analyzers. However, fluorescent dissolved organic matter does not work as well at locations with complex water sourcing, such as at Banks Pumping Plant. If fluorescent dissolved organic matter is to be used in place of carbon analyzers, discrete data should still be collected to confirm the fluorescent dissolved organic matter to carbon regression is accurate over time.

Real Time Data and Forecasting Comprehensive Program

The Real Time Data and Forecasting Comprehensive Program is a central element of the Municipal Water Quality Investigations Program. The program provides real-time water quality monitoring data and associated modeled (predictive and non-predictive) water quality data to urban SWP Contractors. This data informs contractors of Delta and SWP water quality prior to it reaching their treatment facilities. The program continually works to further develop real-time system capabilities and improve Delta and SWP forecast modeling.

Measured constituents at the real-time monitoring stations include organic carbon and bromide, which can contribute to the formation of disinfection by-products during treatment at drinking water facilities. Other constituents reported are by-products of bromide analysis and include chloride, nitrate, and sulfate.

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 to provide 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. During 2019, the forecasting program accomplished the following:

- 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, specific conductance, and organic carbon source fingerprints

Quality Assurance Program

The Quality Assurance Program is responsible for ensuring all DWR water-related data are collected in a way that is scientifically sound, legally defensible, and are of known and documented quality. 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). DWR collaborates with monitoring programs to engage and support them in implementing quality assurance and quality control procedures in their projects. The Quality Assurance Program also collaborates with the implementation team for the Open and Transparent Water Data Act (Dodd; Chapter 506, Statues of 2016 [Assembly Bill 1755]) to ensure quality control of data sets shared with the public.

This program identifies quality assurance processes and quality control practices necessary to ensure valid data from the time a project is planned through the final stages of data interpretation, dissemination, and reporting. The program also provides quality assurance/quality control documentation support, guidance, and training to employees who conduct environmental measurements. The strategic objectives of the program are to

- provide training on quality assurance and quality control topics;

- provide quality assurance tools for project managers to use in developing and implementing projects;
- act as quality assurance subject matter experts and issue guidance on technical quality issues;
- review and approve enterprise and programmatic quality documents;
- support DWR in consistent, high-quality data management;
- collaborate with other agencies and partners to work toward consistencies in data collection and dissemination; and
- support comparability of data quality and data management processes between agencies and partnerships.

Collaboration and Outreach

Internal Collaboration. The Quality Assurance Program's activities are primarily driven by the Quality Assurance Committee. The Quality Assurance Committee meets monthly and is open to staff across DWR to engage and discuss quality assurance issues, help guide the direction for the Quality Assurance Program, and to collaborate in the development of quality assurance processes and procedures. In 2019, the Quality Assurance Committee became an Environmental Coordination Committee Informational Working Group. Quality Assurance Committee meetings included discussion of general quality assurance topics, troubleshooting, and discussion of updated guidance in the areas of sample collection, data review, and data management.

Accomplishments by the Quality Assurance Program through internal collaboration included the following:

- published the enterprise *Water Quality Sampling Standard Operating Procedure* and posted to internal DWR website
- developed and distributed real-time data field sheets for use by all real-time data collection programs

- standardized numerous real-time data monitoring procedures
- addressed discrete sample contamination through a filter comparison study
- reviewed and approved guidance issued for significant figures for field measurements, as well as chlorophyll field processes
- issued guidance on the process of Bryte Chemical Laboratory's accreditation with the State Water Board's Environmental Laboratory Accreditation Program and how accreditation affects monitoring programs
- supported Bryte Chemical Laboratory with State Water Board's Environmental Laboratory Accreditation Program accreditation
- distributed four editions of *The Quality Compass*, the Quality Assurance Program's quarterly newsletter
- launched the DWR Quality Assurance web-based, collaborative document management and storage system site

External Collaboration. The Quality Assurance Program engages external partners to advocate for and engage in quality assurance across multiple agencies involved in water-related data collection in California in an effort to support comparability and compatibility between data sets. In 2019, external partners included the State Water Board's Quality Assurance Program and Environmental Laboratory Accreditation Program, the U.S. Environmental Protection Agency, CalData, and the Interagency Ecological Program Data Utilization Working Group. The Quality Assurance Program also collaborated with interagency partners in a chlorophyll intercalibration study for the purpose of establishing consistent data collection processes between agencies.

The Quality Assurance Program and Interagency Ecological Program Data Utilization Working Group developed

a data management plan template for Interagency Ecological Program use and organized the Data Management Showcase. This event highlighted the need for quality assurance incorporation in projects and provided guidance on how to develop data management templates for DWR and Interagency Ecological Program projects.

In addition, the Quality Assurance Program presented at the DWR Environmental Scientist Workshop, the American Chemical Society Conference, the Society of Environmental Toxicology and Chemistry annual meeting, and the California Storm Water Quality Conference to further advocate and engage DWR and external partners in quality assurance.

Guidance and Training. A major effort of the Quality Assurance Program is to provide guidance and training for DWR staff. Some of the guidance is through discussions at Quality Assurance Committee or other formal or informal meetings. In 2019, guidance was issued through these venues, but also included programmatic standard operating procedure review for DWR monitoring, as well as attending field runs and providing suggestions for quality improvements.

In 2019, the Quality Assurance Program sponsored the following classes:

- Introduction to R (two offerings)
- Basic Environmental Statistics
- Science Communication Training

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 Standard Methods for the Examination of Water and Wastewater 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 vast 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 2019, the laboratory upgraded its capability and capacity to detect and analyze trace levels of metals with the purchase of an inductively coupled argon plasma mass spectrometer. It is a fully automated and computer-controlled analytical instrument equipped with a 120-position autosampler that generates highly stable, accurate, and reproducible data. The instrument's detection limit has been established at 10 parts per trillion.

The laboratory has continued to manage a variety of analytical contracts with other State agencies and several outside laboratories in accordance with the master contract policy approved in fiscal year 1994–1995. These contracts are used to perform analyses beyond the capability and capacity of the laboratory, such as solids and fish tissues. The laboratory works in conjunction with the DWR Municipal Water Quality Program and Quality Assurance/Quality Control Section to replace these contracts as they expire each fiscal year.

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 (CAMAL Net) headed by CDPH. The laboratory network's main objective is to voluntarily assist the CDPH in the analysis of chemical agents in water quality samples should a natural disaster or terrorist event occur in California. The assistance is only required should the analytical capacity of the 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 is the largest contiguous brackish marsh remaining in the United States, consisting of approximately 59,000 acres of tidal and managed brackish water wetlands and 30,000 acres of bays and sloughs. 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. Through agreements and plans, DWR has been working in coordination with Reclamation, DFW, Suisun Resource Conservation District, U.S. Fish and Wildlife Service, and other agencies, on habitat management, preservation, and restoration of Suisun Marsh. For more background information, see Bulletin 132-19.

Facility Operations, Maintenance, and Related Activities

Morrow Island Distribution System

The 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 2019 included mowing, spraying, and drying out and distributing vegetation spoils to an adjacent landowner. In 2019, DWR's Delta Field Division added 400 cubic yards of aggregate base for road maintenance.

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, DFW issued an incidental take permit for the ongoing and long-term operation of existing SWP facilities in the Delta for the protection of longfin smelt. MIDS is included as one of these facilities. To minimize the take of longfin smelt at the MIDS diversion, DFW specifies the average intake velocities each year to adequately protect these fish. Also, as a requirement of the incidental take permit,

DWR is developing a study to confirm the aforementioned operation prevents or substantially reduces the entrainment of longfin smelt at MIDS.

Reclamation and DWR continue to coordinate with U.S. Fish and Wildlife Service, National Marine Fisheries Service, and DFW regarding fish entrainment and annual flow restrictions at MIDS.

Suisun Marsh Salinity Control Gates

The Suisun Marsh Salinity Control Gates 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 Suisun Marsh Salinity Control Gates in 2018–2019.

The control season (generally October through May) started in September 2018. The flashboards were installed and the boat locks became operational on July 27, 2018. The Suisun Marsh Salinity Control Gates were tidally operated beginning on October 17, 2018. Salinity was within the 12–14 mS/cm range for the compliance stations, so operations ceased. The flashboards were removed on May 7, 2019, and the gates were set to the open position on January 23, 2019.

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. Interior ditch cleaning and road maintenance projects were completed in 2019. Also in 2019, DWR's Delta Field Division added 2,394.69 cubic yards of aggregate base for road maintenance, 2,350 cubic yards of material for existing interior levee repair,

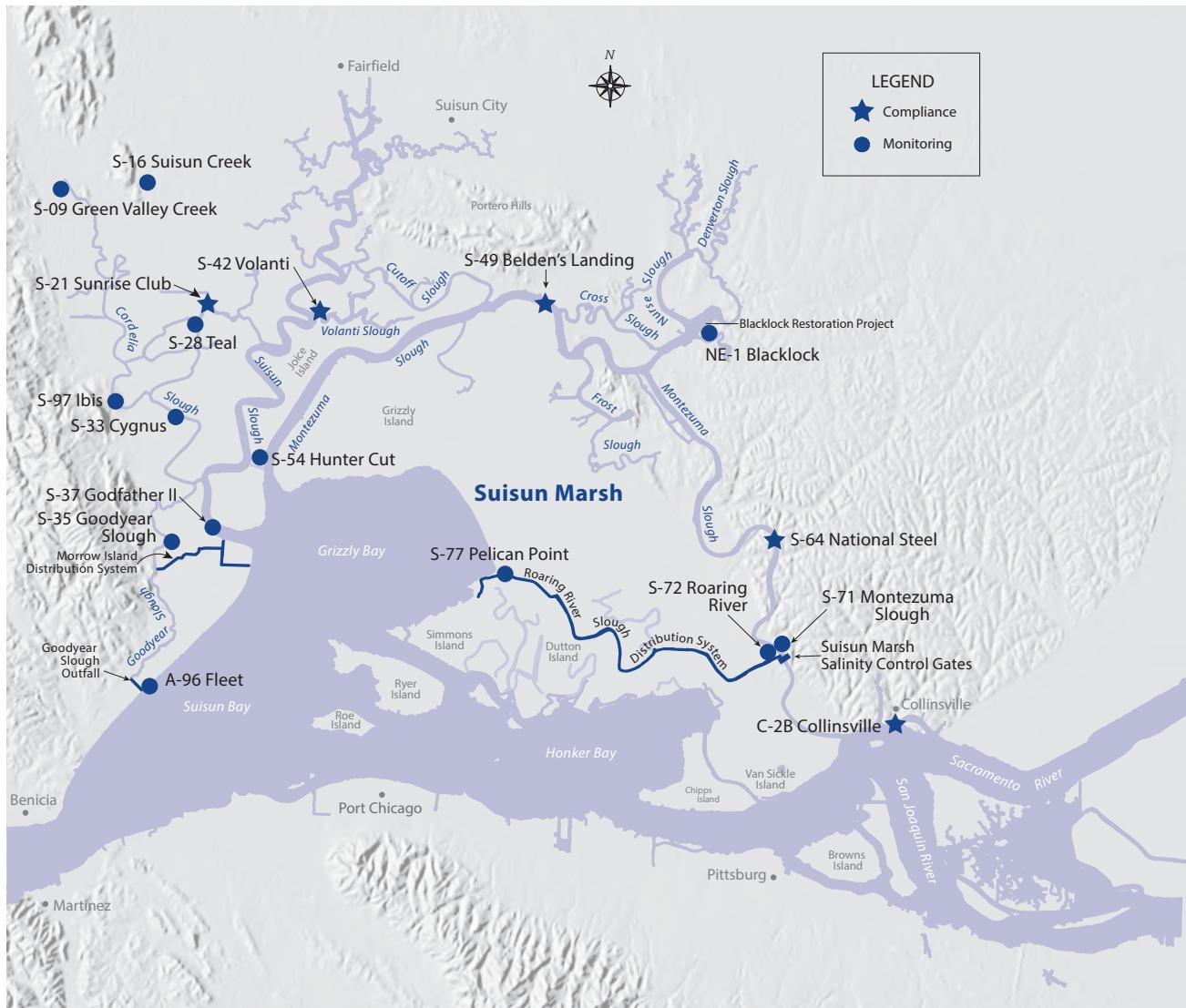


Figure 4-2 Compliance and Monitoring Stations and Water Management Facilities in Suisun Marsh

five cubic yards of material for coring levees, and replaced 287.6 cubic yards of riprap on existing interior levees.

Goodyear Slough Outfall

The Goodyear Slough Outfall is operated and maintained as needed to provide lower-salinity water to managed wetland properties. In 2019, maintenance activities included mowing, spraying, ditch clearing, road maintenance, and removing 104 cubic yards of floating debris. DWR's Delta Field Division added 201 cubic yards of

aggregate base for road maintenance and two cubic yards of materials for repairing existing interior levees. Also in 2019, DWR began permitting and planning activities to rehabilitate the Goodyear Slough Outfall to repair a sheet pile bulkhead wall, which had begun to buckle.

Water Quality and Compliance

Salinity levels for the 2018–2019 control season were below monthly standards for all five compliance stations.

Details about salinity levels in the marsh are available in a monthly report titled *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 2019 are summarized in Table 4-4. From 1968 through December 31, 2019, DWR disbursed more than \$209.5 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 *Suisun Marsh Preservation Agreement* and for meeting standards set by the State Water Board. Reclamation has reimbursed DWR about \$64.9 million (31 percent), and the State's General Fund has reimbursed about \$9.5 million (4.5 percent). These figures do not include up-front payments made by Reclamation for DWR and other direct costs, as well as about \$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 1968–2019 (in dollars)

Year [1]	Reach 305 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 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

Table 4-4 Suisun Marsh Expenditures and Reimbursements Administered by DWR, Calendar Years 1968–2019 (in dollars)

Year [1]	Reach 305 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 Contractors' Costs [7] minus [8] [9]
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	4,115,061			(939,879)		3,175,182	135,804	3,039,378
2008	3,829,742			(1,670,278)		2,159,464	125,867	2,033,597
2009	4,696,688			(1,123,705)		3,572,983	154,991	3,417,991
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	210,237	4,300,000
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	8,765,481			(388,253)		8,377,228	289,289	8,087,940
2017	13,231,132			(2,136,908)		11,094,224	436,647	10,657,576
2018	12,679,468			(1,204,000)		11,475,468	418,464	11,057,004
2019	13,308,267			0		13,308,267	439,249	12,869,018
Total	209,516,973	(9,478,000)	6,634,600	(64,860,563)	(2,323,609)	139,489,401	7,003,189	132,486,211

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 Contractors have been reduced by \$2,843,400. 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 No 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

Legislation and Litigation

An egret wades through the Castaic Lagoon at the Castaic Lake State Recreation Area in Los Angeles County.

Significant Events in 2019

*D*uring 2019 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 General 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 General Counsel tracks State and federal litigation that impacts management of the SWP. The DWR General Counsel also manages legal cases that involve SWP operations.

Legislation

State Legislation

Senate Bill 49 (Skinner, Chapter 697, Statutes of 2019)

Senate Bill 49 expanded the California Energy Commission's authority to consider greenhouse gas emissions reduction benefits when establishing standards. It requires the California Natural Resources Agency, in collaboration with the California Energy Commission and DWR, to assess and report on opportunities to improve energy efficiency of the SWP.

Litigation

As of December 31, 2019, DWR was involved in, or closely monitored, a number of court cases and other actions related to the management of the SWP.

SWP Contracting and Authority

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, application 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 Contractors, and the Central Coast Water Authority. The agreement contained principles to guide the amendment of Water Supply Contracts to address water allocation and issues related to SWP management and financing.

From 1995 to 1999, 27 of the 29 SWP Contractors executed Monterey Amendments. The Monterey Agreement Environmental Impact Report (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, the Central Delta plaintiffs appealed the lower court's ruling to the Third District Court of Appeal.

There were no updates or activity on this case in 2019.

This case was consolidated with the Center for Food Safety case below and entered for *Biological Diversity v. California Department of Water Resources* (Case No. C080572).

For more information about the revised Monterey Plus EIR, see Chapter 8, Water Contracts and Deliveries.

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.

In 2018 and early 2019, there were no updates on this case.

Water Supply Contract Extension Litigation

California Department of Water Resources v. All Persons Interested in the Matter of the State Water Project Water Supply Contract Amendments for Continued Service and the Terms and Conditions Thereof (Case No. 34-2018-0246183); North Coast Rivers Alliance et al. v. California Department of Water Resources (Case No. 34-2019-80003047); Planning and Conservation League et al. v. California Department of Water Resources (Case No. 34-2019-80003053)

On December 11, 2018, DWR filed a validation action in Sacramento County Superior Court to confirm the legality and validity of the contract extension amendments, which would extend the terms of the water supply contracts between DWR and the SWP Contractors until 2085. The action also amends certain financial provisions in the contracts. Several SWP Contractors filed answers in support of validation, and several public interest groups and public water agencies filed answers opposing validation. In January 2019, two petitioner groups filed petitions for writ of mandate in Sacramento County Superior Court challenging DWR's approval of the contract extension amendments based on alleged non-compliance with the California Environmental Quality Act (CEQA), Delta Reform Act (Senate Bill X7 1; Simitian; Chapter 5, Statutes of 2009, Seventh Extraordinary Session; Water Code section 85000, et seq.), and the public trust doctrine. In June 2019, the validation matter and two environmental cases were ordered related, and in August 2019, all three matters were assigned to a single judge.

Water Management Amendments Litigation

North Coast Rivers Alliance v. California Department of Water Resources (Case No. 34-2017-80002667)

On January 16, 2019, North Coast River Alliance, the Institute for Fisheries Resources, Pacific Coast Federation of Fishermen's Association, and the Winnemem Wintu Tribe filed a lawsuit. The

suit alleges DWR's entry into the addendum to the agreement between the United States and DWR for the Coordinated Operation of the Central Valley Project (CVP) and the SWP and the hold harmless agreement to address the effects of the California WaterFix (CWF) on CVP operations between the U.S. Bureau of Reclamation (Reclamation) and DWR violated CEQA, the Delta Reform Act, Water Code section 85000, et seq., and the public trust doctrine.

This case remains in the pretrial motions phase. The court granted the North Delta Water Agency's motion to intervene. DWR is gathering documents for the administrative record. The stipulated date for completion of the administrative record is March 17, 2020.

Sacramento-San Joaquin Delta (Delta)

State Water Resources Control Board State Water Board Cases (Judicial Council Coordination Proceeding No. 5013). On December 12, 2018, the State Water Board adopted Resolution 2018-0059, approving amendments to the Bay-Delta Water Quality Control Plan for the San Joaquin River flows and southern Delta salinity. These amendments resulted in several lawsuits filed in State court challenging their validity. These lawsuits have been coordinated as Judicial Council Coordination Proceeding No. 5013 in Sacramento County Superior Court. DWR is not a named party.

The State Water Resources Control Board (State Water Board) submitted these amendments to the Office of Administrative Law, which were approved on February 25, 2019. On February 26, 2019, the State Water Board filed its notice of determination. Since the adoption of these amendments, several lawsuits have been filed in State court challenging their validity. The parties are currently working on completing the administrative record, which is expected April 1, 2020.

United States of America v. State Water Resources Control Board & State Water Resources Control Board Chair E. Joaquin Esquivel, U.S. District Court, Eastern District of California (Case No 2:19-at-00236). On March 28, 2019, Reclamation, in addition to its state court filing, also filed a complaint for declaratory and injunctive relief in federal court. Reclamation's CEQA claims have been stayed and are pending an appeal of the stay by Reclamation. Reclamation's remaining federal claim is an intergovernmental immunity claim based on the continued requirement of Reclamation to meet seven salinity standards at Vernalis.

California WaterFix State Litigation

The following litigation regarding the CWF filed in State court were coordinated in one proceeding.

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; 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 Appeal determined the pre-condemnation 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 DWR would therefore 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 Appeal 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 CWF geotechnical and environmental studies to move forward.

There was no new activity on this case in 2019.

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, including its compliance with CEQA, and the Department of Fish and Wildlife's issuance of an incidental take permit under CEQA. On the same date that it approved the project, 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. These cases were coordinated in Sacramento County Superior Court and collectively styled the "CDWR Environmental Impact Cases." On May 2, 2019, DWR announced withdrawal of permits and approvals for CWF and rescinded the bond resolutions adopted to finance the CWF. See Chapter 3 for more information about withdrawing CWF permits. Subsequently, DWR and all other parties

voluntarily dismissed their actions, ending the coordinated proceeding. A briefing and hearing schedule was set for defendants' motions seeking for attorney fees and costs. Motions for fees and costs were denied. The moving parties appealed.

After DWR rescinded its project approval and set aside certification, petitioners filed dismissals without prejudice. On August 23, 2019, DWR received nine separate motions for attorney fees seeking approximately \$13.5 million.

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's case by about two months. The federal agencies are in the process of preparing the administrative record.

On March 1, 2019, DWR filed a motion to stay the legal proceedings in the *Bay.Org v. Bernhardt* (E.D. Cal., No. 117CV01176LJOEPG). In this case, Bay.Org and other non-governmental organizations challenged the U.S. Fish and Wildlife Service's issuance of a biological opinion for the CWF. DWR intervened in this case as a defendant.

On May 13, 2019, the case was dismissed without prejudice.

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 Reclamation) petition to add three new points of

diversion/redirection 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 the second part 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.

On March 1, 2019, DWR and Reclamation (collectively petitioners) requested the State Water Board place petitioners' joint water right change petition for CWF (change petition) in abeyance and stay the hearing for 60 days.

DWR and Reclamation withdrew the petition on May 2, 2019, and State Water Board cancelled all remaining hearing items.

Delta Plan

Delta Stewardship Council Cases (Super. Ct. Sacramento County, Judicial Council Coordination Proceeding No. 4758; C082944, application pending. The following cases were coordinated into this proceeding: (1) *San Luis and 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 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 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, 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 Appeal. 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 Appeal 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, [California Code of

Regulations, Title 23, Section 5003]) related to Stockton General Plan definitions and future public works projects.

In April 2018, while the appeals were pending, the Delta Stewardship Council adopted amendments to the *Delta Plan* (*Delta Plan Amendments*) and certified the programmatic EIR for the *Delta Plan Amendments*.

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

North Coast Rivers Alliance v. Delta Stewardship Council (34-2018-80002898-CU-WM-GDS). On March 16, 2017, the Delta Stewardship Council posted a notice of preparation of a draft program EIR concerning the proposed *Delta Plan Amendments* and, on November 1, 2017, it issued the draft program EIR for public review and comment. On April 26, 2018, the Delta Stewardship Council certified the 2018 program EIR, approved the *Delta Plan Amendments*, approved the findings and statement of overriding considerations, and filed the notice of determination pertaining to certification of the program EIR.

In the summer of 2018, four sets of petitioners filed petitions for writ of mandate alleging the *Delta Plan Amendments* violated CEQA and additional arguments on claims arising from the Delta Reform Act, the public trust doctrine, and the Human Right to Water (AB 685; Eng; Chapter 524; Section 106.3; 2012).

No briefing or hearing was set in 2019.

Staten Island

Wetlands Preservation Foundation v. California Department of Water Resources and The Nature Conservancy (Case No. C092656 and C093416, Third Appellate District). The

petition for writ of mandate and violation of the public trust was filed and served on DWR in July 2018. The Wetlands Preservation Foundation claims DWR caused a nuisance and breached its duties under its ownership of the conservation easement and under the California public trust doctrine by allowing The Nature Conservancy to continue to grow corn on Staten Island. The plaintiffs allege that the continued farming of corn causes increased subsidence rates. DWR's evidence will show that it neither owed nor breached any duty enforceable by mandate, including any duty under the public trust doctrine. The trial in this matter began on November 25, 2019.

Drought-Related Actions

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 Board's orders granting temporary urgency change petitions to DWR and Reclamation in 2014 and 2015. (For information about the temporary urgency change petitions, see Bulletin 132-16, Chapter 4, Water Quality Programs.) DWR and Reclamation are named as real parties in interest.

On September 16, 2015, the California Sportfishing Protection Alliance filed a first amended complaint claiming that the 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.

On February 6, 2017, the defendants filed a motion for judgment on the pleadings for failure to join Reclamation as an indispensable party; the motion was denied by the court on March 14, 2017. On May 2, 2017, the court issued an order granting in part and denying in part the State Water Board's motion. In part, the trial court specified that "National Audubon states the standard." Cross-motions for summary judgment and summary adjudication were filed by the State Water Board and the plaintiffs, respectively, on July 25 and 27, 2017. A hearing on the cross-motions was held November 11, 2017, and the court issued an order on January 29, 2018, denying both motions. On February 13, 2018, the State Water Board filed a motion for clarification of order denying motions for summary judgment, related to whether triable issues of fact exist and for clarification on the legal standard for trial of the public trust doctrine cause of action.

On January 28, 2019, the parties stipulated to vacate the trial date of February 25, 2019, and set a new trial date of November 12, 2019.

California Water Curtailment Cases (Super. Ct. Santa Clara County, No. 1-15-CV-285182, 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 through dismissal orders 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 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 heard 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.

The first phase of the trial was held on January 26, 2018, and the court issued a final statement of decision after phase one of the trial on April 3, 2018. The court rejected petitioners' claims challenging the State Water Board dismissal orders, holding that: (1) petitioners lacked standing to challenge the dismissal orders, as they were not aggrieved by the orders which imposed no consequences on them; (2) petitioners failed to show that the State Water Board failed to conduct enforcement proceeding in the manner required by law; and (3) the curtailment notices were a "final agency action" under Water Code Section 1126.

Although the court found petitioners' substantive claims moot in light of the dismissal orders ending the enforcement actions, it addressed the jurisdictional scope of the State Water Board's authority due to its continued public interest and importance, holding that (1) the State Water Board does not have jurisdiction to curtail pre-1914 appropriators under Water Code Section 1052 based on a general lack of available water under their priorities of right; and (2) the curtailment notices violated due process and, for future droughts, the State Water Board was advised to fashion a curtailment process that gives water users a meaningful opportunity to challenge the underlying findings before they are ordered to curtail their water use and before fines for noncompliance begin to accrue against them.

DWR is an intervenor in this case, generally aligned with and supportive of State Water Board's position. The parties have submitted

proposed appellate briefing schedules to the court, with DWR and State Water Board seeking an opening brief deadline of March 18, 2020, with respondent briefs due 30 days thereafter.

On May 9, 2019, the Superior Court judge issued an order for a proposed judgement. (Parties were able to file objections by May 29, 2019.)

The trial court issued judgments on June 6, 2019, ruling that Water Code Section 1052 does not authorize the State Water Board to curtail pre-1914 appropriators. (State Water Board curtailment powers under other legal authority, such as the public trust doctrine, was not adjudicated.) The plaintiffs filed motions for attorneys' fees and memoranda of costs on June 21, 2019. Notices of appeal were filed in August 2019.

In October 2019, DWR filed a response.

In the superior court, a hearing on motions to strike and/or tax costs and for attorneys' fees was scheduled for December 18, 2019. DWR and the California Natural Resources Agency should have little exposure to fees or costs due to the date of its intervention.

On December 23, 2019, the trial court issued an order awarding no attorneys' fees or costs against DWR and the State Water Contractor intervenors and awarding \$15,372.58 in costs against the State Water Board.

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 CEQA 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 Third District Court of Appeal 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. In 2018, oral arguments were heard. In late December, the court issued its opinion finding that the CEQA suit was preempted by federal law. The Supreme Court of California ordered the lower court to vacate its judgment and dismiss the case for lack of subject matter jurisdiction.

On April 10, 2019, the Supreme Court of California granted review and transferred

the case to the Third District Court of Appeal with directions to vacate its decision and reconsider the case in light of *Friends of the Eel River v. North Coast Railroad Authority* (2017) 3 Cal.5th 677. DWR submitted its supplemental briefing in June 2019.

Oroville Spillways Litigation

Eleven total cases were filed after the Oroville Dam spillways incident in 2017. All cases have now been coordinated in Sacramento County and assigned to one trial judge. Plaintiffs moved to certify two class actions: *Bechtel et al. v. California Department of Water Resources* and *Akers et al. v. California Department of Water Resources*. DWR settled one case involving the County of Butte concerning county roads and the damage incurred by South Feather Water and Power Agency.

Bechtel et al. v. California Department of Water Resources (Super. Ct. 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.

Plaintiffs moved to certify this case as a class action, but the coordinated trial judge granted DWR’s motion to defeat class certification. Plaintiffs are appealing.

Akers et al. v. California Department of Water Resources (Super. Ct. Butte County, Case No. 18 CV. 00449). This complaint includes an allegation on behalf of three classes of plaintiffs: 1) the “diminution class,” i.e., plaintiffs who allege diminution in property value; 2) the “property loss class,” i.e., plaintiffs who allege property loss; and 3) the “business loss class,” i.e., plaintiffs who allege lost business income.

Plaintiffs moved to certify this case as a class action, but the coordinated trial judge granted DWR’s motion to defeat class certification. Plaintiffs are appealing.

City of Oroville v. California Department of Water Resources (Super. Ct. Butte County, Case No. 18 CV. 00163). The City of Oroville is seeking compensation for damage to infrastructure caused by flooding and use during the emergency response and reconstruction; costs to evacuate citizens; salary and benefits paid to impacted city employees; costs for rental equipment; lost sales tax revenue; lost tourism revenue; and costs of law enforcement, administration, and emergency and fire services used to facilitate the evacuation.

DWR filed a motion to strike this complaint that was not granted by the trial judge. Discovery was ongoing in 2019.

JEM Farms LP et al. v. California Department of Water Resources (Super. Ct. Butte County, Case No. 18 CV. 00324). Plaintiff farmers allege their respective agricultural lands were damaged because of flooding, seepage, high water, excessive flows, and abrupt and erratic releases of high volumes of water. These plaintiffs also seek double or treble damages pursuant to Civil Code Section 3346 (damage to timber or trees), though not all have specifically alleged they own orchards or trees. The remaining plaintiffs are business owners and property owners who claim lost revenue, cleanup costs, and/or diminution in property value. Some

plaintiffs do not allege property damage but claim diminution in value because their residential properties are downstream of the Oroville Dam.

DWR filed a motion to strike that was not granted. DWR has filed summary judgment motions against several of the plaintiffs and is awaiting the court's decision. Discovery was ongoing in 2019.

People v. California Department of Water Resources (Super. Ct. Butte County, Case No. 18 CV. 00415). This complaint alleges DWR violated California Fish and Game Code Section 5650.1 by releasing 1.7 million cubic yards of material deleterious to fish, plant life, mammals, and bird life into the Feather River. The Butte County District Attorney is seeking civil penalties of \$34 billion to \$51 billion. DWR is considering several pre-trial motions. Butte County brought two motions to transfer venue back to Butte County, which were both denied.

Goose Club Farms North, LLC v. California Department of Water Resources (Super. Ct. Sutter County, Case No. 18 CV. 0000545).

Goose Club Farms North, LLC, owns farmland in the Sutter Bypass and is claiming two feet of sediment and sand was deposited in various location on its property, preventing ongoing farming, due to the Oroville Dam spillways emergency. Goose Club Farms North alleges dangerous condition of public property (in violation of California Government Code, Section 835), inverse condemnation, private nuisance, public nuisance, and premises liability.

Limited merits discovery on the case continued in 2019.

Bains Brothers Properties, LP et al. v. California Department of Water Resources (Super. Ct. Butte County, Case No. 18 CV. 01562).

Bains Brothers Properties owns farmland along the Feather River and Honcut Creek. The company claims that rapidly changing

releases from Lake Oroville caused levees to deteriorate, leading to property loss, slipouts, and other physical damage.

Limited merits discovery continued in 2019.

Mary's Gone Crackers, Inc. et al. v. California Department of Water Resources (Super. Ct. Butte County, Case No. 18 CV. 01857). Mary's Gone Crackers, Inc., alleges lost production, lost inventory, and cleanup costs and damage to agricultural lands as a result of the Oroville Dam Spillways incident.

Limited merits discovery continued in 2019.

Pacific Gas & Electric Co. v. California Department of Water Resources (Super. Ct. Butte County, Case No. 18 CV. 02014).

Pacific Gas & Electric Company (PG&E) owned powerlines that ran across the base of the main spillway at Oroville Dam. DWR contracts with PG&E for maintenance of DWR's powerlines. DWR called on PG&E to move DWR's powerlines during the spillway incident. PG&E declined on the basis that the work was too dangerous but then proceeded to move its own powerlines.

This suit seeks recovery of PG&E's costs to move its lines. PG&E's bankruptcy filing does not stay the lawsuit against DWR.

Discovery continued in 2019.

Mission Springs Water District v. Desert Water Agency (Super. 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.

There was no new activity on this case in 2019.

Other Cases and Proceedings

Center for Food Safety et al. v. California Department of Water Resources. (Super. Ct. Sacramento County, No. 34-2016-800002469) (C086215 application 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 Appeal.

In May 2018, the matter was fully briefed, and there were no further updates in 2019.

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 final arbitration award on January 9, 2018, awarding Independent Construction Company the sum of \$5.27 million against DWR.

In February 2018, DWR filed a petition with the Sacramento County Superior Court to vacate the arbitration award on the grounds that, among other things, Independent Construction Company was deemed to be an unlicensed contractor due to the failure of its management to fulfill its legal obligations to maintain licensed status. After a lengthy court briefing on August 2, 2019, the Superior Court judge issued a ruling in DWR's favor vacating the arbitration award, denying Independent Construction Company any recovery, and setting the stage for DWR to potentially recoup the approximately \$14 million it had paid Independent Construction Company under the construction contract.

Independent Construction Company immediately appealed the decision to the Third District Court of Appeal. DWR filed a cross-appeal on whether the Sacramento County Superior Court should have granted DWR a judgment decree of the \$14 million disgorgement. The parties are presently in the briefing stage.

In October 2019, DWR filed proceedings in both the Alameda County Superior Court and in the arbitration case, seeking a formal order/judgment of approximately \$14 million of disgorgement money from Independent Construction Company.

Pulice Construction, Inc. v. California Department of Water Resources (OAH No. A-0006-2019).

This case arose out of a \$75 million contract with Pulice Construction, Inc., in 2014 to rehabilitate and strengthen the Perris Lake Dam due

to seismic concerns. Pulice Construction filed a complaint in arbitration against DWR on March 19, 2019, seeking \$16 million in damages, primarily alleging that DWR failed to disclose material site conditions. Pulice Construction's claims assert the differing site conditions caused significant delays dealing with unexpected rock blasting and crushing operations. DWR is withholding approximately \$6 million in liquidated damages for Pulice Construction's late completion of the work.

In December 2019, a mediation was held, but it failed to resolve the dispute.



Chapter 6

Water Supply Development and Reliability

Lake Perris State Recreation Area.

Significant Events in 2019

On May 7, 2019, the Department of Water Resources and the U.S. Bureau of Reclamation submitted a petition for temporary change to consolidated place of use to the State Water Resources Control Board. In the petition, they requested temporary changes to their water rights permits to consolidate the State Water Project and Central Valley Project's authorized places of use.

Information in this chapter was contributed by the State Water Project Analysis Office, the Division of Regional Assistance, the Division of Planning, 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 annual Table A water allocations delivered to State Water Project Contractors (SWP 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 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 Contractors and other agencies, including Central Valley Project (CVP) contractors
- funding studies on the giant garter snake (*Thamnophis gigas*), 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 stream depletion due to groundwater substitution transfers and regional groundwater pumping 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 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 Contractors, between SWP 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 2019 water transfers, see Chapter 8, 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 place 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.

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 General 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 2019, DWR and the U.S. 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 2019* is expected to be released in August 2020. The next update (*Report 2021*) is expected in April 2022. 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 for one existing and one future condition study. The 2019 report and its technical addendum provided information on the annual SWP deliveries in the 10-year historical sequence preceding the publication date (2009–2018); simulation model results on the current (2020) level of development; and one future condition (2035 level of development and 45 centimeter sea level rise).

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 up to the release of the expected report in August 2020. The level of demand for SWP water assumed the maximum Table A amounts in 2019 and reflected recent trends in demand patterns from SWP Contractors.

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 stream depletion due to groundwater substitution transfers and support 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 2019 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

During 2019, there were no updates.

For background information on DWR's water rights, see Bulletin 132-18 and earlier versions.

Petition for Temporary Change to Consolidate Place of Use

On May 7, 2019, DWR and the U.S. Bureau of Reclamation (Reclamation) submitted a petition for temporary change under CWC Section 1725, et seq., to the State Water Resources Control Board (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.

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 July 15, 2019, approving the requested changes; the order remains in effect for one year.

For more information about transfers and exchanges, please see Chapter 8, Water Contracts and Deliveries.

Water Right Change Petition for California WaterFix

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 began in July 2016 and continued in 2019. On May 2, 2019,

DWR and Reclamation jointly withdrew their California WaterFix change in point of diversion petition.

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 12, 2018 (Resolution No. 2018-0059). 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.

Adoption of 2018 Bay-Delta Plan

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 consisted 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 included 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 affected the scope of the 2006 Bay-Delta Plan review and included evidentiary hearings on critical issues concerning the Delta's ecology.

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 also proposed to update the program of implementation to achieve these objectives, which would 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 CWC, 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.

In July 2018, the State Water Board issued the final Substitute Environmental Document.

On July 27, 2018, Reclamation issued its comments on the State Water Board document and indicated that the U.S. Secretary of the Interior may determine that the new water quality standards are not consistent with the congressional directives for the CVP and New Melones Project.

On August 15, 2018, the California Secretary for Natural Resources requested that the State Water Board give DWR and the California Department of Fish and Wildlife the opportunity to discuss information they could present on scientific methods available to evaluate the relative benefits of flow and non-flow actions to protect native salmonid fish species in the San Joaquin River basin.

On February 25, 2019, the State Water Board adopted amendments to the Bay-Delta Plan, which are now in effect.

Voluntary Agreements

On January 7, 2019, the Governor reinitiated discussions among interested parties to seek voluntary agreements that the State Water Board could consider in its Bay-Delta Plan update. These discussions have centered on achieving multiple water quality, water supply, and sustainable water management objectives.

These efforts have significantly progressed since the December 12, 2018, State Water Board meeting. On March 1, 2019, DWR and the California Department of Fish and Wildlife submitted documents to the State Water Board outlining potential voluntary agreements to support environmental objectives through a State Water Board set of tools while protecting water supply reliability.

The documents reflect progress since December 2018 to expand the previously submitted framework to improve conditions for fish through targeted river flows and a suite of habitat-enhancing projects, including floodplain inundation and physical improvement of spawning and rearing areas. Further work and analysis are needed to determine whether the agreements can meet the environmental objectives required by law and identified in the State Water Board's update to the Bay-Delta Plan.

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



Chapter 7

Water Supply

Heavy snow fell in the Sierra Nevada Mountains near Phillips Station where the Department of Water Resources conducted its third snow survey of the 2019 season in February.

Significant Events in 2019

Water year 2018–2019 was an above average year for precipitation and mountain snowpack. This was a significant change from last year, which had below average precipitation and mountain snowpack. California received precipitation at 131 percent of average in water year 2018–2019 compared to 73, 164, and 105 percent of average in water years 2017–2018, 2016–2017, and 2015–2016, respectively. Of the three major Sierra regions, the Tulare Lake region had the highest percent of average runoff (167 percent). The highest percent of average April 1 snow water content was in the central Sierra region (164 percent) as measured by snow sensors.

The Northern Sierra 8-Station Precipitation Index had 70.7 inches of precipitation, which represents 136 percent of the index average. Rainfall in the months of January, February, and March represented about 45 inches of this total. The San Joaquin 5-Station Precipitation and Tulare Basin 6-Station Precipitation indices totaled 50.0 inches (124 percent of average), and 36.8 inches (128 percent of average), respectively. The statewide mountain snowpack on April 1 was 175 percent of average based on manual snow measurements.

Statewide river runoff totaled 137 percent of average in the 2018–2019 water year, which was a dramatic increase after the previous water year's total of 68 percent of average. The Feather River runoff totaled 140 percent of average. Water year runoff totals for the Sacramento River Region (SRR), San Joaquin 4 Rivers (SJR), and Tulare Lake Region (TLR) were 139, 159, and 167 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 2018–2019.

The water year began at 97 percent of average on October 1 and finished at 124 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 and 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 Indices.

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 Chipp's 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, please consult the most recent edition of Bulletin 120, Bulletin 132, and/or contact DWR's Hydrology and Flood Operations Office.

Water Year 2018–2019

California experiences extreme variability in year-to-year outcomes of seasonal precipitation accumulation. A recent example was the transition from the 2012–2016 drought to the very wet water year of 2016–2017, when all gauge stations received well over average precipitation. Water year 2018–2019 again demonstrated that variability can manifest itself year-to-year, as well as within a season: water year 2018–2019 showed that the accumulation of seasonal precipitation does not have to follow the expectations of averages.

Autumn and Winter

Water year 2018–2019 continued to demonstrate effects of climate change with greater variability and more extremes. Before the wet winter and spring months, California experienced a very dry fall, during which the devastating Camp Fire started November 8, 2018, in Butte County. Fall transitioned into a wet winter with 63 percent of the water year total for the DWR Northern Sierra 8-Station index falling in the three months of January,

February, and March. Temperatures were very cold in February.

The water year ended with 139 percent of average precipitation in the Northern Sierra, and 168 percent of average April–July streamflow in the Sacramento River, and 171 percent of average precipitation for the San Joaquin River regions.

Spring and Summer

The extremes did not stop with February in May the Northern Sierra 8-Station Precipitation Index was 303 percent of average precipitation for the month and the fourth warmest average minimum temperature statewide in 125 years of record was recorded in August. The water year ended with 136 percent of average precipitation in the Northern Sierra 8-Station and 169 percent of average April–July streamflow in the Sacramento River Region and 170 percent of average precipitation for the San Joaquin Region.

Precipitation

California experienced above average rainfall (131 percent of average) for the water year, and all regions except the North Coast experienced from 131 percent to 140 percent of average precipitation. Figure 7-1 presents water year precipitation for the various regions of the state. The largest percent of average precipitation fell in the San Francisco Bay and Tulare Lake regions.

Table 7-1 presents monthly precipitation totals for water year 2018–2019 at various gauges located throughout the state, listed north to south. Statewide, the wettest months, as measured by inches of precipitation, were January, February, and March. In February, precipitation at every station listed in Table 7-1 was above 150 percent of average.

Of the stations listed in Table 7-1, Sacramento WB City had the wettest water year as measured by percent of average (147).

Blue Canyon experienced precipitation above 100 percent of average in six of the 12 months in water year 2019. The total precipitation for September at this station was 4.06 inches (549 percent of average).

May precipitation totals were 3.42 inches (743 percent of average) for Sacramento and 2.38 inches (850 percent of average) for Fresno. In San Francisco, May precipitation totals were 2.00 inches (500 percent of average). For the water year, Sacramento received 147 percent of its annual precipitation average, Fresno received 109 percent of its annual average, and San Francisco received 103 percent of average.

The variability from month to month is very evident by noting the volumes of precipitation that occurred in the typically wet month of December and the relatively dry month of May. December experienced 2.16 inches (33 percent of average) while May's precipitation was 5.22 inches (370 percent of average) at Yosemite.

The four-month period from December through March is typically the wettest period in the Sierra Nevada.

For water year 2019, the Northern Sierra 8-Station Precipitation Index showed a total precipitation of 70.7 inches, above the average of 51.8 inches. Precipitation in the water year was 18.9 inches above average and 36 percent above normal.

The San Joaquin 5-Station Precipitation Index, which is representative of the central Sierra, had a water year total of 50.0 inches, which was above the average of 40.2 inches and 124 percent of normal.

The Tulare Basin 6-Station Precipitation Index accumulated a total of 36.8 inches.



Figure 7-1 Statewide Precipitation by Hydrologic Region, 2018–2019 Water Year, as Percent of Average

Table 7-1 Monthly Precipitation Totals at Various Locations in California, Water Year¹ 2018–2019 (inches)

Station ²	Water Year 2018–2019													Water Year 2019–2020			
	2018						2019							WY Total			
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec		
Mount Shasta City	0.57	4.16	3.68	5.52	15.60	5.69	3.53	5.66	0.32	0	0	1.45	46.18	0.21	2.47	6.25	
percent of average	24	91	62	86	279	129	126	333	30	0	0	184	128	9	54	106	
Eureka Woodley Island	0.85	4.94	4.95	6.67	14.43	4.79	2.41	2.61	0	0	0.18	1.75	43.58	1.51	1.75	7.63	
percent of average	28	89	77	103	279	92	84	144	0	0	75	230	114	51	32	119	
Blue Canyon (DWR-2)	1.33	10.59	5.20	15.77	22.37	11.36	4.40	10.47	0.54	0	0	4.06	86.09	0.11	3.99	13.85	
percent of average	35	134	50	127	229	134	88	385	61	0	0	549	137	3	51	132	
Sacramento WB City	0.04	2.66	2.65	4.65	8.90	3.24	0.77	3.42	0	0	0	0.06	26.39	0	0.71	4.78	
percent of average	4	131	83	124	272	136	52	743	0	0	0	29	147	0	35	150	
San Francisco WB Airport	0.16	3.07	1.65	4.57	7.19	4.47	0.20	2	0	0	0	0.12	23.43	0.01	1.46	3.78	
percent of average	16	111	37	93	173	149	12	500	0	0	0	92	103	1	53	85	
Yosemite Headquarters	1.28	5.10	2.16	7.30	14.14	5.32	2.18	5.22	0.17	0	0	0.06	42.93	0	2	5.22	
percent of average	74	121	33	109	226	108	67	370	30	0	0	10	117	0	47	79	
Fresno WB Airport	0.1	1.67	0.56	2.23	3.26	1.26	0.39	2.38	0	0	0	0	11.85	0	0.72	2.16	
percent of average	21	150	32	111	157	68	36	850	0	0	0	0	109	0	65	123	
Grant Grove	0	7.20	1.66	7.45	14.84	13.89	2.63	6.43	0.66	0	0	0	54.76	0	4.78	7.36	
percent of average	0	140	21	100	206	184	61	550	236	0	0	0	126	0	93	94	
Los Angeles WSO Airport	0.58	2.09	1.45	5.52	4.42	2.10	0.05	0.73	0	0.05	0	0	16.99	0	1.43	4.42	
percent of average	153	148	69	204	151	112	5	521	0	500	0	0	133	0	101	210	
San Diego NWS Lindbergh Field	0.57	0.81	3.02	2.80	3.42	1.23	0.16	0.8	0.01	0	0	0.11	12.93	0	2.72	4.03	
percent of average	136	72	158	137	178	76	21	381	14	0	0	61	125	0	241	211	

¹ Water Year = October 1–September 30² NWS = National Weather Service; WB = Weather Bureau; WSO = Weather Service Office

Table 7-2 shows the monthly precipitation indices for the Northern Sierra 8-Station, San Joaquin 5-Station, and Tulare Basin 6-Station.

Mountain Snowpack

Snow accumulation was well above normal as of April 1. Monthly statewide snowpack for the water year is shown in Table 7-3. 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 45.3 inches or 161 percent of average. This was a dramatic change relative to 2018, which was 54 percent of average, based on snow sensors. The heavy precipitation of February is evident by the large increase

in snow from February 1 to March 1. The snowpack went from near average to slightly over 150 percent of average.

River Runoff

Statewide river runoff totaled 137 percent of average in the 2018–2019 water year. The monthly runoff totals for the SRR, the SJR, the TLR, and the Feather River are shown in Table 7-4. As shown, the water year runoff totals for these areas ranged from 139 to 167 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 169, 170, and 184 percent of average, for the SRR, SJR, and TLR regions, respectively.

Table 7-2 Regional Monthly Precipitation for Water Year 2018–2019

	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
2018	October	1.0	35	0.8	36	1.5	125
	November	6.8	103	6.9	150	4.9	163
	December	5.1	55	2.3	36	1.9	40
2019	January	13.2	148	8.5	118	5.6	104
	February	21.6	264	15.8	236	9.7	194
	March	9.8	129	8.0	131	7.5	163
	April	3.8	101	1.6	46	0.6	24
	May	6.7	303	5.6	329	4.7	427
	June	0.5	46	0.1	17	0.3	75
	July	0.0	0	0.1	33	0.1	33
	August	0.2	70	0.0	0	0.0	0
	September	2.1	230	0.2	29	0.1	20
Total¹		70.7	136	50.0	124	36.8	128

¹Totals may not sum as expected due to rounding.

Water Supply Indices

The Sacramento Valley 40-30-30 Index and the San Joaquin Valley 60-20-20 Index were both “wet,” based on observed data for water year 2018–2019.

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

Water Year 2019–2020 October through December Water Conditions

The last three months of calendar year 2019 marked the beginning of a new water year, 2019–2020. October was a much drier-than-average month at 11 percent of the statewide precipitation average, followed by November at 72 percent of the statewide precipitation average. December, however, was much wetter at 133 percent of the statewide precipitation average. As a result, at the end of December, water year runoff totals for three months were 70 percent of

average for the SRR, 72 percent of average for the SJR, and 91 percent of average for the TLR.

Storage

Statewide Storage

Monthly storage totals for the major Sierra Nevada reservoirs are shown in Table 7-5. Water year 2018–2019 began at 97 percent of average reservoir storage. Storage decreased slightly to 93 percent of average by the end of December. Thereafter, storage increased to 111 percent of average by the end of March. During the traditional snowmelt season, April–July, the percent of average storage increased to 125 percent of average.

State Water Project Storage

The State Water Project (SWP) operates a complex system of dams, canals, and reservoirs to collect and store water for future deliveries. Lake Oroville is the first of two primary SWP conservation facilities.

Precipitation Indices

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. Precipitation from this region is a primary source for the State's water supply.

The rain gauge stations are listed below:

- | | | |
|----------------------|-------------------------------|------------------|
| 1) Mount Shasta City | 4) Quincy | 7) Blue Canyon |
| 2) Shasta Dam | 5) Brush Creek | 8) Pacific House |
| 3) Mineral | 6) Sierraville Ranger Station | |

San Joaquin 5-Station Precipitation Index (5SI)

In the central Sierra Nevada, precipitation is indexed by averaging rain gauge totals at five representative stations, creating what is known as the San Joaquin 5-Station Precipitation Index. The index provides a representative sample of the major watersheds (Stanislaus, Tuolumne, Merced, and San Joaquin rivers) and serves as a wetness index for the San Joaquin River hydrologic region.

The rain gauge stations are listed below:

- | | | |
|---------------------------|------------------------------|--------------------|
| 1) Calaveras Big Trees | 3) Yosemite Headquarters | 5) Huntington Lake |
| 2) Hetch Hetchy Reservoir | 4) North Fork Ranger Station | |

Tulare Basin 6-Station Precipitation Index (6SI)

In the southern Sierra Nevada, precipitation is indexed by averaging rain gauge totals at six representative stations, creating what is known as the Tulare Basin 6-Station Precipitation Index. The index provides a representative sample of the Kings, Kaweah, Tule, and Kern river watersheds.

The rain gauge stations are listed below:

- | | | |
|----------------------|-----------------|-----------------|
| 1) Balch Power House | 3) Giant Forest | 5) Ash Mountain |
| 2) Springville | 4) Pascoes | 6) Isabella |

Table 7-3 Statewide Mountain Snowpack for Water Year 2018–2019

	Date	Snow Water Equivalent (inches)	Percent of Average	Percent of April 1 Average ¹
2018	October 1	NA	NA	NA
	November 1	NA	NA	NA
	December 1	4.7	103	17
2019	January 1	7.1	70	25
	February 1	17.5	98	61
	March 1	37.5	151	151
	April 1	45.3	161	161
	May 1	31.0	145	112
	June 1	16.9	202	62
	July 1	1.0	71	4
	August 1	0.0	0	0
	September 1	0.0	0	0

¹April 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.

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 Contractor peaking demands in the summer months. The remaining SWP dams and reservoirs regulate the stored water supply with delivery patterns designed to fit local water demands.

2019 Storage Totals in Major SWP Reservoirs

End-of-year storage on December 31, 2019, in major SWP reservoirs and the State's share of joint-use reservoirs was 3.5 million acre-feet (maf) or 67 percent of maximum storage, compared to 2.5 maf or 47 percent of maximum storage at the end of 2018. The average end-of-month total storage in major SWP reservoirs for 2019 was 4.0 maf.

Lake Oroville

Lake Oroville has a maximum water storage capacity of 3,537,580 acre-feet (af). Runoff from the upper Feather River drainage is collected and stored in this reservoir and released to the Sacramento-San Joaquin Delta (Delta) through Oroville

Table 7-4 Unimpaired Runoff for Water Year 2018–2019 (million acre-feet)

	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	WY
SRR runoff	0.37	0.48	0.75	2.48	4.20	4.83	4.70	3.13	2.04	0.79	0.52	0.48	24.77
percent of average	78	56	44	101	177	166	204	144	166	134	128	120	139
SJR runoff	0.05	0.08	0.11	0.35	1.00	1.07	1.47	1.83	2.25	0.80	0.20	0.10	9.28
percent of average	68	59	46	80	229	168	175	132	211	182	165	163	159
TLR runoff	0.03	0.04	0.06	0.12	0.33	0.53	0.72	0.99	1.37	0.62	0.18	0.08	5.07
percent of average	65	55	51	69	183	196	182	138	224	214	182	138	167
Feather River runoff	0.07	0.10	0.16	0.56	0.96	1.17	1.34	0.91	0.47	0.20	0.13	0.11	6.17
percent of average	68	51	43	100	177	160	214	150	144	132	126	125	140
Statewide runoff	71	45	41	93	182	152	191	139	186	162	141	125	137
percent of average													

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)

Dam, Thermalito Diversion Dam, and Thermalito Afterbay.

2019 Inflow. Total Lake Oroville inflow for 2019 was 6.02 maf, which was 151 percent of the average (3.99 maf) over the last 30 years. Maximum daily inflow occurred

on February 14 at 99,951 af. Minimum daily inflow occurred on September 9 at 935 af. Peak monthly total inflow occurred in April at 1,252,784 af, 21 percent of the 2019 total. The highest total inflow in the last 30 years (1990–2019) was in 2017 at 9,009,424 af. The lowest total inflow for the same period was in 2015 at 1,295,451 af.

Runoff Estimates

Unimpaired runoff represents the natural water production in a river basin, unaltered by upstream diversions, storage, or export of water to or import of water from other basins.

Sacramento River Region (SRR)

The runoff estimate for the SRR is the sum of unimpaired flow in million acre-feet (maf) at the following gauging stations:

- | | |
|---|-------------------------------------|
| 1) Sacramento River above Bend Bridge | 3) Yuba River near Smartville |
| 2) Feather River at Oroville
(inflow to Lake Oroville) | 4) American River below Folsom Lake |

San Joaquin 4 Rivers (SJR)

The runoff estimate for the SJR is the sum of unimpaired flow in maf at the following gauging stations:

- | | |
|--|---|
| 1) Stanislaus River below Goodwin Dam
(inflow to New Melones Reservoir) | 3) Merced River below Merced Falls
(inflow to Lake McClure) |
| 2) Tuolumne River below La Grange
(inflow to New Don Pedro Reservoir) | 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 | 3) Tule River below Lake Success |
| 2) Kaweah River below Terminus Reservoir | 4) Kern River below Lake Isabella |

Eight River Index

The Eight River Index is the sum of the unimpaired runoff from the eight rivers in the SRR and the SJR.

Water 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, 2006, and 2018 Bay–Delta Plans. D-1641 implements portions of the 2018 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.

Figure 7-2 shows monthly Lake Oroville inflow for 2017, 2018, and 2019.

Figure 7-3 shows historical maximum and minimum cumulative Lake Oroville inflow and the current cumulative inflow for 2019.

2019 Storage. Minimum storage occurred on January 1 at 1,032,393 af, 29 percent of lake capacity. Maximum storage occurred from June 25 to 27 at 3,474,293 af, 98 percent of lake capacity. End-of-year Lake Oroville storage was 2,079,448 af.

Figure 7-4 shows storage in Lake Oroville for 2018 and 2019.

2019 San Luis Reservoir Operations

San Luis Reservoir is operated jointly by DWR and the U.S. 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 from March 25 to 28 at 2,028,471 af, 100 percent of its normal maximum operating capacity. At the beginning of 2019, San Luis Reservoir contained 1,502,521 af, 74 percent of its capacity. The SWP storage share was 867,981 af. The highest

Table 7-5 Monthly Reservoir Storage for Water Year 2018–2019 (thousand acre-feet)

Reservoir	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Shasta percent of average	2,191 83	2,177 82	2,268 81	2,912 96	3,948 120	4,028 110	4,223 109	4,477 117	4,355 122	4,024 128	3,658 131	3,425 129
Oroville percent of average	1,179 56	1,030 49	1,032 48	1,404 61	2,188 90	2,849 107	3,285 115	3,461 117	3,457 122	3,107 123	2,637 116	2,228 104
Folsom percent of average	397 80	330 72	312 66	523 105	598 111	735 116	887 122	935 116	920 118	838 126	755 127	714 131
San Luis percent of average	1,218 116	1,173 98	1,503 110	1,750 111	1,983 117	2,028 112	1,749 98	1,441 92	1,492 119	1,419 147	1,233 147	1,259 136
Pardee percent of average	187 108	190 109	185 105	184 103	182 101	193 106	205 112	206 108	204 106	203 107	199 108	196 108
New Melones percent of average	1,756 132	1,765 132	1,789 130	1,871 132	2,005 138	2,001 134	1,921 130	2,047 138	2,223 149	2,142 150	2,052 152	2,033 156
Don Pedro percent of average	1,403 108	1,405 107	1,429 107	1,499 109	1,660 117	1,641 112	1,700 116	1,856 121	1,964 124	1,976 131	1,787 128	1,700 127
Millerton percent of average	282 138	294 130	299 108	318 96	366 109	340 94	311 87	395 100	513 125	492 149	410 168	353 160
Pine Flat percent of average	240 69	271 73	318 78	384 82	576 109	554 98	662 109	743 104	942 139	878 177	671 181	555 167
Kaweah percent of average	11 95	13 98	22 127	32 146	22 85	40 92	129 165	149 123	179 169	98 188	29 140	15 119
Success percent of average	6 75	8 83	10 78	15 84	20 83	40 122	63 147	78 151	92 193	66 201	29 160	12 108
Isabella percent of average	68 41	67 42	67 41	76 43	126 68	225 111	273 118	321 108	348 111	306 114	246 116	196 107
Statewide percent of average	97	95	93	100	114	111	114	114	120	125	125	124

end-of-month SWP share of water storage occurred in March at 1,062,792 af.

Figure 7-5 shows the SWP share of storage and total storage in San Luis Reservoir for 2018 and 2019.

2019 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 2019,

Lake Del Valle held 24,985 af, which was about 32 percent of its maximum capacity of 77,111 af. Its highest storage occurred on February 14 at 40,876 af. Its lowest storage occurred on January 1 and 4 at 24,975 af.

On December 31, storage in Lake Del Valle was 25,170 af, 33 percent of its maximum capacity. There was 39,020 af of natural inflow into Lake Del Valle, and 5,401 af of inflow from the South Bay Aqueduct. There were 15,397 af releases to Arroyo Valle, and

releases for 2019 to the South Bay Aqueduct from Lake Del Valle totaled 25,736 af.

2019 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 Contractors.

At the beginning of 2019, these reservoirs held 597,685 af, which is 87 percent of their combined normal maximum operating capacity of 689,021 af. At the end of 2019, the reservoirs held 564,931 af, 82 percent of combined normal maximum operating capacity.

Diversions from the Delta

The SWP diverts water from the Delta, through the Barker Slough and Banks

pumping plants, for delivery to SWP 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 2019, the North Bay Aqueduct received 44,534 af of water from the Barker Slough Pumping Plant.

Figure 7-6 shows the amounts of water pumped each month for 2019 at Banks Pumping Plant, totaling 2,968,427 af. This amount was all SWP diversions. There was

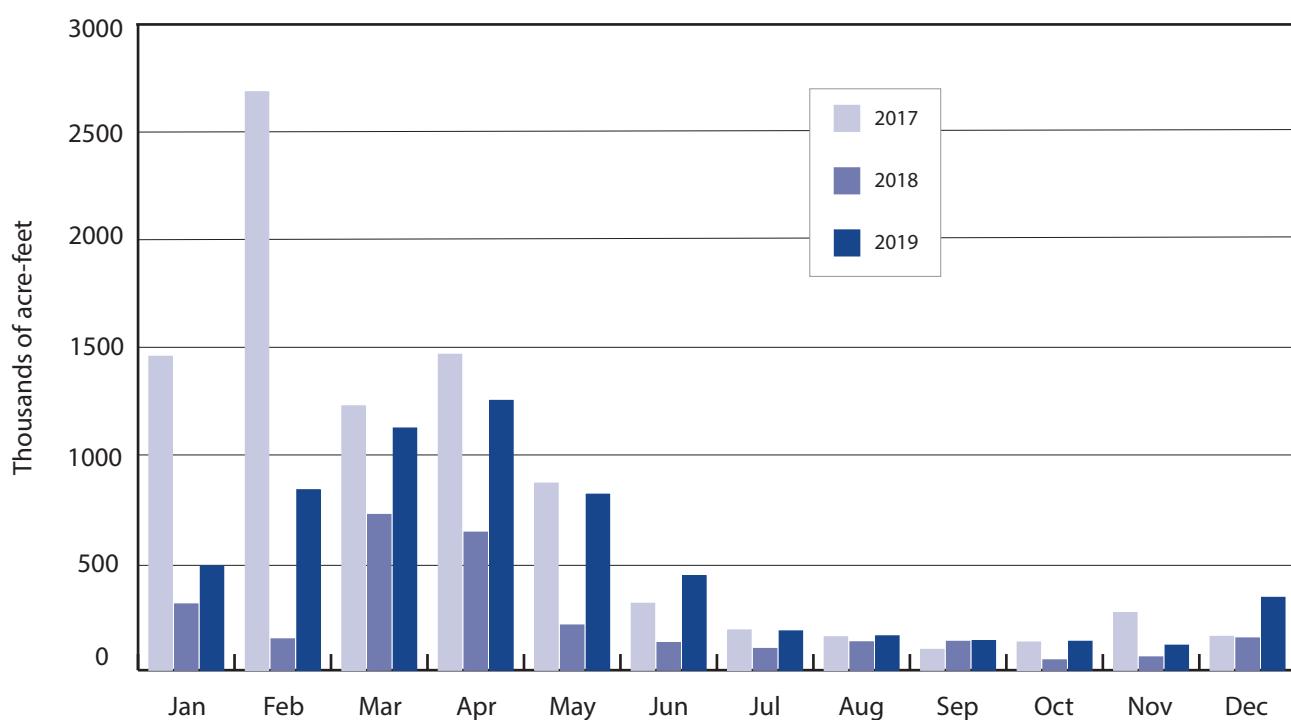


Figure 7-2 Monthly Inflow into Lake Oroville from the Feather River, 2017–2019

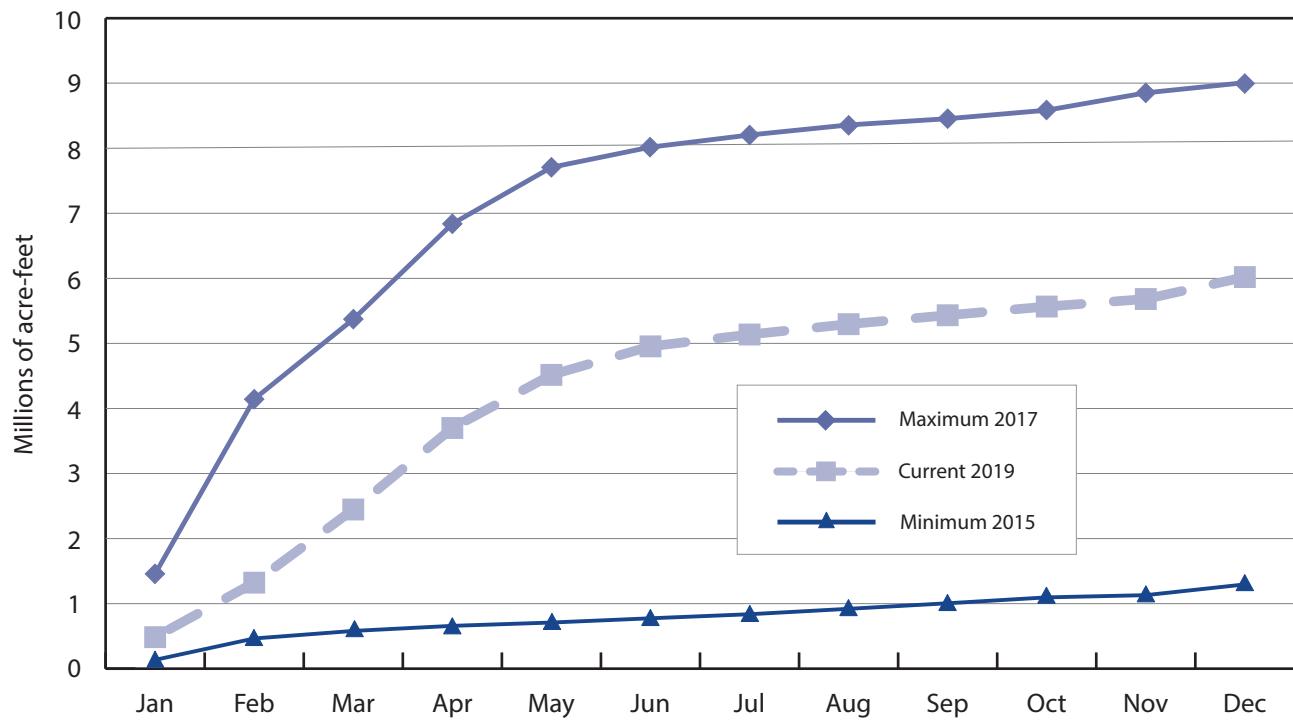


Figure 7-3 Lake Oroville Cumulative Inflow over the Last 30 Years—
Current and Historical Maximum and Minimum

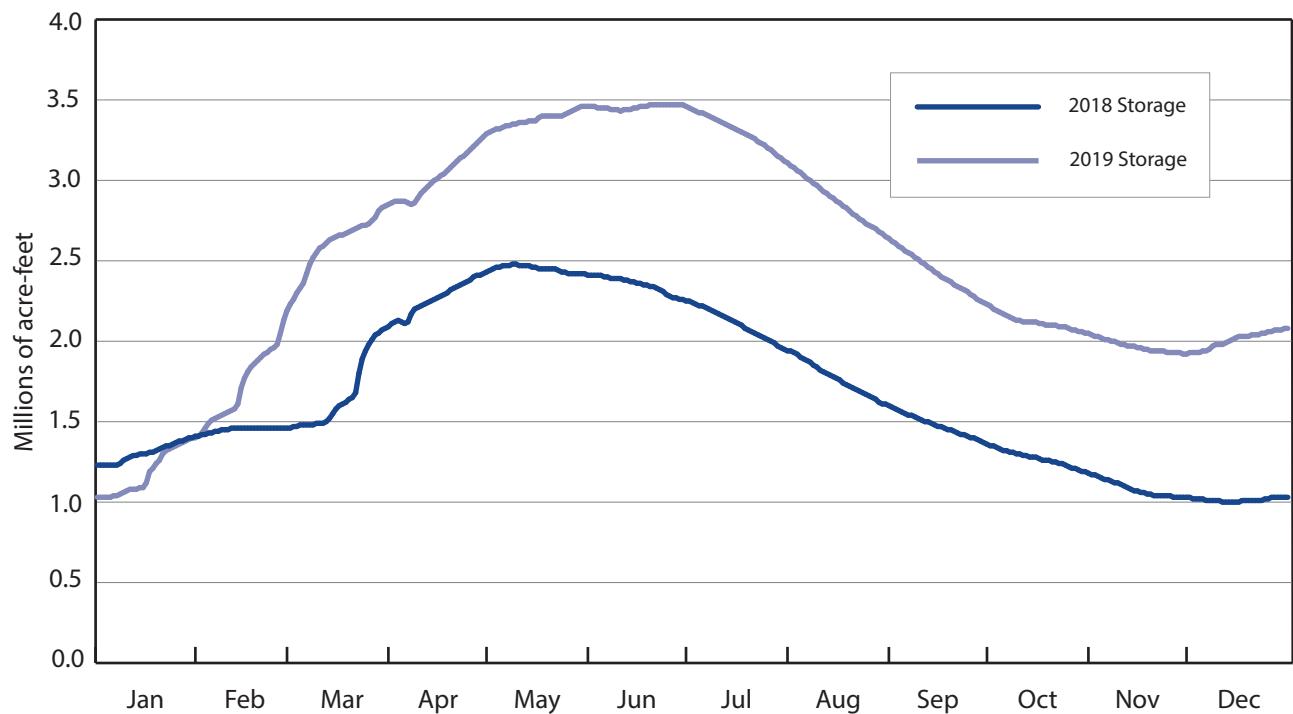


Figure 7-4 Daily Storage in Lake Oroville, 2018 and 2019

no pumping for the Cross Valley Canal, and there was no water wheeled for the CVP.

The CVP diverted 2,117,414 af at Jones Pumping Plant and 101,833 af at Contra Costa Pumping Plant in 2019.

The combined Delta exports include all of these plants. Figure 7-7 shows the monthly amounts of water diverted from the Delta in 2019 by the SWP and CVP. Maximum daily Delta exports occurred on February 20 at 23,651 af. Combined SWP and CVP monthly Delta exports in 2019 varied from a low of 167,207 af in May to a high of 678,028 af on July 1. Delta exports totaled approximately 5.2 maf in 2019.

Figure 7-8 shows monthly total amounts pumped at Dos Amigos Pumping Plant for 2019. Dos Amigos Pumping Plant diverts water from O'Neill Forebay to the California

Aqueduct. Dos Amigos pumped the largest amount in August at 523,542 af.

Figure 7-9 shows the amount of water pumped each month in 2019 at Edmonston Pumping Plant. Water pumped through the Edmonston Pumping Plant for delivery to Southern California totaled 1,517,956 af.

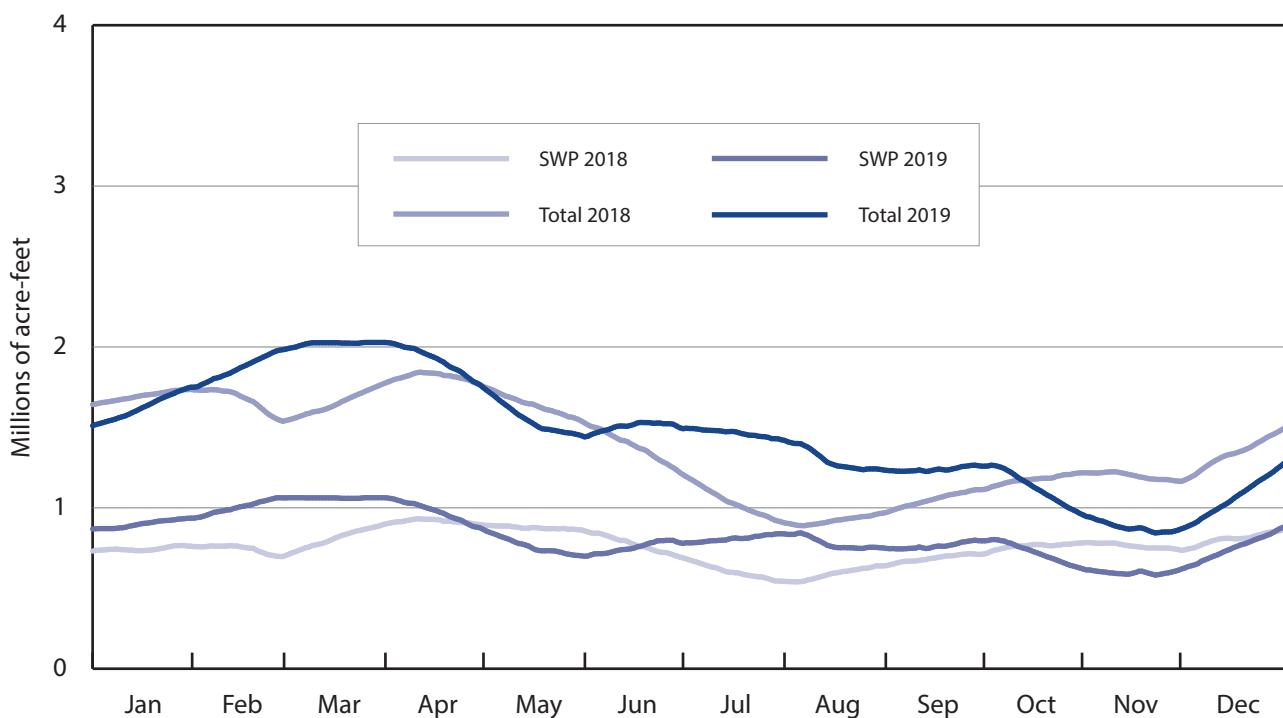


Figure 7-5 SWP Share of Storage and Total Storage in San Luis Reservoir, 2018 and 2019

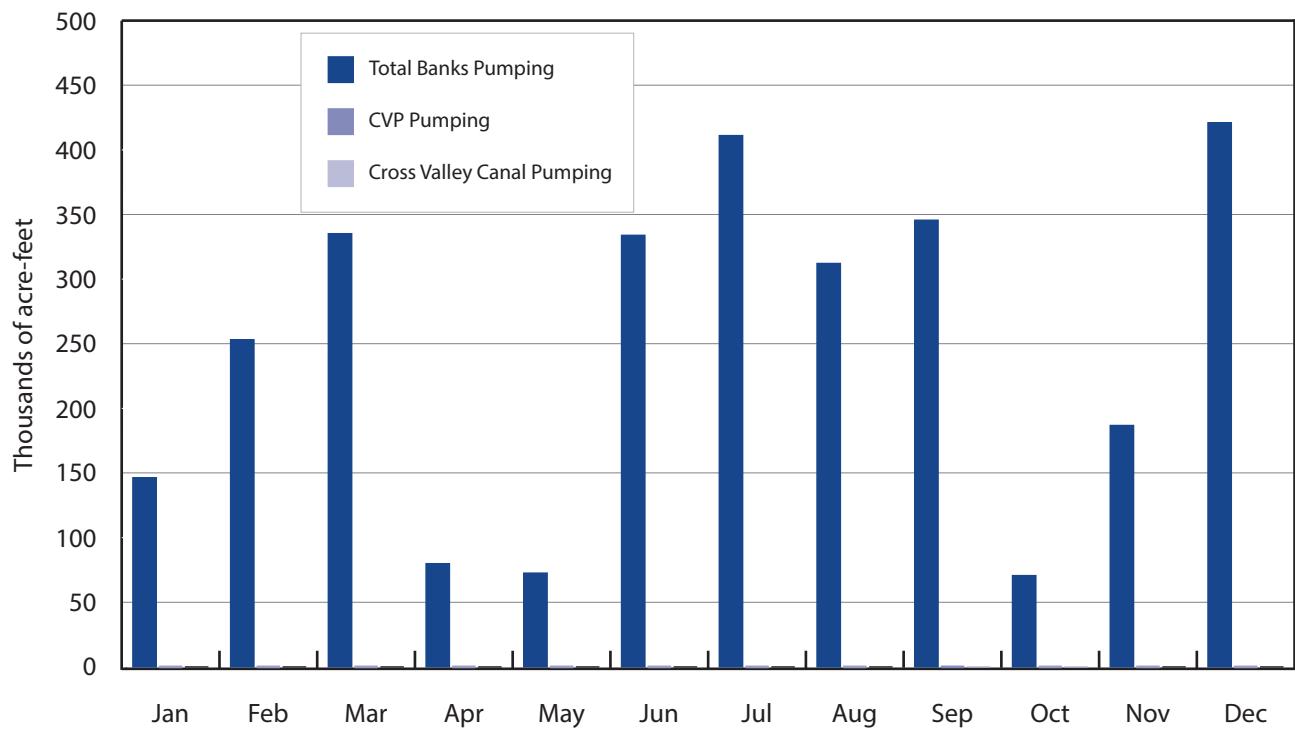


Figure 7-6 Water Pumped at Banks Pumping Plant, 2019

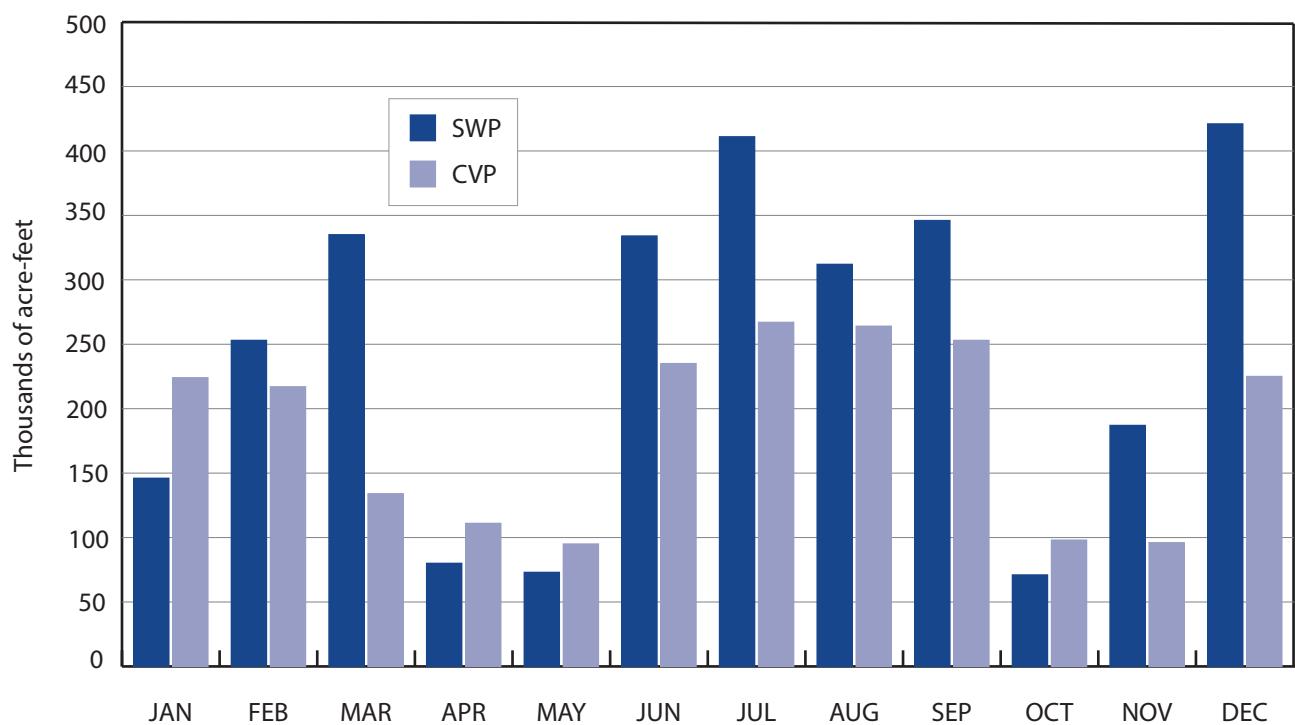


Figure 7-7 Sacramento-San Joaquin Delta Exports by State Water Project and Central Valley Project, 2019

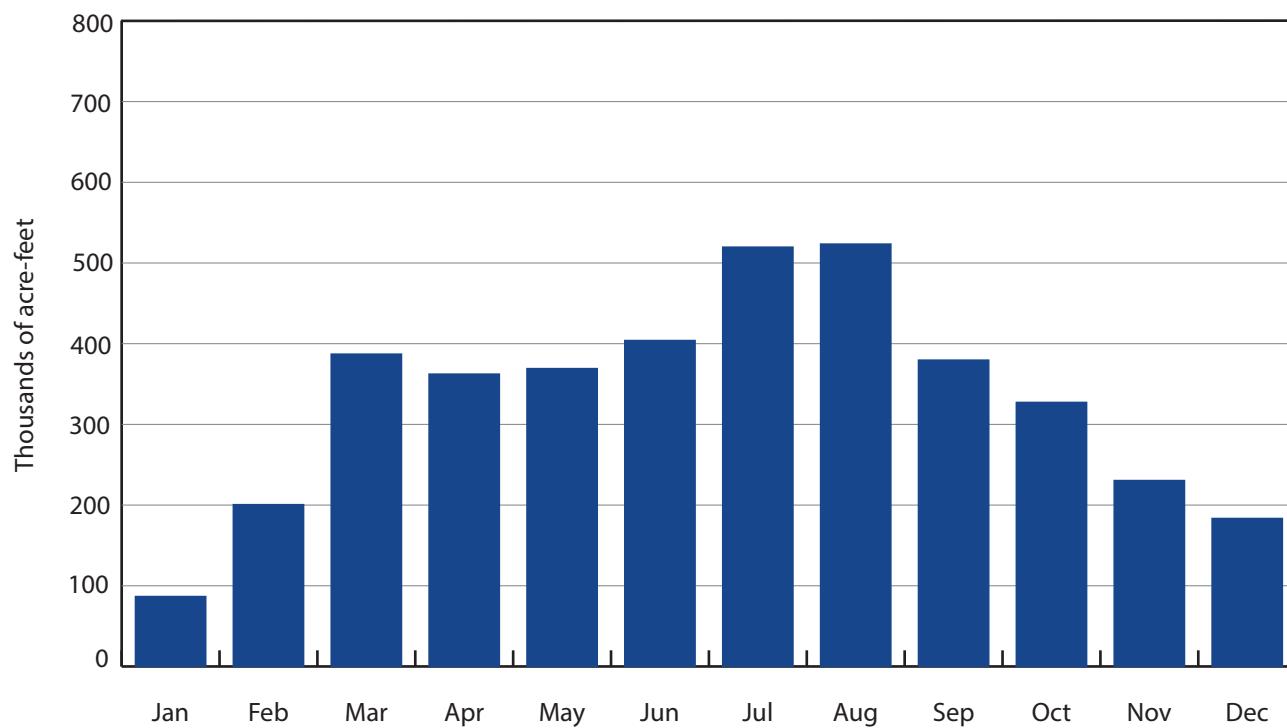


Figure 7-8 Water Pumped at Dos Amigos Pumping Plant, 2019

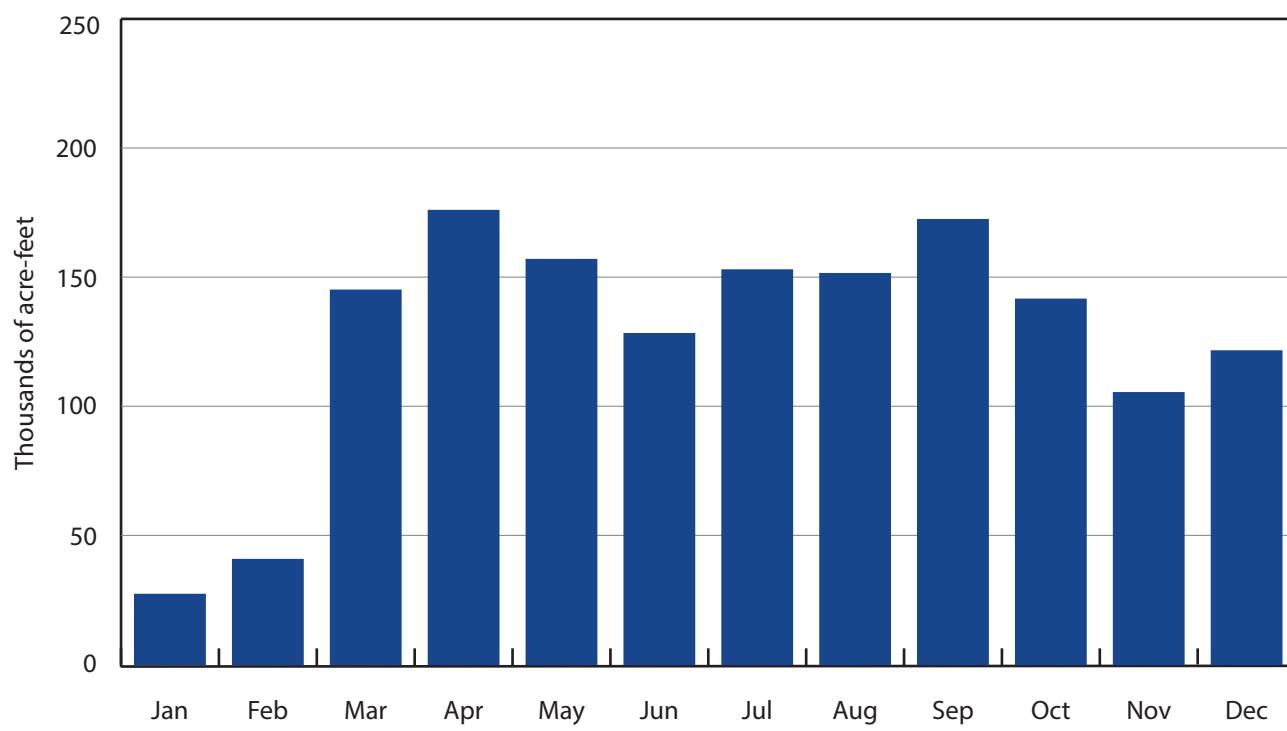


Figure 7-9 Water Pumped at Edmonston Pumping Plant, 2019



Chapter 8

Water Contracts and Deliveries

An aerial view of the California Aqueduct near Teerink Pumping Plant.

Significant Events in 2019

A total of 4,169,825 acre-feet (af) of State Water Project (SWP) and non-SWP water was delivered to 29 SWP Contractors and 23 other agencies. The portion delivered to SWP Contractors was 3,049,508 af; the portion delivered to non-SWP Contractors was 1,120,317 af.

The hydrologic conditions in the Sacramento and San Joaquin river watersheds were both classified as “wet.” As a result, the Department of Water Resources (DWR) approved 75 percent of the SWP Contractors’ Table A allocation requests.

Two SWP Contractors recovered approximately 28,651 af of water from water banks in 2019.

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 an SWP 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 Contractors and approved for delivery by DWR based on hydrologic conditions, current reservoir storage, and combined requests from the SWP Contractors. Under certain water year conditions, DWR is not able to deliver the quantity of water requested by SWP Contractors. In those years, a proportional amount is allocated and delivered according to the SWP Water Supply Contracts by prorating the amount in proportion to each SWP 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 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 8 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 Extensions

In May 2013, DWR and the SWP Contractors began negotiations in a public forum to develop contract amendments to extend the term and change certain financial provisions of the SWP Water Supply Contracts. In June 2014, the negotiators for DWR and the SWP 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, which extends to December 31, 2035; (2) 75 years from the effective date of the

contract; or (3) until all bonds issued to finance construction costs of SWP facilities are repaid. Each SWP Contractor may elect to receive continued service under its SWP Water Supply Contract contingent upon certain specified terms and conditions and other reasonable and equitable terms

mutually agreed upon by DWR and the SWP 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,

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 Santa Clarita Valley Water Agency (formerly Castaic Lake Water Agency) (1992), respectively. Today, DWR has contracts with 29 SWP 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 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 Supply 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.

each SWP Contractor that signs an amendment would extend its contract term to December 31, 2085.

Also under the Agreement in Principle, payment provisions for capital costs and certain other costs will be amended from an amortized basis to an annual “pay as you go” basis. The “pay as you go” provisions will provide revenues needed by DWR to operate the SWP in a fiscally sound manner. The SWP Water Supply Contracts’ current provisions authorizing DWR to charge the SWP Contractors annually for the full amount of required annual debt service and coverage on the bonds will continue in any extended SWP Water Supply Contract.

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

- an increase in DWR’s operating reserves—a mechanism for financing capital projects with interest from the SWP Contractors
- the establishment of accounts to fund certain State Water Resources Development System expenses not chargeable to the SWP Contractors
- the establishment of a finance committee consisting of DWR and SWP Contractor representatives to serve as a forum for discussions and to provide a channel for recommendations concerning SWP financial policies

Before any SWP Water Supply Contract amendment is adopted, DWR must accomplish the following as part of the contract amendment process: (1) complete an environmental review pursuant to the California Environmental Quality Act; and (2) deliver a presentation in an informational hearing to the California Legislature. In 2018, DWR certified the final environmental impact report on November 13, 2018, and approved the proposed project on December 11, 2018. Informational hearings were held with the Senate Natural Resources

and Water Committee and the Joint Legislative Budget Committee on July 3, 2018 and September 11, 2018, respectively.

As of December 31, 2019, DWR has executed a total of 19 contract extension amendments with the SWP Contractors. In order for the amendments to be effective, a total of 24 SWP Contractors, with an aggregate maximum annual Table A amount of more than 3,950,000 acre-feet (af) must execute, or commit to execute, the amendments with DWR. For additional information regarding the contract extension amendment litigation, please refer to Chapter 5, Legislation and Litigation.

Water Management Amendment Negotiations

In 2018, DWR and the SWP Contractors held a series of public negotiations sessions that resulted in the Agreement in Principle for the SWP Water Supply Contract Amendment for Water Management and California WaterFix. In October 2018, DWR circulated for public review the draft environmental impact report that analyzed the potential environmental impacts of the proposed contract amendments. After the issuance of the Governor’s April 29, 2019 Executive Order N-10-19, which announced a departure from the California WaterFix project, DWR withdrew various project approvals for the California WaterFix project.

On May 20, 2019, DWR and the SWP Contractors held a public negotiations session where an agreement was reached to remove the provisions related to the cost allocation for the California WaterFix from the proposed contract amendment and to proceed with a separate SWP Water Supply Contract Amendment for Water Management. The resulting 2019 Agreement in Principle for the SWP Water Supply Contract Amendment for Water Management stated that the proposed contract

amendment would “supplement and clarify terms of the SWP water supply contract that will provide greater water management regarding transfers and exchanges of SWP water within the SWP service area.” DWR determined it was appropriate to revise the 2018 draft environmental impact report to evaluate the removal of provisions addressing cost allocation for the California WaterFix and to focus the analysis on the proposed water management activities. In late 2019, DWR began preparation of the Partially Recirculated draft environmental impact Report for the SWP Water Supply Contract Amendments for Water Management.

Amendments to SWP Water Supply Contracts

All of the original SWP Water Supply Contracts signed by DWR and the 29 SWP 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 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

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 af of agricultural contractor Table A amounts, financial restructuring, and additional and preapproval of water supply management practices. The Monterey Amendments are discussed in detail in Bulletin 132-95, Chapter 1, Summary of Significant Events.

In 2019, 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. See Bulletin 132-18 for more information on the settlement agreement.

2019 Amendments to SWP Water Supply Contracts

There was one amendment to the SWP Water Supply Contracts in 2019.

Alameda-Zone 7

DWR executed Amendment No. 27 to the water supply contract between Alameda-Zone 7 and DWR on August 22, 2019. This amendment provides the terms and conditions for the additional capacity available to Alameda-Zone 7 due to the South Bay Aqueduct enlargement project and its related payment obligations. The South Bay Aqueduct enlargement project was completed in 2014 and became operational in 2015. (SWPAO #17014)

Miscellaneous Agreements with SWP Contractors

2019 Water Conveyance and Exchange Agreements

Water conveyance and exchange agreements that were executed or pending execution with SWP Contractors during 2019 are described below.

AVEK/Palmdale

A change in point of delivery agreement among DWR, AVEK, and Palmdale, executed December 30, 2019, approved the delivery of up to 500 af of Palmdale's 2019 Table A water to the Upper Amargosa Creek Turnout. The Upper Amargosa Creek Turnout is a permanent turnout located at approximately Milepost 342.73 in Reach 20B of the California Aqueduct. Palmdale's Table A water delivered to the Upper Amargosa Creek Turnout would be used to recharge the adjudicated groundwater basin in the Antelope Valley region. Palmdale would recover this water in the future using its existing wells for use within Palmdale's service area. This agreement terminates on December 31, 2019. During 2019, no water was moved under this agreement. (SWPAO #19040)

Santa Clarita/ Ventura/United Water Conservation District

A letter agreement among DWR, Santa Clarita, Ventura, and United Water Conservation District, a member agency of Ventura, executed November 19, 2019, approved the delivery of up to 2,000 af of Santa Clarita's 2019 Table A water to Ventura through December 31, 2019. In exchange, Ventura will return to Santa Clarita, based on an unbalanced exchange ratio of 2:1, up to 1,000 af of United Water Conservation District's allocation of Ventura's future Table A water through December 31, 2029. During 2019, a total of 1,000 af of Santa Clarita's Table A water was delivered to Ventura under this agreement. (SWPAO #19039)

Kern/Santa Clarita

A letter agreement among DWR, Kern, and Santa Clarita, executed November 22, 2019, approved the delivery of up to 25,000 af of Santa Clarita's 2019 Table A water to Kern through December 31, 2019. In exchange, Kern will return to Santa Clarita, based on an unbalanced exchange ratio of 2:1, up to

12,500 af of its future Table A water through December 31, 2029. During 2019, a total of 11,000 af of Santa Clarita's Table A water was delivered to Kern under this agreement. (SWPAO #19037)

Kern/Palmdale

A letter agreement among DWR, Kern, and Palmdale, executed November 22, 2019, approved the delivery of up to 15,000 af of Palmdale's 2019 Table A water to Kern through December 31, 2019. In exchange, Kern will return to Palmdale, based on an unbalanced exchange ratio of 2:1, up to 7,500 af of its future Table A water through December 31, 2029. During 2019, a total of 11,959 af of Palmdale's Table A water was delivered to Kern under this agreement. (SWPAO #19036)

Kern/Littlerock

A letter agreement among DWR, Kern, and Littlerock, executed November 25, 2019, approved the delivery of up to 1,208 af of Littlerock's 2019 Table A water to Kern through December 31, 2019. In exchange, Kern will return to Littlerock, based on an unbalanced exchange ratio of 2:1, up to 604 af of its future Table A water through December 31, 2029. During 2019, a total of 1,208 af of Littlerock's Table A water was delivered to Kern under this agreement. (SWPAO #19035)

Kern

A letter agreement between DWR and Kern, executed November 25, 2019, approved the conveyance of up to 15,000 af of San Joaquin River Exchange Contractors Water Authority's (San Joaquin Exchange Contractors) Central Valley Project (CVP) water to Kern through December 31, 2019. The U.S. Bureau of Reclamation (Reclamation) made this CVP water available to DWR at O'Neill Forebay for subsequent delivery by DWR to Kern under Article 55 of Kern's Water Supply Contract with DWR. During 2019, a total of 15,000 af of CVP

water was conveyed to Kern under this agreement. (SWPAO #19034)

An agreement between DWR and Kern, executed October 28, 2019, approved the conveyance of up to 6,000 af of Westlands Water District's (Westlands) CVP water to Kern through February 29, 2020. Westlands' CVP water was delivered to Kern for storage in the groundwater basin underlying Semitropic Water Storage District, a member unit of Kern. Reclamation made this CVP water available to DWR at O'Neill Forebay for subsequent delivery by DWR to Kern under Article 55 of Kern's Water Supply Contract with DWR. In 2019, a total of 2,100 af of CVP water was conveyed to Kern under this agreement. (SWPAO #19033)

AVEK/Santa Clarita

A letter agreement among DWR, AVEK, and Santa Clarita, executed October 16, 2019, approved the delivery of up to 7,500 af of Santa Clarita's 2019 Table A water to AVEK through December 31, 2019. In exchange, AVEK will return to Santa Clarita, based on an unbalanced exchange ratio of 2:1, up to 3,750 af of its future Table A water through December 31, 2029. During 2019, a total of 7,500 af of Santa Clarita's Table A water was delivered to AVEK under this agreement. (SWPAO #19032)

Kern/Metropolitan/Santa Barbara

An agreement among DWR, Kern, Metropolitan, and Santa Barbara, pending execution, allows for the delivery of up to 700 af of Santa Barbara's 2019 Table A water to Metropolitan through December 31, 2019. In exchange, Metropolitan will return to Santa Barbara, based on an unbalanced exchange ratio of 2:1, up to 350 af of its future Table A water through December 31, 2025. The water was acquired by Irvine Ranch Water District on behalf of Metropolitan. The agreement also allows for a change in point of delivery of Santa Barbara's 2019 Table A water to Kern's

turnout(s) through December 31, 2019 for storage in the Strand and Stockdale Integrated Banking Projects located in Kern County and operated by Kern's member unit, Rosedale-Rio Bravo Water Storage District (Rosedale-Rio Bravo). Metropolitan will recover the stored water for use in its service area by December 31, 2025. During 2019, a total of 700 af of Santa Barbara's Table A water was delivered to Kern's turnout(s) under this agreement. (SWPAO #19031)

AVEK/Kern

A letter agreement among DWR, AVEK, and Kern, executed September 30, 2019, approved the delivery of up to 2,500 af of AVEK's 2019 Table A water to Kern through December 31, 2019, on behalf of landowner Tejon Ranch Company, which farms in both AVEK and Kern service areas. During 2019, a total of 2,454 af of AVEK's Table A water was delivered to Kern under this agreement. (SWPAO #19030)

Empire/Kern

A letter agreement among DWR, Empire, and Kern, executed September 12, 2019, approved the delivery of up to 1,500 af of Empire's 2019 Table A water to Kern through December 31, 2019, on behalf of landowner Sandridge Partners Incorporated, which farms in both Empire and Kern service areas. During 2019, a total of 1,142 af of Empire's Table A water was delivered to Kern under this agreement. (SWPAO #19029)

Kern

A letter agreement between DWR and Kern, executed September 26, 2019, approved the conveyance of up to 30,000 af of Westlands' CVP water to Kern through February 29, 2020. Westlands' CVP water delivered to Kern would be used by Kern's member units, Semitropic Water Storage District and Wheeler Ridge-Maricopa Water Storage District. Reclamation would make the CVP water available to DWR at O'Neill Forebay

for subsequent delivery by DWR to Kern under Article 55 of Kern's Water Supply Contract with DWR. During 2019, no water was delivered to Kern under this agreement. (SWPAO #19028)

San Gorgonio/Ventura/Casitas Municipal Water District/City of San Buenaventura

A letter agreement among DWR, San Gorgonio, Ventura, City of San Buenaventura (San Buenaventura), and Casitas Municipal Water District (Casitas), executed October 3, 2019, approved the delivery of up to 2,000 af of Ventura's 2019 Table A water to San Gorgonio through December 31, 2019. This amount was provided by two of Ventura's member agencies, San Buenaventura (up to 1,350 af) and Casitas (up to 650 af). In exchange, San Gorgonio will return to San Buenaventura and Casitas, based on an unbalanced exchange ratio of 2:1, up to 1,000 af of its future approved Table A water through December 31, 2029. During 2019, a total of 2,000 af of Ventura's Table A water was delivered to San Gorgonio under this agreement. (SWPAO #19027)

Tulare

A letter agreement between DWR and Tulare, executed August 8, 2019, approved the conveyance of up to 5,300 af of CVP water to Tulare. This CVP water was acquired by Angiola Water District, a member unit of Tulare, from Fresno Slough Water District (up to 4,000 af) and Mercy Springs Water District (up to 1,300 af). Reclamation made this CVP water available to DWR at O'Neill Forebay for subsequent delivery by DWR to Tulare under Article 55 of Tulare's Water Supply Contract with DWR. This agreement is effective through February 28, 2020. During 2019, a total of 3,975 af of CVP water was conveyed to Tulare under this agreement. (SWPAO #19026)

AVEK/Littlerock

An agreement among DWR, AVEK, and Littlerock, executed August 28, 2019, approved a temporary additional point of delivery of up to 1,150 af of Littlerock's 2019 Table A water to AVEK's temporary diversion facility located at approximately Milepost 366.53 in Reach 22B of the California Aqueduct's East Branch (Big Rock Creek Siphon Temporary Turnout). The Big Rock Creek Siphon Temporary Turnout directly feeds into an adjudicated groundwater basin in the Antelope Valley region, which Littlerock can store SWP water supplies in and recover later using its own pumping wells for use within its service area. A separate temporary water diversion agreement between DWR and AVEK, executed January 1, 2019, and subsequently amended June 28, 2019, approved the temporary diversion of water directly from the California Aqueduct through the Big Rock Creek Siphon Temporary Turnout. This agreement is effective through December 31, 2019. During 2019, a total of 162 af of Littlerock's Table A water was delivered to the Big Rock Siphon Temporary Turnout under this agreement. (SWPAO #19025)

Tulare

A letter agreement between DWR and Tulare, executed September 3, 2019, approved the conveyance of up to 40,000 af of non-SWP water to Tulare through December 31, 2020. This non-SWP water consists of Friant Recirculation Water from Lower Tule River Irrigation District and Orange Cove Irrigation District; and/or Cross Valley Water from Lower Tule, Pixley Irrigation District, and Hills Valley Irrigation District. Reclamation made this non-SWP water available to DWR at O'Neill Forebay and/or Banks Pumping Plant for subsequent delivery by DWR to Tulare under Article 55 of Tulare's Water Supply Contract with DWR. During 2019, a total of 3,779 af of water was delivered to Tulare under this Agreement. (SWPAO #19023)

Santa Clara

A letter agreement between DWR and Santa Clara, executed August 8, 2019, approved the exchange of up to 75,000 af of SWP water with Santa Clara's CVP water. Reclamation made available up to 75,000 af of Santa Clara's CVP water to DWR at O'Neill Forebay. DWR delivered Santa Clara's CVP water to SWP service areas south of O'Neill Forebay. In exchange, DWR delivered 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 one-year approval effective July 15, 2019 for the consolidation of CVP and SWP places of use. This agreement terminates on July 13, 2020. During 2019, a total of 22,399 af of Santa Clara's CVP was made available to DWR and a total of 22,399 af of SWP water was delivered to Santa Clara under this agreement. (SWPAO #19022)

AVEK/Kern

A letter agreement among DWR, AVEK, and Kern, executed August 13, 2019, approved the delivery of up to 15,000 af of AVEK's 2019 Table A water to Kern through December 31, 2019, on behalf of landowner Homer, LLC, which farms in both AVEK and Kern service areas. During 2019, a total of 15,000 af of AVEK's Table A water was delivered to Kern under this agreement. (SWPAO #19021)

Kern

A letter agreement between DWR and Kern, executed August 6, 2019, approved the conveyance of up to 10,000 af of 2019 CVP water to Kern through February 28, 2020. Wheeler Ridge-Maricopa Water Storage District, a member unit of Kern, acquired this CVP water from San Luis Water District. Reclamation made this CVP water available to DWR at O'Neill Forebay for subsequent delivery by DWR to Kern under Article 55 of Kern's Water Supply Contract with DWR. During 2019, a total of 10,000 af of CVP

water was conveyed to Kern under this agreement. (SWPAO #19020)

Kern/Tulare

A change in point of delivery agreement among DWR, Kern, and Tulare, executed September 20, 2019, approved the delivery of up to 35,000 af of Tulare's 2019 Table A water to Kern through December 31, 2019. This is to facilitate the delivery of pre-1914 Kings River water rights water acquired by Kern from J.G. Boswell Company, a landowner in Tulare, to Kern's service area. Tulare would use the pre-1914 Kings River water rights water, up to 35,000 af, in its service area. During 2019, a total of 35,000 af of Tulare's Table A water was delivered to Kern under this agreement. (SWPAO #19019)

Kern

A letter agreement between DWR and Kern, executed July 10, 2019, approved the conveyance of up to 5,000 af of San Joaquin Exchange Contractors' CVP water to Kern through February 29, 2020. Reclamation made the San Joaquin Exchange Contractors' CVP water available to DWR at O'Neill Forebay for subsequent delivery by DWR to Kern under Article 55 of Kern's Water Supply Contract with DWR. During 2019, a total of 5,000 af of water was conveyed to Kern under this agreement. (SWPAO #19018)

Tulare/Pleasant Valley Water District/ San Luis/Westlands

A change in point of delivery agreement among DWR, Tulare, Pleasant Valley Water District (Pleasant Valley), San Luis Water District (San Luis), and Westlands, executed October 31, 2019, approved the delivery of up to a total of 65,000 af of Tulare's 2019 and/or 2020 Table A water to Pleasant Valley, San Luis, and Westlands through July 13, 2020. This is to facilitate the delivery of pre-1914 Kings River water rights water acquired by Pleasant Valley, San Luis, and Westlands from J.G. Boswell Company, a landowner in Tulare, to their

respective service areas. Tulare would use the pre-1914 Kings River water rights water, up to 65,000 af, in its service area. DWR filed a petition with the State Water Board and received a one-year approval effective July 15, 2019, for the consolidation of SWP and CVP places of use. During 2019, no water was moved under this agreement. (SWPAO #19016)

AVEK/Kern

A letter agreement among DWR, AVEK, and Kern, executed August 5, 2019, approved the conveyance of up to 100 af of non-SWP water to AVEK's Los Angeles Department of Water and Power (LADWP) Turnout (AVEK's LADWP Turnout). AVEK's LADWP Turnout, located at approximately Milepost 311.84, allows direct water deliveries from the California Aqueduct to LADWP's service area within Metropolitan's service area via the Los Angeles Aqueduct. This non-SWP water is "Nickel Water" located in Kern County that LADWP has acquired from San Gorgonio. This non-SWP water was made available to DWR at Reach 12E of the California Aqueduct for subsequent delivery by DWR to AVEK's LADWP Turnout, under Article 55 of AVEK's Water Supply Contract with DWR. During 2019, a total of 99 af of non-SWP water was delivered to AVEK under this agreement. (SWPAO #19015)

AVEK/Kern/San Gorgonio

A letter agreement among DWR, AVEK, Kern, and San Gorgonio, executed August 5, 2019, approved the conveyance of up to 1,700 af of non-SWP water to San Gorgonio, through December 31, 2019. 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, under Article 55 of San Gorgonio's Water Supply Contract with DWR. During 2019, a total of 1,601 af of water

was conveyed to San Gorgonio under this agreement. (SWPAO #19014)

Empire

A contract between DWR and Empire, executed March 14, 2019, approved the delivery of unscheduled water to Empire in 2019 at times when SWP water is not needed for fulfilling Table A deliveries or for meeting project operational commitments. During 2019, a total of 35 af of unscheduled water was delivered to Empire under this agreement. (SWPAO #19008)

AVEK/Palmdale

An agreement among DWR, AVEK, and Palmdale, executed August 6, 2019, approved a temporary additional point of delivery of up to 2,000 af of Palmdale's 2019 Table A water to AVEK's temporary diversion facility located at approximately Milepost 366.53 in Reach 22B of the California Aqueduct's East Branch (Big Rock Creek Siphon Temporary Turnout) through December 31, 2019. The Big Rock Creek Siphon Temporary Turnout directly feeds into an adjudicated groundwater basin in the Antelope Valley region, which Palmdale can store SWP water supplies in and recover later using its own pumping wells for use within its service area. A separate temporary water diversion agreement between DWR and AVEK, executed on January 1, 2019 and subsequently amended on June 28, 2019, approved the temporary diversion of water directly from the California Aqueduct through the Big Rock Creek Siphon Temporary Turnout through December 31, 2019. During 2019, a total of 245 af of Palmdale's Table A water was delivered to the Big Rock Creek Siphon Temporary Turnout under this agreement. (SWPAO #19007)

Mojave/Santa Barbara

A letter agreement among DWR, Mojave, and Santa Barbara, executed March 27, 2019, approved the delivery of up to 6,200 af of Mojave's 2019 Table A water

to Santa Barbara through December 31, 2019. In exchange, Santa Barbara will return to Mojave, based on an unbalanced exchange ratio of 4:1, up to 1,550 af, of its future Table A water to Mojave through December 31, 2029. During 2019, no water was moved under this agreement. (SWPAO #19006)

Kern/Tulare

A letter agreement among DWR, Kern, and Tulare, executed May 13, 2019, approved the delivery of up to 10,000 af of Tulare's 2019 Table A water to Kern through December 31, 2019, on behalf of landowner Sandridge Partners Incorporated, which farms in both Tulare and Kern service areas. During 2019, a total of 3,719 af of Tulare's Table A water was delivered to Kern under this agreement. (SWPAO #19005)

Kern

A letter agreement between DWR and Kern, executed February 20, 2019, approved the conveyance of up to 3,000 af of CVP water to Kern through February 28, 2019. Semitropic Water Storage District, a member unit of Kern, acquired this CVP water from Shafter-Wasco Irrigation District. Reclamation made this CVP water available to DWR at O'Neill Forebay for subsequent delivery by DWR to Kern under Article 55 of Kern's Water Supply Contract with DWR. During 2019, a total of 2,876 af of CVP water was conveyed to Kern under this agreement. (SWPAO #19004)

Tulare/Westlands

A letter agreement among DWR, Tulare, and Westlands, executed February 26, 2019, approved the delivery of up to 2,500 af of Tulare's 2019 Table A water to Westlands through December 31, 2019, on behalf of landowner Westlake Farms Incorporated, which farms in both Tulare and Westlands service areas. During 2019, no water was moved under this agreement. (SWPAO #19003)

AVEK/Kern

A letter agreement among DWR, AVEK, and Kern, executed March 6, 2019, approved the delivery of up to 16,000 af of AVEK's 2019 Table A water to Kern through July 1, 2019. In exchange, Kern will return to AVEK, based on an unbalanced exchange ratio of 3:1, up to 5,333 af of its future Table A water through December 31, 2023. During 2019, a total of 16,000 af of AVEK's Table A water was delivered to Kern under this agreement. (SWPAO #19002)

AVEK/Littlerock

An agreement among DWR, AVEK and Littlerock, executed January 28, 2019, approved a temporary additional point of delivery of up to 1,150 af of Littlerock's 2019 Table A water to AVEK's temporary diversion facility located at approximately Milepost 366.53 in Reach 22B of the California Aqueduct's East Branch (Big Rock Creek Siphon Temporary Turnout) through June 30, 2019. The Big Rock Creek Siphon Temporary Turnout directly feeds into an adjudicated groundwater basin in the Antelope Valley region, which Littlerock can store SWP water in and recover later using its own pumping wells for use within its service area. A separate temporary water diversion agreement between DWR and AVEK, executed on January 1, 2019, approved the temporary diversion of water directly from the California Aqueduct through the Big Rock Creek Siphon Temporary Turnout. During 2019, no water was delivered to the Big Rock Creek Siphon Temporary Turnout under this Agreement. (SWPAO #18037)

AVEK

An agreement between DWR and AVEK, executed January 28, 2019, approved a temporary additional point of delivery of up to 2,000 af of AVEK's 2019 Table A water to AVEK's temporary diversion facility located at approximately Milepost 366.53 in Reach 22B of the California Aqueduct's

East Branch (Big Rock Creek Siphon Temporary Turnout) through June 30, 2019. The Big Rock Creek Siphon Temporary Turnout directly feeds into an adjudicated groundwater basin in the Antelope Valley region, which AVEK can store SWP water supplies in and recover later using its own pumping wells for use within its service area. A separate temporary water diversion agreement between DWR and AVEK, executed January 1, 2019, and subsequently amended June 28, 2019, approved the temporary diversion of water directly from the California Aqueduct through the Big Rock Creek Siphon Temporary Turnout through December 31, 2019. An amendment (SWPAO #18035-A), executed June 28, 2019, extended the term of the agreement through December 31, 2019. During 2019, a total of 245 af of AVEK's Table A water was delivered to the Big Rock Creek Siphon Temporary Turnout under this Agreement. (SWPAO #18035, SWPAO #18035-A)

Kern

A change in point of delivery agreement between DWR and Kern, executed February 7, 2019, approved the delivery of up to 5,000 af of Kern's 2018 and/or 2019 Table A Water to O'Neill Forebay. This is to facilitate the return of a portion of the San Joaquin Exchange Contractors' CVP water previously stored in Rosedale-Rio Bravo, under a separate agreement between DWR and Kern, executed November 22, 2017 (SWPAO #17031, Bulletin 132-18). DWR made Kern's Table A Water available to Reclamation at O'Neill Forebay for subsequent delivery by Reclamation to the San Joaquin River Exchange Contractors. DWR received approval from the State Water Board on November 9, 2019, for an additional exchange of water under the original State Water Board's Division of Water Rights' July 2, 2018 Order that approved the consolidation of SWP and CVP places of use. This agreement is effective through July 1, 2019. During 2019, a total of 1,000 af of Kern's Table A water was

delivered to O'Neill Forebay under this agreement. (SWPAO #18031)

Metropolitan/San Bernardino

An amendment (SWPAO #18008-A) among DWR, Metropolitan and San Bernardino, executed January 10, 2019, approved an increase in the delivery amount of San Bernardino's Table A water to Devil Canyon Afterbay, from up to 20,000 af, to up to 25,000 af. The original agreement (SWPAO #18008) among DWR, Metropolitan, and San Bernardino, executed July 24, 2018, approved the delivery of up to 20,000 af of San Bernardino's 2018 Table A water to Devil Canyon Afterbay for subsequent delivery by Metropolitan to either San Bernardino and/or Metropolitan service areas via Metropolitan's delivery facilities, through December 31, 2018. Due to a planned temporary outage of the East Branch Extension, DWR was not able to deliver SWP water to San Bernardino. Metropolitan offered to assist in the delivery of San Bernardino's approved Table A water to San Bernardino during this outage. During 2019, no water was moved under this agreement. (SWPAO #18008-A and #18008)

Butte

An amendment (SWPAO #17021-A) between DWR and Butte, executed May 9, 2019, approves an alternate mechanism for Pacific Gas & Electric Company (PG&E) to make available up to 3,000 af of PG&E's water to Lake Oroville for three years through December 31, 2021.

The original agreement (SWPAO #17021) between DWR and Butte, executed March 26, 2018, approved the conveyance of up to 3,000 af per year of PG&E's water to California Water Service, a member agency of Butte, through December 31, 2027. SWPAO #17021 approves PG&E to make its water available to DWR at Lake Oroville through the Upper Miocene Canal, then through PG&E's Lime Saddle Powerhouse.

Due to the Camp Fire in late 2018, a portion of the Miocene Canal used by PG&E was destroyed which prevented PG&E's water from being made available to Lake Oroville through the Lime Saddle Powerhouse.

SWPAO #17021-A allows the diversion of PG&E's water just downstream of the Upper Miocene Head Dam into the Feather River, then to Lake Oroville. DWR conveys PG&E's water from Lake Oroville to California Water Service's turnout(s) via the Thermalito Power Canal under Article 55 of Butte's Water Supply Contract with DWR. During 2019, a total of 2,811 af of water was conveyed to Butte under this agreement. (SWPAO #17021-A, SWPAO #17021)

San Bernardino/San Gorgonio

A multi-year agreement among DWR, San Bernardino, and San Gorgonio, executed March 21, 2019, approved a change in point of delivery of up 2,400 af annually of San Gorgonio's Table A water to San Bernardino's turnout(s) located on the East Branch Extension of the California Aqueduct. Yucaipa Valley Water District (Yucaipa Valley) serves customers located in both San Bernardino and San Gorgonio service areas. However, Yucaipa Valley's only physical connection to the SWP system is located at San Bernardino's turnout at Reach 3A of the California Aqueduct's East Branch Extension from which SWP water is conveyed to Yucaipa Valley's service area. This agreement allows Yucaipa Valley to receive San Gorgonio's Table A water via San Bernardino's turnout(s) for use in the San Gorgonio portion of Yucaipa Valley's service area. This agreement terminates on December 31, 2035. During 2019, a total of 177 af of San Gorgonio's Table A water was delivered to San Bernardino's turnout(s) under this agreement. (SWPAO #16030)

Water Conveyance and Exchange Agreements Prior to 2019

Kern

A letter agreement between DWR and Kern, executed December 26, 2018, approved the conveyance of up to 6,000 af of CVP water to Kern through February 28, 2019. Wheeler Ridge-Maricopa Water Storage District, a member unit of Kern, acquired this CVP water from three CVP Friant Division districts (Orange Cove Irrigation District, Lindsay-Strathmore Irrigation District, and Tulare Irrigation District). Reclamation made this CVP water available to DWR at O'Neill Forebay for subsequent delivery by DWR to Kern under Article 55 of Kern's Water Supply Contract with DWR. During 2019, a total of 1,734 af of CVP water was conveyed to Kern under this agreement. (SWPAO #18033)

Kern/Westlands

An agreement among DWR, Kern, and Westlands, executed November 26, 2018, approved the delivery of up to 15,000 af of Westlands' CVP water to Kern through February 28, 2019. This CVP 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 CVP water available to DWR at O'Neill Forebay for subsequent delivery by DWR to Kern under Article 55 of Kern's Water Supply Contract with DWR. During 2019, a total of 400 af of water was conveyed to Kern under this agreement. (SWPAO #18027)

Santa Clara/Solano

A letter agreement among DWR, Santa Clara, and Solano, executed September 13, 2018, approved the delivery of up to 8,000 af of Solano's 2018 Table A water to Santa Clara through December 31, 2018. In exchange, Santa Clara will return to Solano, based on an unbalanced exchange ratio of 4:1, up to 2,000 af of its future Table A water through

December 31, 2028. During 2019, a total of 1,000 af of Santa Clara's Table A water was delivered to Solano under this agreement. (SWPAO #18018)

Mojave/Santa Barbara

A letter agreement among DWR, Mojave, and Santa Barbara, executed June 11, 2018, approved the delivery of up to 5,633 af of Mojave's 2018 Table A water to Santa Barbara through December 31, 2018. In exchange, Santa Barbara will return to Mojave, based on an unbalanced exchange ratio of 4:1, up to 1,409 af of its future Table A water through December 31, 2028. During 2019, a total of 1,215 af of Santa Barbara's Table A water was delivered to Mojave under this agreement. (SWPAO #18016)

Kern

A letter agreement between DWR and Kern, executed July 12, 2018, approved the conveyance of up to 50,000 af of Kern-Tulare Water District's CVP water to Kern. Reclamation made this CVP water available to DWR at O'Neill Forebay and/or Banks Pumping Plant for subsequent delivery by DWR to Kern under Article 55 of Kern's Water Supply Contract with DWR. DWR filed a petition with the State Water Board and received a one-year approval effective June 2, 2018, for the consolidation of CVP and SWP places of use. This agreement terminated on July 1, 2019. During 2019, a total of 559 af of water was conveyed to Kern under this agreement. (SWPAO #18012)

Dudley Ridge/Kern/Metropolitan

A multiyear exchange and change in point of delivery agreement among DWR, Dudley Ridge, Kern, and Metropolitan, executed June 7, 2018, approved the delivery of up to 12,240 af of Dudley Ridge's approved Table A water to Metropolitan through December 31, 2027. In exchange, Metropolitan will return to Dudley Ridge,

based on an unbalanced exchange ratio of 2:1, up to 6,120 af of its future approved Table A water within 10 years of delivery to Metropolitan or by December 31, 2035, whichever comes earlier. This agreement allows for the delivery of a portion of Dudley Ridge's approved Table A water to either Metropolitan's service area and/or to Kern's turnout(s) for storage in the Irvine Ranch Water District's banking facilities in Kern County. Water delivered to Kern County for storage will be returned to Metropolitan for later use in its own service area by December 31, 2035. During 2019, a total of 1,311 af of Dudley Ridge's Table A water was delivered to Kern's turnout(s) under this agreement. (SWPAO #17030)

Santa Barbara/Santa Clarita

A letter agreement among DWR, Santa Barbara, and Santa Clarita (formal name change per SWPAO #18006), executed December 29, 2016, approved the delivery of up to 1,500 af of Santa Clarita's approved SWP water to Santa Barbara through December 31, 2016. In exchange, Santa Barbara will return to Santa Clarita, based on an unbalanced exchange ratio of 2:1, up to 750 af of its future approved SWP water to San Clarita through December 31, 2026. During 2019, a total of 750 af of Santa Barbara's Table A water was delivered to Santa Clarita, thereby completing this agreement. (SWPAO #16034)

Napa/Santa Clara

A letter agreement among DWR, Napa, and Santa Clara, executed December 21, 2016, approved the delivery of up to 8,259 af of Napa's approved SWP water to Santa Clara through December 31, 2016. In exchange, Santa Clara will return to Napa, based on an unbalanced exchange ratio of 2:1, up to 4,130 af of its future SWP water through December 31, 2026. During 2019, a total of 4,000 af of Santa Clara's Table A water was delivered to Napa under this agreement. (SWPAO #16031)

Dudley Ridge/San Gabriel

A multi-year exchange agreement among DWR, Dudley Ridge, and San Gabriel, executed April 11, 2017, approved the delivery of a portion of Dudley Ridge's approved SWP water supplies to San Gabriel. In exchange, San Gabriel will return to Dudley Ridge, a like amount of its future SWP water within ten years of Dudley Ridge's water delivery to San Gabriel or by December 31, 2035, whichever comes earlier. The terms and conditions of this agreement also cover prior water deliveries under a previous multi-year water exchange agreement, executed September 14, 2010, among DWR, Dudley Ridge, and San Gabriel (SWPAO #10013, Bulletin 132-11). During 2019, a total of 3,345 af of Dudley Ridge's SWP water was delivered to San Gabriel under this agreement, of which 1,773 af was Article 21 water and 1,572 af was Article 56(c) carryover water. (SWPAO #16028)

Santa Clara

An agreement (SWPAO #15016) between DWR and Santa Clara, executed September 21, 2015, approved additional points of delivery of a portion of Santa Clara's approved SWP water to San Luis Reservoir and/or O'Neill Forebay through December 31, 2017. Santa Clara's water delivered to San Luis Reservoir and/or O'Neill Forebay under this agreement was subsequently delivered through CVP's San Felipe Division for use within Santa Clara's service area that is within the SWP place of use. A subsequent amendment (SWPAO #15016-A), executed November 21, 2017, extended the term of the agreement to December 31, 2020. During 2019, a total of 852 af of Santa Clara's Article 56(c) carryover water was delivered to San Luis Reservoir under this agreement. (SWPAO #15016, #15016-A)

AVEK/Santa Barbara

A letter agreement (SWPAO #15005) among DWR, AVEK, and Santa Barbara, 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 to AVEK, based on an even exchange ratio of 1:1, up to 7,500 af of its future approved SWP water through December 31, 2025. An amendment (SWPAO #15005-A), executed August 31, 2015, allowed for a portion of AVEK's SWP water that Santa Barbara was unable to take full delivery to its service area through December 31, 2015, to be stored in San Luis Reservoir as carryover water for later delivery to Santa Barbara through December 31, 2017. Another amendment (SWPAO #15005-B), 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 2019, a total of 1,319 af of Santa Barbara's Table A water was delivered to AVEK under this agreement. (SWPAO #15005, #15005-A, and #15005-B)

Butte

Three multi-year agreements (SWPAO #13013, SWPAO #13014, and SWPAO #13015) were executed in 2014 among DWR, Butte, and several participating SWP contractors. Butte's Water Supply Contract with DWR provides for Butte to have a maximum Table A amount of 27,500 af per year. Butte determined that 24,000 af per year of its Table A amount is not needed to meet its in-county demands for 2014 through 2021 and requested a delivery of up to 24,000 af per year of its Table A water to Palmdale, Dudley Ridge, and Kern. Of this, up to 10,000 af of Butte's allocated Table A water is made available to transfer to Palmdale. The remaining 14,000 af of Butte's allocated Table A water is shared on a percentage basis of 85.66 percent and 14.34 percent for transfer to Kern and Dudley Ridge respectively. Butte also determined that the difference of 3,500 af per year (27,500 af minus 24,000 af) may not be fully utilized by Butte for its

in-county needs and requested a delivery of a portion of the 3,500 af per year on a percentage basis to Palmdale, Dudley Ridge, and Kern when it becomes available (Butte's Additional Water). In 2019, Butte's allocated Table A water was delivered as follows:

Butte/Kern. A multi-year 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 2019, a total of 11,150 af of Butte's Table A water was delivered to Kern under this agreement. (SWPAO #13015)

Butte/Dudley Ridge. A multi-year 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 2019, a total of 1,859 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 2019, a total of 7,500 af of Butte's Table A water was delivered to Palmdale under this agreement. (SWPAO #13013)

Dudley Ridge/Kern/Metropolitan

A multi-year exchange and change in point of delivery agreement among DWR, Dudley

Ridge, Kern, and Metropolitan, executed December 16, 2013, approved the delivery of up to 8,700 af of Dudley Ridge's approved SWP water to Metropolitan by December 31, 2017. In exchange, Metropolitan will return to Dudley Ridge, based on an unbalance exchange ratio of 2:1, up to 4,350 af of its future approved SWP water by December 31, 2022. This agreement allows for the delivery of a portion of Dudley Ridge's approved SWP water to either Metropolitan's service area and/or to Kern's turnout(s) for storage in the Rosedale Rio-Bravo/Irvine Ranch Water District Banking and Exchange Program, for later use by Metropolitan in its own service area. During 2019, a total of 440 af of Metropolitan's Table A water was delivered to Dudley Ridge under this agreement. (SWPAO #13012)

Dudley Ridge/Kern

A multi-year agreement among DWR, Dudley Ridge, and Kern, executed June 13, 2011, approved the delivery of a portion of Dudley Ridge's Table A water for same landowner transfers to Kern through December 31, 2020. During 2019, a total of 4,000 af of Dudley Ridge's Table A water was delivered to Kern under this agreement. (SWPAO #10030)

Empire West/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' turnout(s) through April 1, 2027, on behalf of two landowners, Brooks Farms and Newton Brothers Farms, who farm in both Empire and Westlands service areas. The State Water Board issued an order authorizing the long-term change in place of use on November 21, 2011. During 2019, a total of 449 af of Empire's Table A water was delivered to Westlands under this agreement. (SWPAO #10008)

Dudley Ridge/Kern

A multi-year exchange agreement among DWR, Dudley Ridge, and Kern, executed March 14, 2011, approved water exchange(s) and/or same landowner transfer(s) between Dudley Ridge and Kern through December 31, 2020. This agreement allows for the delivery of a portion of: (1) either Dudley Ridge's or Kern's Table A water to the other party in exchange for the return of future Table A water and/or (2) either Dudley Ridge's or Kern's Table A water for same landowner transfer(s) to the other party without any expected return. During 2019, a total of 1,683 af of Kern's Article 56(c) carryover water was delivered to Dudley Ridge under this agreement. (SWPAO #10007)

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' turnout(s) through April 1, 2027, on behalf of two landowners, Hansen Ranches and Newton Brothers Farms, who farm in both Tulare and Westlands service areas. The State Water Board issued an order authorizing the long-term change in place of use on November 21, 2011. During 2019, a total of 1,500 af of Tulare's Table A water was delivered to Westlands under this agreement. (SWPAO #10006)

Dudley Ridge/Tulare

A long-term change in point of delivery agreement among DWR, Dudley Ridge, and Tulare, executed April 5, 2009, approved the delivery of a portion of Dudley Ridge's approved SWP water through Tulare's turnout(s) for use on lands within Dudley Ridge's service area, and conversely, the delivery of a portion of Tulare's approved SWP water through Dudley Ridge's turnout(s) for use on lands within Tulare's service area. This allows SWP water to be

delivered to lands within the Dudley Ridge and Tulare service areas not otherwise serviceable using their own respective conveyance facilities. This agreement is effective through December 31, 2035. During 2019, a total of 788 af of Dudley Ridge's Article 56(c) carryover water was delivered to Tulare's turnout(s) under this agreement. (SWPAO #08062)

Kings/Westlands

A long-term change in point of delivery agreement among DWR, Kings, and Westlands, executed May 6, 2008, approved the delivery of Kings' approved SWP water to Westlands' turnout(s) in Reaches 6 and 7 of the California Aqueduct for use on Westlands' agricultural lands within Kings' service area. This agreement is effective through December 31, 2035. During 2019, a total of 84 af of Kings' Article 21 water was delivered to Westlands' turnout(s) under this agreement. (SWPAO #07010)

Kern/Santa Clarita

A long-term agreement among DWR, Santa Clarita (formal name change per SWPAO #18006), and Kern, executed February 5, 2008, approved the annual conveyance of up to 11,000 af of Kern River pre-1914 water rights water acquired by Santa Clarita from Buena Vista Water Storage District (Buena Vista), a member unit of Kern, to Santa Clarita. The conveyance of the Kern River pre-1914 water rights water to Santa Clarita is accomplished by either (1) a change in point of delivery of a portion of Kern's Table A water to Santa Clarita as an exchange for a like amount of Buena Vista's water, or (2) by direct pump-in of the Kern River pre-1914 water rights water to the California Aqueduct and conveyed to Santa Clarita under Article 55 of Santa Clarita's Water Supply Contract with DWR. During 2019, a total of 1,100 af was delivered to Santa Clarita under this agreement. (SWPAO #07008)

Kings/Westlands

A long-term change in point of delivery agreement among DWR, Kings, and Westlands, executed March 24, 2004, approved the delivery of up to 5,000 af of Kings' Table A water annually through Westlands' turnout(s) for use within King's service area. This agreement is effective through December 31, 2035. During 2019, a total of 1,974 af of Kings' water was delivered to Westlands' turnout(s) under this agreement, of which 1,807 af was Table A water and 167 af was Article 56(c) carryover water. (SWPAO #04005)

Solano/Cities of Fairfield, Vacaville and Benicia

A settlement agreement among DWR, Solano, and the cities of Fairfield, Vacaville, and Benicia (Three Cities); and a separate conveyance agreement between DWR and Solano, executed concurrently on May 19, 2003, provides for the delivery of up to 31,620 af per year of settlement water to Solano for use by the Three Cities through December 31, 2035. DWR conveys the settlement water through the North Bay Aqueduct to the Three Cities to help meet their current and future municipal and industrial water needs. During 2019, a total of 5,064 af of settlement water was delivered to Solano for conveyance to the Three Cities under this agreement. (SWPAO #03017)

Kings/Tulare

A long-term change in point of delivery agreement among DWR, Kings, and Tulare, executed March 10, 2006, approved the annual delivery of up to 200 af of Kings' Table A water to Westlands' turnout(s) through December 31, 2035. The water was conveyed to GWF Energy LLC for use within Kings' service area. During 2019, a total of 2 af of Kings' Table A water was delivered to Westlands' turnout(s) under this agreement. (SWPAO #02031)

Kern

A long-term change in point of delivery agreement between DWR and Kern, executed June 8, 2000, approved the annual delivery of a portion of Kern's 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 Banking Project. On April 21, 2000, the State Water Board approved Western Hills' service area to be included within the authorized SWP place of use. During 2019, a total of 659 af of Kern's Table A water was delivered to Western Hills under this agreement. (SWPAO #01001)

Napa/Solano

A change in point of delivery agreement among DWR, Napa, and Solano, executed December 26, 2001, approved the annual delivery of up to 628 af of Napa's Table A water to the City of Vallejo's Water Treatment Plant located in Solano's service area; Napa's Table A water is subsequently conveyed to the City of American Canyon, a member agency of Napa. This agreement is effective through December 31, 2035. During 2019, a total of 24 af of Napa's Table A water was delivered to Solano's turnout(s) under this agreement. (SWPAO # 00029)

AVEK/Mojave

A change in point of delivery agreement (SWPAO #97003) among DWR, AVEK, and Mojave, executed November 13, 1997, approved the delivery of up to 2,250 af of Mojave's Table A water annually to AVEK's turnout(s) in Reach 19A of the California Aqueduct through December 31, 2019. Mojave's Table A water is delivered to the solar power generating plant that is located within Mojave's service area, but not located near any of Mojave's delivery facilities. AVEK has the conveyance facilities and agreed to provide water service to the solar power generating plant on Mojave's behalf. An amendment (SWPAO #97003-A), executed

Table 8-1 Storage of Water Outside SWP Water Contractor Service Areas in 2019 (acre-feet)¹

Contractor	Contract Status	Storage Provider	To Storage (includes losses, if any)	From Storage	Return By
Alameda-Zone 7					
SWPAO #00037 ^a	Continuing	Semitropic	0	1,000	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	8,900	0	2035
SWPAO #06010	Continuing	Cawelo	10,000	0	2035
Alameda County					
SWPAO #07005	Continuing	Semitropic	0	0	2035
SWPAO #10009	Continuing	Semitropic	13,271	0	2035
Dudley Ridge					
<i>SWP Water</i>					
SWPAO #08050	Continuing	Kern Water Bank	21,020	0	2035
SWPAO #09002	Continuing	Semitropic	0	0	2035
<i>Non-SWP Water</i>					
SWPAO #09040 ^a	Continuing	Kern Water Bank	0	0	2020
SWPAO #03053	Continuing	Cawelo	0	0	2035
Metropolitan					
SWPAO #95010	Continuing	Semitropic	87,058	0	2035
SWPAO #01013 ^a	Continuing	Arvin-Edison	1	10,975	2035
SWPAO #03019	Continuing	Kern Delta	56,405	0	2035
SWPAO #11011	Continuing	Mojave	0	0	2035
SWPAO #16006	Continuing	AVEK	20,000	0	2025
Santa Barbara					
SWPAO #17022	Continuing	Semitropic	1,100	0	2035
San Bernardino					
SWPAO #11015	Continuing	Kern Delta	0	0	2035
Santa Clara					
<i>SWP Water</i>					
SWPAO #06011	Continuing	Semitropic	0	0	2035
SWPAO #10012	Continuing	Semitropic	23,384	0	2035
<i>Non-SWP Water</i>					
SWPAO #06012 ^a	Continuing	Semitropic	0	0	2035
SWPAO #10029	Continuing	Semitropic	0	0	2035
SWPAO #11012	Continuing	Semitropic	40,216	0	2035
Santa Clarita (formal name change, per SWPAO #18006)					
SWPAO #02015 ^a	Continuing	Semitropic	0	0	2022
SWPAO #03060 ^a	Continuing	Semitropic	0	0	2024
SWPAO #05016	Continuing	Rosedale-Rio Bravo	0	0	2035
SWPAO #16032	Continuing	Semitropic	5,002	0	2035
Total			286,357	11,975	

¹ Storage amounts in this table may differ from the amounts in Table 8-6 due to water-type reclassification.^a Indicates amendments to agreement.

January 12, 2012, extended the term of the original agreement to December 31, 2035, and increased the annual delivery amount to AVEK's turnout(s), from up to 2,250 af, to up to 4,800 af. SWPAO #97003-A also allows for the delivery of up to 1,800 af annually of Mojave's Table A water through AVEK's turnout(s) for use by the solar power generating plant, and the delivery of up to 3,000 af annually of Mojave's 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 Table A water to AVEK's turnout(s) at Reach 20A of the California Aqueduct. During 2019, a total of 502 af of Mojave's water was delivered to AVEK's turnout(s) under this agreement, of which 439 af was Table A water and 63 af was Article 56(c) carryover water. (SWPAO #97003, SWPAO #97003-A and SWPAO #97003-B)

Turnout Agreements

Antelope Valley-East Kern Water Agency

On January 10, 2019, the State Water Project Analysis Office executed an Amendment to the October 10, 2018, Agreement with AVEK for the construction, operation and maintenance of the Upper Amargosa Creek Turnout, which is located at Milepost 342.73 of the California Aqueduct's East Branch and has a design capacity of 100 cubic feet per second. The Amendment downsized the 48-inch magnetic flowmeter to a 36-inch magnetic flowmeter due to the physical length of pipe required for the magnetic flowmeter to function properly. The rest of the October 10, 2018, Agreement remained unchanged and in effect.

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 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. The active change in point of delivery agreements are listed in Table 8-1. These agreements include provisions for conveyance to and from storage, and recovery methods by exchange and/or pump-in to the California Aqueduct. During 2019, a total of 286,357 af was conveyed to storage, including losses, and 11,975 af was recovered from storage.

Turn-Back Water Pool Programs

In 2019, no SWP Contractor participated in the Turn-Back Water Pool Program.

Article 21 Water Program

Pursuant to the Monterey Amendments, Article 21 water replaces surplus, wet weather, and Article 12(d) water. The Article 21 Water Program allows an SWP 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 and Napa are contracted to receive Article 21 deliveries in all years. During 2019, 246,192 af of Article 21 water was delivered to SWP Contractors.

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 additional water to offset Sacramento-San Joaquin Delta (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 up to 60,000 af purchased by DWR and Reclamation annually.

Component 2 water includes water that DWR and Reclamation purchase from Yuba—up to 15,000 af in a dry year and up to 30,000 af in a critical year.

Component 3 water includes all storage component water above Components 1 and 2 quantities purchased by DWR and Reclamation.

Component 4 water includes groundwater supplies that Yuba may offer to DWR and Reclamation for purchase.

Table 8-2 lists Article 21 water delivered to SWP Contractors.

Flexible Storage Program

Pursuant to Article 54 of the Monterey Amendments, the Flexible Storage Program provides the option to SWP 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 Contractors are given five 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 Contractors participating in the Castaic Lake Flexible Storage Program include Metropolitan, Ventura, and Santa Clarita. 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 Contractor allowed to withdraw water, up to a maximum of 65,000 af, from Lake Perris.

In 2019, Metropolitan started the year with a flexible storage balance due of zero af. Metropolitan did not withdraw any flexible storage water in 2019 and replaced zero af, leaving Metropolitan with an end-of-year flexible storage balance due of zero. Santa Clarita started the year with a flexible storage balance due of zero af. Santa Clarita did not withdraw any flexible storage water in 2019,

Table 8-2 Article 21 Water Deliveries (acre-feet)

Contractor	Delivered
Antelope Valley-East Kern	8,174
County of Kings	431
Dudley Ridge	3,468
Empire	35
Kern	130,806
Napa	3,964
Palmdale	335
San Bernardino	981
San Gabriel	498
Santa Barbara	579
Santa Clara	1,123
Metropolitan	65,491
Tulare	15,309
Ventura	14,998
Total	246,192

and replaced zero af, leaving Santa Clarita with an end-of-year flexible storage balance due of zero.

Carryover Program

Pursuant to Article 56(c) of the Monterey Amendments, SWP 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 Contractors requesting storage in proportion to their annual Table A amount for that year.

In 2019, a total to 253,675 af of carryover water was delivered. Twenty-one SWP Contractors took delivery of Article 56(c) water in the amount of 253,508 af of previously approved Table A water, carried over as extended carryover. A total of 167 af of SWP Contractors' carryover water was delivered to non-SWP Contractors.

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

There were no deliveries under this program since it was a wet year.

Agreements with Non-SWP Contractors

In addition to negotiating agreements with SWP Contractors to provide for specified water deliveries, DWR also enters into agreements with non-SWP Contractors to provide water conveyance service.

Reclamation and Cross Valley Canal Contractors

Reclamation supplies CVP water that DWR conveys through the California Aqueduct to Reach 12E or to storage in San Luis reservoir for County of Fresno, County of Tulare, Hills Valley Irrigation District, Kern-Tulare Water District, Pixley Irrigation District, and Tri-Valley Water District (Cross Valley Canal Water Contractors).

DWR entered into two new change in point of delivery contracts in 2019. DWR executed an agreement with Kern Tulare

Water District to change the point of delivery from Reach 12E to Reaches 9–13B of the California Aqueduct for up to 70,000 af of its 2018–2019 CVP water on March 1, 2019, under SWPAO #19302 to facilitate delivery to Kern County Water Agency. DWR executed a point of delivery agreement with Fresno County to change up to 10,000 af from Reach 12E to Reach 10A to facilitate delivery of its 2018–2019 CVP water to Arvin Edison Water Storage District on March 7, 2019, under SWPAO #19303.

Reclamation—Joint Point of Diversion

In 2019, DWR and Reclamation did not renew the Joint Point of Diversion agreement, and therefore there was no pumping done.

Reclamation and Kern National Wildlife Refuge—U.S. Fish and Wildlife Services

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 the 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 23,108 af during 2019 (SWPAO #12309). For DWR conveyances of CVP water during 2019 under SWPAO #12309, DWR invoiced Reclamation \$74,479.40.

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 547 af to the national cemetery through Reach 2B of the California Aqueduct in 2019 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, and Reclamation provides for the conveyance of up to 800 af of Byron-Bethany Irrigation District's CVP water to repayment Reach 2A of the California Aqueduct for use by Musco Family Olive Company. DWR delivered a total of 639 af in 2019 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 2018 are reported in the sections covering deliveries to non-SWP Contractors later in this chapter.

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 2019, DWR determined that 133 usable days were available to the City of Antioch under the contract. This resulted in 75 days needing to be reimbursed. DWR used 38 days of carryover credit from the previous year to offset water-day deficiency. This resulted in 37 days needing to be reimbursed, DWR reimbursed the City of Antioch \$381,876.71 for the 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 2019, DWR determined that 38 usable days were available to Contra Costa under the contract. This resulted in 104 days of unadjusted deficiency. Using 46 days of carryover credit from previous year resulted in 58 days of adjusted deficiency. DWR reimbursed Contra Costa Water District \$146,232 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 2019.

Del Puerto

An agreement among DWR, Reclamation, Del Puerto, and Oak Flat, executed October 21, 2019, approved the exchange of up to 2,000 af of Del Puerto's CVP water for an equivalent amount of Oak Flat's 2019 and/or 2020 Table A water through July 13, 2020. DWR will deliver up to 2,000 af of Oak Flat's Table A water to Oak Flat's turnout(s) located on the California Aqueduct for use by Del Puerto in Del Puerto's service area. 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 State Water Board, and received a one-year approval order, effective July 15, 2019, for the consolidation of SWP and CVP places of use. During 2019, a total of 107 af of water was delivered to Oak Flat's turnout(s) under this agreement. (SWPAO #19024)

An agreement among DWR, Reclamation, Del Puerto, and Oak Flat, executed May 21, 2019, approved the exchange of up to 2,000 af of Del Puerto's CVP water for an equivalent amount of Oak Flat's 2018 and/or 2019 Table A water through July 1, 2019. DWR would deliver up to 2,000 af of Oak Flat's Table A water to Oak Flat's turnout(s) located on the California Aqueduct for use by Del Puerto in Del Puerto's service area. 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 State Water Board, and received a one-year approval order, effective July 2, 2018, for the consolidation of SWP and CVP places of use. During 2019, a total of 157 af of water was delivered to

Oak Flat's turnout(s) under this agreement. (SWPAO #18021)

Water Deliveries

The SWP delivers water for a variety of beneficial uses. In addition to delivering Table A water to SWP 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 2019 Water Deliveries

In 2019, a total of 4,196,825 af of SWP and non-SWP water was delivered to 29 SWP Contractors and 23 non-SWP agencies. The SWP portion totaled 3,049,508 af, and the non-SWP portion totaled 1,120,317 af.

Figure 8-1 shows amounts of water delivered to various locations during 2019.

SWP

DWR conveys SWP water as defined in the SWP Water Supply Contracts. SWP water includes current year Table A water, transfer and exchange of Table A water, carryover of Table A water, and Article 21 water.

The 3,049,508 af delivered to SWP Contractors was categorized as follows:

- 1,926,579 af of Table A water
- 387,807 af of transfers and exchanges of Table A water among SWP Contractors
- 253,508 af of 2019 carryover water
- 246,108 af of Article 21 water
- 28,651 af of water bank recovery
- 42,519 af of delivery of backup water
- 5,064 af of settlement water
- 24,673 af of local water

- 9,002 af of permit water
- 120,929 af of other non-SWP programs
- 4,668 af of SWP Contracted Supply

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 1,120,317 af portion delivered to 23 non-SWP agencies was categorized accordingly:

- 957 af of SWP water for parks and recreation
- 22,974 af of other non-SWP programs
- 1,005,676 af of regulated delivery of local supply
- 5 af for parks and recreation
- 461 af for fish and wildlife
- 65,950 af for Cross Valley Canal Contractors
- 23,108 af for Kern National Wildlife Refuge
- 1,186 af for annual contracts

Allocation of Table A Water

Each year, by October 1, SWP 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



Figure 8-1 Water Delivered in 2019 and Delivery Locations of SWP Contractors and Feather River Area Districts with Water Rights Agreements with DWR

by the SWP 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, 2018, SWP Contractors submitted initial requests for 2019 totaling 4.17 million acre-feet (maf).

DWR approved delivery of 0.42 maf on November 30, 2018, resulting in initial Table A amounts of 10 percent of SWP Contractor requests. DWR increased the 2019 Table A amounts to 3.13 maf, for a final allocation of 75 percent, on June 19, 2019.

Table 8-3 lists the changes in Table A amounts that were approved by DWR based on updated hydrologic conditions.

Table 8-3 2019 Allocated Table A Amounts

Notice to SWP Contractors No.	Allocation Amount (maf)	Percentage of Requested Water
18-06	0.42	10
19-03	0.63	15
19-06	1.46	35
19-07	2.92	70
19-10	3.13	75

Specific Water Delivery Information

Specific information about water deliveries made to SWP Contractors and other agencies during 2019, and historical deliveries from 1962 through 2018, 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 Supply Contract provisions. If your research requires

more current data than was available at the time of publication, please consult the most recent edition of Bulletin 132 and/or contact DWR staff in the State Water Project Analysis Office.

Water Delivered to SWP Contractors in 2019 by Service Area

Table 8-4 shows SWP water delivered in 2019 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 Contractors in 2019. (The amounts also include SWP water that was delivered to non-SWP Contractors.)

Column 3 shows no water delivered under the Water Pool Program in 2019.

Column 4 shows 253,675 af was carried over from previous years for delivery in 2019. 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 Contractors to use or lose water by December 31 of each year. The SWP 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 2019 a total of 2,572,478 af.

Column 6 shows Article 21 water delivered to SWP Contractors. In 2019, 246,192 af of Article 21 water was delivered.

Column 7 shows zero af of other SWP water. Other SWP water consists of settlement water delivered to Solano.

Column 8 shows a total of 2,818,670 af of SWP water was delivered in 2019. 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 Contractors. Column 9 shows delivery of 42,519 af of backup water, Column 10 shows 28,651 af of water bank recovery, and Column 11 shows 159,668 af of other non-SWP water. Other non-SWP water is local and permit water that an SWP 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 Contractors. In 2019, the SWP delivered 3,049,508 af of water to the 29 SWP Contractors.

Water Delivered in 2019 by Month

Table 8-5 shows water delivery amounts by month. During 2019, the SWP provided water service to 52 agencies, including 29 SWP Contractors. The following discussion summarizes the SWP and non-SWP water deliveries.

SWP Water. SWP water, as defined in the SWP Water Supply Contracts, includes Article 21 water, carryover Table A water, current year Table A amounts, transfer and exchange of Table A water, and Turn-Back Pools A and B. Detailed information concerning those conveyances for 2019 is found under the "Miscellaneous Agreements with SWP Contractors" section in this chapter's preceding pages or is listed below.

Deliveries in the North Bay area included 14,066 af of settlement and permit waters delivered to Napa, Solano, and Cities of Fairfield, Vacaville and Benicia.

In the South Bay area, a total of 15,986 af of local water was delivered to Alameda County Flood Control and Water Conservation District, Zone 7 and Alameda County. These two South Bay Aqueduct SWP Contractors hold water rights to runoff from the Lake Del Valle watershed.

In the Southern California area, 1,034 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 2019, 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.

Last Chance Creek Water District. Under the water supply agreement between DWR and Last Chance Creek Water District, a total of 8,906 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 2019, 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 973,052 af, under their water right settlement agreements, as follows:

- Garden Highway Mutual Water Company, 16,463 af
- Joint Water Districts Board, 662,537 af
- Oswald Water District, 1,523 af
- Plumas Mutual Water Company, 8,651 af

- Tudor Mutual Water Company, 2,854 af
- Western Canal Water District, 280,610 af
- Valberde and Ramelli, 414 af

DWR conveyed local water totaling 6,843 af through SWP facilities on behalf of two non-SWP agencies:

- Thermalito Water and Sewer District, 1,771 af
- South Feather Water and Power Agency, 5,072 af

Delta. In the Delta, 16,875 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*.

Annual Table A Water and Water Conveyed by Type Since 1962

Table 8-6 shows information on annual Table A water and water conveyed, by type, for the previous 58 years. The following discussion is arranged according to column numbers.

Annual Table A Water. Columns 1 through 7 show the amount of SWP Contractors' annual maximum Table A water by area for years 1962 through 2019 as specified in the Table A schedules of the SWP Water Supply Contracts.

In some instances, Table A schedules—projections of each contractor's need for water to 2035—have been amended to meet the needs of individual contractors. The amounts of annual Table A water each SWP 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 2019. In 2019, a total of 2,572,478 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 2019. 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 2019, a total of 246,192 af of Article 21 or unscheduled water was delivered.

Other Water. Column 10 includes amounts of water classified as other water delivered in 2019, including non-SWP water conveyed through SWP facilities and regulated delivery of local supply. In 2019, a total of 361,397 af of other water was delivered.

Feather River Divisions. 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 2019, a total of 988,801 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 2019, a total of 957 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.

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 8-6 shows SWP water delivered by category from 1962 to 2019. Table A water. Column 8 shows amounts of Table A water delivered each year from 1962 through 2019. In 2019, a total of 2,572,478 af of Table A water was delivered.

Table 8-4 Water Delivered to SWP Contractors in 2019, 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]
	2019 Table A Not Transferred, Exchanged, or Stored [1]	2019 Table A Transferred or Exchanged [2]	2019 Water Pool Programs [3]	Carryover Water [4]	2019 Total Table A [5]	2019 Article 21 [6]	Other SWP Water [7]	Total SWP Water [8]	Delivery of Backup Water [9]	Water Bank Recovery [10]	
Feather River											
Butte	144	20,509	-	-	20,653	-	-	20,653	-	-	2,811
Plumas	436	-	-	-	436	-	-	436	-	-	436
Yuba City	1,655	-	-	1,655	-	-	-	1,655	-	-	1,655
North Bay											
Napa	3,096	24	-	201	3,321	3,964	-	7,285	-	-	7,285
Solano	16,179	-	-	237	16,416	-	-	16,416	-	-	30,482
South Bay											
Alameda-Zone 7	31,168	18,484	-	2,644	52,296	-	-	52,296	-	-	6,728
Alameda County	6,501	12,653	-	2,577	21,731	-	-	21,731	-	-	9,258
Santa Clara	10,601	26,943	-	8,703	46,247	1,123	-	47,370	-	-	64,966
San Joaquin Valley											
Oak Flat	2,175	-	-	9	2,184	-	-	2,184	-	-	2,184
Kings	2,522	1,809	-	167	4,498	431	-	4,929	-	-	4,929
Dudley Ridge	-	24,811	-	3,883	28,694	3,468	-	32,162	-	-	35,387
Empire	1	1,591	-	311	1,903	35	-	1,938	-	-	1,938
Kern	563,121	659	-	99,683	663,463	130,806	-	794,269	42,519	17,676	896,188
Tulare	14,639	40,219	-	15,352	70,210	15,309	-	85,519	-	-	7,754
Central Coastal											
San Luis Obispo	2,531	-	-	111	2,642	-	-	2,642	-	-	2,642
Santa Barbara	13,555	5,084	-	4,004	22,643	579	-	23,222	-	-	23,222
Southern California											
AVEK	42,193	33,454	-	2,637	78,284	8,174	-	86,458	-	-	99
Coachella	34,588	-	-	-	34,588	-	-	34,588	-	-	34,588
Crestline	75	-	-	-	75	-	-	75	-	-	1,034
Desert	13,938	-	-	-	13,938	-	-	13,938	-	-	13,938
Little Rock	29	1,370	-	35	1,434	-	-	1,434	-	-	1,434
Metropolitan	1,012,458	163,904	-	92,763	1,269,125	65,491	-	1,334,616	10,975	-	1,345,591
Mojave	19,404	439	-	872	20,715	-	-	20,715	-	-	5,302
Palmdale	2,090	12,204	-	1,896	16,190	335	-	16,525	-	-	16,525
San Bernardino	65,479	-	-	12,018	77,497	981	-	78,478	-	-	78,478
San Gabriel	19,377	-	-	-	19,377	498	-	19,875	-	-	19,875
San Gorgonio	8,587	177	-	1,964	10,728	-	-	10,728	-	-	1,601
Santa Clarita	37,885	24,502	-	3,608	65,995	-	-	65,995	-	-	1,100
Ventura	2,152	3,388	-	-	5,540	14,998	-	20,538	-	-	20,538
Total	1,926,579	392,224	-	253,675	2,572,478	246,192	-	2,818,570	42,519	28,651	159,668

¹Please 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.

²This 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 8-5 Total Amounts of Water Delivered in 2019, by Month (acre-feet)

Contracting Agency and Type of Service		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total Deliveries
FEATHER RIVER AREA		2019												
<i>SWP Agencies</i>														
City of Yuba City		0	0	0	0	0	0	831	824	0	0	0	0	1,655
Table A		0	0	0	0	0	0	831	824	0	0	0	0	1,655
Yuba Total		0	0	0	0	0	0							
County of Butte														
Table A		4	6	7	9	12	20	19	17	13	12	5	144	
Table A Transferred to Others*		0	0	0	697	834	1,362	1,878	5,209	1,547	430	173	8,379	20,509
Non-SWP Water		138	94	118	143	150	238	379	516	391	294	201	149	2,811
Butte Total (*excluded from total)		142	100	125	152	162	258	399	535	408	307	213	154	2,955
Plumas County Flood Control and Water Conservation District														
Table A		2	0	0	1	37	91	121	104	59	21	0	0	436
Plumas Total		2	0	0	1	37	91	121	104	59	21	0	0	436
<i>Non-SWP Contractors</i>														
Garden Highway Mutual Water Company														
Regulated delivery of local supply		0	0	0	668	1,923	2,633	3,883	2,195	1,250	3,701	0	210	16,463
Joint Water Districts Board														
Regulated delivery of local supply		26,470	0	0	71	96,256	95,135	113,477	95,170	36,620	55,590	75,830	55,560	650,179
Last Chance Creek Water District														
Regulated delivery of local supply		0	0	0	0	0	1,456	2,569	3,693	2,216	738	107	184	10,963
Oswald Water District														
Regulated delivery of local supply		0	0	0	8	103	270	384	239	253	187	79	0	1,523
Plumas Mutual Water Company														
Regulated delivery of local supply		0	0	0	352	893	2,010	825	1,186	1,906	909	570	0	8,651
South Feather Water and Power Agency														
Regulated delivery of local supply		122	0	0	82	587	728	809	863	833	621	270	157	5,072
Thermalito Water and Sewer District														
Regulated delivery of local supply		0	0	0	77	177	239	286	293	244	198	155	102	1,771
Tudor Mutual Water Company														
Regulated delivery of local supply		0	0	0	0	148	477	878	666	591	94	0	0	2,854

Table 8-5 Total Amounts of Water Delivered in 2019, by Month (acre-feet)

Contracting Agency and Type of Service	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	2019 Total Deliveries
Western Canal Water District	5,757	0	0	859	35,412	44,782	56,737	43,735	9,309	27,760	43,958	12,301	280,610
Regulated delivery of local supply													
Valberde and Ramelli													
Regulated delivery of local supply	0	0	2	0	6	31	97	123	112	36	7	0	414
<i>SWP</i>	6	6	7	10	49	111	972	947	76	34	12	5	2,235
Non-SWP	31,127	94	120	3,697	132,443	151,715	189,821	166,466	60,736	84,306	113,047	58,040	991,612
Feather River Area Total	31,133	100	127	3,707	132,492	151,826	190,793	167,413	60,812	84,340	113,059	58,045	993,847
NORTH BAY AREA													
<i>SWP Agencies</i>													
Napa County Flood Control and Water Conservation District													
Table A	0	0	0	0	0	0	0	1,336	576	464	349	257	114
Table A Transferred from Others	0	0	0	0	0	0	0	0	800	800	800	800	4,000
Table A Transferred to Others*	0	0	0	0	5	0	0	0	3	9	7	0	24
Article 21	690	760	55	765	410	1,284	0	0	0	0	0	0	3,964
Carryover Water	201	0	0	0	0	0	0	0	0	0	0	0	201
Napa Total (*excluded from total)	891	760	55	765	410	1,284	1,336	1,264	1,149	1,057	914	11,261	
Solano County Water Agency													
Table A	0	0	0	0	0	0	279	3,669	2,627	2,896	2,130	2,805	1,773
Table A Transferred from Others	0	0	0	0	5	0	0	0	1,003	9	7	0	0
Carryover	237	0	0	0	0	0	0	0	0	0	0	0	237
Non-SWP Water	52	0	2	104	2,048	3,657	1,688	1,471	1,876	1,622	1,464	82	14,066
Solano Total (*excluded from total)	289	0	2	104	2,053	3,936	5,357	5,101	4,781	3,759	4,269	1,855	31,506
<i>SWP</i>	1,128	760	55	765	415	1,563	5,005	5,006	4,169	3,286	3,862	2,687	28,701
Non-SWP	52	0	2	104	2,048	3,657	1,688	1,471	1,876	1,622	1,464	82	14,066
North Bay Area Total	1,180	760	57	869	2,463	5,220	6,693	6,477	6,045	4,908	5,326	2,769	42,767
SOUTH BAY AREA													
<i>SWP Agencies</i>													
Alameda County Flood Control and Water Conservation District, Zone 7													
Table A	0	0	0	0	1,112	2,132	4,803	5,398	5,766	4,698	4,035	2,154	1,070
Table A Transferred to Others*	0	0	0	0	1,108	2,206	6,420	5,442	500	0	0	0	31,168
Carryover	584	683	961	0	0	0	0	0	0	0	0	0	18,484
Carryover Water Transferred to Others*	0	416	0	0	0	0	0	0	0	0	0	0	2,228
Non-SWP Water	157	980	2,767	305	1,303	329	212	294	209	0	0	0	416
													6,728
													172

Table 8-5 Total Amounts of Water Delivered in 2019, by Month (acre-feet)

Contracting Agency and Type of Service		2019 Total Deliveries										
Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Alameda-Zone 7 Total (*excluded from total)	741	1,663	3,728	1,417	3,435	5,132	5,610	6,060	4,907	4,035	2,154	1,242
Alameda County Water District												40,124
Table A	0	0	0	0	0	0	0	0	0	0	0	0
Table A Transferred to Others*	0	0	0	0	2,700	2,828	2,701	2,382	900	464	375	303
Carryover	1,425	534	0	0	0	0	0	0	0	0	0	0
Carryover Water Transferred to Others*	0	618	0	0	0	0	0	0	0	0	0	0
Non-SWP Water	0	534	917	6	1,394	1,700	2,286	2,269	152	0	0	0
Alameda County Total (*excluded from total)	1,425	1,068	917	6	1,394	1,700	2,286	2,269	2,081	1,790	1,478	1,304
Santa Clara Valley Water District												17,718
Table A	0	0	0	0	0	2,081	3,818	3,157	1,545	0	0	0
Table A Transferred to Others*	0	0	0	0	3,844	7,651	5,229	5,219	1,800	800	800	800
Article 21	0	0	1,123	0	0	0	0	0	0	0	0	0
Carryover	2,644	1,984	0	1,984	650	0	0	0	0	0	0	0
Carryover Water Transferred to Others*	0	1,441	0	0	0	0	0	0	0	0	0	0
Non-SWP Water	0	1,249	1,102	0	0	0	0	0	0	0	0	0
Non-SWP Water Transferred from Others	0	0	0	0	0	7,500	8,000	15,498	9,656	10,717	4,764	6,480
Santa Clara Total (*excluded from total)	2,644	3,233	2,225	1,984	2,731	11,318	11,157	17,043	9,656	10,717	4,764	6,480
Non-SWP Contractors												83,952
Byron-Bethany Irrigation District												
Regulated delivery of local supply												
Recreation/Fish and Wildlife (SWP Share)												
Lake Del Valle	2	0	4	7	12	16	17	18	10	14	6	1
SWP	4,655	3,201	2,088	3,103	4,875	8,637	8,572	7,329	6,637	5,839	3,638	2,375
Non-SWP	310	2,899	5,018	1,765	4,740	12,936	13,820	20,305	11,802	12,010	5,382	6,840
South Bay Area Total	4,965	6,100	7,106	4,868	9,615	21,573	22,392	27,634	18,439	17,849	9,020	9,215
SAN JOAQUIN VALLEY AREA												158,776
SWP Agencies												
County of Kings	0	0	0	0	0	0	0	1,638	3	84	780	17
Table A	0	0	0	0	124	171	212	298	282	249	269	126
Table A Transferred to Others*	0	0	0	0	347	0	0	0	0	0	0	0
Article 21	0	0	0	0	0	0	0	0	0	0	0	347

Table 8-5 Total Amounts of Water Delivered in 2019, by Month (acre-feet)

Contracting Agency and Type of Service	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	2019 Total Deliveries
Article 21 Water Transferred to Others*	0	0	84	0	0	0	0	0	0	0	0	0	84
Carryover Water Transferred from Others	78	89	0	0	0	0	0	0	0	0	0	0	167
Kings Total (*excluded from total)	0	0	347	0	0	0	0	1,638	3	84	780	17	2,869
Dudley Ridge Water District													
Table A Water Transferred from Others	0	0	0	91	298	429	261	227	116	380	156	341	2,299
Table A Transferred to Others*	0	0	0	0	0	0	1,052	19,135	1,293	740	2,591	0	24,811
Article 21	0	313	1,299	0	0	0	0	0	0	0	0	0	1,612
Article 21 Water Transferred to Others*	0	83	1,773	0	0	0	0	0	0	0	0	0	1,856
Carryover	42	44	0	0	0	0	0	0	0	0	0	0	86
Carryover Transferred from Others	0	0	1,683	0	0	0	0	0	0	0	0	0	1,683
Carryover Water Transferred to Others*	155	3,642	0	0	0	0	0	0	0	0	0	0	3,797
Non-SWP Water Transferred from Others	0	3,225	0	0	0	0	0	0	0	0	0	0	3,225
Dudley Ridge Total (*excluded from total)	42	3,582	2,982	91	298	429	261	227	116	380	156	341	8,905
Empire West Side Irrigation District													
Table A	1	0	0	0	0	0	0	0	0	0	0	0	1
Table A Transferred to Others*	0	0	0	0	0	0	0	0	449	1,142	0	0	1,591
Article 21	0	35	0	0	0	0	0	0	0	0	0	0	35
Carryover	311	0	0	0	0	0	0	0	0	0	0	0	311
Empire Total (*excluded from total)	312	0	35	0	0	0	0	0	0	0	0	0	347
Kern County Water Agency													
Table A	0	0	0	43,322	52,407	81,751	111,484	129,361	58,769	49,496	28,227	8,304	563,121
Table A Transferred from Others	0	1	0	30,913	43,182	29,582	51,258	60,975	37,562	32,655	30,889	17,761	334,778
Table A Transferred to Others*	23	25	25	44	45	83	108	103	85	59	40	19	659
Article 21	0	8,934	121,872	0	0	0	0	0	0	0	0	0	130,806
Article 21 Transferred from Others	0	83	0	0	0	0	0	0	0	0	0	0	83
Carryover Water	3,640	71,680	21,580	0	0	0	0	0	0	0	0	0	96,900
Carryover Water Transferred from Others	0	3,912	0	0	0	0	0	0	0	0	0	0	3,912
Carryover Water Transferred to Others	0	0	2,783	0	0	0	0	0	0	0	0	0	2,783
Water Bank Recovery	0	0	0	1,552	4,254	10,979	891	0	0	0	0	0	17,676
Water Bank Recovery Water Transferred to Others*	0	0	0	0	0	0	9,895	1,080	0	0	0	0	10,975
Delivery of Backup Water	0	0	25,810	0	0	0	0	16,709	0	0	0	0	42,519
Non-SWP Water Transferred from Others	6,098	3,526	0	0	0	0	5,000	0	10,000	0	10,772	6,328	41,724
Non-SWP Water Transferred to Others*	1,981	7,021	1,100	0	0	7,500	8,000	14,948	6,049	5,418	1	0	52,018

Table 8-5 Total Amounts of Water Delivered in 2019, by Month (acre-feet)

Contracting Agency and Type of Service	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	2019 Total Deliveries
Kern Total (*excluded from total)	9,738	88,136	169,262	75,787	99,843	122,312	168,633	207,045	106,331	82,151	69,888	32,393	1,231,519
Oak Flat Water District													
Table A	0	0	0	203	255	394	526	313	224	178	63	19	2,175
Caryover Water	0	2	7	0	0	0	0	0	0	0	0	0	9
Oak Flat Total	0	2	7	203	255	394	526	313	224	178	63	19	2,184
Tulare Lake Basin Water Storage District													
Table A	0	0	0	0	0	0	0	0	1,164	1,173	613	2,520	9,169
Table A Transferred to Others*	0	0	0	1,500	0	0	0	3,719	0	24,807	10,193	0	0
Article 21	0	1,221	14,088	0	0	0	0	0	0	0	0	0	15,309
Carryover	10,345	5,007	0	0	0	0	0	0	0	0	0	0	15,352
Carryover Transferred from Others	0	788	0	0	0	0	0	0	0	0	0	0	788
Non-SWP Water Transferred from Others	0	0	0	0	0	0	0	0	0	2,103	1,872	3,322	457
Tulare Total (*excluded from total)	10,345	7,016	14,088	0	0	0	0	1,164	3,276	2,485	5,842	9,626	53,842
California State Parks/Fish and Wildlife (SWP Share)													
California Fish and Wildlife, O'Neill	69	18	30	30	23	53	42	46	46	96	0	98	36
California Fish and Wildlife, Lateral 4	0	0	0	0	0	0	0	10	0	0	0	13	0
California State Parks, O'Neill	0	0	1	0	0	0	0	1	0	0	0	0	2
California State Parks, San Luis	0	0	1	0	0	0	0	1	0	1	0	1	4
California State Parks/Fish and Wildlife (SWP Share) Total	69	18	32	30	23	53	54	46	97	0	112	36	570
Non-SWP Contractors													
Bureau of Reclamation													
Non-SWP Water Transferred to Others*	1,141	3,469	0	0	0	0	0	5,000	1,800	6,060	7,270	16,758	13,265
Kern National Wildlife Refuge	1,848	472	0	0	1,031	0	0	0	1,732	4,931	5,062	4,987	3,045
California Fish and Wildlife	57	14	24	25	19	41	44	38	79	0	90	30	23,108
California State Parks	0	0	0	0	2	0	1	0	2	0	0	0	461
Reclamation Total (*excluded from total)	1,905	486	24	25	1,052	41	45	1,770	5,012	5,062	5,077	3,075	5
CVP Annual Contractors													23,574
Musco Family Olive Company	30	44	49	48	47	50	23	62	76	96	70	44	639
San Joaquin Valley National Cemetery	1	1	0	48	63	91	103	99	75	44	22	0	547
CVP Annual Contractors Total	31	45	49	96	110	141	126	161	151	140	92	44	1,186
Cross Valley Canal Contractors													
County of Fresno	0	3,992	0	2,198	317	0	0	0	0	7,179	2,905	5,609	22,200
Kern-Tulare Water District	3,998	9,766	0	0	0	0	0	0	0	12,016	12,470	0	0
Lower Tulare River Irrigation District	1,140	3,564	0	796	0	0	0	0	0	0	0	0	38,250
													5,500

Table 8-5 Total Amounts of Water Delivered in 2019, by Month (acre-feet)

Contracting Agency and Type of Service		2019 Total Deliveries										
Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Cross Valley Canal Total	5,138	17,322	0	2,994	317	0	0	12,016	19,649	2,905	5,609	65,950
Western Hills Water District												
Table A Point of Delivery from SWP	23	25	25	44	45	83	108	103	85	59	40	19
Western Hills Total	23	25	25	44	45	83	108	103	85	59	40	19
Westlands Water District												
Table A Transferred from Others	0	0	0	1,624	171	212	298	731	249	269	126	78
Article 21 Transferred from Others	0	0	84	0	0	0	0	0	0	0	0	0
Carryover Water Transferred from Others	78	89	0	0	0	0	0	0	0	0	0	0
Non-SWP Water Transferred to Others*	400	0	0	0	0	0	0	0	0	0	2,100	0
Westlands Total (*excluded from total)	78	89	84	1,624	171	212	298	731	249	269	126	78
SWP	14,509	92,117	161,052	76,227	96,381	112,504	163,989	194,558	98,278	83,734	62,913	35,744
Non-SWP	13,172	24,604	25,883	4,667	5,733	11,161	6,062	18,640	29,282	26,723	22,168	15,513
San Joaquin Valley Area Total	27,681	116,721	186,935	80,894	102,114	123,665	170,051	213,198	127,560	110,457	85,081	51,257
CENTRAL COASTAL AREA												
<i>SWP Agencies</i>												
San Luis Obispo County Flood Control and Water Conservation District												
Table A	164	151	198	200	222	247	266	257	243	288	80	215
Carryover	55	56	0	0	0	0	0	0	0	0	0	111
San Luis Obispo Total	219	207	198	200	222	247	266	257	243	288	80	215
Santa Barbara County Flood Control and Water Conservation District												
Table A	0	0	439	547	1,087	1,650	2,220	2,206	1,927	1,961	555	963
Table A Transferred to Others*	0	0	0	0	254	703	1,006	1,839	375	0	207	700
Article 21	0	229	350	0	0	0	0	0	0	0	0	579
Carryover Water	1,748	506	103	832	451	278	0	0	80	6	0	4,004
Santa Barbara Total (*excluded from total)	1,748	735	892	1,379	1,538	1,928	2,220	2,206	2,007	1,967	555	963
SWP	1,967	942	1,090	1,579	1,760	2,175	2,486	2,463	2,250	2,255	635	1,178
Central Coastal Area Total	1,967	942	1,090	1,579	1,760	2,175	2,486	2,463	2,250	2,255	635	1,178
SOUTHERN CALIFORNIA AREA												
<i>SWP Agencies</i>												
Antelope Valley-East Kern Water Agency												
Table A	0	0	0	6,602	7,334	8,837	8,896	4,284	2,698	1,621	661	1,260
Table A Transferred from Others	0	0	0	42	36	188	513	5,677	7,166	6,256	5,678	4,109
Table A Transferred to Others*	0	0	0	6,300	9,700	0	3,446	3,181	1,810	8,726	0	291
												33,454

Table 8-5 Total Amounts of Water Delivered in 2019, by Month (acre-feet)

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Contracting Agency and Type of Service	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total Deliveries
Article 21	0	1,317	6,857	0	0	0	0	0	0	0	0	0	8,74
Carryover Water	1,005	1,632	0	0	0	0	0	0	0	0	0	0	2,637
Carryover Water Transferred from Others	10	17	36	0	0	0	0	0	0	0	0	0	63
Non-SWP Water Transferred from Others	0	0	0	0	0	0	0	0	0	99	0	0	99
AVEK Total (*excluded from total)	1,015	2,966	6,893	6,644	7,370	9,025	9,409	9,961	9,864	7,976	6,339	5,369	82,831
Coachella Valley Water District													
Table A	0	0	0	0	0	0	0	0	0	1,114	14,025	15,219	4,230
Coachella Total	0	0	0	0	0	0	0	0	0	1,114	14,025	15,219	4,230
Crestline-Lake Arrowhead Water Agency													
Table A	0	0	0	0	0	0	0	0	0	0	0	75	75
Non-SWP Water	140	58	50	53	59	91	119	162	127	104	0	71	1,034
Crestline Total (*excluded from total)	140	58	50	53	59	91	119	162	127	104	75	71	1,109
Desert Water Agency													
Table A	0	0	0	0	0	0	0	0	0	448	5,652	6,133	1,705
Desert Total	0	0	0	0	0	0	0	0	0	448	5,652	6,133	1,705
Little Rock Creek Irrigation District													
Table A	0	0	0	0	0	0	0	0	3	0	6	0	8
Table A Transferred to Others*	0	0	0	0	0	0	0	0	0	44	58	59	1,209
Carryover	0	35	0	0	0	0	0	0	0	0	0	0	35
Little Rock Total (*excluded from total)	0	35	0	0	0	0	0	0	3	0	6	0	8
The Metropolitan Water District of Southern California													
Table A	0	0	17	118,278	104,604	72,004	127,182	134,542	140,088	110,267	94,852	110,624	1,012,458
Table A Transferred from Others	0	0	0	0	0	0	164	604	1,115	204	204	904	3,399
Table A Transferred to Others*	0	1	0	19,661	20,671	14,502	32,470	31,171	10,721	15,807	13,197	5,703	163,904
Article 21	0	17,377	48,114	0	0	0	0	0	0	0	0	0	65,491
Carryover Water	44,962	14,353	33,448	0	0	0	0	0	0	0	0	0	92,763
Water Bank Recovery	0	0	0	0	0	0	9,895	1,080	0	0	0	0	10,975
Metropolitan Total (*excluded from total)	44,962	31,730	81,579	118,278	104,604	82,063	128,866	135,657	140,292	110,471	95,056	111,528	1,185,086
Mojave Water Agency													
Table A	0	0	0	785	1,142	1,002	1,885	2,359	3,327	5,694	2,665	545	19,404
Table A Transferred from Others	0	0	0	0	0	0	333	300	375	0	207	0	1,215
Table A Transferred to Others*	0	0	0	42	36	88	80	100	50	38	3	2	439
Carryover Water	12	115	682	0	0	0	0	0	0	0	0	0	809
Carryover Water Transferred to Others*	10	17	36	0	0	0	0	0	0	0	0	0	63

Table 8-5 Total Amounts of Water Delivered in 2019, by Month (acre-feet)

Contracting Agency and Type of Service		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	2019 Total Deliveries
Non-SWP Water	0	0	0	189	652	604	621	607	580	588	597	864	5,302	
Mojave Total (*excluded from total)	12	115	682	974	1,794	1,606	2,839	3,266	4,282	6,282	3,469	1,409	26,730	
Palmdale Water District														
Table A	0	0	0	0	0	0	0	0	0	0	0	715	1,375	
Table A Transferred from Others	0	0	0	606	536	933	1,617	1,870	1,442	333	163	0	7,500	
Table A Transferred to Others*	0	0	0	0	0	0	3	44	58	59	5,507	6,533	12,204	
Article 21	0	155	180	0	0	0	0	0	0	0	0	0	335	
Carryover Water	1,131	15	750	0	0	0	0	0	0	0	0	0	1,896	
Palmdale Total	1,131	170	930	606	536	933	1,617	1,870	1,442	333	878	1,375	11,821	
San Bernardino Valley Municipal Water District														
Table A	0	0	361	8,603	7,325	7,476	9,556	7,912	6,922	6,958	5,644	4,722	65,479	
Table A Transferred from Others	0	0	47	0	0	0	0	130	0	0	0	0	0	
Article 21	0	0	981	0	0	0	0	0	0	0	0	0	981	
Carryover Water	1,146	4,668	6,204	0	0	0	0	0	0	0	0	0	12,018	
San Bernardino Total (*excluded from total)	1,146	4,668	7,593	8,603	7,325	7,606	9,556	7,912	6,922	6,958	5,644	4,722	78,655	
San Gabriel Valley Municipal Water District														
Table A	454	0	53	2,061	2,554	2,995	3,155	1,891	1,879	1,743	1,697	895	19,377	
Article 21	0	209	289	0	0	0	0	0	0	0	0	0	498	
Article 21 Transferred from Others	0	0	1,773	0	0	0	0	0	0	0	0	0	1,773	
Carryover Water Transferred from Others	155	1,417	0	0	0	0	0	0	0	0	0	0	1,572	
San Gabriel Total (*excluded from total)	609	1,626	2,115	2,061	2,554	2,995	3,155	1,891	1,879	1,743	1,697	895	23,220	
San Gorgonio Pass Water Agency														
Table A	0	0	0	1,138	1,297	1,753	1,647	14	873	0	951	914	8,587	
Table A Transferred from Others	0	0	0	0	0	0	0	0	0	0	1,355	645	0	
Table A Transferred to Others*	0	0	47	0	0	0	0	130	0	0	0	0	0	
Carryover Water	1,214	15	735	0	0	0	0	0	0	0	0	0	1,964	
Non-SWP Water Transferred from Others	0	0	0	0	0	0	0	1,250	350	0	1	0	1,601	
San Gorgonio Total (*excluded from total)	1,214	15	735	1,138	1,297	1,753	1,647	1,264	1,223	1,355	1,597	914	14,152	
Santa Clarita Valley Water Agency														
Table A	0	0	0	3,870	3,537	4,789	5,655	4,870	5,165	5,004	3,605	1,390	37,885	
Table A Transferred from Others	0	0	0	0	0	0	0	750	0	0	0	0	750	
Table A Transferred to Others*	0	0	0	0	0	0	0	2,163	3,400	3,108	13,831	2,000	24,502	
Carryover	1,676	522	1,410	0	0	0	0	0	0	0	0	0	3,608	

Table 8-5 Total Amounts of Water Delivered in 2019, by Month (acre-feet)

Contracting Agency and Type of Service	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	2019 Total Deliveries
Carryover Transferred from Others	0	0	1,100	0	0	0	0	0	0	0	0	0	1,100
Non-SWP Water Transferred from Others	0	0	1,100	0	0	0	0	0	0	0	0	0	1,100
Santa Clarita Total (*excluded from total)	1,676	522	3,610	3,870	3,537	4,789	5,655	5,620	5,165	5,004	3,605	1,390	44,443
Ventura County Watershed Protection District													
Table A	0	0	2	0	0	0	0	0	0	0	0	0	2,150
Table A Transferred from Others	0	0	0	0	0	0	0	0	0	0	0	0	1,000
Table A Transferred to Others*	0	0	0	0	0	0	164	204	204	1,559	849	204	3,388
Article 21	0	181	14,817	0	0	0	0	0	0	0	0	0	14,998
Ventura Total (*excluded from total)	0	181	14,819	0	0	0	0	0	0	0	0	0	18,150
California State Parks/Fish and Wildlife (SWP Share)													
Castaic Lagoon	0	0	0	5	3	9	14	13	10	12	7	0	73
Lake Perris—Parks and Recreation	1	0	1	3	5	11	17	13	21	7	8	1	88
Pyramid Lake	2	1	2	4	7	4	8	9	8	8	4	2	59
Silverwood Lake	3	3	2	3	5	5	9	9	8	7	4	2	60
California State Parks/Fish and Wildlife (SWP Share) Total	6	4	5	15	20	29	48	44	47	34	23	5	280
SWP	51,771	42,032	117,861	142,000	128,385	100,300	161,094	165,628	171,754	159,146	139,145	135,840	1,514,956
Non-SWP	882	10,124	13,316	242	711	10,590	1,820	2,019	1,057	791	598	935	43,085
Southern California Area Total	52,653	52,156	131,177	142,242	129,096	110,890	162,914	167,647	172,811	159,937	139,743	136,775	1,558,041
SWP WATER													
SWP Water Supply Contracts													
Table A	625	157	1,077	186,731	186,026	191,909	287,007	302,272	234,922	211,922	171,156	152,775	1,926,579
Table A Transfers and Exchanges	0	1	47	31,652	44,057	31,426	54,586	72,717	47,674	41,990	38,742	24,915	387,807
Carryover Water	72,543	107,985	68,699	2,816	1,101	278	0	0	80	6	0	0	253,508
SWP Contracted Supply to Non-SWP Agencies	101	114	109	1,668	216	295	406	834	334	328	166	97	4,668
<i>Subtotal</i>	73,269	108,257	69,932	222,867	231,400	223,908	341,999	375,823	283,010	254,246	210,064	177,787	2,572,562
Other Water Supply Contracts													
Article 21	690	30,779	212,180	765	410	1,284	0	0	0	0	0	0	246,108
Delivery of Backup Water	0	0	25,810	0	0	0	0	0	16,709	0	0	0	42,519
Water Bank Recovery	0	0	0	1,552	4,254	20,874	1,971	0	0	0	0	0	28,651
<i>Subtotal</i>	690	30,779	237,990	2,317	4,664	22,158	1,971	16,709	0	0	0	0	317,238
Non-SWP Water Supply Contracts													
Local Water	297	2,821	4,836	553	3,408	2,724	3,238	3,332	1,068	692	597	1,107	24,673

Table 8-5 Total Amounts of Water Delivered in 2019, by Month (acre-feet)

Contracting Agency and Type of Service	2019 Total Deliveries											
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Settlement Water	0	0	1	104	2,048	2,911	0	0	0	0	0	0
Vallejo Permit Water	52	0	1	0	0	746	1,688	1,471	1,876	1,622	1,464	82
Other Non-SWP Programs	6,236	6,845	1,218	143	150	7,738	13,379	17,264	22,500	12,982	19,060	13,414
<i>Subtotal</i>	<i>6,585</i>	<i>9,666</i>	<i>6,056</i>	<i>800</i>	<i>5,606</i>	<i>14,119</i>	<i>18,305</i>	<i>22,067</i>	<i>25,444</i>	<i>15,296</i>	<i>21,121</i>	<i>14,603</i>
SWP Total	80,544	148,702	313,978	225,984	241,670	260,185	362,275	414,599	308,454	269,542	231,185	192,390
NON-SWP WATER												
Non-SWP Contractors												
SWP Park and Recreation, Fish and Wildlife	77	22	41	52	55	98	119	108	154	48	141	42
Other Non-SWP Programs	742	10,066	12,166	0	0	0	0	0	0	0	0	22,974
Regulated delivery of local supply	31,142	136	234	5,008	134,336	154,884	192,764	168,194	62,130	85,305	113,464	58,079
CVP California State Parks	0	0	0	2	0	1	0	1	0	2	0	0
CVP California Fish and Wildlife	57	14	24	25	19	41	44	38	79	0	90	30
CVP/Reclamation Contractors												461
Cross Valley Canal Contractors	5,138	17,322	0	2,994	317	0	0	0	12,016	19,649	2,905	5,609
Kern National Wildlife Refuge	1,848	472	0	0	1,031	0	0	1,732	4,931	5,062	4,987	3,045
Annual Contracts	31	45	49	96	110	141	126	161	151	140	92	44
Non-SWP Total	39,035	28,077	12,514	8,175	135,870	155,164	193,054	170,233	79,463	110,204	121,679	66,849
Grand Total	119,579	176,779	326,492	234,159	415,349	377,540	555,329	584,832	387,917	379,746	352,864	259,239
												4,169,825

Table 8-6 Total Amounts of Annual Table A Water and Water Conveyed, by Type, 1962–2019 (acre-feet)

Year	Annual Table A Amounts According to Water Supply Contracts						Water Conveyed								
	Upper Feather River Area [1]	North Bay Area [2]		San Joaquin Valley Area [3]		Southern California Area [6]	Total [7]	Deliveries			Initial Fill Water [14]	Losses and Storage Changes* [15]	Total [16]		
		Table A Water [8]	Surplus, and Unscheduled Water ^r [9]	Other Water ^s [10]	Feather River Diversions ^t [11]	Fish and Wildlife Water [12]	Subtotal [13]	Initial Fill Water [14]	Losses and Storage Changes* [15]	Initial Fill Water [14]	Losses and Storage Changes* [15]				
1962	-	-	-	-	-	-	-	9,704	7,499	-	17,203	9	272		
1963	-	-	-	-	-	-	-	13,212	16,049	-	29,261	71	185		
1964	-	-	-	-	-	-	-	21,743	17,891	-	39,634	171	152		
1965	-	-	-	-	-	-	-	35,985	27,425	-	63,410	93	729		
1966	-	-	-	-	-	-	-	59,599	33,361	-	92,960	-	1,746		
1967	-	-	11,538	-	-	11,538	11,354	-	45,225	24,639	-	81,218	8,328	4,212	
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
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
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
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
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
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
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
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	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
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)
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
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)
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)
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)
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
1983	2,000	950	141,400	867,118	8,439	1,681,257	2,701,164	1,184,119	13,019	172,330	633,778	7,849	2,010,795	-	(90,997)
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)
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
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
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)
1988	5,060	15,471	152,500	1,246,100	43,722	2,225,482	5,6342	2,424,633	-	520,375	884,877	4,889	3,786,514	-	(92,850)
1989	5,500	24,615	156,700	1,290,400	56,342	2,853,747	3,958,190	2,376,373	-	474,559	830,500	8,135	4,166,941	-	447,917
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	9,162	3,891,299	-	(528,869)
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
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

Table 8-6 Total Amounts of Annual Table A Water and Water Conveyed, by Type, 1962-2019 (acre-feet)**(Continued)**

	Annual Table A Amounts According to Water Supply Contracts						Deliveries						Water Conveyed			
	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]
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	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	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	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)	3,197,958	
2010	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	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	76,631	222,619	1,140,000	70,486	2,623,100	4,172,256	2,593,699	-	363,266	1,047,832	1,609	4,006,406	-	(537,209)	3,469,197	
2013	76,681	222,619	1,140,000	70,486	2,623,100	4,172,396	1,623,212	-	613,361	1,166,635	1,641	3,404,849	-	(256,889)	3,147,960	
2014	76,731	222,619	1,136,556	70,486	2,626,544	4,172,536	476,033	1,444	699,178	839,792	677	2,017,124	-	(222,460)	1,794,664	
2015	76,781	222,619	1,133,556	70,486	2,626,544	4,172,686	846,547	690	585,388	675,530	721	2,108,876	-	(419,759)	1,689,117	
2016	39,800	76,781	222,619	1,133,556	70,486	2,629,544	4,172,786	2,021,891	3,319	343,472	974,673	1,401	3,344,756	-	(527,248)	2,817,508
2017	39,800	76,781	222,619	1,133,556	70,486	2,629,544	4,172,786	3,106,473	296,804	411,745	967,411	775	4,783,208	-	(206,274)	4,573,934
2018	39,800	76,781	222,619	1,133,556	70,486	2,629,544	4,172,786	1,567,466	2,180	610,518	979,689	879	3,160,712	-	(8,343)	3,152,369
2019	39,800	76,781	222,619	1,133,556	70,486	2,633,544	4,172,786	2,572,478	246,192	361,397	988,801	957	4,169,825	-	(83,006)	4,086,819
Total	695,133	1,902,325	9,128,942	51,399,712	2,280,148	101,517,323	166,923,583	91,305,046	9,566,791	16,415,510	48,438,530	159,491	165,885,368	1,834,310	(1,514,944)	166,204,734

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 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 8-7 SWP Water Delivered by Category, 1962-2019 (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	
1962	0	0	0	0	0	0	9,704	7,499	0	17,203
1963	0	0	0	0	0	0	13,212	16,049	0	29,261
1964	0	0	0	0	0	0	21,743	17,891	0	39,634
1965	0	0	0	0	0	0	35,985	27,425	0	63,410
1966	0	0	0	0	0	0	59,599	33,361	0	92,960
1967	5,563	5,791	11,354	0	0	0	45,225	24,639	0	69,864
1968	86,541	85,168	171,709	10,000	111,534	121,534	1,214	903,367	0	904,581
1969	63,956	129,064	193,020	0	72,397	72,397	8,692	832,454	0	841,146
1970	83,415	150,578	233,993	0	131,848	131,848	25,401	804,320	0	829,721
1971	93,776	263,564	357,340	0	294,581	294,581	35,438	825,886	8	861,332
1972	186,796	425,005	611,801	0	422,322	422,322	53,848	875,529	6,489	935,866
1973	297,497	395,391	692,888	0	294,916	294,916	29,540	851,285	1,155	881,980
1974	423,982	450,993	874,075	0	412,453	412,453	31,493	963,956	2,118	997,567
1975	670,492	553,498	1,223,990	356	620,329	620,685	46,995	924,696	3,377	975,068
1976	631,876	741,126	1,373,002	4,147	547,538	551,885	103,546	1,018,653	1,745	1,123,944
1977	354,930	218,966	573,896	0	0	0	410,991	624,497	1,111	1,036,599
1978	782,625	529,740	1,312,365	0	16,215	16,215	177,245	836,864	1,691	1,015,800
1979	692,888	711,404	1,404,292	0	646,830	646,830	431,693	933,067	1,766	1,366,526
1980	726,545	784,946	1,511,491	52,220	350,017	402,217	40,269	925,750	2,131	968,150
1981	1,053,273	835,852	1,889,125	18,920	889,508	908,428	283,310	993,785	4,688	1,281,783
1982	916,014	822,042	1,738,056	140	214,994	215,134	144,267	819,586	4,646	968,499
1983	482,749	701,370	1,184,119	0	13,019	13,019	172,030	633,778	7,849	813,657
1984	725,799	861,794	1,587,593	3,663	259,254	262,917	366,273	891,128	7,040	1,264,441
1985	983,341	929,424	1,912,765	9,638	292,206	301,844	474,417	924,049	4,033	1,402,499
1986	998,611	1,009,295	2,007,906	2,595	21,755	24,350	177,176	843,040	3,865	1,024,081
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
1988	1,308,071	1,068,302	2,376,373	0	0	0	520,375	884,877	4,889	1,410,141
1989	1,602,543	1,251,204	2,853,747	0	0	0	474,559	830,500	8,135	1,313,194
1990	1,876,072	706,079	2,582,151	0	90	90	424,697	875,099	9,262	1,309,058
1991	536,669	12,444	549,113	3,521	0	3,521	543,582	565,395	4,879	1,113,856
1992	955,687	455,112	1,410,799	1,156	0	1,156	166,992	613,978	2,605	783,575
1993	1,069,258	1,243,978	2,313,236	0	0	0	256,853	822,589	1,082,051	2,017,795
1994	1,134,992	614,359	1,749,351	48,150	64,475	112,625	236,739	874,018	8,200	1,118,957
1995	801,570	1,165,523	1,967,093	17,984	46,346	64,330	85,560	860,077	2,575	948,212

(Continued)

Table 8-7 SWP Water Delivered by Category, 1962–2019 (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	
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
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
1998	865,795	860,724	1,726,519	9,982	10,306	20,288	127,405	872,738	2,108	1,002,251
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
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
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
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
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
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
2005	1,923,222	904,034	2,827,256	186,787	544,296	731,083	92,838	1,074,706	1,515	1,169,079
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
2007	1,670,740	510,011	2,180,751	186,570	123,403	309,973	598,789	1,193,237	2,581	1,794,607
2008	1,024,147	220,093	1,244,240	2,729	0	2,729	769,517	1,087,669	2,778	1,839,964
2009	1,036,052	349,214	1,385,266	6,032	0	6,032	709,885	1,125,147	2,047	1,837,079
2010	1,503,322	507,350	2,010,672	7,505	0	7,505	790,602	978,172	1,167	1,769,941
2011	1,876,438	971,134	2,847,572	207,307	213,384	420,691	388,632	1,028,542	1,593	1,418,767
2012	1,880,188	713,511	2,593,699	0	0	0	363,266	1,047,832	1,609	1,412,707
2013	1,198,284	424,928	1,623,212	0	0	0	613,361	1,166,635	1,641	1,781,637
2014	405,814	70,219	476,033	1,444	0	1,444	699,178	839,792	677	1,539,647
2015	620,511	226,036	846,547	690	0	690	585,388	675,530	721	1,261,639
2016	1,505,573	516,318	2,021,891	3,319	0	3,319	343,472	974,673	1,401	1,319,546
2017	2,057,048	1,049,425	3,106,473	165,556	131,248	296,804	411,745	967,411	775	1,379,931
2018	1,185,953	381,493	1,567,446	2,180	0	2,180	610,518	979,689	879	1,591,086
2019	1,762,999	809,479	2,572,478	97,916	148,276	246,192	361,397	988,801	957	1,351,155
Total	56,118,885	35,186,161	91,305,046	1,754,550	7,812,241	9,566,791	16,415,510	48,438,530	159,491	65,013,531

¹ Includes Table A Transfers, Table A exchanges, Carryover, and Pool/Water.

² Includes water conveyed for SWP and non-SWP contractors.

³ Includes amounts of water diverted according to various water rights agreement.



Chapter 9

Power Resources

Crews remove the butterfly valve for refurbishing at Gianelli Pumping-Generating Plant in Merced County.

Significant Events in 2019

Energy used at the 29 State Water Project (SWP) pumping and generating plants—excluding Castaic Powerplant, which is owned and operated by Los Angeles Department of Water and Power (LADWP)—totaled 12.49 million megawatt hours (MWh). To meet SWP energy needs, the Department of Water Resources (DWR) purchased 1.59 million MWh of energy at a cost of \$39.75 million. This included 0.39 million MWh from four renewable energy electric utilities at a cost of \$16.71 million and 1.20 million MWh of long-term energy at a cost of \$23.04 million. Additional associated energy costs totaled \$247.57 million, including transmission costs. The total cost of energy-related costs for 2019 was \$287.32 million.

Pursuant to WSPP (formerly known as Western Systems Power Pool) bilateral trades, transactions made under the Lodi Energy Center Power Sales Agreement, transactions under the California Independent System Operator (CAISO), and revenues from other long-term contracts, DWR received a total of \$60.16 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) 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 projection of power 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 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 2019, CAISO focused on issues affecting grid reliability such as managing the

grid around several large fires, 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 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 tariff and business practice manuals are compatible with SWP operations. DWR's participation in CAISO stakeholder processes focused on the following primary elements in 2019:

- market initiatives roadmap
- stakeholder initiatives catalog
- budget and grid management charge process
- transmission access charge structure
- day-ahead market enhancements
- extended day-ahead market
- resource adequacy enhancements
- reliability must-run and capacity procurement mechanism

- local capacity procurement for 2019 requirements
- annual resource adequacy processes including Path 26 allocation, import allocation, and net qualifying capacity
- flexible capacity needs study process for 2019
- flexible resource adequacy criteria and must-offer obligation, phase 2
- maximum import capability stabilization and multi-year allocation
- energy storage and distributed energy resources, phase 3 and 4
- local and system level market power mitigation enhancements
- intertie deviation settlement
- non-generator resource participation model
- storage as a transmission asset
- congestion revenue rights auction efficiency and reform
- commitment cost enhancements, phase 3
- commitment costs and default energy bids enhancements
- regional integration and Energy Imbalance Market greenhouse gas compliance
- generator interconnection process enhancements
- excess behind the meter production
- hybrid resources
- variable operations and maintenance cost review
- market settlement timeline
- real-time market neutrality settlement
- import bidding and market parameters
- transmission planning
- regional energy market

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 demand response report (ER06-615)
- CAISO third amendment to DWR's participating load agreement (ER19-2787)
- CAISO Energy Imbalance Market (ER18-2341)
- FERC review of Pacific Gas & Electric Company (PG&E) and DWR work performance agreement (ER18-656)
- CAISO resource adequacy (ER18-728, ER18-857, ER15-1825, ER18-1699, EL18-177, ER20-94, ER19-1562, ER19-1542)
- CAISO commitment cost enhancements, phase 3 (ER19-951)
- CAISO commitment costs and default energy bid enhancements (ER19-2727)
- CAISO congestion revenue rights (ER18-1344, ER18-2034, ER19-26)
- CAISO tariff clarifications (ER19-1837)
- CAISO energy storage and distributed energy resources, phase 3 (ER19-2733)
- CAISO generator interconnection process (ER18-2498)
- CAISO recovery of marginal fuel-related costs (ER19-385)
- CAISO Order 841 compliance (ER19-468)
- CAISO imbalance conformance enhancements (ER19-538)
- CAISO custom load aggregation point (ER19-582)
- CAISO local market power mitigation (ER19-2347)
- CAISO inverter-based interconnection requirements (ER19-1153)
- CAISO interconnection process enhancements (ER19-2679, ER19-1153)

- CAISO reliability must-run and capacity procurement mechanism enhancements (ER19-1641)
- CAISO generator contingency and remedial action scheme (ER19-354)
- CAISO Order No. 831 compliance (ER19-2757)
- CAISO real-time market neutrality settlement (ER19-2497)
- CAISO Order No. 845 compliance (ER19-1950)
- CAISO gas cost recovery (ER19-458, ER19-385, ER19-554)
- 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)
- FERC grid enhancing technologies (AD19-19)
- PG&E transmission owner tariff filing (TO20) proposal to increase transmission revenue requirement rates for retail and wholesale customers of CAISO (ER19-413)
- San Diego Gas & Electric transmission owner tariff filing (TO5—Cycle 1) proposal to increase transmission revenue requirement rates for retail and wholesale customers of CAISO (ER19-221)
- San Diego Gas & Electric transmission owner tariff filing (TO5—Cycle 2) proposal to increase transmission revenue requirement rates for retail and wholesale customers of CAISO (ER20-503)
- 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)
- SCE transmission owner tariff annual update filing (SCE TO2019) proposal to increase transmission revenue requirement rates for retail and wholesale customers of CAISO (ER18-169)
- SCE transmission owner tariff annual update filing (SCE TO2019A) proposal to increase transmission revenue requirement rates for retail and wholesale customers of CAISO (ER19-1553)
- Trans Bay Cable transmission owner tariff filing proposal to increase transmission revenue requirement (ER19-2846)
- PG&E's proposed annual update filing to its transmission revenue balancing account (ER20-100)
- San Diego Gas & Electric's proposed annual update to its transmission revenue balancing account (ER20-254)
- SCE's proposed annual update to its transmission revenue balancing account (ER20-268)
- Trans Bay Cable's proposed annual update to its transmission revenue balancing account (ER20-678)

North American Electric Reliability Corporation Reliability Compliance *Background*

The Energy Policy Act of 2005 assigned FERC the responsibility for bulk electric system reliability and the North American Electric Reliability Corporation was subsequently tasked with establishing mandatory reliability standards for the bulk electric system. WECC is the regional entity responsible for the reliability and security of the bulk electric system in the Western Interconnection, which includes western Canada and the western United States. WECC oversees implementation of the reliability standards and validation of compliance, including assessment of penalties and sanctions. Details of the North American Electric Reliability Corporation reliability standards

and the attributes of the compliance program can be found in Bulletin 132-11.

DWR's Internal Compliance Program

WECC conducted a Critical Infrastructure Protection Standards Compliance Audit in 2019 to assess DWR's compliance with the North American Electric Reliability Corporation Reliability Standards for 2012–2018. DWR also reviewed its internal compliance program policies and associated processes to update them or develop new ones.

North American Electric Reliability Corporation requires that owners of bulk electric system transmission elements functionally map with a registered transmission planner and a transmission operator. In response, DWR established internal implementation plans and continued coordinating with WECC to meet those mapping requirements.

DWR also submitted, in compliance with the requirements of the reliability standards, its annual self-certification to WECC for 2018. 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 2019, DWR reported its calendar year 2018 pump load, generation, energy imports, and sulfur hexafluoride emissions to the California Air Resources Board (CARB). DWR's sulfur hexafluoride emissions were below the maximum allowable limit; however, because the allowable limit will be lower in future years, DWR continued to implement plans to further reduce its sulfur hexafluoride emissions. DWR continued to work with CARB to ensure that the new

greenhouse gas regulations will not have significant impacts on SWP operation. DWR also reported its 2018 greenhouse gas emissions to The Climate Registry. DWR procured compliance instruments to meet its contractual obligation for the Lodi Energy Center's Cap-and-Trade Program compliance cost.

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.

For additional information about relicensing, see Chapter 3, Environmental Programs, and Chapter 12, Recreation.

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 the near future.

South SWP Hydropower and Devil Canyon Project 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 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.

South SWP Hydropower, FERC Project No. 2426.

From May 2019 to September 2019, DWR and LADWP met with interested cultural and tribal resources relicensing participants pursuant to Section 106 of the National Historic Preservation Act. Cultural and tribal resources studies and relicensing documents were discussed, and comments, concerns, or questions were addressed regarding the relicensing of the project. From April 2018 to November 2019, DWR and LADWP met with State, federal, and non-governmental organization stakeholder agencies to discuss development of protection, mitigation, and enhancement measures. These meetings were a collaborative effort to establish relationships and refine DWR's and LADWP's commitments with respect to environmental, cultural, and recreational resource issues to gain early consensus with stakeholders.

On May 15, 2019, DWR and LADWP filed an updated study report with FERC. The report provided an updated status of the studies being performed by DWR and LADWP as directed by FERC's June 14, 2017, study plan. On May 29, 2019, DWR and LADWP conducted a meeting with relicensing participants to discuss study status, answer questions, and discuss proposals for new studies or modifications. On June 13, 2019, DWR and LADWP filed with FERC an updated study report meeting summary. Field work investigations, data analysis, and reports for 22 studies were completed by August 21, 2019. On September 11, 2019, FERC issued a study plan determination in response to stakeholder comments on the updated study report. FERC required an additional study to be performed for a Level 3 controlled flow whitewater boating study in Piru Creek between Pyramid Lake and Lake Piru. From December 19–20, 2019, DWR carried out the whitewater boating study on Piru Creek. Boaters engaged with peak flows on two sections of Piru Creek and provided opinions of the experience.

On August 21, 2019, and October 8, 2019, DWR met with Department of Fish and Wildlife to discuss fish stocking at Castaic Lake and the possibility of creating an agreement to continue fish stocking outside of DWR's FERC license.

On August 30, 2019, DWR and LADWP filed the draft license application with FERC. The application provided a comprehensive project description and construction history; operations, costs and financing information; a description of potential project impacts and proposed protection, mitigation, and enhancement measures; detailed design drawings; and project maps.

Devil Canyon Project, FERC Project

No. 14797. On April 10, 2019, DWR filed the draft license application with FERC. Field work investigations, data analysis, and reports for 11 studies were completed

by November 5, 2019. On November 20, 2019, DWR filed the final license application with FERC. Both the draft license application and the final license application provided a comprehensive project description and construction history; operations, costs and financing information; a comprehensive description of the environmental setting within the project boundary; a description of potential project impacts and proposed protection, mitigation, and enhancement measures; detailed design drawings; and project maps.

On November 20, 2019, DWR met with representatives from State Water Resources Control Board to discuss the 401 Water Quality Certification process and the related California Environmental Quality Act process and schedule.

Existing SWP Power Facilities

Figure 9-1 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

To meet its greenhouse gas reduction goals, DWR executed agreements with various



Figure 9-1 Names, Locations, and Nameplate Capacities of Primary State Water Project Power Facilities

entities to purchase zero greenhouse gas emission energy used by the SWP.

DWR Power Planning Activities

DWR's power planning for the SWP includes periodic development of an Integrated Resource Plan, which concludes with plans for long-term and mid-term power procurements necessary to operate the SWP and ensures rate stability through energy market disruptions.

DWR's power planning also includes the Renewable Energy Procurement Plan, which is part of its *Climate Action Plan Phase I: Greenhouse Gas Emissions Reduction Plan*. Information about the *Renewable Energy Procurement Plan* and the *Climate Action Plan* is available in previous editions of Bulletin 132.

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. As needed, DWR also transacts with marketers and other utilities.

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 U.S. Bureau of Reclamation (Reclamation). DWR's share is 222 MW, and Reclamation's share is 202 MW.

Long-term Purchase Agreements

In 1979, DWR and Kings River Conservation District executed an agreement under which DWR receives the output of the 165 MW hydroelectric Pine Flat Powerplant. The power plant supplies DWR with about 400,000 MWh of energy in median water years.

In 2017, DWR and The Metropolitan Water District of Southern California (Metropolitan) executed an agreement under which DWR received the output of five hydroelectric plants totaling 30 MW. DWR also receives renewable energy credits from four of the five hydroelectric plants. The agreement's termination date was September 30, 2019.

On September 9, 2019, DWR and Metropolitan executed an agreement under which DWR receives the output of four small hydroelectric plants totaling 29 MW starting on October 1, 2019. DWR also receives renewable energy credits from these four hydroelectric plants. The agreement's termination date is September 30, 2022.

In 2010, DWR and various public agencies executed an agreement with the Northern California Power Agency 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.

Originally executed in 2013 and amended in 2014, the 20-year agreement for the 45 MW RE Camelot photovoltaic solar generation facility provides DWR with approximately 124,000 MWh of solar energy and renewable credits annually until 2034.

In 2015, DWR and Solar Star California XLIV executed a 20-year agreement, with an optional 10-year extension, under which DWR receives approximately 24,700 MWh of solar energy and renewable energy credits annually from the 9.0 MW Pearblossom Solar Facility, which is adjacent to the Pearblossom Pumping Plant.

In 2015, DWR and Solverde 1 executed a 20-year agreement under which DWR receives approximately 230,000 MWh of solar energy and renewable energy credits annually from the 85 MW solar plant.

In 2015, DWR and Metropolitan executed an agreement under which DWR received the output of five small hydroelectric plants totaling 51.4 MW and approximately 54,574 MWh of energy and renewable energy credits. The agreement's termination date was December 31, 2019.

In 2017, DWR, the U.S. Department of Energy, the Western Area Power Administration (Desert South West Region), and Reclamation executed a 50-year agreement under which DWR receives up to 6,500 MWh of zero-emission energy annually from the Boulder Canyon Project (Hoover Dam), located near Boulder City, Nevada.

The renewable energy procured under these agreements will further increase the amount of renewable and zero greenhouse gas emission energy used by the SWP and will help DWR meet its greenhouse gas reduction goals.

Short-term Purchase Agreements

DWR typically engages in short-term power transactions with member utilities and energy marketers under the WSPP. These transactions include energy and capacity to meet the requirements of resource adequacy, which is a planning and procurement process to ensure adequate resources.

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 July 2016, DWR and PG&E executed a Work Performance Agreement in which DWR provided funding to PG&E to perform transmission studies, pre-parallel inspection, and witness testing at the Thermalito

Powerplant. This work was needed for Thermalito Powerplant to be commercially operational again following the fire at the facility in November 2012. The agreement was amended in 2018 and 2019 to reflect the estimated increase in project costs. Work continued in 2019 with anticipated completion by the middle of 2020.

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. Work continued in 2019 with anticipated completion by the end of 2020.

In July 2019, DWR gave one-year advance written notice of termination to PG&E, Northern California Power Agency, and City of Santa Clara dba Silicon Valley Power for the *Agreement of Cotenancy in the Castle Rock Junction–Lakeville 230 kV Transmission Line (Agreement)*. The written notice identified termination of DWR's transmission capacity rights and obligations under the *Agreement* to be effective August 1, 2019.

SWP Power Operations in 2019

Tables 9-1 through 9-4, at the end of the chapter, present historical information about SWP power operations for calendar year 2019, 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 2019, energy used for SWP operations at the 29 SWP pumping and generating plants totaled 7,715 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. Reclamation furnishes additional energy for this purpose.

Table 9-1 shows the amount of energy used each month at SWP pumping and power generating plants to operate the SWP in 2019.

Energy Generated and Purchased

Table 9-2 shows the amounts of energy generated at SWP facilities in 2019, as well as energy purchased for SWP operations.

Hydroelectric

The Hyatt-Thermalito power complex in Oroville generated 2,700,016 MWh of energy in 2019.

Energy generated at SWP aqueduct recovery plants—Gianelli, Alamo, Mojave Siphon, Devil Canyon, and Warne—totaled 1,771,431 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 2019 was 398,420 MWh.

Contractual Resource Arrangements in 2019

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 2019, LADWP provided 334,735 MWh for DWR's share of energy generated at Castaic Powerplant.

DWR's share of Gianelli Pumping-Generating Plant used 225,960 MWh and generated 181,988 MWh of energy in 2019.

Purchases and Costs

Table 9-3 shows the amounts of energy, transmission, and other services purchased in 2019. 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 1.59 million MWh of energy at a cost of \$39.75 million. Other SWP-related costs include \$5.34 million for transmission service outside CAISO and \$242.23 million for operation, maintenance, and miscellaneous CAISO charges, among other things. Key costs associated with the latter amount are: (1) \$7.60 million for operations and maintenance related to Pine Flat Powerplant; and (2) \$9.4 million for debt service and \$8.10 million for capital improvement, management, operations, and maintenance, connected to the Lodi Energy Center. The \$5.34 million for transmission service outside CAISO includes \$0.42 million for PG&E and \$4.03 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 2019, the power plant provided 714,558 MWh of energy to the SWP at an energy component cost of \$5.43 million.

Under the Metropolitan Small Hydro contract, DWR purchased 103,205 MWh of energy in 2019 from four small hydroelectric power plants on the Metropolitan system at a cost of \$5.79 million.

Also, under the Lodi Energy Center Power Sales Agreement with Northern

California Power Agency, DWR received a purchase credit of \$19.50 million based on 398,735 MWh generated at the Lodi Energy Center plant during 2019 and conveyed to the CAISO power grid. This amount is shown as revenue in Table 9-4.

Under renewable energy contracts with RE Columbia, LLC; Metropolitan; Solar Star California XLIV, LLC; and Solverde 1, LLC, DWR received a total of 393,292 MWh at a cost of \$16.71 million.

Finally, under the *Boulder Canyon Project Agreement* with the U.S. Department of Energy, Western Area Power Administration, DWR received 4,860 MWh at a cost of \$61,682.

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 2019, the SWP did not purchase short-term energy under agreements with bilateral marketers. This is reflected in Table 9-3.

Contractual Sales of Excess Power

In 2019, DWR received \$60.16 million in energy revenues. This includes (1) \$32.38 million for ancillary service transactions made through CAISO; and (2) \$26.41 million associated with long-term contracts, including, among other things, \$19.31 million related to the Lodi Energy Center Power Sales Agreement with Northern California Power Agency.

Other Long-term Agreements

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

Table 9-1 Energy Used at Pumping Plants and Power Plants in 2019, 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	122	116	5	20	165	73	122	0	132	11	3	773
North Bay Interim Pumping Plant	0	0	0	0	0	0	0	0	0	0	0	0	0
Cordelia Pumping Plant	555	400	38	410	502	1,185	1,402	1,482	1,405	1,315	1,206	884	10,789
Barker Slough Pumping Plant	223	146	19	168	442	1,033	1,442	1,380	1,274	971	1,061	506	8,672
South Bay Pumping Plant	3,738	1,872	1,785	1,129	4,320	6,987	12,348	8,861	5,683	4,604	4,501	6,195	62,021
Del Valle Pumping Plant	5	5	7	9	7	7	363	74	6	7	12	15	516
Banks Pumping Plant	41,817	72,815	95,330	23,103	20,905	96,165	116,792	89,381	98,329	20,587	53,249	119,983	848,456
Gianelli Pumping-Generating Plant (SWP share)	30,773	50,227	2,246	0	433	22,409	3,187	2,641	21,552	2,369	12,312	77,910	226,059
Dos Amigos Pumping Plant (SWP share)	10,029	17,063	45,986	36,607	31,506	31,772	44,517	52,843	39,633	35,263	23,521	23,477	392,218
Buena Vista Pumping Plant	7,554	9,883	37,249	46,434	41,875	36,316	45,795	43,896	46,871	38,182	27,815	31,102	412,973
Teerink Pumping Plant	7,870	11,092	40,555	49,262	44,476	37,603	45,481	44,436	49,748	41,035	30,593	34,142	436,293
Chrisman Pumping Plant	17,303	24,068	90,002	108,832	97,881	81,061	96,994	95,381	107,732	89,423	66,373	75,527	950,576
Edmonston Pumping Plant	61,654	89,907	326,241	393,174	352,126	287,956	343,473	340,726	387,492	319,130	238,292	274,843	3,412,015
Alamo Powerplant (station service)	57	50	55	56	51	3	1	1	0	0	0	8	1
Pearblossom Pumping Plant	6,581	17,059	50,887	73,562	77,889	50,948	68,914	78,593	76,358	75,291	61,736	75,519	713,337
Pine Flat Powerplant (station service) ¹	241	219	53	0	0	0	0	0	0	0	0	0	515
Mojave Siphon Powerplant (station service)	63	42	19	2	0	2	6	15	0	1	16	0	165
Devil Canyon Powerplant (station service)	1	1	0	0	0	1	0	0	1	1	4	0	11
Oso Pumping Plant	4,871	2,890	16,890	15,347	8,345	11,353	10,284	6,143	12,916	6,185	2,211	1,500	98,935
Warne Powerplant (station service)	90	135	12	140	434	255	216	451	155	279	548	12	2,728
Las Perillas Pumping Plant	303	460	277	630	1,091	1,504	1,700	1,455	925	695	82	106	9,227
Badger Hill Pumping Plant	767	1,173	631	1,632	2,814	3,703	4,144	3,618	2,289	1,639	195	255	22,860
Devil's Den Pumping Plant	1,395	684	784	1,122	1,240	1,532	1,749	1,748	1,587	1,601	477	837	14,757
Bluestone Pumping Plant	1,295	640	733	1,046	1,165	1,438	1,642	1,632	1,481	1,490	442	775	13,780
Polonio Pass Pumping Plant	1,414	693	800	1,139	1,265	1,562	1,780	1,778	1,612	1,622	481	852	14,997
Greenspot Pump Station	53	59	58	56	67	61	66	67	65	386	943	2,020	3,902
Crafton Hills Pump Station	1,333	60	1,414	2,108	2,150	2,698	2,714	2,334	2,345	2,410	2,494	1,260	23,317
Cherry Valley Pump Station	79	16	54	67	98	207	169	86	85	142	177	89	1,240
Citrus Pump Station	1,483	94	3,211	4,285	4,300	5,257	4,448	2,675	2,769	2,636	2,772	50	33,980
Total Energy Required for the SWP²	201,551	298,879	715,452	760,325	695,404	683,183	809,702	781,820	862,316	647,396	531,535	727,833	7,715,395

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 9-2 Energy Generated and Purchased in 2019, 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	36,810	27,342	256,304	350,457	373,570	264,431	326,260	352,539	295,539	172,097	137,724	106,492	2,700,016	
Gianelli Pumping-Generating Plant (SWP share)	0	0	681	52,847	40,564	6,017	4,276	23,136	4,494	39,121	10,825	0	181,988	
Alamo Powerplant	0	0	0	0	190	7,909	9,896	9,646	7,273	9,720	8,181	9,969	62,784	
Mojave Siphon Powerplant	628	1,489	5,059	8,153	8,805	5,626	7,813	7,831	8,505	6,920	7,025	8,994	76,848	
Devil Canyon Powerplant	18,313	40,965	86,592	127,192	130,019	89,316	123,464	130,152	127,970	123,901	114,306	132,771	1,244,961	
Warne Powerplant	10,376	6,167	36,905	32,029	17,340	23,965	21,292	12,851	27,226	13,202	3,499	0	204,851	
<i>Subtotal</i>	66,726	75,962	385,541	570,705	570,488	397,264	493,001	536,155	471,457	364,961	281,561	258,226	4,471,447	
Energy Sources from Long-term Agreements														
Castaic Powerplant	16,608	9,912	51,799	52,632	28,056	39,264	35,280	20,448	44,640	21,684	4,440	10,632	334,735	
Metropolitan Small Hydro Generation ¹	6,098	1,988	5,460	7,341	11,050	12,389	10,328	8,503	10,347	0	0	0	73,508	
Pine Flat Powerplant (Kings River Conservation District)	0	0	71,591	59,978	118,920	134,757	143,428	105,645	44,501	35,498	238	0	714,556	
Energy to Metropolitan for CRA ² Pumping	0	0	0	0	0	0	0	0	0	0	0	0	0	
Energy from Metropolitan for CRA ²	0	0	0	0	0	0	0	0	0	0	0	0	0	
Lodi Energy Center	48,919	44,851	39,452	415	1,843	6,927	32,949	33,362	25,638	57,454	42,760	63,851	398,420	
Hoover-Boulder Canyon Project	273	383	431	545	580	489	489	456	402	364	324	124	4,860	
Renewable Energy ³	17,967	21,427	31,275	37,284	40,442	47,907	44,255	43,185	37,592	43,015	35,818	22,824	422,992	
Purchases														
Purchases (Firm and WSPP Contracts)														
CAISO Energy ⁴	94,478	189,207	169,354	31,839	(74,132)	51,111	82,920	67,428	253,376	181,875	209,154	436,027	1,692,639	
<i>Subtotal</i>	184,344	267,768	369,363	190,034	126,759	292,845	349,650	279,028	416,496	339,889	292,733	533,458	3,642,370	
Total Resources	250,470	343,730	754,904	760,740	697,247	690,110	842,650	815,183	887,954	704,850	574,294	791,684	8,113,817	
Less Energy Sales ⁵	(48,919)	(44,851)	(39,452)	(415)	(1,843)	(6,927)	(32,949)	(33,362)	(25,638)	(57,454)	(42,760)	(63,851)	(398,420)	
Total Energy Provided to the SWP⁶	201,551	298,879	715,452	760,325	695,404	683,183	809,702	781,821	862,316	647,396	531,535	727,833	7,715,395	

¹ Metropolitan Water District original contract expired at the end of September 2019.

² Contractual Resource Arrangement (CRA).

³ RE Camelot, LLC; Solar Star California XIV, LLC; The Metropolitan Water District of Southern California; and Solverde 1, LLC.

⁴ Energy provided by CAISO for balancing the total SWP loads and resources.

⁵ Includes power received under Lodi Energy Center Power Sales Agreement as a purchase credit.

⁶ Totals may not sum as expected due to rounding.

DWR pumping facilities occasionally used to pump federal water. During 2019, DWR collected a net revenue of \$0.29 million. The actual CAISO charges and revenue associated with this amount are included—but not listed independently—on Tables 9-3 and 9-4.

Forecasting Power Operations

Each year, after reviewing the SWP 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 9-3 Energy, Transmission, and Related Costs in 2019

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					0
CAISO–Other ¹				212,955,526	212,955,526
Energy Marketers–Bilaterals (WSPP)				938,673	938,673
Long-term Contracts ²	1,221,042 ^a	23,041,441	5,338,948	28,336,202	56,716,591
Long-term Energy Markets–Renewable Energy ³	393,292	16,705,372			16,705,372
Total	1,614,333	39,746,813	5,338,948	242,230,400	287,316,161

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.³ RE Columbia, LLC; The Metropolitan Water District of Southern California; Solar Star California XLIV, LLC; and Solverde 1, LLC.^a Includes 398,419 MWh generated at the Northern California Power Agency Lodi Energy Center.**Table 9-4 Energy and Energy-related Revenue in 2019 per Contract Agreements**

Category	Energy Trades (MWh)	Energy Revenues (in dollars)	Other Energy- related Revenue (in dollars)	Total Revenues (in dollars)
CAISO–Bilateral Trades				0
CAISO–Other ¹			32,384,889	32,384,889
Energy Marketers–Bilaterals			1,362,701	1,362,701
NCPA Long-Term Energy Contract (LEC)	398,419 ^a	19,504,090	305,648	19,809,738
Long-term Contracts ²		1,206,659	5,377,037	6,583,696
Long-term Renewable Energy Contracts			15,735	15,735
Total	398,419	20,710,749	39,446,010	60,156,759

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 Lodi Energy Center.



Chapter 10

Facilities Maintenance

Thermalito Diversion Dam on the Feather River downstream from Oroville Dam in Butte County.

Significant Events in 2019

In April, the Oroville Dam Spillway operated in accordance with the Flood Operations Plan and applicable operating orders to a maximum release of 26,000 cubic feet per second. Surveillance and instrumentation monitoring and post-spill inspections verified satisfactory performance.

The 5-Year Part 12D and Director's Safety Review Board activities for Oroville Dam, Parish Camp Saddle Dam, and Bidwell Bar Canyon Saddle Dam continued in 2019. These activities continued into 2020.

The 5-Year Part 12D and Director's Safety Review Board activities for Thermalito Diversion, Thermalito Forebay, Thermalito Afterbay, and Feather River Fish Barrier dams were conducted. The reports were completed and submitted to the Federal Energy Regulatory Commission and the Division of Safety of Dams in July 2019.

The 5-Year Part 12D and Director's Safety Review Board inspections for Pyramid Dam, the William E. Warne Power Complex, Cedar Springs Dam, and Devil Canyon Second Powerplant Afterbay were initiated. These activities continued into 2020.

In June 2019, the Director's Safety Review Board for Crafton Hills and Castaic Dams began with a series of presentations to Board members and State regulators, followed by inspection of the facilities.

Post-earthquake inspections were conducted of San Luis, San Joaquin, and Southern Field division facilities between July 4–July 6, 2019, following the 2019 Ridgecrest earthquake sequence. No signs of damage were observed.

A Periodic Facility Review was completed by U.S. Bureau of Reclamation for Sisk, O'Neill Forebay, Los Banos Detention, and Little Panoche Detention dams in June 2019. A Periodic Facility Review includes a review of instrumentation, recommendation statuses, and a site inspection.

Information for this chapter was provided by the Division of Operations and Maintenance, the Division of Safety of Dams, the Division of Regional Water Assistance (formerly 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 Dam Safety Services (DSS), Division of Safety of Dams (DSOD), Federal Energy Regulatory Commission (FERC), and the U.S. Bureau of Reclamation (Reclamation) conduct various inspections and safety analyses to ensure the safety of SWP dams.

O&M staff, through the DSS and field divisions, inspect, collect, and analyze data for all SWP dams and appurtenant structures. DSS 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. Downstream hazard classifications and condition assessment ratings are updated for the dams, as needed. Definitions are on DSOD's website. Table 10-1 shows hazard classifications and conditions assessment ratings for 2019.

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 five years.

DWR contracts periodically with independent consultants to review the safety of SWP dams and power facilities, except for Pearblossom Spill Basin Dam. That facility was originally designed to be used during misoperation at the Pearblossom Pumping Plant. The spill basin was never fully completed, has never been used, and is not under DSOD jurisdiction.

Table 10-1 Hazard Classifications and Conditions Assessments

Facility	Result
Antelope Dam	Satisfactory
Frenchman Dam	Satisfactory
Grizzly Valley Dam	Satisfactory
Oroville Dam	Fair
Thermalito Diversion Dam	Satisfactory
Thermalito Forebay Dam	Satisfactory
Thermalito Afterbay Dam	Satisfactory
Feather River Fish Barrier Dam	Satisfactory
Bethany Dams	Satisfactory
Clifton Court Forebay Dam	Satisfactory
Del Valle Dam	Satisfactory
Dyer Reservoir	Satisfactory
Patterson Dam	Satisfactory
Castaic Dam	Fair
Pyramid Dam	Satisfactory
Cedar Springs Dam	Satisfactory
Devil Canyon Powerplant Second Afterbay Dam	Satisfactory
Perris Dam	Satisfactory
Crafton Hills Dam	Satisfactory

Routine Inspections

During 2019, O&M, along with agency representatives from DSOD, FERC, and Reclamation, conducted routine periodic inspections for all the dams in the Oroville Field Division, Delta Field Division, San Luis Field Division, and Southern Field Division. Table 10-2 shows SWP dam inspections conducted in 2019.

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 and Periodic Facility Reviews of these joint-use facility dams every eight years. The latest comprehensive reviews for Sisk Dam and O'Neill Dam occurred in 2015; the latest comprehensive reviews for the Los Banos and Little Panoche detention dams occurred in 2016. The next comprehensive review is not due until 2023 for Sisk and O'Neill dams, and not until 2024 for Los Banos and Little Panoche detention dams.

Periodic Facility Reviews are also conducted by Reclamation every eight years using an alternate schedule spaced between the comprehensive reviews. A joint periodic facility review inspection of the facilities with Reclamation, DSS, and San Luis Field Division was conducted in July 2019.

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 five 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

Table 10-2 State Water Project Dam Inspections in 2019

Field Division	Facility	Type of Inspection						
		Operations & Maintenance Dam Safety Branch	Division of Safety of Dams	Federal Energy Regulatory Commission	U.S. Bureau of Reclamation Annual Inspection	U.S. Bureau of Reclamation 8-Year Periodic Facility Review	Director's Safety Review Board	Part 12D 5-Year Review
Oroville								
	Antelope Dam	X	X	-	-	-	-	-
	Frenchman Dam	X	X	-	-	-	-	-
	Grizzly Valley Dam	X	X	-	-	-	-	-
	Oroville Dam	X	X	X	-	-	-	-
	Bidwell Canyon Saddle Dam	X	X	X	-	-	-	-
	Parish Camp Saddle Dam	X	X	X	-	-	-	-
	Thermalito Diversion Dam	X	X	X	-	-	-	-
	Thermalito Forebay Dam	X	X	X	-	-	-	-
	Thermalito Afterbay Dam	X	X	X	-	-	-	-
	Feather River Fish Barrier Dam	X	X	X	-	-	-	-
Delta								
	Bethany Dams	X	X	-	-	-	-	-
	Clifton Court Forebay Dam	X	X	-	-	-	-	-
	Del Valle Dam	X	X	-	-	-	-	-
	Dyer Reservoir	X	X	-	-	-	-	-
	Patterson Dam	X	X	-	-	-	-	-
San Luis								
	Little Panoche Detention Dam	X	-	-	X	X	-	-
	Los Banos Detention Dam	X	-	-	X	X	-	-
	O'Neill Dam	X	-	-	X	X	-	-
	Sisk Dam	X	-	-	X	X	-	-
Southern								
<i>West Branch</i>								
	Castaic Dam	X	X	-	-	-	X	X
	Pyramid Dam	X	X	X	-	-	X	X
	Quail Canal and Dam	X	-	X	-	-	X	X
	William Warne Power Development	X	-	X	-	-	-	-
<i>East Branch</i>								
	Cedar Springs Dam	X	X	X	-	-	X	X
	Devil Canyon Powerplant Second Afterbay Dam	X	X	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 San Luis Field Division dams and the Quail Canal and Dam are not under DSOD jurisdiction. DSOD inspects dams at least once every fiscal year (July 1 through June 30).

of dam performance during earthquakes, evaluation of instrumentation data, inspection of each dam, and evaluation of studies performed by DWR. The DSRB then prepares reports on each dam, approving dams as safe for continued operation and making recommendations. Based on DSRB recommendations, DWR prepares action plans. In 2019, there were five DSRB inspections, one each for Castaic, Pyramid, Quail Canal, Cedar Springs, and Devil Canyon Second Afterbay dams.

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 Powerplant Second Afterbay facilities in Southern Field Division. Every five years, a FERC Part 12D safety inspection is also conducted. In 2019, the Part 12D inspections for P-2100 dams were conducted. In 2019, there were five Part 12D inspections, one each for Castaic, Pyramid, Cedar Springs, Devil Canyon Powerplant Second Afterbay dams, and Quail Canal.

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 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 DSS 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.

Canal Condition Assessment Program Inspections

Canal Condition Assessment Program inspections are scheduled biennially, every five years, or every 10 years. Future inspections intend to identify trends in maintenance and aging of the SWP.

Canal Condition Assessment Program inspections consists of

- visual inspection and observations;
- analysis of findings;
- data management;
- risk assessment; and
- recommendations and prioritization.

Canal Condition Assessment Program inspections are done to fully document the existing condition of all assets along the canal and provide recommendations for repairing/replacing, monitoring, or further investigation of identified issues or defects. Assets inspected along the canal include the canal prism (concrete liner, embankment, toe), check structures, culverts, bridges, utility crossings, roads, siphons, and turnouts.

In 2019, the Canal Condition Assessment Program visual inspections were

performed in the Delta, San Joaquin, and Southern field divisions. Final reports with recommendations were provided to the field divisions.

Pipeline Condition Assessment Program Inspections

The Pipeline Condition Assessment Program consists of inspections and other risk-informed treatments of these assets. This includes pipelines, tunnels, siphons, and discharge lines.

The Pipeline Condition Assessment Program consists of structural integrity inspections for pipeline assets, including steel and various concrete materials. Inspection criteria consists of observation and assessment of deficiencies such as cracks, delamination, spalls, joint separation, leakage, roundness, corrosion and any other observable defects or abnormalities. Additionally, as technologies and methods for the reliable asset management of these pipelines improves, more noninvasive inspection technologies are being utilized for condition assessment, without the need to remove the pipeline from service. In recent years, DWR has employed non-destructive inspection and testing technologies for the pipelines.

During 2019, the Pipeline Condition Assessment Program successfully completed 12 total miles of pipeline structural integrity inspections and reports. These reports and their findings and recommendations were shared with the field divisions. Each inspection is summarized below in the “Repairs, Modifications, and Inspections by Field Divisions” section.

Oroville Dam Safety Comprehensive Needs Assessment

In 2017, DWR initiated the Oroville Dam Safety Comprehensive Needs Assessment project to identify measures to bolster the safety and reliability of Oroville Dam and the appurtenant structures. Progress on the Oroville Dam Safety Comprehensive Needs Assessment project continued during 2019.

DWR continued work on the Oroville Dam Safety Comprehensive Needs Assessment project, which includes development of baseline semiquantitative risk estimates, as well the potential risk reduction provided by identified “measures” or risk treatments.

The Independent Review Board for the Oroville Dam Safety Comprehensive Needs Assessment project convened on four occasions and issued three reports (Nos. 4, 5, and 6) in 2019 that included recommendations for DWR’s consideration.

Oroville Facilities Level 2 Risk Analysis

Following the 2017 Oroville Dam spillways incident, federal legislation was passed that directed FERC to have DWR identify and retain independent consultants to prepare a Level 2 risk analysis consistent with FERC’s risk-informed decision-making guidelines. In 2018, DWR retained the independent consultants and submitted their plan to FERC.

The Oroville Dam complex Level 2 Risk Analysis workshops were held between January and August 2019 and totaled 53 days. The workshops were led by an independent facilitation team and attended by external subject matter experts, the Part 12D Board, U.S. Army Corps of Engineers subject matter experts, and DWR. After the workshops, DSS staff monitored the progress of the independent teams’ document preparation efforts.

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 2019, 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 2019.

Related Activities

Environmental Protection Agency 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 *Superfund Record of Decision: Atlas Asbestos Mine, CA*, issued by the U.S. Environmental Protection Agency 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 five years since.

In fall 2010, as a part of the upcoming 2011 review cycle, DWR toured the basin with representatives from the U.S. Environmental Protection Agency 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 U.S. Environmental Protection Agency 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 2019, DWR continued its standard operating procedures within the basin to comply with the U.S. Environmental Protection Agency's Comprehensive Environmental Response Compensation and Liability Act of 1980 (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 project study report in October 2011. The comments focused on flood control and ongoing operations and maintenance needs related to properly maintaining the channel. In late November 2018, the California Department of Transportation approved a construction contract, and preliminary construction activities began by the end of 2018. Arroyo Pasajero flows in the spring of 2019 slowed construction, but the bridge project was completed by the end of 2019.

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. As of 2019, the basin's flood control features continued to function as expected.

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 2019 by Oroville, Delta, San Luis, San Joaquin, and Southern field divisions.

Oroville Field Division

In May 2019, a condition assessment of the intake structure at Antelope Dam was conducted using a remotely operated vehicle.

A remotely operated vehicle inspection of the seepage collection outlet pipe at Oroville Dam was performed in February 2019 to document its condition. Sediment samples were collected and sent for laboratory analysis.

In August 2019, the Oroville Dam Crest Road and parking areas were repaved.

The Oroville Dam Spillway was operated in accordance with the Flood Operations Plan and applicable operating orders to a maximum release of 26,000 cubic feet per second in April 2019. Surveillance and instrumentation monitoring and post-spill inspections verified satisfactory performance.

Throughout 2019, significant security enhancements were constructed around Oroville Dam. The installation of security fencing along the left groin of the dam included the repair of erosion gullies and minor surface drainage improvements.

In February 2019, Oroville Field Division cleared rock debris at the intakes of the Western Canal and Richvale Canal outlets at Thermalito Afterbay Dam. The inspection of the dewatered outlet conduits of the Western Canal and Richvale Canal outlets were also inspected.

In July 2019, the Feather River Fish Hatchery raw water line was inspected from the slide gate to the aerator at the fish hatchery.

In July and November of 2019, dive inspections of the Thermalito Diversion Dam bays were performed to assess the condition of the bulkhead guides, radial gates, and concrete piers.

A nondestructive evaluation and a visual structural inspection of the Thermalito Diversion Dam stilling basin and Robie Thermalito Pumping-Generating Plant bypass spillway were performed in August and October 2019, respectively.

In October 2019, rope access structural inspection of the Thermalito Forebay bypass radial gate was performed. Load balance testing of the hoist ropes as part of the biannual recurring balance testing of the

Thermalito Forebay bypass radial gate was also completed.

Delta Field Division

In May 2019, Delta Field Division dewatered Patterson Reservoir allowing for sediment removal, inspection of its liner, performance of asphalt liner repairs, and other maintenance.

On July 16, 2019, a 4.4 magnitude earthquake triggered the inspection of Del Valle Dam. Delta Field Division conducted post-earthquake inspections that confirmed that no damage was experienced to SWP facilities.

In October 2019, nondestructive examinations and visual structural inspections of the Bethany and Dyer spillways were performed.

The radial gate refurbishment project at Clifton Court Forebay Dam's intake structure was completed under Specification No. 16-06.

In October 2019, canal condition assessment program inspections were successfully completed for the California Aqueduct and South Bay Aqueduct.

In June 2019, a pipeline condition assessment program visual inspection of the Banks Pumping Plant discharge line No. 3 were conducted. This inspection included 0.2 miles of 15-foot diameter steel pipe.

San Luis Field Division

A Periodic Facility Review was completed by Reclamation for Sisk, O'Neill, Los Banos Detention, and Little Panoche Detention dams in June 2019. A Periodic Facility Review includes a review of instrumentation, recommendation statuses, and a site inspection. Periodic Facility Reviews are conducted every eight years. Reclamation,

DSS, and San Luis Field Division participated in the inspections.

Reclamation's Sisk Safety of Dams Project management team meetings occurred throughout 2019. The design phase for the Sisk Safety of Dams Project also began.

Between April and May 2019, a pipeline condition assessment was completed for the Dos Amigos Pumping Plant discharge line Nos. 4, 5, and 6. This inspection covered approximately 0.5 miles total of 18-foot diameter steel and reinforced concrete pipe.

In June 2019, Reclamation conducted Periodic Facility Review inspections for Sisk, O'Neill, Los Banos Detention, and Little Panoche Detention dams.

In August 2019, DSS reviewed and provided comments to 60 percent of the design plans and specifications for the Sisk Dam Safety of Dams Modification Project. The purpose of the project is to increase stability of the embankment in zones with liquefiable soil potential.

San Joaquin Field Division

Canal condition assessment program Inspections were successfully completed in the California Aqueduct during November 2019. Note that this inspection did not include the Coastal Branch.

Southern Field Division

Post-earthquake inspections of Southern Field Division were conducted facilities between July 4 and July 6, 2019, following the Ridgecrest earthquake sequence. No signs of damage were observed.

Visual inspections and nondestructive examinations were performed for the Perris Dam and Crafton Hills Dam spillways, the Devil Canyon Powerplant Second Afterbay wastewater tunnel, and the emergency overflow weir at Lower Quail Canal.

In May 2019, Line 1 of the Perris Dam right reach toe drain and seepage collection system was inspected and cleaned.

Field work associated with the Pyramid Dam Emergency Spillway Investigation was conducted and included the installation of three slope inclinometers to enhance monitoring of the dam's abutments and four piezometers within the emergency spillway.

Southern Field Division completed refurbishment and reinstallation of the 42-inch, 78-inch, and 132-inch diameter isolation valves within the Castaic Dam turn-out facility.

In April 2019, an inspection of the Castaic Dam toe drain piping system was performed. The toe drain was found in good condition with no immediate need for cleaning.

In April 2019, the construction phase of the spillway underdrain pipe repairs and access road improvements (Specification No. 18-18) began at Cedar Springs Dam. Work accomplished in 2019 included removal of collector pipes and backfill from behind the spillway walls, as well as cleaning and inspection of the underdrains.

In July 2019, a pipeline condition assessment visual inspection of the Feather River Fish Hatchery raw water line was conducted. This inspection consisted of approximately one mile of 60-inch diameter welded steel and reinforced concrete pipe.

Four new piezometers were installed along the Perris Dam right reach to monitor groundwater conditions and the functionality of the toe drain seepage system.

The Crafton Hills Reservoir was dewatered to allow for inspection and maintenance of the outlet works.

The Canal Condition Assessment Program Inspections were successfully completed

throughout the East and West branches of the California Aqueduct during September 2019. The pipeline Condition Assessment Program completed visual inspections of the Tehachapi Tunnel Crossing, including tunnel Nos. 1 through 3 and the Carley V. Porter Tunnel Crossing. This inspection consisted of over three miles of 23.5-foot diameter cast in place concrete pipe and 4.7 miles of 20-foot diameter cast in place concrete pipe during January 2019. During this inspection, deficiencies were identified in the walls of the concrete tunnels and some repairs were made.

The pipeline Condition Assessment Program completed a visual inspection of the Pastoria Siphon, barrels 1 and 2 during January 2019. This inspection consisted of over one mile of 16-foot diameter steel pipeline

The pipeline Condition Assessment Program completed a visual inspection of the Pearblossom Pumping Plant discharge line No. 3 during February 2019. This inspection consisted of 1.2 miles of 13-foot diameter steel and pretensioned concrete cylinder pipe.

The pipeline condition assessment program completed a visual inspection of the Myrick Siphon in April 2019. This inspection consisted of 0.2 miles of three-foot diameter reinforced concrete pipe.

Other Inspections

Bridges and Overchutes

In addition to the conveyance facilities, three bridges in the Oroville Field Division, two bridges in the Delta Field Division, 17 bridges and 61 overchutes in the San Joaquin Field Division, and 22 bridges in the Southern Field Division were inspected as part of a regularly scheduled maintenance program.

2019 Ridgecrest Earthquakes

On July 4, 2019, at 10:33 a.m. local time, a magnitude 6.4 earthquake occurred approximately 11 miles northeast of Ridgecrest. The earthquake was felt throughout Southern California and parts of Central California. The July 4 earthquake was followed by the 7.1 magnitude Ridgecrest earthquake on July 5, 2019, at 8:19 p.m. Approximately 50 Southern Field Division personnel responded immediately to the two earthquakes, which occurred on the July 4 holiday and night of July 5. San Joaquin and San Luis Field divisions also conducted post-earthquake inspections after the 7.1 magnitude event. DSS, O&M's Civil Maintenance Branch, and the Division of Engineering also responded to support with follow-up inspections of key facilities. Observations made at Cedar Springs Dam led to several follow-up actions and inspections.

Outages for Maintenance and Repair of Facilities

Table 10-3 presents information, arranged chronologically, about significant scheduled and unscheduled outages at SWP pumping and power plants in 2019. The table includes information about incidents resulting in outages of 14 days or more.

Table 10-3 Outages for Maintenance and Repair of Facilities in 2019, by Month

1 of 7

Month	Facility	Unit	Outage Description
January	Banks Pumping Plant	8	January 7 to January 25 for Condition Assessment Program inspection and hydraulic preventative maintenance
	Barker Slough Pumping Plant	8	January 1 to April 30 for pump and motor refurbishment (continued from October 7, 2018)
	Del Valle Pumping Plant	1	January 1 to July 3 for pump and motor refurbishment (continued from August 14, 2018)
	Devil Canyon Powerplant	1	January 18 to January 31 for transformer ground fault
	South Bay Pumping Plant	4	January 1 to December 31 for pump shaft repair (continued from May 17, 2018)
	South Bay Pumping Plant	9	January 2 to June 28 for pump replacement
	Hyatt Powerplant	1	January 1 to December 31 for unit replacement
	Hyatt Powerplant	4	January 1 to January 17 for unit declared unavailable due to low lake level
	Hyatt Powerplant	4	January 2 to February 9 for penstock #2 outage
	Hyatt Powerplant	5	January 1 to January 17 for low lake level
	Hyatt Powerplant	5	January 2 to February 9 for penstock #2 outage
	Hyatt Powerplant	6	January 1 to January 17 for low lake level
	Hyatt Powerplant	6	January 2 to February 9 for penstock #2 outage
	Robie Thermalito Pumping Generating Plant	1	January 1 to December 31 for unit commissioning testing
	Robie Thermalito Pumping Generating Plant	2	January 1 to December 31 for unit commissioning testing
	Robie Thermalito Pumping Generating Plant	3	January 1 to November 25 for unit commissioning testing
	Robie Thermalito Pumping Generating Plant	4	January 1 to December 31 for unit commissioning testing
	Alamo Powerplant	1	January 1 to May 31 for inner shaft inspection (continued from October 29, 2018)
	Crafton Hills Pumping Plant	1	January 31 to February 28 for discharge valve replacement
	Crafton Hills Pumping Plant	2	January 31 to February 28 for discharge valve replacement
	Crafton Hills Pumping Plant	3	January 31 to February 28 for discharge valve replacement
	Crafton Hills Pumping Plant	4	January 31 to February 28 for discharge valve replacement
	Crafton Hills Pumping Plant	5	January 31 to February 28 for discharge valve replacement
	Crafton Hills Pumping Plant	6	January 31 to February 28 for discharge valve replacement
	Crafton Hills Pumping Plant	7	January 31 to February 28 for discharge valve replacement
	Citrus Pumping Plant	1	January 31 to February 28 for discharge valve replacement
	Citrus Pumping Plant	2	January 31 to February 28 for discharge valve replacement
	Citrus Pumping Plant	3	January 31 to February 28 for discharge valve replacement
	Citrus Pumping Plant	4	January 6 to May 8 for inspection and repair air rotating rectifier
	Citrus Pumping Plant	4	January 31 to February 28 for discharge valve replacement

Table 10-3 Outages for Maintenance and Repair of Facilities in 2019, by Month

Month	Facility	Unit	Outage Description
	Citrus Pumping Plant	5	January 31 to February 28 for discharge valve replacement
	Citrus Pumping Plant	6	January 31 to February 28 for discharge valve replacement
	Citrus Pumping Plant	7	January 31 to February 28 for discharge valve replacement
	Citrus Pumping Plant	8	January 31 to February 28 for discharge valve replacement
	Cherry Valley Pumping Plant	2	January 30 to February 25 for transmission line problems
	Pearblossom Pumping Plant	7	January 14 to March 11 for annual Condition Assessment Program inspection, discharge line #3 inspection, and discharge valve inspection
	Pearblossom Pumping Plant	8	January 14 to March 11 for annual Condition Assessment Program inspection, discharge line #3 inspection, and discharge valve inspection
	Pearblossom Pumping Plant	9	January 14 to March 11 for annual Condition Assessment Program inspection, discharge line #3 inspection, and discharge valve inspection
	Bluestone Pumping Plant	2	January 1 to December 17 for internal pump inspection (continued from July 31, 2017)
	Edmonston Pumping Plant	1	January 14 to January 31 for west discharge line #2 inspection
	Edmonston Pumping Plant	2	January 14 to February 9 for west discharge out of service for post Central Valley Project refill process
	Edmonston Pumping Plant	4	January 14 to February 9 for west discharge out of service for post Central Valley Project refill process
	Edmonston Pumping Plant	6	January 14 to February 9 for west discharge out of service for post Central Valley Project refill process
	Edmonston Pumping Plant	8	January 14 to February 9 for west discharge out of service for post Central Valley Project refill process
	Edmonston Pumping Plant	10	January 14 to February 9 for west discharge out of service for post Central Valley Project refill process
	Edmonston Pumping Plant	12	January 14 to February 9 for west discharge out of service for post Central Valley Project refill process
	Edmonston Pumping Plant	14	January 14 to February 9 for west discharge out of service for post Central Valley Project refill process
	Edmonston Pumping Plant	2	January 12 to February 9 for discharge line inspection
	Edmonston Pumping Plant	3	January 14 to January 31 for west discharge line #2 inspection
	Edmonston Pumping Plant	4	January 12 to February 9 for discharge line inspection
	Edmonston Pumping Plant	5	January 14 to January 31 for west discharge line #2 inspection
	Edmonston Pumping Plant	6	January 12 to February 9 for discharge line #2 inspection
	Edmonston Pumping Plant	7	January 1 to December 31 for thrust pump trouble
	Edmonston Pumping Plant	8	January 12 to February 9 for discharge line inspection

Table 10-3 Outages for Maintenance and Repair of Facilities in 2019, by Month

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Month	Facility	Unit	Outage Description
January	Edmonston Pumping Plant	9	January 14 to January 31 for west discharge line #2 inspection
	Edmonston Pumping Plant	10	January 12 to February 9 for discharge line inspection
	Edmonston Pumping Plant	11	January 14 to January 31 for west discharge line #2 inspection
	Edmonston Pumping Plant	12	January 12 to February 9 for discharge line inspection
	Edmonston Pumping Plant	13	January 14 to January 31 for west discharge line #2 inspection
	Edmonston Pumping Plant	14	January 12 to February 9 for discharge line inspection
	Las Perillas Pumping Plant	2	January 1 to April 8 for pump and inlet valve installation (continued from October 25, 2018)
	Las Perillas Pumping Plant	3	January 1 to April 8 for pump and inlet valve installation (continued from October 25, 2018)
	Polonio Pass Pumping Plant	6	January 1 to March 26 for pump refurbishment (continued from September 29, 2016)
	Teerink Pumping Plant	7	January 1 to June 29 for discharge valve refurbishment (continued from November 15, 2018)
	Giannelli Pumping-Generating Plant	7	January 1 to December 31 for penstock #4 roller headgate refurbishment
	Giannelli Pumping-Generating Plant	7	January 1 to December 31 for penstock #4 roller headgate refurbishment
February	Banks Pumping Plant	7	February 4 to December 31 for annual Condition Assessment Program inspection
	South Bay Pumping Plant	8	February 7 to April 7 due to air release line leak
	Hyatt Powerplant	2	February 13 to March 15 for penstock #1 annual outage
	Hyatt Powerplant	3	February 13 to March 15 for penstock #1 annual outage
	Teerink Pumping Plant	1	February 13 to March 1 for electrical/mechanical Condition Assessment Program inspection and brush preventative maintenance
	Teerink Pumping Plant	2	February 13 to March 1 for electrical/mechanical Condition Assessment Program inspection and brush preventative maintenance
	Teerink Pumping Plant	3	February 13 to March 1 for electrical/mechanical Condition Assessment Program inspection and brush preventative maintenance
	Teerink Pumping Plant	1	February 13 to March 1 for electrical/mechanical Condition Assessment Program inspection and brush preventative maintenance

Table 10-3 Outages for Maintenance and Repair of Facilities in 2019, by Month

Month	Facility	Unit	Outage Description
March	Teerink Pumping Plant	2	February 13 to March 1 for electrical/mechanical Condition Assessment Program inspection and brush preventative maintenance
	Dos Amigos Pumping Plant	2	February 4 to March 8 for Los Banos–Dos Amigo 230 kilovolt line relay upgrade
	Banks Pumping Plant	5	March 4 to March 22 for Condition Assessment Program inspection
	Barker Slough Pumping Plant	1	March 4 to March 22 for disconnect, switchgear and unit preventative maintenance
	Barker Slough Pumping Plant	2	March 4 to March 22 for disconnect, switchgear and unit preventative maintenance
	Barker Slough Pumping Plant	3	March 4 to March 22 for disconnect, switchgear and unit preventative maintenance
	Barker Slough Pumping Plant	4	March 4 to March 22 for disconnect, switchgear and unit preventative maintenance
	Barker Slough Pumping Plant	5	March 4 to March 22 for disconnect, switchgear and unit preventative maintenance
	Barker Slough Pumping Plant	6	March 4 to March 22 for disconnect, switchgear and unit preventative maintenance
	Barker Slough Pumping Plant	7	March 4 to March 22 for disconnect, switchgear and unit preventative maintenance
April	Barker Slough Pumping Plant	9	March 4 to March 22 for disconnect, switchgear and unit preventative maintenance
	Mojave Siphon Powerplant	2	March 11 to May 3 for programmable logic controller upgrade and Condition Assessment Program
	Oso Pumping Plant	2	March 14 to August 2 for carbon dioxide release and plant evacuation
	Badger Hill Pumping Plant	3	March 19 to April 6 for repair unit brush ring assembly
	Dos Amigos Pumping Plant	1	March 11 to March 29 for discharge line inspection
	Giannelli Pumping-Generating Plant	5	March 27 to April 19 for blast and coat scroll case stay vanes
	Giannelli Pumping-Generating Plant	6	March 27 to April 19 for blast and coat scroll case stay vanes
	Banks Pumping Plant	11	April 2 to April 18 for Condition Assessment Program inspection and hydraulic preventative maintenance
	Citrus Pumping Plant	2	April 9 to May 9 for unknown reasons
	Pearblossom Pumping Plant	5	April 1 to April 17 for Condition Assessment Program inspection
	Pearblossom Pumping Plant	6	April 1 to April 17 for Condition Assessment Program inspection and Doble testing

Table 10-3 Outages for Maintenance and Repair of Facilities in 2019, by Month

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Month	Facility	Unit	Outage Description
May	Chrisman Pumping Plant	4	April 10 to May 22 for discharge line #2 Condition Assessment Program inspection
	Chrisman Pumping Plant	4	April 10 to May 22 for discharge line #2 Condition Assessment Program inspection
	Chrisman Pumping Plant	5	April 10 to May 22 for discharge line #2 Condition Assessment Program inspection
	Banks Pumping Plant	5	May 6 to May 23 for Condition Assessment Program inspection and discharge valve hydraulic preventative maintenance
	Banks Pumping Plant	6	May 28 to June 27 for stop log installation for discharge valve removal
	Citrus Pumping Plant	3	May 9 to June 26 for rotating rectified testing
	Devil Canyon Powerplant	1	May 21 to June 14 for annual Condition Assessment Program inspection
	Mojave Powerplant	3	May 20 to June 21 for Condition Assessment Program inspection
	Pearblossom Pumping Plant	1	May 28 to June 14 for Condition Assessment Program inspection and Doble testing
	Dos Amigos Pumping Plant	6	May 6 to May 30 for discharge line inspection
June	Banks Pumping Plant	1	June 3 to June 19 for Condition Assessment Program inspection
	Citrus Pumping Plant	7	June 11 to August 9 for wiring problem
	Dos Amigos Pumping Plant	2	June 12 to December 10 for ground fault on starting
	Dos Amigos Pumping Plant	2	June 12 to December 10 for ground fault on starting
	Dos Amigos Pumping Plant	5	June 3 to June 27 for remote terminal unit replacement and exciter preventative maintenance
July	Cordelia Pumping Plant	1	July 14 to December 23 for motor and pump refurbishment
	Del Valle Pumping Plant	2	July 1 to August 11 for power rectifier failure
	Pearblossom Pumping Plant	3	July 29 to August 15 for Condition Assessment Program inspection and Doble testing
	Buena Vista Pumping Plant	8	July 22 to August 21 for brush preventative maintenance
August	Banks Pumping Plant	3	August 5 to August 22 for Condition Assessment Program inspection and hydraulic preventative maintenance
	Banks Pumping Plant	3	August 5 to August 22 for Condition Assessment Program inspection and hydraulic preventative maintenance
	Del Valle Pumping Plant	2	August 11 to November 12 for South Bay water contractors request

Table 10-3 Outages for Maintenance and Repair of Facilities in 2019, by Month

Month	Facility	Unit	Outage Description
	Thermalito Diversion Dam	1	August 2 to September 16 for annual plant maintenance outage
	Oso Pumping Plant	3	August 12 to September 24 for placing stop log for valve seat adjustment
	Oso Pumping Plant	4	August 12 to September 24 for placing stop log for valve seat adjustment
	Oso Pumping Plant	5	August 12 to September 24 for placing stop log for valve seat adjustment
	Oso Pumping Plant	6	August 12 to September 24 for placing stop log for valve seat adjustment
	Pearblossom Pumping Plant	2	August 26 to November 12 for Condition Assessment Program inspection and Doble testing
September	Hyatt Powerplant	4	September 17 to December 1 for investigation of air housing odor
	Citrus Pumping Plant	7	September 21 to December 31 for scheduled out of service for vibration testing
	Devil Canyon Powerplant	2	September 3 to September 27 for annual Condition Assessment Program inspection
	Mojave Siphon Powerplant	1	September 9 to October 25 for annual Condition Assessment Program inspection
	Pearblossom Pumping Plant	2	September 9 to October 25 for annual Condition Assessment Program inspection
	Buena Vista Pumping Plant	3	September 16 to December 31 for motor cleaning and brush preventative maintenance
	Devil's Den Pumping Plant	6	September 21 to December 31 for emergency discharge valve closure issues
October	Banks Pumping Plant	4	October 28 to November 27 for air release piping repairs
	Banks Pumping Plant	6	October 13 to December 13 for transformer KYC relay replacement
	Devil Canyon Powerplant	4	October 7 to December 19 for annual Condition Assessment Program inspection and governor rebuild
	Las Perillas Pumping Plant	4	October 23 to December 31 for install blind flange on discharge valve
	Chrisman Pumping Plant	4	October 6 to November 13 for replace discharge valve seat
	Chrisman Pumping Plant	6	October 6 to November 13 for replace discharge valve seat
	Teerink Pumping Plant	6	October 24 to November 27 for KYB transformer outage
	Teerink Pumping Plant	7	October 24 to November 27 for KYB transformer outage
	Teerink Pumping Plant	8	October 24 to November 27 for KYB transformer outage
	Teerink Pumping Plant	9	October 24 to November 27 for KYB transformer outage

Table 10-3 Outages for Maintenance and Repair of Facilities in 2019, by Month

7 of 7

Month	Facility	Unit	Outage Description
November	Dos Amigos Pumping Plant	1	October 1 to December 31 for unit refurbishment and pole replacement
	Banks Pumping Plant	10	November 4 to November 25 for Condition Assessment Program inspection and discharge valve preventative maintenance
	Banks Pumping Plant	10	November 28 to December 12 for auxiliary supply breaker problem
	Del Valle Pumping Plant	2	November 12 to December 31 for pump not rotating
	Thermalito Diversion Dam	1	November 11 to December 31 for dive to inspect stop log guides on gate 3-14
	Robie Thermalito Pumping-Generating Plant	1	November 11 to December 31 for unit commissioning testing
	Badger Hill Pumping Plant	3	November 18 to December 31 for motor removal and repair
	Edmonston Pumping Plant	11	November 4 to December 31 for stator rewind and rotor refurbishment
	Banks Pumping Plant	3	December 10 to December 31 for amortisseur winding high temperature
	Hyatt Powerplant	2	December 9 to December 31 for penstock #1 outage
December	Hyatt Powerplant	3	December 9 to December 31 for penstock #1 outage
	Robie Thermalito Pumping-Generating Plant	3	December 5 to December 31 for unit commissioning testing
	Warne Powerplant	1	December 1 to December 31 for switchyard line/bus relay upgrade
	Warne Powerplant	2	December 1 to December 31 for switchyard line/bus relay upgrade
	Edmonston Pumping Plant	9	December 10 to December 31 for fail to open discharge valve



Chapter 11

Engineering, Construction, and Real Estate

The emergency spillway, service spillway, and Lake Oroville in Butte County.

Significant Events in 2019

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 and the Division of Operations and Maintenance.

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 facilities started in 1960, and the first SWP water deliveries through the South Bay Aqueduct began in 1962 to Alameda County.

In 1963, the Department of Water Resources (DWR) began work on the California Aqueduct, and by 1968, the SWP was delivering water to SWP Contractors in the San Joaquin Valley. By 1973, with the completion of the Edmonston Pumping Plant at the foot of the Tehachapi Mountains and other East Branch conveyance facilities, the SWP was delivering water to Lake Perris at the southernmost point in Riverside County.

Other water deliveries 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 2019, study, 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 the Light Detection and Ranging (LiDAR) and ortho photogrammetry study of the SWP; Perris Dam seismic remediation; and assessing potential habitat restoration and water conveyance options in the Delta.

Study and Design Activities

In 2019, 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 San Luis Field Division Pools 20 and 21 embankment subsidence rehabilitation; Perris Dam emergency release facility design; and the LiDAR and ortho photogrammetry study of the SWP. Table 11-1 (at the end of the chapter) provides a list of completed and ongoing design work that was undertaken in 2019.

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.

New or Continuing Activities

The following list includes study and design activities continued from previous reporting periods or initiated in 2019:

- Upper Feather Division
 - » Antelope Dam, Grizzly Valley Dam, and Frenchman Dam 2017 spillway inspections—study
 - » Upper Feather River dams faulting and seismicity updated reports—study
- Oroville Division
 - » Oroville Dam emergency spillway stability analyses—study
- South Bay Aqueduct
 - » Milepost 35 out of round repair—design
- San Luis Division
 - » Dos Amigos Pumping Plant geologic investigation, review, and planning workshop—study
 - » San Luis Field Division irrigation crossings inspection and repair—design
 - » San Luis Field Division Pools 20 and 21 embankment subsidence rehabilitation—study
- South San Joaquin Division
 - » Buena Vista Pumping Plant water line replacement—design
 - » San Joaquin Field Division liner raise and instrumentation—design
- Tehachapi Division
 - » Edmonston Pumping Plant east and west elevators replacement—design
- Mojave Division
 - » Cedar Springs Dam spillway inspections—study
- Santa Ana Division
 - » Perris Dam emergency release facility—preliminary design and environmental documents
 - » Crafton Hills Reservoir seepage repair—study

- West Branch
 - » Pyramid Dam spillway inspections—study
 - » Castaic Dam spillway inspections—study
- Other Projects
 - » California Aqueduct subsidence—study

Completed Activities

In 2019, DOE completed the following studies and activities:

- Upper Feather River LiDAR and orthomosaic from photogrammetry, Phase II—study
- 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
- Oroville Field Division Federal Energy Regulatory Commission License Coordination Branch modular office building project—design
- Hyatt Powerplant emergency recovery 230 kilovolt power lines project—design
- Winter Island tidal habitat restoration—design
- South Bay Aqueduct compression vault project—design
- Del Valle Dam conservation outlet works intake structure stability investigation, Phase II—study
- Del Valle Dam spillway inspections—study
- Del Valle Pipeline Sycamore Park slide gate—hydraulic study
- Cottonwood Chute No. 2 generator—design
- SWP LiDAR and photogrammetry—study
- California WaterFix right-of-way due diligence research—study

Construction Activities

DWR divides the SWP into the following construction divisions: Upper Feather; Oroville; Delta; Suisun Marsh Facilities; North Bay Aqueduct; California Aqueduct (North San Joaquin, San Luis, South San Joaquin, and Tehachapi divisions), also known as the “main line”; East Branch (Mojave and Santa Ana divisions); West Branch; and Coastal Branch.

DOE worked on 27 construction contracts in various SWP construction divisions in 2019. Contract projects included pipeline repair, control system upgrades, fire systems modernization, equipment refurbishments and upgrades, seismic upgrades of bridges, and maintenance facility improvements at dam and reservoir sites. Table 11-2 (at the end of the chapter) provides a list of new, ongoing, and completed construction contracts undertaken in 2019. Resolution of contract claims may extend the actual contract closeout beyond the completion or acceptance date.

SWP—General

Northern Yolo Bypass

Fremont Weir modification for improved adult fish passage (Specification No. 17-18) included construction of a new channel to connect the Sacramento River to a new fish passage structure and the structure to an existing deep pond; elevated working platform; camera system; water level sensors; bottom hinged gate and control equipment; battery power system and solar panels; remote telemetry unit and control system; and gravel bedding/stone slope protection. Work also included replacing Agricultural Crossing No. 2 and removing Agricultural Crossing No. 3. Work is expected to be completed in June 2020.

Oroville Division

Hyatt Powerplant, Thermalito Diversion Dam Powerplant, and Oroville Operations and Maintenance Center Fire Systems Modernization Project

The following major systems at Hyatt Powerplant were installed, tested, and commissioned (Specification No. 15-06): fire alarm system (at both Hyatt Powerplant and Oroville Area Control Center); pre-action sprinkler system; wet sprinkler system; and in-cabinet suppression system for Unit Nos. 1–6. Work was completed on March 27, 2019, and is expected to be accepted in June 2020.

Robie Thermalito Pumping-Generating Plant

Furnish Main Control Board System.

Installation of the main control board system (Specification No. 16-11) and the protective relaying system was completed, and commissioning began for both systems. Work is expected to be completed in June 2020.

Fire Safety Modernization. Life safety improvements (Specification No. 16-14), which began in February 2017, continued. Work includes replacements, upgrades, and modifications and installation of new fire suppression and detection systems. Systems include fire alarm and voice evacuation, carbon dioxide suppression, inert gas suppression, high-pressure water mist, standpipe and hose fire protection, and deluge. Work also includes heating, ventilating, and air conditioning systems modifications, as well as new egresses. In 2019, installation and commissioning were completed for fire hydrants as well as deluge suppression, carbon dioxide suppression, inert gas fire suppression, and high-pressure water mist systems. The California Department of Forestry and Fire Protection’s Office of the State Fire Marshal witnessed

and accepted all systems. Work is expected to be completed in December 2020.

Restoration and Modernization. Electrical equipment installation (Specification No. 16-16), which began in April 2017, continued. Start-up and commissioning work on Unit Nos. 3 and 4 were completed. Units were released for commercial operation in August for Unit No. 4 and November for Unit No. 3. Reassembly of Unit Nos. 1 and 2 continued in 2019. Work is expected to be completed in June 2021.

Oroville Dam Service Spillway Emergency Repairs

As part of the repairs resulting from the 2017 Oroville Dam spillways incident (Specification No. 17-04), construction of the Oroville Field Division hazmat building and Reclamation District 2064 emergency levee repair were completed. Work is expected to be completed in June 2020.

Oroville Emergency Response and Recovery

Oroville Dam service spillway (flood control outlet) and emergency spillway restoration (Specification No. 17-09), which began in April 2017, continued. Work included mass grading, drainage, and access road work to restore the site, as well as electrical and lighting work on the service spillway. The service spillway was used for the first time to make water releases in April 2019. Work is expected to be completed in June 2020.

Thermalito Diversion Dam

Phase II of the radial gates maintenance repair project (Specification No. 18-07) began in June 2018. Work included tension rod installation, concrete spall repairs, lower girder brace repairs, electrical work, miscellaneous weld and coating repairs, and clearing all clogged drains. Work was accepted in February 2019.

Oroville Dam, Thermalito Diversion Dam, and Oroville Operations and Maintenance Center Security Hardening

Security improvements at the Oroville Field Division water facilities (Specification No. 18-09) began in August 2018. Work included installing eight- and ten-foot anti-climb fencing along the Hyatt Powerplant perimeter on the right side of the Oroville Dam Spillway looking upstream; ornamental security fencing at the Oroville Operations and Maintenance Center; impact-rated gates and operators at various locations; bollards and blocker systems; and conduit, fiber, and cabling to support the various security features throughout the field division. Work is expected to be completed in May 2020.

Bidwell Canyon Marina Parking Lot Expansion (Site 4)

Construction of the gravel parking lot expansion and access improvements for users with disabilities (Specification No. 18-16) were completed on May 14, 2019. Final inspection took place on May 30, 2019. Work was accepted in November 2019.

Bidwell Saddle Dam Trailhead Improvements (Site 7)

Recreation enhancements, including picnic areas and accessible parking (Specification No. 18-15), began in August 2018. Work was accepted in July 2019.

Bidwell Canyon Stage II, Improvements (Site 8)

Boat ramp improvement work (Specification No. 18-05) was suspended on February 14, 2019, because rising water levels in Lake Oroville inundated the construction site. Work will resume when water recedes. Work is expected to be completed in April 2020.

Lake Oroville Marina Low Water Access Trail (Site 9A)

Low-water access trail construction (Specification No. 18-17) was suspended on January 22, 2019, because rising water levels in Lake Oroville inundated the construction site. The contract is expected to be closed by July 2020.

Lake Oroville Loafer Point Boat Launch Facility, Stage I (Site 3B)

The Loafer Point Boat Launch Facility project (Specification No. 19-08) began. Work includes constructing a paved roadway, a paved parking lot for vehicles and boat trailers, a boat launch ramp, and boarding floats. Work is expected to be completed in August 2020.

Delta Facilities

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 complied 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. Work was completed in January 2019 and accepted in June 2019.

Temporary Rock Barriers —2019, 2020, and 2021

The project includes construction and removal of temporary rock barriers and appurtenances at Old River, Middle River, and Grant Line Canal (Specification No. 18-19). Work includes placement and removal of DWR-furnished rock materials, culverts, docks, articulating concrete mats, and other accessories. Maintenance, refurbishment and/or replacement of appurtenances may also be required. Work is expected to be completed in March 2022.

Sherman and Twitchell Islands

Fish release station work (Specification No. 19-01) included earthwork, concrete slabs on grade, steel platforms with metal gratings, piping valves, flow meters, and submersible pumps; lights and gates; self-cleaning retrievable fish screens; vertical lift gates, automated swing gates, manual walk gates, and manual sliding gates; site lighting; an access control system for the gates; and pavement markings, wheel stops, and surface-mounted delineators. Work is expected to be completed in June 2021.

Winter Island Tidal Wetland Habitat Restoration

The project (Specification No. 19-06) includes site clearing; creation of a channel through the existing levees; demolition and removal of docks, platforms, piles, and bulkheads; and seeding of disturbed areas. East channel excavation, north and south levee breaching, and seeding were completed. Work is expected to be completed in May 2020.

South Bay Aqueduct

Santa Clara Pipeline

Mileposts 16.30, 28.90, 34.23, and 41.68.

This project included modifying valve vaults to furnish and install lockouts for butterfly valves as well as modifying an existing gas line (Specification No. 16-09). Work was completed in 2018, and the contract was completed in June 2019.

North San Joaquin Division

Clifton Court Forebay Dam

The refurbishment of radial Gate Nos. 1, 2, 3, 4, and 5 on the Clifton Court Forebay Dam control structure (Specification No. 16-06) began in September 2016. The contract is expected to be completed in November 2019.

Erosion and pavement repairs were completed for both an existing eroded bank slope and an existing asphalt concrete

roadway (Specification No. 18-13) damaged during construction and contract closeout. The contract was completed in June 2019.

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. After moving the riprap stockpile from the north to south parcel and punch list work, the contract was completed in October 2019.

Chrisman Pumping Plant

Apron repairs (Specification No. 18-20) began in December 2018. Work included removing and replacing existing broken concrete panels, as well as placing reinforcing steel and backfilling. The contract was completed in February 2019, but there were delays to the acceptance, which occurred in October 2019.

San Luis Division

Canal Liner and Embankment Repair, Milepost 62.3

This project included dewatering Pool 12 of the California Aqueduct (Specification No. 17-26). Work was originally completed in 2018. However, while repairing Milepost 62.3, the aqueduct slope at Milepost 65, also within Pool 12, failed. This additional embankment repair at Milepost 65 was then added to this project as an emergency repair. The contract is expected to be completed in April 2020.

Mojave Division

Cedar Springs Dam

Spillway underdrain pipe repairs and access road improvements (Specification No. 18-18) began in March 2019. Excavation and hazardous materials were removed, and pipe was installed. Mobilization and demolition is 80 percent complete; backfill and seeding are

not yet completed. Work is expected to be completed in October 2020.

Santa Ana Division

Perris Dam

Seismic retrofits of the tower bridge (Specification No. 19-03) began in July 2019. Work included protecting in place the existing outlet tower and other facilities during selective demolition and modification of the existing bridge; providing temporary shoring and support for existing girders for replacement of the expansion bearing assemblies; removing existing expansion bearings at the tower bridge seat and replacing with new elastomeric bearing pads; installing shear blocks; constructing reinforced concrete pedestal/catcher blocks extensions at the tower bridge seat; constructing reinforced concrete catcher blocks at abutment; removing and replacing end diaphragm steel members; adding steel girder web stiffeners at shear blocks; adding steel plate to girder bottom flange at abutment; and performing various electrical work during planned outage. Work is expected to be completed in August 2020.

West Branch

Los Robles Road—Bridge

The seismic retrofit of the bridge at Los Robles Road (Specification No. 18-08) includes protecting in place the California Aqueduct, existing utility lines, and other facilities during selective demolition and modification of the existing bridge; constructing shear keys at bridge abutments; constructing new extended footings at bridge piers; installing steel pier casings; and repairing cracks. Work was accepted in December 2019.

Construction Activities in Multiple Divisions

Roaring River Slough Distribution System, Montezuma Slough

Drain structure 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 originally accepted in July 2017. Approximately two weeks after initial project completion, DWR noted that the pipe crossing was beginning to erode and collapse. DWR ordered the contractor to mobilize equipment, materials, and manpower to construct a cofferdam to assess damage and plan necessary repairs. Work was accepted in February 2019.

Suisun Marsh and Delta Legal Boundary

Levee and wetland maintenance (Specification No. 18-02) began in April 2018. Work consists of levee, road, and water control structure repairs; channel flow improvements, associated appurtenant structures, and earthwork; and levee maintenance, including placement and grading of aggregate base on access roads, mowing grass and weeds, applying herbicides for weed control, and interior property maintenance. Work is expected to be completed in March 2022.

Elk Slough, Cache Slough, Lindsey Slough, Steamboat Slough, and Shag Slough

Phase III of emergency levee repairs (Specification No. 18-03) began in June 2018. Levee repairs were completed at nine sites in Yolo, Solano, and Sacramento counties. Work included landside slope repair; tree removal; excavation and backfilling; geotextile fabric installation; rockfill and launch rock material installation; earthfilling agricultural soil on finished slopes and in voids in rockfill; seeding and erosion control fabric placement; and pole cutting

installation. Work was completed and accepted in November 2019.

Decker Island

Converting existing wetland into tidal habitat (Specification No. 18-04) began in July 2018. Work included the following:

- degraded northern area—moved trees and brush, excavated and transported materials, and backfilled the excavated materials to the spoil area
- southern breach area—removed trees and brush, removed and disposed of the existing culvert, excavated and backfilled the excavated materials to the spoil area
- berms—removed trees and brush, and reconfigured Berm Nos. 2 and 3

Work was accepted in June 2019.

Environmental Activities

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. The following are notable environmental activities for 2019.

Perris Dam Emergency Release Facility Efforts

Efforts to plan and design the emergency release facility at Perris Dam continued in 2019. The Environmental Coordination Section applied for environmental permits and other documentation, including a

Lake and Streambed Alteration Agreement from the California Department of Fish and Wildlife, a Clean Water Act Section 404 permit from the Army Corps of Engineers, a Clean Water Act Section 401 Water Quality Standard Certification from the Santa Ana Regional Water Quality Control Board, and a letter of compliance from the Western Riverside County Regional Conservation Authority.

Subsidence Program

San Joaquin Field Division Liner Raise and Instrumentation Project

Environmental planning for the California Aqueduct Subsidence Program's San Joaquin Field Division Liner Raise and Instrumentation Project continued in 2019 at Pools 22, 24, and 25, including environmental surveys, consultation with local tribal governments, and preparation of an initial study and mitigated negative declaration.

Castaic Dam Modernization Program

Castaic Dam High Intake Tower Bridge Retrofit Project

Efforts to plan and design the seismic retrofit of the Castaic Dam high intake tower bridge began in 2019. The environmental team prepared a technical memo evaluating potential effects of a large drawdown of the water level on Castaic Lake's fisheries and water quality.

Real Estate Activities

In 2019, DWR processed a net total of \$13.02 million in payments 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.

SWP Acquisitions

In 2019, DWR conducted the following activities related to SWP acquisitions.

Yolo Bypass Salmonid Habitat Restoration and Fish Passage Program

Fremont Weir Adult Fish Passage

Modification Project. DWR executed a spoil agreement with the TeVelde Revocable Family Trust allowing DWR access to, and permission to spoil on, property in Yolo County.

Fish Restoration Program

Chippis Island Acquisitions and Tidal Habitat Restoration Project.

DWR executed a warrant request for \$972,000 to place funds into escrow with Old Republic Title Company for the acquisition of DWR Parcel No. FRP-15 in Solano County from The Metropolitan Water District of Southern California.

Decker Island Tidal Habitat Restoration Project.

DWR executed a temporary entry permit for access to perform post-project environmental monitoring in Solano County.

Prospect Island Tidal Habitat Fish Restoration Project.

DWR executed a right-of-way contract for a temporary construction area to construct a temporary access ramp across private property between the Sacramento River Deep Water Ship Channel levee road and County Road 107 in Yolo County.

Division of Integrated Science and Engineering Reclamation District 1600 Groundwater Study

DWR executed three temporary entry permits for the purposes of geologic groundwater inspection and installation of water monitoring wells in Yolo County.

North Delta Flow Action Project

DWR executed two temporary entry permits for access in Yolo County to monitor and

report water levels and flow conditions, as well as to monitor and collect samples for measuring the capacity of food production for downstream fishes.

DWR executed a temporary entry permit with R&J Farms Inc. for access to property in Yolo County to monitor and report water levels and flow conditions, as well as to monitor and collect samples for measuring the capacity of food production for downstream fishes.

Sherman Island and Twitchell Island Fish Screens

DWR executed encroachment permit No. 2019-01 with Reclamation District 1601 allowing DWR access to parcels in Sacramento County to construct, operate, and maintain self-cleaning, retractable fish screens at the waterside terminus of DWR-owned intake siphons.

DWR executed an encroachment permit with Reclamation District 341 allowing DWR access to parcels in Sacramento County to construct, operate, and maintain self-cleaning, retractable fish screens at the waterside terminus of DWR-owned intake siphons.

South Delta Temporary Barriers Project

DWR executed two temporary entry permits to stage, stockpile, and operate and maintain a temporary rock barrier in Old River. Both of the permits allow DWR's contractor, University of California, Davis, to install necessary equipment for acoustic telemetry receivers.

Suisun Marsh Monitoring Program

Morrow Island Monitoring Project. DWR executed a warrant request payable to the Morrow Island Land Company as annual payment for a lease that allows DWR access to a parcel in Solano County for maintenance and data collection from two groundwater

monitoring information stations, Goodyear Slough (S-35) and Godfather II (S-37).

Other Water Monitoring Stations. DWR executed a temporary entry permit for access to an existing water information monitoring station, Sunrise Club (S-21), in Solano County.

DWR executed a temporary entry permit for access to an existing water information monitoring station, Belden's Landing (S-49).

East Branch Extension, Phase I Improvements

DWR fully executed two quitclaim deeds to clear temporary construction easements.

West Tracy Fault Geotechnical Investigations Project

DWR executed a temporary entry permit, granted by Byron Sanitary District, to allow DWR access to property in Contra Costa County for the purpose of inspecting a landscape feature related to a fault line.

Dos Amigos Pumping Plant Siphon House and Discharge Lines Investigation Project

DWR executed 13 temporary entry permits for access to property in Merced County to perform surveys to gather geologic and geomorphic data.

Irrigation Crossing Pipe Inspection and Repairs

DWR executed 20 temporary entry permits to conduct pipeline inspection, repair, and verification of California Aqueduct water intrusion in Fresno and Merced counties.

Silverwood Lake

DWR executed a permit for entry with Southern California Edison allowing for entry onto DWR-owned land to replace existing electrical infrastructure in San Bernardino County.

Temporary Entry Permits Summary

In 2019, DWR obtained temporary entry permits in support of construction activities:

- Agricultural Road Crossing 4 Fish Passage Project, 1
- Cold stream gauge project, 1
- Decker Island restoration project, 1
- Delta Island Consumptive Use Monitoring Program, 4
- Devil Canyon Project, Federal Energy Regulatory Commission relicensing, 1
- Fish Restoration Program, Chippis Island, 2
- Kiosk—Head of Old River project, 2
- Los Banos Detention Dam vegetation removal project, 1
- Milepost 62 embankment and liner repair project, 1
- North Central Region Office Coordinated Temporary Entry Permits Program, 14
- Oroville Dam Spillways Reconstruction Project, 1
- Perris Dam emergency release facility, 2
- South Bay Aqueduct—Santa Clara Pipeline emergency repair, 2
- South Delta Improvement Program—temporary rock barriers, 1
- South Delta Temporary Barriers Project, 4
- Sycamore Island fishing pond enhancement project, 1
- 2014-12D Parish Camp Saddle Dam study, 1
- 2017 storm damage emergency rehabilitation, 1

- collected fees totaling \$728,077 for review and inspection costs related to encroachment permit applications
- coordinated review of 14 tentative tract map developments within one mile of the California Aqueduct

SWP Appraisals

In 2019, 11 percent of total assignments (16 out of 143) completed by DWR were exclusively for the SWP:

- Clifton Court Acquisition Project—provided one appraisal
- Joice Island Acquisition Project—provided one appraisal and one appraisal review
- Suisun Marsh Mitigation Enhancement Project—provided one appraisal and one appraisal review
- Widening of Highway 70—provided one appraisal review for a California Department of Transportation-drafted appraisal
- Perris Dam Emergency Release Facility Project—provided five appraisals and five appraisal reviews

SWP Property Management

In 2019, DWR conducted the following activities related to property management:

- managed leasing activities of SWP nonoperating properties, which produced \$742,446
- processed 32 and executed 25 encroachment permit applications

Table 11-1 Study and Design Activities, 2019

Sheet 1 of 2

Construction Division and Facility	Study or Design Activity	Date Design Began	Design Actual/ Estimated Completion Date
Upper Feather Division			
Antelope Dam, Grizzly Valley Dam, and Frenchman Dam spillways	Inspections	June 2017	pending
Upper Feather River dams	Faulting and seismicity updated reports	February 2016	pending
Upper Feather River	Phase II Light Detection and Ranging (LiDAR) and orthomosaic from photogrammetry study	March 2017	July 2019
Oroville Division			
Oroville Dam	Seepage and slope stability analyses	July 2016	December 2021
Bidwell Canyon Marina, Site 4	Parking lot expansion	November 2017	February 2019
Bidwell Canyon Boat Ramp, Site 8	Stage 2 parking lot expansion and boat ramp lane addition	June 2017	March 2019
Bidwell Saddle Dam Trailhead, Site 7	Access improvements	June 2017	April 2019
Oroville Field Division Federal Energy Regulatory Commission License Coordination Branch	Modular office building project	February 2017	May 2019
Hyatt Powerplant	Emergency recovery 230 kilovolt power lines project	February 2017	July 2019
Delta Facilities			
Winter Island	Tidal habitat restoration	March 2015	October 2019
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 II conservation outlet works intake structure stability investigation	December 2018	December 2019
Del Valle Dam spillway	Inspections	September 2017	December 2019
Del Valle Pipeline	Sycamore Park slide gate hydraulic study	April 2018	July 2019
San Luis Division			
Dos Amigos Pumping Plant	Geologic investigation, review, planning workshop	October 2018	October 2020
San Luis Field Division	Inspect and repair irrigation crossings	July 2016	September 2020
	Pools 20 and 21 embankment subsidence rehabilitation	August 2018	October 2020
South San Joaquin Division			
Buena Vista Pumping Plant	Replace water line	October 2016	October 2021
San Joaquin Field Division	Liner raise and instrumentation	February 2018	December 2020
Tehachapi Division			
Edmonston Pumping Plant	East and west elevators replacement	December 2017	December 2020
Mojave Division			
Cottonwood Chute No. 2	Generator design	March 2016	February 2019
Cedar Springs Dam spillway	Inspections	July 2017	pending

Table 11-1 Study and Design Activities, 2019

Construction Division and Facility	Study or Design Activity	Date Design Began	Design Actual/ Estimated Completion Date
Santa Ana Division			
Perris Dam	Emergency release facility preliminary design and environmental documents	October 2006	June 2022
Crafton Hills Reservoir	Seepage repair study	May 2016	pending
West Branch			
Pyramid Dam spillway	Inspections	May 2017	pending
Castaic Dam spillway	Inspections	October 2017	pending
Other Projects			
San Luis and San Joaquin field divisions	California Aqueduct subsidence study	July 2015	pending
State Water Project	Light Detection and Ranging (LiDAR) and ortho photogrammetry study	June 2016	December 2019
California WaterFix—Legal Delta	Right-of-way due diligence research study	October 2017	December 2019

Table 11-2 Construction Activities, 2019

Sheet 1 of 2

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				
Northern Yolo Bypass	Fremont Weir modification to build new channel for improved adult fish passage (17-18)	September 2017	June 2020	7,756
Oroville Division				
Hyatt Powerplant, Thermalito Diversion Dam Powerplant, and Oroville Operations and Maintenance Center	Fire systems modernization (15-06)	October 2015	June 2020	23,845
Robie Thermalito Pumping-Generating Plant	Main control board system installation (16-11) Life safety improvements (16-14) Restoration and modernization of fire safety and suppression systems (16-16)	December 2016 February 2017 April 2017	June 2020 December 2020 June 2021	2,657 14,188 18,211
Oroville Dam	Service spillway (flood control outlet) and emergency spillway repairs (17-04) Service spillway (flood control outlet) and emergency spillway restoration (17-09)	February 2017 April 2017	June 2020 June 2020	109,297 671,495
Bidwell Canyon, Site 8	Stage II improvements, including reconstructing and paving existing gravel lot to provide additional paved vehicle/trailer parking spaces (18-05)	October 2018	April 2020	6,608
Thermalito Diversion Dam	Radial gates maintenance repair, Phase II (18-07)	June 2018	February 2019	1,131
Oroville Dam, Thermalito Diversion Dam, and Oroville Operations and Maintenance Center	Security improvements at the Oroville Field Division water facilities located in Butte County (18-09)	August 2018	May 2020	21,713
Bidwell Saddle Dam Trailhead, Site 7	Improvements to add recreational picnic areas and accessible parking (18-15)	August 2018	July 2019	390
Bidwell Canyon Marina Parking Lot, Site 4	Expansion, including additional parking spaces east of the Bidwell Campground Gold Flat Loop and accessibility improvements in the existing tiered marina parking lot (18-16)	November 2018	November 2019	851
Lake Oroville Marina Low Water Access Trail, Site 9A	Construct trail from existing Lime Saddle boat ramp to mobile Lake Oroville Marina (18-17)	October 2018	July 2020	293
Lake Oroville, Loafer Point, Site 3B	Stage I boat launch facility (19-08)	December 2019	August 2020	5,014
Delta Facilities				
Sherman Island	Construct fish release sites at Little Baja and Manzo Ranch (16-01)	April 2016	June 2019	2,762
Temporary Rock Barriers —2019, 2020, and 2021	Middle River, Old River, and Grant Line Canal (18-19)	January 2019	March 2022	7,162
Sherman and Twitchell islands	Fish screens (19-01)	May 2019	June 2021	1,397
Winter Island	Tidal wetland habitat restoration (19-06)	July 2019	May 2020	905

Table 11-2 Construction Activities, 2019

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)
South Bay Aqueduct				
Santa Clara Pipeline				
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	June 2019	3,597
North San Joaquin Division				
Clifton Court Forebay Dam	Refurbish radial gates 1, 2, 3, 4, and 5 (16-06)	September 2016	November 2019	11,832
	Repair existing eroded bank slope and damage to existing asphalt concrete roadway (18-13)	May 2018	June 2019	406
West Weber North Storage Facility	Site improvements (17-01)	May 2017	October 2019	9,285
Chrisman Pumping Plant	Apron repairs, remove and replace existing broken concrete panels; place reinforcing steel and backfill (18-20)	December 2018	October 2019	753
San Luis Division				
Milepost 62.3	Canal liner and embankment repair (17-26)	February 2018	April 2020	13,115
Mojave Division				
Cedar Springs Dam	Spillway underdrain pipe repairs and access road improvements (18-18)	March 2019	October 2020	2,810
Santa Ana Division				
Perris Dam	Tower bridge seismic retrofit (19-03)	July 2019	August 2020	418
West Branch				
Los Robles Road	Seismic retrofit of bridge (18-08)	July 2018	December 2019	3,714
Multiple Divisions				
Roaring River Slough Distribution System, Montezuma Slough	Drain structure replacement (17-11)	June 2017	February 2019	1,167
Suisun Marsh and Delta Legal Boundary	Levee and wetland maintenance 2018, 2019, 2020, and 2021 (18-02)	April 2018	March 2022	2,699
Elk Slough, Cache Slough, Lindsey Slough, Steamboat Slough, and Shag Slough	Levee repairs at nine sites (18-03)	June 2018	November 2019	4,402
Decker Island	Tidal wetland habitat restoration (18-04)	July 2018	June 2019	681



Chapter 12

Recreation

A place to rest overlooking Lake Del Valle in Alameda County.

Significant Events in 2019

Annual recreation attendance at State Water Project (SWP) facilities surpassed five million in 2019, a number not reached since 2003. Since 1962, approximately 261,866,800 recreation days have been spent at the SWP recreation facilities.

Lake Perris State Recreation Area supported 923,700 recreation days in 2019. The last year Lake Perris experienced attendance this high was in 2005, with 1,020,700 recreation days. Attendance increased 7.7 percent from 2018's 857,500 recreation days. This may be a result of the lake level returning to normal after the Department of Water Resources (DWR) completed the Perris Dam Seismic Remediation Project in April 2018, which consisted of earthquake retrofitting repairs, and gradually refilled the reservoir.

DWR is investing more than \$30 million in several early implementations of Lake Oroville's Settlement Agreement Recreation Management Plan projects, which will enhance visitor access and experiences at the Lake Oroville State Recreation Area.

Information for this chapter was provided by the Division of Regional Assistance (formerly the Division of Integrated Regional Water Management), the Public Affairs Office, 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, horseback riding, 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, provide financing for SWP recreational facilities and fish and wildlife enhancement projects, declaring that these projects benefit all the people of California and should be paid for by all Californians. Department of Water Resources (DWR) coordinates with the California Department of Parks and Recreation (California State Parks) and the California Department of Fish and Wildlife (DFW) to ensure that the recreation and fish and wildlife enhancement potential at SWP facilities is fully realized.

Recreation Areas

The SWP has 39 developed recreation areas or sites throughout California, including 18 developed fishing access sites. Figure 12-1 shows the name and location of each area.

Recreation Use

Recreation Days

Since the SWP began delivering water in 1962, nearly 261,866,800 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 2019, SWP facilities supported an estimated 5.2 million recreation days of use (Table 12-1). This is a 10 percent increase from 2018 and the first time this number reached five million since 2003. Most of the SWP recreation use was concentrated at the major reservoirs, with approximately 39 percent of the recreation attendance occurring in the Southern Field Division, 32 percent occurring in the Oroville Field Division, and the remaining 29 percent distributed between the remaining three field divisions. Of the total recreation days

recorded, 8.4 percent occurred at DWR's three educational visitors centers.

Lake Oroville State Recreation Area received the highest visitation at 1,395,920 recreation days, up roughly five percent from 2018, despite the lowest recorded vehicle traffic counts in recent years. Several natural disasters (Camp Fire cleanup and sheltering efforts) and public safety power shutdowns influenced vehicle traffic. Closures of specific recreation sites and facilities were also implemented for various reasons, such as damage to recreation site access roads, concern for public safety, and to accommodate construction activities.

Lake Perris State Recreation Area experienced the highest increase in visitation by percentage with 923,700 recreation days, up 7.7 percent from 2018. Lake Perris's overall highest attendance gain was between 2017 (551,500 recreation days) and 2018 (857,500 recreation days), when attendance increased 55.5 percent. The completion in April 2018 of the Perris Dam Seismic Remediation Project and subsequent return of normal water levels likely contributed to this extended increase in recreation.

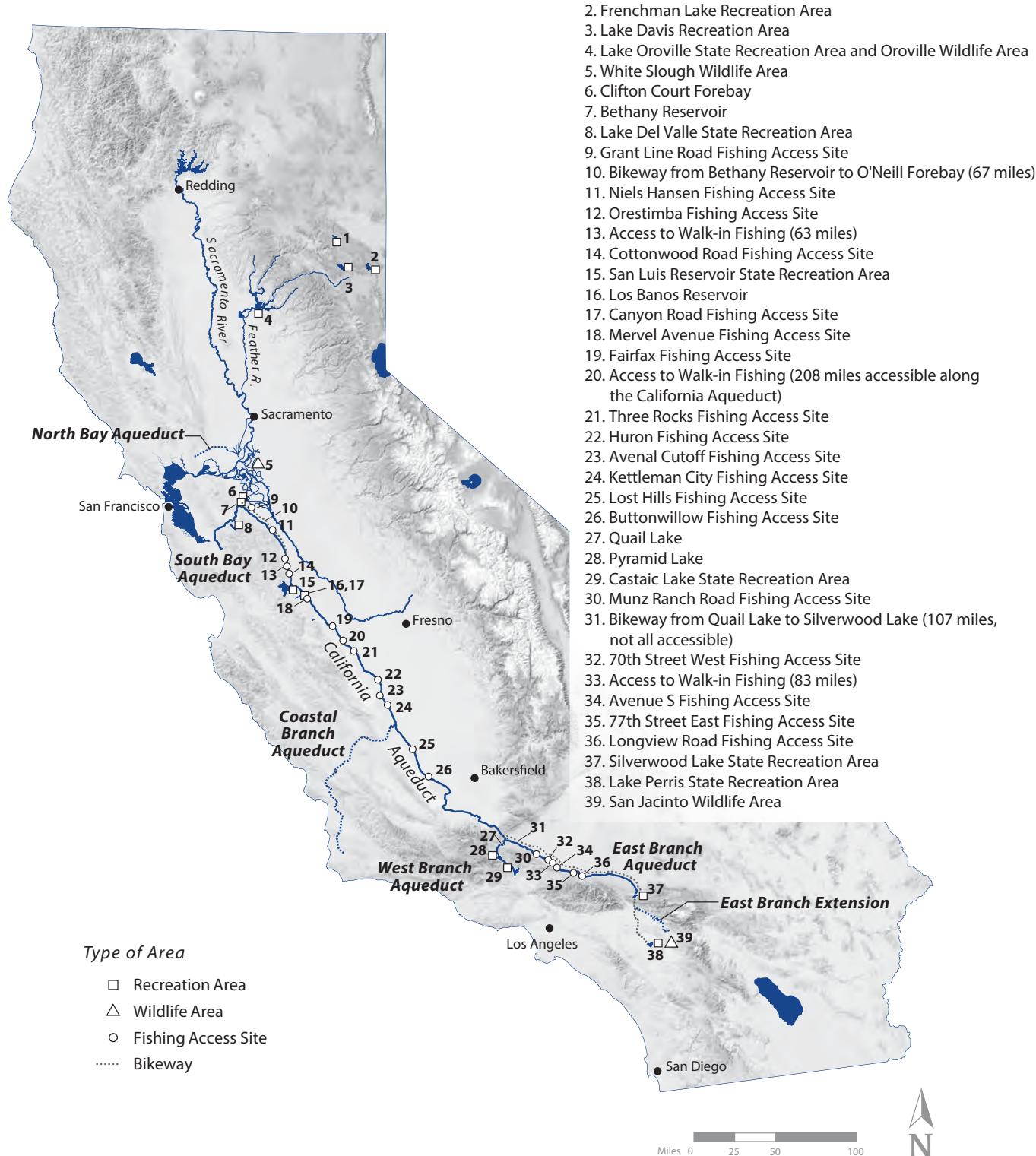


Figure 12-1 Names and Locations of SWP Recreation Areas

SWP Educational Visitors Centers

Visitation at DWR's three SWP educational visitors centers, in recreation days, totaled approximately 438,700:

- (1) 92,000 at Lake Oroville Visitors Center
- (2) 173,700 at Romero Overlook Visitors Center, San Luis Reservoir
- (3) 173,000 at Vista Del Lago Visitors Center, Pyramid Lake

These visitors centers also provided 300 tours, 715,000 hours of education, and 52 school programs for grades kindergarten through 12.

In 2019, the Romero Overlook Visitors Center added an interactive water levels display and interactive water globe for visitors. It did not have to close during these improvements.

Three additional visitors centers located at SWP facilities are operated by either California State Parks or by East Bay Regional Park District (EBRPD):

- (1) Rocky Ridge Visitors Center, located at Lake Del Valle, is operated by EBRPD and received 11,083 visitors. Using DWR's annual allocation of the Land and Water Conservation Fund grant, this visitors center was closed for remodeling and renovation with a proposed reopening in spring 2021. It will be renamed the "Del Valle Visitor Center."
- (2) Ya'i Heki' Regional Indian Museum, located at Lake Perris, was originally constructed by DWR and is operated by California State Parks. It received 7,428 visitors in 2019.
- (3) The Silverwood Lake Nature Center, constructed by California State Parks, was closed to the public in 2019 for remodeling. It is expected to reopen in 2021.

Overall, the recreation usage of over 5.2 million recreation days at the SWP

facilities listed in Table 12-1 contributed significantly to the total visitation reported at the 280 units of the California State Park System in fiscal year 2019–2020.

Upper Feather River Lakes Recreation Studies

The U.S. Forest Service operates the recreation areas at the Upper Feather River lakes. Only paid recreation uses, such as campground or day-use fees, are reported to DWR. Free dispersed recreation use is not reported; consequently, recreation use is underreported for the three Upper Feather River lakes in Table 12-1. In an effort to obtain more accurate data about these locations, DWR conducts an annual creel survey and an annual fisheries survey at one of the Upper Feather River lakes on a rotating basis.

Creel Survey 2019

A creel survey is a sampling tool used to measure the fishing activities of sport anglers and to estimate the number of fish harvested from a body of water. It involves interviewing anglers about the day's fishing effort, including what the angler caught, released, and how much time was spent fishing. In 2019, DWR conducted its creel survey at Antelope Lake between the last weekend in April and Labor Day weekend.

Fisheries Survey 2019

Since construction of the Upper Feather River projects in the 1960s, streamflow release schedules for all three reservoirs (Antelope, Frenchman, and Davis lakes) have been reevaluated and modified to varying degrees. DWR modifies streamflow to improve downstream conditions for both streamsides recreation and wild trout populations. Managing these reservoirs provides information about recreation enhancement use levels and quality, as well as reassurance that northern pike (*Esox lucius*) remain eradicated from the

Table 12-1 Estimated Recreation Days in 2019, by Field Division Facility

Facility, Grouped by Field Division	Recreation Days
Oroville Field Division	
Frenchman Lake	120,200 ^{a,b}
Antelope Lake	90,000 ^{a,b}
Lake Davis	66,300 ^{a,b}
Lake Oroville, Thermalito Diversion Pool, and Thermalito Forebay	555,800
Thermalito Afterbay and Oroville Wildlife Area	416,200
Feather River Fish Hatchery	331,900
Lake Oroville Visitors Center	92,000
Subtotal	1,672,457
Delta Field Division	
Lake Del Valle	574,000
Bethany Reservoir	8,500 ^c
White Slough Wildlife Area	3,700 ^a
Subtotal	586,112
San Luis Field Division	
San Luis Reservoir State Recreation Area: San Luis Reservoir, O'Neill Forebay, and Los Banos Reservoir	289,700
Romero Overlook Visitors Center	173,700
Subtotal	463,431
San Joaquin Field Division	
Fishing Access Sites: Kettleman City, Lost Hills, Buttonwillow, and California Aqueduct Walk-in Fishing	8,000 ^a
Subtotal	8,000
Southern Field Division	
Silverwood Lake	278,400
Lake Perris	923,700
Vista Del Lago Visitors Center	173,000
Pyramid Lake	85,000
Castaic Lake and Castaic Lagoon	563,200
Fishing Access Site: Quail Lake	5,300 ^a
Fishing Access Site: Longview Road	100 ^a
California Aqueduct: Walk-in Fishing	3,500 ^a
California Aqueduct: Bikeway	4,000 ^a
Subtotal	2,035,906
Total for Recreational Sites	4,765,906
Total for Visitors Centers	438,700
Grand Total	5,204,606

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 noted, which are based on partial data.

^aThese 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.

^bBecause of high employee turnover at the Beckwourth Ranger District, the U.S. Forest Service was only able to provide user data for these sites for May and June 2019. Using 2018 data for the missing months of data, a rough estimated total was obtained for these locations.

^cAt this facility, attendance is only counted Thursdays through Sundays, but the park is open to the public the remainder of the week using the honor system of payment.

system. The annual fisheries survey provides additional data about fishery abundance populations and health.

For 2019, Antelope Lake was originally scheduled as the site for the annual electrofishing survey, but the Walker Fire burned most of the historic survey areas along Indian Creek, and the road along the creek was closed. Instead, DWR conducted its electrofishing survey at Big Grizzly Creek below Grizzly Valley Dam. Data was collected at three stations using the multiple-pass depletion method. Station 1 had two passes, Station 2 had three passes, and Station 3 had two passes. A total of 14 rainbow trout (*Oncorhynchus mykiss*) and 274 brown trout (*Salmo trutta*) were captured, measured, and returned to the stream below the survey area.

Weather Effects on Recreation Use

Several weather-related park closures occurred in 2019:

- Lake Del Valle was closed from February 14 through March 15 because of potential flooding, and again from October 27 through October 30 because of extreme winds and fire dangers.
- Silverwood Lake's attendance between January and March was affected by storms and freezing temperatures, causing unsafe road conditions. The park was open by noon during these winter conditions. The Sawpit and Cleghorn beaches experienced mild damage, including debris on the beaches and continued sedimentation. During the summer months, the lake had significant algae blooms around marinas and boat docks.

Oroville Recreation Plan Amendment

The Spillway Recreation Facilities, the Diversion Pool, and certain trails were closed during much of 2017 and after because

of the Oroville Dam spillways incident (see Bulletin 132-18). To help offset the temporary closures of the Oroville Facilities and to account for the lower-than-normal pool elevation during the emergency response and recovery activities, DWR proposed early implementation of certain proposed Settlement Agreement Recreation Management Plan recreation facilities to provide additional recreation capacity as soon as possible. DWR filed proposals with the Federal Energy Regulatory Commission on June 1, August 3, and December 8, 2017, to amend the existing recreation plan. The Federal Energy Regulatory Commission approved DWR's proposals by orders issued July 12, 2017, September 13, 2017, and February 1, 2018.

DWR is investing more than \$30 million in several early implementations of Settlement Agreement Recreation Management Plan projects to enhance visitor access and experiences at the Lake Oroville State Recreation Area. These include permanent increases in parking, boat launching capacity, and enhanced trailhead facilities.

For completed projects, see the Recreation chapter in Bulletins 132-18 and 132-19. For recreation improvement projects currently underway, see the "Lake Oroville State Recreation Area" sections in this chapter. Anticipated project completion timelines for projects in process are subject to change.

Recreation Facilities

Planning

SWP Recreation Coordinating Committee

In 1960, the San Luis Reservoir Recreation Coordinating Committee was formed, which included stakeholders from both the Lake Oroville and Lake Perris projects. Shortly thereafter, two additional committees were formed: the Los Angeles and Ventura Counties Committee; and the Riverside and San Bernardino Counties Committee. The

purpose of these committees was to present current information and exchange ideas for ongoing and future recreation planning and maintenance at all SWP facilities. Attendees included SWP participants and the press.

In 1984, the three committees were combined into one and renamed the SWP Recreation Coordinating Committee. The SWP Recreation Coordinating Committee meets biannually throughout the state at SWP facilities to continue its function as an open forum to discuss ongoing and future SWP recreation projects.

2019 Spring Meeting Summary. The meeting was held at DWR's West Sacramento office on April 10. DWR's Division of Operations and Maintenance presented its spring water predictions, SWP park superintendents provided status reports on each park's operations, and DWR's State Climatologist made a presentation about the effects of normal and abnormal snowpacks on water supply and recreation operations. The Wildlife Conservation Board discussed the many grants available to State and local agencies to plan and implement recreation projects. The Delta Protection Commission relayed its progress on the Great California Delta Trail, a continuous regional recreation corridor that will extend through the Sacramento-San Joaquin Delta and link trail systems from Sacramento to the San Francisco Bay. DWR's Public Affairs Office discussed its role in creating recreation programs that educate the public on water safety, water etiquette, and freshwater ecology, as well as new roles it's taking to educate and notify the public on California's rich but always potentially dangerous recreational resources.

2019 Fall Meeting Summary. The meeting was originally scheduled for the first week of December 2019 at Lake Perris but was postponed to January 28, 2020, and moved to Castaic Lake.

Lake Oroville State Recreation Area

Bidwell Canyon Marina Low Water Access Improvements. DWR plans to improve the low water access to Bidwell Canyon Marina during low water years. Access improvements would be constructed between the elevations of 730 and 660 feet mean sea level. This project is anticipated to occur in 2021 but requires a low lake elevation.

Enterprise Boat Ramp Expansion—Design and Permitting. DWR plans to expand the existing Enterprise Boat Ramp by constructing both a new Stage 2 parking area to accommodate approximately 12 vehicles with trailers as well as a new Stage 2 ramp that extends to 750 feet in elevation. The project is expected to begin in 2022.

Lake Del Valle State Recreation Area

EBRPD worked on the following facilities planning in 2019 at Lake Del Valle Regional Park.

Build and Pave Trail (Project 1505). EBRPD plans to construct a trail to connect Lake Del Valle Regional Park with Shadow Cliffs Regional Recreation Area.

Renovate Water System/Water Treatment Plant Improvements (Project 5058). The contractor completed mapping of a potable water distribution line throughout the park in 2019. Construction is scheduled to begin in early 2020.

Visitors Center (Project 5224). EBRPD will partner with DWR to fund the visitors center expansion and renovation, which includes changing the name from the Rocky Ridge Visitors Center to the Del Valle Visitor Center.

Service Yard, Phase III (Project 5529). The geotechnical survey was completed by the contractor. EBRPD's Maintenance Department plans on moving forward with

planning and engineering in 2020. The goal is to move two modular buildings into place and start the renovation of those buildings by the end of 2020.

San Luis Reservoir State Recreation Area

California State Parks and DWR's Division of Safety of Dams created a mitigation plan for the closure of Basalt Campground. This plan included building a 74-campsite campground at San Luis Creek and improving existing facilities and the boat launch.

Castaic Lake State Recreation Area

The 50-year contract to manage recreation at Castaic Lake State Recreation Area between California State Parks and LADPR expired in November 2019. A new contract is being negotiated between the two agencies for a 25-year term. LADPR is also negotiating with DWR for additional water to help ease some of the low-water problems in Castaic Lagoon.

LADPR is planning to remove all of its picnic shelters after one of them fell and caused an injury to a visitor. New picnic pavilions will be installed in their places.

New campground upgrades are planned in existing spaces that will accommodate full recreational vehicle hookups including water, electricity, sewer, and internet. Funds will be acquired through Measure A, Los Angeles County's local Safe, Clean Neighborhood Parks and Beaches Measure of 2016.

Silverwood Lake State Recreation Area

Continued planning and biological surveys were completed for replacement of an effluent line from the Cleghorn Treatment Plant.

Lake Perris State Recreation Area

Lake Perris park superintendents reported being awarded funds to build a new lifeguard

headquarters, one of two such lifeguard program headquarters in the U.S. They expect to train 100 lifeguards in its first class of students.

California State Parks put out to bid a 30-year contract to manage the Lake Perris Marina.

New Facilities

Silverwood Lake State Recreation Area

A new contract was awarded to a private contractor for fabrication of new exhibits at the Silverwood Lake Nature Center. A new wireless communication system between lifeguard towers was also installed.

Improvements to Facilities

Lake Oroville State Recreation Area

Bidwell Canyon Marina Parking Lot

Expansion. DWR constructed approximately 100 single-vehicle gravel parking spaces south of the existing Bidwell Canyon Marina parking lot, improved a pedestrian path connecting the new parking facility to the paved marina parking lot, and made access improvements for users with disabilities in early 2019. The \$1.7 million project was completed in May 2019.

Bidwell Canyon Boat Ramp Improvements.

The Stage 2 area consisted of a gravel parking lot and a two-lane concrete boat ramp. DWR, in coordination with California State Parks, began constructing 101 concrete parking spaces for vehicles with trailers, two new boat launch lanes, and two boarding float lanes between 745 and 700 feet in elevation. The project also improved the vertical alignment of the access road to the Stage 3 section, increasing accessibility to the lake for houseboats. Work began during fall 2018 but was unable to be completed prior to the lake rising quickly in winter 2019.

Lime Saddle Marina Low Water Access

Improvements. Following completion of the

\$2 million Lime Saddle parking lot expansion project in late 2018, DWR began construction on a low water access improvement project at the Lime Saddle Marina. Approximately 50 percent of the work, which included trail widening, rock slope protection, and gabion retaining wall installation, was completed just before the lake began rising in January 2019. The work took place between the elevations of 740 and 670 feet mean sea level. Work will not resume until the lake reaches an elevation at or below 700 feet mean sea level, which is expected during the second half of 2022. The trail will be extended to 660 feet mean sea level, and the trail surface will be hardened with concrete pads and articulated concrete mats. Approximately \$600 thousand has been spent on this project to date.

San Luis Reservoir State Recreation Area

California State Parks made the following facility improvements in 2019:

- replaced the air conditioning system in its maintenance building
- repainted restrooms at San Luis Creek Day Use Area
- removed old precast concrete restrooms at San Luis Creek Day Use Area
- updated fuel and gasoline pumps to bring into compliance with safety code
- removed deadfall and created additional fire breaks in all campgrounds and day use areas
- replaced two restroom roofs at San Luis Creek Day Use Area
- repaired 25 shade ramadas at San Luis Creek and Medeiros day use areas
- repainted curbing and parking areas at Basalt Campground

Silverwood Lake State Recreation Area

California State Parks continued remodeling its nature center.

California State Parks began a major renovation of the Rio Group Campground, including pouring new concrete pads, replacing the shade ramadas, replacing all of the barbecue grills and prep counters, and replacing 50 picnic tables with concrete picnic tables. The restrooms will undergo a similar renovation, with an expected completion date in 2020.

Accessibility improvements to the existing bicycle and pedestrian trail from Parking Lot 3 were completed. Work included constructing a new pedestrian bridge as well as a lake overlook, walkway, and bench accessible to users with disabilities.

Lake Perris State Recreation Area

California State Parks began road improvements to Parking Lot 7. In addition, DWR hired a crane to place docks back on the pylons at the launch ramp and moved a ramp for users with disabilities back in place at the Lake Perris Marina as water levels continued to rise after DWR completed the Perris Dam repairs.

Recreation Activities

The SWP, with its many reservoirs and hundreds of miles of aqueducts, offers Californians extensive and varied recreational opportunities. Figure 12-2 shows the various types of recreation available along the SWP.

Lake Oroville State Recreation Area

DWR, California State Parks, and other agencies sponsored several activities at Lake Oroville State Recreation Area in 2019.

In April, DWR participated in a wildflower festival hosted by the Feather River Recreation and Park District at Riverbend Park in Oroville. Approximately 500 visitors attended, fewer than in previous years because of bad weather. DWR's information booth displayed topics about native plants,

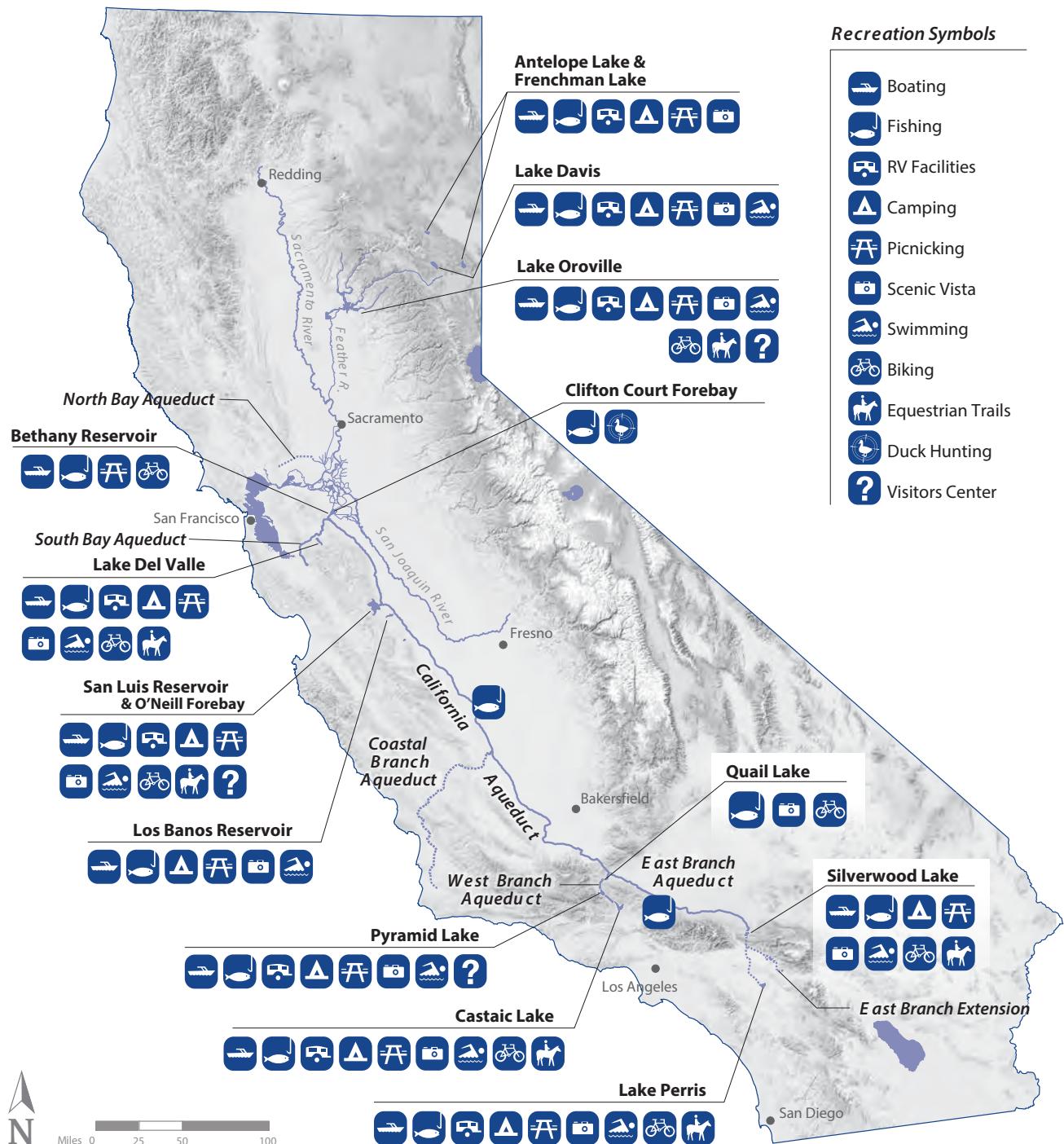


Figure 12-2 Types of Recreation along the SWP

water-wise plants, the Save Our Water Campaign, and included an activities table for children that included planting poppy seeds.

California State Parks and the Bidwell Bar Association hosted the annual Bidwell Bar Day event at Bidwell Canyon on May 4. A total of 150 people attended this event.

DWR participated in the Feather Fiesta Days event hosted by the City of Oroville and the Oroville Area Chamber of Commerce. Held in downtown Oroville with approximately 12,000 attendees, DWR ran an information booth promoting DWR's C.A.S.T. (Catch A Special Thrill) for Kids fishing event, which teaches children with special needs how to fish. The booth also included DWR brochures, kids' activities, and water safety handouts featuring DWR water safety mascots Albert (a fish) and Einstein (a heron). DWR also provided portable toilets for the event.

The Butte County Department of Education hosted its annual Special Olympics event in May. Held at Harrison Field in Oroville, 1,500 adults and children attended, with 600 students participating. DWR ran an information booth with a table for children's activities promoting water safety, including building sailboats. This event also promoted the C.A.S.T. for Kids fishing event and the Lake Oroville Visitors Center.

DWR, California State Parks, DFW, the California Department of Forestry and Fire Protection, the California Conservation Corps, and the C.A.S.T. for Kids Foundation hosted a C.A.S.T. for Kids fishing event for 50 children with special needs. The event, which treated the children to a day of fishing on the lake, was supported by 34 experienced bass fishermen and 147 volunteers. The Kiwanis Club assisted with making a barbecue lunch, and the Lineman's College assisted with breakfast and getting the children ready for their

fishing trip. Because several Oroville recreation facilities, including the Spillway Launch Ramp, have been closed since the 2017 Oroville Dam spillways incident (see Bulletin 132-18, Figure 13-2), the C.A.S.T. for Kids Program has been using the Bidwell Canyon Boat Ramp and parking lot.

The City of Oroville and the Rotary Club of Oroville hosted the Fourth of July fireworks display. For 2019, the event was relocated to the Thermalito North Forebay at the Oroville Municipal Airport for fire safety. Approximately 15,000 attendees were treated to a safer fireworks show. DWR's Oroville Field Division provided portable toilets and hand washing stations.

DWR, California State Parks, and the Oroville Area Chamber of Commerce hosted the annual Oroville Salmon Festival. This one-day fall event, held on September 28, was held at the Feather River Fish Hatchery and downtown Oroville. An estimated 25,000 participants attended.

The Bidwell Bar Association hosted the annual Frontier Christmas at the Lake Oroville Visitors Center. One thousand visitors learned how to make pioneer crafts and pan for gold at this pioneer-themed event, which offered crafts, entertainment, and food booths.

The City of Oroville and the Oroville Area Chamber of Commerce hosted the Parade of Lights, in which 10,000 visitors enjoyed a lighted parade in downtown Oroville. DWR's Oroville Field Division supplied portable toilets for this December event.

Lake Del Valle State Recreation Area

EBRPD sponsored or co-sponsored the following activities in 2019:

- 31 campfire programs for 2,071 visitors
- 34 school programs for 1,700 children

- 51 boat tours on Lake Del Valle for 981 participants
- free EBRPD fishing permits for 21,919 visitors
- 441 free boat launches, 482 cartop launches, and 89 free board launches for visitors
- 181 Regional in Nature programs with 5,862 participants and 87 non-Regional in Nature programs with 2,166 participants

EBRPD held an event at Lake Del Valle with a nonprofit program serving youth and families from Richmond's Iron Triangle neighborhood that provides a variety of outdoor, recreation, camping, and youth development programs. EBRPD also held a fishing field trip on July 20 for 20 participants from the Bay Area Outreach and Recreation Program as part of their camping trip.

On September 21, EBRPD held its annual Coastal Cleanup at Lake Del Valle. Cleaning up the shoreline, 207 volunteers picked up 200 pounds of trash within three hours. In addition, 2,000 plastic bottle caps and 2,000 metal bottle caps were collected for a total of 50 pounds of recycling. A total of 600 hours were worked.

EBRPD and local fire departments served 100 participants during four Aquatic Adventure Camps in the summer. Water safety presentations and lifeguard services were taught during these sessions.

Vamos a Aprender ("Let's Go Learn" in Spanish) is a free, Spanish-language water safety education program for children ages 7 to 15 at Lake Del Valle. Funded by the Regional Parks Foundation, the program focuses on proper life jacket use. From late July through September, sessions were held at East Swim Beach and West Swim Beach, with two sessions held on Saturdays and Sundays.

San Luis Reservoir State Recreation Area

DWR, California State Parks, and local agencies sponsored several activities at San Luis Reservoir State Recreation Area in 2019.

California State Parks sponsored the "Path of the Padres" hikes, funded by the Four Rivers Association. During February and March, 160 hikers experienced wildflowers, geology, cultural and historical areas, and Native American sites along a 35-mile trail. Water conservation and the reservoir systems at Los Banos and San Luis reservoirs were discussed on a boat ride to the trailhead.

A Junior Lifeguard Program was held for three weeks in July for 18 students.

Campfire programs were provided every Saturday from Memorial Day weekend through Labor Day weekend to more than 800 park visitors at the refurbished Basalt Campground.

Junior Ranger activities were held at San Luis Creek every Saturday from Memorial Day weekend through Labor Day weekend.

Castaic Lake State Recreation Area

LADPR sponsored or co-sponsored the following activities in 2019:

- weekly bass tournaments
- five sessions of FamCamp co-sponsored by DWR for 300 participants ages 17 and under teaching boating safety, camping, and team-building principles
- 10 days of dragon boat paddling for 175 participants to learn how to paddle as a team
- four moonlight kayak events for 80 participants who learned about the environment at the lake, the SWP, water safety, and boating safety
- Moonlight Fishing on the Lake sponsored by Friends of Castaic Lake for 120 guests

- Junior Lifeguard Program for 450 participants ages nine to 17 who learned lifeguard training, first aid, cardiopulmonary resuscitation (CPR), and water safety skills
- four Night Float Tube Fishing events sponsored by the Friends of Castaic Lake for 75 participants that allowed individuals to fish the Castaic Lagoon until midnight in float tubes and kayaks
- C.A.S.T. for Kids fishing event on October 6 hosted by DWR, Friends of Castaic Lake, and LADPR for 75 participants, held at the lower lagoon
- Dragon Boat Festival with 300 participants, which included dragon boat racing and other fun events
- Pacific Islander Festival on September 28 and September 29 with 300 participants, which included food vendors and Pacific Islander dances

The following races were held at Castaic Lake during 2019:

- five-kilometer run and gnome-themed parade around the Castaic Dam facility, hosted by a local non-profit, 75 participants
- organized run on April 27 that had challenging obstacles for individuals, hosted by an obstacle race company, 8,500 participants
- two-day organized run on December 8 and December 9 that had challenging obstacles for individuals, hosted by another obstacle race company, 9,000 participants
- five mountain bike race events through the Grasshopper Canyon trails, hosted by an individual, 125 participants per event
- obstacle race that was open to the public on November 23, hosted by an obstacle race company that creates obstacle races for women, 6,000 participants

In addition to the recreation events listed above, LADPR hosts a large variety of

government training programs to make Los Angeles and its surrounding areas safer. This includes hosting space for the following groups:

- Los Angeles Police Department
- U.S. Federal Emergency Management Agency camps
- swift water rescue groups
- bottom water rescue groups
- several fire rescue offices
- Junior Lifeguard Program, which has 16 instructors and trains 500 young people annually how to become lifeguards (An additional 300 young people are on the waiting list.)

Silverwood Lake State Recreation Area

DWR, California State Parks, and local agencies sponsored several activities at Silverwood Lake State Recreation Area in 2019.

Bald eagle counts were conducted and hosted by the Mojave River Natural History Association in association with the count conducted by the U.S. Forest Service on January 12, February 9, and March 9.

An Earth Day celebration was enjoyed by 13 participants who assisted with orchard maintenance and trail work. The Mojave River Natural History Association assisted California State Parks with organizing this event.

Rangers and volunteers presented eight campfire programs for 120 attendees between Memorial Day and Labor Day weekends. Topics included wildlife issues and Silverwood Lake's relationship with the SWP. Campfire programs were co-sponsored by the Mojave River Natural History Association.

The California State Parks Foundation hosted monthly Park Champions volunteer

work days from January through March. Between 10 and 20 volunteers met at the park to conduct service work such as trail maintenance, trail improvements, and litter pick-up.

Apple Days were offered as small events on October 5, 12, and 19. Approximately 30 to 40 visitors per day had the opportunity to learn about Silverwood Lake's historic apple orchard and press and drink fresh apple cider.

DWR co-hosted a C.A.S.T. for Kids fishing event at which 25 children with special needs were paired with 19 experienced bass fishermen for a day of fishing on the lake.

Lake Perris State Recreation Area

DWR, California State Parks, and local agencies sponsored several activities at Lake Perris State Recreation Area in 2019. The Ya'i Heki' Regional Indian Museum held a total of 8,643 events:

- 202 campfire programs, which occurred every Saturday evening
- 1,692 hiking and walking tours of the area that started from the museum
- 447 Junior Ranger Programs for kids

- 3,437 special events, which included 65 Boy Scout events, 1,500 "Think Together" events, and 20 tours for adults with 180 participants
- 1,129 field trips
- 1,177 off-site tours
- 10 community events with 262 attendees
- two Junior Lifeguard Programs, training young men and women how to be lifeguards

Fish Planting

In 2019, DFW planted approximately 330,200 fish into SWP reservoirs (see Table 12-2). This was 30.8 percent fewer fish than the 477,000 fish planted in 2018. A reason for this change was a disease outbreak that occurred in the DFW hatchery system, causing a decrease in the number of available healthy trout that could be safely planted into reservoirs without spreading disease. Pyramid, Castaic, and Silverwood lakes received significantly fewer DFW fish than they received in 2018, but some of this was made up by DWR purchasing trout from private hatcheries.

In 2019, Pyramid Lake received 200 percent more fish (303 percent more pounds)

Table 12-2 Fish Planted by the Department of Fish and Wildlife in 2019 (thousands)¹

Location	Eagle Lake Rainbow Trout	Brook Trout	Rainbow Trout	Chinook Salmon	Steelhead Trout	Brown Trout	Total for Lake
Antelope Lake	17.1	8.0	10.4				35.5
Lake Davis	15.1		30.8			8.4	54.3
Frenchman Lake	45.0						45.0
Lake Oroville				101.8			101.8
Thermalito Afterbay					33.7		33.7
Lake Del Valle			18.3				18.3
Los Banos Reservoir	6.9						6.9
Pyramid Lake	2.0		8.0				10.0
Castaic Lake			11.8				11.8
Silverwood Lake			11.4				11.4
Lake Perris			1.0				1.0
Total	86.1	8.0	91.7	101.8	33.7	8.4	329.7

¹ Information provided by the Department of Fish and Wildlife

of fish) than in 2018, while Castaic and Silverwood lakes received 10 percent fewer fish (but 110 percent more pounds of fish) and 24 percent fewer fish (but 2 percent more pounds of fish), respectively. In northern California, Lake Oroville received 20.2 percent fewer diploid Chinook salmon than in 2018, but the three Upper Feather River lakes received more trout: Antelope Lake received 55 percent more Eagle Lake rainbow trout (*Oncorhynchus mykiss aquilarum*) and 74 percent more brook trout (*Salvelinus fontinalis*); and Lake Davis and Frenchman Lake both received 180 percent and 133.2 percent more fish plants, respectively.

DWR purchased 62,803 rainbow trout (79,980 pounds of fish) from both DFW and private hatcheries for Pyramid, Castaic, and Silverwood lakes for recreation mitigation under its hydropower license, Federal Energy Regulatory Commission Project No. 2426. Of the total rainbow trout purchased by DWR, 29,655 (47 percent) were purchased from a trout farm in Merced County, and the balance were purchased from DFW. Pyramid Lake received a total of 20,836 fish (27,180 pounds of fish), Castaic Lake received 21,524 fish (25,300 pounds of fish), and Silverwood Lake received 20,443 fish (27,500 pounds of fish).

EBRPD also purchased and planted additional fish into Lake Del Valle: 19,000 pounds of three- to six-pound rainbow trout from a supplier near Mount Lassen, and 4,500 pounds of channel catfish (*Ictalurus punctatus*). EBRPD charges an additional fishing permit fee to compensate for the cost of these non-State purchases, but the popularity of this supplier's rainbow trout (referred to as "Lassen Rainbows") makes Lake Del Valle a popular fishing spot in the San Francisco Bay Area.

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 75 percent SWP Table A allocation for 2019, maximum diversion amounts under the onshore recreation agreement were allocated at 75 percent, or a total of 5,087 acre-feet (af) as follows: 2,063 af at San Luis Reservoir; 300 af at Lake Del Valle; 1,748 af at Castaic Lake and Castaic Lagoon; 938 af at Lake Perris; and 38 af at Bethany Reservoir. Actual deliveries under the agreement totaled 274 af as follows: six af at San Luis Reservoir; 107 af at Lake Del Valle; 73 af at Castaic Lake and Castaic Lagoon; 88 af at Lake Perris; and zero af at Bethany Reservoir. Additional SWP recreation deliveries included 60 af at Silverwood Lake and 59 af at Pyramid Lake.

Recreation Financing

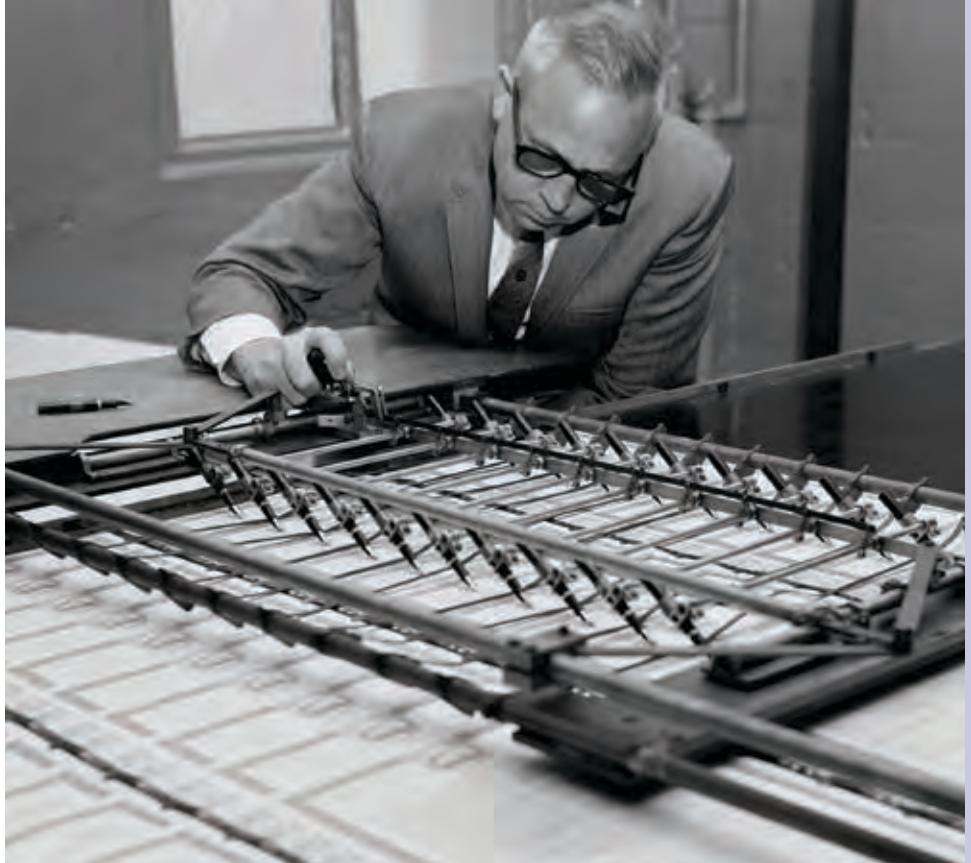
Capital Cost Allocations

Table 12-3 shows capital costs allocated to recreation and fish and wildlife enhancement and overall costs of lands acquired for recreation development through 2019. Total capital costs increased by \$19,100,156 over those reported in Bulletin 132-19 because of an increase of \$19,056,495 in 2019, and an upward adjustment of \$43,661 in years prior to 2019. The increase in 2019 included \$11,513,707 in joint costs and \$7,542,788 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 12-3 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
	1952–2018 Updated	2019	Subtotal	1952–2018 Updated	2019	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	2,735,310	12,135	2,747,445	49,950	0	49,950	2,797,395
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	4,643,121	13,483	4,656,604	201,137	0	201,137	4,857,741
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	17,455,720	783,584	18,239,304	0	0	0	18,239,304
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	5,931,088	625,791	6,556,879	867,243	0	867,243	7,424,122
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	7,518,584	356,765	7,875,349	-45,422	0	-45,422	7,829,927
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	34,751,932	5,227,798	39,979,730	15,305,996	7,540,148	22,846,144	62,825,874
Del Valle Dam and Lake Del Valle (48.0%) ^{a,b}							
California Water Resources Development Bond Fund	10,546,762	0	10,546,762	519,425	0	519,425	11,066,187
All Other Funds	4,411,888	19,784	4,431,672	-32,202	0	-32,202	4,399,470
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	140,686,440	4,474,367	145,160,807	7,562,773	2,640	7,565,413	152,726,220
Total	298,325,205	11,513,707	309,838,912	37,712,118	7,542,788	45,254,906	355,093,818

^a Percentages are the share of joint costs.^b Specific recreation 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, \$6,847,122 for Perris Dam and Lake Perris, and \$898,059 for the California Aqueduct.



Chapter 13

Financial Analysis

California Department of Water Resources Director William R. Gianelli uses a device to provide multi-signatures on California State Water Bonds. Historical photo taken April 16, 1968.

Significant Events in 2019

On April 24, the Department of Water Resources (DWR) delivered \$299.590 million of Water System Revenue Bonds, Series BA. The proceeds were presold on April 16 to refinance commercial paper and to 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 2019 through 2029.

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, 2019, are presented in Tables 13-1 and 13-2, 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 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 2029, including reimbursement of \$487 million interim financing for prior expenditures, will total \$3.4 billion. Special capital requirements for revenue bond financing of these construction costs are projected at \$206 million for a total capital requirement of \$3.6 billion. This projection includes construction and financing costs for the following significant SWP projects planned for completion by 2029:

- Perris Dam remediation
- Thermalito Diversion Dam Powerplant restoration and modernization
- SWP protective relay replacement
- SWP Sacramento-San Joaquin Delta (Delta) compliance program
- SWP fire systems modernization
- Sherman and Twitchell islands fish screens
- Oroville Dam Spillway response, recovery, and restoration
- Yolo Bypass Salmonid Habitat Restoration and Fish Passage Project
- California Aqueduct subsidence study and remediation
- Federal Energy Regulatory Commission (FERC) Project No. 2100 relicensing
- FERC Project No. 2426 relicensing
- Financial Management Enhancements Program
- SWP Dam Safety Program

Most of these capital requirements will be financed from the projected sale of \$3.5 billion of revenue bonds. No direct payments from SWP Contractors are projected. The remaining \$45 million of the total capital requirement of \$3.6 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 13-1 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 Contractors. Table 13-1 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 13-3.

Capital Requirements

Lines 1 through 20 in Table 13-1 show actual and projected SWP capital requirements through 2029. Estimates of future capital expenditures include allowances for construction cost escalation of 4.2 percent per year from 2021 through 2029. Right-of-way costs are escalated at 4.0 percent per year from 2021 through 2029. 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 was to include 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 was postponed. In 2018, the project was suspended at the request of the Solano County Water Agency. In 2019, the project was officially terminated.

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.

Table 13-3 Allocation of Capital Expenditures (in thousands of dollars)

Facilities and Construction Divisions	Expenditures			Preliminary Allocation Among Project Purposes			
	Incurred Through 2019	Future Expenditures 2020–2029	Total	Water Supply and Power Generation	Flood Control ¹	Recreation and Fish and Wildlife Enhancement	Other ²
Project Construction Expenditures							
Upper Feather Division	19,736	29,502	49,238	4,034	0	45,204	0
Oroville Division (excludes Small Hydro)	1,412,369	431,553	1,843,922	1,661,845	71,761	110,317	0
Delta Facilities Division	567,202	261,980	829,183	801,990	0	27,192	0
North Bay Aqueduct	121,132	21,659	142,791	142,791	0	0	0
South Bay Aqueduct (excludes Enlargement)	206,062	38,719	244,781	210,165	12,944	21,671	0
California Aqueduct							
North San Joaquin Division	469,721	133,072	602,793	585,604	0	17,188	0
San Luis Division	600,543	717,568	1,318,111	1,292,631	0	25,480	0
South San Joaquin Division	361,950	403,076	765,026	745,586	0	19,440	0
Tehachapi Division	399,891	108,298	508,189	486,900	0	21,289	0
Mojave Division (excludes Small Hydro)	390,167	97,920	488,087	444,797	0	43,290	0
Santa Ana Division	474,383	259,017	733,400	590,481	0	142,918	0
West Branch	588,834	282,733	871,567	821,759	0	49,809	0
Coastal Branch	507,895	45,399	553,294	553,294	0	0	0
<i>Subtotal, California Aqueduct</i>	<i>3,793,383</i>	<i>2,047,083</i>	<i>5,840,466</i>	<i>5,521,053</i>	<i>0</i>	<i>319,413</i>	<i>0</i>
Other Project Facilities							
Small Hydroelectric Power Generating Facilities	102,002	16,616	118,618	118,618	0	0	0
Off-Aqueduct Power Generating Facilities	491,574	0	491,574	491,574	0	0	0
South Bay Aqueduct Enlargement	208,570	2,043	210,613	210,613	0	0	0
East Branch Enlargement	462,031	0	462,031	462,031	0	0	0
East Branch Extension	420,901	96	420,997	420,997	0	0	0
Coastal Power Allocation	30,708	0	30,708	30,708	0	0	0
Agricultural Drainage Facilities	91,404	3,123	94,527	0	0	0	94,527
Planning and Pre-operations	87,623	32,720	120,343	120,343	0	0	0
Unassigned/Miscellaneous	(4,521)	492	(4,029)	0	0	0	(4,029)
<i>Subtotal, Project Construction Expenditures</i>	<i>8,010,176</i>	<i>2,885,587</i>	<i>10,895,763</i>	<i>10,196,762</i>	<i>84,705</i>	<i>523,798</i>	<i>90,498</i>
Other Capital Requirements							
Davis-Grunsky Act Program	130,000	0	130,000	0	0	0	130,000
Total Capital Expenditures	8,140,176	2,885,587	11,025,763	10,196,762	84,705	523,798	220,498

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.

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 13-4. Costs for Alamo Powerplant consist of expenditures for Unit 1 facilities allocated to enlargement.

Table 13-4 East Branch Enlargement Capital Costs by Facility (in millions of dollars)

Facility	Amount
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

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 was completed as of 2017, with final documentation to be completed in 2020. All costs in Line 9 will be allocated to and repaid by the two participating contractors.

Line 10, South Bay Aqueduct Improvements and Enlargement, shows expenditures for providing additional capacity required to meet increases in water demands for the service area of Alameda County Flood Control and Water Conservation District, Zone 7, and increasing the existing capacity

of the South Bay Aqueduct (SBA) to its original design capacity. Construction began in 2006, and overall project work was completed in 2016.

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 13-1. The capital costs for facilities included in Line 11 are shown in Table 13-5.

Table 13-5 Estimated Capital Costs for Power Generation and Transmission Facilities (in millions of dollars)

Power Plants	Amount
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	43.0
Hyatt	46.2
Robie Thermalito	181.9
Thermalito Diversion Dam	14.1
<i>Subtotal</i>	<i>936.0</i>
Transmission Lines	Amount
Midway–Wheeler Ridge	10.7
Geysers–Lakeville	6.9
<i>Subtotal</i>	<i>17.6</i>
Total	953.6

Line 12, Additional Conservation Facilities, shows projected costs to plan and study additional conservation facilities. Specific planning activities and projected spending amounts for 2020 through 2029 are shown in Table 13-6. 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 impact report preparation are currently financed by participating contractors.

Line 13, Agricultural Drainage Facilities, includes projected costs of the Agricultural Drainage Program. The activities in this program are monitoring, evaluating, reducing, and treating drainage, as well as investigating treatment and reuse of drainage water.

DWR assumes that future costs of the drainage program will be financed by revenue transfers (Line 37).

Line 14, Other Costs, includes items such as general design and construction costs, costs of completing operation and maintenance facilities, and costs of other completion activities for the initial facilities of the California Aqueduct. Portions of those costs ultimately will be allocated to California Aqueduct units described in the preceding paragraphs.

Line 15, Total Project Construction Expenditures, is the total of Lines 1 through 14.

Line 16, Davis–Grunsky Act Program Costs, shows costs of the Davis–Grunsky Act Program, a financial assistance program. Authorized in 1960 as part of the Burns–Porter Act, the Davis–Grunsky

Table 13-6 Estimated Future Costs for Planning Additional Conservation Facilities (in millions of dollars)

Activity	Amount
SWP Future Water Supply	32.7
Other Planning Costs	0.0
Total	32.7

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.

As of December 31, 2019, 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 13-7.

Line 18, Total Capital Requirements, is the total of Lines 15, 16, and 17.

Line 19, Power Facilities Capital Requirements, shows the total capital requirements for power facilities included in Line 18.

Line 20, Water Facilities Capital Requirements, shows the total capital requirements for water facilities included in Line 18.

Capital Financing

The SWP was constructed using three general types of financing: Burns-Porter Act, revenue bonds, and capital resources. Lines 21 through 37 of Table 13-1 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 20 percent of the expenditures through 2019 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 2019.

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, 2019, DWR had sold \$12 billion of revenue bonds. That amount includes \$6.7 billion of refunded bonds, leaving a total principal obligation of \$5.3 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, 2019. 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 \$438 million of Water System Revenue Bond proceeds has been spent through December 31, 2019. Of this total, \$435 million has been used for construction expenditures, and \$3.4 million was used for bond discounts, interest costs, and debt service reserve requirements.

Table 13-7 Application of Revenue Bond Proceeds (in millions of dollars)

Bond Series¹	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	<i>Subtotal</i>	
Oroville	218.0	2.6	19.9	1.5	3.0	27.0	245.0
Devil Canyon–Castaic	126.4	0.0	10.0	0.7	2.1	12.8	139.2
Pyramid Series A	74.0	0.0	19.2	1.0	1.6	21.8	95.8
Reid Gardner Series B	146.1	0.0	41.9	0.0	12.0	53.9	200.0
Reid Gardner Series C	91.1	0.0	17.9	7.9	8.1	33.9	125.0
Small Hydro–South Geysers Series D	49.6	0.0	19.9	0.0	5.5	25.4	75.0
Bottle Rock Series E	96.9	0.0	22.0	3.7	2.4	28.1	125.0
Alamo–South Geysers Series F	59.1	0.0	14.2	0.0	1.7	15.9	75.0
Reid Gardner Series G	1.6	0.0	0.0	0.0	237.9	237.9	239.5
Power Facilities Series H	22.2	0.0	0.0	0.0	184.5	184.5	206.7
East Branch Enlargement Series A	108.3	0.0	12.6	0.0	11.1	23.7	132.0
Water System Facilities Series B	97.4	0.0	0.0	0.0	2.6	2.6	100.0
Water System Facilities Series C	0.6	0.0	0.0	0.0	8.4	8.4	9.0
Water System Facilities Series D	95.9	0.0	2.9	0.0	1.2	4.1	100.0
Water System Facilities Series E	0.4	0.0	0.0	0.0	8.6	8.6	9.0
Water System Facilities Series F	0.0	0.0	0.0	0.0	160.0	160.0	160.0
Water System Facilities Series G	86.8	0.0	4.6	0.0	8.6	13.2	100.0
Water System Facilities Series H	85.5	0.0	5.7	0.0	8.8	14.5	100.0
Water System Facilities Series I	158.9	0.0	5.8	0.0	15.3	21.1	180.0
Water System Facilities Series J	0.0	0.0	0.0	0.0	649.8	649.8	649.8
Water System Facilities Series K	88.6	0.0	3.1	0.0	8.3	11.4	100.0
Water System Facilities Series L	0.0	0.0	0.0	0.0	537.8	537.8	537.8
Water System Facilities Series M	166.3	0.0	9.9	0.0	13.8	23.7	190.0
Water System Facilities Series N	137.4	0.0	6.0	0.0	8.6	14.6	152.0
Water System Facilities Series O	156.5	0.0	8.4	0.0	170.1	178.5	335.0
Water System Facilities Series P	141.6	0.0	5.2	0.0	13.2	18.4	160.0
Water System Facilities Series Q	135.0	0.0	8.0	0.0	123.6	131.6	266.6
Water System Facilities Series R	0.0	0.0	0.0	0.0	20.7	20.7	20.7
Water System Facilities Series S	78.2	0.0	5.8	0.0	116.2	122.0	200.2
Water System Facilities Series T	0.0	0.0	0.0	0.0	135.7	135.7	135.7
Water System Facilities Series U	98.7	0.0	5.3	0.0	103.2	108.5	207.2
Water System Facilities Series V	0.0	0.0	0.0	0.0	20.6	20.6	20.6
Water System Facilities Series W	41.0	0.0	1.3	0.0	218.7	220.0	261.0
Water System Facilities Series X	0.0	0.0	0.0	0.0	160.2	160.2	160.2
Water System Facilities Series Y	0.0	0.0	0.0	0.0	329.9	329.9	329.9
Water System Facilities Series Z	0.0	0.0	0.0	0.0	170.7	170.7	170.7
Water System Facilities Series AA	0.0	0.0	0.0	0.0	108.7	108.7	108.7
Water System Facilities Series AB	92.2	0.0	3.9	0.0	93.6	97.5	189.7
Water System Facilities Series AC	13.7	0.0	0.6	0.0	257.7	258.3	272.0
Water System Facilities Series AD	12.4	0.0	0.9	0.0	99.1	100.0	112.4
Water System Facilities Series AE	383.9	0.0	9.5	0.0	239.5	249.0	632.9
Water System Facilities Series AF	33.4	0.0	1.3	0.0	253.1	254.4	287.7
Water System Facilities Series AG	9.9	0.0	0.4	0.0	158.8	159.2	169.1
Water System Facilities Series AH	71.7	0.0	3.6	0.0	22.3	26.0	97.7
Water System Facilities Series AI	0.0	0.0	0.0	0.0	92.3	92.3	92.3

Table 13-7 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 AJ	69.3	0.0	3.7	0.0	143.9	147.6	216.9
Water System Facilities Series AK	32.0	0.0	0.9	0.0	3.4	4.3	36.3
Water System Facilities Series AL	0.0	0.0	0.0	0.0	105.9	105.9	105.9
Water System Facilities Series AM	0.0	0.0	0.0	0.0	184.0	184.0	184.0
Water System Facilities Series AN	44.8	0.0	0.3	0.0	4.4	4.7	49.5
Water System Facilities Series AO	0.0	0.0	0.0	0.0	317.5	317.5	317.5
Water System Facilities Series AP	47.7	0.0	1.2	0.0	(3.5)	(2.4)	45.3
Water System Facilities Series AQ	122.6	0.0	7.2	0.0	(9.6)	(2.4)	120.2
Water System Facilities Series AR	168.1	0.0	5.4	0.0	(12.1)	(6.7)	161.4
Water System Facilities Series AS	0.0	0.0	0.0	0.0	645.8	645.8	645.8
Water System Facilities Series AT	139.5	0.0	5.9	0.0	3.9	9.8	149.2
Water System Facilities Series AU	104.6	0.0	3.4	0.0	1.3	4.7	109.3
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
Water System Facilities Series AZ	129.7	0.0	6.6	0.0	79.0	85.6	215.3
Water System Facilities Series BA	346.0	0.0	9.0	0.0	(55.5)	(46.5)	299.6
Subtotal	4,867.5	2.6	350.2	14.8	6,723.4	7,091.1	11,958.6^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	0.1	0.0	0.0	0.0	0.0	0.0	0.1
Future SBA Enlargement Bonds	2.0	0.0	0.1	0.0	0.1	0.2	2.2
Future Water System Facilities Bonds	3,325.2	0.0	90.7	0.0	115.4	206.0	3,531.3
Total	8,194.9	2.6	441.0	14.8	6,838.9	7,297.2	15,492.1

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 \$6,683.7 million of refunded principal, leaving a net principal obligation of \$5,274.9 million.

Line 25, East Branch Extension, Future Bonds, shows DWR's estimate of \$0.1 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 \$226 million of Water System Revenue Bond proceeds had been spent through December 31, 2019. Of this total, \$225 million was used for construction expenditures, and \$0.9 million was used for bond discounts, interest costs, and debt service reserve requirements.

Line 27, South Bay Aqueduct Enlargement, Future Bonds, shows DWR's estimate of \$2.2 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, 2019, \$4.1 billion of proceeds from Water System Revenue Bonds, Series A through Series BA, was applied to SWP projects other than the East Branch Enlargement, the East Branch Extension, and the SBA Enlargement. Of this total, \$4 billion was

used to pay for construction expenditures and \$0.1 billion was used to pay for bond discounts, capitalized interest, and debt service reserve requirements.

Line 29, Water System Facilities, Future Bonds, shows that \$3.5 billion of future water revenue bonds is needed to provide \$3.3 billion for construction of SWP water system facilities and \$0.2 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 have been 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 authorized four series of Water Revenue Commercial Paper Notes.

Series 1 is authorized for \$600 million of notes. Series 2, 3, and 4 are authorized for a combined \$800 million of notes to cover costs for the Oroville Dam Spillway Recovery and Restoration Project that are 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 13-2). Projected amounts for the years 2020 through 2029 include funds to finance expenditures for agricultural drainage facilities, as indicated in Line 13 of Table 13-1, 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 2020 through 2029. Data on annual revenues and expenditures are presented in Table 13-2. A detailed discussion of each line item follows.

Project Revenues

Project revenues primarily consist of SWP 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 \$142.7 million in capital costs through December 31, 2019.

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 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 13-8).

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 13-9 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

Table 13-8 Revenue Bond Proceeds Affecting Project Interest Rate (in millions of dollars)

Project	Proceeds Included in Project Interest Rate					Percentage of Total Amount Included in Calculating Project Interest Rate [4] / [5]
	Applied to Construction Costs	Less Portion of Proceeds Derived from Interest Earnings Prior to Delivery of Bonds	Plus Bond Financing and Refunding Costs	Subtotal, Proceeds Included in Calculating Project Interest Rate [1] - [2] + [3]	Total Principal Amount of Bonds	
	[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 13-9 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 13-9 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	
\$ 9,000,000 Series W Water Bonds	8/1/91	8/1/91	95,250	6,172	6.480	
\$649,835,000 Series J Water System Revenue Bonds	1/16/92	1/28/92	12,422,222	745,198	5.999	4.621
\$100,000,000 Series K Water System Revenue Bonds	5/12/92	6/4/92	2,366,783	147,064	6.214	
\$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 13-9 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)
\$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	2,920,117	146,006	5.000	
\$140,825,000 Series AY Water System Revenue Bonds	12/6/17	12/9/17	1,050,620	30,038	2.859	
\$215,295,000 Series AZ Water System Revenue Bonds	10/10/18	10/18/18	1,906,161	94,688	4.967	
\$299,590,000 Series BA Water System Revenue Bonds	4/16/19	4/24/19	3,034,581	151,729	5.000	
Total			257,011,846	14,093,224		
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.

conditions and substantiates DWR's determination of 2021 water charges to be billed on July 1, 2020. However, information about significant differences between the sum of future charges included in Lines 2 through 12 of Table 13-2 and the substantiation of 2020 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, 2019. Those costs presented in the financial analysis include allowances for price escalation.
- Pre-2020 charges in Appendix B represent charges as they should have been, according to currently known conditions. Pre-2020 charges included in Table 13-2 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 13-2 for 2020 and thereafter have been adjusted for any apparent overpayments or underpayments of pre-2020 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 BA bonds. Charges in Table 13-2 apply to Series A through Series BA 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 BA bonds. Surcharge values included in Table 13-2 apply to Series B through Series BA bonds and

to assumed future issues required to finance SWP construction costs included in Table 13-1.

Line 13, Subtotal, Water Contractor Payments, is the total of Lines 2 through 12.

Line 14, Revenue Bond Cover Adjustments, represents the credit to contractors resulting from the cover of 25 percent of the annual debt service for Power Facilities Revenue Bonds and Water System Revenue Bonds. Cover is collected as required by the bond resolutions to provide security to the bondholders. If not needed to meet annual bond service, the cover is credited to the contractors in the following year. The annual charges for the following cost components include an amount for bond cover:

- minimum OMP&R component of the Transportation Charge for Off-Aqueduct Power Facilities
- Water System Revenue Bond Surcharge
- capital cost component of the Transportation Charge for East Branch Enlargement Facilities
- capital cost component of the Transportation Charge for Coastal Branch Extension Facilities
- capital cost component of the Transportation Charge for East Branch Extension Facilities
- capital cost component of the Transportation Charge for Tehachapi East 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 U.S. 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 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 reduced to 39.72 percent. In 2018, the percentage was set at 39.90 for calendar years 2016 through 2020. The amounts in Line 16 are based on the assumption that the federal share will be 37.67 percent for calendar years 2021 through 2029.

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 \$274.5 million in OMP&R costs through December 31, 2019.

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 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 \$80.8 million of loans disbursed as of December 31, 2019. 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 13-1. 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 13-2.

Line 26, Project Operations, Maintenance, Power, and Replacement Costs, shows the OMP&R portion of the historical and projected costs presented in Table 13-10.

Table 13-10 and Line 26 of Table 13-2 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 2019. 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 9, 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, 2019, a net deposit (which includes returned deposits) of \$114.7 million had been made; \$102.5 million had been spent for replacement costs. The balance of the replacement reserve as of that date was \$36.0 million.

Line 28, Deposits to Special Reserves Under Revenue Bond Financing, includes two significant components: special reserve deposits related to revenue bonds and capital resources revenue carryover from prior years used for construction in the current year. Special reserve deposits are the net of several income and expenditure items.

Income items related to revenue bonds are 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 1952–2019 column also includes advances to DWR's revolving fund for working funds to purchase mobile equipment and to meet day-to-day operating expenses.

Table 13-10 Operations, Maintenance, Power, and Replacement Costs by Facility, Composition, and Purpose (in thousands of dollars)

Feature	Calendar Year										TOTAL
	1962-2017	2018	2019	1962-2019	2020	2021	2022	2023	2024	2025	
Project Facility											
Feather River facilities	1,811,318	91,831	96,435	1,999,584	89,992	90,419	89,796	90,631	90,284	90,937	92,479
North Bay Aqueduct	132,442	8,512	7,667	148,621	9,842	8,609	8,717	8,758	8,723	8,785	8,923
Delta facilities	1,231,047	92,456	52,480	1,375,983	93,911	89,796	98,204	84,978	84,739	85,436	86,972
Suisun Marsh	98,544	14,343	13,986	126,873	5,615	6,231	5,956	5,913	5,890	5,933	6,043
South Bay Aqueduct	463,027	28,226	20,545	511,798	24,360	25,023	23,337	23,710	23,621	23,789	24,130
California Aqueduct	5,148,109	222,906	277,022	5,648,036	194,762	284,575	277,341	287,769	275,901	284,392	278,363
Delta to Edmonston	4,774,129	222,280	233,528	5,199,937	208,506	280,306	272,957	298,903	290,988	297,004	294,590
Edmonston to Perris	258,229	32,665	37,951	328,845	45,515	49,995	65,473	36,403	36,217	36,919	37,634
West Branch	415,948	30,466	24,382	470,796	23,376	25,817	25,154	25,684	25,777	25,961	26,332
Coastal Branch	162,028	10,924	11,592	184,544	11,785	11,566	11,408	11,400	11,244	11,213	11,290
East Branch Enlargement	68,547	9,923	13,422	91,892	10,331	11,359	10,341	10,855	10,810	10,888	11,060
East Branch Extension	1,588,091	109	110	1,588,310	111	112	114	115	116	117	118
Off-Aqueduct power-generating facilities	11,578	1,294	2,270	15,142	3,590	3,590	3,590	2,800	2,800	0	0
Recreation, planning, and Central Valley Project negotiations	424,976	12,683	450,342	12,683	12,683	12,683	12,683	11,379	11,379	11,379	11,379
Water quality monitoring	6,558	163	309	7,030	309	309	309	309	309	309	309
Davis-Grunsky Act Program	Subtotal	16,544,570	778,781	824,382	18,147,733	734,888	855,480	905,380	899,807	878,798	895,862
Payments to/credits from PG&E* under Comprehensive Agreement	(59,848)	0	0	(59,848)	0	0	0	0	0	0	0
Total OMP&R Costs	16,484,722	778,781	824,382	18,087,885	734,888	855,480	905,380	899,807	878,798	895,862	890,028
Composition											
Salaries and expenses of headquarters personnel	4,695,918	209,717	213,489	5,119,124	171,346	224,411	248,280	241,613	233,145	241,300	235,097
Salaries and expenses of field personnel	6,261,780	222,291	251,780	6,735,851	202,079	264,662	292,812	284,949	274,962	284,579	277,265
Pumping power	4,897,254	371,820	394,095	5,663,169	360,907	406,152	411,162	405,721	400,298	395,312	403,168
Used by pumping plants	(786,385)	(25,156)	(35,092)	(846,633)	445	(39,857)	(46,988)	(32,591)	(29,723)	(25,446)	(25,620)
Produced by generation plants	1,588,091	109	110	1,588,310	111	112	114	115	116	117	118
Off-Aqueduct power-generating facilities requirement	8,963	0	0	8,963	0	0	0	0	0	0	0
Oroville-Thermalito insurance premiums	(121,051)	0	0	(121,051)	0	0	0	0	0	0	0
Less portion of costs incurred during construction	(59,848)	0	0	(59,848)	0	0	0	0	0	0	0
Payments to/credits from PG&E* under Comprehensive Agreement	(59,848)	0	0	(59,848)	0	0	0	0	0	0	0
Total OMP&R Costs	16,484,722	778,781	824,382	18,087,885	734,888	855,480	905,380	899,807	878,798	895,862	890,028
Project Purpose											
Water supply and power generation	15,356,390	714,947	759,840	16,831,177	671,380	791,972	841,872	836,299	815,290	832,354	826,520
Recreation and fish and wildlife enhancement	329,640	27,359	25,542	382,540	25,542	25,542	25,542	25,542	25,542	25,542	25,542
Flood control	393,609	19,460	19,558	432,627	19,558	19,558	19,558	19,558	19,558	19,558	19,558
Miscellaneous purposes	422,523	15,747	17,815	456,085	16,781	16,781	16,781	16,781	16,781	16,781	16,781
Federal share: San Luis and Delta facilities	42,409	1,268	1,627	45,304	1,627	1,627	1,627	1,627	1,627	1,627	1,627
Other (Davis-Grunsky, drainage, City of Los Angeles)	(59,848)	0	0	(59,848)	0	0	0	0	0	0	0
Payments to/credits from PG&E* under Comprehensive Agreement	(59,848)	0	0	(59,848)	0	0	0	0	0	0	0
Total OMP&R Costs	16,484,722	778,781	824,382	18,087,885	734,888	855,480	905,380	899,807	878,798	895,862	890,028
Payments to/credits from PG&E* under Comprehensive Agreement											
Water supply and power generation	15,356,390	714,947	759,840	16,831,177	671,380	791,972	841,872	836,299	815,290	832,354	826,520
Recreation and fish and wildlife enhancement	329,640	27,359	25,542	382,540	25,542	25,542	25,542	25,542	25,542	25,542	25,542
Flood control	393,609	19,460	19,558	432,627	19,558	19,558	19,558	19,558	19,558	19,558	19,558
Miscellaneous purposes	422,523	15,747	17,815	456,085	16,781	16,781	16,781	16,781	16,781	16,781	16,781
Federal share: San Luis and Delta facilities	42,409	1,268	1,627	45,304	1,627	1,627	1,627	1,627	1,627	1,627	1,627
Other (Davis-Grunsky, drainage, City of Los Angeles)	(59,848)	0	0	(59,848)	0	0	0	0	0	0	0
Payments to/credits from PG&E* under Comprehensive Agreement	(59,848)	0	0	(59,848)	0	0	0	0	0	0	0
Total OMP&R Costs	16,484,722	778,781	824,382	18,087,885	734,888	855,480	905,380	899,807	878,798	895,862	890,028

* Pacific Gas & Electric Company

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 13-1. In Table 13-2, 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, 2019, show the total principal and interest payments, respectively, on bonds sold to date. Table 13-11 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 BA).

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 13-1 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 2.15 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 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 13-12 represent estimated costs of water delivery by service area for calendar years 2021 and 2026. The unit rates include costs of existing and future SWP facilities accounted for in Table 13-1 and Table 13-7. The unit water charges are based on the assumption that in 2021 and 2026, the SWP will be able to deliver the entire amount of water requested by each contractor. The unit water charges included in Table 13-12 are listed both as 2021 dollars and as escalated rates reflecting assumed future inflation of 4.0 percent from 2021 through 2026.

Table 13-12 Estimated Unit Water Charges for 2021 and 2026, by Service Area (in dollars per acre-foot)

Service Area and Charge	2021 (in 2021 dollars)	2026 (in 2026 dollars)
Feather River Area		
Capital; OM&R	554	605
North Bay Area		
Capital; OM&R	481	553
Power	28	24
Total	509	577
South Bay Area		
Capital; OM&R	501	554
Power	65	64
Total	566	618
Coastal Area		
Capital; OM&R	1,245	1,386
Power	155	188
Total	1,400	1,574
San Joaquin Area		
Capital; OM&R	220	245
Power	33	31
Total	253	276
Southern California Area		
Capital; OM&R	417	502
Power	188	207
Total	605	709

Table 13-1 Capital Requirements and Financing, December 31, 2019 (in thousands of dollars)

Line Number/Item	Calendar Year																
	1952–2017	2018	2019	1952–2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2020–2029	1952–2029	
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	116,641	146	132	116,919	239	2,456	1,411	976	1,688	0	0	0	0	0	6,770	123,689	
3. Delta & Suisun Marsh Facilities	365,192	42,559	23,046	430,797	88,052	42,806	47,019	21,591	7,673	16,008	20,496	10,840	0	0	254,484	685,281	
4. Final 4 Units at Banks Delta 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	520,482	2,282	1,951	524,715	4,466	4,397	3,029	4,238	367	272	272	272	0	0	17,313	542,028	
6. West Branch Aqueduct	225,521	5,977	10,519	242,017	15,858	17,901	20,700	18,213	20,567	39,527	54,951	50,462	0	0	238,179	480,196	
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	556,083	20,039	18,774	594,896	151	180	0	0	0	0	0	0	0	0	331	595,227	
9. East Branch Extension	413,906	6,794	201	420,901	96	0	0	0	0	0	0	0	0	0	96	420,997	
10. South Bay Aqueduct Improvements and Enlargement	274,684	453	769	275,907	446	1,549	48	0	0	0	0	0	0	0	0	2,043	277,950
11. Power Generation and Transmission Facilities	925,436	21,438	6,731	953,605	13,144	3,897	2,582	1,817	295	249	254	2,881	0	0	25,119	978,724	
12. Additional Conservation Facilities	175,789	2,407	2,989	181,184	3,272	3,272	3,272	3,272	3,272	3,272	3,272	3,272	3,272	3,272	32,720	213,904	
13. Agricultural Drainage Facilities	88,981	1,105	1,318	91,404	1,041	1,041	0	0	0	0	0	0	0	0	3,123	94,527	
14. Other Costs	1,048,782	259,385	161,644	1,469,812	252,910	228,020	317,056	424,189	349,320	246,253	261,146	226,515	0	0	2,305,409	3,775,221	
15. Total Project Construction Expenditures	7,419,518	362,584	228,074	8,010,176	379,675	305,519	396,158	474,296	383,182	305,581	340,391	294,242	3,272	3,272	2,885,587	10,895,763	
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	558,507	(28,272)	(46,456)	483,778	30,298	21,382	27,845	33,575	27,088	21,466	23,901	20,637	0	0	206,191	689,970	
18. Total Capital Requirements	8,108,024	334,312	181,618	8,623,954	409,972	326,901	424,003	507,871	410,269	327,047	364,292	314,879	3,272	3,272	3,091,779	11,715,733	
19. Power Facilities Capital Requirements	925,436	21,438	6,731	953,605	13,144	3,897	2,582	1,817	295	249	254	2,881	0	0	25,119	978,724	
20. Water Facilities Capital Requirements	7,182,588	312,874	174,887	7,670,349	396,828	323,004	421,421	506,054	409,974	326,798	364,038	311,998	3,272	3,272	3,066,660	10,737,009	
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	411,920	3,555	275	415,750	0	0	0	0	0	0	0	0	0	0	0	415,750	
25. East Branch Extension, Future Bonds	0	0	0	0	104	0	0	0	0	0	0	0	0	0	104	104	
26. South Bay Aqueduct Enlargement, Current Bonds	224,418	415	200	225,033	0	0	0	0	0	0	0	0	0	0	0	225,033	
27. South Bay Aqueduct Enlargement, Future Bonds	0	0	0	0	482	1,660	51	0	0	0	0	0	0	0	0	2,194	2,194
28. Water System Facilities, Current Bonds	2,386,834	364,475	299,115	3,050,424	0	0	0	0	0	0	0	0	0	0	0	3,050,424	
29. Water System Facilities, Future Bonds	0	0	0	0	391,679	459,514	529,451	573,371	495,769	362,547	389,792	320,379	8,772	0	3,531,274	3,531,274	
30. Subtotal, Water System Revenue Bonds	3,505,812	368,445	299,590	4,173,847	392,265	461,173	529,503	573,371	495,769	362,547	389,792	320,379	8,772	0	3,533,572	7,707,418	
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	647,964	(38,695)	(122,477)	486,793	13,207	(138,772)	(110,000)	(70,000)	(90,000)	(40,000)	(30,000)	(10,000)	(10,000)	(1,228)	(486,793)	0	
35. Direct Pay	8,023	62	5	8,090	0	0	0	0	0	0	0	0	0	0	0	8,090	
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	126,990	4,500	4,500	135,990	4,500	4,500	4,500	4,500	4,500	4,500	4,500	4,500	4,500	4,500	45,000	180,990	
38. Subtotal, Other Capital Financing	3,439,755	(34,133)	(117,972)	3,287,650	17,707	(134,272)	(105,500)	(65,500)	(85,500)	(35,500)	(25,500)	(5,500)	(5,500)	(3,272)	(441,793)	2,845,857	
39.																	

Table 13-2 State Water Project Revenues and Expenditures, December 31, 2019 (in thousands of dollars)

Line Number/Item	Calendar Year															
	1952-2017	2018	2019	1952-2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2020-2029	1952-2029
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	5,823,343	223,738	219,254	6,266,335	214,360	214,124	218,927	234,265	253,602	252,368	251,291	250,425	249,666	248,706	2,387,734	8,654,069
3. Transportation Minimum	5,189,694	262,096	273,377	5,725,167	319,087	277,370	333,883	311,023	314,133	317,274	320,447	323,651	326,888	330,157	3,173,912	8,899,080
4. Transportation Variable	6,911,480	279,250	317,702	7,508,432	162,570	325,656	321,405	350,389	336,611	350,656	336,595	339,466	350,120	347,332	3,220,798	10,729,230
5. Off-Aqueduct Power Facilities	3,216,511	2,403	2,263	3,221,177	6,081	6,650	150	150	150	150	150	150	150	150	13,931	3,235,108
6. Delta Water Charge	4,200,426	289,879	292,398	4,782,703	340,503	356,986	356,986	356,986	356,986	356,986	356,986	356,986	356,986	356,986	3,553,376	8,336,078
7. East Branch Enlargement	1,116,042	45,781	47,013	1,208,836	47,512	48,158	46,762	40,430	41,909	46,251	24,684	25,070	20,175	20,564	361,516	1,570,352
8. East Branch Extension	277,558	38,689	43,937	360,184	45,442	45,813	45,066	44,778	44,620	44,664	45,328	49,357	55,123	55,042	475,233	835,418
9. Coastal Extension	69,175	3,136	3,051	75,362	3,484	3,488	4,299	3,241	3,238	2,645	2,685	2,589	3,658	3,691	33,018	108,380
10. South Bay Aqueduct Enlargement	141,049	18,846	19,983	179,879	19,384	19,296	19,464	19,702	19,660	19,502	20,670	21,375	22,378	22,301	203,731	383,611
11. Tehachapi East Afterbay	58,542	5,970	6,100	70,613	6,121	6,157	6,239	6,315	6,323	6,220	6,937	7,317	7,956	7,935	67,520	138,133
12. Water Revenue Bond Surcharge	778,831	35,124	49,417	863,373	84,275	83,770	83,506	85,459	85,136	83,734	80,610	83,918	75,460	77,598	823,466	1,686,838
13. <i>Subtotal, Water Contractor Payments</i>	27,782,652	1,204,912	1,274,497	30,262,060	1,248,819	1,387,469	1,436,685	1,452,737	1,462,367	1,480,449	1,446,383	1,460,305	1,468,559	1,470,462	14,314,236	44,576,296
14. Revenue Bond Cover Adjustments	(1,175,498)	(54,228)	(62,159)	(1,291,886)	(70,668)	(69,511)	(69,280)	(66,433)	(65,546)	(64,186)	(58,591)	(61,632)	(57,342)	(58,592)	(641,780)	(1,933,666)
15. Rate Management Adjustments	(623,503)	(40,470)	(40,479)	(704,452)	(40,471)	(40,471)	(40,471)	(40,471)	(40,471)	(40,471)	(40,471)	(40,471)	(40,471)	(40,471)	(404,708)	(1,109,160)
Other Revenues																
16. Federal Payments for Project Operating Costs	449,989	20,443	22,380	492,812	23,701	23,701	23,701	23,701	23,701	23,701	23,701	23,701	23,701	23,701	237,014	729,826
17. Appropriations for Operating Costs Allocated to Recreation	60,509	7,500	5,860	73,869	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	100,000	173,869
18. Davis-Grunsky Loan Repayments	78,761	1,114	883	80,758	872	880	880	865	786	723	689	606	564	415	7,281	88,039
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	581,834	6,181	6,192	594,207	6,190	6,190	6,190	6,190	6,190	6,190	6,190	6,190	6,190	6,190	61,900	656,107
21. Oroville-Thermalito Payments	249,279	0	0	249,279	0	0	0	0	0	0	0	0	0	0	0	249,279
22. Miscellaneous Revenues	184,264	0	0	184,264	0	0	0	0	0	0	0	0	0	0	0	184,264
23. <i>Subtotal, Other Revenues</i>	2,257,613	35,237	35,315	2,328,165	40,763	40,771	40,771	40,756	40,677	40,615	40,581	40,498	40,456	40,307	406,195	2,734,360
24. Total Operating Revenues	28,241,264	1,145,450	1,207,173	30,593,887	1,178,444	1,318,259	1,367,706	1,386,590	1,397,028	1,416,406	1,387,902	1,398,699	1,411,203	1,411,706	13,673,943	44,267,830
25. Total Operating Revenues and Capital Resources Revenues	29,055,965	1,145,450	1,207,173	31,408,588	1,178,444	1,318,259	1,367,706	1,386,590	1,397,028	1,416,406	1,387,902	1,398,699	1,411,203	1,411,706	13,673,943	45,082,531
PROJECT EXPENSES																
26. Project Operations, Maintenance, Power, and Replacement Costs	16,484,722	778,781	824,382	18,087,885	734,888	855,480	905,380	899,807	878,798	895,862	890,028	890,905	921,795	912,830	8,785,773	26,873,657
27. Deposits to Replacement Reserves	112,600	2,613	(485)	114,728	0	0	0	0	0	0	0	0	0	0	0	114,728
28. Deposits to Special Reserves Under Revenue Bond Financing	914,363	89,480	89,747	1,093,589	85,719	85,747	54,619	54,381	34,714	(8,587)	(49,554)	(99,898)	(145,142)	(142,035)	(130,036)	963,553
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)	3,869,271	158,070	164,519	4,191,860	185,177	180,234	181,099	167,562	172,967	174,938	161,845	182,020	173,904	188,161	1,767,907	5,959,767
31. Interest on Bonds Sold Through December 31, 2015 (Current Bonds)	6,568,821	112,007	124,511	6,805,339	124,918	115,840	107,151	98,261	89,253	81,809	72,518	64,510	55,465	46,207	855,932	7,661,271
32. Future Water Bond Principal Repayments	0	0	0	0	26,327	48,016	78,111	116,023	161,419	205,847	243,700	289,219	33			

Table 13-11 Annual Debt Service on Bonds Sold through December 31, 2019 (in thousands of dollars)

1 of 2

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 Branch 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							
		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	0	2,803	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	0	0	11,114	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	0	0	16,742	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	0	0	26,912	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	0	0	41,636	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	0	0	57,909	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	0	0	66,343	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	0	0	76,043	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	0	0	0	1,260	81,086	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	0	0	0	2,530	82,390	0	0	7,708	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	0	0	0	4,400	82,501	0	0	7,708	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	0	0	0	6,475	82,259	0	0	7,708	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	0	0	0	8,555	82,218	0	0	7,708	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	0	0	0	11,835	82,050	0	0	7,708	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	0	0	0	18,475	81,849	0	0	7,708	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	0	0	0	25,235	80,965	0	0	7,708	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	0	0	0	19,315	87,607	0	0	7,708	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	0	0	0	22,935	85,845	0	0	7,708	0	5,312	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	0	0	0	37,170	84,422	0	0	7,708	0	14,347	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	0	2,449	0	3,727	0	0	0	0	41,630	88,763	900	0	7,708	0	35,719	0	4,777	0	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	0	4,198	0	3,727	0	0	0	0	32,430	88,298	955	0	7,647	0	35,719	0	5,647	0	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	0	4,198	0	3,727	0	0	0	0	35,930	86,723	1,010	0	7,583	9,425	27,209	0	5,647	0	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	0	4,263	0	3,537	0	0	0	0	35,980	84,778	1,070	0	7,515	3,805	32,882	0	5,516	1,240	10,315	0	4,021	0	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	0	7,822	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	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	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	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	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	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	0	0	75,165	165,094			
1993	33,390	52,707	13,755	2,237	1,525	5,688	755	3,3																															

Table 13-11 Annual Debt Service on Bonds Sold through December 31, 2019 (in thousands of dollars)

2 of 2

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 Branch Extension Facilities Water System Revenue Bonds ³		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						
2018	25,435	3,011	0	0	4,661	1,094	2,720	694	2,442	547	70,157	67,783	105,415	73,129	6,910	2,045	0	0	0	0	0	0	22,883	10,248	1,572	936	11,246	15,790	7,487	7,644	2,557	2,215	158,070	112,007				
2019	16,975	1,804	0	0	4,238	939	2,499	641	2,173	458	87,019	82,533	112,904	86,375	7,325	1,682	0	0	0	0	0	0	20,227	9,168	983	1,089	12,652	16,304	7,757	2,670	2,218	164,518	124,511					
2020	17,405	956	0	0	5,259	733	3,139	518	2,713	343	102,029	86,760	130,545	89,310	7,765	1,298	0	0	0	0	0	0	20,848	8,234	1,739	997	13,453	15,597	8,043	7,385	2,785	2,098	185,178	124,919				
2021	8,595	318	0	0	2,525	474	1,591	365	1,128	207	108,438	81,501	122,277	82,865	8,230	890	0	0	0	0	0	0	22,506	7,212	1,880	910	14,016	14,989	8,386	7,002	2,939	1,972	180,234	115,840				
2022	1,885	59	0	0	5,005	350	4,702	287	1,185	152	107,944	76,174	120,721	77,022	8,725	458	0	0	0	0	0	0	22,458	6,116	2,623	817	14,638	14,313	8,786	6,597	3,148	1,828	181,099	107,151				
2023	85	7	0	0	1,004	112	532	67	634	93	117,393	70,834	119,648	71,113	0	0	0	0	0	0	0	18,494	5,015	1,904	688	14,751	13,604	9,400	6,169	3,365	1,672	167,562	98,261					
2024	35	2	0	0	638	64	361	41	423	63	120,236	64,343	121,693	64,513	0	0	0	0	0	0	0	20,613	4,079	1,994	597	15,273	12,881	9,852	5,683	3,542	1,500	172,967	89,253					
2025	0	0	0	0	135	33	96	23	167	42	118,074	59,412	118,472	59,510	0	0	0	0	0	0	0	25,067	3,098	1,615	501	15,983	12,131	10,172	5,238	3,629	1,331	174,938	81,809					
2026	0	0	0	0	141	26	101	18	183	34	117,381	52,973	117,806	53,051	0	0	0	0	0	0	0	9,075	1,837	1,724	424	17,224	11,346	11,629	4,714	4,387	1,146	161,845	72,518					
2027	0	0	0	0	376	19	268	13	262	26	130,666	47,146	131,572	47,204	0	0	0	0	0	0	0	9,825	1,396	1,727	344	21,217	10,499	12,769	4,139	4,910	928	182,020	64,510					
2028	0	0	0	0	0	0	0	0	146	14	118,026	40,642	118,172	40,656	0	0	0	0	0	0	0	6,394	911	2,667	260	26,801	9,450	14,204	3,505	5,666	683	173,904	55,465					
2029	0	0	0	0	0	0	0	0	155	7	129,356	34,193	129,511	34,200	0	0	0	0	0	0	0	7,040	576	2,819	134	27,986	8,122	14,871	2,778	5,934	397	188,161	46,207					
2030	0	0	0	0	0	0	0	0	0	0	104,032	28,509	104,032	28,509	0	0	0	0	0	0	0	1,315	258	0	0	21,321	6,744	8,037	2,066	412	106	135,117	37,683					
2031	0	0	0	0	0	0	0	0	0	0	107,880	24,537	107,880	24,537	0	0	0	0	0	0	0	1,335	232	0	0	22,363	5,687	8,389	1,710	423	92	140,390	32,258					
2032	0	0	0	0	0	0	0	0	0	0	113,032	19,504	113,032	19,504	0	0	0	0	0	0	0	1,395	175	0	0	23,611	4,577	8,786	1,303	446	72	147,270	25,631					
2033	0	0	0	0	0	0	0	0	0	0	117,598	14,795	117,598	14,795	0	0	0	0	0	0	0	1,435	133	0	0	24,749	3,437	6,830	902	468	55	151,080	19,322					
2034	0	0	0	0	0	0	0	0	0	0	122,496	9,889	122,496	9,889	0	0	0	0	0	0	0	1,480	90	0	0	27,159	2,242	7,170	600	485	37	158,790	12,858					
2035	0	0	0	0	0	0	0	0	0	0	127,150	5,072	127,150	5,072	0	0	0	0	0	0	0	1,525	46	0	0	28,253	1,148	7,440	324	506	19	164,874	6,609					
Total	1,582,400	2,384,309	244,995	246,522	106,494	195,997	59,781	101,057	48,925	82,070	2,804,771	2,417,004	4,847,366	5,426,959	139,165	283,872	440,493	567,878	65,341	114,454	137,654	224,290	481,223															



Chapter 14

SWP Education and Information

Department of Water Resources employees staffed a booth at the Feather River Fish Hatchery during the Oroville Salmon Festival.

Significant Events in 2019

The California Department of Water Resources (DWR) Public Affairs Office (PAO) expanded messaging for DWR projects and programs through many ways in 2019.

DWR provided approximately 57,000 water education materials to educators throughout California and hosted the Water Education Committee in Sacramento. Over a two-day period, more than 40 water educators, outreach, and public information staff heard from DWR experts on climate change, multi-benefits projects, water conveyance, aging infrastructure, and groundwater. A new collaborative project to educate students about the State Water Project (SWP) and Sacramento-San Joaquin Delta ecology began in 2019 between DWR's Water Education Program and Division of Environmental Services, with support from the Solano Resource Conservation District.

As work for the Oroville Dam Spillways Reconstruction Project was completed, PAO informed the community of key milestones through community meetings, weekly newsletters, news releases, and videos on social media, including the reopening of major recreation facilities closed since the Oroville Dam spillways incident in February 2017. PAO supported the California Natural Resources Agency public affairs office in launching the Oroville Dam Citizens Advisory Commission, created in 2018 by Senate Bill 955 (Nielsen, Chapter 509, Statutes of 2018), to be a public forum for discussing issues related to Oroville Dam facilities. PAO began distribution of the weekly *Lake Oroville Community Update* newsletter in May with nearly 1,000 subscribers.

PAO provided messaging and other communication tools for SWP allocations, Castaic and Pyramid Dams modernization projects, algal blooms at SWP reservoirs, the Perris Dam Remediation Project, and DWR's snow surveys near Lake Tahoe.

In 2019, DWR's social media channels had 35,500 followers on Facebook; 21,500 on Twitter; 2,600 on Instagram; 13,700 on LinkedIn; and 15,700 on YouTube.

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, digital articles, 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

In 2019, PAO participated in several outreach efforts and news media responses related to State Water Project (SWP) policy, programs, events, and activities.

Oroville Spillways Recovery

After completion of Phase I of the Oroville Dam Spillways Reconstruction Project in November 2017 to build a functional service spillway, construction continued in 2019 to complete the emergency spillway and perform minor finishing work on the service spillway. The reconstructed service spillway was successfully used in April to provide flood storage during the water year. PAO used a variety of communication tools to keep the public informed of project milestones. PAO also developed and maintained a dynamic web page for the reconstruction project that included images documenting the emergency response and recovery efforts. Video and drone footage of all phases of the project were available on DWR's YouTube page.

Oroville-Thermalito Complex

Recreation returned to the crest of Oroville Dam in May when pedestrian and bicycle access to the popular walkway was restored. The spillway boat ramp area reopened in August, returning Lake Oroville's largest boat launch facility to full use. Stage II construction to build paved parking and additional low water access boat ramp lanes at the Bidwell Canyon area began but was halted because of rising lake elevations. The

Robie Thermalito Pumping-Generating Plant was reconnected to full power and began complete testing of all internal electrical and mechanical systems replaced after being destroyed by fire in 2012. PAO began distribution of the weekly *Lake Oroville Community Update* newsletter in May with nearly 1,000 subscribers and produced an informational newspaper insert *Lake Oroville: Part of Our Community*.

Sustainable Groundwater Management Act

The Sustainable Groundwater Management Act, passed in 2014, provides a framework for groundwater management and empowers local groundwater sustainability agencies to develop and implement long-term plans to manage their groundwater sustainability within 20 years. In 2019, DWR conducted its regulatory review and approved nine Alternatives to Groundwater Sustainability Plans submitted to DWR for basins seeking compliance under the act. Additionally, DWR continued to provide assistance to local groundwater sustainability agencies, including relevant groundwater datasets, funding for local planning support, and facilitation support for groundwater sustainability agencies. PAO provided communications for these efforts and informational public meetings that DWR hosted throughout the state. PAO also worked on communications materials, such as news releases and brochures, for these efforts.

Snow Surveys

After more than 30 atmospheric rivers in Northern California, with many making landfall, the state's snowpack on April 1 was 175 percent of average. As part of the monthly snow surveys' press conferences at Phillips Station near Lake Tahoe, PAO responded to multiple media outlets attending the event. In addition to providing a broadcast of the event on Facebook Live and video and photography website links, PAO distributed advisories, news releases, and social media messaging.

SWP Allocations

On November 30, 2018, PAO distributed the news release for the initial SWP allocation at 10 percent. The release for the final SWP allocation at 75 percent was issued on June 20, 2019. DWR transports SWP water to 29 water contractors which serve more than 27 million Californians and 750,000 acres of farmland.

Perris Dam Remediation Project

For the Perris Dam Remediation Project's second major project launching, PAO provided a news release, social media messaging, and website updates. Information highlighted the construction on the Outlet Tower Bridge that is part of the Outlet Tower Improvements Project, the second of three Perris Dam seismic retrofit projects.

Castaic and Pyramid Dams Modernization Programs

For the SWP modernization programs at Castaic and Pyramid dams, PAO developed web pages, releases, flyers, fact sheets, social media messaging, and photography. In addition to coordinating messaging with several agencies, PAO planned and participated in the annual meeting with emergency management agencies.

Algal Blooms at SWP Reservoirs

PAO responded to media and public inquiries about algal bloom concerns in English and Spanish. Algal bloom advisories were posted to DWR's website and social media for Lake Perris, Silverwood Lake, Castaic Lake, Pyramid Lake, and San Luis Reservoir.

News Media

Publications

Brochures

PAO creates and maintains more than 40 brochures about the SWP and DWR. They are distributed to the public and others at events throughout California. Digital copies are also available.

Brochure updates included *SWP at a Glance* and the California SWP. PAO also prepared Spanish translations for several facilities and programs, including algal blooms, SWP visitors centers, Perris Dam projects, Feather River Fish Hatchery, SWP safety, SWP recreation, and water conservation and education.

DWR News Releases

PAO issued dozens of news releases on a variety of topics, including the Castaic Dam Modernization Program kickoff; Perris Dam Seismic Remediation Project, second phase; SWP allocations; Water Year 2020; Oroville Spillways Federal Emergency Management Agency (FEMA) reimbursement; fuel reduction projects around Lake Oroville; public meetings on permitting for long-term SWP operations; Oroville's Thermalito Diversion Pool, Brad Freeman Trail, and Oroville Dam Spillway boat ramp and Crest Road reopenings; and algal blooms at several SWP reservoirs.

Digital Resources

Water News

Each weekday, PAO compiles and electronically distributes news articles, digital articles, 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 issues relevant to DWR and its programs.

Topics highlighted in the weekday news clips include water supply, water quality, climate change, drought, watershed programs, activities of other water-related agencies and groups, and relevant legislation.

DWR Updates

DWR updates or digital articles feature DWR projects, programs, and employees. The features posted to the public DWR website highlight news and updates related to the SWP. Article topics included SWP modernization programs; Division of Operations and Maintenance's Apprentice Program; algal blooms at SWP reservoirs; Lake Oroville boat ramp and Oroville Dam spillways projects; the resumption of Robie Thermalito Pumping-Generating Plant operations; the Tule Red restoration project in Suisun Marsh; and SWP water safety and recreation.

Social Media

DWR's social media presence includes Facebook, Twitter, Instagram, and YouTube. DWR increased its social media presence through continued engagement with followers on each platform, using more multimedia—graphics, videos, photos—and identifying stakeholders that amplify content on their own social media channels. In 2019, DWR's social media channels had the following number of followers:

- Facebook: 35,500

- Twitter: 21,500
- Instagram: 2,600
- LinkedIn: 13,700
- YouTube: 15,700

PAO posts multiple messages on Facebook, Twitter, Instagram, and YouTube about various DWR projects, including the SWP, along with updates and activities of interest to the public and DWR employees.

Photography and Videos

Several SWP facilities and programs were documented by PAO's photography and video units. Some videos posted to DWR's YouTube featured the Oroville Dam Spillways Reconstruction Project and Oroville Dam Crest Road reopening, Tule Red restoration project in the Suisun Marsh, the Forecast-Coordinated Operations Program, and snow surveys. DWR photography highlighted work for the Porter Tunnel inspections in Kern County, Castaic Dam and Pyramid Dam modernization programs, the Fish Science Building in the Delta Field Division, the Gianelli Pumping-Generating Plant refurbishment project, the Oroville Salmon Festival, and algal blooms at SWP reservoirs (Silverwood Lake, Pyramid Lake, San Luis Reservoir, and Castaic Lake).

Website

PAO manages the content of DWR's public website, including text, photos, and video. PAO also advises DWR departmental programs on page layout, edited text, and selected photos for SWP program pages.

In addition to creating new pages for SWP recreation and SWP modernization programs in 2019, PAO updated the Perris Dam Seismic Remediation Project and algal bloom web pages.

Community Relations and Outreach

In 2019, PAO continued to educate the public about water, water conservation, and the SWP by attending several events.

California State Fair

In July 2019, 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.

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. DWR guides led more than 300 tours at Lake Oroville Visitors Center and the Feather River Fish Hatchery. Tours were also provided to Metropolitan Water District of Southern California and international delegates.

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 14-1 shows the SWP visitors center locations.

The final drafts of the Interpretation Master Plans for the three visitors centers were completed. In addition to providing draft content for the development of the Exhibit Master Plan, the plans provide recommendations on modernizing DWR exhibits and tours.

In 2019, more than 715,000 hours of education were provided to guests.

Education hours include visits to the visitors centers, guided programs, self-guided tours with presentations, and outreach.

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.

In 2019, PAO promoted SWP water education and safety at the following events:

- Bok Kai Festival, Marysville
- Chalk It Up Festival, Sacramento
- Cinco de Mayo Festival, Stockton
- Courtland Pear Festival, Courtland
- Earth Day, Napa
- Eco Fair, Vacaville
- Junior Water Ambassadors Academy, Palmdale
- Patterson Apricot Festival, Patterson
- Salmon Festival, Oroville
- Santa Clarita River Rally and Environmental Expo, Santa Clarita
- Water 101 Academy Ambassador Program, Santa Clara Valley Water District, San Jose

School Education Program

Established in 1976 with the goal of educating K-6 students about the importance of water conservation, DWR's School Education Program seeks to educate California's students, parents, and educators about water concepts and issues, including the vital role of the SWP in California's water conveyance systems, and the effects of the state's geography, climate, and population on water resources. DWR provides classroom resources to California teachers, attends

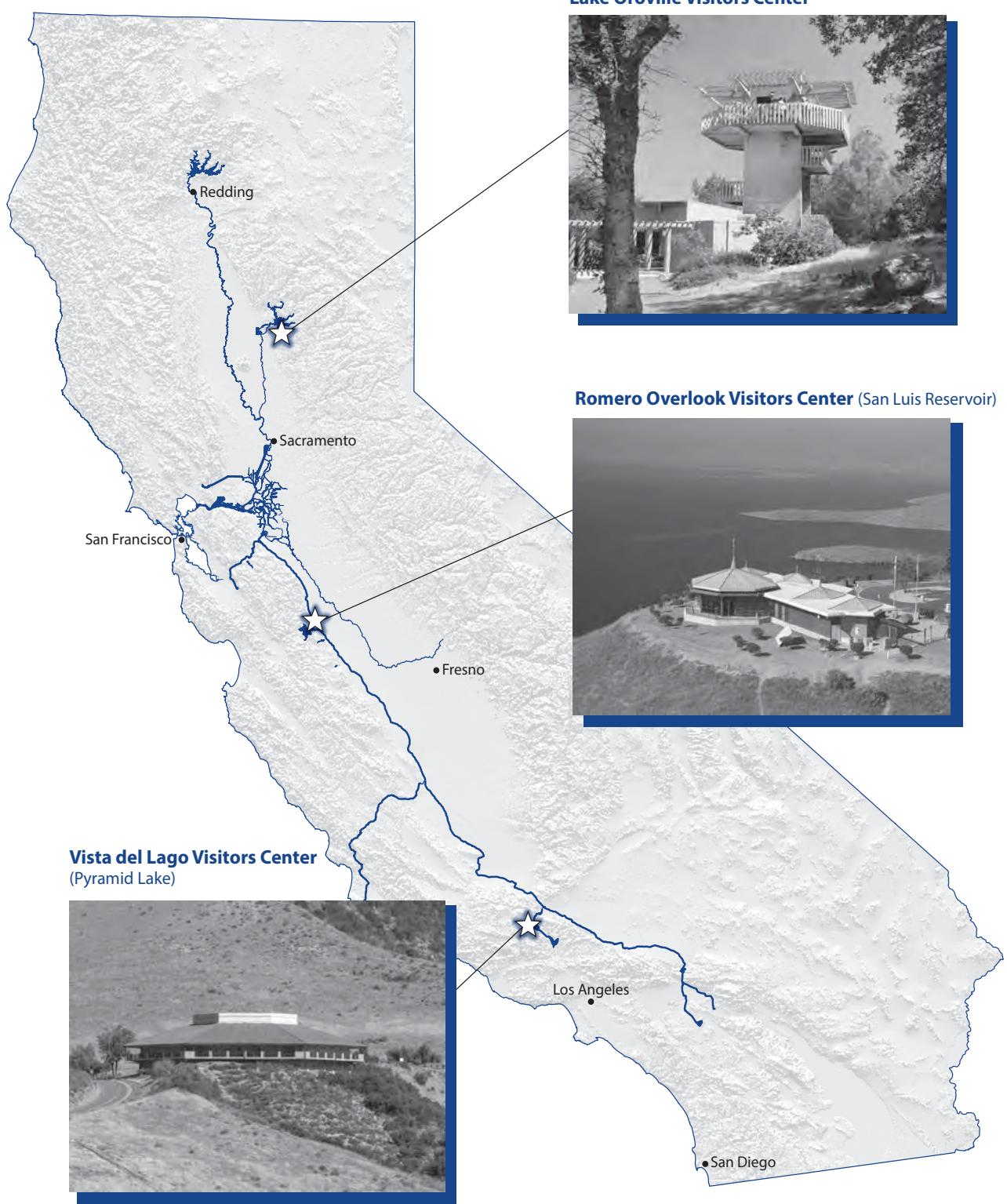


Figure 14-1 Visitors Centers on the SWP

events, coordinates water education professional development workshops, and facilitates a statewide network of water educators. The program works with other DWR divisions and offices, along with external partners, to develop and promote the classroom materials and professional development workshops. Program achievements for 2019 are described below.

School Events and Educator Outreach

In 2019, PAO, Integrated Regional Water Management, and Division of Environmental Services interacted with more than 3,000 children, teachers, and family members, and provided materials at multiple events including the following:

- San Joaquin County AgVenture, Stockton, Lodi, and Manteca
- State Scientist Day, Sacramento
- Farm Day, Amador County

As in previous years, DWR recruited a team of judges from the Bay-Delta and SWP offices to judge and provide a special award for the best water resources project at the Sacramento Regional Science and Engineering Fair in April.

PAO also represented DWR at the annual California Association of Science Teachers conference in October, with having a table in the exhibit hall and by making two presentations. Teachers who visited the PAO table in the exhibit hall learned about the available resources and could take samples with them back to their classrooms. The presentations included a session on teaching about California's water resources and an exhibitor session where DWR shared its resources in a format different than the exhibit hall.

In December, DWR was invited to attend a two-day University of California/California State University Climate Summit

at University of California, Los Angeles to discuss ways to develop in-service and pre-service climate change training for California's K-12 educators.

Supplementary Teaching Materials

Since its earliest days, the school education program has provided supplementary teaching materials, including posters, maps, worksheets, workbooks, and videos. California teachers, water agencies, and other non-formal educators can order these through the *Water Facts & Fun* online catalog or receive them at outreach events.

In 2019, approximately 57,000 materials were provided to educators throughout California.

The new poster on climate change and its impacts on California's water resources, which was developed in 2018, was printed and began to be distributed in 2019. DWR also completed its collaboration with The Metropolitan Water District of Southern California that involved developing a virtual reality tour of the SWP. These were added to the Apple and Google Play app stores as free apps and incorporated into The Metropolitan Water District of Southern California's water education program.

A new collaborative project began in 2019 between DWR's water education program and Division of Environmental Services, with support from the Solano Resource Conservation District. This project involved developing several "push-in" lessons for grades six, seven, and eight that would educate students in Rio Vista about the SWP and Sacramento-San Joaquin Delta ecology, and encourage them to consider career opportunities in water resources, including at the future Rio Vista Estuarine Research Station.

Professional Development for Teachers

DWR's water education program funded two professional development workshops for teachers and helped coordinate several others in 2019. Through these workshops, more than 150 teachers, who reach more than 20,000 students annually, learned about California water resources, the impacts of climate change on water, and the importance of the SWP and healthy watersheds. These workshops included the following:

- California Environmental Education Foundation Teacher Institute
- Delta Studies Institute for teachers, cosponsored with the San Joaquin County Office of Education
- Sacramento River Floodplain Ecology Institute for teachers, sponsored by DWR's Division of Flood Management in collaboration with California State University, Chico
- Central Valley Floodplain Ecology Institute for educators, sponsored by DWR's Division of Flood Management in collaboration with Science, Art & Music Academy and the Central Valley Science Project, California State University, Fresno
- Sacramento Floodplain Ecology Institute, sponsored by DWR's Division of Flood Management in collaboration with the Galt Joint Union Elementary School District
- Water and Climate Project Water Education for Teachers (WET) workshops, sponsored by DWR's Climate Hawks team

- California Project WET Program Advisory Committee
- California Department of Education's California Environmental Education Interagency Network Committee
- Water Education Committee meetings, hosted by the Soquel Creek Water District and Water Replenishment District of Southern California
- Creek Week Planning Committee, Splash Off, and community event
- Caring for Our Watersheds contest, sponsored by Agrium Inc. and the Center for Land-Based Learning
- National Network for Ocean and Climate Change Interpretation Governing Council

In 2019, DWR hosted the Water Education Committee in Sacramento. Over a two-day period, more than 40 water educators, outreach, and public information staff heard from DWR experts on climate change, multi-benefits projects, water conveyance, aging infrastructure, and groundwater. Guest speakers discussed best practices in science education and flood risk communication. Attendees also visited the Oroville Dam to learn about the SWP and the education and outreach programs at the dam.

Collaboration and Partnerships

DWR's School Education Program collaborates with other entities with similar interests and goals to pool resources in educating California's youth on the importance of water resources. During 2019, PAO participated in the following collaborative activities/meetings:

Glossary

This glossary contains terms used in the text of Bulletin 132-20 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.

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 Formerly 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.

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 Somewhat salty. Water containing dissolved minerals in amounts that exceed normally acceptable standards for municipal, domestic, and irrigation uses. Brackish water contains 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.

butterfly valve A device that controls the passage of water through pipelines. Valves are important for water infrastructure because they act as the primary line of defense when there is an issue in the pipeline and water flow needs to be isolated to prevent effects on adjacent infrastructure. A butterfly valve is distinguished from other types of valves by its closing mechanism, which is a disk that rotates.

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 WaterFix An infrastructure project that would include constructing two tunnels to convey water from the north to the south Delta. The purpose of California 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.

circuit breaker A switch that automatically interrupts the current of an overloaded electric circuit.

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.

Cormack-Jolly-Seber model A type of capture-recapture model used to estimate abundance/population size and survival.

creel survey A creel is a wicker basket to hold fish: an angler's fishing basket. A creel survey is a sampling tool used to measure the fishing activities of sport anglers and to estimate the number of fish harvested from a body of water. It involves interviewing anglers about the day's fishing effort, including what the angler caught, released, how much time was spent fishing, and sometimes measuring fish and counting boats or watercraft.

crop idling Removing lands from irrigation with the aim of returning the lands to irrigation later. Crop idling may be done once or can be episodic.

crown fire A forest fire that spreads from treetop to treetop.

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.

cypriniform fish A soft-finned fish of the order Cypriniforms. It includes carps, minnows, loaches, and relatives.

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 causes of harmful algal blooms.

disked, disking To cultivate with an implement (such as a harrow or plow) that turns and loosens the soil with a series of discs.

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.

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.

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.

electrofishing A fishing technique that uses direct current electricity flowing between a submerged cathode and anode. This affects the movements of nearby fish so that they swim toward the anode, where they can be caught or stunned. Electrofishing is a common scientific survey method used to sample fish populations to determine abundance, density and species composition. When performed correctly, electrofishing results in no permanent harm to the fish, which return to their natural mobility state in as little as two minutes after being caught.

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.

epiphyte An organism that usually grows on the surface of a plant and derives its moisture and nutrients from the air, rain, water (in marine environments), or from debris accumulating around it.

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.

evapotranspiration The amount of water transpired by plants, retained in plant tissues, and evaporated from plant tissues and surrounding soil surfaces.

excess water conditions Periods when it is agreed that releases from upstream reservoirs plus unregulated flow exceeds Sacramento Valley in-basin uses plus exports. DWR and the Bureau of Reclamation jointly decide when balanced or excess water conditions exist. During excess water conditions, sufficient water is available to meet all beneficial needs, and the SWP and Central Valley Project are not required to supplement the supply with water from reservoir storage.

export An amount of water transported from one source or location to another.

F

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.

flashboard One or more boards projecting above the top of a dam to increase the depth of the water.

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.

fuel Any material that burns. Fuel feeds a fire by providing energy. It can be anything from live or dead plants to structures, such as homes. There are different types of fuel, such as fuels in the understory (surface fuels) and fuels that extend from the ground to surface into higher levels of the forest (ladder fuels).

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 algae (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.

ground fire A fire that burns mostly in decayed rotos below ground and in the duff layer (the duff layer is made up of compacted dead plant materials such as leaves, bark, needles, and twigs). Ground fires are sustained by glowing combustion (without flames) and can go undetected for a long time because they produce little to no smoke and spread slowly.

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.

louver An opening provided with one or more slanted fixed or movable fins to allow flow of water; also, a vane or shutter of a louver.

M

macrofauna Animals large enough to be seen by the naked eye.

mark-recapture Method used to estimate the size of a population where it is not practical to count every individual. A small number of animals are captured, marked, and released back into the population. Later, another small number of animals is captured, and the researcher records how many of the animals have a mark.

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 by-product 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 contractors to address fundamental contract issues by amending the Water Supply Contracts.

Monterey Amendments Amendments to the Water Supply Contracts for the SWP entered into by DWR and most (27 of 29) of the SWP 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.

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.

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

panne Water-retaining depressions located within salt and brackish marshes. Pannes usually do not maintain water in the summer months between high tides.

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 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 (e.g., human error), and surveillance approach. The goal of a PFMA is to consider how a 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.

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.

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).

redd A shallow nest of fish eggs covered with gravel in a streambed.

Regional in Nature program A professional term used by California State Parks and certain other local-level California park districts to describe nature programs offered by their districts. Other nature programs offered at a park but not administered by the district are referred to as “non-Regional in Nature” in this context.

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.

riffle A shallow extending across a streambed and causing broken water; a stretch of water flowing over a riffle.

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.

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 live-box 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.

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.

seine A large net with sinkers on one edge and floats on the other that hangs vertically in the water and is used to enclose and catch fish when its ends

are pulled together or are drawn ashore; also, to fish with or catch fish with a seine. Beach seining involves dragging a rectangular net with poles attached to the ends through the water a short distance to capture fish.

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.

smolting To become a smolt. See smolt.

snowpack The annual accumulation of snow in mountain areas.

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.

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.

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.

switchyard A usually enclosed area for the switching facilities of a power station.

T

Table 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 SWP 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 radiotelemetry 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.

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.

toe of dam The location of the intersection of the natural ground with the dam structure.

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.

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, rocks, and wastewater treatment.

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 Southern California Edison’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 sets 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.

transponder A device that, upon receiving a designated signal, emits a signal of its own and that is used especially for the detection, identification,

and location of objects, or, in wildlife studies, different animals. The term is a contraction of the words transmitter and responder.

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 Actinomycetes, 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.

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 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 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 Resources Control 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 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.

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 two 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.

Y

young-of-year All of the fish of a species younger than one year of age.

Z

zooplankton Small aquatic animals that are suspended or swimming in water.

Bulletin 132-20

Appendix B

Data and Computations

Used to Determine

2021 Water Charges

Appendix B, Data and Computations Used to Determine 2021 Water Charges, was previously printed and distributed under a September 2020 cover letter from Pedro Villalobos, Division Manager of SWPAO, to State Water Project 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 September 2020. However, Table B-7 was not published in the September 2020 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-84.

Appendix B

Data and Computations

Used to Determine 2021 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.

Full Name	Abbreviation
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
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
Santa Clarita Valley Water Agency ¹	Santa Clarita
Solano County Water Agency	Solano
Tulare Lake Basin Water Storage District	Tulare
Ventura County Watershed Protection District	Ventura

¹ Castaic Lake Water Agency's SWP Water Supply Contract was transferred to Santa Clarita Valley Water Agency effective November 2, 2018.

Appendix B

Data and Computations

Used to Determine 2021 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 2021. The information is based on established data about the SWP, both known and projected, as of June 2020 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

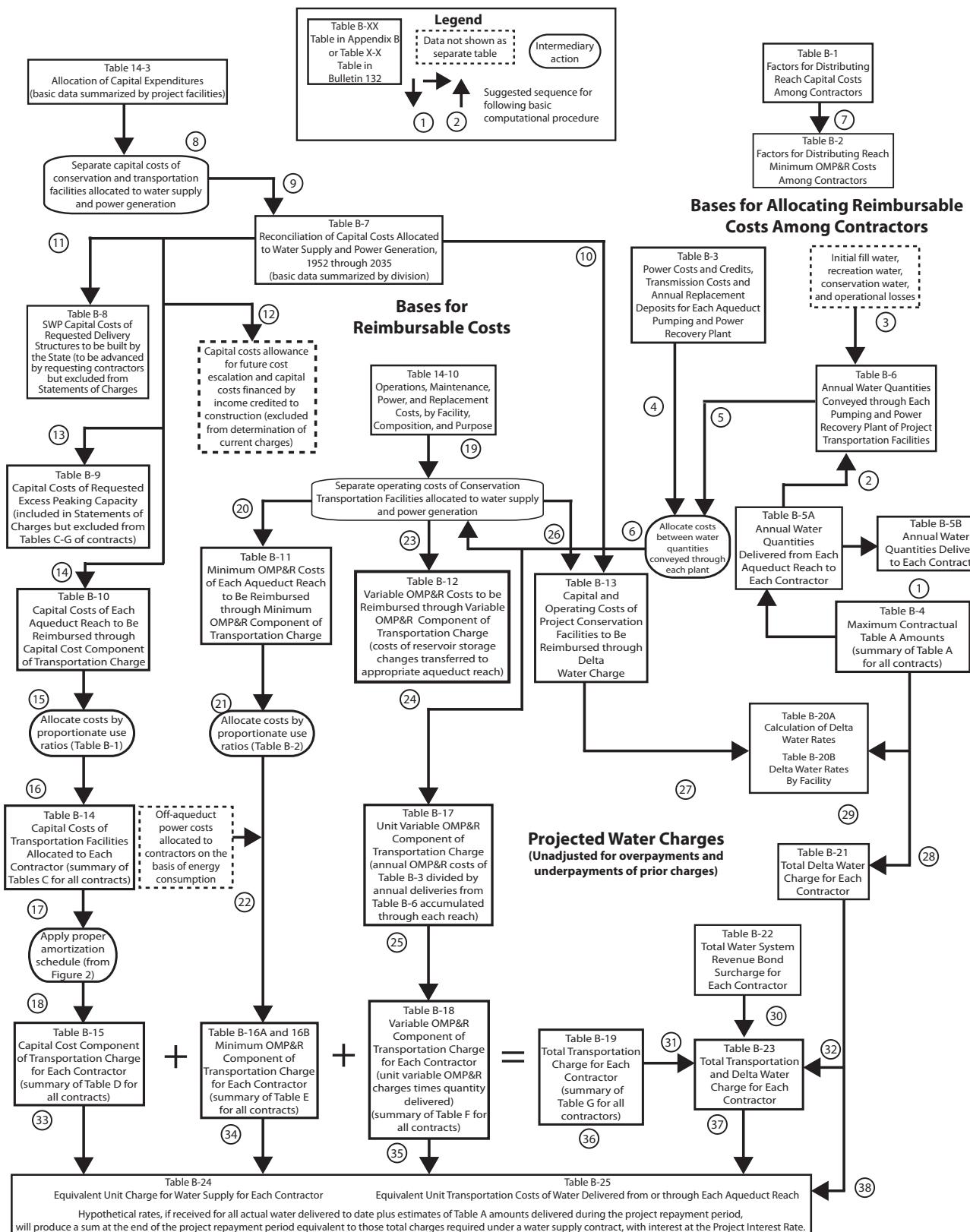


Figure B-1 Relationships of Data Used to Substantiate Statements of Charges

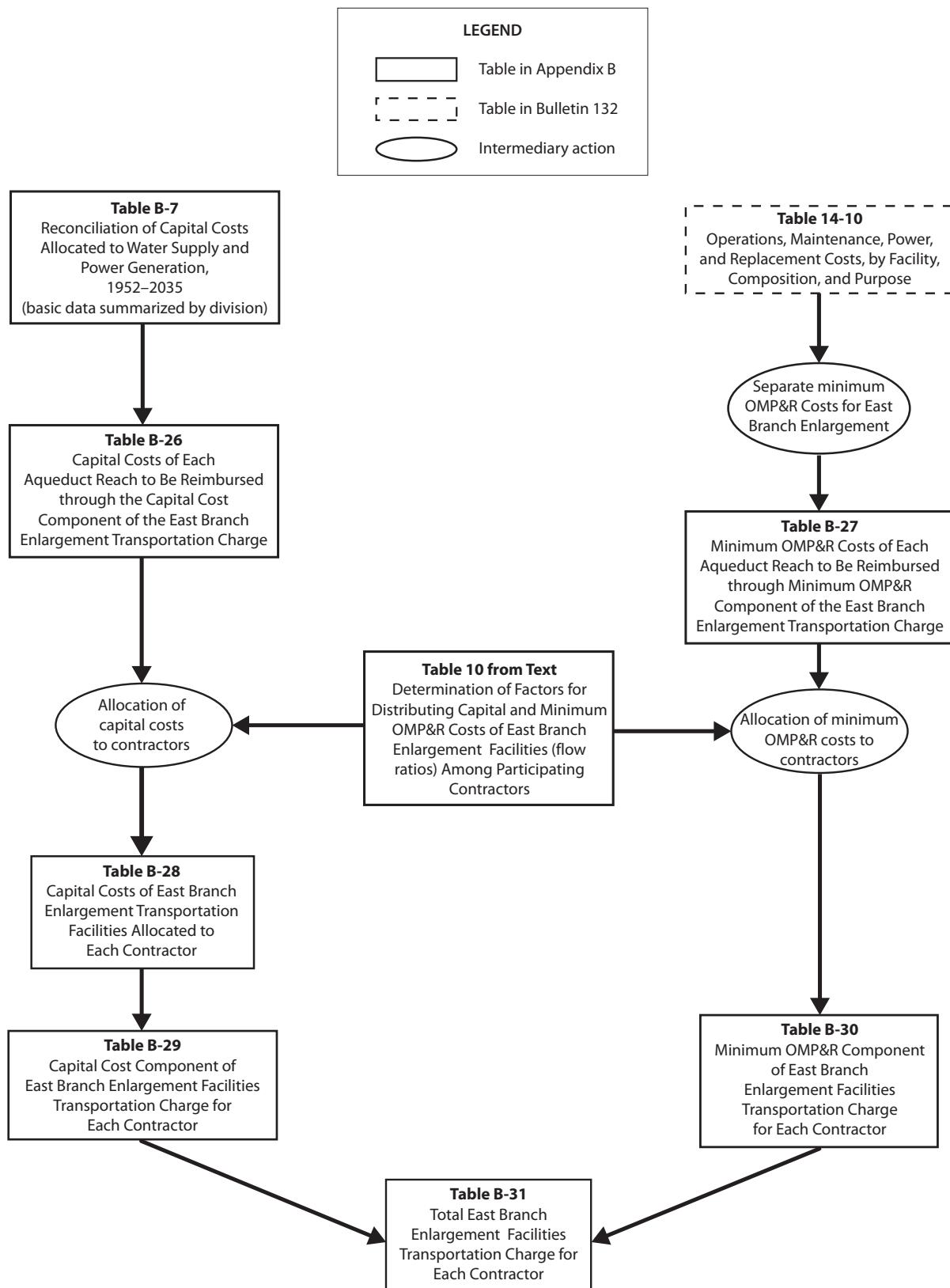


Figure B-2 Relationships of Data Used to Substantiate East Branch Enlargement Charges

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 depend on and vary with quantities of

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

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 2021.

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 2019, 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.

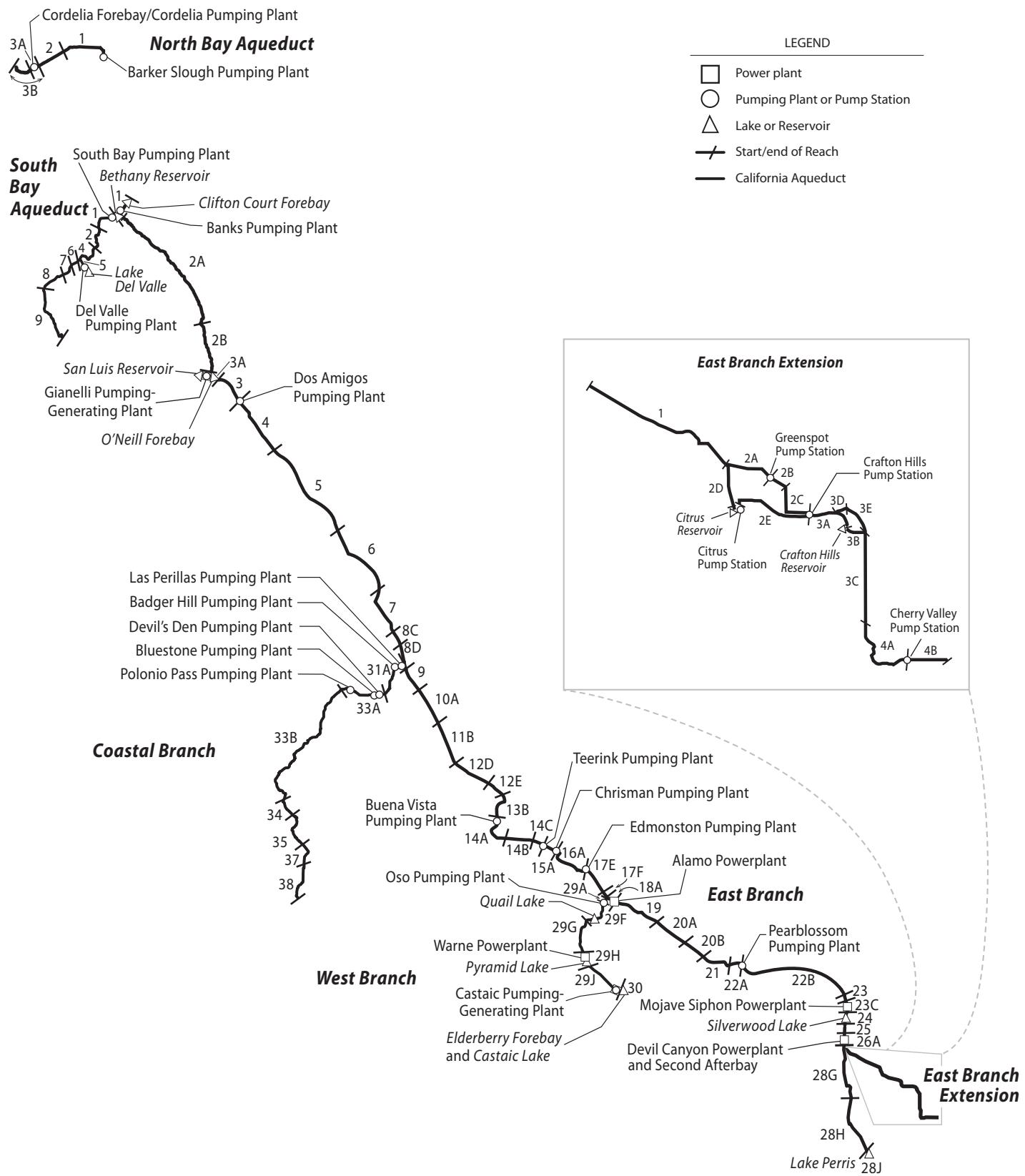


Figure B-4 Repayment Reaches and Descriptions

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 Chrismen Pumping Plant
- 16A Chrismen 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	Santa Clarita ¹	41,000	2000	Purchased capacity upstream of Reach 16A	
Kern	Palmdale	4,000	2000	Purchased capacity upstream of Reach 11B	
Kern	Alameda-Zone 7	7,000	2000	Purchased capacity upstream of Reach 10A	
Kern	Alameda-Zone 7	15,000	2000	Purchased capacity upstream of Reach 10A	
Kern	Alameda-Zone 7	10,000	2001	Purchased capacity upstream of Reach 11B	
Kern	Solano	5,756	2001	Purchased capacity upstream of Reach 11B and Reach 31A	
Kern	Napa	4,025	2001	Purchased capacity upstream of Reach 11B and Reach 31A	
Kern	Alameda-Zone 7	2,219	2004	Purchased capacity upstream of Reach 11B	
<i>Subtotal under Article 53</i>		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	
Dudley Ridge	Mojave	4,000	2020	Purchased capacity upstream of Reach 8D	
<i>Subtotal outside of Article 53</i>		163,022			

¹ Castaic Lake Water Agency's SWP Water Supply Contract was transferred to Santa Clarita Valley Water Agency effective November 2, 2018.

Table B-2 presents corresponding ratios for allocating 2021 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 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 2020 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 (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, 2019; 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),

Table 2 Project Purpose Cost Allocation Factors (percentages)¹

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 ²	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 ^a	78.0 ^b
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) ^{3,4}	94.3 / 99.6	96.9 / 99.6	5.7 / 0.4	3.1 / 0.4
Aqueduct and Plants ^{3,4}	94.3 / 99.6	96.9 / 99.6	5.7 / 0.4	3.1 / 0.4
Pyramid Dam and Lake ^{3,4}	94.3 / 96.1	96.9 / 96.1	5.7 / 3.9	3.1 / 3.9
Castaic Dam and Lake ^{3,4}	94.3 / 91.1	96.9 / 91.1	5.7 / 8.9	3.1 / 8.9
Silverwood Dam and Lake ^{3,4}	94.3 / 85.3	96.9 / 85.3	5.7 / 14.7	3.1 / 14.7
Perris Dam and Lake ^{3,4}	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

¹ Percentages indicated apply to the majority of the facilities with minor exceptions.² 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.^a Percentage indicated consists of 48.0 percent of costs allocated to recreation and 26.8 percent to flood control.^b Percentage indicated consists of 44.9 percent of costs allocated to recreation and 33.1 percent to flood control.³ Percentage indicated is used for 2012 and previous years.⁴ Percentage indicated is used for 2013 and forward.

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.

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 Project 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 2021 and 2022, and escalation of certain projected operating costs (labor and operating expense) were 1 percent per year for 2023-2035. Labor and operating expense escalation rates were originally set at 4.0 percent per year for 2021 through 2022, in the Bulletin 132-20 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 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 Santa Clarita Valley Water Agency also prepaid capital costs (Castaic Lake Water Agency's SWP Water Supply Contract was transferred to Santa Clarita Valley Water Agency effective November 2, 2018. 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 3 Criteria for Amortizing Capital Costs of Transportation Facilities

Contractor	Year of Initial Payment ¹
Alameda County Flood Control and Water Conservation District, Zone 7	1963 ^a
Alameda County Water District	1963
Antelope Valley-East Kern Water Agency	1963
City of Yuba City	^b
Coachella Valley Water District	1964
County of Butte	^b
County of Kings	1968
Crestline-Lake Arrowhead Water Agency	1964
Desert Water Agency	1963 ^c
Dudley Ridge Water District	1968 ^d
Empire West Side Irrigation District	1968 ^d
Kern County Water Agency	
Agricultural Use	1968 ^d
Municipal and Industrial Use	1968 ^d
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 ^c
San Gorgonio Pass Water Agency	1963 ^c
San Luis Obispo County Flood Control and Water Conservation District	1964 ^e
Santa Barbara County Flood Control and Water Conservation District	1964
Santa Clara Valley Water District	1963
Santa Clarita Valley Water Agency	1964 ^f
Solano County Water Agency	1973
Tulare Lake Basin Water Storage District	1968 ^d
Ventura County Watershed Protection District	1964

¹ Allocated capital costs of transportation facilities amortized in equal annual installments unless otherwise noted.

^a Principal payments on each annual capital cost prior to 1971 delayed until calendar year 1972, except payments for 1963.

^b For City of Yuba City and County of Butte, payments for Delta Water Charge only.

^c Payment deferred for 1963 and added to 1964 payment with accrued interest.

^d 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.

^e For San Luis Obispo and Santa Barbara, all principal and interest payments for costs of the Coastal Stub were deferred until 1976.

^f Castaic Lake Water Agency's SWP Water Supply Contract was transferred to Santa Clarita Valley Water Agency effective November 2, 2018.

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 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 (Kern) 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

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

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. 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 2019. 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 5 Summary of 2019 Off-Aqueduct Power Facility Charges and Credits (in dollars)

Charges by Item	
Reid Gardner Powerplant	0
Reid Gardner Closure Costs	2,189,599
Bottle Rock Powerplant	73,474
South Geysers Powerplant	0
<i>Subtotal</i>	2,263,073
Credits by Item	
Power Sales	0
Net Total Charge	2,263,073

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 2020, 2021, and 2022 and then only minor operating costs are projected post-2022.

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

Table 6 Projected Charges for Off-Aqueduct Power Facilities (in dollars)

Year	Total Annual Cost	25 Percent Bond Cover
2020	6,080,821	-
2021	6,650,000	-
2022	10,650,000	-
2023	150,000	-
2024	150,000	-
2025	150,000	-
2026	150,000	-
2027	150,000	-
2028	150,000	-
2029	150,000	-
2030	150,000	-
2031	150,000	-
2032	150,000	-
2033	150,000	-
2034	150,000	-
2035	150,000	-

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 7 Kilowatt-Hour per Acre-Foot Factors for Allocating Off-Aqueduct Power Facility Costs

Pumping Plant	kWh per acre-foot¹	
	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
Citrus	1,240	5,789
Crafton Hills	1,087	6,876
Cherry Valley	224	7,100
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

¹Includes transmission losses.

Table B-17 presents a summary of actual and projected total variable OMP&R costs for each acre-foot conveyed through each aqueduct pumping plant and power plant for each year of the project. 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.

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 2021 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 2021 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 2023–2035.

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

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	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	0	12,126	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	337,557	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–														
2019	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	Coachella	Desert	Littlerock	Palmdale	San Gabriel	Santa Clarita ¹	Total
1972	0	0	0	0	0	0	0	35,269	0	0	10	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	6,016	
1974	0	0	0	0	0	0	0	7,140	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	6,891	
1976	0	0	0	0	0	0	0	1,981	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	0	2,035	44,484	42	0	0	2,264	0	0	0	0	0	48,825	
1979	0	0	0	0	0	0	0	0	2,821	0	0	0	0	0	0	0	0	485	
1980	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	175	0	0	0	12,126	
1982	0	0	0	0	0	0	2,173	0	0	0	0	4,671	0	0	0	0	0	422	
1983	0	0	0	0	0	48	9,511	0	0	1,365	0	0	0	0	0	0	0	11,315	
1984	0	0	0	0	0	2,874	0	0	144,021	281	809	0	0	0	0	0	0	2,906	
1985	0	0	0	0	0	2,029	0	64	25,664	0	98	0	48,767	0	0	0	0	256	
1986	0	0	0	0	0	0	0	0	0	0	13	2,194	4,614	0	0	0	0	6,821	
1987	0	0	0	0	0	599	313	84	24,141	0	95	0	18,207	0	0	0	0	545	
1988	892	73	665	561	0	1,853	1,404	58,905	0	72	2,368	44,526	0	0	0	0	0	627	
1989	3,478	1,062	96	0	0	13	403	55,085	0	239	8,278	0	0	0	1,035	5,489	0	1,043	
1990	63	0	470	0	0	0	0	28,587	0	0	0	0	0	812	0	0	0	30,226	
1991	1,184	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,464	
1992	271	257	0	0	0	0	49	10,109	221	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	24,983	41,156	0	4,856	0	255,337	
1994	0	759	886	0	0	0	7	9,933	0	0	0	0	0	0	56	0	0	14,101	
1995	0	0	2,353	0	0	10,197	0	28,085	310	0	0	0	0	0	0	0	0	27	
1996	5	0	81	2,612	0	334	205	4,552	969	0	7,809	0	0	0	3,598	3,232	0	23,397	
1997	0	3,932	3,999	0	0	6,190	0	546,733	0	40	0	0	0	0	34,867	0	0	595,761	
1998	0	0	19,666	8,442	0	22,631	1	312,626	0	651	0	0	0	0	11,054	0	0	375,071	
1999	0	0	0	0	0	0	0	76,425	0	0	6,922	0	0	0	11,576	50,087	0	145,010	
2000–2019	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	24,983	41,156	2,439	74,749	53,741	9,858	2,184,530

¹ Castaic Lake Water Agency's SWP Water Supply Contract was transferred to Santa Clarita Valley Water Agency effective November 2, 2018.

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 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 East Branch Enlargement. The costs are to be repaid by the seven SWP water contractors participating in the East Branch Enlargement. Currently, this table includes only minimum OMP&R costs attributable to the East Branch Enlargement. In accordance with

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

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 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 are separated into 3 phases: Phase 1 Original, Phase 1 Improvements, and Phase 2. The East Branch Extension costs 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 12*. *Table 11* shows the capital factors and the corresponding debt service, including the 25 percent bond cover, for each of the phases in 2021.

Table 11 East Branch Extension Facilities Debt Service for 2021

SWP Water Contractor	Share of Participation (percent)	Total Debt Service Charge (in dollars)
Phase 1 Original		
San Bernardino	45.8417	4,810,186
San Gorgonio	54.1583	5,682,851
<i>Subtotal</i>	100.0000	10,493,037
Phase 1 Improvements		
San Bernardino	63.3410	3,676,206
San Gorgonio	36.6590	2,127,626
<i>Subtotal</i>	100.0000	5,803,832
Phase 2		
San Bernardino	64.4210	12,858,594
San Gorgonio	35.5790	7,101,659
<i>Subtotal</i>	100.0000	19,960,253
Total		36,257,122

South Bay Aqueduct Enlargement Charges

The South Bay Aqueduct including the enlargement capacity began operations in 2015. The enlargement construction costs are being recovered in full by Alameda County Flood Control and Water Conservation District, Zone 7 (Alameda-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 through the transportation variable charge. The off-peak pumping charges originally paid by Alameda-Zone 7

Table 12 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 Creek	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*	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*	Carter Street Vault to Garden Air Creek	0.46994300	0.53005700	1.00000000
3D*	Yucaipa Connector Pipeline to Yucaipa Pipeline Tie-In	0.73338500	0.26661500	1.00000000
3E*	Yucaipa 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

* Reach designation in Phase II (calendar year 2013 and forward) have been modified to reflect new repayment reaches.

are then returned to Alameda-Zone 7 as a credit in the subsequent year. *Table 13* shows the corresponding debt service for the enlargement project, including the 25 percent bond cover, and the off-peak pumping debt service included in the 2020 Statements of Charges as described above.

Future Bulletin 132 editions will include the finalized minimum and capital cost

Table 13 South Bay Aqueduct Enlargement Debt Service for 2021

Project	Total Debt Service Charge (in dollars)
Enlargement	
Alameda-Zone 7	17,144,982
Off-Peak Pumping	1,672,112
Total	18,817,094

distribution factors. The 2018 Statements of Charges (B132-17) began to recover and redistribute the costs of these enlarged facilities using the agreed upon distribution factors.

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, 2017, and 2019 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 programs that started in 2007 and 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 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.

In 2018, a fifth set of funding agreements for the preconstruction planning costs of the California WaterFix facility was executed between DWR and ten participating SWP water contractors to provide gap funding. Bill years 2018 and 2019 included a total of \$58.4 million, which was billed directly as separate line items in the Statements of Charges and are not reflected in the appendix tables.

During 2013, SWP water contractors agreed to participate in the 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 was reflected in each SWP water contractor's 2019 charges with interest at the Project Interest Rate of 4.610.

Sites Reservoir

In 2019, SWP water contractors submitted authorization letters to DWR for participation in the Sites Reservoir Project—Phase 2. The six participating SWP water contractors were billed directly as a separate line item in the 2020 Statements of Charges totaling \$36.4 million, which is not reflected in the appendix tables. Revised 2020 Statements of Charges were sent out in December 2019, removing the line items totaling \$36.4 million previously included in the participating contractors charges for Sites Reservoir Project—Phase 2. DWR did not receive the funding agreements required

to include the project in the participating SWP water contractors' 2020 Statements of Charges.

TABLE B-1 Factors for Distributing Reach Capital Costs Among Contractors¹

Sheet 1 of 2

Reach No.	Reach Description	Napa	Solano	Alameda-Zone 7	Alameda County	Santa Clara	Future Contractor South Bay	Total
1	NORTH BAY AQUEDUCT 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		
	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	Coachella	Crestline	Desert	Littlerock
	CALIFORNIA AQUEDUCT							
1	Delta through Bethany Reservoir	0.00533010	0.00983337	0.02939084	0.00528315	0.00133612	0.00871300	0.00049180
2A	Bethany Reservoir to Orestimba Creek	0.00557213	0.01027988	0.03072531	0.00552068	0.00139620	0.00910474	0.00051413
2B	Orestimba Creek to O'Neill Forebay	0.00557824	0.01029119	0.03075915	0.00552831	0.00139814	0.00911733	0.00051469
3	O'Neill Forebay to Dos Amigos Pumping Plant	0.00557719	0.01028923	0.03075332	0.00552772	0.00139798	0.00911637	0.00051461
4	Dos Amigos Pumping Plant to Panoche Creek	0.00557607	0.01028717	0.03074719	0.00552710	0.00139784	0.00911536	0.00051451
5	Panoche Creek to Five Points	0.00557467	0.01028462	0.03073954	0.00552633	0.00139763	0.00911409	0.00051440
6	Five Points to Arroyo Pasajero	0.00557257	0.01028074	0.03072799	0.00552517	0.00139733	0.00911216	0.00051419
7	Arroyo Pasajero to Kettleman City	0.00557189	0.01027949	0.03072428	0.00552480	0.00139723	0.00911154	0.00051413
8C	Kettleman City through Milham Avenue	0.00557103	0.01027792	0.03071961	0.00552432	0.00139712	0.00911076	0.00051405
8D	Milham Avenue through Avenal Gap	0.00568611	0.01049020	0.03135418	0.00563986	0.00142632	0.00930130	0.00052466
9	Avenal Gap through Twisselman Road		0.03426625	0.00616886	0.00156011	0.01017373	0.00057339	
10A	Twisselman Road through Lost Hills		0.03481391	0.00626946	0.00158556	0.01033963	0.00058254	
11B	Lost Hills to 7th Standard Road		0.03835043	0.00691699	0.00174933	0.01140749	0.00064171	
12D	7th Standard Road through Elk Hills Road		0.04031661	0.00727790	0.00184059	0.01200265	0.00067463	
12E	Elk Hills Road through Tupman Road		0.04037074	0.00728878	0.00184332	0.01202059	0.00067553	
13B	Tupman Road to Buena Vista Pumping Plant		0.04379882	0.00791595	0.00200194	0.01305492	0.00073290	
14A	Buena Vista Pumping Plant through Santiago Creek		0.04599268	0.00831952	0.00210399	0.01372049	0.00079691	
14B	Santiago Creek through Old River Road		0.04682530	0.00847388	0.00214303	0.01397505	0.00078354	
14C	Old River Road to Wheeler Ridge Pumping Plant		0.04825217	0.00873768	0.00220973	0.01441013	0.00080743	
15A	Wheeler Ridge Pumping Plant to Chrisman Pumping Plant		0.04905609	0.00888679	0.00224744	0.01465600	0.00082089	
16A	Chrisman Pumping Plant to Edmonston Pumping Plant		0.05089794	0.00922722	0.00233351	0.01521742	0.00085171	
17E	Edmonston Pumping Plant to Porter Tunnel		0.05329388	0.00967107	0.00244575	0.01594937	0.00089182	
17F	Porter Tunnel to Junction, West Branch, California Aqueduct		0.05340725	0.00969176	0.00245098	0.01598349	0.00089372	
18A	Junction, West Branch, California Aqueduct through Alamo Powerplant		0.13238112	0.02399391	0.00606795	0.03957043	0.00221525	
19	Alamo Powerplant to Fairmont		0.13237766	0.02399451	0.00606811	0.03957141	0.00221522	
19C	Buttes Junction through Buttes Reservoir	1.00000000						
20A	Fairmont through 70th Street West	0.06847931	0.02576425	0.00651573	0.04249001	0.00237800		
20B	70th Street West to Palmdale	0.02276024	0.02702917	0.00683555	0.04457607	0.00249470		
21	Palmdale to Littlerock Creek	0.02318952	0.02754716	0.00696651	0.04543034	0.00254199		
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							
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							
31A	Avenal Gap to Devil's Den Pumping Plant	0.10560301	0.19482503					
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						

¹ 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 Contractors¹

Reach No.	Dudley Ridge	Empire	Future Contractor San Joaquin Valley	Kern		Kings	Oak Flat	Tulare
				Municipal and Industrial	Agricultural			
CALIFORNIA AQUEDUCT								
1	0.01707770	0.00088678	0.00254693	0.02741768	0.30629913	0.00090695	0.00167121	0.03504975
2A	0.01781031	0.00092482	0.00266258	0.02864263	0.31945188	0.00094747	0.00174288	0.03655331
2B	0.01785838	0.00092731	0.00266550	0.02868743	0.32030556	0.00094896		0.03665201
3	0.01786337	0.00092757	0.00266499	0.02868589	0.32039254	0.00094892		0.03666225
4	0.01786863	0.00092785	0.00266446	0.02868428	0.32048398	0.00094886		0.03667303
5	0.01787517	0.00092819	0.00266380	0.02868227	0.32059816	0.00094879		0.03668649
6	0.01788508	0.00092870	0.00266279	0.02867923	0.32077093	0.00094868		0.03670685
7	0.01788826	0.00092887	0.00266246	0.02867825	0.32082633	0.00094864		0.03671338
8C	0.01789228	0.00092909	0.00266205	0.02867702	0.32089625	0.00094859		0.03672162
8D	0.01828779		0.00271703	0.02928147	0.32798200			0.01820857
9				0.03204523	0.32739538			
10A				0.03257442	0.31658608			
11B				0.03597398	0.24684668			
12D				0.03787171	0.20804762			
12E				0.03793198	0.20695175			
13B				0.01458796	0.16600071			
14A				0.00620338	0.13319181			
14B				0.00632023	0.11741558			
14C				0.00651962	0.09039633			
15A				0.00663252	0.07516317			
16A				0.00688973	0.04028829			
17E				0.00212516				
31A				0.05046240	0.57546190			

Reach No.	Mojave	Palmdale	San Bernardino	San Gabriel	San Gorgonio	Santa Clarita ²	Metropolitan	Ventura	California Aqueduct Total
CALIFORNIA AQUEDUCT									
1	0.01101147	0.00369131	0.02362857	0.00650354	0.00398392	0.01285827	0.43929350	0.00429212	1.00000000
2A	0.01151136	0.00385891	0.02469101	0.00679699	0.00416304	0.01343201	0.45921072	0.00448701	1.00000000
2B	0.01152409	0.00386317	0.02472511	0.00680570	0.00416880	0.01345351	0.45973548	0.00449194	1.00000000
3	0.01152193	0.00386244	0.02472246	0.00680478	0.00416835	0.01345294	0.45965407	0.00449108	1.00000000
4	0.01151965	0.00386167	0.02471968	0.00680380	0.00416787	0.01345233	0.45956848	0.00449019	1.00000000
5	0.01151681	0.00386070	0.02471620	0.00680259	0.00416730	0.01345157	0.45946161	0.00448907	1.00000000
6	0.01151251	0.00385926	0.02471095	0.00680076	0.00416640	0.01345042	0.45929991	0.00448738	1.00000000
7	0.01151113	0.00385879	0.02470927	0.00680016	0.00416612	0.01345006	0.45924807	0.00448685	1.00000000
8C	0.01150938	0.00385821	0.02470716	0.00679941	0.00416576	0.01344960	0.45918261	0.00448616	1.00000000
8D	0.01174718	0.00393793	0.02522383	0.00694100	0.00425288	0.01373353	0.46868533	0.00457883	1.00000000
9	0.01283841	0.00430367	0.02758959	0.00758975	0.00465175	0.01356094	0.51227887	0.00500407	1.00000000
10A	0.01304366	0.00437246	0.02803943	0.00771262	0.00472760	0.01377767	0.52040901	0.00508405	1.00000000
11B	0.01436906	0.00481665	0.03093503	0.00850448	0.00521581	0.01517717	0.57349473	0.00560046	1.00000000
12D	0.01510596	0.00506361	0.03254889	0.00894541	0.00548790	0.01595523	0.60297374	0.00588755	1.00000000
12E	0.01512626	0.00507040	0.03259749	0.00895830	0.00549608	0.01597665	0.60379667	0.00589546	1.00000000
13B	0.01641098	0.00550099	0.03540212	0.00972547	0.00596896	0.01733322	0.65516902	0.00639604	1.00000000
14A	0.01723325	0.00577656	0.03720681	0.01021819	0.00627322	0.01820137	0.68807273	0.00671639	1.00000000
14B	0.01754538	0.00588113	0.03789703	0.01040613	0.00638960	0.01853084	0.70057530	0.00683798	1.00000000
14C	0.01808019	0.00606036	0.03907670	0.01072763	0.00658850	0.01909545	0.72199174	0.00704634	1.00000000
15A	0.01838154	0.00616135	0.03974336	0.01090913	0.00670088	0.01941356	0.73406357	0.00716371	1.00000000
16A	0.01907194	0.00639271	0.04126559	0.01132404	0.00695754	0.02014241	0.76170731	0.00743264	1.00000000
17E	0.01997003	0.00669365	0.04325018	0.01186455	0.00729213	0.02109050	0.79767940	0.00778251	1.00000000
17F	0.02001251	0.00670788	0.04334270	0.01189888	0.00730773	0.02113537	0.79937767	0.00779906	1.00000000
18A	0.04960424	0.01662680	0.10730448	0.02944860	0.01809192		0.57469530		1.00000000
19	0.04960300	0.01662640	0.10730707	0.02944876	0.01809230		0.57469556		1.00000000
19C									1.00000000
20A	0.05324853	0.01784830	0.11522152	0.03161798	0.01942666		0.61700971		1.00000000
20B	0.05586076	0.01872390	0.12087843	0.03316986	0.02038045		0.64729087		1.00000000
21	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					0.03544337	0.95147783	0.01307880		1.00000000
29F					0.03544339	0.95147785	0.01307876		1.00000000
29G					0.03544339	0.95147785	0.01307876		1.00000000
29H					0.02817144	0.96278381	0.00904475		1.00000000
29J					0.03544338	0.95147787	0.01307875		1.00000000
30					0.02927284	0.96212388	0.00860328		1.00000000
31A					0.07364766				1.00000000
33A									1.00000000
33B									1.00000000
34									1.00000000
35									1.00000000

¹ Proportionate use factors do not reflect permanent water transfers as a result of the Monterey Amendment and after.² Castaic Lake Water Agency's SWP Water Supply Contract was transferred to Santa Clarita Valley Water Agency effective November 2, 2018.

TABLE B-2 Factors for Distributing Reach Minimum OMP&R Costs Among Contractors¹

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		0.42946876	0.16864923	0.40188201	0.00000000	1.00000000	
2	Altamont Turnout through Patterson Reservoir		0.39618910	0.17848805	0.42532285	0.00000000	1.00000000	
4	Patterson Reservoir to Del Valle Junction		0.37257554	0.18546748	0.44195698	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		0.28280545	0.21144710	0.50574745	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			
	CALIFORNIA AQUEDUCT							
1	Delta through Bethany Reservoir			0.00870517	0.02074403			N/A

Reach No.	Reach Description	San Luis Obispo	Santa Barbara	AVEK	Coachella	Crestline	Desert	Littlerock
	CALIFORNIA AQUEDUCT							
1	Delta through Bethany Reservoir	0.00531721	0.00980965	0.03130290	0.03261149	0.00133220	0.01285625	0.00049034
2A	Bethany Reservoir to Orestimba Creek	0.00556969	0.01027545	0.03278363	0.03414192	0.00139484	0.01346023	0.00051362
2B	Orestimba Creek to O'Neill Forebay	0.00557579	0.01028673	0.03282317	0.03419082	0.00139677	0.01347910	0.00051418
3	O'Neill Forebay to Dos Amigos Pumping Plant	0.00557472	0.01028476	0.03281798	0.03418767	0.00139663	0.01347773	0.00051409
4	Dos Amigos Pumping Plant to Panoche Creek	0.00557360	0.01028270	0.03281253	0.03418436	0.00139648	0.01347630	0.00051400
5	Panoche Creek to Five Points	0.00557222	0.01028014	0.03280571	0.03418023	0.00139630	0.01347451	0.00051388
6	Five Points to Arroyo Pasajero	0.00557012	0.01027626	0.03279539	0.03417401	0.00139599	0.01347180	0.00051368
7	Arroyo Pasajero to Kettleman City	0.00556944	0.01027501	0.03279208	0.03417200	0.00139589	0.01347093	0.00051361
8C	Kettleman City through Milham Avenue	0.00551362	0.01017203	0.03245544	0.03380385	0.00138102	0.01332672	0.00050847
8D	Milham Avenue through Avenal Gap	0.00562578	0.01037893	0.03311858	0.03450099	0.00140943	0.01360122	0.00051880
9	Avenal Gap through Twisselman Road			0.03487590	0.03506593	0.00151577	0.01430879	0.00055739
10A	Twisselman Road through Lost Hills			0.03541492	0.03560973	0.00153966	0.01453292	0.00056600
11B	Lost Hills to 7th Standard Road			0.03876599	0.03898858	0.00168766	0.01592313	0.00061955
12D	7th Standard Road through Elk Hills Road			0.04062326	0.04086218	0.00176990	0.01669509	0.00064922
12E	Elk Hills Road through Tupman Road			0.04067436	0.04091461	0.00177239	0.01671773	0.00065006
13B	Tupman Road to Buena Vista Pumping Plant			0.04396863	0.04423547	0.00191768	0.01808321	0.00070269
14A	Buena Vista Pumping Plant through Santiago Creek			0.04605876	0.04634448	0.00201035	0.01895277	0.00073611
14B	Santiago Creek through Old River Road			0.04670791	0.04700238	0.00203984	0.01922748	0.00074647
14C	Old River Road to Wheeler Ridge Pumping Plant			0.04788751	0.04819483	0.00209269	0.01972179	0.00076533
15A	Wheeler Ridge Pumping Plant to Chrisman Pumping Plant			0.04857809	0.04889274	0.00212358	0.02001090	0.00077637
16A	Chrisman Pumping Plant to Edmonston Pumping Plant			0.05017462	0.05050488	0.00219467	0.02067706	0.00080191
17E	Edmonston Pumping Plant to Porter Tunnel			0.05215958	0.05250984	0.00228321	0.02150622	0.00083365
17F	Porter Tunnel to Junction, West Branch, California Aqueduct			0.05262294	0.05261398	0.00228776	0.02154897	0.00083530
18A	Junction, West Branch, California Aqueduct through Alamo Powerplant			0.13774725	0.11306511	0.00603056	0.05137695	0.00201555
19	Alamo Powerplant to Fairmont			0.13774370	0.11306344	0.00603069	0.05137766	0.00201511
19C	Buttes Junction through Buttes Reservoir			1.00000000				
20A	Fairmont through 70th Street West			0.06855702	0.12212506	0.00651522	0.05550243	0.00237787
20B	70th Street West to Palmdale			0.02284441	0.12811683	0.00683511	0.05822670	0.00249455
21	Palmdale to Littlerock Creek			0.02327543	0.13055246	0.00696606	0.05933989	0.00254183
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				
29F	Oso Pumping Plant through Quail Embankment			0.00296796				
29G	Quail Embankment through Warne Powerplant							
29H	Pyramid Dam and Lake							
29J	Pyramid Lake through Castaic Powerplant							
30	Castaic Dam and Lake							
31A	Avenal Gap to Devil's Den Pumping Plant	0.10542164	0.19449108		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					

¹ Proportionate use factors apply to 2021, and reflect permanent capacity water transfers that have been signed as of February 1, 2020.

* South Bay Aqueduct factors reflect enlargement capacities for Alameda County Flood Control and Water Conservation District, Zone 7. These factors are applicable for years 2015 and forward.

TABLE B-2 Factors for Distributing Reach Minimum OMP&R Costs Among Contractors¹

Sheet 2 of 2

Reach No.	Napa	Solano	Alameda-Zone 7	Dudley Ridge	Empire	Future Contractor San Joaquin Valley	Kern		Kings	Oak Flat	Tulare
							Municipal and Industrial	Agricultural			
CALIFORNIA AQUEDUCT											
1	0.00101482	0.00145893	0.02319901	0.01349570	0.00088461	0.00254078	0.02734537	0.27096661	0.00247148	0.00166714	0.02580275
2A	0.00106145	0.00152588	0.00868251	0.01410081	0.00092428	0.00266143	0.02862280	0.28310507	0.00258398	0.00174185	0.02695974
2B	0.00106360	0.00152903	0.00869820	0.01413883	0.00092676	0.00266435	0.02866750	0.28387568	0.00258988		0.02703241
3	0.00106370	0.00152918	0.00869836	0.01414278	0.00092702	0.00266383	0.02866595	0.28395699	0.00259028		0.02703994
4	0.00106379	0.00152932	0.00869852	0.01414692	0.00092729	0.00266329	0.02866433	0.28404246	0.00259072		0.02704786
5	0.00106390	0.00152950	0.00869873	0.01415210	0.00092763	0.00266262	0.02866229	0.28414920	0.00259125		0.02705775
6	0.00106409	0.00152978	0.00869906	0.01415993	0.00092814	0.00266161	0.02865922	0.28431071	0.00259206		0.02707272
7	0.00106415	0.00152988	0.00869918	0.01416245	0.00092832	0.00266127	0.02865823	0.28436250	0.00259232		0.02707752
8C	0.00105126	0.00151126	0.00859811	0.01396988	0.00091570	0.00263462	0.02834121	0.28040800	0.00255949		0.02670939
8D	0.00107347	0.00154323	0.00877815	0.01427284		0.00268820	0.02892875	0.28656839	0.00165698		0.00825002
9	0.00079077	0.00109117	0.00779026				0.03113088	0.28994559			
10A	0.00080367	0.00110880	0.00791534				0.03162743	0.27881661			
11B	0.00064367	0.00094254	0.00351060				0.03469801	0.21548493			
12D							0.03640750	0.18286854			
12E							0.03646180	0.18175865			
13B							0.01396780	0.14042247			
14A							0.00592355	0.10802055			
14B							0.00601264	0.09940480			
14C							0.00617095	0.07838713			
15A							0.00626342	0.06492276			
16A							0.00647554	0.03387634			
17E							0.00198233				
31A	0.00628695	0.00977801	0.02617705			0.05037550		0.36716813	0.00176551		

Reach No.	Mojave	Palmdale	San Bernardino	San Gabriel	San Geronio	Santa Clarita ²	Metropilitan	Ventura	California Aqueduct Total
CALIFORNIA AQUEDUCT									
1	0.02235967	0.00458372	0.02355927	0.00648440	0.00397223	0.02543294	0.41531378	0.00427755	1.00000000
2A	0.02339345	0.00480082	0.02466697	0.00679035	0.00415899	0.02659606	0.43500352	0.00448066	1.00000000
2B	0.02343677	0.00480645	0.02470097	0.00679904	0.00416471	0.02665338	0.43550031	0.00448557	1.00000000
3	0.02343752	0.00480564	0.02469831	0.00679811	0.00416426	0.02665660	0.43542322	0.00448473	1.00000000
4	0.02343829	0.00480480	0.02469552	0.00679714	0.00416380	0.02665996	0.43534219	0.00448383	1.00000000
5	0.02343927	0.00480373	0.02469202	0.00679592	0.00416322	0.02666418	0.43524098	0.00448272	1.00000000
6	0.02344072	0.00480212	0.02468675	0.00679407	0.00416233	0.02667055	0.43508787	0.00448102	1.00000000
7	0.02344119	0.00480162	0.02468505	0.00679346	0.00416205	0.02667259	0.43503878	0.00448048	1.00000000
8C	0.02316660	0.00475269	0.02442207	0.00672261	0.00411770	0.02634212	0.44210856	0.00443558	1.00000000
8D	0.02365255	0.00484967	0.02492461	0.00686039	0.00420245	0.02690139	0.45116937	0.00452581	1.00000000
9	0.02151929	0.00521180	0.02680496	0.00737540	0.00451947	0.02759444	0.48503968	0.00486251	1.00000000
10A	0.02185034	0.00529275	0.02722726	0.00749079	0.00459067	0.02804585	0.49262963	0.00493763	1.00000000
11B	0.02391004	0.00579559	0.02984414	0.00820674	0.00503189	0.03082566	0.53971652	0.00540476	1.00000000
12D	0.02505081	0.00599111	0.03129850	0.00860427	0.00527709	0.03237873	0.56586015	0.00566365	1.00000000
12E	0.02508148	0.00599865	0.03134228	0.00861586	0.00528449	0.03243323	0.56662365	0.00567076	1.00000000
13B	0.02710686	0.00648455	0.03391167	0.00931912	0.00571769	0.03515621	0.61287595	0.00613000	1.00000000
14A	0.02839029	0.00679287	0.03555047	0.00976684	0.00599398	0.03671535	0.64232226	0.00642137	1.00000000
14B	0.02878644	0.00688867	0.03607197	0.00990811	0.00608189	0.03299597	0.65161359	0.00651184	1.00000000
14C	0.02950887	0.00706269	0.03700648	0.01016250	0.00623945	0.03179262	0.66834427	0.00667625	1.00000000
15A	0.02993197	0.00716455	0.03755281	0.01031130	0.00633155	0.03223745	0.67812999	0.00677252	1.00000000
16A	0.03091124	0.00740007	0.03880992	0.01065425	0.00654351	0.03329671	0.70068423	0.00699505	1.00000000
17E	0.03212830	0.00769290	0.04037534	0.01108105	0.00680742	0.03461371	0.72875471	0.00727174	1.00000000
17F	0.03219190	0.00770814	0.04045569	0.01110307	0.00682097	0.03468230	0.73020283	0.00728615	1.00000000
18A	0.04929713	0.01652427	0.10664131	0.02926634	0.01798005		0.46986948		1.00000000
19	0.04929585	0.01652388	0.10664396	0.02926656	0.01798044		0.46987231		1.00000000
19C									1.00000000
20A	0.05324421	0.01784728	0.11521174	0.03161525	0.01942494		0.50757898		1.00000000
20B	0.05585607	0.01872278	0.12086783	0.03316690	0.02037859		0.53249023		1.00000000
21	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						0.05726734	0.92702291	0.01274255	1.00000000
29F						0.05726649	0.92702302	0.01274253	1.00000000
29G						0.05742327	0.92979606	0.01278067	1.00000000
29H						0.03349572	0.95753173	0.00897255	1.00000000
29J						0.05740996	0.92980918	0.01278086	1.00000000
30						0.03248607	0.95895422	0.00855971	1.00000000
31A	0.09301782					0.07351496			1.00000000
33A									1.00000000
33B									1.00000000
34									1.00000000
35									1.00000000

¹ Proportionate use factors apply to 2021 and reflect permanent capacity water transfers that have been signed as of February 1, 2020.² Castaic Lake Water Agency's SWP Water Supply Contract was transferred to Santa Clarita Valley Water Agency effective November 2, 2018.

TABLE B-3 Power Costs and Credits, Transmission Costs and Annual Replacement Deposits for Each Aqueduct Pumping and Power Recovery Plant¹ (in dollars)

Sheet 1 of 3

Calendar Year	NORTH BAY AQUEDUCT			SOUTH BAY AQUEDUCT	CALIFORNIA AQUEDUCT			
	Reach 1	Reach 3A	Reach 3B	Reach 1*	Reach 1	Reach 4	Reach 14A	Reach 15A
	Barker Slough Pumping Plant	Cordelia Pumping Plant Solano	Cordelia Pumping Plant Napa ²	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	291,653	148,222	149,332	2,796,466	33,843,372	12,777,130	11,868,461	12,642,244
2006	242,154	117,460	148,345	2,568,839	24,339,547	10,548,227	11,560,760	12,365,249
2007	462,282	228,703	257,649	4,821,272	23,723,747	11,700,558	17,533,146	19,017,896
2008	430,968	196,012	308,003	3,431,443	14,724,510	6,683,865	11,681,734	13,417,359
2009	221,737	103,297	164,960	2,502,260	13,817,379	4,321,527	7,111,173	7,918,654
2010	265,310	112,275	219,598	2,505,650	27,496,067	9,982,260	11,242,799	11,838,347
2011	275,556	115,853	232,342	3,360,022	40,345,447	15,490,865	14,791,387	15,502,466
2012	268,876	119,755	188,049	3,669,585	23,718,573	12,244,296	14,182,610	14,515,920
2013	442,871	206,271	329,682	5,239,983	22,948,225	9,508,627	13,263,175	13,678,767
2014	390,522	185,664	478,305	4,499,338	18,515,305	4,795,725	8,620,766	8,976,306
2015	393,929	241,043	364,189	5,351,140	16,683,160	6,200,710	10,649,282	12,031,281
2016	283,041	159,315	265,349	4,689,684	38,238,739	12,514,225	16,718,094	18,121,865
2017	311,138	185,614	201,156	3,354,792	47,656,997	22,833,163	24,626,050	25,957,005
2018	533,094	310,891	339,231	5,508,728	31,441,813	11,742,558	15,295,701	15,798,709
2019	480,934	265,981	337,984	2,884,088	43,170,885	17,708,372	18,976,942	20,071,027
2020	612,746	179,016	483,937	6,465,027	18,708,270	7,051,762	12,718,536	13,446,418
2021	646,467	0	616,971	6,330,569	43,709,243	17,213,256	21,337,804	21,482,508
2022	661,953	0	631,750	6,265,898	46,187,667	19,223,890	25,116,370	25,605,214
2023	609,349	0	398,982	5,977,575	47,465,206	19,055,034	24,031,800	24,775,658
2024	614,127	0	402,110	6,038,574	40,582,848	19,038,587	23,926,473	24,651,318
2025	620,032	0	405,977	6,096,645	40,057,981	19,221,673	24,156,563	24,888,378
2026	619,788	0	405,817	6,094,246	41,966,690	19,214,110	24,147,058	24,878,586
2027	620,538	0	406,308	6,101,617	31,253,023	19,237,349	24,176,264	24,908,677
2028	619,115	0	405,376	6,087,619	50,731,135	19,193,218	24,120,802	24,851,535
2029	619,929	0	405,909	6,095,630	41,838,756	19,218,474	24,152,542	24,884,236
2030	619,921	0	405,904	6,095,553	40,880,916	19,218,233	24,152,240	24,883,924
2031	619,871	0	405,871	6,104,956	41,675,068	19,216,654	24,150,256	24,881,880
2032	619,941	0	405,917	6,095,743	38,498,993	19,218,831	24,152,991	24,884,699
2033	620,379	0	406,204	6,100,055	36,228,280	19,232,426	24,170,076	24,902,301
2034	619,029	0	405,320	6,086,778	51,475,965	19,190,564	24,117,467	24,848,099
2035	620,780	0	406,466	6,103,996	28,554,079	19,244,851	24,185,691	24,918,389
TOTAL	16,670,781	3,829,153	11,969,146	185,350,237	1,267,705,540	545,710,611	670,959,124	698,867,654

¹ Starting with 2005, transmission costs that vary and depend on power usage are included, therefore recovered through the variable component.

² Power costs for the period 1968 through 1987 are for an interim facility.

* 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 Plant¹ (in dollars)

Sheet 2 of 3

Calendar Year	CALIFORNIA AQUEDUCT (continued)							
	Reach 16A	Reach 17E	Reach 18A	Reach 22B	Reach 23	Reach 26A	Reach 2B (EBX)	Reach 2E (EBX)
	Chrisman Pumping Plant	Edmonston Pumping Plant	Alamo Powerplant	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	27,903,257	98,001,353	(5,880,165)	17,491,390	(6,454,740)	(28,818,797)	69,675	0
2006	27,031,692	85,162,213	(4,091,143)	15,897,803	(6,391,206)	(34,897,387)	123,850	0
2007	41,500,147	139,024,950	(3,029,048)	19,299,268	(5,896,486)	(28,814,592)	249,356	0
2008	26,303,550	82,319,716	(3,426,928)	10,848,292	(3,300,797)	(16,968,293)	243,120	0
2009	16,505,608	75,455,178	(3,266,008)	9,232,658	(2,288,833)	(13,842,660)	360,468	0
2010	26,188,035	95,967,889	(5,115,083)	16,896,385	(5,653,201)	(24,769,829)	313,518	0
2011	33,898,542	118,678,644	(6,536,645)	23,343,392	(7,792,422)	(32,285,174)	371,784	0
2012	32,006,954	111,758,355	(2,492,869)	16,862,107	(8,905,115)	(23,525,846)	436,935	0
2013	29,886,253	105,217,112	(2,081,221)	12,238,125	(4,915,165)	(14,305,918)	460,795	0
2014	19,719,066	68,276,577	(1,786,122)	7,199,676	(1,465,644)	(5,391,598)	317,659	0
2015	26,670,261	94,909,655	(2,289,717)	9,270,446	(2,103,231)	(6,675,218)	345,261	0
2016	39,961,379	143,096,047	(7,801,980)	24,272,460	(8,723,634)	(21,862,397)	705,640	0
2017	56,762,351	205,997,554	(14,494,695)	40,178,031	(21,279,891)	(37,337,924)	371,493	1,052,912
2018	34,883,943	124,417,575	(5,755,465)	21,493,523	(6,979,417)	(19,682,937)	7,853	1,211,629
2019	43,776,465	157,386,663	(6,884,861)	32,525,880	(12,556,957)	(31,124,021)	154,278	1,540,352
2020	28,827,979	103,738,870	(5,262,361)	15,071,033	(5,846,711)	(10,254,003)	0	288,517
2021	48,466,428	176,602,925	(12,839,299)	33,131,323	(17,550,825)	(27,373,482)	0	637,516
2022	58,050,110	212,340,438	(12,732,590)	32,356,909	(17,352,628)	(27,060,816)	0	577,117
2023	56,475,997	206,242,176	(11,592,015)	29,540,981	(14,469,311)	(22,628,410)	0	598,306
2024	56,179,750	205,110,263	(11,587,032)	29,772,582	(14,469,310)	(22,628,410)	0	602,997
2025	56,720,005	207,082,712	(11,587,032)	30,058,891	(14,469,311)	(22,628,411)	0	608,796
2026	56,697,688	207,001,234	(11,587,032)	30,047,064	(14,469,311)	(22,628,411)	0	608,556
2027	56,766,263	207,251,599	(11,587,032)	30,083,405	(14,469,310)	(22,628,410)	0	609,292
2028	56,636,038	206,776,152	(11,587,032)	30,014,393	(14,469,310)	(22,628,410)	0	607,894
2029	56,710,565	207,048,248	(11,587,032)	30,053,889	(14,469,310)	(22,628,410)	0	608,694
2030	56,709,854	207,045,652	(11,587,032)	30,053,511	(14,469,310)	(22,628,410)	0	608,687
2031	56,705,196	207,028,647	(11,587,032)	30,051,043	(14,469,311)	(22,628,411)	0	608,637
2032	56,711,618	207,052,093	(11,587,032)	30,054,446	(14,469,310)	(22,628,410)	0	608,706
2033	56,751,734	207,198,555	(11,587,032)	30,075,706	(14,469,310)	(22,628,410)	0	609,136
2034	56,628,208	206,747,565	(11,587,032)	30,010,243	(14,469,310)	(22,628,410)	0	607,810
2035	56,788,399	207,332,417	(11,587,032)	30,095,137	(14,469,310)	(22,628,410)	0	609,530
TOTAL	1,557,494,967	5,611,534,708	(297,474,738)	856,494,608	(368,039,238)	(1,047,324,021)	4,610,240	13,205,085

¹ 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 Plant¹ (in dollars)

Sheet 3 of 3

Calendar Year	CALIFORNIA AQUEDUCT (continued)							Grand Total
	Reach 3A (EBX)	Reach 4B (EBX)	Reach 29A	Reach 29G	Reach 29J	Reach 31A	Reach 33A	
	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	
[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	49,010	2,548	3,712,885	(7,106,531)	(13,339,416)	859,917	1,753,288	162,760,553
2006	144,846	16,318	2,767,050	(7,208,025)	(12,042,760)	870,640	1,547,938	130,822,412
2007	257,067	11,196	7,605,070	(11,444,524)	(21,845,299)	1,344,581	2,350,998	218,357,935
2008	327,206	7,446	4,778,592	(7,762,363)	(14,997,326)	1,168,629	1,735,140	132,149,878
2009	391,371	7,530	4,625,473	(6,997,502)	(15,725,766)	711,010	1,018,796	102,348,312
2010	431,030	19,506	3,835,535	(6,643,531)	(11,641,405)	939,577	1,507,158	155,937,888
2011	499,615	33,108	3,568,564	(5,996,974)	(10,892,193)	1,149,892	2,173,461	210,327,529
2012	533,579	48,171	5,510,580	(8,863,057)	(15,797,149)	1,041,736	2,019,898	179,541,943
2013	557,947	36,868	6,767,052	(9,189,037)	(15,851,695)	1,447,274	2,073,468	177,959,459
2014	440,998	16,594	4,838,287	(4,376,621)	(7,912,327)	1,678,114	2,547,742	130,564,331
2015	461,141	15,152	7,368,826	(6,599,051)	(11,183,098)	1,696,668	2,009,646	165,811,474
2016	781,683	49,119	6,588,412	(7,078,001)	(12,085,744)	1,623,737	3,143,145	253,660,177
2017	1,237,740	86,294	6,612,633	(7,354,995)	(12,930,250)	1,695,744	3,152,853	348,875,766
2018	956,707	43,801	5,258,762	(5,753,362)	(10,120,900)	2,037,590	3,708,929	226,698,957
2019	1,055,578	52,603	4,584,612	(5,121,274)	(8,967,375)	1,796,316	2,463,871	284,578,343
2020	365,388	57,173	5,597,236	(4,644,103)	(7,596,027)	1,713,839	1,709,948	183,432,490
2021	561,082	95,584	6,019,153	(6,320,501)	(9,701,434)	1,692,590	4,522,763	309,280,641
2022	507,977	86,201	10,538,678	(10,165,318)	(17,274,321)	1,667,758	4,457,437	359,689,694
2023	525,967	93,438	9,846,372	(9,247,256)	(14,055,098)	666,465	5,786,119	360,097,335
2024	530,090	94,171	9,599,549	(8,955,874)	(14,055,099)	673,043	5,836,618	351,957,375
2025	535,188	95,076	9,691,863	(8,955,042)	(14,055,099)	679,316	5,892,746	355,116,947
2026	534,978	95,039	9,688,050	(8,955,042)	(14,055,099)	679,088	5,890,428	356,873,525
2027	535,625	95,154	9,699,768	(8,955,042)	(14,055,099)	679,878	5,897,552	346,627,419
2028	534,396	94,936	9,677,516	(8,955,874)	(14,055,098)	677,654	5,884,023	365,216,078
2029	535,099	95,061	9,690,250	(8,955,041)	(14,055,098)	679,187	5,891,766	356,833,344
2030	535,092	95,059	9,690,129	(8,955,042)	(14,055,099)	679,276	5,891,692	355,870,750
2031	535,048	95,052	9,689,333	(8,955,042)	(14,055,099)	679,139	5,891,208	356,642,964
2032	535,109	95,062	9,690,430	(8,955,874)	(14,055,099)	679,270	5,891,875	353,499,999
2033	535,487	95,130	9,697,285	(8,955,042)	(14,055,099)	679,714	5,896,043	351,503,618
2034	534,322	94,923	9,676,178	(8,955,041)	(14,055,098)	677,443	5,883,210	365,908,233
2035	535,833	95,191	9,703,550	(8,955,041)	(14,055,098)	680,119	5,899,852	344,079,389
TOTAL	16,571,113	1,925,794	267,897,469	(390,118,256)	(702,473,091)	42,084,556	127,891,767	9,095,343,208

¹ 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 ¹				CENTRAL COASTAL AREA		
	Napa ²	Solano	Total	Alameda-Zone 7	Alameda County	Santa Clara	Total	San Luis Obispo	Santa Barbara	Total
1962	[1]	[2]	[3]	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

¹ 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.

² Napa's Table A quantities exclude amounts during the period 1968 through 1987 that were supplied by non-project water.

TABLE B-4 Maximum Contractual Table A Amounts (acre-feet)

Sheet 2 of 4

Calendar Year	SAN JOAQUIN VALLEY AREA									
	Dudley Ridge	Empire	Kern			Total	Kings	Oak Flat	Tulare	Total
			Municipal and Industrial	Agricultural	Total					
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	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	Coachella	Crestline	Desert	Littlerock	Mojave	Palmdale	San Bernardino	San Gabriel	San Gorgonio
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	20,000	5,200	526	8,000	170	8,400	1,620	1,677	122	0
1973	25,000	5,800	870	9,000	290	10,700	2,940	48,000	11,500	0
1974	30,000	6,400	1,160	10,000	400	13,100	4,260	50,000	12,300	0
1975	35,000	7,000	1,450	11,000	520	15,400	5,580	52,500	13,100	0
1976	44,000	7,600	1,740	12,000	640	17,800	6,900	55,000	14,000	0
1977	50,000	8,421	2,030	13,000	730	20,200	8,220	57,500	14,800	0
1978	57,000	9,242	2,320	14,000	920	0	9,340	60,000	15,700	0
1979	63,000	10,063	2,610	15,000	1,040	24,900	10,260	62,500	16,600	0
1980	69,200	10,884	2,900	17,000	1,150	27,200	11,180	65,500	17,400	6,800
1981	75,000	12,105	3,190	19,000	1,270	23,100	11,700	68,500	18,300	7,800
1982	81,300	13,326	3,480	21,000	1,380	22,843	12,320	71,500	19,100	8,800
1983	87,700	14,547	3,770	23,000	1,500	34,300	12,940	74,500	19,900	9,800
1984	35,000	15,768	4,060	25,000	1,610	36,700	13,560	78,000	20,700	10,800
1985	40,000	16,989	4,350	27,000	1,730	39,000	14,180	81,500	21,800	11,800
1986	42,000	18,210	4,640	29,000	1,840	41,400	14,800	85,000	23,200	12,900
1987	44,000	19,431	4,930	31,500	1,960	43,700	15,420	89,000	24,600	14,000
1988	46,000	20,652	5,220	34,000	2,070	46,000	16,040	93,000	26,000	15,100
1989	125,700	21,873	5,510	36,500	2,190	48,500	16,660	97,000	27,400	16,200
1990	132,100	23,100	5,800	38,100	2,300	50,800	17,300	101,500	28,800	17,300
1991	138,400	23,100	5,800	38,100	2,300	50,800	17,300	102,600	28,800	17,300
1992	138,400	23,100	5,800	38,100	2,300	50,800	17,300	102,600	28,800	17,300
1993	138,400	23,100	5,800	38,100	2,300	50,800	17,300	102,600	28,800	17,300
1994	138,400	23,100	5,800	38,100	2,300	50,800	17,300	102,600	28,800	17,300
1995	138,400	23,100	5,800	38,100	2,300	50,800	17,300	102,600	28,800	17,300
1996	138,400	23,100	5,800	38,100	2,300	50,800	17,300	102,600	28,800	0
1997	138,400	23,100	5,800	38,100	2,300	50,800	17,300	102,600	28,800	0
1998	138,400	23,100	5,800	38,100	2,300	75,800	17,300	102,600	28,800	0
1999	138,400	23,100	5,800	38,100	2,300	75,800	17,300	102,600	28,800	2,000
2000	138,400	23,100	5,800	38,100	2,300	75,800	21,300	102,600	28,800	3,000
2001	138,400	23,100	5,800	38,100	2,300	75,800	21,300	102,600	28,800	4,000
2002	141,400	23,100	5,800	38,100	2,300	75,800	21,300	102,600	28,800	4,000
2003	141,400	23,100	5,800	38,100	2,300	75,800	21,300	102,600	28,800	5,000
2004	141,400	33,000	5,800	38,100	2,300	75,800	21,300	102,600	28,800	6,000
2005	141,400	121,100	5,800	50,000	2,300	75,800	21,300	102,600	28,800	6,500
2006	141,400	121,100	5,800	50,000	2,300	75,800	21,300	102,600	28,800	7,000
2007	141,400	121,100	5,800	50,000	2,300	75,800	21,300	102,600	28,800	8,650
2008	141,400	121,100	5,800	50,000	2,300	75,800	21,300	102,600	28,800	17,300
2009	141,400	121,100	5,800	50,000	2,300	75,800	21,300	102,600	28,800	17,300
2010	141,400	138,350	5,800	55,750	2,300	82,800	21,300	102,600	28,800	17,300
2011	141,400	138,350	5,800	55,750	2,300	82,800	21,300	102,600	28,800	17,300
2012	141,400	138,350	5,800	55,750	2,300	82,800	21,300	102,600	28,800	17,300
2013	141,400	138,350	5,800	55,750	2,300	82,800	21,300	102,600	28,800	17,300
2014	144,844	138,350	5,800	55,750	2,300	82,800	21,300	102,600	28,800	17,300
2015	144,844	138,350	5,800	55,750	2,300	85,800	21,300	102,600	28,800	17,300
2016	144,844	138,350	5,800	55,750	2,300	85,800	21,300	102,600	28,800	17,300
2017	144,844	138,350	5,800	55,750	2,300	85,800	21,300	102,600	28,800	17,300
2018	144,844	138,350	5,800	55,750	2,300	85,800	21,300	102,600	28,800	17,300
2019	144,844	138,350	5,800	55,750	2,300	85,800	21,300	102,600	28,800	17,300
2020	144,844	138,350	5,800	55,750	2,300	89,800	21,300	102,600	28,800	17,300
2021	144,844	138,350	5,800	55,750	2,300	89,800	21,300	102,600	28,800	17,300
2022	144,844	138,350	5,800	55,750	2,300	89,800	21,300	102,600	28,800	17,300
2023	144,844	138,350	5,800	55,750	2,300	89,800	21,300	102,600	28,800	17,300
2024	144,844	138,350	5,800	55,750	2,300	89,800	21,300	102,600	28,800	17,300
2025	144,844	138,350	5,800	55,750	2,300	89,800	21,300	102,600	28,800	17,300
2026	144,844	138,350	5,800	55,750	2,300	89,800	21,300	102,600	28,800	17,300
2027	144,844	138,350	5,800	55,750	2,300	89,800	21,300	102,600	28,800	17,300
2028	144,844	138,350	5,800	55,750	2,300	89,800	21,300	102,600	28,800	17,300
2029	144,844	138,350	5,800	55,750	2,300	89,800	21,300	102,600	28,800	17,300
2030	144,844	138,350	5,800	55,750	2,300	89,800	21,300	102,600	28,800	17,300
2031	144,844	138,350	5,800	55,750	2,300	89,800	21,300	102,600	28,800	17,300
2032	144,844	138,350	5,800	55,750	2,300	89,800	21,300	102,600	28,800	17,300
2033	144,844	138,350	5,800	55,750	2,300	89,800	21,300	102,600	28,800	17,300
2034	144,844	138,350	5,800	55,750	2,300	89,800	21,300	102,600	28,800	17,300
2035	144,844	138,350	5,800	55,750	2,300	89,800	21,300	102,600	28,800	17,300
TOTAL	7,507,768	4,782,511	321,556	2,626,000	127,210	4,069,043	1,127,720	5,909,177	1,641,322	748,350

TABLE B-4 Maximum Contractual Table A Amounts (acre-feet)

Sheet 4 of 4

Calendar Year	SOUTHERN CALIFORNIA AREA (continued)				FEATHER RIVER AREA				South Bay Area Future Contractor	Grand Total
	Santa Clarita ³	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	3,700	0	0	3,700	0	300	250	550	0	191,500
1969	5,000	0	0	5,000	0	350	270	620	0	267,395
1970	5,700	0	0	5,700	0	400	300	700	0	322,600
1971	6,700	0	0	6,700	0	450	440	890	0	375,590
1972	8,936	154,772	0	209,423	0	500	470	970	0	741,759
1973	12,400	354,600	0	481,100	0	600	500	1,100	0	986,252
1974	15,400	454,900	0	597,920	0	700	530	1,230	0	1,182,200
1975	18,200	555,200	0	714,950	0	1,050	560	1,610	0	1,386,869
1976	21,200	655,600	0	836,480	0	1,400	590	1,990	0	1,508,387
1977	24,100	755,900	0	954,901	0	1,800	620	2,420	0	1,667,321
1978	24,762	856,300	0	1,049,584	0	1,200	650	1,850	0	1,818,034
1979	28,000	956,600	0	1,190,573	0	1,450	680	2,130	0	2,028,088
1980	30,400	1,057,000	1,000	1,317,614	0	1,100	710	1,810	0	2,214,770
1981	32,800	1,157,300	2,000	1,432,065	0	1,200	740	1,940	0	2,392,468
1982	34,800	1,257,600	3,000	1,550,449	0	1,200	770	1,970	0	2,574,545
1983	37,300	1,358,000	4,000	1,681,257	0	1,200	800	2,000	0	2,701,164
1984	39,600	1,458,300	5,000	1,744,098	1,600	1,200	830	3,630	0	2,884,337
1985	41,800	1,558,700	6,000	1,864,849	1,700	1,200	860	3,760	0	3,055,846
1986	43,600	1,659,300	8,000	1,983,890	2,100	1,200	890	4,190	0	3,257,736
1987	45,600	1,759,800	10,000	2,103,941	2,500	1,200	920	4,620	0	3,484,115
1988	48,000	1,860,400	13,000	2,225,482	2,900	1,200	960	5,060	0	3,688,335
1989	50,100	1,961,000	16,000	2,424,633	3,300	1,200	1,000	5,500	0	3,958,190
1990	52,000	2,011,500	20,000	2,500,600	3,800	1,200	1,040	6,040	0	4,079,666
1991	54,200	2,011,500	20,000	2,510,200	9,600	1,200	1,080	11,880	0	4,126,567
1992	54,200	2,011,500	20,000	2,510,200	9,600	1,200	1,120	11,920	0	4,138,816
1993	54,200	2,011,500	20,000	2,510,200	9,600	1,200	1,160	11,960	0	4,146,966
1994	54,200	2,011,500	20,000	2,510,200	9,600	1,200	1,200	12,000	0	4,154,201
1995	54,200	2,011,500	20,000	2,510,200	9,600	1,200	1,250	12,050	0	4,163,066
1996	54,200	2,011,500	20,000	2,492,900	9,600	1,200	1,300	12,100	0	4,111,341
1997	54,200	2,011,500	20,000	2,492,900	9,600	1,200	1,350	12,150	0	4,084,866
1998	54,200	2,011,500	20,000	2,517,900	9,600	1,200	1,400	12,200	0	4,086,021
1999	54,200	2,011,500	20,000	2,519,900	9,600	2,890	1,450	13,940	0	4,119,646
2000	95,200	2,011,500	20,000	2,565,900	9,600	2,890	1,510	14,000	0	4,121,631
2001	95,200	2,011,500	20,000	2,566,900	9,600	3,500	1,570	14,670	0	4,124,136
2002	95,200	2,011,500	20,000	2,569,900	9,600	3,500	1,630	14,730	0	4,125,031
2003	95,200	2,011,500	20,000	2,570,900	9,600	3,500	1,690	14,790	0	4,126,926
2004	95,200	2,011,500	20,000	2,581,800	9,600	3,500	0	13,100	0	4,127,061
2005	95,200	1,911,500	20,000	2,582,300	9,600	1,200	0	10,800	0	4,125,686
2006	95,200	1,911,500	20,000	2,582,800	9,600	1,200	324	11,124	0	4,126,885
2007	95,200	1,911,500	20,000	2,584,450	9,600	1,200	720	11,520	0	4,129,306
2008	95,200	1,911,500	20,000	2,593,100	9,600	27,500	2,020	39,120	0	4,165,931
2009	95,200	1,911,500	20,000	2,593,100	9,600	27,500	2,090	39,190	0	4,166,376
2010	95,200	1,911,500	20,000	2,623,100	9,600	1,731	2,160	13,491	0	4,146,227
2011	95,200	1,911,500	20,000	2,623,100	9,600	2,548	2,240	14,388	0	4,147,174
2012	95,200	1,911,500	20,000	2,623,100	9,600	27,500	2,320	39,420	0	4,172,256
2013	95,200	1,911,500	20,000	2,623,100	9,600	27,500	2,410	39,510	0	4,172,396
2014	95,200	1,911,500	20,000	2,626,544	9,600	27,500	2,500	39,600	0	4,172,536
2015	95,200	1,911,500	20,000	2,629,544	9,600	27,500	2,600	39,700	0	4,172,686
2016	95,200	1,911,500	20,000	2,629,544	9,600	27,500	2,700	39,800	0	4,172,786
2017	95,200	1,911,500	20,000	2,629,544	9,600	27,500	2,700	39,800	0	4,172,786
2018	95,200	1,911,500	20,000	2,629,544	9,600	27,500	2,700	39,800	0	4,172,786
2019	95,200	1,911,500	20,000	2,629,544	9,600	27,500	2,700	39,800	0	4,172,786
2020	95,200	1,911,500	20,000	2,633,544	9,600	27,500	2,700	39,800	0	4,172,786
2021	95,200	1,911,500	20,000	2,633,544	9,600	27,500	2,700	39,800	0	4,172,786
2022	95,200	1,911,500	20,000	2,633,544	9,600	27,500	2,700	39,800	0	4,172,786
2023	95,200	1,911,500	20,000	2,633,544	9,600	27,500	2,700	39,800	0	4,172,786
2024	95,200	1,911,500	20,000	2,633,544	9,600	27,500	2,700	39,800	0	4,172,786
2025	95,200	1,911,500	20,000	2,633,544	9,600	27,500	2,700	39,800	0	4,172,786
2026	95,200	1,911,500	20,000	2,633,544	9,600	27,500	2,700	39,800	0	4,172,786
2027	95,200	1,911,500	20,000	2,633,544	9,600	27,500	2,700	39,800	0	4,172,786
2028	95,200	1,911,500	20,000	2,633,544	9,600	27,500	2,700	39,800	0	4,172,786
2029	95,200	1,911,500	20,000	2,633,544	9,600	27,500	2,700	39,800	0	4,172,786
2030	95,200	1,911,500	20,000	2,633,544	9,600	27,500	2,700	39,800	0	4,172,786
2031	95,200	1,911,500	20,000	2,633,544	9,600	27,500	2,700	39,800	0	4,172,786
2032	95,200	1,911,500	20,000	2,633,544	9,600	27,500	2,700	39,800	0	4,172,786
2033	95,200	1,911,500	20,000	2,633,544	9,600	27,500	2,700	39,800	0	4,172,786
2034	95,200	1,911,500	20,000	2,633,544	9,600	27,500	2,700	39,800	0	4,172,786
2035	95,200	1,911,500	20,000	2,633,544	9,600	27,500	2,700	39,800	0	4,172,786
TOTAL	4,545,098	109,260,272	988,000	143,654,027	449,900	775,559	106,474	1,331,933	0	233,688,159

³ Castaic Lake Water Agency's SWP Water Supply Contract was transferred to Santa Clarita Valley Water Agency effective November 2, 2018.

TABLE B-5A Annual Water Quantities Delivered from Each Aqueduct Reach to Each Contractor (acre-feet)

Sheet 1 of 21

Calendar Year	FEATHER RIVER AREA			NORTH BAY AQUEDUCT									
	Butte	Grizzly Valley Pipeline	Plumas	Reach 1		Reach 3A		Reach 3A-T		Reach 3B			
				Solano	Napa	Solano	Napa	Solano	Napa ¹	Solano	Total		
1962	[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	3,029	508	1,715	15,487	0	8,493	22	11,092	11,660	0	46,754		
2019	2,955	436	1,655	13,814	8	8,035	16	9,633	11,261	0	42,767		
2020	3,177	405	4,900	6,752	0	6,042	0	14,864	12,591	0	40,249		
2021	270	730	5,760	28,654	0	0	0	17,415	0	46,069			
2022	270	730	5,760	28,654	0	0	0	0	17,415	0	46,069		
2023	270	730	5,760	28,654	0	0	0	0	17,415	0	46,069		
2024	270	730	5,760	28,654	0	0	0	0	17,415	0	46,069		
2025	270	730	5,760	28,654	0	0	0	0	17,415	0	46,069		
2026	270	730	5,760	28,654	0	0	0	0	17,415	0	46,069		
2027	270	730	5,760	28,654	0	0	0	0	17,415	0	46,069		
2028	270	730	5,760	28,654	0	0	0	0	17,415	0	46,069		
2029	270	730	5,760	28,654	0	0	0	0	17,415	0	46,069		
2030	270	730	5,760	28,654	0	0	0	0	17,415	0	46,069		
2031	270	730	5,760	28,654	0	0	0	0	17,415	0	46,069		
2032	270	730	5,760	28,654	0	0	0	0	17,415	0	46,069		
2033	270	730	5,760	28,654	0	0	0	0	17,415	0	46,069		
2034	270	730	5,760	28,654	0	0	0	0	17,415	0	46,069		
2035	270	730	5,760	28,654	0	0	0	0	17,415	0	46,069		
TOTAL	41,984	25,286	145,923	851,200	24	365,781	1,186	177,609	627,478	3,500	2,026,778		

¹ For the period 1968 through 1987, deliveries were non-project water pumped through an interim facility.

TABLE B-5A Annual Water Quantities Delivered from Each Aqueduct Reach to Each Contractor (acre-feet)

Sheet 2 of 21

Calendar Year	SOUTH BAY AQUEDUCT ²										
	Reach 1		Reach 2	Reach 4	Reach 5		Reach 6	Reach 7	Reach 8	Reach 9	
	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	
1962	[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	4,188	9,110	3,225	0	9,850	0	9,734	44,995	81,187
2018	84	0	7,318	4,243	4,452	0	23,426	209	17,952	77,136	134,820
2019	142	0	10,113	3,957	3,108	0	16,076	21	8,439	40,533	82,389
2020	347	0	6,614	4,138	1,512	0	8,795	7,224	14,752	76,153	119,535
2021	0	0	7,900	7,150	2,400	0	25,921	6,766	15,194	60,000	125,331
2022	0	0	7,980	7,150	2,400	0	25,841	7,029	15,195	60,000	125,595
2023	0	0	8,060	7,150	2,400	0	25,761	7,263	15,189	60,000	125,823
2024	0	0	7,510	7,150	2,400	0	26,311	7,520	15,232	60,000	126,123
2025	0	0	7,510	7,150	2,400	0	26,311	7,520	15,232	60,000	126,123
2026	0	0	7,510	7,150	2,400	0	26,311	7,520	15,232	60,000	126,123
2027	0	0	7,510	7,150	2,400	0	26,311	7,520	15,232	60,000	126,123
2028	0	0	7,510	7,150	2,400	0	26,311	7,520	15,232	60,000	126,123
2029	0	0	7,510	7,150	2,400	0	26,311	7,520	15,232	60,000	126,123
2030	0	0	7,510	7,150	2,400	0	26,311	7,520	15,232	60,000	126,123
2031	0	0	7,510	7,150	2,400	0	26,311	7,520	15,232	60,000	126,123
2032	0	0	7,510	7,150	2,400	0	26,311	7,520	15,232	60,000	126,123
2033	0	0	7,510	7,150	2,400	0	26,311	7,520	15,232	60,000	126,123
2034	0	0	7,510	7,150	2,400	0	26,311	7,520	15,232	60,000	126,123
2035	0	0	7,510	7,150	2,400	0	26,311	7,520	15,232	60,000	126,123
TOTAL	25,208	53,844	447,775	379,172	119,166	11,722	948,330	442,913	753,200	4,685,094	7,866,424

² For the period June 1962 through November 1967, deliveries were supplied by non-project water.

TABLE B-5A Annual Water Quantities Delivered from Each Aqueduct Reach to Each Contractor (acre-feet)

Sheet 3 of 21

Calendar Year	CALIFORNIA AQUEDUCT											
	NORTH SAN JOAQUIN DIVISION						SAN LUIS DIVISION					
	Reach 1		Reach 2A				Reach 3		Reach 3A			
	Kern (Agricultural)	Alameda-Zone 7	Kern (Agricultural)	Oak Flat ³	Santa Clara	Tulare	Dudley Ridge	Metropolitan	Alameda-Zone 7	Alameda County	AVEK	Dudley Ridge
	[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	0
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	6,068
2013	0	0	1,156	2,820	0	0	0	0	0	0	0	0
2014	0	0	609	1,520	0	0	0	5,808	7,408	0	0	16,789
2015	0	0	718	1,077	0	0	0	2,360	6,032	0	0	14,460
2016	0	0	677	1,855	0	0	0	0	0	0	0	0
2017	0	0	738	2,893	0	0	0	0	0	0	0	0
2018	0	0	735	2,289	0	0	0	0	0	0	0	7,885
2019	0	0	659	2,184	0	0	0	0	0	0	0	0
2020	0	0	654	2,243	0	0	0	0	0	3,375	0	8,450
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	38,147	254,002	200	300	602	0	8,168	16,815	5,873	53,652

³ 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)

Sheet 4 of 21

Calendar Year	CALIFORNIA AQUEDUCT											
	SAN LUIS DIVISION (continued)											
	Reach 3A (continued)						Reach 4					
	Kern	Reach 3A (continued)			Reach 4	Kern	Reach 4			Santa Clarita ⁴	Tulare	
		Municipal and Industrial	Agricultural	Metropolitan	Santa Barbara	Santa Clara	Santa Clarita ⁴	Tulare	Dudley Ridge	Municipal and Industrial	Agricultural	
1962	[35]	[36]	[37]	0	0	0	0	0	0	0	0	[46] 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	3,320	68,960	0	0	0	0	0	0	0	1,517	878	0
2001	0	140,242	0	0	30,000	0	0	0	0	0	0	0
2002	6,000	62,024	0	0	0	0	0	0	0	0	0	0
2003	0	151,044	29,596	0	0	0	0	0	0	0	1,351	0
2004	0	44,877	0	0	0	0	0	0	0	0	0	0
2005	0	109,712	50,000	0	8,804	0	277	0	0	0	7,000	0
2006	0	19,575	0	0	0	0	0	0	0	0	0	0
2007	71,567	116,272	0	0	0	0	0	0	0	0	0	0
2008	0	94,562	0	0	0	0	0	0	0	0	10,721	0
2009	0	164,653	52,933	0	9,999	3,300	0	0	0	0	0	0
2010	0	35,896	124,543	0	9,993	0	0	0	0	0	0	0
2011	0	0	78,324	0	1,825	0	0	0	0	0	0	0
2012	0	23,401	0	0	0	0	0	0	0	0	0	0
2013	0	64,524	0	0	6,000	0	0	0	0	0	0	6,000
2014	0	104,689	15,000	0	27,476	0	0	0	0	0	0	0
2015	0	105,549	0	0	17,115	0	0	0	0	0	3,278	0
2016	0	54,247	37,283	7,230	28,878	5,940	0	0	0	1,047	0	7,723
2017	0	0	15,946	15,584	3,497	30,000	0	0	0	0	0	0
2018	0	23,607	0	0	2,000	0	0	0	0	0	0	0
2019	0	27,009	0	0	852	0	0	0	0	0	0	0
2020	0	28,370	0	0	5,000	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	80,887	1,439,213	403,625	22,814	151,439	39,240	277	16,344	2,642	44,584	6,000	18,689

⁴ Castaic Lake Water Agency's SWP Water Supply Contract was transferred to Santa Clarita Valley Water Agency effective November 2, 2018.

TABLE B-5A Annual Water Quantities Delivered from Each Aqueduct Reach to Each Contractor (acre-feet)

Sheet 5 of 21

Calendar Year	CALIFORNIA AQUEDUCT (continued)												
	SAN LUIS DIVISION (continued)										SOUTH SAN JOAQUIN DIVISION		
	Reach 5												Reach 6
	Dudley Ridge	Empire	Kern		Metropolitan	Oak Flat	Santa Clarita ⁴	Tulare	Empire	Kern		Kings	
			Municipal and Industrial	Agricultural						Municipal and Industrial	Agricultural		
	[47]	[48]	[49]	[50]	[51]	[52]	[53]	[54]	[55]	[56]	[57]	[58]	
1962	0	0	0	0	0	0	0	0	0	0	0	0	
1963	0	0	0	0	0	0	0	0	0	0	0	0	
1964	0	0	0	0	0	0	0	0	0	0	0	0	
1965	0	0	0	0	0	0	0	0	0	0	0	0	
1966	0	0	0	0	0	0	0	0	0	0	0	0	
1967	0	0	0	0	0	0	0	0	0	0	0	0	
1968	0	0	0	0	0	0	0	0	0	0	0	0	
1969	0	0	0	0	0	0	0	0	0	0	0	0	
1970	0	0	0	0	0	0	0	0	0	0	0	0	
1971	0	0	0	0	0	0	0	0	0	0	0	0	
1972	0	0	0	0	0	0	0	0	0	0	0	0	
1973	0	0	0	0	0	0	0	0	0	0	0	0	
1974	0	0	0	0	0	0	0	0	0	0	0	0	
1975	0	0	0	0	0	0	0	0	0	0	0	0	
1976	0	0	0	0	0	0	0	0	0	0	0	0	
1977	0	0	0	0	0	0	0	0	0	0	0	0	
1978	0	0	0	0	0	0	0	0	0	0	0	0	
1979	0	0	0	0	0	0	0	0	0	0	0	0	
1980	0	0	0	0	0	0	0	0	0	0	0	0	
1981	0	0	0	0	0	0	0	0	0	0	0	0	
1982	0	0	0	0	0	0	0	0	0	0	0	0	
1983	0	0	0	0	0	0	0	0	0	0	0	0	
1984	0	0	0	0	0	0	0	0	0	0	0	0	
1985	0	0	0	0	0	0	0	0	0	0	0	0	
1986	0	0	0	0	0	0	0	0	0	0	0	0	
1987	0	0	0	0	0	0	0	0	0	0	0	0	
1988	0	0	0	0	0	0	0	1,550	0	0	0	0	
1989	0	0	0	18,831	0	0	0	0	0	0	0	8,260	
1990	0	0	0	0	0	0	0	0	0	0	0	0	
1991	0	0	0	0	0	0	0	0	0	0	0	0	
1992	10,823	0	0	0	0	0	0	0	0	0	0	0	
1993	27,200	0	0	28,200	0	2,000	5,095	1,624	0	0	0	31,200	
1994	0	0	0	0	0	0	0	0	0	0	0	0	
1995	0	0	0	21,776	0	0	0	0	0	0	0	3,932	
1996	0	0	1,125	81,507	0	0	0	4,000	0	0	0	0	
1997	0	0	9,080	154,940	0	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	21,500	0	0	8,000	0	0	0	33,776	
2000	0	0	8,130	57,647	0	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	870	0	0	0	0	0	1,490	0	0	0	1,779	
2010	0	431	0	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	449	0	0	0	0	0	2,800	514	0	0	2,706	
2013	0	692	0	8,393	0	0	0	5,350	280	0	0	2,666	
2014	0	303	0	0	0	0	0	661	38	0	0	1,109	
2015	0	142	0	1,349	0	0	0	7,576	120	0	0	391	
2016	0	425	0	7,553	0	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	301	0	0	0	0	0	2,210	0	0	0	2,450	
2019	0	0	0	0	0	0	0	1,500	449	0	0	2,060	
2020	0	0	0	0	0	0	0	0	0	0	0	2,909	
2021	0	0	0	0	0	0	0	0	0	0	0	3,120	
2022	0	0	0	0	0	0	0	0	0	0	0	3,120	
2023	0	0	0	0	0	0	0	0	0	0	0	3,120	
2024	0	0	0	0	0	0	0	0	0	0	0	3,120	
2025	0	0	0	0	0	0	0	0	0	0	0	3,120	
2026	0	0	0	0	0	0	0	0	0	0	0	3,120	
2027	0	0	0	0	0	0	0	0	0	0	0	3,120	
2028	0	0	0	0	0	0	0	0	0	0	0	3,120	
2029	0	0	0	0	0	0	0	0	0	0	0	3,120	
2030	0	0	0	0	0	0	0	0	0	0	0	3,120	
2031	0	0	0	0	0	0	0	0	0	0	0	3,120	
2032	0	0	0	0	0	0	0	0	0	0	0	3,120	
2033	0	0	0	0	0	0	0	0	0	0	0	3,120	
2034	0	0	0	0	0	0	0	0	0	0	0	3,120	
2035	0	0	0	0	0	0	0	0	0	0	0	3,120	
TOTAL	38,023	3,613	18,335	380,196	21,500	2,000	5,095	89,674	2,347	21,857	146,355	89,363	

⁴ Castaic Lake Water Agency's SWP Water Supply Contract was transferred to Santa Clarita Valley Water Agency effective November 2, 2018.

TABLE B-5A Annual Water Quantities Delivered from Each Aqueduct Reach to Each Contractor (acre-feet)

Sheet 6 of 21

Calendar Year	CALIFORNIA AQUEDUCT (continued)														
	SOUTH SAN JOAQUIN DIVISION (continued)														
	Reach 6 (continued)		Reach 7										Reach 8C		
	Metropolitan	Tulare	Dudley Ridge	Kern		Municipal and Industrial	Agricultural	Kings	Metropolitan	Santa Clarita ⁴	Tulare	Dudley Ridge	Empire	Kern	
Metropolitan	Tulare	Dudley Ridge		Municipal and Industrial	Agricultural			Kings	Metropolitan	Santa Clarita ⁴	Tulare	Dudley Ridge	Empire	Municipal and Industrial	
1962	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
1963	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
1964	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
1965	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
1966	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
1967	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
1968	0	0	0	0	0	0	0	0	0	0	0	0	1,978	0	
1969	0	0	0	0	0	0	0	0	0	0	0	0	56	0	
1970	0	0	0	0	0	0	0	0	0	0	0	0	3,942	0	
1971	0	0	0	0	0	0	0	0	0	0	0	0	5,990	0	
1972	0	0	0	0	0	0	0	0	0	0	0	0	5,795	0	
1973	0	0	0	0	0	0	0	0	0	0	0	0	3,000	0	
1974	0	0	0	0	0	0	0	0	0	0	0	0	3,000	0	
1975	0	0	0	0	0	0	0	0	0	0	0	0	3,000	0	
1976	0	0	0	0	0	0	0	0	0	0	0	0	3,000	0	
1977	0	0	0	0	0	0	0	0	0	0	0	0	738	0	
1978	0	0	0	0	0	0	0	0	0	0	0	0	454	0	
1979	0	0	0	0	0	0	0	0	0	0	0	0	1,739	0	
1980	0	0	0	0	0	0	0	0	0	0	0	0	894	0	
1981	0	0	0	0	0	0	0	0	0	0	0	0	5,859	0	
1982	0	0	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	0	0	
1984	0	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	5,197	0	
1986	0	0	0	0	0	0	0	0	0	0	0	0	1,170	0	
1987	0	0	0	0	0	0	0	0	0	0	0	0	2,525	0	
1988	0	0	0	0	0	0	0	0	0	0	0	0	3,475	0	
1989	0	0	0	0	0	5,262	0	0	0	0	0	2,391	3,000	0	
1990	0	0	0	0	0	0	0	0	0	0	0	0	1,279	0	
1991	0	0	0	0	0	0	0	0	0	0	0	0	221	0	
1992	0	0	0	0	0	0	0	0	0	0	0	280	1,354	0	
1993	0	0	0	18,157	10,043	0	0	0	0	0	0	0	2,741	0	
1994	0	0	0	0	0	0	0	0	0	2,100	0	0	1,666	0	
1995	0	0	0	10,875	20,595	0	0	0	0	0	0	0	1,631	989	
1996	0	0	0	3,424	69,704	0	0	0	0	0	0	95	1,868	0	
1997	0	0	0	27,079	32,463	0	0	0	0	0	0	0	0	0	
1998	0	3,000	200	3,998	62,081	0	0	0	0	0	0	90	542	0	
1999	11,000	23,000	0	7,923	19,500	0	500	0	20,000	1,200	4,470	86	3,176	0	
2000	0	3,000	0	0	45,137	0	0	20,000	1,200	20,500	166	1,799	0	0	
2001	0	600	0	0	0	0	0	0	0	0	0	14	1,360	0	
2002	0	0	0	0	0	0	0	0	0	12,067	0	0	1,405	0	
2003	0	0	0	0	0	0	0	0	0	15,103	0	0	1,436	0	
2004	0	0	0	0	0	0	0	0	0	0	0	0	3,562	0	
2005	0	0	0	0	0	6,904	0	0	0	4,000	0	0	3,834	0	
2006	0	0	0	0	0	2,500	0	0	0	6,000	0	0	3,282	0	
2007	0	0	0	0	0	16,214	0	0	0	2,545	0	0	2,084	0	
2008	0	0	400	0	1,998	1,330	0	0	0	1,500	0	0	947	0	
2009	0	2,100	1,400	0	0	0	0	0	0	600	0	0	164	0	
2010	0	0	0	0	0	0	0	0	0	3,850	0	0	2,828	0	
2011	0	0	0	0	0	0	0	0	0	2,500	0	0	1,515	0	
2012	0	500	0	0	0	2,000	0	0	0	0	0	0	1,279	0	
2013	0	1,159	500	0	0	0	0	0	0	0	1,121	0	0	595	0
2014	0	275	0	0	0	0	0	0	0	0	0	0	0	175	0
2015	0	0	850	0	0	0	0	0	0	0	0	0	0	362	0
2016	0	4,257	0	0	0	0	0	0	0	0	3,175	0	0	951	0
2017	0	0	0	0	0	0	0	0	0	0	0	0	0	318	0
2018	0	0	0	0	0	0	0	0	0	0	0	0	0	852	0
2019	0	0	0	0	0	0	0	0	0	0	0	788	0	347	0
2020	0	0	0	0	0	0	0	0	0	0	0	0	1,108	0	0
2021	0	0	0	0	0	0	0	0	0	0	0	0	1,800	0	
2022	0	0	0	0	0	0	0	0	0	0	0	0	0	1,800	0
2023	0	0	0	0	0	0	0	0	0	0	0	0	0	1,800	0
2024	0	0	0	0	0	0	0	0	0	0	0	0	0	1,800	0
2025	0	0	0	0	0	0	0	0	0	0	0	0	0	1,800	0
2026	0	0	0	0	0	0	0	0	0	0	0	0	0	1,800	0
2027	0	0	0	0	0	0	0	0	0	0	0	0	0	1,800	0
2028	0	0	0	0	0	0	0	0	0	0	0	0	0	1,800	0
2029	0	0	0	0	0	0	0	0	0	0	0	0	0	1,800	0
2030	0	0	0	0	0	0	0	0	0	0	0	0	0	1,800	0
2031	0	0	0	0	0	0	0	0	0	0	0	0	0	1,800	0
2032	0	0	0	0	0	0	0	0	0	0	0	0	0	1,800	0
2033	0	0	0	0	0	0	0	0	0	0	0	0	0	1,800	0
2034	0	0	0	0	0	0	0	0	0	0	0	0	0	1,800	0
2035	0	0	0	0	0	0	0	0	0	0	0	0	0	1,800	0
TOTAL	11,000	37,891	3,350	71,456	282,997	12,734	20,500	3,300	77,431	3,910	126,854	989			

⁴ Castaic Lake Water Agency's SWP Water Supply Contract was transferred to Santa Clarita Valley Water Agency effective November 2, 2018.

TABLE B-5A Annual Water Quantities Delivered from Each Aqueduct Reach to Each Contractor (acre-feet)

Sheet 7 of 21

Calendar Year	CALIFORNIA AQUEDUCT (continued)											
	SOUTH SAN JOAQUIN DIVISION (continued)											
	Reach 8C (continued)			Reach 8D						Reach 9		
	Kern	Agricultural	Kings	Tulare	Dudley Ridge	Empire	Kern		Kings	San Luis Obispo	Tulare	Dudley Ridge
							Municipal and Industrial	Agricultural				
[71]	[72]	[73]	[74]	[75]	[76]	[77]	[78]	[79]	[80]	[81]	[82]	
1962	0	0	0	0	0	0	0	0	0	0	0	0
1963	0	0	0	0	0	0	0	0	0	0	0	0
1964	0	0	0	0	0	0	0	0	0	0	0	0
1965	0	0	0	0	0	0	0	0	0	0	0	0
1966	0	0	0	0	0	0	0	0	0	0	0	0
1967	0	0	0	0	0	0	0	0	0	0	0	0
1968	0	900	25,100	26,360	0	0	0	0	0	0	0	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	0	3,408	0	0
1971	0	3,700	80,906	41,053	0	0	0	0	0	41,579	0	0
1972	0	1,400	144,843	42,443	0	0	0	0	0	113,550	0	0
1973	0	1,500	26,317	22,057	0	0	1,500	0	0	24,147	0	0
1974	0	1,500	32,603	33,390	0	0	0	0	0	39,686	0	0
1975	0	1,600	41,536	40,555	0	0	0	0	0	44,722	0	0
1976	0	1,600	26,595	41,421	0	0	0	0	0	32,216	0	0
1977	0	1,530	12,984	11,153	0	0	0	0	0	5,097	0	0
1978	0	2,070	3,934	51,747	0	0	0	0	0	8,119	0	0
1979	0	2,000	74,758	38,544	0	0	0	0	0	80,363	0	0
1980	0	2,200	35,140	41,000	0	0	0	0	0	40,304	0	0
1981	0	2,300	50,888	41,000	0	0	0	0	0	32,550	0	0
1982	0	1,536	4,405	41,000	0	0	0	214	0	14,146	0	0
1983	0	3,550	1,001	42,900	0	0	0	0	0	5	0	0
1984	0	3,100	3,677	45,100	0	0	0	0	0	2,066	0	0
1985	0	3,400	68,638	46,251	0	0	0	0	0	41,153	0	0
1986	0	3,700	40,017	50,249	0	0	0	0	0	39,338	0	0
1987	0	4,000	30,359	46,288	0	0	0	0	0	62,725	0	0
1988	0	4,000	46,281	47,994	0	0	0	0	0	48,035	0	0
1989	0	4,000	63,703	52,158	0	0	0	0	0	63,947	0	0
1990	0	2,000	23,504	36,296	0	0	161	0	0	32,066	0	0
1991	0	0	1,697	927	0	0	0	0	0	483	0	0
1992	0	1,806	15,982	12,667	0	0	0	0	0	30,746	0	0
1993	0	4,000	57,112	23,221	0	0	0	0	0	65,732	197	0
1994	0	2,116	21,510	28,793	0	0	1,726	0	0	40,852	0	0
1995	10,527	4,000	40,934	45,240	0	2,959	27,270	0	0	57,435	0	0
1996	1,500	4,000	84,130	52,722	0	0	1,455	0	100	148,745	0	0
1997	1,500	0	9,467	57,496	0	0	0	0	100	9,402	4,900	0
1998	1,000	15	8,956	49,435	0	0	20,000	0	0	8,721	0	0
1999	400	4,000	90,334	58,290	0	0	9,000	0	0	162,631	0	0
2000	400	3,600	63,842	57,920	0	0	0	0	0	113,952	0	0
2001	0	1,560	23,300	40,155	0	0	6,089	0	0	58,369	0	0
2002	0	2,854	34,009	48,179	0	0	7,522	0	0	47,426	0	0
2003	0	3,692	25,317	45,732	0	0	8,350	0	0	61,521	0	0
2004	0	5,803	30,546	45,823	0	0	4,979	0	0	55,625	0	0
2005	0	4,057	42,450	58,627	0	0	0	1,891	0	92,552	0	0
2006	0	1,105	34,367	61,410	0	0	0	3,266	0	64,840	0	0
2007	0	657	31,305	39,974	0	0	7,740	1,921	0	49,633	0	0
2008	0	240	14,146	18,974	0	0	21,242	107	0	16,903	0	0
2009	0	1,612	13,522	12,037	0	0	19,684	0	0	16,794	5,500	0
2010	0	26	14,005	17,346	0	0	14,094	1,900	0	40,609	0	0
2011	0	2,160	23,814	22,427	0	0	65	1,194	0	30,827	292	0
2012	0	2,699	25,847	17,122	0	0	2,168	0	0	56,570	3,400	0
2013	0	1,029	16,490	19,605	0	0	4,239	950	0	24,241	1,941	0
2014	0	81	2,880	12,960	0	0	3,554	66	0	5,118	1,000	0
2015	0	838	977	9,473	0	0	2,000	0	0	617	1,250	0
2016	0	2,651	534	11,403	0	0	140	0	0	2,447	3,430	0
2017	0	1,428	17,107	15,319	0	0	0	1,611	0	39,654	0	774
2018	0	1,261	16,630	4,821	438	0	0	2	0	31,711	4,849	0
2019	0	750	12,773	7,222	0	0	1,683	1,772	0	40,281	500	1,142
2020	0	400	3,190	13,308	0	0	17,700	460	0	21,227	0	0
2021	0	912	20,993	26,169	0	0	0	1,368	0	31,490	0	0
2022	0	912	20,993	26,169	0	0	0	1,368	0	31,490	0	0
2023	0	912	20,993	26,169	0	0	0	1,368	0	31,490	0	0
2024	0	912	20,993	26,169	0	0	0	1,368	0	31,490	0	0
2025	0	912	20,993	26,169	0	0	0	1,368	0	31,490	0	0
2026	0	912	20,993	26,169	0	0	0	1,368	0	31,490	0	0
2027	0	912	20,993	26,169	0	0	0	1,368	0	31,490	0	0
2028	0	912	20,993	26,169	0	0	0	1,368	0	31,490	0	0
2029	0	912	20,993	26,169	0	0	0	1,368	0	31,490	0	0
2030	0	912	20,993	26,169	0	0	0	1,368	0	31,490	0	0
2031	0	912	20,993	26,169	0	0	0	1,368	0	31,490	0	0
2032	0	912	20,993	26,169	0	0	0	1,368	0	31,490	0	0
2033	0	912	20,993	26,169	0	0	0	1,368	0	31,490	0	0
2034	0	912	20,993	26,169	0	0	0	1,368	0	31,490	0	0
2035	0	912	20,993	26,169	0	0	0	1,368	0	31,490	0	0
TOTAL	15,327	123,806	1,936,338	2,211,904	438	2,959	182,361	35,874	200	2,637,236	27,259	1,916

TABLE B-5A Annual Water Quantities Delivered from Each Aqueduct Reach to Each Contractor (acre-feet)

Sheet 8 of 21

Calendar Year	CALIFORNIA AQUEDUCT (continued)											
	SOUTH SAN JOAQUIN DIVISION (continued)											
	Reach 9 (continued)				Reach 10A							
	Kern		Tulare	Alameda-Zone 7	Alameda County	AVEK	Dudley Ridge	Empire	Kern		Metropolitan	San Bernardino
	Municipal and Industrial	Agricultural							Municipal and Industrial	Agricultural		
[83]	[84]	[85]	[86]	[87]	[88]	[89]	[90]	[91]	[92]	[93]	[94]	
1962	0	0	0	0	0	0	0	0	0	0	0	0
1963	0	0	0	0	0	0	0	0	0	0	0	0
1964	0	0	0	0	0	0	0	0	0	0	0	0
1965	0	0	0	0	0	0	0	0	0	0	0	0
1966	0	0	0	0	0	0	0	0	0	0	0	0
1967	0	0	0	0	0	0	0	0	0	0	0	0
1968	0	30,951	0	0	0	0	0	0	0	0	0	0
1969	0	24,489	0	0	0	0	0	0	0	0	0	0
1970	0	46,114	1,855	0	0	0	0	0	0	158	0	0
1971	0	58,356	0	0	0	0	0	0	0	9,973	0	0
1972	0	75,464	0	0	0	0	0	0	0	5,876	0	0
1973	0	54,583	0	0	0	0	0	0	0	22,948	0	0
1974	0	63,814	0	0	0	0	0	0	10,019	22,719	0	0
1975	0	50,021	0	0	0	0	0	0	2,791	72,121	0	0
1976	0	53,465	0	0	0	0	0	0	74	50,444	0	0
1977	0	24,668	0	0	0	0	0	0	201	34,451	0	0
1978	0	72,231	0	0	0	0	0	0	0	161,889	0	0
1979	0	74,524	0	0	0	0	0	0	285	153,245	0	0
1980	0	79,946	0	0	0	0	0	0	3,780	131,836	0	0
1981	0	76,508	0	0	0	0	0	0	341	133,500	0	0
1982	0	76,877	0	0	0	0	0	0	4,700	164,832	0	0
1983	2,217	84,573	0	0	0	0	0	0	0	146,493	0	0
1984	4,100	85,732	0	0	0	0	0	0	6,910	150,302	0	0
1985	0	67,696	0	0	0	0	0	0	6,495	153,473	0	0
1986	0	79,943	0	0	0	0	0	0	5,065	198,099	0	0
1987	0	97,732	0	0	0	0	0	0	900	226,521	0	0
1988	1,100	83,858	0	0	0	0	0	0	9,529	212,495	0	0
1989	0	91,134	0	0	0	0	0	0	21,038	251,979	0	0
1990	0	83,108	0	0	0	0	0	0	25,189	47,472	0	0
1991	13,683	601	0	0	0	0	0	0	1,142	6,820	0	0
1992	28	40,183	0	0	0	0	0	0	3,685	89,390	0	0
1993	5,945	53,597	0	0	0	0	0	0	775	233,862	44,496	0
1994	0	44,994	0	0	0	0	0	0	5,227	126,792	0	0
1995	0	64,076	0	0	0	0	0	0	366	229,448	50,000	0
1996	2,236	89,291	0	0	6,200	0	0	0	6,666	199,854	95,000	0
1997	0	72,013	0	0	10,000	0	900	0	3,577	157,385	125,000	0
1998	0	57,530	0	1,970	3,780	0	0	0	2,603	163,587	39,500	0
1999	0	72,734	0	22,910	16,100	0	0	0	1,657	190,787	75,850	0
2000	0	73,562	0	23,940	13,380	0	0	0	7,672	283,208	0	0
2001	0	54,198	0	5,000	0	0	0	0	160	98,175	0	0
2002	0	60,957	0	14,287	2,083	0	0	0	145	171,498	0	0
2003	0	54,724	0	6,500	18,800	0	0	0	217	174,674	70,940	0
2004	0	54,330	0	5,740	8,000	0	0	0	65,751	117,286	0	0
2005	0	53,206	0	0	28,422	0	0	0	146	232,519	31,210	0
2006	0	56,909	0	5,740	27,447	0	5,000	0	0	237,623	0	0
2007	0	66,018	0	717	1,029	0	3,000	0	0	203,794	0	0
2008	0	63,315	0	0	0	0	2,800	0	1,702	103,176	0	0
2009	0	64,007	2,330	0	0	0	2,000	0	690	95,798	0	0
2010	0	76,357	0	3,000	7,000	0	2,000	0	14	102,773	74,000	0
2011	0	78,177	2,000	3,414	16,020	0	2,908	0	26	137,476	149,012	0
2012	0	69,395	2,000	0	7,500	0	1,660	0	29	201,876	45,000	2,868
2013	0	82,005	0	0	0	0	2,500	0	2,057	116,190	0	0
2014	0	67,754	0	0	0	0	0	0	0	40,332	0	0
2015	0	64,809	0	0	0	0	0	0	3,751	49,953	0	0
2016	0	68,699	0	5,000	18,272	0	1,075	0	817	101,941	0	0
2017	0	75,501	0	19,381	19,302	9,226	2,446	251	867	166,972	77,731	0
2018	0	69,618	900	0	0	11,015	5,717	0	2,604	93,384	0	0
2019	0	68,454	10,486	13,447	13,271	4,762	613	0	3,712	119,564	87,058	0
2020	0	73,637	0	0	0	0	0	0	0	122,108	0	0
2021	0	61,816	0	0	3,240	0	0	0	0	171,305	60,000	0
2022	0	61,816	0	0	2,976	0	0	0	0	171,305	60,000	0
2023	0	61,816	0	0	2,748	0	0	0	0	171,305	60,000	0
2024	0	61,816	0	0	2,448	0	0	0	0	171,305	60,000	0
2025	0	61,816	0	0	2,448	0	0	0	0	171,305	60,000	0
2026	0	61,816	0	0	2,448	0	0	0	0	171,305	60,000	0
2027	0	61,816	0	0	2,448	0	0	0	0	171,305	60,000	0
2028	0	61,816	0	0	2,448	0	0	0	0	171,305	60,000	0
2029	0	61,816	0	0	2,448	0	0	0	0	171,305	60,000	0
2030	0	61,816	0	0	2,448	0	0	0	0	171,305	60,000	0
2031	0	61,816	0	0	2,448	0	0	0	0	171,305	60,000	0
2032	0	61,816	0	0	2,448	0	0	0	0	171,305	60,000	0
2033	0	61,816	0	0	2,448	0	0	0	0	171,305	60,000	0
2034	0	61,816	0	0	2,448	0	0	0	0	171,305	60,000	0
2035	0	61,816	0	0	2,448	0	0	0	0	171,305	60,000	0
TOTAL	29,309	4,353,678	19,571	131,046	254,946	25,003	32,619	251	213,375	9,288,646	1,864,797	2,868

TABLE B-5A Annual Water Quantities Delivered from Each Aqueduct Reach to Each Contractor (acre-feet)

Sheet 9 of 21

Calendar Year	CALIFORNIA AQUEDUCT (continued)												
	SOUTH SAN JOAQUIN DIVISION (continued)												
	Reach 10A (continued)				Reach 11B								
	Santa Barbara	Santa Clara	Santa Clarita ⁴	Tulare	Alameda Zone 7	AVEK	Dudley Ridge	Empire	Kern		Metropolitan		Santa Clarita ⁴
	[95]	[96]	[97]	[98]	[99]	[100]	[101]	[102]	[103]	[104]	[105]	[106]	[107]
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	24,776	0	0	0
1969	0	0	0	2,842	0	0	0	0	0	64,682	0	0	0
1970	0	0	0	4,315	0	0	0	0	0	72,279	0	0	0
1971	0	0	0	0	0	0	0	0	0	63,773	0	0	0
1972	0	0	0	0	0	0	0	0	0	72,358	0	0	0
1973	0	0	0	0	0	0	0	0	0	67,544	0	0	0
1974	0	0	0	0	0	0	0	0	0	87,476	0	0	0
1975	0	0	0	0	0	0	0	0	0	85,675	0	0	0
1976	0	0	0	0	0	0	0	0	0	85,067	0	0	0
1977	0	0	0	0	0	0	0	0	3,981	29,603	0	0	0
1978	0	0	0	0	0	0	0	0	0	88,753	0	0	0
1979	0	0	0	0	0	0	0	0	484	108,379	0	0	0
1980	0	0	0	0	0	0	0	0	3,112	103,207	0	0	0
1981	0	0	0	0	0	0	0	0	494	104,395	0	0	0
1982	0	0	0	0	0	0	0	0	798	99,081	0	0	0
1983	0	0	0	0	0	0	0	0	2,069	94,117	0	0	0
1984	0	0	0	0	0	0	0	0	2,349	124,819	0	0	0
1985	0	0	0	0	0	0	0	0	10,666	118,646	0	0	0
1986	0	0	0	0	0	0	0	0	8,673	124,836	0	0	0
1987	0	0	0	0	0	0	0	0	13,074	111,877	0	0	0
1988	0	0	0	0	0	0	0	0	13,509	114,031	0	0	0
1989	0	0	0	0	0	0	0	0	9,986	127,058	0	0	0
1990	0	0	0	0	0	0	0	0	9,319	104,107	0	0	0
1991	0	0	0	0	0	0	0	0	6,099	118	0	0	0
1992	0	0	0	0	0	0	0	0	7,419	35,093	0	0	0
1993	0	0	0	0	0	0	0	0	2,696	72,645	0	0	0
1994	0	0	0	0	0	0	0	0	3,506	71,202	0	0	0
1995	0	0	0	0	0	0	0	0	1,154	97,072	0	0	0
1996	0	45,000	0	0	0	0	0	0	1,185	96,250	0	0	0
1997	0	35,000	0	0	0	0	0	0	1,111	104,823	0	0	0
1998	0	23,800	0	0	0	0	0	0	1,311	72,646	0	0	0
1999	0	30,000	0	0	0	0	0	0	2,127	92,262	0	0	0
2000	0	23,730	0	0	0	0	1,500	0	3,793	89,622	0	0	0
2001	0	0	0	0	0	0	0	0	636	73,105	0	0	0
2002	0	3,311	24,000	0	0	0	0	0	1,457	91,123	0	0	0
2003	0	33,000	0	0	0	0	0	0	1,379	87,174	0	0	0
2004	0	0	32,522	0	0	0	0	0	1,299	97,722	0	0	0
2005	0	55,448	0	0	0	0	0	0	824	93,554	0	0	0
2006	0	64,036	0	0	0	0	0	0	0	98,417	0	0	0
2007	0	3,692	0	0	0	0	0	0	4,030	94,334	0	0	0
2008	0	4,306	0	0	0	0	0	0	263	93,417	0	0	0
2009	0	0	0	0	0	0	300	0	127	96,776	0	0	0
2010	0	51,990	0	800	0	0	5,350	0	381	92,220	0	0	974
2011	0	65,770	0	500	0	0	0	0	1,160	105,682	0	0	3,500
2012	0	0	0	0	0	0	2,000	0	1,019	94,519	0	5,500	0
2013	0	0	0	0	0	0	2,500	0	1,167	110,418	0	5,500	0
2014	0	0	0	0	0	0	9,786	0	0	87,728	0	0	0
2015	0	0	0	0	0	0	8,200	0	4,553	84,288	0	0	0
2016	0	9,634	0	0	0	0	5,000	0	1,037	91,735	942	0	0
2017	0	71,163	5,340	0	0	0	3,569	255	19,966	93,037	0	0	0
2018	900	42,600	0	0	0	0	3,985	7,490	0	422	91,111	0	0
2019	1,100	63,600	5,002	1,652	511	0	2,887	0	472	87,332	0	0	14,975
2020	0	5,000	0	0	0	0	0	0	0	13,649	0	0	0
2021	0	0	0	0	0	0	0	0	0	5,500	0	0	0
2022	0	0	0	0	0	0	0	0	0	5,500	0	0	0
2023	0	0	0	0	0	0	0	0	0	5,500	0	0	0
2024	0	0	0	0	0	0	0	0	0	5,500	0	0	0
2025	0	0	0	0	0	0	0	0	0	5,500	0	0	0
2026	0	0	0	0	0	0	0	0	0	5,500	0	0	0
2027	0	0	0	0	0	0	0	0	0	5,500	0	0	0
2028	0	0	0	0	0	0	0	0	0	5,500	0	0	0
2029	0	0	0	0	0	0	0	0	0	5,500	0	0	0
2030	0	0	0	0	0	0	0	0	0	5,500	0	0	0
2031	0	0	0	0	0	0	0	0	0	5,500	0	0	0
2032	0	0	0	0	0	0	0	0	0	5,500	0	0	0
2033	0	0	0	0	0	0	0	0	0	5,500	0	0	0
2034	0	0	0	0	0	0	0	0	0	5,500	0	0	0
2035	0	0	0	0	0	0	0	0	0	5,500	0	0	0
TOTAL	2,000	631,080	66,864	10,109	511	3,985	48,582	255	149,107	4,668,113	942	11,000	19,449

⁴ Castaic Lake Water Agency's SWP Water Supply Contract was transferred to Santa Clarita Valley Water Agency effective November 2, 2018.

TABLE B-5A Annual Water Quantities Delivered from Each Aqueduct Reach to Each Contractor (acre-feet)

Sheet 10 of 21

Calendar Year	CALIFORNIA AQUEDUCT (continued)										
	SOUTH SAN JOAQUIN DIVISION (continued)										
	Reach 12D			Reach 12E							
	Dudley Ridge	Kern		Alameda Zone 7	Alameda County	AVEK	Dudley Ridge	Kern		Metropolitan	San Bernardino
		Municipal and Industrial	Agricultural					Municipal and Industrial	Agricultural		
[108]	[109]	[110]	[111]	[112]	[113]	[114]	[115]	[116]	[117]	[118]	
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	9,279	0	0	
1971	0	0	0	0	0	0	0	28,056	0	0	
1972	0	0	0	0	0	0	0	62,342	0	0	
1973	0	0	0	0	0	0	0	13,082	0	0	
1974	0	0	0	0	0	0	0	4,248	0	0	
1975	0	0	0	0	0	0	0	10,787	0	0	
1976	0	0	0	0	0	0	37,519	20,555	0	0	
1977	0	0	0	0	0	0	20,280	1,737	0	0	
1978	0	0	0	0	0	0	47,133	15,011	0	0	
1979	0	0	0	0	0	0	50,740	61,567	0	0	
1980	0	0	0	0	0	0	32,039	22,252	0	0	
1981	0	0	0	0	0	0	59,917	58,470	0	0	
1982	0	0	0	0	0	0	36,139	75,587	0	0	
1983	0	0	0	0	0	0	0	10,950	0	0	
1984	0	0	0	0	0	0	63,941	39,929	0	0	
1985	0	0	0	0	0	0	69,839	84,117	0	0	
1986	0	0	0	0	0	0	62,109	51,540	0	0	
1987	0	0	0	0	0	0	95,297	86,223	0	0	
1988	0	0	0	0	0	0	86,390	123,249	0	0	
1989	0	0	0	0	0	0	83,965	146,544	0	0	
1990	0	0	0	0	0	0	82,164	38,973	0	0	
1991	0	0	0	0	0	0	8,842	303	0	0	
1992	0	0	0	0	0	0	47,181	57,048	0	0	
1993	0	0	0	0	0	0	84,822	285,554	5,504	0	
1994	0	0	0	0	0	0	66,188	77,839	0	0	
1995	0	0	0	0	0	0	1,000	107,130	181,097	0	
1996	0	0	0	0	0	0	4,131	89,257	134,138	0	
1997	0	0	0	0	0	0	8,012	32,061	128,329	1,486	
1998	0	0	0	0	0	0	5,925	28,258	88,998	24,234	
1999	0	0	0	0	0	0	1,321	110,161	255,343	62,162	
2000	0	21	0	0	0	0	953	11,772	156,215	149,731	
2001	0	41	0	0	0	0	0	385	51,076	0	
2002	0	760	6	0	0	0	0	0	135,335	0	
2003	0	2,431	152	0	0	0	0	39,479	112,056	45,989	
2004	0	3,419	768	0	0	0	1,600	52,303	95,893	0	
2005	0	2,841	644	3,419	1,878	0	1,154	43,835	340,281	15,384	
2006	0	2,513	1,556	10,000	0	0	0	82,207	296,230	5,065	
2007	0	2,164	2,284	0	0	0	0	1,179	87,764	0	
2008	0	1,514	3,000	0	0	0	0	0	58,983	0	
2009	0	564	4,274	0	0	0	0	0	82,434	0	
2010	0	1,904	2,206	10,000	0	0	0	4,851	72,809	134,855	
2011	0	973	65	10,000	1,960	0	0	26,249	309,617	109,787	
2012	0	3,128	939	20,308	0	0	200	19,423	102,054	92,803	
2013	0	3,473	1,531	0	0	0	0	26,652	60,295	0	
2014	0	0	5,225	0	0	0	0	0	500	0	
2015	0	985	3,486	0	0	0	0	280	2,750	0	
2016	0	2,225	1,442	7,000	0	0	0	1,225	64,819	3,908	
2017	0	1,830	789	10,619	0	25,417	13,924	7,852	343,922	78,271	
2018	107	923	28	0	0	0	0	0	90,347	3,512	
2019	0	974	2	4,942	0	6,590	896	3,266	304,555	58,417	
2020	0	0	3,029	0	0	0	0	6,392	25,999	0	
2021	0	4,500	70,405	5,000	0	0	0	46,200	48,135	30,000	0
2022	0	4,500	70,405	5,000	0	0	0	46,200	48,135	30,000	0
2023	0	4,500	70,405	5,000	0	0	0	46,200	48,135	30,000	0
2024	0	4,500	70,405	5,000	0	0	0	46,200	48,135	30,000	0
2025	0	4,500	70,405	5,000	0	0	0	46,200	48,135	30,000	0
2026	0	4,500	70,405	5,000	0	0	0	46,200	48,135	30,000	0
2027	0	4,500	70,405	5,000	0	0	0	46,200	48,135	30,000	0
2028	0	4,500	70,405	5,000	0	0	0	46,200	48,135	30,000	0
2029	0	4,500	70,405	5,000	0	0	0	46,200	48,135	30,000	0
2030	0	4,500	70,405	5,000	0	0	0	46,200	48,135	30,000	0
2031	0	4,500	70,405	5,000	0	0	0	46,200	48,135	30,000	0
2032	0	4,500	70,405	5,000	0	0	0	46,200	48,135	30,000	0
2033	0	4,500	70,405	5,000	0	0	0	46,200	48,135	30,000	0
2034	0	4,500	70,405	5,000	0	0	0	46,200	48,135	30,000	0
2035	0	4,500	70,405	5,000	0	0	0	46,200	48,135	30,000	0
TOTAL	107	100,183	1,087,501	151,288	3,838	32,007	39,116	2,424,373	5,689,106	1,241,108	27,132

TABLE B-5A Annual Water Quantities Delivered from Each Aqueduct Reach to Each Contractor (acre-feet)

Sheet 11 of 21

Calendar Year	CALIFORNIA AQUEDUCT (continued)										
	SOUTH SAN JOAQUIN DIVISION (continued)										
	Reach 12E (continued)			Reach 13B							
	Santa Barbara	Santa Clara	Santa Clarita ⁴	Alameda-Zone 7	Alameda County	Dudley Ridge	Kern		Metropolitan	Palmdale	Santa Barbara
[119]	[120]	[121]	[122]	[123]	[124]	[125]	[126]	[127]	[128]	[129]	
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	4,891	0	0	0	0
1971	0	0	0	0	0	0	0	0	0	0	0
1972	0	0	0	0	0	0	0	17,388	0	0	0
1973	0	0	0	0	0	0	0	9,297	0	0	0
1974	0	0	0	0	0	0	8,038	4,246	0	0	0
1975	0	0	0	0	0	0	8,538	7,059	0	0	0
1976	0	0	0	0	0	0	5,626	8,855	0	0	0
1977	0	0	0	0	0	0	0	5,024	0	0	0
1978	0	0	0	0	0	0	21,773	7,601	0	0	0
1979	0	0	0	0	0	0	5,663	17,766	0	0	0
1980	0	0	0	0	0	0	0	22,515	0	0	0
1981	0	0	0	0	0	0	7,844	14,037	0	0	0
1982	0	0	0	0	0	0	0	25,553	0	0	0
1983	0	0	0	0	0	0	0	3,491	0	0	0
1984	0	0	0	0	0	0	12,117	26,178	0	0	0
1985	0	0	0	0	0	0	0	67,711	0	0	0
1986	0	0	0	0	0	0	0	66,551	0	0	0
1987	0	0	0	0	0	0	5,609	40,374	0	0	0
1988	0	0	0	0	0	0	9,298	47,167	0	0	0
1989	0	0	0	0	0	0	5,504	57,114	0	0	0
1990	0	0	0	0	0	0	7,645	20,423	0	0	0
1991	0	0	0	0	0	0	0	0	0	0	0
1992	0	0	0	0	0	0	789	17,449	0	0	0
1993	0	0	0	0	0	0	0	12,798	88,157	0	0
1994	0	0	0	0	0	0	0	2,494	33,148	0	0
1995	0	0	0	0	0	0	0	8,751	110,685	0	0
1996	0	0	0	0	0	0	0	28,063	64,849	0	0
1997	0	0	0	0	0	0	0	43,803	49,312	0	0
1998	0	0	0	0	0	0	0	29,444	40,085	5,500	0
1999	0	0	0	0	0	0	0	12,969	92,998	0	0
2000	0	0	0	0	0	0	0	0	102,202	0	0
2001	0	0	0	0	0	1,733	0	0	33,925	0	0
2002	0	0	0	0	0	736	0	71,444	0	0	0
2003	0	0	0	0	0	350	2,396	124,582	1,865	0	0
2004	0	0	0	0	0	1,657	1,922	73,801	0	0	0
2005	0	2,619	20,000	2,321	0	14,540	21,781	269,631	192	0	0
2006	0	0	20,000	0	0	5,670	11,787	196,116	0	0	0
2007	0	0	8,200	0	0	2,161	0	72,240	0	0	0
2008	0	0	0	0	0	0	200	9,785	0	0	0
2009	0	0	0	0	0	0	0	12,060	0	0	0
2010	0	0	25,844	0	0	304	0	63,966	22,000	0	0
2011	4,002	706	0	2,331	3,420	34,733	4,896	265,382	25,845	7,000	7,893
2012	0	0	6,416	0	0	0	448	70,805	1,950	2,500	0
2013	0	0	0	0	0	0	0	14,189	0	0	0
2014	0	0	0	0	0	0	0	2,246	0	0	0
2015	0	0	0	0	0	0	0	481	0	0	0
2016	0	0	0	0	0	0	3,005	12,815	0	0	0
2017	0	0	0	0	0	28,487	3,201	191,350	4,477	352	0
2018	0	0	0	0	0	0	0	9,710	0	0	0
2019	0	0	0	0	0	20,124	0	118,397	0	0	0
2020	0	0	0	0	0	0	0	5,060	0	0	0
2021	0	0	0	0	0	0	0	0	0	0	0
2022	0	0	0	0	0	0	0	0	0	0	0
2023	0	0	0	0	0	0	0	0	0	0	0
2024	0	0	0	0	0	0	0	0	0	0	0
2025	0	0	0	0	0	0	0	0	0	0	0
2026	0	0	0	0	0	0	0	0	0	0	0
2027	0	0	0	0	0	0	0	0	0	0	0
2028	0	0	0	0	0	0	0	0	0	0	0
2029	0	0	0	0	0	0	0	0	0	0	0
2030	0	0	0	0	0	0	0	0	0	0	0
2031	0	0	0	0	0	0	0	0	0	0	0
2032	0	0	0	0	0	0	0	0	0	0	0
2033	0	0	0	0	0	0	0	0	0	0	0
2034	0	0	0	0	0	0	0	0	0	0	0
2035	0	0	0	0	0	0	0	0	0	0	0
TOTAL	4,002	3,325	80,460	4,652	3,420	110,495	286,402	2,690,111	61,829	9,852	7,893

⁴ Castaic Lake Water Agency's SWP Water Supply Contract was transferred to Santa Clarita Valley Water Agency effective November 2, 2018.

TABLE B-5A Annual Water Quantities Delivered from Each Aqueduct Reach to Each Contractor (acre-feet)

Sheet 12 of 21

Calendar Year	CALIFORNIA AQUEDUCT (continued)											
	SOUTH SAN JOAQUIN DIVISION (continued)											
	Reach 13B (continued)		Reach 14A				Reach 14B				Reach 14C	
	Santa Clara	Tulare	AVEK	Dudley Ridge	Municipal and Industrial	Agricultural	AVEK	Dudley Ridge	Municipal and Industrial	Agricultural	AVEK	Dudley Ridge
[130]	[131]	[132]	[133]	[134]	[135]	[136]	[137]	[138]	[139]	[140]	[141]	
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	3	0	0
1971	0	0	0	0	0	23,844	0	0	0	49,929	0	0
1972	0	0	0	0	0	26,621	0	0	0	77,034	0	0
1973	0	0	0	0	0	15,328	0	0	0	47,040	0	0
1974	0	0	0	0	0	7,794	0	0	0	32,356	0	0
1975	0	0	0	0	0	10,306	0	0	0	27,736	0	0
1976	0	0	0	0	0	268	0	0	0	35,296	0	0
1977	0	0	0	0	0	8,299	0	0	0	13,539	0	0
1978	0	0	0	0	0	34,029	0	0	0	72,351	0	0
1979	0	0	0	0	3,012	27,356	0	0	0	59,413	0	0
1980	0	0	0	0	4,312	16,876	0	0	0	40,513	0	0
1981	0	0	0	0	4,511	13,007	0	0	8	42,753	0	0
1982	0	0	0	0	3,735	24,240	0	0	184	57,739	0	0
1983	0	0	0	0	1,168	20,302	0	0	0	57,922	0	0
1984	0	0	0	0	137	35,369	0	0	10	79,179	0	0
1985	0	0	0	0	206	33,103	0	0	0	72,855	0	0
1986	0	0	0	0	180	26,384	0	0	0	70,864	0	0
1987	0	0	0	0	610	30,098	0	0	9	67,710	0	0
1988	0	0	0	0	622	32,778	0	0	19	75,968	0	0
1989	0	0	0	0	721	29,292	0	0	7	82,201	0	0
1990	0	0	0	0	673	26,800	0	0	13	81,076	0	0
1991	0	0	0	0	768	0	0	0	0	0	0	0
1992	0	0	0	0	673	16,238	0	0	464	41,143	0	0
1993	0	0	0	0	629	17,832	0	0	0	62,493	0	0
1994	0	0	0	0	2,513	16,760	0	0	3,000	54,011	0	0
1995	0	3,500	0	0	3	21,234	0	0	0	67,391	0	0
1996	0	0	0	0	0	26,978	0	0	0	85,936	0	0
1997	0	0	0	0	0	23,035	0	0	0	79,790	0	0
1998	0	0	0	0	0	15,706	0	0	0	58,132	0	0
1999	0	0	0	0	0	21,153	0	0	0	67,576	0	0
2000	0	0	0	0	0	19,264	0	0	0	70,585	0	0
2001	0	0	0	0	0	12,452	0	0	0	49,602	0	0
2002	0	0	0	0	0	11,161	0	0	0	52,762	0	0
2003	0	0	0	0	0	13,685	0	0	0	44,576	0	0
2004	0	0	0	0	0	13,030	0	0	0	52,012	0	0
2005	9,014	0	0	0	0	15,663	0	0	0	56,739	0	0
2006	0	0	0	0	0	17,779	0	0	0	65,142	0	0
2007	0	0	0	0	0	21,435	0	0	0	67,955	0	0
2008	2,324	0	0	0	0	20,087	0	0	0	63,497	0	0
2009	0	0	0	0	0	22,281	0	0	0	60,726	0	0
2010	0	10,000	0	0	0	21,964	0	0	0	58,110	0	0
2011	0	0	0	0	0	24,131	0	0	0	61,859	0	0
2012	0	8,000	0	0	0	25,982	0	0	0	64,489	0	0
2013	0	0	0	0	0	29,414	0	0	0	62,137	0	0
2014	0	0	0	0	0	28,172	0	0	0	50,337	0	0
2015	0	0	0	0	0	25,886	0	0	0	48,996	0	0
2016	0	0	0	0	0	27,686	0	0	0	55,147	0	0
2017	0	0	0	0	0	26,520	0	0	0	67,600	0	0
2018	0	0	1,207	820	0	24,524	0	2,220	0	56,850	290	2,327
2019	0	0	1,705	0	0	24,675	749	0	0	62,912	0	0
2020	0	0	0	0	0	31,193	0	0	0	14,056	0	0
2021	0	0	0	0	0	18,900	0	0	0	40,800	0	0
2022	0	0	0	0	0	18,900	0	0	0	40,800	0	0
2023	0	0	0	0	0	18,900	0	0	0	40,800	0	0
2024	0	0	0	0	0	18,900	0	0	0	40,800	0	0
2025	0	0	0	0	0	18,900	0	0	0	40,800	0	0
2026	0	0	0	0	0	18,900	0	0	0	40,800	0	0
2027	0	0	0	0	0	18,900	0	0	0	40,800	0	0
2028	0	0	0	0	0	18,900	0	0	0	40,800	0	0
2029	0	0	0	0	0	18,900	0	0	0	40,800	0	0
2030	0	0	0	0	0	18,900	0	0	0	40,800	0	0
2031	0	0	0	0	0	18,900	0	0	0	40,800	0	0
2032	0	0	0	0	0	18,900	0	0	0	40,800	0	0
2033	0	0	0	0	0	18,900	0	0	0	40,800	0	0
2034	0	0	0	0	0	18,900	0	0	0	40,800	0	0
2035	0	0	0	0	0	18,900	0	0	0	40,800	0	0
TOTAL	11,338	21,500	2,912	820	24,473	1,341,514	749	2,220	3,714	3,458,038	290	2,327

TABLE B-5A Annual Water Quantities Delivered from Each Aqueduct Reach to Each Contractor (acre-feet)

Sheet 13 of 21

Calendar Year	CALIFORNIA AQUEDUCT (continued)												TEHACHAPI DIVISION	
	SOUTH SAN JOAQUIN DIVISION (continued)													
	Reach 14C (continued)			Reach 15A			Reach 16A			Reach 17E				
	Kern		Metropolitan	Reach 15A		Kern		Reach 16A		Kern		Reach 17E		
	Municipal and Industrial	Agricultural		Avek	Dudley Ridge	Municipal and Industrial	Agricultural	Avek	Dudley Ridge	Municipal and Industrial	Agricultural			
[142]	[143]	[144]	[145]	[146]	[147]	[148]	[149]	[150]	[151]	[152]	[153]			
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	24,187	0	0	0	0	3,552	0	0	0	0	0	0	
1972	0	35,016	0	0	0	0	6,064	0	0	0	4,768	0	0	
1973	0	19,043	0	0	0	0	19,916	0	0	0	1,961	0	0	
1974	0	12,601	0	0	0	0	18,000	0	0	3,000	1,564	0	0	
1975	0	12,783	0	0	0	0	35,420	0	0	3,200	9,867	0	0	
1976	0	9,005	0	0	0	0	39,551	0	0	3,500	11,667	0	0	
1977	0	3,757	0	0	0	0	6,158	0	0	3,420	685	0	0	
1978	0	24,542	0	0	0	0	31,148	0	0	7,989	1,655	0	0	
1979	0	22,372	0	0	0	0	38,602	0	0	2,813	15,808	0	0	
1980	0	19,953	0	0	0	0	37,817	0	0	2,700	16,145	0	0	
1981	7	18,729	0	0	0	0	39,033	0	0	2,636	18,156	0	0	
1982	0	26,479	0	0	0	0	47,782	0	0	1,921	16,577	0	0	
1983	0	26,613	0	0	0	0	37,426	0	0	1,400	17,907	0	0	
1984	2	34,996	0	0	0	0	49,848	0	0	1,338	24,246	0	0	
1985	0	31,758	0	0	0	0	44,078	0	0	1,309	16,820	0	0	
1986	0	34,566	0	0	0	0	42,461	0	0	1,213	15,559	0	0	
1987	10	31,019	0	0	0	0	34,748	0	0	1,665	10,170	0	0	
1988	1	37,165	0	0	0	16	41,978	0	0	1,925	8,987	0	0	
1989	5	37,800	0	0	0	2	43,239	0	0	2,668	8,649	0	0	
1990	9	34,174	0	0	0	6	36,347	0	0	2,819	8,608	0	0	
1991	0	0	0	0	0	0	0	2,000	0	2,588	343	0	0	
1992	0	18,084	0	0	0	0	24,243	0	0	2,087	8,275	0	0	
1993	0	28,103	0	0	0	0	27,997	0	0	2,494	9,167	0	0	
1994	1,000	22,624	0	0	0	0	29,511	0	0	3,011	13,877	0	0	
1995	0	31,285	0	0	0	0	26,134	0	0	3,188	15,042	0	0	
1996	0	38,879	0	0	0	0	36,186	0	0	2,573	18,142	0	0	
1997	0	33,512	0	0	0	0	36,281	0	0	3,997	17,048	0	0	
1998	0	23,097	0	0	0	0	28,712	0	0	3,751	17,032	0	0	
1999	0	31,489	0	0	0	0	36,801	0	0	3,316	24,071	0	0	
2000	0	33,716	0	0	0	0	40,063	0	0	3,015	20,919	0	0	
2001	0	23,557	0	0	0	0	31,192	0	0	1,894	13,476	0	0	
2002	0	27,138	0	0	0	0	41,552	0	0	4,227	14,520	0	0	
2003	0	24,783	12,911	0	0	0	36,602	0	0	1,168	16,799	0	0	
2004	0	30,313	0	0	0	0	40,184	0	0	2,239	19,714	0	0	
2005	0	21,979	0	0	0	0	39,870	0	0	167	18,353	0	0	
2006	1,413	20,193	5,440	0	0	0	46,244	0	0	279	22,570	0	0	
2007	0	24,947	1,881	0	0	0	47,390	0	0	204	26,229	0	0	
2008	0	27,847	0	0	0	0	33,029	0	0	3,834	18,426	0	0	
2009	0	27,185	0	0	0	0	26,007	0	0	1,531	19,517	0	0	
2010	0	25,477	29,818	0	0	0	22,045	0	0	1,033	19,829	0	0	
2011	0	27,061	27,326	0	0	0	42,158	0	0	3,808	17,957	0	0	
2012	0	23,446	31,703	0	0	0	27,920	0	0	3,453	19,842	0	0	
2013	0	25,004	6,592	0	0	0	28,147	0	0	148	21,311	4	0	
2014	0	20,992	0	0	0	0	10,784	0	0	0	18,673	1	0	
2015	0	17,267	0	0	0	0	10,202	0	0	2,407	16,214	0	0	
2016	0	23,159	911	0	0	0	15,901	0	0	1,324	21,278	0	0	
2017	0	28,487	19,176	0	0	0	45,572	0	0	2,249	24,558	0	0	
2018	0	23,473	18,751	2,149	979	0	15,525	2,243	1,249	258	22,838	0	0	
2019	0	24,155	0	0	0	0	35,180	0	0	1,773	21,917	0	0	
2020	0	11,915	0	0	0	0	28,676	0	0	2,522	18,419	0	0	
2021	0	18,100	0	0	0	0	26,900	0	0	8,622	17,845	0		
2022	0	18,100	0	0	0	0	26,900	0	0	8,622	17,845	0	0	
2023	0	18,100	0	0	0	0	26,900	0	0	8,622	17,845	0	0	
2024	0	18,100	0	0	0	0	26,900	0	0	8,622	17,845	0	0	
2025	0	18,100	0	0	0	0	26,900	0	0	8,622	17,845	0	0	
2026	0	18,100	0	0	0	0	26,900	0	0	8,622	17,845	0	0	
2027	0	18,100	0	0	0	0	26,900	0	0	8,622	17,845	0	0	
2028	0	18,100	0	0	0	0	26,900	0	0	8,622	17,845	0	0	
2029	0	18,100	0	0	0	0	26,900	0	0	8,622	17,845	0	0	
2030	0	18,100	0	0	0	0	26,900	0	0	8,622	17,845	0	0	
2031	0	18,100	0	0	0	0	26,900	0	0	8,622	17,845	0	0	
2032	0	18,100	0	0	0	0	26,900	0	0	8,622	17,845	0	0	
2033	0	18,100	0	0	0	0	26,900	0	0	8,622	17,845	0	0	
2034	0	18,100	0	0	0	0	26,900	0	0	8,622	17,845	0	0	
2035	0	18,100	0	0	0	0	26,900	0	0	8,622	17,845	0	0	
TOTAL	2,447	1,507,225	154,509	2,149	979	24	1,966,776	4,243	1,249	239,384	1,013,830	5		

TABLE B-5A Annual Water Quantities Delivered from Each Aqueduct Reach to Each Contractor (acre-feet)

Sheet 14 of 21

Calendar Year	CALIFORNIA AQUEDUCT (continued)											
	MOJAVE DIVISION											
	Reach 18A		Reach 19				Reach 20A					
	AVEK	AVEK	Metropolitan	Mojave	Santa Barbara	Santa Clara	AVEK	Metropolitan	Mojave	Palmdale	Santa Barbara	Santa Clara
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	1,223	0	0	0	0	0	0	0	0	0	0
1975	0	7,622	0	0	0	0	420	0	0	0	0	0
1976	3,808	23,063	0	0	0	0	471	0	0	0	0	0
1977	1,231	8,927	0	0	0	0	773	0	0	0	0	0
1978	1,321	36,333	0	0	0	0	5,549	0	0	0	0	0
1979	2,098	49,910	0	0	0	0	7,555	0	0	0	0	0
1980	2,610	61,534	0	0	0	0	7,605	0	0	0	0	0
1981	2,340	65,690	0	0	0	0	10,333	0	0	0	0	0
1982	1,669	41,127	0	0	0	0	7,313	0	0	0	0	0
1983	43	26,377	0	0	0	0	6,253	0	0	0	0	0
1984	90	22,462	0	0	0	0	9,558	0	0	0	0	0
1985	8	23,440	0	0	0	0	11,613	0	0	1,510	0	0
1986	8	16,898	0	0	0	0	13,808	0	0	3,041	0	0
1987	0	15,958	0	0	0	0	15,493	0	0	2,389	0	0
1988	0	13,471	0	0	0	0	17,117	0	0	366	0	0
1989	0	18,007	0	0	0	0	23,481	0	0	381	0	0
1990	0	17,281	0	0	0	0	25,843	0	0	282	0	0
1991	0	728	0	0	0	0	4,282	0	1,391	84	0	0
1992	0	7,238	0	0	0	0	18,518	0	1,310	185	0	0
1993	0	13,340	0	0	0	0	23,662	0	1,514	164	0	0
1994	0	19,122	0	0	0	0	25,250	0	1,399	299	0	0
1995	0	20,222	0	0	0	0	22,385	0	1,227	328	0	0
1996	0	23,919	0	0	0	0	26,979	0	1,316	354	0	0
1997	0	28,834	0	64	0	0	27,999	0	1,272	313	0	0
1998	0	22,466	0	1,345	0	0	25,985	0	0	195	0	0
1999	0	30,944	0	1,439	0	0	32,409	0	0	377	0	0
2000	0	34,786	0	1,361	0	0	37,819	0	0	0	0	0
2001	0	24,370	0	1,385	0	0	33,216	0	0	0	0	0
2002	0	14,297	0	1,370	0	0	36,311	0	0	0	0	0
2003	0	12,145	0	1,285	0	0	39,532	0	0	0	0	0
2004	0	11,201	0	1,223	0	0	40,408	0	0	0	0	0
2005	11	11,804	0	1,051	0	0	41,496	0	0	0	0	0
2006	0	18,438	0	1,021	0	0	53,878	0	0	0	0	0
2007	0	22,916	0	1,176	0	0	47,639	0	0	0	0	0
2008	0	9,096	0	1,238	0	0	33,919	0	0	0	0	0
2009	0	5,717	0	1,345	0	0	35,402	0	0	0	0	0
2010	0	10,825	0	1,181	0	0	43,122	0	0	0	0	0
2011	0	55,707	0	2,184	0	0	35,543	0	0	0	0	0
2012	0	41,053	0	1,306	0	0	33,390	0	0	0	0	0
2013	16	13,414	0	1,095	0	0	33,507	0	0	0	0	0
2014	0	621	0	41	0	0	15,761	0	1,004	0	0	0
2015	0	0	0	0	0	0	12,447	0	1,023	0	0	0
2016	11	15,374	14	0	0	0	20,506	0	984	0	0	0
2017	318	66,255	7,526	71	5,781	2,000	19,123	2,500	858	0	0	5,500
2018	0	19,848	5,460	0	0	0	27,841	0	866	0	0	0
2019	0	28,218	20,001	0	100	0	28,085	0	502	0	1,219	0
2020	27	8,317	0	855	0	0	4,413	0	7	0	0	0
2021	210	42,126	10,000	719	0	0	40,505	0	0	0	0	0
2022	222	43,386	10,000	740	0	0	39,107	0	0	0	0	0
2023	228	44,688	10,000	763	0	0	37,664	0	0	0	0	0
2024	234	46,030	10,000	789	0	0	36,191	0	0	0	0	0
2025	234	46,030	10,000	789	0	0	36,191	0	0	0	0	0
2026	234	46,030	10,000	789	0	0	36,191	0	0	0	0	0
2027	234	46,030	10,000	789	0	0	36,191	0	0	0	0	0
2028	234	46,030	10,000	789	0	0	36,191	0	0	0	0	0
2029	234	46,030	10,000	789	0	0	36,191	0	0	0	0	0
2030	234	46,030	10,000	789	0	0	36,191	0	0	0	0	0
2031	234	46,030	10,000	789	0	0	36,191	0	0	0	0	0
2032	234	46,030	10,000	789	0	0	36,191	0	0	0	0	0
2033	234	46,030	10,000	789	0	0	36,191	0	0	0	0	0
2034	234	46,030	10,000	789	0	0	36,191	0	0	0	0	0
2035	234	46,030	10,000	789	0	0	36,191	0	0	0	0	0
TOTAL	19,077	1,723,098	183,001	33,726	5,881	2,000	1,595,580	2,500	14,673	10,268	1,219	5,500

TABLE B-5A Annual Water Quantities Delivered from Each Aqueduct Reach to Each Contractor (acre-feet)

Sheet 15 of 21

Calendar Year	CALIFORNIA AQUEDUCT (continued)										
	MOJAVE DIVISION (continued)										
	Reach 20B			Reach 21			Reach 22A		Reach 22B		
	AVEK	Littlerock	Palmdale	AVEK	Littlerock	Palmdale	AVEK	Littlerock	AVEK ⁵	Coachella ⁶	Desert ⁶
[166]	[167]	[168]	[169]	[170]	[171]	[172]	[173]	[174]	[175]	[176]	
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	338	0	0	0	0	0	0	0
1973 0	0	0	0	0	290	0	0	0	5,800	9,000	
1974 0	0	0	0	0	400	0	0	0	6,400	10,000	
1975 0	0	0	0	0	520	0	0	0	7,000	11,000	
1976 416	0	0	0	589	0	0	0	0	7,600	12,000	
1977 271	0	0	0	111	0	0	0	0	0	0	
1978 934	0	0	0	208	0	0	0	0	10,084	15,300	
1979 930	0	0	0	133	0	0	0	0	10,063	15,000	
1980 655	0	0	0	191	0	3	0	0	10,884	17,000	
1981 966	0	0	0	1,270	0	46	0	0	12,105	19,000	
1982 8	0	0	0	0	0	174	0	0	13,326	21,000	
1983 20	0	0	0	38	0	268	0	0	14,547	23,000	
1984 2	0	0	0	1	0	550	0	0	15,768	25,000	
1985 217	0	32	0	0	16	1,786	0	0	16,989	27,000	
1986 0	0	45	0	163	10	1,735	0	0	18,210	29,000	
1987 151	0	1,624	0	1,080	1,366	2,273	5	214	19,431	31,500	
1988 281	0	1,261	0	419	143	3,210	0	0	20,652	34,000	
1989 112	0	7,848	0	971	780	3,591	0	89	21,873	36,500	
1990 84	0	8,292	0	1,747	34	3,988	0	10	23,100	38,100	
1991 131	0	3,830	0	522	0	2,427	0	0	6,930	11,430	
1992 650	0	3,850	0	251	0	3,859	0	0	10,427	17,197	
1993 996	0	7,597	0	734	0	5,098	0	0	0	0	
1994 124	0	8,119	0	1,098	0	4,657	0	0	0	0	
1995 0	0	6,633	0	480	0	4,679	0	0	0	0	
1996 0	0	11,080	0	494	0	5,458	0	0	0	0	
1997 0	0	11,548	0	444	0	5,549	0	0	0	0	
1998 0	0	8,557	0	404	0	4,468	0	0	0	0	
1999 36	0	12,901	0	342	0	5,684	0	0	0	0	
2000 80	0	9,060	5,002	0	0	5,890	0	0	0	0	
2001 282	0	10,427	0	0	0	4,989	0	0	0	0	
2002 1,662	0	18,496	0	0	0	5,404	0	497	0	0	
2003 2,289	0	11,547	0	0	0	6,063	0	0	0	0	
2004 1,774	0	12,139	0	0	23	6,095	0	253	0	0	
2005 1,336	0	11,678	0	0	34	5,184	0	0	0	0	
2006 1,415	0	12,487	0	0	5	6,653	0	0	0	0	
2007 1,349	0	19,609	0	0	25	7,711	0	588	0	0	
2008 792	25	14,255	0	0	0	4,756	0	0	0	0	
2009 366	42	15,339	0	0	0	4,185	0	0	0	0	
2010 643	0	10,969	0	0	0	3,899	0	0	0	0	
2011 507	0	9,881	0	0	0	2,289	0	0	0	0	
2012 901	0	16,397	0	0	0	2,328	0	0	0	0	
2013 693	0	10,567	0	0	0	3,227	0	118	0	0	
2014 744	0	8,406	0	0	0	1,318	0	88	0	0	
2015 447	0	5,836	0	0	0	1,298	0	116	0	0	
2016 677	0	10,516	0	0	0	3,155	0	144	0	0	
2017 1,204	0	13,858	0	0	0	2,231	0	0	0	0	
2018 1,551	0	10,210	0	0	0	2,212	0	0	0	0	
2019 1,375	0	11,821	0	26	0	2,680	0	245	0	0	
2020 3,932	0	4,192	0	411	0	2,007	0	0	0	0	
2021 1,954	0	18,780	0	1,380	0	1,409	0	492	0	0	
2022 2,017	0	18,780	0	1,380	0	1,448	0	504	0	0	
2023 2,076	0	18,780	0	1,380	0	1,494	0	528	0	0	
2024 2,139	0	18,780	0	1,380	0	1,538	0	540	0	0	
2025 2,139	0	18,780	0	1,380	0	1,538	0	540	0	0	
2026 2,139	0	18,780	0	1,380	0	1,538	0	540	0	0	
2027 2,139	0	18,780	0	1,380	0	1,538	0	540	0	0	
2028 2,139	0	18,780	0	1,380	0	1,538	0	540	0	0	
2029 2,139	0	18,780	0	1,380	0	1,538	0	540	0	0	
2030 2,139	0	18,780	0	1,380	0	1,538	0	540	0	0	
2031 2,139	0	18,780	0	1,380	0	1,538	0	540	0	0	
2032 2,139	0	18,780	0	1,380	0	1,538	0	540	0	0	
2033 2,139	0	18,780	0	1,380	0	1,538	0	540	0	0	
2034 2,139	0	18,780	0	1,380	0	1,538	0	540	0	0	
2035 2,139	0	18,780	0	1,380	0	1,538	0	540	0	0	
TOTAL	62,718	67	622,607	5,002	34,375	2,436	165,884	5	10,366	251,189	402,027

⁵ Year 1988 advance allocation.⁶ 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)

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Calendar Year	CALIFORNIA AQUEDUCT (continued)									
	MOJAVE DIVISION (continued)									
	Reach 22B (continued)					Reach 23		Reach 24		
	Littlerock	Metropolitan ⁶	Mojave	Palmdale	Santa Barbara	Mojave	Crestline	Metropolitan ⁶	Mojave	San Bernardino
1962	[177]	[178]	[179]	[180]	[181]	[182]	[183]	[184]	[185]	[186]
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	55	0	0	0	464	0	0	0
1973	0	(14,800)	0	0	0	0	389	0	0	0
1974	0	(16,400)	0	0	0	14	627	0	0	0
1975	0	(18,000)	0	0	0	0	825	0	0	0
1976	0	(19,600)	0	0	0	0	1,002	0	0	0
1977	0	0	22	0	0	58	1,109	0	0	0
1978	0	(25,384)	0	0	0	0	1,209	0	0	0
1979	0	(25,063)	4,000	0	0	0	1,260	0	0	0
1980	0	(27,884)	4,000	0	0	0	1,239	0	0	0
1981	0	(31,105)	4,000	0	0	0	1,485	0	0	0
1982	0	(34,326)	10,500	0	0	0	1,238	0	0	0
1983	0	(37,547)	0	0	0	0	911	0	0	0
1984	0	(40,768)	0	0	0	0	1,128	0	0	0
1985	0	(43,989)	0	0	0	0	1,422	0	0	0
1986	0	(47,210)	0	0	0	0	1,506	0	0	0
1987	0	(50,931)	17	0	0	0	1,849	0	0	0
1988	0	(54,652)	9	0	0	0	2,006	0	0	0
1989	0	(58,373)	0	0	0	200	2,170	0	0	0
1990	0	(61,200)	0	0	0	0	1,827	0	0	0
1991	0	(18,360)	0	0	0	0	849	0	2,032	0
1992	0	(27,624)	42	0	0	0	519	0	9,334	0
1993	0	0	0	0	0	0	439	0	10,000	0
1994	0	0	14,634	0	0	0	785	0	819	0
1995	0	0	7,495	0	0	0	409	0	0	0
1996	0	0	6,111	0	0	0	485	0	0	0
1997	0	0	9,038	0	0	0	651	0	0	0
1998	0	0	2,580	0	0	0	187	0	0	0
1999	0	0	6,705	0	0	0	1,132	0	0	0
2000	0	0	10,019	0	0	0	1,194	0	0	0
2001	0	0	3,048	0	0	0	1,057	0	0	0
2002	0	0	2,976	0	0	0	2,189	0	0	0
2003	0	7,625	13,150	0	0	0	1,563	17,249	0	0
2004	0	0	11,953	0	0	0	2,006	0	0	0
2005	0	5,942	12,169	0	0	0	807	14,058	341	0
2006	0	0	32,993	0	0	0	641	0	0	0
2007	0	0	27,684	0	0	0	1,768	0	17,249	710
2008	0	0	20,479	0	0	0	848	0	3,679	411
2009	0	0	20,214	0	0	0	894	0	7,488	149
2010	0	0	27,640	0	0	0	357	0	9,331	26
2011	0	30,907	2,915	0	0	0	474	14,141	0	31
2012	0	12,025	9,938	0	0	0	624	2,994	0	0
2013	0	0	5,888	0	0	0	1,368	0	500	0
2014	0	0	2,536	0	0	0	1,233	0	0	202
2015	0	0	7,807	0	0	0	1,253	0	0	0
2016	0	0	12,949	0	1,125	0	1,084	0	8,350	120
2017	0	0	23,020	0	0	0	897	0	10,866	219
2018	0	0	4,605	0	0	0	1,193	0	0	237
2019	200	0	16,971	245	0	0	75	0	4,457	0
2020	0	0	7,200	0	0	0	2,019	0	0	246
2021	0	0	31,430	0	0	0	3,480	0	0	163
2022	0	0	31,430	0	0	0	3,480	0	0	163
2023	0	0	31,430	0	0	0	3,480	0	0	163
2024	0	0	31,430	0	0	0	3,480	0	0	163
2025	0	0	31,430	0	0	0	3,480	0	0	163
2026	0	0	31,430	0	0	0	3,480	0	0	163
2027	0	0	31,430	0	0	0	3,480	0	0	163
2028	0	0	31,430	0	0	0	3,480	0	0	163
2029	0	0	31,430	0	0	0	3,480	0	0	163
2030	0	0	31,430	0	0	0	3,480	0	0	163
2031	0	0	31,430	0	0	0	3,480	0	0	163
2032	0	0	31,430	0	0	0	3,480	0	0	163
2033	0	0	31,430	0	0	0	3,480	0	0	163
2034	0	0	31,430	0	0	0	3,480	0	0	163
2035	0	0	31,430	0	0	0	3,480	0	0	163
TOTAL	200	(596,717)	816,812	245	1,125	272	104,866	48,442	84,446	4,796

⁶ 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)

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Calendar Year	CALIFORNIA AQUEDUCT (continued)									
	SANTA ANA DIVISION (continued)									
	Reach 26A					Reach 28G		Reach 28H		Reach 28J
	Coachella ⁶	Desert ⁶	Metropolitan ⁶	San Bernardino ⁷	San Gabriel	Metropolitan	Coachella	Desert	Metropolitan	Coachella
[187]	[188]	[189]	[190]	[191]	[192]	[193]	[194]	[195]	[196]	
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	1,275	0	0	0	0	0	0
1973	0	0	444	32,426	0	18,942	0	0	0	0
1974	0	0	84,981	16,605	612	0	0	0	0	0
1975	0	0	169,960	13,865	5,450	0	0	0	0	0
1976	0	0	215,312	12,273	6,071	0	0	0	55	0
1977	0	0	64,823	24,833	8,996	0	0	0	43	0
1978	0	0	297,708	4,055	7,771	0	0	0	48	0
1979	0	0	260,903	18	290	0	0	0	1,290	0
1980	0	0	300,345	0	1,085	0	0	0	3,013	0
1981	0	0	395,678	16,021	3,619	0	0	0	4,365	0
1982	0	0	214,566	8,409	12,599	0	0	0	3,961	0
1983	0	0	175,288	5,994	734	0	0	0	6,645	0
1984	0	0	122,311	5,556	7,656	0	0	0	109,743	0
1985	0	0	147,599	7,390	5,028	0	0	0	182,781	0
1986	0	0	215,265	6,421	9,454	0	0	0	131,439	0
1987	0	0	175,012	18,751	10,630	0	0	0	144,743	0
1988	0	0	247,101	21,386	8,948	0	0	0	199,641	0
1989	0	0	326,217	20,782	12,839	0	0	0	247,430	0
1990	0	0	399,387	18,831	16,649	0	0	0	257,796	0
1991	0	0	107,182	3,661	5,399	0	0	0	38,832	0
1992	0	0	219,524	3,358	7,908	0	0	0	85,341	0
1993	23,100	38,100	98,291	4,361	14,397	0	0	0	61,841	0
1994	14,102	23,257	192,979	9,135	15,230	0	0	0	134,262	0
1995	23,100	38,100	107,299	696	12,922	0	0	0	117,762	0
1996	62,219	102,622	73,438	6,064	15,989	0	0	0	144,906	0
1997	58,100	53,100	157,215	9,654	18,175	0	0	0	107,853	0
1998	78,100	58,100	36,770	1,878	9,310	0	6,582	7,708	77,473	1,027
1999	50,480	58,100	139,752	12,874	21,729	0	0	0	206,689	0
2000	42,323	58,234	326,647	0	15,140	0	0	0	379,713	0
2001	9,100	15,010	284,007	0	2,360	0	0	0	260,984	0
2002	16,755	27,640	301,700	26,399	24,851	0	0	0	340,635	0
2003	14,443	23,819	464,719	5,000	21,934	0	0	0	246,485	0
2004	15,465	21,190	428,316	40,000	12,541	0	0	0	357,995	0
2005	34,356	49,089	361,976	15,834	13,984	0	0	0	242,245	0
2006	121,100	50,000	404,594	20,000	16,284	0	0	0	342,734	0
2007	66,007	27,253	370,971	10,022	4,024	0	7,221	2,981	271,874	0
2008	40,171	24,643	210,520	187	7,212	0	6,620	1,785	175,460	0
2009	45,074	17,872	138,216	0	11,520	0	948	391	126,265	0
2010	53,866	18,398	463,654	20,008	19,180	0	30,415	12,257	129,145	1,311
2011	84,566	34,076	610,454	368	23,591	0	5,713	2,303	213,215	0
2012	98,793	33,806	362,047	50,723	22,058	0	16,575	8,266	86,266	2,219
2013	33,551	17,611	234,576	1,120	9,252	0	28,232	3,180	45,039	4,756
2014	9,966	3,049	95,402	1,345	1,200	0	1,103	0	0	1,801
2015	26,600	67	110,774	2,100	5,760	0	10,996	9,611	25,883	0
2016	59,654	21,893	427,649	3,974	16,088	0	9,768	0	72,825	0
2017	67,648	26,819	721,554	2,560	22,056	0	4,301	0	285,400	11,959
2018	112,282	47,746	176,825	3,654	17,055	0	24,386	0	135,252	2,421
2019	34,588	13,938	705,757	2,901	23,220	0	0	0	127,090	0
2020	85,622	25,899	46,443	519	4,543	0	12,389	10,339	48,157	10,917
2021	83,010	33,450	249,331	0	17,280	0	0	0	279,951	0
2022	83,010	33,450	249,331	0	17,280	0	0	0	279,951	0
2023	83,010	33,450	249,331	0	17,280	0	0	0	279,951	0
2024	83,010	33,450	249,331	0	17,280	0	0	0	279,951	0
2025	83,010	33,450	249,331	0	17,280	0	0	0	279,951	0
2026	83,010	33,450	249,331	0	17,280	0	0	0	279,951	0
2027	83,010	33,450	249,331	0	17,280	0	0	0	279,951	0
2028	83,010	33,450	249,331	0	17,280	0	0	0	279,951	0
2029	83,010	33,450	249,331	0	17,280	0	0	0	279,951	0
2030	83,010	33,450	249,331	0	17,280	0	0	0	279,951	0
2031	83,010	33,450	249,331	0	17,280	0	0	0	279,951	0
2032	83,010	33,450	249,331	0	17,280	0	0	0	279,951	0
2033	83,010	33,450	249,331	0	17,280	0	0	0	279,951	0
2034	83,010	33,450	249,331	0	17,280	0	0	0	279,951	0
2035	83,010	33,450	249,331	0	17,280	0	0	0	279,951	0
TOTAL	2,626,281	1,431,181	15,932,116	493,286	792,543	18,942	165,249	58,821	10,379,879	36,411

⁶ 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.

⁷ Includes 1,650 acre-feet recaptured from groundwater storage in 1982, 10,000 acre-feet in 1987, and 8,749 acre-feet in 1988. This water was stored under DWR's Ground Water Demonstration Program.

TABLE B-5A Annual Water Quantities Delivered from Each Aqueduct Reach to Each Contractor (acre-feet)

Sheet 18 of 21

Calendar Year	CALIFORNIA AQUEDUCT (continued)									
	SANTA ANA DIVISION (continued)									
	Reach 28J (continued)		Reach EBX1		Reach EBX2C		Reach EBX3A		Reach EBX4B-G	
	Desert	Metropolitan	Coachella	Metropolitan	San Bernardino	San Bernardino	San Bernardino	San Gorgonio	San Gorgonio	San Gorgonio
[197]	[198]	[199]	[200]	[201]	[202]	[203]	[204]	[205]	[206]	
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	251	0	0	0	0	0	0	0	0
1976	0	2,000	0	0	0	0	0	0	0	0
1977	0	2,442	0	0	0	0	0	0	0	0
1978	0	64,054	0	0	0	0	0	0	0	0
1979	0	94,353	0	0	0	0	0	0	0	0
1980	0	91,532	0	0	0	0	0	0	0	0
1981	0	149,405	0	0	0	0	0	0	0	0
1982	0	155,629	0	0	0	0	0	0	0	0
1983	0	41,616	0	0	0	0	0	0	0	0
1984	0	5,672	0	0	0	0	0	0	0	0
1985	0	6,538	0	0	0	0	0	0	0	0
1986	0	30,071	0	0	0	0	0	0	0	0
1987	0	26,315	0	0	0	0	0	0	0	0
1988	0	22,209	0	0	0	0	0	0	0	0
1989	0	51,462	0	0	0	0	0	0	0	0
1990	0	36,060	0	0	0	0	0	0	0	0
1991	0	5,958	0	0	0	0	0	0	0	0
1992	0	12,223	0	0	0	0	0	0	0	0
1993	0	4,588	0	0	0	0	0	0	0	0
1994	0	4,725	0	0	0	0	0	0	0	0
1995	0	21,099	0	0	0	0	0	0	0	0
1996	0	12,418	0	0	0	0	0	0	0	0
1997	0	47,777	0	0	0	0	0	0	0	0
1998	4,839	50,411	0	0	0	0	0	0	0	0
1999	0	8,163	0	0	0	0	0	0	0	0
2000	0	7,864	0	5,466	18,399	0	0	0	0	0
2001	0	33,414	0	0	26,488	0	0	0	0	0
2002	0	41,552	0	1,427	37,069	0	0	0	0	0
2003	0	50,776	0	74,496	16,703	1,793	2,617	0	0	116
2004	0	20,437	0	120,338	13,229	1,430	2,371	0	0	841
2005	0	114,499	8,163	153,700	12,715	966	1,978	57	0	692
2006	0	32,242	0	147,432	11,832	885	2,455	159	3,471	807
2007	0	48,923	0	94,208	38,151	3,130	4,984	119	3,758	177
2008	0	10,432	0	16,745	25,038	686	8,536	287	3,863	1,042
2009	0	5,849	0	18,314	25,041	4,090	9,792	274	4,499	1,898
2010	528	65,439	0	0	19,190	617	9,415	123	2,555	5,685
2011	0	51,638	0	0	19,578	699	9,275	109	1,213	9,290
2012	3,029	36,875	0	0	27,534	3,177	9,440	164	0	11,010
2013	0	40,494	0	0	19,850	3,034	7,901	180	0	9,445
2014	0	998	0	0	4,610	375	4,322	102	0	5,044
2015	1,539	977	0	0	15,970	382	5,474	454	0	3,481
2016	0	30,785	0	0	46,122	3,649	7,784	647	0	10,816
2017	4,817	59,375	0	0	52,218	6,682	15,919	898	0	14,946
2018	0	13,336	0	0	26,108	4,241	9,258	553	0	12,622
2019	0	66,952	0	0	50,827	13,622	11,128	177	0	14,152
2020	0	0	0	0	21,908	51	786	0	0	8,006
2021	0	0	0	0	61,397	0	0	0	410	9,970
2022	0	0	0	0	61,397	0	0	0	410	9,970
2023	0	0	0	0	61,397	0	0	0	410	9,970
2024	0	0	0	0	61,397	0	0	0	410	9,970
2025	0	0	0	0	61,397	0	0	0	410	9,970
2026	0	0	0	0	61,397	0	0	0	410	9,970
2027	0	0	0	0	61,397	0	0	0	410	9,970
2028	0	0	0	0	61,397	0	0	0	410	9,970
2029	0	0	0	0	61,397	0	0	0	410	9,970
2030	0	0	0	0	61,397	0	0	0	410	9,970
2031	0	0	0	0	61,397	0	0	0	410	9,970
2032	0	0	0	0	61,397	0	0	0	410	9,970
2033	0	0	0	0	61,397	0	0	0	410	9,970
2034	0	0	0	0	61,397	0	0	0	410	9,970
2035	0	0	0	0	61,397	0	0	0	410	9,970
TOTAL	14,752	1,679,828	8,163	632,126	1,449,535	49,509	123,435	4,303	25,509	259,620

TABLE B-5A Annual Water Quantities Delivered from Each Aqueduct Reach to Each Contractor (acre-feet)

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Calendar Year	CALIFORNIA AQUEDUCT (continued)						
	WEST BRANCH						
	Reach 29A	Reach 29F	Reach 29H		Reach 30		
	AVEK	AVEK	Santa Clarita ⁴	Ventura	Coachella	Desert	Metropolitan ⁸
[207]	[208]	[209]	[210]	[211]	[212]	[213]	
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	53	0	0	0	0	0	71,938
1973 0	20	0	0	0	0	0	155,297
1974 0	36	0	0	0	0	0	209,136
1975 0	26	0	0	0	0	0	374,280
1976 0	24	0	0	0	0	0	420,684
1977 0	0	0	0	0	0	0	122,447
1978 0	0	0	0	0	0	0	171,139
1979 0	0	0	0	0	0	0	145,591
1980 0	0	0	0	0	0	0	164,721
1981 0	0	0	0	0	0	0	277,503
1982 0	0	0	0	0	0	0	351,362
1983 0	0	0	0	0	0	0	157,519
1984 0	0	0	0	0	0	0	260,624
1985 0	0	0	0	0	0	0	390,696
1986 0	0	0	0	0	0	0	379,275
1987 0	0	0	0	0	0	0	417,285
1988 0	0	0	0	0	0	0	488,265
1989 0	0	0	0	0	0	0	589,962
1990 0	0	0	0	4,836	0	0	764,380
1991 0	0	0	988	0	0	0	257,835
1992 0	0	0	0	0	0	0	420,849
1993 0	6	0	0	0	0	0	437,470
1994 0	0	0	0	0	0	0	475,900
1995 0	0	0	0	0	0	0	139,882
1996 0	0	0	0	0	0	0	267,618
1997 0	11	0	0	10,240	0	16,890	271,379
1998 0	7	0	0	0	0	0	187,277
1999 0	0	0	0	0	0	0	327,001
2000 0	0	0	2,200	0	0	0	632,991
2001 0	0	0	0	0	0	0	444,764
2002 0	0	0	3,148	0	0	0	723,605
2003 0	0	0	6,768	3,150	0	0	678,964
2004 0	0	0	0	4,047	0	0	797,294
2005 0	0	0	0	0	0	0	538,839
2006 0	0	0	0	0	0	0	574,679
2007 0	0	0	0	1,890	0	0	711,831
2008 0	0	0	0	1,980	0	0	485,156
2009 0	0	0	0	3,150	0	0	589,294
2010 0	0	0	0	3,150	0	0	376,877
2011 0	0	0	0	2,520	0	0	375,921
2012 0	24	0	0	3,150	0	0	553,244
2013 0	47	0	0	2,242	0	0	565,849
2014 0	0	0	0	0	0	0	275,992
2015 0	0	0	0	630	0	0	435,892
2016 0	0	0	1,890	0	0	0	509,583
2017 510	0	0	2,678	0	0	0	354,401
2018 0	0	0	1,102	0	0	0	326,408
2019 0	0	0	18,150	0	0	0	281,887
2020 27	0	0	6,309	0	0	0	305,106
2021 210	0	0	1,890	0	0	0	517,618
222	0	0	1,890	0	0	0	517,618
228	0	0	1,890	0	0	0	517,618
234	0	0	1,890	0	0	0	517,618
234	0	0	1,890	0	0	0	517,618
234	0	0	1,890	0	0	0	517,618
234	0	0	1,890	0	0	0	517,618
234	0	0	1,890	0	0	0	517,618
234	0	0	1,890	0	0	0	517,618
234	0	0	1,890	0	0	0	517,618
234	0	0	1,890	0	0	0	517,618
234	0	0	1,890	0	0	0	517,618
234	0	0	1,890	0	0	0	517,618
234	0	0	1,890	0	0	0	517,618
234	0	0	1,890	0	0	0	517,618
234	0	0	1,890	0	0	0	517,618
TOTAL	4,005	254	6,768	95,560	10,240	16,890	27,000,162

⁴ Castaic Lake Water Agency's SWP Water Supply Contract was transferred to Santa Clarita Valley Water Agency effective November 2, 2018.⁸ 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)

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Calendar Year	CALIFORNIA AQUEDUCT (continued)									
	WEST BRANCH (continued)				COASTAL BRANCH					
	Reach 30 (continued)			Reach 31A			Kern		Kings	
Calendar Year	San Bernardino	Santa Barbara	Santa Clarita ⁴	Ventura	AVEK	Dudley Ridge	Municipal and Industrial	Agricultural		
	[214]	[215]	[216]	[217]	[218]	[219]	[220]	[221]	[222]	
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	71,657	0	
1969	0	0	0	0	0	0	0	52,094	0	
1970	0	0	0	0	0	0	0	71,910	0	
1971	0	0	0	0	0	0	0	98,481	0	
1972	0	0	0	0	0	0	0	107,850	0	
1973	0	0	0	0	0	0	0	69,227	0	
1974	0	0	0	0	0	0	0	68,474	0	
1975	0	0	0	0	0	0	0	74,516	0	
1976	0	0	0	0	0	0	0	78,358	0	
1977	0	0	0	0	0	0	0	35,504	0	
1978	0	0	0	0	0	0	0	81,242	0	
1979	0	0	7	0	0	0	0	104,017	0	
1980	0	0	1,210	0	0	0	0	97,497	0	
1981	0	0	5,761	0	0	0	0	97,054	0	
1982	0	0	9,516	0	0	0	0	83,076	0	
1983	0	0	9,476	0	0	0	0	87,859	0	
1984	0	0	11,477	0	0	0	0	119,098	0	
1985	0	0	12,401	0	0	0	0	110,124	0	
1986	0	0	13,928	0	0	0	0	118,298	0	
1987	0	0	16,167	0	0	0	0	116,259	0	
1988	0	0	18,904	0	0	0	0	109,435	0	
1989	0	0	21,719	0	0	0	0	102,156	0	
1990	0	0	22,139	0	0	0	0	103,362	0	
1991	0	1,240	3,846	0	0	0	0	780	0	
1992	0	0	14,812	0	0	0	0	73,748	0	
1993	0	0	13,787	0	0	0	0	90,764	0	
1994	0	0	14,919	0	0	0	200	77,536	0	
1995	0	0	17,747	0	0	0	0	85,050	0	
1996	0	0	18,448	0	0	0	0	100,578	0	
1997	0	0	22,842	1,850	0	0	0	97,020	0	
1998	0	0	19,782	1,850	0	0	0	86,879	0	
1999	0	0	28,813	1,850	0	0	0	92,095	0	
2000	0	0	31,085	1,850	0	0	0	85,215	0	
2001	0	0	30,701	1,850	0	0	0	63,448	0	
2002	8,601	0	42,080	1,850	0	0	0	65,055	0	
2003	0	0	44,967	1,850	0	0	0	65,691	0	
2004	0	0	47,463	1,203	0	0	0	66,498	0	
2005	0	0	36,747	1,665	0	4,684	0	68,190	0	
2006	0	0	40,017	1,850	0	0	0	85,214	0	
2007	0	0	45,919	1,110	0	0	0	93,954	49	
2008	0	0	42,878	1,818	0	0	17,059	68,385	0	
2009	0	0	38,784	741	0	0	0	83,255	0	
2010	0	0	31,288	925	0	2,967	0	81,047	276	
2011	0	0	31,445	1,480	0	200	0	86,594	238	
2012	0	0	36,153	1,203	33,511	0	0	50,050	0	
2013	0	0	44,126	648	0	0	0	82,887	0	
2014	0	0	29,448	93	0	0	0	74,406	0	
2015	0	0	29,189	370	0	7,500	0	71,616	0	
2016	0	0	31,888	1,110	1,489	0	0	86,363	0	
2017	0	0	47,912	11,573	0	500	0	94,876	1,704	
2018	0	0	42,835	648	0	2,542	0	86,401	0	
2019	0	0	42,961	1,388	3,648	0	0	73,993	347	
2020	0	0	52,702	2,528	0	0	0	87,377	275	
2021	0	0	55,120	10,110	0	0	0	52,810	183	
2022	0	0	55,120	10,110	0	0	0	52,810	183	
2023	0	0	55,120	10,110	0	0	0	52,810	183	
2024	0	0	55,120	10,110	0	0	0	52,810	183	
2025	0	0	55,120	10,110	0	0	0	52,810	183	
2026	0	0	55,120	10,110	0	0	0	52,810	183	
2027	0	0	55,120	10,110	0	0	0	52,810	183	
2028	0	0	55,120	10,110	0	0	0	52,810	183	
2029	0	0	55,120	10,110	0	0	0	52,810	183	
2030	0	0	55,120	10,110	0	0	0	52,810	183	
2031	0	0	55,120	10,110	0	0	0	52,810	183	
2032	0	0	55,120	10,110	0	0	0	52,810	183	
2033	0	0	55,120	10,110	0	0	0	52,810	183	
2034	0	0	55,120	10,110	0	0	0	52,810	183	
2035	0	0	55,120	10,110	0	0	0	52,810	183	
TOTAL	8,601	1,240	1,945,089	194,953	38,648	18,393	17,259	5,174,663	5,634	

⁴ Castaic Lake Water Agency's SWP Water Supply Contract was transferred to Santa Clarita Valley Water Agency effective November 2, 2018.

TABLE B-5A Annual Water Quantities Delivered from Each Aqueduct Reach to Each Contractor (acre-feet)

Calendar Year	CALIFORNIA AQUEDUCT (continued)						
	COASTAL BRANCH (continued)						
	Reach 31A (continued)		Reach 33A				
	Santa Clarita ⁴	Tulare	San Luis Obispo	Santa Barbara	Total	Grand Total	
	[223]	[224]	[225]	[226]	[227]	[228]	
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	7,382	0	0	0	192,188	294,457	
1969	9,970	0	0	0	195,705	268,104	
1970	11,739	0	0	0	276,211	369,459	
1971	12,490	0	0	0	553,081	654,442	
1972	13,905	0	0	0	895,006	1,037,770	
1973	9,418	0	0	0	638,930	737,532	
1974	9,700	0	0	0	783,984	878,947	
1975	10,700	0	0	0	1,129,728	1,230,830	
1976	11,700	0	0	0	1,245,662	1,380,124	
1977	5,075	0	0	0	465,442	582,381	
1978	11,362	0	0	0	1,339,268	1,458,733	
1979	19,138	0	0	0	1,537,075	1,666,457	
1980	13,882	0	0	0	1,413,363	1,536,456	
1981	12,700	0	0	0	1,779,479	1,918,563	
1982	12,700	0	0	0	1,641,571	1,750,862	
1983	12,659	0	0	0	1,089,626	1,187,156	
1984	12,741	0	0	0	1,489,814	1,591,416	
1985	12,099	0	0	0	1,863,544	1,990,295	
1986	13,301	0	0	0	1,882,290	1,999,155	
1987	11,821	0	0	0	1,984,570	2,131,608	
1988	11,534	0	0	0	2,221,538	2,385,122	
1989	14,645	0	0	0	2,686,838	2,853,747	
1990	6,440	0	0	0	2,398,121	2,582,151	
1991	716	0	0	0	489,489	549,113	
1992	5,887	0	0	0	1,374,775	1,471,454	
1993	4,157	0	0	0	2,173,352	2,315,235	
1994	9,422	0	0	0	1,727,504	1,861,976	
1995	9,486	0	0	0	1,926,835	2,031,423	
1996	14,052	0	0	0	2,429,928	2,543,472	
1997	4,870	0	1,099	7,439	2,263,966	2,405,444	
1998	311	0	3,592	18,618	1,657,381	1,764,963	
1999	4,086	0	3,743	20,137	2,755,025	2,898,961	
2000	8,395	0	3,962	22,741	3,390,079	3,569,072	
2001	1,238	0	4,283	18,946	2,034,350	2,175,194	
2002	2,737	0	4,355	27,636	2,738,943	2,909,555	
2003	4,001	0	4,453	26,968	3,151,625	3,327,811	
2004	3,776	0	4,165	29,705	3,050,652	3,230,590	
2005	2,709	0	4,251	23,344	3,597,829	3,753,874	
2006	2,735	0	4,209	23,275	3,526,551	3,693,938	
2007	6,071	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	1	0	3,801	15,452	2,065,868	2,227,564	
2010	768	0	3,757	17,775	2,694,511	2,836,927	
2011	1,746	0	3,819	21,050	3,510,684	3,666,432	
2012	2,404	0	3,944	19,474	2,726,325	2,881,783	
2013	6,128	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	2,203,916	2,359,869	
2017	370	2,159	2,845	29,740	3,648,178	3,770,284	
2018	62	0	2,427	27,448	1,861,752	2,048,578	
2019	382	11,606	2,642	18,138	2,927,812	3,058,014	
2020	0	0	4,644	6,823	1,245,045	1,413,311	
2021	2,000	0	13,256	27,292	2,295,776	2,473,936	
2022	2,000	0	13,294	27,292	2,295,571	2,473,995	
2023	2,000	0	13,370	27,292	2,295,442	2,474,094	
2024	2,000	0	13,406	27,292	2,295,204	2,474,156	
2025	2,000	0	13,406	27,292	2,295,204	2,474,156	
2026	2,000	0	13,406	27,292	2,295,204	2,474,156	
2027	2,000	0	13,406	27,292	2,295,204	2,474,156	
2028	2,000	0	13,406	27,292	2,295,204	2,474,156	
2029	2,000	0	13,406	27,292	2,295,204	2,474,156	
2030	2,000	0	13,406	27,292	2,295,204	2,474,156	
2031	2,000	0	13,406	27,292	2,295,204	2,474,156	
2032	2,000	0	13,406	27,292	2,295,204	2,474,156	
2033	2,000	0	13,406	27,292	2,295,204	2,474,156	
2034	2,000	0	13,406	27,292	2,295,204	2,474,156	
2035	2,000	0	13,406	27,292	2,295,204	2,474,156	
TOTAL	393,611	13,765	288,485	903,852	134,846,095	144,952,490	

⁴ Castaic Lake Water Agency's SWP Water Supply Contract was transferred to Santa Clarita Valley Water Agency effective November 2, 2018.

Tables B-5A-Adj through B-31

Note: Where applicable, the projected data values shown in this appendix are shaded and the bill year data are in **bold** type.

TABLE B-5A-Adj Annual Water Quantity Adjustments to Water Delivered from Each Aqueduct Reach to Each Contractor (acre-feet)

Sheet 1 of 5

Calendar Year	CALIFORNIA AQUEDUCT												
	SAN LUIS DIVISION												
	Reach 1	Reach 3A											
Santa Clara	Alameda-Zone 7	Alameda County	AVEK	Crestline	Dudley Ridge	Kern (Agricultural)	Kings	Metropolitan	Mojave	Palmdale	San Bernardino	San Gabriel	
	[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	(11,135)	0	0	0	0	0	0
2001	0	0	0	0	0	0	(11,487)	0	0	0	0	0	0
2002	0	0	0	0	0	0	(9,332)	0	0	0	0	0	0
2003	0	0	0	0	0	0	(18,428)	0	0	0	0	0	0
2004	0	0	0	0	0	0	(866)	0	0	0	0	0	0
2005	0	0	0	0	0	(576)	(20,082)	0	0	0	0	0	0
2006	0	0	0	0	0	0	(20,239)	0	0	0	0	0	0
2007	0	0	0	0	0	0	(9,867)	0	0	0	0	0	0
2008	(8,885)	0	0	0	0	0	(99,439)	0	0	0	0	0	0
2009	0	0	0	(5,926)	(1)	(28)	(88,699)	0	(815)	(5)	(15)	(21)	(4)
2010	0	0	0	0	0	0	(87,370)	0	(181,745)	0	0	0	0
2011	0	0	0	0	0	0	(56,909)	0	(106,423)	0	0	0	0
2012	0	0	0	0	0	(6,068)	(60,762)	0	0	0	0	0	0
2013	0	0	0	0	0	0	(11,846)	0	0	0	0	0	0
2014	0	0	0	(32)	(5)	(36)	(114,007)	(2)	(789)	(6)	(14)	(23)	(6)
2015	0	(6,264)	(8,763)	(6)	(1)	(16,796)	(76,141)	0	(159)	(1)	(3)	(5)	(1)
2016	0	(1,904)	(4,677)	0	0	0	(69,891)	0	0	0	0	0	0
2017	0	0	0	0	0	(14,831)	(68,628)	0	(70,867)	0	0	0	0
2018	0	0	0	0	0	(7,885)	(55,715)	0	0	0	0	0	0
2019	0	0	0	0	0	0	(80,188)	0	0	0	0	0	0
2020	0	0	0	0	0	0	(886)	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)	(7)	(46,220)	(971,917)	(2)	(360,798)	(12)	(32)	(49)	(11)

TABLE B-5A-Adj Annual Water Quantity Adjustments to Water Delivered from Each Aqueduct Reach to Each Contractor (acre-feet)

Sheet 2 of 5

Calendar Year	CALIFORNIA AQUEDUCT (continued)													
	SAN LUIS DIVISION (continued)								SOUTH SAN JOAQUIN DIVISION					
	Reach 3A (continued)							Reach 4		Reach 7		Reach 10A		
	San Gorgonio	San Luis Obispo	Santa Barbara	Santa Clara	Santa Clarita ¹	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	0
1963	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1964	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1965	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1966	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1967	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1968	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1969	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1970	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1971	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1972	0	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	0
1974	0	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	0
1976	0	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	0
1978	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1979	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1980	0	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	0
1982	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1983	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1984	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1985	0	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	0
1987	0	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	0
1989	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1990	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1991	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1992	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1993	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1994	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1995	0	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	0
1997	0	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	0
1999	0	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	0
2001	0	0	0	0	0	0	0	0	0	(25,164)	(1,807)	0	0	0
2002	0	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	0
2004	0	0	0	0	0	(4,000)	0	0	(6,020)	0	0	0	0	0
2005	0	0	0	(20,000)	0	(277)	0	0	0	0	0	0	0	0
2006	0	0	0	(53,573)	0	0	0	0	0	0	0	0	0	0
2007	0	0	0	0	0	0	0	0	0	0	0	(5,000)	0	0
2008	0	0	0	(3,681)	0	0	0	0	0	0	0	(7,000)	(10,000)	0
2009	(4)	(2)	(19)	(1,000)	(38)	(49)	(1)	0	0	0	0	0	(3,083)	0
2010	0	0	0	(44,668)	(3,300)	(17,551)	0	0	0	0	0	0	0	0
2011	0	0	0	(51,404)	0	(11,096)	0	0	0	0	0	0	0	0
2012	0	0	0	0	0	(9,366)	0	0	0	0	0	0	0	0
2013	0	0	0	0	0	(6,054)	0	0	0	0	0	(4,000)	(4,000)	0
2014	(13)	(134)	(926)	0	(34)	(8)	0	0	0	0	0	(8,074)	(13,652)	0
2015	(3)	(27)	(187)	(21,076)	(7)	(11)	0	0	0	0	0	(11,185)	(14,115)	0
2016	0	0	0	(6,706)	0	0	0	0	0	0	0	(324)	0	0
2017	0	0	(11,128)	(83,322)	(17,988)	(4,000)	0	0	0	0	0	0	0	0
2018	0	0	0	(32,999)	0	(16,950)	0	0	0	0	0	0	(5,000)	0
2019	0	0	0	(62,615)	0	(7,754)	0	0	0	0	0	0	0	0
2020	0	0	0	0	0	(551)	0	0	0	0	0	(468)	0	0
2021	0	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	0
2023	0	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	0
2025	0	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	0
2027	0	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	0
2029	0	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	0
2031	0	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	0
2033	0	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	0
2035	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	(20)	(163)	(12,260)	(381,044)	(21,367)	(77,657)	(1)	(12,806)	(6,020)	(24,167)	(28,145)	(32,858)	(54,850)	

¹ Castaic Lake Water Agency's SWP Water Supply Contract was transferred to Santa Clarita Valley Water Agency effective November 2, 2018.

TABLE B-5A-Adj Annual Water Quantity Adjustments to Water Delivered from Each Aqueduct Reach to Each Contractor (acre-feet)

Sheet 3 of 5

Calendar Year	CALIFORNIA AQUEDUCT (continued)												
	SOUTH SAN JOAQUIN DIVISION (continued)												
	Reach 10A (continued)							Reach 12E					
Desert	Kern (Agricultural)	Metropolitan	San Bernardino	Santa Clara	Santa Clarita ¹	Alameda-Zone 7	AVEK	Coachella	Desert	Dudley Ridge	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	(1,813)	(31,500)	0	(30,000)	0	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	(10,000)	0	0	0	0	0	0	0	0	(5,170)	(5,073)
2004	0	(3)	(93,555)	0	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	(12,469)	(93,986)	0	(20,000)	0	0	0	0	0	0	0	(16,618)	(5,000)
2008	(4,864)	0	(99,024)	0	(10,000)	0	0	(8,393)	(3,000)	(3,486)	0	(103,683)	(8,402)
2009	0	(7,733)	(65,499)	0	(27,319)	(4,950)	0	(6,393)	(3,000)	0	0	(105,145)	(14,516)
2010	0	(56)	0	0	0	0	0	(8,393)	0	0	(43,833)	(52,413)	0
2011	0	0	0	0	0	0	0	0	0	0	0	(14,223)	(23,419)
2012	0	0	0	0	(17,000)	0	0	0	(4,000)	0	0	(12,815)	0
2013	0	(24,626)	(37,544)	0	(27,308)	0	0	0	(16,500)	0	0	(34,355)	(31,478)
2014	0	(7,476)	(30,049)	(694)	(29,134)	(4,951)	(5,901)	0	(5,000)	0	0	(90,996)	(9,882)
2015	0	(20,190)	(32,517)	0	(40,572)	0	(5,029)	0	(9,500)	0	0	(56,927)	(6,899)
2016	0	(626)	(12,440)	0	(1,122)	0	0	0	(16,500)	0	0	(64,384)	(23,389)
2017	0	0	0	0	0	0	0	0	(5,397)	0	0	(6,075)	(6,375)
2018	0	0	0	0	0	0	0	0	(20,603)	0	(6,379)	(44,565)	(2,618)
2019	0	0	0	0	0	0	(99)	0	0	0	0	(3,504)	(5,114)
2020	0	0	0	0	0	0	0	0	0	0	0	(20,637)	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	(4,864)	(74,992)	(506,114)	(694)	(202,455)	(9,901)	(10,930)	(14,885)	(91,893)	(3,486)	(6,379)	(637,568)	(233,143)

¹Castaic Lake Water Agency's SWP Water Supply Contract was transferred to Santa Clarita Valley Water Agency effective November 2, 2018.

TABLE B-5A-Adj Annual Water Quantity Adjustments to Water Delivered from Each Aqueduct Reach to Each Contractor (acre-feet)

Sheet 4 of 5

Calendar Year	CALIFORNIA AQUEDUCT (continued)											
	SOUTH SAN JOAQUIN DIVISION (continued)											
	Reach 12E (continued)				Reach 13B							
Calendar Year	San Bernardino	San Gorgonio	Santa Clara	Santa Clarita ¹	Alameda-Zone 7	Alameda County	Dudley Ridge	Kern Agricultural	Metropolitan	Palmdale	San Bernardino	Santa Clara
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	(132,228)	0	0	0	0
2002	0	0	0	0	0	0	0	(22,161)	0	0	0	0
2003	0	0	0	0	0	0	0	(15,316)	(24,523)	0	0	0
2004	0	0	0	0	0	0	0	(43,985)	(4,813)	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	(11,000)	0	0	0	(257,750)	0	(4,926)	0	0
2008	0	0	0	(11,000)	0	0	0	(228,579)	(25,721)	0	0	0
2009	0	0	(6,134)	(11,000)	0	0	0	(186,044)	0	0	0	0
2010	0	0	(2,750)	0	0	0	0	(59,451)	0	0	0	0
2011	0	0	0	0	0	0	0	(29,041)	0	0	0	0
2012	0	0	0	0	0	0	(6,068)	(103,364)	0	0	0	0
2013	(1,500)	0	0	0	0	0	0	(160,286)	(1,033)	0	0	(17,692)
2014	(400)	0	0	(13,824)	(931)	(1,088)	(16,789)	(161,077)	(17,184)	0	(3,906)	(5,253)
2015	0	0	(288)	(13,993)	(1,600)	(2,097)	(14,460)	(112,780)	(21,935)	0	0	(4,625)
2016	0	0	0	(5,940)	0	0	0	(28,033)	0	0	0	0
2017	0	(1,700)	0	0	0	0	0	(60,240)	0	0	0	0
2018	(1,700)	0	0	(6,000)	0	0	(1,506)	(54,934)	0	0	0	0
2019	0	(1,601)	0	(1,100)	0	0	0	(40,181)	0	0	0	0
2020	0	0	0	0	0	0	(3,540)	(197,580)	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)	(5,001)	(6,422)	(76,607)	(2,531)	(3,185)	(42,363)	(1,893,030)	(95,209)	(4,926)	(3,906)	(27,570)

¹ Castaic Lake Water Agency's SWP Water Supply Contract was transferred to Santa Clarita Valley Water Agency effective November 2, 2018.

TABLE B-5A-Adj Annual Water Quantity Adjustments to Water Delivered from Each Aqueduct Reach to Each Contractor (acre-feet)

Sheet 5 of 5

Calendar Year	CALIFORNIA AQUEDUCT (continued)										GRAND TOTAL
	SOUTH SAN JOAQUIN DIVISION (continued)					MOJAVE DIVISION				SANTA ANA DIVISION	
	Reach 14B	Reach 14C		Reach 15A	Reach 16A	Reach 22A	Reach 22B		Reach 24	Reach EBX2C	
	Kern (Agricultural)	Kern (Agricultural)	Metropolitan	Kern (Agricultural)	Kern (Agricultural)	AVEK	AVEK	Metropolitan	Metropolitan	San Bernardino	
[52]	[53]	[54]	[55]	[56]	[57]	[58]	[59]	[60]	[61]	[62]	
1962	0	0	0	0	0	0	0	0	0	0	0
1963	0	0	0	0	0	0	0	0	0	0	0
1964	0	0	0	0	0	0	0	0	0	0	0
1965	0	0	0	0	0	0	0	0	0	0	0
1966	0	0	0	0	0	0	0	0	0	0	0
1967	0	0	0	0	0	0	0	0	0	0	0
1968	0	0	0	0	0	0	0	0	0	0	0
1969	0	0	0	0	0	0	0	0	0	0	0
1970	0	0	0	0	0	0	0	0	0	0	0
1971	0	0	0	0	0	0	0	0	0	0	0
1972	0	0	0	0	0	0	0	0	0	0	0
1973	0	0	0	0	0	0	0	0	0	0	0
1974	0	0	0	0	0	0	0	0	0	0	0
1975	0	0	0	0	0	0	0	0	0	0	0
1976	0	0	0	0	0	0	0	0	0	0	0
1977	0	0	0	0	0	0	0	0	0	0	0
1978	0	0	0	0	0	0	0	0	0	0	0
1979	0	0	0	0	0	0	0	0	0	0	0
1980	0	0	0	0	0	0	0	0	0	0	0
1981	0	0	0	0	0	0	0	0	0	0	0
1982	0	0	0	0	0	0	0	0	0	0	0
1983	0	0	0	0	0	0	0	0	0	0	0
1984	0	0	0	0	0	0	0	0	0	0	0
1985	0	0	0	0	0	0	0	0	0	0	0
1986	0	0	0	0	0	0	0	0	0	0	0
1987	0	0	0	0	0	0	0	0	0	0	0
1988	0	0	0	0	0	0	0	0	0	0	0
1989	0	0	0	0	0	0	0	0	0	0	0
1990	0	0	0	0	0	0	0	0	0	0	0
1991	0	0	0	0	0	0	0	0	0	0	0
1992	0	0	0	0	0	0	0	0	0	0	0
1993	0	0	0	0	0	0	0	0	0	0	0
1994	0	0	0	0	0	0	0	0	0	0	0
1995	0	0	0	0	0	0	0	0	0	0	0
1996	0	0	0	0	0	0	0	0	0	0	0
1997	0	0	0	0	0	0	0	0	0	0	0
1998	0	0	0	0	0	0	0	0	0	0	0
1999	0	0	0	0	0	0	0	0	0	0	0
2000	0	0	0	0	0	0	0	0	0	0	(51,089)
2001	(396)	(242)	0	0	0	(152)	0	0	0	0	(255,589)
2002	0	0	0	0	0	0	0	0	0	0	(46,131)
2003	0	0	(12,380)	0	0	0	0	0	0	0	(90,890)
2004	0	0	(25,512)	0	0	0	0	0	0	(844)	(197,363)
2005	0	0	0	0	0	0	0	0	0	(7)	(40,942)
2006	0	0	0	0	0	0	0	0	0	(2)	(73,814)
2007	0	0	(24,225)	0	0	0	(8,751)	(17,249)	0	0	(486,841)
2008	0	0	(37,602)	0	0	0	(4,816)	(3,679)	(6)	0	(681,260)
2009	(1,706)	(5,168)	(54,948)	(2,788)	(444)	0	0	0	(7,488)	(11)	(609,996)
2010	(1,867)	(4,761)	(32,758)	(2,913)	0	0	0	(2,891)	0	0	(546,720)
2011	0	0	(16,065)	0	0	0	0	0	0	0	(308,580)
2012	(73)	(862)	(10,010)	(405)	0	0	0	0	0	0	(230,793)
2013	(264)	(4,691)	(33,205)	(406)	0	0	0	0	0	0	(416,788)
2014	(6,898)	(10,773)	(47,358)	(5,962)	0	(1,046)	0	0	0	0	(614,333)
2015	(10,554)	(11,108)	(70,200)	(5,560)	0	(1,516)	0	0	0	0	(597,091)
2016	(8,376)	(4,939)	(29,819)	(3,549)	0	(1,056)	0	0	0	0	(283,675)
2017	0	0	(5,863)	0	0	0	0	0	0	0	(356,414)
2018	(6,266)	(4,988)	(13,893)	(1,656)	0	0	0	0	0	0	(283,657)
2019	0	0	(5,861)	0	0	0	0	0	0	0	(208,017)
2020	(1,014)	(1,012)	0	(463)	0	0	0	0	0	0	(226,151)
2021	0	0	0	0	0	0	0	0	0	0	0
2022	0	0	0	0	0	0	0	0	0	0	0
2023	0	0	0	0	0	0	0	0	0	0	0
2024	0	0	0	0	0	0	0	0	0	0	0
2025	0	0	0	0	0	0	0	0	0	0	0
2026	0	0	0	0	0	0	0	0	0	0	0
2027	0	0	0	0	0	0	0	0	0	0	0
2028	0	0	0	0	0	0	0	0	0	0	0
2029	0	0	0	0	0	0	0	0	0	0	0
2030	0	0	0	0	0	0	0	0	0	0	0
2031	0	0	0	0	0	0	0	0	0	0	0
2032	0	0	0	0	0	0	0	0	0	0	0
2033	0	0	0	0	0	0	0	0	0	0	0
2034	0	0	0	0	0	0	0	0	0	0	0
2035	0	0	0	0	0	0	0	0	0	0	0
TOTAL	(37,414)	(48,544)	(419,699)	(23,702)	(444)	(3,618)	(152)	(13,567)	(31,307)	(870)	(6,606,134)

Tables B-5B through B-31

Note: Where applicable, the projected data values shown in this appendix are shaded and the bill year data are in **bold** type.

TABLE B-5B Annual Water Quantities Delivered to Each Contractor (acre-feet)

Sheet 1 of 4

Calendar Year	NORTH BAY AREA			SOUTH BAY AREA ¹				CENTRAL COASTAL AREA		
	Napa ²	Solano	Total	Alameda-Zone 7	Alameda County	Santa Clara	Total	San Luis Obispo	Santa Barbara	Total
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	56,458	29,036	127,155	212,649	2,845	51,105	53,950
2018	11,682	35,072	46,754	39,523	18,161	121,736	179,420	2,427	28,348	30,775
2019	11,285	31,482	42,767	52,296	21,731	104,985	179,012	2,642	20,557	23,199
2020	12,591	27,658	40,249	21,406	25,351	86,153	132,910	4,644	6,823	11,467
2021	17,415	28,654	46,069	48,371	25,200	60,000	133,571	13,256	27,292	40,548
2022	17,415	28,654	46,069	48,371	25,200	60,000	133,571	13,294	27,292	40,586
2023	17,415	28,654	46,069	48,371	25,200	60,000	133,571	13,370	27,292	40,662
2024	17,415	28,654	46,069	48,371	25,200	60,000	133,571	13,406	27,292	40,698
2025	17,415	28,654	46,069	48,371	25,200	60,000	133,571	13,406	27,292	40,698
2026	17,415	28,654	46,069	48,371	25,200	60,000	133,571	13,406	27,292	40,698
2027	17,415	28,654	46,069	48,371	25,200	60,000	133,571	13,406	27,292	40,698
2028	17,415	28,654	46,069	48,371	25,200	60,000	133,571	13,406	27,292	40,698
2029	17,415	28,654	46,069	48,371	25,200	60,000	133,571	13,406	27,292	40,698
2030	17,415	28,654	46,069	48,371	25,200	60,000	133,571	13,406	27,292	40,698
2031	17,415	28,654	46,069	48,371	25,200	60,000	133,571	13,406	27,292	40,698
2032	17,415	28,654	46,069	48,371	25,200	60,000	133,571	13,406	27,292	40,698
2033	17,415	28,654	46,069	48,371	25,200	60,000	133,571	13,406	27,292	40,698
2034	17,415	28,654	46,069	48,371	25,200	60,000	133,571	13,406	27,292	40,698
2035	17,415	28,654	46,069	48,371	25,200	60,000	133,571	13,406	27,292	40,698
TOTAL	628,688	1,398,090	2,026,778	2,216,357	1,540,698	5,489,976	9,247,031	288,685	950,026	1,238,711

¹ For the period June 1962 through November 1967, deliveries were supplied by non-project water.² For the period 1968 through 1987, deliveries are non-project water pumped through an interim facility.

TABLE B-5B Annual Water Quantities Delivered to Each Contractor (acre-feet)

Sheet 2 of 4

Calendar Year	SAN JOAQUIN VALLEY AREA									
	Dudley Ridge	Empire	Kern			Total	Kings	Oak Flat	Tulare	Total
			Municipal and Industrial	Agricultural	[15]					
[11]	[12]	[13]	[14]	[15]	[16]	[17]	[18]	[19]		
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	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	64,245	1,698	35,965	1,159,922	1,195,887	6,645	2,893	61,920	1,333,288	
2018	41,006	1,591	4,207	608,151	612,358	3,713	2,289	51,451	712,408	
2019	33,030	1,938	10,197	970,487	980,684	4,929	2,184	93,273	1,116,038	
2020	21,758	1,108	8,914	481,842	490,756	4,044	2,243	24,417	544,326	
2021	26,169	1,800	59,322	533,816	593,138	5,583	3,420	52,483	682,593	
2022	26,169	1,800	59,322	533,816	593,138	5,583	3,420	52,483	682,593	
2023	26,169	1,800	59,322	533,816	593,138	5,583	3,420	52,483	682,593	
2024	26,169	1,800	59,322	533,816	593,138	5,583	3,420	52,483	682,593	
2025	26,169	1,800	59,322	533,816	593,138	5,583	3,420	52,483	682,593	
2026	26,169	1,800	59,322	533,816	593,138	5,583	3,420	52,483	682,593	
2027	26,169	1,800	59,322	533,816	593,138	5,583	3,420	52,483	682,593	
2028	26,169	1,800	59,322	533,816	593,138	5,583	3,420	52,483	682,593	
2029	26,169	1,800	59,322	533,816	593,138	5,583	3,420	52,483	682,593	
2030	26,169	1,800	59,322	533,816	593,138	5,583	3,420	52,483	682,593	
2031	26,169	1,800	59,322	533,816	593,138	5,583	3,420	52,483	682,593	
2032	26,169	1,800	59,322	533,816	593,138	5,583	3,420	52,483	682,593	
2033	26,169	1,800	59,322	533,816	593,138	5,583	3,420	52,483	682,593	
2034	26,169	1,800	59,322	533,816	593,138	5,583	3,420	52,483	682,593	
2035	26,169	1,800	59,322	533,816	593,138	5,583	3,420	52,483	682,593	
TOTAL	2,611,951	135,674	3,689,180	44,777,266	48,466,446	267,411	256,002	4,882,230	56,619,714	

TABLE B-5B Annual Water Quantities Delivered to Each Contractor (acre-feet)

Sheet 3 of 4

Calendar Year	SOUTHERN CALIFORNIA AREA									
	AVEK	Coachella	Crestline	Desert	Littlerock	Mojave	Palmdale	San Bernardino	San Gabriel	San Gorgonio
[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	0	0	0	0	0	0	0	0	0
1969	0	0	0	0	0	0	0	0	0	0
1970	0	0	0	0	0	0	0	0	0	0
1971	0	0	0	0	0	0	0	0	0	0
1972	53	0	464	0	338	55	0	1,275	0	0
1973	20	5,800	389	9,000	290	0	0	32,426	0	0
1974	1,259	6,400	627	10,000	400	14	0	16,605	612	0
1975	8,068	7,000	825	11,000	520	0	0	13,865	5,450	0
1976	27,782	7,600	1,002	12,000	589	0	0	12,273	6,071	0
1977	11,202	0	1,109	0	111	80	0	24,833	8,996	0
1978	44,137	10,084	1,209	15,300	208	0	0	4,055	7,771	0
1979	60,493	10,063	1,260	15,000	133	4,000	0	18	290	0
1980	72,407	10,884	1,239	17,000	191	4,000	0	0	1,085	0
1981	79,375	12,105	1,485	19,000	1,270	4,000	0	16,021	3,619	0
1982	50,291	13,326	1,238	21,000	0	10,500	0	8,409	12,599	0
1983	32,961	14,547	911	23,000	38	0	0	5,994	734	0
1984	32,662	15,768	1,128	25,000	1	0	0	5,556	7,656	0
1985	37,064	16,989	1,422	27,000	0	0	1,558	7,390	5,028	0
1986	32,449	18,210	1,506	29,000	163	0	3,096	6,421	9,454	0
1987	34,089	19,431	1,849	31,500	1,085	17	5,379	18,751	10,630	0
1988	34,079	20,652	2,006	34,000	419	9	1,770	21,386	8,948	0
1989	45,280	21,873	2,170	36,500	971	200	9,009	20,782	12,839	0
1990	47,206	23,100	1,827	38,100	1,747	0	8,608	18,831	16,649	0
1991	9,568	6,930	849	11,430	522	3,423	3,914	3,661	5,399	0
1992	30,265	10,427	519	17,197	251	10,686	4,035	3,358	7,908	0
1993	43,102	23,100	439	38,100	734	11,514	7,761	4,361	14,397	0
1994	49,153	14,102	785	23,257	1,098	16,852	8,418	9,135	15,230	0
1995	47,286	23,100	409	38,100	480	8,722	6,961	696	12,922	0
1996	56,356	62,219	485	102,622	494	7,427	11,434	6,064	15,989	0
1997	62,393	68,340	651	69,990	444	10,374	11,861	9,654	18,175	0
1998	52,926	85,709	187	70,647	404	3,925	8,752	1,878	9,310	0
1999	69,073	50,480	1,132	58,100	342	8,144	13,278	12,874	21,729	0
2000	83,577	42,323	1,194	58,234	0	11,380	9,060	18,399	15,140	0
2001	62,857	9,100	1,057	15,010	0	4,433	10,427	26,488	2,360	0
2002	58,171	16,755	2,189	27,640	0	4,346	18,496	72,069	24,851	0
2003	60,029	14,443	1,563	23,819	0	14,435	11,547	26,113	21,934	116
2004	59,731	15,465	2,006	21,190	0	13,176	12,162	57,030	12,541	841
2005	59,831	42,519	807	49,089	0	13,561	11,712	31,493	13,984	749
2006	80,384	121,100	641	50,000	0	34,014	12,492	35,172	16,284	4,437
2007	80,203	73,228	1,768	30,234	0	46,109	19,634	56,997	4,024	4,054
2008	54,436	46,791	848	26,428	25	25,396	14,255	34,858	7,212	5,192
2009	45,670	46,022	894	18,263	42	29,047	15,339	39,072	11,520	6,671
2010	58,489	85,592	357	31,183	0	38,152	10,969	49,256	19,180	8,363
2011	94,046	90,279	474	36,379	0	5,099	16,881	38,017	23,591	10,612
2012	111,207	117,587	624	45,101	0	11,244	18,897	112,808	22,058	11,174
2013	51,022	66,539	1,368	20,791	0	7,483	10,567	31,905	9,252	9,625
2014	18,532	12,870	1,233	3,049	0	3,581	8,406	10,854	1,200	5,146
2015	14,308	37,596	1,253	11,217	0	8,830	5,836	23,926	5,760	3,935
2016	41,356	69,422	1,084	21,893	0	22,283	10,516	61,649	16,088	11,463
2017	124,284	83,908	897	31,636	0	34,815	14,210	77,598	22,056	15,844
2018	72,341	139,089	1,193	47,746	0	5,471	10,210	43,498	17,055	13,175
2019	78,057	34,588	75	13,938	226	21,930	12,066	78,478	23,220	14,329
2020	18,723	108,928	2,019	36,238	411	8,062	4,192	23,510	4,543	8,006
2021	86,906	83,010	3,480	33,450	1,380	32,149	18,780	61,560	17,280	10,380
2022	86,906	83,010	3,480	33,450	1,380	32,170	18,780	61,560	17,280	10,380
2023	86,906	83,010	3,480	33,450	1,380	32,193	18,780	61,560	17,280	10,380
2024	86,906	83,010	3,480	33,450	1,380	32,219	18,780	61,560	17,280	10,380
2025	86,906	83,010	3,480	33,450	1,380	32,219	18,780	61,560	17,280	10,380
2026	86,906	83,010	3,480	33,450	1,380	32,219	18,780	61,560	17,280	10,380
2027	86,906	83,010	3,480	33,450	1,380	32,219	18,780	61,560	17,280	10,380
2028	86,906	83,010	3,480	33,450	1,380	32,219	18,780	61,560	17,280	10,380
2029	86,906	83,010	3,480	33,450	1,380	32,219	18,780	61,560	17,280	10,380
2030	86,906	83,010	3,480	33,450	1,380	32,219	18,780	61,560	17,280	10,380
2031	86,906	83,010	3,480	33,450	1,380	32,219	18,780	61,560	17,280	10,380
2032	86,906	83,010	3,480	33,450	1,380	32,219	18,780	61,560	17,280	10,380
2033	86,906	83,010	3,480	33,450	1,380	32,219	18,780	61,560	17,280	10,380
2034	86,906	83,010	3,480	33,450	1,380	32,219	18,780	61,560	17,280	10,380
2035	86,906	83,010	3,480	33,450	1,380	32,219	18,780	61,560	17,280	10,380
TOTAL	3,701,843	3,097,533	104,866	1,923,671	34,647	949,929	645,408	2,159,162	792,543	289,432

TABLE B-5B Annual Water Quantities Delivered to Each Contractor (acre-feet)

Sheet 4 of 4

Calendar Year	SOUTHERN CALIFORNIA AREA (continued)				FEATHER RIVER AREA				South Bay Area Future Contractor	GRAND TOTAL
	Santa Clarita ^{3,4}	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	7,382	0	0	7,382	0	0	0	0	0	294,457
1969	9,970	0	0	9,970	0	0	0	0	0	268,104
1970	11,739	0	0	11,739	0	0	70	70	0	369,459
1971	12,490	0	0	12,490	0	192	64	256	0	654,442
1972	13,905	71,938	0	88,028	0	186	505	691	0	1,037,770
1973	9,418	159,883	0	217,226	0	53	679	732	0	737,532
1974	9,700	277,717	0	323,334	0	127	648	775	0	878,947
1975	10,700	526,491	0	583,919	0	253	405	658	0	1,230,830
1976	11,700	618,451	0	697,468	0	527	382	909	0	1,380,124
1977	5,075	189,755	0	241,161	0	706	303	1,009	0	582,381
1978	11,362	507,565	0	601,691	0	579	278	857	0	1,458,733
1979	19,145	477,074	0	587,476	0	302	329	631	0	1,666,457
1980	15,092	531,727	0	653,625	0	267	295	562	0	1,536,456
1981	18,461	795,846	0	951,182	0	221	355	576	0	1,918,563
1982	22,216	691,192	0	830,771	0	334	305	639	0	1,750,862
1983	22,135	343,521	0	443,841	0	325	262	587	0	1,187,156
1984	24,218	457,582	0	569,571	108	177	272	557	0	1,591,416
1985	24,500	683,625	0	804,576	62	308	254	624	0	1,990,295
1986	27,229	708,840	0	836,368	328	313	317	958	0	1,999,155
1987	27,988	712,424	0	863,143	88	459	452	999	0	2,131,608
1988	30,438	902,564	0	1,056,271	303	385	523	1,211	0	2,385,122
1989	36,364	1,156,698	0	1,342,686	403	300	486	1,189	0	2,853,747
1990	28,579	1,396,423	4,836	1,585,906	494	380	548	1,422	0	2,582,151
1991	4,562	391,447	988	442,693	265	328	420	1,013	0	549,113
1992	20,699	710,313	0	815,658	642	117	485	1,244	0	1,471,454
1993	23,039	652,190	0	818,737	746	256	444	1,446	0	2,315,235
1994	26,441	807,866	0	972,337	1,035	329	492	1,856	0	1,861,976
1995	27,233	436,042	0	601,951	910	203	308	1,421	0	2,031,423
1996	32,500	593,380	0	888,970	820	257	360	1,437	0	2,543,472
1997	27,712	721,810	1,850	1,003,254	1,005	185	231	1,421	0	2,405,444
1998	20,093	410,065	1,850	665,746	1,054	527	0	1,581	0	1,764,963
1999	32,899	852,617	1,850	1,122,518	1,096	286	0	1,382	0	2,898,961
2000	40,680	1,522,412	4,050	1,806,449	901	586	0	1,487	0	3,569,072
2001	31,939	1,023,169	1,850	1,188,690	1,065	513	0	1,578	0	2,175,194
2002	68,817	1,408,919	4,998	1,707,251	1,181	419	0	1,600	0	2,909,555
2003	55,736	1,701,615	5,000	1,936,350	1,324	551	0	1,875	0	3,327,811
2004	83,761	1,724,380	5,250	2,007,533	1,434	1,440	0	2,874	0	3,230,590
2005	59,456	1,528,045	1,665	1,812,911	1,894	527	0	2,421	0	3,753,874
2006	62,752	1,512,186	1,850	1,931,312	5,342	468	0	5,810	0	3,693,938
2007	60,190	1,499,688	3,000	1,879,129	2,327	956	0	3,283	0	3,284,475
2008	42,878	898,313	3,798	1,160,430	1,923	451	243	2,617	0	2,152,219
2009	42,085	930,871	3,891	1,189,387	2,114	581	200	2,895	0	2,227,564
2010	57,900	1,420,331	4,075	1,783,847	2,331	807	243	3,381	0	2,836,927
2011	33,191	1,686,570	4,000	2,039,139	2,297	1,092	98	3,487	0	3,666,432
2012	50,473	1,224,907	4,353	1,730,433	2,695	1,374	79	4,148	0	2,881,783
2013	61,754	892,550	2,890	1,165,746	4,850	908	366	6,124	0	2,224,875
2014	29,448	387,392	93	481,804	4,237	1,617	251	6,105	0	1,242,286
2015	29,189	573,526	1,000	716,376	3,004	2,763	285	6,052	0	1,497,970
2016	37,828	1,083,900	3,000	1,380,482	1,229	2,518	387	4,134	0	2,359,869
2017	83,622	1,626,357	14,251	2,129,478	1,746	2,320	363	4,429	0	3,770,284
2018	42,897	679,544	1,750	1,073,969	1,715	3,029	508	5,252	0	2,048,578
2019	48,345	1,347,162	19,538	1,691,952	1,655	2,955	436	5,046	0	3,058,014
2020	52,702	399,706	8,837	675,877	4,900	3,177	405	8,482	0	1,413,311
2021	57,120	1,146,900	12,000	1,564,395	5,760	270	730	6,760	0	2,473,936
2022	57,120	1,146,900	12,000	1,564,416	5,760	270	730	6,760	0	2,473,995
2023	57,120	1,146,900	12,000	1,564,439	5,760	270	730	6,760	0	2,474,094
2024	57,120	1,146,900	12,000	1,564,465	5,760	270	730	6,760	0	2,474,156
2025	57,120	1,146,900	12,000	1,564,465	5,760	270	730	6,760	0	2,474,156
2026	57,120	1,146,900	12,000	1,564,465	5,760	270	730	6,760	0	2,474,156
2027	57,120	1,146,900	12,000	1,564,465	5,760	270	730	6,760	0	2,474,156
2028	57,120	1,146,900	12,000	1,564,465	5,760	270	730	6,760	0	2,474,156
2029	57,120	1,146,900	12,000	1,564,465	5,760	270	730	6,760	0	2,474,156
2030	57,120	1,146,900	12,000	1,564,465	5,760	270	730	6,760	0	2,474,156
2031	57,120	1,146,900	12,000	1,564,465	5,760	270	730	6,760	0	2,474,156
2032	57,120	1,146,900	12,000	1,564,465	5,760	270	730	6,760	0	2,474,156
2033	57,120	1,146,900	12,000	1,564,465	5,760	270	730	6,760	0	2,474,156
2034	57,120	1,146,900	12,000	1,564,465	5,760	270	730	6,760	0	2,474,156
2035	57,120	1,146,900	12,000	1,564,465	5,760	270	730	6,760	0	2,474,156
TOTAL	2,557,427	59,060,089	290,513	75,607,063	145,923	41,984	25,286	213,193	0	144,952,490

³ Devil's Den Water District merged with Castaic Lake Water Agency effective January 1, 1992.⁴ Castaic Lake Water Agency's SWP Water Supply Contract was transferred to Santa Clarita Valley Water Agency effective November 2, 2018.

TABLE B-6 Annual Water Quantities Conveyed through Each Pumping and Power Recovery Plant of Project Transportation Facilities (acre-feet)

Sheet 1 of 10

Calendar Year	NORTH BAY AQUEDUCT											
	Barker Slough Pumping Plant				Cordelia Pumping Plant Solano				Cordelia Pumping Plant Napa			
	Initial Fill Water	Operational Losses	Water Supply Delivery	Total	Initial Fill Water	Operational Losses	Water Supply Delivery	Total	Initial Fill Water	Operational Losses	Water Supply Delivery ¹	Total
1961	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]	[12]
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	3,330	46,754	50,084	0	0	19,607	19,607	0	899	11,660	12,559
2019	0	1,767	42,767	44,534	0	0	17,692	17,692	0	769	11,261	12,030
2020	0	51	40,249	40,300	0	0	20,906	20,906	0	5	12,591	12,596
2021	0	51	46,069	46,120	0	0	0	0	0	5	17,415	17,420
2022	0	51	46,069	46,120	0	0	0	0	0	5	17,415	17,420
2023	0	51	46,069	46,120	0	0	0	0	0	5	17,415	17,420
2024	0	51	46,069	46,120	0	0	0	0	0	5	17,415	17,420
2025	0	51	46,069	46,120	0	0	0	0	0	5	17,415	17,420
2026	0	51	46,069	46,120	0	0	0	0	0	5	17,415	17,420
2027	0	51	46,069	46,120	0	0	0	0	0	5	17,415	17,420
2028	0	51	46,069	46,120	0	0	0	0	0	5	17,415	17,420
2029	0	51	46,069	46,120	0	0	0	0	0	5	17,415	17,420
2030	0	51	46,069	46,120	0	0	0	0	0	5	17,415	17,420
2031	0	51	46,069	46,120	0	0	0	0	0	5	17,415	17,420
2032	0	51	46,069	46,120	0	0	0	0	0	5	17,415	17,420
2033	0	51	46,069	46,120	0	0	0	0	0	5	17,415	17,420
2034	0	51	46,069	46,120	0	0	0	0	0	5	17,415	17,420
2035	0	51	46,069	46,120	0	0	0	0	0	5	17,415	17,420

¹ For the period 1968 through 1987, deliveries are non-SWP water pumped through an interim facility.

TABLE B-6 Annual Water Quantities Conveyed through Each Pumping and Power Recovery Plant of Project Transportation Facilities (acre-feet)

Sheet 2 of 10

Calendar Year	SOUTH BAY AQUEDUCT						CALIFORNIA AQUEDUCT							
	South Bay Pumping Plant						NORTH SAN JOAQUIN DIVISION							
		Initial Fill Water	Operational Losses	Reservoir Storage Changes	Deliveries		Initial Fill Water	Operational Losses	Reservoir Storage Changes	Deliveries		Total		
					Water Supply ²	Recreation				Water Supply	Recreation			
1961	[13]	[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	0
1963	9	272	0	8,906	0	9,187	0	0	0	0	0	0	0	0
1964	71	185	0	12,645	0	12,901	0	0	0	0	0	0	0	0
1965	171	152	0	20,911	0	21,234	0	0	0	0	0	0	0	0
1966	93	729	0	34,026	0	34,848	0	0	0	0	0	0	0	0
1967	0	1,746	0	54,913	0	56,659	0	0	0	0	0	0	0	0
1968	0	1,677	0	56,763	0	58,440	5,746	1,183	0	11,538	0	18,467	2,957	21,424
1969	0	1,847	0	101,055	0	102,902	11,079	74,464	0	293,243	0	378,786	531,275	910,061
1970	3,449	2,668	0	69,712	0	75,829	7,336	44,287	0	265,417	0	317,040	531,185	848,225
1971	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
1972	0	1,815	8,854	98,584	0	109,253	23,207	(10,754)	8,854	65,1665	8	672,980	7,708	680,688
1973	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
1974	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
1975	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
1976	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
1977	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
1978	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
1979	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
1980	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
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	(31,047)	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	(298,297)	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	(379,949)	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)	859,792	690	929,009	(140,538)	788,471
2016	0	2,031	5,558	119,221	69	126,879	0	106,956	(57,641)	2,039,462	1,399	2,090,176	503,353	2,593,529
2017	0	2,409	(6,363)	81,187	46	77,279	0	118,158	12,421	3,372,951	775	3,504,305	(3,969)	3,500,336
2018	0	2,778	(391)	134,820	100	137,307	0	104,012	45,050	1,712,915	879	1,862,856	167,385	2,030,241
2019	0	1,873	185	82,389	103	84,550	0	105,128	(38,086)	2,802,184	953	2,870,179	67,564	2,937,743
2020	0	3,381	0	119,535	400	123,316	0	123,002	40,420	1,138,429	8,660	1,310,511	29,521	1,340,032
2021	0	3,381	0	125,331	400	129,112	0	121,701	(149,420)	2,421,107	8,660	2,402,048	83,324	2,485,372
2022	0	3,381	0	125,595	400	129,376	0	121,560	156,000	2,421,166	8,660	2,707,386	(188,203)	2,519,183
2023	0	3,351	0	125,823	400	129,574	0	128,679	(18,971)	2,421,265	8,660	2,539,633	115,791	2,655,424
2024	0	3,351	0	126,123	400	129,874	0	128,486	11,289	2,421,327	8,660	2,569,762	79,858	2,649,620
2025	0	3,351	0	126,123	400	129,874	0	130,241	(12,518)	2,421,327	8,660	2,547,710	(247,205)	2,300,505
2026	0	3,351	0	126,123	400</td									

TABLE B-6 Annual Water Quantities Conveyed through Each Pumping and Power Recovery Plant of Project Transportation Facilities (acre-feet)

Sheet 3 of 10

Calendar Year	CALIFORNIA AQUEDUCT (continued)												
	SAN LUIS DIVISION							SOUTH SAN JOAQUIN DIVISION					
	Dos Amigos Pumping Plant						Buena Vista Pumping Plant						
	Initial Fill Water	Operational Losses	Reservoir Storage Changes	Deliveries		Total	Initial Fill Water	Operational Losses	Reservoir Storage Changes	Deliveries		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	0
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	11,079	25,126	0	189,104	0	225,309	0	0	0	0	0	0	0
1969	3,887	9,922	0	192,689	0	206,498	0	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)	1,867,309	981	1,905,515	0	63,781	(63,199)	1,428,801	981	1,430,364	
2017	0	116,906	18,784	3,493,870	351	3,629,911	0	103,689	18,784	2,084,752	300	2,207,525	
2018	0	105,704	45,441	1,655,128	275	1,806,548	0	70,151	45,441	1,179,655	225	1,295,472	
2019	0	101,466	(38,271)	2,839,648	303	2,903,146	0	81,478	(38,271)	1,692,163	280	1,735,650	
2020	0	74,833	40,420	972,239	7,210	1,094,702	0	45,510	40,420	780,169	7,010	873,109	
2021	0	72,681	(149,420)	2,291,056	7,210	2,221,527	0	43,358	(149,420)	1,603,562	7,010	1,504,510	
2022	0	74,411	156,000	2,290,851	7,210	2,528,472	0	45,088	156,000	1,603,583	7,010	1,811,681	
2023	0	70,557	(18,971)	2,290,722	7,210	2,349,518	0	41,234	(18,971)	1,603,606	7,010	1,632,879	
2024	0	70,436	11,289	2,290,484	7,210	2,379,419	0	41,113	11,289	1,603,632	7,010	1,663,044	
2025	0	70,499	(12,518)	2,290,484	7,210	2,355,675	0	41,176	(12,518)	1,603,632	7,010	1,639,300	
2026	0	70,511	24,308	2,290,484	7,210	2,392,513	0	41,188	24,308	1,603,632	7,010	1,676,138	
2027	0	70,424	(17,799)	2,290,484	7,210	2,350,319	0	41,101	(17,799)	1,603,632	7,010	1,633,944	
2028	0	70,564	12,291	2,290,484	7,210	2,380,549	0	41,241	12,291	1,603,632	7,010	1,664,174	
2029	0	70,491	(9,046)	2,290,484	7,210	2,359,139	0	41,168	(9,046)	1,603,632	7,010	1,642,764	
2030	0	70,555	20,756	2,290,484	7,210	2,389,005	0	41,232	20,756	1,603,632	7,010	1,672,630	
2031	0	70,427	(97,726)	2,290,484	7,210	2,270,395	0	41,104	(97,726)	1,603,632	7,010	1,554,020	
2032	0	70,029	84,999	2,290,484	7,210	2,452,722	0	40,706	84,999	1,603,632	7,010	1,736,347	
2033	0	70,234	(94,652)	2,290,484	7,210	2,273,276	0	40,911					

TABLE B-6 Annual Water Quantities Conveyed through Each Pumping and Power Recovery Plant of Project Transportation Facilities (acre-feet)

Sheet 4 of 10

Calendar Year	CALIFORNIA AQUEDUCT (continued)												
	SOUTH SAN JOAQUIN DIVISION (continued)												
	Teerink Pumping Plant						Chrisman Pumping Plant						
	Initial Fill Water	Operational Losses	Reservoir Storage Changes	Deliveries		Total	Initial Fill Water	Operational Losses	Reservoir Storage Changes	Deliveries		Total	
1961	[39]	[40]	[41]	0	[42]	[43]	[44]	[45]	[46]	[47]	[48]	[49]	[50]
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	198	2	0	0	0	200	0	0	0	0	0	0	0
1971	7,533	(112)	0	3,552	0	10,973	7,366	(159)	0	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)	1,365,032	981	1,409,721	0	83,653	(63,199)	1,352,680	981	1,374,115	
2017	0	127,631	18,784	1,948,832	300	2,095,547	0	114,305	18,784	1,903,260	300	2,036,649	
2018	0	86,871	45,441	1,074,340	225	1,206,877	0	76,849	45,441	1,057,343	225	1,179,858	
2019	0	108,332	(38,271)	1,583,828	280	1,654,169	0	79,072	(38,271)	1,548,648	280	1,589,729	
2020	0	41,880	40,420	725,031	7,010	814,341	0	41,630	40,420	696,818	7,010	785,878	
2021	0	39,728	(149,420)	1,525,762	7,010	1,423,080	0	39,478	(149,420)	1,498,862	7,010	1,395,930	
2022	0	41,458	156,000	1,525,783	7,010	1,730,251	0	41,208	156,000	1,498,883	7,010	1,703,101	
2023	0	37,604	(18,971)	1,525,806	7,010	1,551,449	0	37,354	(18,971)	1,498,906	7,010	1,524,299	
2024	0	37,483	11,289	1,525,832	7,010	1,581,614	0	37,233	11,289	1,498,932	7,010	1,554,464	
2025	0	37,546	(12,518)	1,525,832	7,010	1,557,870	0	37,296	(12,518)	1,498,932	7,010	1,530,720	
2026	0	37,558	24,308	1,525,832	7,010	1,594,708	0	37,308	24,308	1,498,932	7,010	1,567,558	
2027	0	37,471	(17,799)	1,525,832	7,010	1,552,514	0	37,221	(17,799)	1,498,932	7,010	1,525,364	
2028	0	37,611	12,291	1,525,832	7,010	1,582,744	0	37,361	12,291	1,498,932	7,010	1,555,594	
2029	0	37,538	(9,046)	1,525,832	7,010	1,561,334	0	37,288	(9,046)	1,498,932	7,010	1,534,184	
2030	0	37,602	20,756	1,525,832	7,010	1,591,200	0	37,352	20,756	1,498,932	7,010	1,564,050	
2031	0	37,474	(97,726)	1,525,832	7,010	1,472,590	0	37,224	(97,726)	1,498,932	7,010	1,445,440	
2032	0	37,076	84,999	1,525,832	7,010	1,654,917	0	36,826	84,999	1,498,932	7,010	1,627,767	
2033	0	37,281	(94,652)	1,525,832	7,010	1,475,471	0	37,031	(94,652)	1,498,932	7,010	1,448,321	
2034	0	36,773	69,593	1,525,832	7,010	1,639,208	0	36,523	69,593	1,498,932	7,010	1,612,058	
2035	0	36,113	(242,659)	1,525,832	7,010	1,326,296	0	35,863	(242,659)	1,498,932	7,010	1,299,146	

TABLE B-6 Annual Water Quantities Conveyed through Each Pumping and Power Recovery Plant of Project Transportation Facilities (acre-feet)

Sheet 5 of 10

Calendar Year	CALIFORNIA AQUEDUCT (continued)												
	TEHACHAPI DIVISION							MOJAVE DIVISION					
	Edmonston Pumping Plant						Alamo Powerplant						
	Initial Fill Water	Operational Losses	Reservoir Storage Changes	Deliveries			Total	Initial Fill Water	Operational Losses	Reservoir Storage Changes	Deliveries	Water Supply	Recreation
1961	[51]	[52]	[53]	[54]	[55]	[56]	0	[57]	[58]	[59]	[60]	[61]	[62]
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	5,446	8	0	0	0	5,454	0	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	0
1973	204,638	34,051	1,329	207,808	1,147	448,973	0	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	0
1975	103,352	20,183	(693)	573,219	3,358	699,419	0	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	0
1977	0	18,424	(116,219)	236,086	560	138,851	0	0	0	0	0	0	0
1978	65,027	20,887	121,904	590,329	674	798,821	0	0	0	0	0	0	0
1979	12,302	46,332	(51,299)	568,338	502	576,175	0	0	0	0	0	0	0
1980	0	52,967	(134,009)	639,743	1,262	559,963	0	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	0
1982	0	37,244	117,296	812,206	4,045	970,791	0	0	0	0	0	0	0
1983	0	40,690	(101,155)	431,182	7,291	378,008	0	0	0	0	0	0	0
1984	0	42,112	(115,214)	556,830	5,244	488,972	0	0	0	0	0	0	0
1985	0	45,265	139,988	792,477	4,804	982,534	0	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)	1,330,078	981	1,308,931	0	6,898	7,625	785,607	163	800,293	
2017	0	66,781	18,784	1,876,453	300	1,962,318	0	27,722	(56,730)	1,459,379	235	1,430,606	
2018	0	41,613	45,441	1,030,755	225	1,118,034	0	6,170	56,121	659,762	155	722,208	
2019	0	35,731	(38,271)	1,524,958	280	1,522,698	0	2,373	(29,553)	1,180,572	148	1,153,540	
2020	0	40,080	40,420	675,877	7,010	763,387	0	22,935	40,420	309,205	1,630	374,190	
2021	0	37,928	(149,420)	1,472,395	7,010	1,367,913	0	23,298	6,580	887,447	1,630	918,955	
2022	0	39,658	156,000	1,472,416	7,010	1,675,084	0	23,301	0	887,456	1,630	912,387	
2023	0	35,804	(18,971)	1,472,439	7,010	1,496,282	0	20,939	(18,638)	887,473	1,630	891,404	
2024	0	35,683	11,289	1,472,465	7,010	1,526,447	0	20,881	21,309	887,493	1,630	931,313	
2025	0	35,746	(12,518)	1,472,465	7,010	1,502,703	0	20,965	(11,624)	887,493	1,630	898,464	
2026	0	35,758	24,308	1,472,465	7,010	1,539,541	0	20,930	13,030	887,493	1,630	923,083	
2027	0	35,671	(17,799)	1,472,465	7,010	1,497,347	0	20,861	(6,161)	887,493	1,630	903,823	
2028	0	35,811	12,291	1,472,465	7,010	1,527,577	0	20,961	4,006	887,493	1,630	914,090	
2029	0	35,738	(9,046)	1,472,465	7,010	1,506,167	0	20,955	(913)	887,493	1,630	909,165	
2030	0	35,802	20,756	1,472,465	7,010	1,536,033	0	20,930	8,528	887,493	1,630	918,581	
2031	0	35,674	(97,726)	1,472,465	7,010	1,417,423	0	20,956	(31,057)	887,493	1,630	879,022	
2032	0	35,276	84,999	1,472,465	7,010	1,599,750	0	20,865	43,953	887,493	1,630	953,941	
2033	0	35,481	(94,652)	1,472,465	7,010	1,420,304	0	20,854	(37,929)	887,493	1,630	872,048	
2034	0	34,973	69,593	1,472,465	7,010	1,584,041	0	20,769	28,588	887,493	1,630	938,480	
2035	0	34,313	(242,659)	1,472,465	7,010	1,271,129	0	20,892	(49,219)	887,493	1,630	860,796	

TABLE B-6 Annual Water Quantities Conveyed through Each Pumping and Power Recovery Plant of Project Transportation Facilities (acre-feet)

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Calendar Year	CALIFORNIA AQUEDUCT (continued)											
	MOJAVE DIVISION (continued)											
	Pearblossom Pumping Plant						Mojave Siphon Powerplant					
	Initial Fill Water	Operational Losses	Reservoir Storage Changes	Deliveries		Total	Initial Fill Water	Operational Losses	Reservoir Storage Changes	Deliveries		Total
1961	[63]	[64]	[65]	[66]	[67]	[68]	[69]	[70]	[71]	[72]	[73]	[74]
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	735,426	163	751,964	0	5,792	7,625	721,208	163	734,788
2017	0	22,451	(56,730)	1,332,154	235	1,298,110	0	7,679	(56,730)	1,309,134	235	1,260,318
2018	0	4,197	56,121	591,774	155	652,247	0	4,206	56,121	587,169	155	647,651
2019	0	14,998	(29,553)	1,086,545	148	1,072,138	0	6,055	(29,553)	1,068,884	148	1,045,534
2020	0	17,585	40,420	285,044	1,430	344,479	0	14,115	40,420	277,844	1,430	333,809
2021	0	17,948	6,580	770,364	1,430	796,322	0	14,478	6,580	738,442	1,430	760,930
2022	0	17,951	0	770,376	1,430	789,757	0	14,481	0	738,442	1,430	754,353
2023	0	15,589	(18,638)	770,400	1,430	768,781	0	12,119	(18,638)	738,442	1,430	733,353
2024	0	15,531	21,309	770,412	1,430	808,682	0	12,061	21,309	738,442	1,430	773,242
2025	0	15,615	(11,624)	770,412	1,430	775,833	0	12,145	(11,624)	738,442	1,430	740,393
2026	0	15,580	13,030	770,412	1,430	800,452	0	12,110	13,030	738,442	1,430	765,012
2027	0	15,511	(6,161)	770,412	1,430	781,192	0	12,041	(6,161)	738,442	1,430	745,752
2028	0	15,611	4,006	770,412	1,430	791,459	0	12,141	4,006	738,442	1,430	756,019
2029	0	15,605	(913)	770,412	1,430	786,534	0	12,135	(913)	738,442	1,430	751,094
2030	0	15,580	8,528	770,412	1,430	795,950	0	12,110	8,528	738,442	1,430	760,510
2031	0	15,606	(31,057)	770,412	1,430	756,391	0	12,136	(31,057)	738,442	1,430	720,951
2032	0	15,515	43,953	770,412	1,430	831,310	0	12,045	43,953	738,442	1,430	795,870
2033	0	15,504	(37,929)	770,412	1,430	749,417	0	12,034	(37,929)	738,442	1,430	713,977
2034	0	15,419	28,588	770,412	1,430	815,849	0	11,949	28,588	738,442	1,430	780,409
2035	0	15,542	(49,219)	770,412	1,430	738,165	0	12,072	(49,219)	738,442	1,430	702,725

TABLE B-6 Annual Water Quantities Conveyed through Each Pumping and Power Recovery Plant of Project Transportation Facilities (acre-feet)

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Calendar Year	CALIFORNIA AQUEDUCT (continued)									
	SANTA ANA DIVISION									
	Devil Canyon Powerplant					Greenspot Pump Station				
	Initial Fill Water	Operational Losses	Reservoir Storage Changes	Deliveries	Total	Initial Fill Water	Operational Losses	Water Supply Delivery	Total	
	[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	3,164	53,152	585,739	95	642,150	0	0	4,241	4,241
2019	0	3,039	(19,717)	1,064,352	88	1,047,762	0	0	13,622	13,622
2020	0	9,945	35,420	275,579	1,250	322,194	0	0	51	51
2021	0	10,308	6,580	734,799	1,250	752,937	0	0	0	0
2022	0	10,310	0	734,799	1,250	746,359	0	0	0	0
2023	0	8,482	(8,417)	734,799	1,250	736,114	0	0	0	0
2024	0	8,462	689	734,799	1,250	745,200	0	0	0	0
2025	0	8,489	4,591	734,799	1,250	749,129	0	0	0	0
2026	0	8,475	(3,819)	734,799	1,250	740,705	0	0	0	0
2027	0	8,479	745	734,799	1,250	745,273	0	0	0	0
2028	0	8,481	(5,355)	734,799	1,250	739,175	0	0	0	0
2029	0	8,481	2,909	734,799	1,250	747,439	0	0	0	0
2030	0	8,480	296	734,799	1,250	744,825	0	0	0	0
2031	0	8,475	(1,976)	734,799	1,250	742,548	0	0	0	0
2032	0	8,449	18,821	734,799	1,250	763,319	0	0	0	0
2033	0	8,449	(23,419)	734,799	1,250	721,079	0	0	0	0
2034	0	8,443	21,651	734,799	1,250	766,143	0	0	0	0
2035	0	8,451	(31,434)	734,799	1,250	713,066	0	0	0	0

TABLE B-6 Annual Water Quantities Conveyed through Each Pumping and Power Recovery Plant of Project Transportation Facilities (acre-feet)

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Calendar Year	CALIFORNIA AQUEDUCT (continued)											
	SANTA ANA DIVISION (continued)											
	Citrus Pump Station ³				Crafton Hills Pump Station				Cherry Valley Pump Station			
	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]	[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	22,433	22,433	0	0	22,433	22,433	0	0	12,622	12,622
2019	0	0	25,457	25,457	0	0	25,457	25,457	0	0	14,152	14,152
2020	0	0	8,792	8,792	0	0	8,792	8,792	0	0	8,006	8,006
2021	0	0	10,380	10,380	0	0	10,380	10,380	0	0	9,970	9,970
2022	0	0	10,380	10,380	0	0	10,380	10,380	0	0	9,970	9,970
2023	0	0	10,380	10,380	0	0	10,380	10,380	0	0	9,970	9,970
2024	0	0	10,380	10,380	0	0	10,380	10,380	0	0	9,970	9,970
2025	0	0	10,380	10,380	0	0	10,380	10,380	0	0	9,970	9,970
2026	0	0	10,380	10,380	0	0	10,380	10,380	0	0	9,970	9,970
2027	0	0	10,380	10,380	0	0	10,380	10,380	0	0	9,970	9,970
2028	0	0	10,380	10,380	0	0	10,380	10,380	0	0	9,970	9,970
2029	0	0	10,380	10,380	0	0	10,380	10,380	0	0	9,970	9,970
2030	0	0	10,380	10,380	0	0	10,380	10,380	0	0	9,970	9,970
2031	0	0	10,380	10,380	0	0	10,380	10,380	0	0	9,970	9,970
2032	0	0	10,380	10,380	0	0	10,380	10,380	0	0	9,970	9,970
2033	0	0	10,380	10,380	0	0	10,380	10,380	0	0	9,970	9,970
2034	0	0	10,380	10,380	0	0	10,380	10,380	0	0	9,970	9,970
2035	0	0	10,380	10,380	0	0	10,380	10,380	0	0	9,970	9,970

³ 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

Calendar Year	CALIFORNIA AQUEDUCT (continued)												
	WEST BRANCH												
	Oso Pumping Plant						Warne Powerplant						
	Initial Fill Water	Operational Losses	Reservoir Storage Changes	Deliveries		Total	Initial Fill Water	Operational Losses	Reservoir Storage Changes	Deliveries		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	2,577	0	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	35,425	(10,680)	370,993	70	395,808	0	16,442	(10,680)	370,993	70	376,825	
2019	0	33,516	(8,718)	344,386	132	369,316	0	9,606	(8,718)	344,386	132	345,406	
2020	0	17,095	0	366,672	5,380	389,147	0	15,185	0	366,645	5,380	387,210	
2021	0	14,580	(156,000)	584,948	5,380	448,908	0	12,670	(156,000)	584,738	5,380	446,788	
2022	0	16,307	156,000	584,960	5,380	762,647	0	14,397	156,000	584,738	5,380	760,515	
2023	0	14,815	(333)	584,966	5,380	604,828	0	12,905	(333)	584,738	5,380	602,690	
2024	0	14,752	(10,020)	584,972	5,380	595,084	0	12,842	(10,020)	584,738	5,380	592,940	
2025	0	14,731	(894)	584,972	5,380	604,189	0	12,821	(894)	584,738	5,380	602,045	
2026	0	14,778	11,278	584,972	5,380	616,408	0	12,868	11,278	584,738	5,380	614,264	
2027	0	14,760	(11,638)	584,972	5,380	593,474	0	12,850	(11,638)	584,738	5,380	591,330	
2028	0	14,800	8,285	584,972	5,380	613,437	0	12,890	8,285	584,738	5,380	611,293	
2029	0	14,733	(8,133)	584,972	5,380	596,952	0	12,823	(8,133)	584,738	5,380	594,808	
2030	0	14,822	12,228	584,972	5,380	617,402	0	12,912	12,228	584,738	5,380	615,258	
2031	0	14,668	(66,669)	584,972	5,380	538,351	0	12,758	(66,669)	584,738	5,380	536,207	
2032	0	14,361	41,046	584,972	5,380	645,759	0	12,451	41,046	584,738	5,380	643,615	
2033	0	14,577	(56,723)	584,972	5,380	548,206	0	12,667	(56,723)	584,738	5,380	546,062	
2034	0	14,154	41,005	584,972	5,380	645,511	0	12,244	41,005	584,738	5,380	643,367	
2035	0	13,371	(193,440)	584,972	5,380	410,283	0	11,461	(193,440)	584,738	5,380	408,139	

TABLE B-6 Annual Water Quantities Conveyed through Each Pumping and Power Recovery Plant of Project Transportation Facilities (acre-feet)

Sheet 10 of 10

Calendar Year	CALIFORNIA AQUEDUCT (continued)													
	WEST BRANCH (continued)							COASTAL BRANCH						
	Castaic Powerplant						Las Perillas and Badger Hill Pumping Plants				Devil's Den, Bluestone, and Polonio Pass Pumping Plants			
	Initial Fill Water	Operational Losses	Reservoir Storage Changes	Deliveries		Total	Initial Fill Water	Operational Losses	Water Supply Delivery	Total	Initial Fill Water	Operational Losses	Water Supply Delivery	Total
1961	[109]	[110]	[111]	[112]	[113]	[114]	[115]	[116]	[117]	[118]	[119]	[120]	[121]	[122]
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	11,319	(745)	369,891	19	380,484	0	6,521	118,880	125,401	0	952	29,875	30,827
2019	0	10,896	(9,095)	326,236	73	328,110	0	2,988	110,756	113,744	0	1,163	20,780	21,943
2020	0	9,737	0	360,336	2,330	372,403	0	663	99,119	99,782	0	73	11,467	11,540
2021	0	7,222	(156,000)	582,848	2,330	436,400	0	663	95,541	96,204	0	73	40,548	40,621
2022	0	8,949	156,000	582,848	2,330	750,127	0	663	95,579	96,242	0	73	40,586	40,659
2023	0	6,620	(333)	582,848	2,330	591,465	0	663	95,655	96,318	0	73	40,662	40,735
2024	0	6,557	(10,020)	582,848	2,330	581,715	0	663	95,691	96,354	0	73	40,698	40,771
2025	0	6,536	(894)	582,848	2,330	590,820	0	663	95,691	96,354	0	73	40,698	40,771
2026	0	6,583	11,278	582,848	2,330	603,039	0	663	95,691	96,354	0	73	40,698	40,771
2027	0	6,565	(11,638)	582,848	2,330	580,105	0	663	95,691	96,354	0	73	40,698	40,771
2028	0	6,605	8,285	582,848	2,330	600,068	0	663	95,691	96,354	0	73	40,698	40,771
2029	0	6,538	(8,133)	582,848	2,330	583,583	0	663	95,691	96,354	0	73	40,698	40,771
2030	0	6,627	12,228	582,848	2,330	604,033	0	663	95,691	96,354	0	73	40,698	40,771
2031	0	6,473	(66,669)	582,848	2,330	524,982	0	663	95,691	96,354	0	73	40,698	40,771
2032	0	6,166	41,046	582,848	2,330	632,390	0	663	95,691	96,354	0	73	40,698	40,771
2033	0	6,382	(56,723)	582,848	2,330	534,837	0	663	95,691	96,354	0	73	40,698	40,771
2034	0	5,959	41,005	582,848	2,330	632,142	0	663	95,691	96,354	0	73	40,698	40,771
2035	0	5,176	(193,440)	582,848	2,330	396,914	0	663	95,691	9				

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 ¹	Allowance for Future Price Escalation ²	Costs of Construction of Delivery Structures ³	Costs of Requested Excess Capacity and Future Enlargement ⁴	Capital Cost Component of Delta Water Charge ⁵	Capital Cost Component of Transportation Water Charge ⁶	Water Supply and Power Total		
CONSERVATION FACILITIES	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]
Upper Feather Division									
Frenchman Dam and Lake	180	0	0	0	609	0	789	2,904	13,769
Grizzly Valley Dam and Lake Davis	65	0	0	0	55	0	120	8,957	13,964
Antelope Dam and Lake	1	0	0	0	0	0	1	5,894	17,625
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	664	0	910	18,511	46,114
Oroville Division									
Multipurpose Facilities	3,152	0	0	0	1,265,429	0	1,268,581	146,944	1,447,717
Specific Power Facilities	230	0	0	0	393,034	0	393,264	1,303	396,205
Total, Oroville Division	3,382	0	0	0	1,658,463	0	1,661,845	148,247	1,843,922
California Aqueduct									
North San Joaquin Division (R1-2B)	1,210	0	0	0	209,904	0	211,114	3,926	216,443
San Luis Division (R3A-7)	13,152	0	0	0	949,063	0	962,215	7,462	973,888
Total, California Aqueduct	14,362	0	0	0	1,158,967	0	1,173,329	11,388	1,190,331
Delta Facilities									
Planning and Preoperation	37,311	0	0	0	729,993	0	767,304	18,285	794,497
TOTAL, CONSERVATION FACILITIES	60,603	0	0	0	3,663,129	0	3,723,732	196,431	3,995,208
TRANSPORTATION FACILITIES									
Upper Feather Division									
Grizzly Valley Pipeline	0	0	315	0	0	2,809	3,124	0	3,124
North Bay Aqueduct	266	0	721	0	0	141,804	142,791	0	142,791
South Bay Aqueduct	1,791	0	3,682	0	0	415,305	420,778	23,789	455,394
California Aqueduct									
North San Joaquin Division	2,462	0	176	0	0	371,853	374,490	8,738	386,350
San Luis Division	9,201	0	0	0	0	321,215	330,416	8,825	344,222
South San Joaquin Division	386	0	4,896	2,065	0	738,239	745,586	17,827	765,026
Tehachapi Division	27	0	0	5,230	0	481,643	486,900	20,856	508,189
Mojave Division	918	0	2,703	0	0	441,176	444,797	40,621	488,087
Santa Ana Division	1,184	0	6,288	5,331	0	577,679	590,481	84,356	733,400
West Branch	37,592	0	455	37	0	783,674	821,759	33,896	871,567
Coastal Branch	(279)	0	213	0	0	553,360	553,294	0	553,294
Total, California Aqueduct	51,491	0	14,731	12,663	0	4,268,838	4,347,724	215,119	4,650,135
TOTAL, TRANSPORTATION FACILITIES	53,548	0	19,448	12,663	0	4,828,757	4,914,417	238,908	5,251,444
East Branch Enlargement	0	0	0	0	0	462,031	462,031	0	462,031
East Branch Extension	0	0	0	0	0	420,997	420,997	0	420,997
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	91,404	94,527
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	104,523	118,618	0	118,618
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	(4,029)	(4,029)
Davis-Grunsky	0	0	0	0	0	0	0	130,000	130,000
TOTAL THROUGH 2035	114,151	0	19,448	12,663	3,711,910	6,338,589	10,196,762	652,713	11,025,763

¹ Miscellaneous project receipts that are applied for accounting purposes to reduce the capital costs of the particular facilities.² These allowances are included for planning the future financial program, but not for determining current water charges.³ See Table B-8.⁴ See Table B-9.⁵ See Table B-13.⁶ See Table B-10. Mojave Division total reduced by \$87,033,179 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 ¹						
	1952-2017	2018	2019	2020	2021	2022	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 ²	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	5,000	40,000	0	707,113
Subtotal	675,703	0	0	5,000	40,000	0	720,703
SOUTH BAY AREA							
Alameda County Flood Control and Water Conservation District, Zone 7	1,911,350	0	0	0	40,000	0	1,951,350
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 ²	1,066,680	0	0	0	0	0	1,066,680
Subtotal	3,642,137	0	0	0	40,000	0	3,682,137
CENTRAL COASTAL AREA							
San Luis Obispo County Flood Control and Water Conservation District	58,008	0	0	0	0	0	58,008
Santa Barbara County Flood Control and Water Conservation District	67,058	0	0	0	0	0	67,058
Subtotal	125,066	0	0	0	0	0	125,066
SAN JOAQUIN VALLEY AREA							
County of Kings	55,281	70,736	30,893	450	0	0	157,360
Dudley Ridge Water District	345,170	0	0	0	0	0	345,170
Empire West Side Irrigation District	6,358	0	0	0	0	0	6,358
Green Valley Water District ²	5,292	0	0	0	0	0	5,292
Kern County Water Agency	4,029,503	0	10,332	70,000	0	0	4,109,835
Oak Flat Water District	97,643	0	0	0	0	0	97,643
Santa Clarita Valley Water Agency ³	82,567	0	0	0	0	0	82,567
Tracy Golf and Country Club ²	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 ²	3,342	0	0	0	0	0	3,342
Del Puerto Water District ²	0	10,885	6,922	50,000	0	0	67,807
Subtotal	4,909,571	81,621	48,147	120,450	0	0	5,159,789
SOUTHERN CALIFORNIA AREA							
Antelope Valley-East Kern Water Agency	1,614,783	99,319	320,081	100,000	100,000	0	2,234,183
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
Little Rock Creek Irrigation District	23,732	0	37,653	1,300	0	0	62,685
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	20,000	20,000	0	1,000,685
San Gabriel Valley Municipal Water District	131,052	0	0	0	0	0	131,052
San Gorgonio Pass Water Agency	139,123	35,496	73,814	30,000	0	0	278,433
Santa Clarita Valley Water Agency ³	375,593	0	0	0	0	0	375,593
The Metropolitan Water District of Southern California	4,817,610	0	0	0	60,000	0	4,877,610
Ventura County Watershed Protection District	79,699	0	0	0	0	0	79,699
Subtotal	8,548,446	134,815	431,548	151,300	180,000	0	9,446,109
TOTAL	18,215,564	216,436	479,695	276,750	260,000	0	19,448,445

¹ Approximate only, not to be construed as invoice amounts.² Not an SWP water supply contractor.³ Castaic Lake Water Agency's SWP Water Supply Contract was transferred to Santa Clarita Valley Water Agency effective November 2, 2018.

Table B-9 Capital Costs of Requested Excess Peaking Capacity (in dollars unless otherwise indicated)

Sheet 1 of 2

Calendar Year	Total Advance Payments and Credits for Excess Capacity	Total Incremental Costs for Excess Capacity	Overpayment (+) or Underpayment (-) ¹	Annual Surplus Money Investment Fund Interest Rate ²		Net Over- or Underpayment With Interest ³
				January-June	July-December	
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

¹ Overpayment or underpayment for each calendar year—column [1] minus column [2].² Interest rates shown are annual rates. Interest is credited daily at applicable rates on funds deposited in the State's Surplus Money Investment Fund.³ 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													Reach Total	
	Incremental Costs and Advance Payments by Calendar Year														
	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1981		
THE METROPOLITAN WATER DISTRICT OF SOUTHERN CALIFORNIA															
<i>Incremental Costs</i>															
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	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	
<i>Adjustments</i>															
8C through 25	1. Advance Payments Applied to Incremental Costs Amendment 2 ⁴														
	0	8,056,000	9,094,963	1,523,252	8,310,651	3,426,736	1,086,045	(4,244,807)	(14,381,396)				(356,668)	12,514,776	
28J	2. Interest Credits-Amendment 2 ⁵														
													(1,532,433)	(10,104,646)	
	3. Advance Payments Applied to Incremental Costs Amendment 5 ⁶														
	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 ⁷														
5. Net Required Advance of Funds														See footnote 8.	
	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															
25	<i>Incremental Costs</i>														
	25,730	44,053	38,075	17,959	5,900	6,835								138,552	
Total Unadjusted Incremental Costs for Past Payments														138,552	
	25,730	44,053	38,075	17,959	5,900	6,835									
	<i>Adjustments</i>														
	1. Advance Payments Applied to Incremental Costs ⁴														
	0	184,422	49,052	44,911	61,588	(20,263)	(174,133)						(7,025)	138,552	
	2. Interest Credit													(79,108)	
3. Net Required Advance of Funds														(85,440)	
														See footnote 8.	
0														(86,133)	
														53,112	
ANTELOPE VALLEY-EAST KERN WATER AGENCY															
29A 29F	<i>Incremental Costs</i>														
	1,645	6,326	13,376	10,048	2,018	308	96	190						34,007	
Total Unadjusted Incremental Costs for Past Payments														3,400	
	1,645	6,326	15,076	11,748	2,018	308	96	190						37,407	
	<i>Adjustments</i>														
	1. Advance Payments Applied to Incremental Costs ⁴														
	85,495	52,625	101,648	34,062	(12,794)	(189,120)	0	0					(34,509)	37,407	
	2. Interest Credit													(100,360)	
3. Net Required Advance of Funds														(116,594)	
														See footnote 8.	
85,495														(79,187)	

⁴ Actual payments are shown for 1965 through 1976 with 1981 adjusted to reflect overpayments and underpayments without interest for prior years.⁵ Interest for overpayments and underpayments under provisions of Amendment 2 of the contract.⁶ Actual payments are shown for 1965 through 1973 with 1974 adjusted to reflect overpayments and underpayments without interest for prior years.⁷ Interest for overpayments and underpayments under provisions of Amendment 5 of the contract.⁸ 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	65,208	889	51,882	7,256	125,236	102,584	2,042	359,064	43,584	
2018	0	50,733	1,861	23,293	8,786	84,672	782,350	7,822	1,776,937	30,274	
2019	0	75,483	3,149	35,790	12,761	127,182	1,652,715	20,534	27,080	33,115	
2020	0	290,328	17,368	254,040	105,185	666,921	2,651,830	92,130	263,247	99,165	
2021	0	1,004,810	20,778	1,406,766	732,133	3,164,487	3,852,378	67,994	194,262	591,627	
2022	0	560,576	67,367	1,503,011	203,454	2,334,409	3,652,580	69,416	244,571	773,395	
2023	0	1,295,273	51,483	57,073	110,488	1,514,318	2,895,165	219,428	114,463	3,027,708	
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	48,206,207	33,223,688	8,283,806	30,066,781	119,780,483	95,560,566	7,916,144	21,198,352	35,389,755	

TABLE B-10 Capital Costs of Each Aqueduct Reach to be Reimbursed through Capital Cost Component of Transportation Charge (in dollars)

Sheet 2 of 8

Calendar Year	SOUTH BAY AQUEDUCT (continued)					CALIFORNIA AQUEDUCT			
						NORTH SAN JOAQUIN DIVISION			
	Reach 6	Reach 7	Reach 8	Reach 9	Total	Reach 1	Reach 2A	Reach 2B	Subtotal
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	641	794	553	101,577	610,839	7,157,077	695,554	146,255	7,998,885
2018	1,341	1,662	1,158	436,681	3,038,225	3,299,736	929,591	9,624,786	13,854,112
2019	9,570	10,114	9,261	548,745	2,311,133	5,560,302	544,608	235,545	6,340,454
2020	56,869	58,682	55,972	1,245,160	4,523,055	15,972,258	3,271,679	2,844,201	22,088,138
2021	41,153	42,670	40,642	860,125	5,690,852	16,158,223	4,419,344	206,372	20,783,939
2022	24,555	42,269	39,010	91,322	4,937,119	13,071,491	3,601,709	209,862	16,883,062
2023	18,168	20,312	18,076	49,109	6,362,429	6,878,225	1,836,108	134,310	8,848,643
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	1,454,974	5,547,218	7,751,392	23,535,076	198,353,475	207,222,723	64,292,796	38,694,556	310,210,074

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	24,443	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	(75,001)	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	269,663	810,390	114,448	196,559	2,201,176	42,393	383,194	323,185	342,033
2014	834,389	337,677	549,648	69,916	223,315	2,014,945	12,784	189,301	145,263	168,542
2015	(680,141)	145,444	341,458	4,839	166,339	(22,061)	12,897	174,314	133,514	164,681
2016	197,380	1,508,169	2,481,303	156,598	396,385	4,739,835	14,934	212,961	118,469	174,835
2017	20,329	1,321,654	2,089,249	136,021	2,382,952	5,950,205	1,743	134,718	104,831	166,509
2018	(25,548)	3,277,563	1,038,675	98,627	1,127,656	5,516,973	494	163,322	175,719	210,467
2019	305,829	3,517,914	3,241,597	199,918	2,651,912	9,917,170	821	284,406	270,928	407,083
2020	376,528	7,230,108	5,541,588	370,400	2,250,611	15,769,235	262,389	2,079,454	607,293	3,144,337
2021	192,855	7,196,899	5,949,479	368,489	2,020,912	15,728,633	267,423	3,412,987	746,570	2,032,146
2022	201,251	5,539,196	6,498,756	824,760	16,738,067	29,802,029	384,478	4,115,284	1,461,414	3,567,441
2023	176,950	6,569,365	51,306,423	2,322,314	27,271,390	87,646,443	223,027	4,995,463	2,676,786	4,223,327
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	23,297,454	71,058,043	104,136,108	10,671,677	112,051,420	321,214,701	2,167,257	29,413,875	17,967,707	25,143,063

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

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	2,659,274	26,791	2,686,064	259,599	56,571	0	57,238	52,359	69,053	18,770	
2018	5,461,172	18,630	5,479,802	539,133	23,056	0	29,293	14,238	17,393	7,504	
2019	3,179,459	2,407,175	5,586,634	240,780	26,578	0	32,987	11,660	12,856	8,552	
2020	8,204,531	20,465	8,224,997	1,829,485	160,953	0	206,916	117,894	147,799	52,610	
2021	8,858,695	110,837	8,969,531	1,181,576	222,284	0	290,221	195,775	255,774	73,018	
2022	19,941,598	209,711	20,151,309	1,326,558	118,492	0	133,831	82,752	93,872	32,526	
2023	14,961,317	171,478	15,132,795	1,458,315	131,460	0	151,178	108,287	111,702	44,851	
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</td							

TABLE B-10 Capital Costs of Each Aqueduct Reach to be Reimbursed through Capital Cost Component of Transportation Charge (in dollars)

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* 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)								COASTAL BRANCH		
	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	829,729	1,259,985	0	
2016	177,114	128,685	287,933	30,648	32,746	2,427,910	3,085,035	1,193,427	918,450	0	
2017	246,387	85,850	1,721,122	245,217	23,458	1,769,317	4,091,353	1,474,823	717,086	0	
2018	153,515	1,868,391	1,530,815	654,698	14,928	1,555,633	5,777,979	2,139,134	142,347	0	
2019	1,342,938	3,531,971	1,179,581	1,766,357	26,659	2,341,299	10,188,804	1,286,834	663,698	454	
2020	799,434	136,055	4,163,412	8,092,764	43,372	3,793,238	17,028,276	4,256,285	2,182,345	38,706	
2021	744,668	146,925	2,980,574	4,884,745	318,103	9,077,580	18,152,594	3,087,841	5,258,835	0	
2022	218,406	54,123	834,211	7,020,117	325,414	11,563,668	20,015,939	5,853,344	4,267,366	0	
2023	1,350,287	201,074	667,960	11,873,901	115,868	5,231,459	19,440,549	6,230,621	6,789,990	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	49,668,422	38,842,930	142,166,592	101,604,717	78,805,655	180,403,037	591,491,355	51,092,483	159,439,641	171,454,994	

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)					Total	GRAND TOTAL		
	COASTAL BRANCH (continued)								
	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	41,613,214	49,495,208		
2014	114	1,113	0	0	2,644,952	34,933,102	35,290,474		
2015	1,286	0	0	0	2,091,000	52,071,983	55,432,907		
2016	2,899	0	0	0	2,114,775	79,298,447	80,427,627		
2017	2,412	0	0	0	2,194,321	47,474,814	48,210,889		
2018	242	0	0	0	2,281,723	52,522,618	55,645,516		
2019	272	0	0	0	1,951,258	52,481,879	54,920,194		
2020	0	0	0	0	6,477,336	119,220,906	124,410,882		
2021	0	0	0	0	8,346,676	142,335,389	151,190,727		
2022	262	0	0	0	10,120,972	192,632,914	199,904,442		
2023	3,702	0	0	0	13,024,314	236,190,810	244,067,556		
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	81,153,305	50,100,223	16,067,297	16,612,628	545,920,571	3,651,070,345	3,969,545,442		

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	
1961	0	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]
1962	0	0	0	0	0	0	37,396	5,522	0	0	0
1963	0	0	0	0	0	0	147,719	20,639	0	0	0
1964	0	0	0	0	0	0	149,750	15,574	19,405	0	0
1965	0	0	0	0	0	0	259,939	45,718	46,485	0	0
1966	0	0	0	0	0	0	270,890	23,799	63,921	0	0
1967	0	0	0	0	0	0	438,050	32,798	108,127	0	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	670,038	327,826	296,607	287,461	1,581,931	3,702,233	472,887	429,337	445,245	
2000	505	921,145	255,241	658,337	414,732	2,249,455	3,819,656	542,912	442,523	552,798	
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	1,588,193	416,716	411,335	399,228	2,815,473	3,864,254	342,960	468,135	542,366	
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	1,601,844	635,523	738,142	818,262	3,793,771	3,340,788	510,418	746,881	698,740	
2005	452	1,059,792	322,702	767,313	412,453	2,562,259	3,309,596	262,582	427,600	807,588	
2006	3,900	785,570	233,554	602,287	431,930	2,053,342	3,478,759	377,976	754,014	590,771	
2007	(8)	1,081,246	232,507	467,676	275,805	2,057,234	5,023,799	691,586	588,726	790,531	
2008	3,578	823,765	217,850	526,554	602,872	2,171,042	5,218,899	679,964	744,461	927,351	
2009	88	1,229,747	276,666	619,451	554,226	2,680,090	4,041,198	678,768	715,061	1,362,533	
2010	25	2,671,470	111,842	1,104,059	275,902	4,163,272	4,490,592	578,352	804,400	717,652	
2011	63	2,639,192	584,088	1,238,782	415,722	4,877,785	5,165,636	838,752	874,821	501,976	
2012	(24)	2,614,239	143,190	1,452,281	1,125,652	5,335,363	5,308,626	1,113,956	749,806	832,612	
2013	277	3,328,405	133,834	476,851	371,959	4,311,050	6,182,430	1,217,976	685,040	1,105,530	
2014	111	4,065,718	176,356	610,595	548,856	5,401,525	7,348,027	627,118	640,537	1,307,634	
2015	114	2,881,654	251,148	1,224,921	1,084,166	5,441,889	8,559,354	664,586	633,014	855,605	
2016	5,401	4,877,284	324,910	599,337	1,026,935	6,828,465	6,914,928	686,224	665,312	1,222,060	
2017	111	2,581,218	400,949	694,828	833,187	4,510,182	7,287,602	1,196,795	1,692,142	1,271,812	
2018	47,578	3,478,280	244,062	947,407	1,459,270	6,129,020	11,371,977	1,207,217	714,806	1,804,259	
2019	12,981	3,300,708	711,312	521,848	1,197,154	5,731,023	8,768,969	1,677,296	1,019,581	2,061,323	
2020	17,602	3,935,161	720,413	2,016,738	1,373,410	8,045,722	10,027,258	1,549,865	1,245,098	2,036,245	
2021	17,204	4,017,354	720,313	912,699	1,367,675	7,018,041	10,841,928	1,530,884	1,228,931	2,177,785	
2022	17,200	4,046,285	630,115	717,930	1,752,560	7,146,890	9,406,807	1,777,046	1,227,273	2,206,356	
2023	17,508	4,039,596	697,183	1,227,947	1,512,860	7,477,586	10,192,918	1,635,458	1,246,105	2,161,529	
2024	17,683	4,079,992	704,155	1,240,226	1,527,988	7,552,361	10,294,847	1,651,812	1,258,566	2,183,145	
2025	17,860	4,120,792	711,196	1,252,629	1,543,268	7,627,885	10,397,796	1,668,330	1,271,151	2,204,976	
2026	18,039	4,162,000	718,308	1,265,155	1,558,701	7,704,164	10,501,774	1,685,014	1,283,863	2,227,026	
2027	18,219	4,203,620	725,491	1,277,806	1,574,288	7,781,205	10,606,791	1,701,864	1,296,702	2,249,296	
2028	18,401	4,245,656	732,746	1,290,585	1,590,031	7,859,018	10,712,859	1,718,882	1,309,669	2,271,789	
2029	18,585	4,288,113	740,074	1,303,490	1,605,931	7,937,608	10,819,988	1,736,071	1,322,765	2,294,507	
2030	18,771	4,330,994	747,474	1,316,525	1,621,990	8,016,983	10,928,188	1,753,432	1,335,993	2,317,452	
2031	18,959	4,374,304	754,949	1,329,691	1,638,210	8,097,154	11,037,470	1,770,966	1,349,353	2,340,626	
2032	19,149	4,418,047	762,499	1,342,987	1,654,592	8,178,125	11,147,844	1,788,676	1,362,846	2,364,033	
2033	19,340	4,462,227	770,124	1,356,417	1,671,138	8,259,906	11,259,323	1,806,563	1,376,475	2,387,673	
2034	19,534	4,506,849	777,825	1,369,981	1,687,850	8,342,505	11,371,916	1,824,628	1,390,240	2,411,550	
2035	19,729	4,551,918	785,603	1,383,681	1,704,728	8,425,930	11,485,635	1,842,875	1,404,142	2,435,665	
TOTAL	441,347	117,956,563	20,875,362	37,648,123	44,113,190	220,593,238	335,405,716	47,835,759	44,191,134	62,044,730	

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
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	49,763	34,831	427,065	2,030,681	7,592,040	11,451,290	1,418,731	1,316,625	14,186,646
2000	135,901	87,817	185,990	641,451	6,409,049	12,640,879	905,469	648,297	14,194,644
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	143,863	171,451	501,546	2,781,294	8,815,868	14,425,861	865,656	623,390	15,914,907
2003	77,999	97,782	247,719	987,204	5,662,570	16,518,135	1,742,176	753,175	19,013,487
2004	156,596	179,074	205,223	453,847	6,291,567	13,891,972	1,211,276	679,370	15,782,618
2005	143,052	202,176	135,131	223,699	5,511,424	12,444,218	1,941,698	873,183	15,259,099
2006	144,002	120,668	74,912	378,425	5,919,527	13,744,638	1,921,872	1,254,193	16,920,703
2007	78,627	115,099	67,469	242,249	7,598,085	11,991,014	1,702,766	627,256	14,321,036
2008	171,811	156,742	233,976	235,762	8,368,966	15,570,010	1,454,647	809,165	17,833,821
2009	84,717	141,922	114,597	619,772	7,758,568	13,696,235	1,067,699	864,355	15,628,289
2010	52,326	572,894	23,825	453,466	7,693,507	12,838,958	2,054,832	1,410,711	16,304,501
2011	82,635	77,126	58,547	472,662	8,072,156	16,658,230	2,808,698	1,443,459	20,910,388
2012	56,146	133,309	61,977	2,498,758	10,755,190	15,617,841	1,324,192	1,309,167	18,251,201
2013	82,457	175,232	98,865	1,184,314	10,731,845	16,731,894	1,743,009	2,419,093	20,893,997
2014	185,738	169,939	58,246	2,042,934	12,380,174	23,467,126	2,749,220	1,990,388	28,206,734
2015	122,064	194,385	144,459	3,166,945	14,340,412	24,874,581	1,643,573	1,917,166	28,435,320
2016	137,092	306,373	76,490	8,933,218	18,941,699	24,399,495	2,630,011	2,200,290	29,229,796
2017	92,160	143,309	137,361	4,913,632	16,734,811	24,513,143	846,985	879,260	26,239,388
2018	78,529	174,516	70,218	3,212,804	18,634,325	27,148,365	1,126,496	2,099,247	30,374,108
2019	98,103	282,679	51,997	1,385,739	15,345,688	29,202,251	2,128,201	2,187,604	33,518,056
2020	101,567	251,228	79,665	1,510,783	16,801,709	33,780,491	2,200,144	2,223,266	38,203,901
2021	99,987	248,075	78,126	1,469,359	17,675,075	30,283,516	2,116,902	2,163,157	34,563,575
2022	99,850	247,735	78,022	1,467,380	16,510,469	29,819,991	2,107,819	2,150,555	34,078,365
2023	101,473	251,503	79,390	1,497,332	17,165,708	31,607,613	2,163,037	2,200,783	35,971,433
2024	102,487	254,018	80,184	1,512,305	17,337,364	31,923,689	2,184,668	2,222,791	36,331,148
2025	103,512	256,558	80,986	1,527,428	17,510,737	32,242,926	2,206,514	2,245,019	36,694,459
2026	104,547	259,124	81,796	1,542,703	17,685,847	32,565,355	2,228,579	2,267,469	37,061,403
2027	105,593	261,715	82,614	1,558,130	17,862,705	32,891,008	2,250,865	2,290,144	37,432,017
2028	106,649	264,332	83,440	1,573,711	18,041,331	33,219,919	2,273,374	2,313,045	37,806,338
2029	107,715	266,976	84,274	1,589,448	18,221,744	33,552,118	2,296,108	2,336,175	38,184,401
2030	108,792	269,645	85,117	1,605,343	18,403,962	33,887,639	2,319,069	2,359,537	38,566,245
2031	109,880	272,342	85,968	1,621,396	18,588,001	34,226,515	2,342,259	2,383,133	38,951,907
2032	110,979	275,065	86,828	1,637,610	18,773,881	34,568,780	2,365,682	2,406,964	39,341,426
2033	112,089	277,816	87,696	1,653,986	18,961,621	34,914,468	2,389,339	2,431,034	39,734,841
2034	113,210	280,594	88,573	1,670,526	19,151,237	35,263,613	2,413,232	2,455,344	40,132,189
2035	114,342	283,400	89,459	1,687,231	19,342,749	35,616,249	2,437,364	2,479,897	40,533,510
TOTAL	4,356,496	9,402,151	6,280,777	69,521,402	579,038,165	1,043,215,742	95,338,521	82,327,353	1,220,881,617

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
1961	[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	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	582,573	5,670,118	1,193,492	522,612	657,321	8,626,115	105,185	418,138	430,694	1,148,526
2000	712,148	5,852,710	1,034,123	528,595	876,101	9,003,678	104,382	467,202	513,691	924,071
2001	(566,076)	7,151,927	850,787	372,374	677,824	8,486,836	58,346	553,100	602,903	870,228
2002	1,079,092	5,188,597	669,981	253,784	736,677	7,928,130	55,211	731,568	418,636	1,311,307
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	620,332	6,869,945	680,657	338,440	579,217	9,088,591	35,465	474,482	334,864	605,336
2005	552,813	5,984,685	984,807	401,962	799,334	8,723,601	28,347	403,773	296,545	898,064
2006	(93,381)	6,141,455	1,589,806	635,747	903,560	9,177,187	46,878	532,446	791,814	482,844
2007	1,137,909	7,698,186	1,963,767	688,186	935,895	12,423,943	242,814	856,930	536,534	633,903
2008	897,861	10,658,129	2,158,551	666,757	974,485	15,355,783	72,338	458,599	663,448	950,647
2009	971,092	8,137,795	1,233,553	511,335	1,151,133	12,004,909	36,810	769,895	478,039	933,554
2010	1,009,086	9,613,526	1,575,458	558,986	1,296,450	14,053,506	66,908	742,932	549,794	726,024
2011	1,234,146	7,636,959	2,867,710	602,233	1,663,997	14,005,045	12,939	600,194	794,875	1,163,621
2012	1,675,143	10,874,710	2,402,606	638,282	1,233,493	16,824,235	36,210	662,289	807,969	814,834
2013	1,833,547	11,574,947	2,886,828	1,357,031	3,282,428	20,934,781	39,519	614,460	611,787	1,014,936
2014	1,354,511	11,567,674	2,452,414	784,857	1,301,168	17,460,623	4,016	1,132,448	251,658	1,959,501
2015	1,169,732	11,873,889	2,415,727	861,361	2,078,181	18,398,889	7,012	569,449	267,773	1,455,966
2016	1,605,582	12,315,511	2,085,164	692,825	2,072,806	18,771,888	90,127	214,166	264,844	1,111,952
2017	987,877	9,495,239	1,942,538	735,553	2,532,487	15,693,695	34,506	479,237	359,837	1,149,913
2018	875,558	10,674,715	2,466,448	803,755	2,385,362	17,205,838	196,425	452,669	329,289	486,154
2019	1,716,254	12,447,655	2,535,755	854,907	2,370,673	19,925,245	95,818	805,040	666,057	1,359,210
2020	1,913,886	10,941,338	2,401,861	810,826	2,398,614	18,466,525	135,232	824,289	690,759	1,459,518
2021	1,857,859	11,875,746	3,038,818	778,704	2,469,847	20,020,974	132,452	796,186	666,081	1,418,115
2022	1,905,648	12,048,177	3,514,971	811,222	2,648,929	20,928,947	131,654	792,781	663,372	1,410,864
2023	1,911,390	11,737,972	3,015,069	808,254	2,530,855	20,003,540	134,444	812,463	680,138	1,443,794
2024	1,930,504	11,855,351	3,045,220	816,336	2,556,164	20,203,575	135,789	820,588	686,939	1,458,232
2025	1,949,809	11,973,905	3,075,672	824,499	2,581,725	20,405,610	137,146	828,794	693,809	1,472,814
2026	1,969,307	12,093,644	3,106,429	832,744	2,607,542	20,609,666	138,518	837,082	700,747	1,487,542
2027	1,989,000	12,214,580	3,137,493	841,072	2,633,618	20,815,763	139,903	845,452	707,754	1,502,418
2028	2,008,890	12,336,726	3,168,868	849,483	2,659,954	21,023,921	141,302	853,907	714,832	1,517,442
2029	2,028,979	12,460,093	3,200,557	857,977	2,686,554	21,234,160	142,715	862,446	721,980	1,532,616
2030	2,049,268	12,584,694	3,232,562	866,557	2,713,419	21,446,500	144,142	871,071	729,200	1,547,943
2031	2,069,761	12,710,541	3,264,888	875,223	2,740,553	21,660,966	145,584	879,781	736,492	1,563,422
2032	2,090,459	12,837,647	3,297,537	883,975	2,767,959	21,877,577	147,040	888,579	743,857	1,579,056
2033	2,111,363	12,966,023	3,330,512	892,815	2,795,638	22,096,351	148,510	897,465	751,296	1,594,847
2034	2,132,477	13,095,683	3,363,817	901,743	2,823,595	22,317,315	149,995	906,439	758,808	1,610,795
2035	2,153,802	13,226,640	3,397,455	910,760	2,851,831	22,540,488	151,495	915,504	766,397	1,626,903
TOTAL	61,060,479	453,587,040	100,860,482	33,831,992	92,383,365	741,723,358	6,123,990	36,692,285	31,157,954	58,679,295

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
1961	[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	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	387,552	191,831	413,338	526,195	5,017,085	330,032	215,690	4,819,968	8,732,023	22,736,257
2000	407,003	329,623	651,632	567,643	5,959,445	343,747	141,270	5,385,187	12,485,886	28,280,782
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	382,203	297,572	960,688	864,102	5,962,071	34,549	252,703	5,606,914	11,476,678	28,354,200
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	245,541	176,537	625,209	586,536	7,241,729	(139,395)	(165,604)	8,916,615	14,638,053	33,575,369
2005	211,307	118,697	849,743	466,701	6,233,884	(183,948)	(193,071)	5,885,076	13,848,942	28,864,061
2006	190,864	53,965	764,253	502,669	5,096,107	(183,333)	(183,906)	8,402,592	13,753,674	30,250,866
2007	258,937	292,958	552,479	552,027	6,687,197	(435,760)	(343,898)	10,919,211	8,494,257	29,247,588
2008	429,777	238,540	426,091	726,807	11,120,094	(264,905)	(205,829)	13,041,767	10,926,648	38,584,024
2009	413,944	212,072	623,256	551,957	7,838,367	591,237	(46,848)	8,761,971	13,345,516	34,509,772
2010	446,496	116,204	423,672	703,628	7,870,528	(150,521)	(50,268)	6,648,718	9,689,381	27,783,496
2011	622,763	312,681	874,050	1,583,607	8,800,970	(231,289)	(41,944)	6,234,277	15,904,917	36,631,662
2012	794,411	280,544	1,049,503	3,227,869	11,223,807	395,956	451,768	8,837,085	12,819,896	41,402,142
2013	484,291	454,593	901,716	827,943	11,798,694	278,754	166,475	9,552,814	14,513,536	41,259,519
2014	113,763	75,439	559,825	333,788	15,049,168	208,238	329,364	10,342,848	15,933,534	46,293,589
2015	691,469	302,419	644,710	864,498	11,100,807	106,136	207,859	11,950,065	16,425,713	44,593,876
2016	645,420	67,482	1,309,418	840,657	10,090,811	(55,636)	(347,323)	12,393,198	19,010,140	45,635,255
2017	607,549	62,698	941,394	600,453	7,955,569	(124,322)	634,802	10,861,575	16,080,495	39,643,705
2018	395,580	329,826	1,591,245	1,091,555	13,686,553	30,772	249,458	10,015,705	17,226,948	46,082,178
2019	646,306	520,022	1,156,280	1,101,786	15,074,247	49,096	73,090	12,623,704	20,890,365	55,061,020
2020	678,628	488,315	1,452,065	1,299,070	16,786,330	389,356	569,465	12,949,506	18,990,729	56,713,262
2021	656,969	466,857	1,421,491	1,252,579	16,423,051	371,075	554,112	12,742,093	21,268,099	58,169,160
2022	653,837	465,396	1,413,310	1,246,591	16,838,173	369,723	551,195	13,579,197	17,674,426	55,790,519
2023	669,776	478,258	1,443,245	1,278,741	16,849,343	380,485	563,840	13,221,168	19,504,196	57,459,891
2024	676,474	483,041	1,457,677	1,291,528	17,017,837	384,290	569,478	13,353,379	19,699,238	58,034,490
2025	683,239	487,871	1,472,254	1,304,443	17,188,015	388,133	575,173	13,486,913	19,896,230	58,614,834
2026	690,071	492,750	1,486,976	1,317,488	17,359,895	392,014	580,924	13,621,782	20,095,192	59,200,981
2027	696,972	497,677	1,501,846	1,330,663	17,533,494	395,934	586,734	13,758,000	20,296,144	59,792,991
2028	703,942	502,654	1,516,865	1,343,969	17,708,829	399,894	592,601	13,895,580	20,499,106	60,390,923
2029	710,981	507,681	1,532,033	1,357,409	17,885,917	403,893	598,527	14,034,536	20,704,097	60,994,831
2030	718,091	512,758	1,547,354	1,370,983	18,064,776	407,932	604,512	14,174,881	20,911,138	61,604,781
2031	725,272	517,885	1,562,827	1,384,693	18,245,424	412,011	610,557	14,316,630	21,120,249	62,220,827
2032	732,525	523,064	1,578,455	1,398,540	18,427,878	416,131	616,663	14,459,796	21,331,452	62,843,036
2033	739,850	528,295	1,594,240	1,412,525	18,612,157	420,292	622,830	14,604,394	21,544,766	63,471,467
2034	747,248	533,578	1,610,182	1,426,651	18,798,279	424,495	629,058	14,750,438	21,760,214	64,106,180
2035	754,721	538,913	1,626,284	1,440,917	18,986,262	428,740	635,349	14,897,943	21,977,816	64,747,244
TOTAL	26,524,625	18,216,383	49,331,854	48,116,829	548,056,009	14,768,703	16,582,423	483,311,893	740,416,263	2,077,978,507

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	[48]
1961	[40]	[41]	[42]	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	3,471	0	3,471	0	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	19,705,431	157,808	19,863,240	3,125,026	719,941	5,383,593	1,657,395	1,386,060	188,209	
2000	23,273,837	244,966	23,518,803	1,876,319	739,748	1,381,859	1,436,449	973,896	165,586	
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	20,783,080	473,014	21,256,094	1,405,595	803,650	760,787	586,475	1,158,565	282,426	
2003	20,832,780	283,154	21,115,934	3,732,959	677,475	710,041	624,601	469,225	279,922	
2004	26,595,905	245,959	26,841,863	1,822,916	1,375,981	1,322,889	1,045,309	1,054,908	413,454	
2005	16,373,205	1,498,563	17,871,768	2,840,786	1,503,138	1,541,599	880,561	677,638	353,610	
2006	14,723,341	273,033	14,996,374	4,460,222	1,313,604	1,201,851	2,921,902	963,501	758,401	
2007	15,893,697	346,307	16,240,003	5,904,583	1,632,546	1,798,630	1,824,330	831,082	655,656	
2008	23,017,672	320,131	23,337,804	2,270,632	1,373,279	1,261,902	829,424	500,211	709,675	
2009	22,756,256	156,856	22,913,112	2,555,951	1,547,073	1,347,673	1,173,039	781,265	540,951	
2010	14,662,660	262,469	14,925,129	3,375,017	1,603,154	2,605,498	1,725,362	785,074	694,882	
2011	18,662,153	139,112	18,801,264	2,545,981	1,772,468	2,315,210	2,216,453	624,379	579,320	
2012	21,030,692	219,025	21,249,717	5,061,299	1,461,392	1,601,178	2,701,121	1,804,950	652,041	
2013	33,824,099	263,213	34,087,312	5,816,369	1,658,471	1,288,578	3,043,025	1,397,487	528,772	
2014	38,067,676	221,953	38,289,629	3,928,791	2,613,424	1,356,469	2,957,130	621,225	753,651	
2015	27,072,628	146,583	27,219,211	4,660,997	2,079,933	2,851,824	869,453	2,593,134	1,111,181	
2016	27,131,213	127,509	27,258,722	4,300,070	2,291,722	1,409,746	1,232,836	878,386	274,270	
2017	26,806,937	157,748	26,964,686	4,208,321	2,637,066	1,576,162	1,264,154	714,679	386,208	
2018	23,790,978	280,857	24,071,834	5,190,566	2,672,593	2,417,405	1,532,928	929,417	538,618	
2019	27,081,944	755,653	27,837,597	5,370,855	1,163,369	1,847,305	538,903	577,035	123,172	
2020	30,176,789	558,379	30,735,168	6,216,989	2,645,262	2,550,524	1,496,441	1,057,231	544,530	
2021	28,768,267	541,751	29,310,018	6,401,075	2,576,172	2,498,700	1,454,096	1,029,288	525,111	
2022	31,909,917	537,634	32,447,551	6,473,234	2,573,127	2,496,630	1,452,169	1,028,153	524,258	
2023	30,587,841	551,380	31,139,221	6,427,404	2,624,169	2,540,438	1,482,245	1,048,606	536,613	
2024	30,893,719	556,894	31,450,613	6,491,678	2,650,411	2,565,842	1,497,067	1,059,092	541,979	
2025	31,202,657	562,463	31,765,120	6,556,594	2,676,915	2,591,501	1,512,038	1,069,683	547,399	
2026	31,514,683	568,088	32,082,771	6,622,160	2,703,684	2,617,416	1,527,158	1,080,380	552,873	
2027	31,829,830	573,768	32,403,598	6,688,382	2,730,721	2,643,590	1,542,430	1,091,184	558,402	
2028	32,148,128	579,506	32,727,634	6,755,266	2,758,028	2,670,026	1,557,854	1,102,096	563,986	
2029	32,469,609	585,301	33,054,910	6,822,819	2,785,608	2,696,726	1,573,433	1,113,117	569,626	
2030	32,794,306	591,154	33,385,460	6,891,047	2,813,464	2,723,693	1,589,167	1,124,248	575,322	
2031	33,122,249	597,066	33,719,315	6,959,957	2,841,599	2,750,930	1,605,059	1,135,490	581,075	
2032	33,453,471	603,036	34,056,507	7,029,557	2,870,015	2,778,439	1,621,109	1,146,845	586,886	
2033	33,788,006	609,067	34,397,073	7,099,852	2,898,715	2,806,224	1,637,320	1,158,314	592,755	
2034	34,125,886	615,157	34,741,043	7,170,851	2,927,702	2,834,286	1,653,693	1,169,897	598,682	
2035	34,467,145	621,309	35,088,454	7,242,559	2,956,979	2,862,629	1,670,230	1,181,596	604,669	
TOTAL	1,335,622,760	19,498,580	1,355,121,340	204,096,374	89,908,475	102,860,793	71,699,775	46,919,178	23,179,681	

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	
1961	[49]	[50]	[51]	[52]	[53]	[54]	[55]	[56]	[57]	[58]	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	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	9,396,721	2,027,488	1,190,851	25,075,285	189,880	5,975,580	493,503	1,964,144	1,057,166	9,680,274	
2000	9,545,979	1,712,016	1,520,535	19,352,386	353,641	4,204,605	844,572	1,004,579	1,130,000	7,537,396	
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	11,272,123	1,694,700	942,548	18,906,870	509,212	3,409,739	1,252,645	424,235	2,242,690	7,838,520	
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	10,504,452	2,128,380	1,088,345	20,756,633	427,791	5,437,257	1,238,443	439,997	3,579,824	11,123,311	
2005	7,604,037	2,414,926	2,243,430	20,059,725	452,675	5,606,198	1,518,256	683,607	(1,916,769)	6,343,967	
2006	10,111,792	1,924,426	573,584	24,229,283	301,178	5,203,442	638,263	320,547	5,212,633	11,676,063	
2007	10,023,030	2,957,603	650,573	26,278,031	227,833	8,078,282	823,731	705,613	3,282,198	13,117,656	
2008	14,696,282	2,416,322	1,010,001	25,067,729	307,554	6,671,804	809,314	780,677	4,571,098	13,140,448	
2009	12,250,584	3,494,124	1,519,962	25,210,623	509,167	7,248,564	629,994	681,317	2,770,722	11,839,763	
2010	12,897,810	3,226,278	2,497,248	29,410,322	605,860	6,524,007	472,877	422,032	3,548,804	11,573,580	
2011	13,500,979	4,104,748	3,060,699	30,720,238	432,297	5,573,238	884,689	565,634	4,855,209	12,311,067	
2012	13,587,910	2,845,790	4,692,072	34,407,752	244,671	6,414,986	1,708,415	546,612	3,967,600	12,882,285	
2013	14,567,546	3,501,375	3,602,526	35,404,151	439,182	7,913,864	857,872	733,760	2,328,890	12,273,568	
2014	17,923,884	4,318,586	2,885,517	37,358,678	316,530	9,065,979	1,171,054	330,766	9,690,728	20,575,057	
2015	19,339,105	4,542,001	2,744,237	40,791,864	178,396	11,934,915	823,952	497,201	2,377,182	15,811,646	
2016	21,237,358	5,164,807	4,343,970	41,133,165	499,735	10,937,050	598,717	644,907	2,732,884	15,413,293	
2017	17,493,200	5,243,683	4,850,178	38,373,651	561,211	9,351,515	1,439,013	648,730	(4,400,620)	7,599,849	
2018	13,435,393	6,261,856	5,653,012	38,631,788	305,315	12,214,411	1,084,428	925,481	8,691,611	23,221,245	
2019	18,498,376	6,623,538	2,828,497	37,571,051	564,607	11,742,540	2,480,130	1,675,103	1,933,270	18,395,649	
2020	19,344,906	7,402,401	6,131,922	47,390,206	1,238,039	14,858,100	1,837,171	843,960	14,219,503	32,996,773	
2021	20,304,799	7,397,904	4,501,305	46,688,450	825,417	13,963,903	1,868,076	841,917	7,340,809	24,840,122	
2022	19,588,964	7,482,883	4,673,415	46,292,833	970,569	14,009,349	1,873,314	834,834	5,633,363	23,321,429	
2023	19,943,685	7,502,006	5,153,236	47,258,402	1,021,455	14,419,888	1,878,115	848,639	9,155,204	27,323,301	
2024	20,143,122	7,577,026	5,204,769	47,730,986	1,031,670	14,564,087	1,896,896	857,126	9,246,756	27,596,535	
2025	20,344,553	7,652,797	5,256,816	48,208,296	1,041,987	14,709,728	1,915,865	865,697	9,339,223	27,872,500	
2026	20,547,999	7,729,325	5,309,384	48,690,379	1,052,407	14,856,825	1,935,024	874,354	9,432,615	28,151,225	
2027	20,753,479	7,806,618	5,362,478	49,177,284	1,062,931	15,005,393	1,954,374	883,098	9,526,942	28,432,738	
2028	20,961,014	7,884,684	5,416,103	49,669,057	1,073,560	15,155,447	1,973,918	891,929	9,622,211	28,717,065	
2029	21,170,624	7,963,531	5,470,264	50,165,748	1,084,296	15,307,002	1,993,657	900,848	9,718,433	29,004,236	
2030	21,382,330	8,043,166	5,524,967	50,667,404	1,095,138	15,460,072	2,013,594	909,856	9,815,617	29,294,277	
2031	21,596,153	8,123,598	5,580,216	51,174,077	1,106,090	15,614,673	2,033,730	918,955	9,913,774	29,587,222	
2032	21,812,115	8,204,834	5,636,018	51,685,818	1,117,151	15,770,819	2,054,067	928,144	10,012,911	29,883,092	
2033	22,030,236	8,286,882	5,692,379	52,202,677	1,128,322	15,928,528	2,074,608	937,426	10,113,040	30,181,924	
2034	22,250,538	8,369,751	5,749,302	52,724,702	1,139,605	16,087,813	2,095,354	946,800	10,214,171	30,483,743	
2035	22,473,044	8,453,448	5,806,795	53,251,9							

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 3C	Reach 3D	Reach 3E
1961	[59]	[60]	[61]	[62]	[63]	[64]	[65]	[66]	[67]	[68]	[69]
1962	0	0	0	0	0	0	0	0	0	1	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	0	360	0	0
2004	10,740	40,841	509,089	2,340	0	0	276,019	0	337	0	0
2005	9,849	15,079	526,273	4,153	0	0	496,547	0	9,036	0	0
2006	10,215	10,235	547,652	9,253	57,553	0	403,157	0	1,274	0	0
2007	27,124	9,821	657,894	5,083	125,317	0	616,360	0	58,543	0	0
2008	77,266	33,507	849,804	1,330	208,975	0	1,320,481	0	93,096	0	0
2009	79,970	15,365	1,001,173	919	230,886	0	1,015,588	0	24,880	0	0
2010	53,052	6,430	807,478	15,658	261,397	0	1,261,486	0	9,349	0	0
2011	21,407	5,387	700,551	4,440	117,224	0	1,102,193	0	10,973	0	0
2012	5,707	15,611	750,192	15,693	171,100	0	1,604,944	0	26,651	0	0
2013	1,121	6,020	626,727	171,472	293,188	0	1,629,759	0	4,281	0	0
2014	8,278	9,524	829,281	104,882	167,033	0	1,838,721	0	3,984	0	0
2015	(140)	7,379	824,321	11,288	89,609	0	1,509,687	0	105,508	0	0
2016	0	12,816	706,387	116,849	34,192	0	1,861,763	0	31,203	0	0
2017	1,233	7,139	1,077,118	160,825	29,140	1,448,093	1,901,271	0	56,307	0	0
2018	7,910	13,649	827,855	41,307	24,137	922,615	3,805,671	327,155	12,206	0	5,309
2019	1,975	11,984	840,257	112,735	73,572	2,404,889	3,767,449	1,313,862	39,169	0	29,973
2020	3,623	5,393	903,992	104,348	115,903	2,410,498	4,183,068	977,449	40,107	20,624	227
2021	3,616	5,366	902,533	104,024	105,765	2,304,119	4,257,897	1,295,267	39,675	20,711	201
2022	3,581	5,315	897,080	103,029	105,400	2,294,707	4,285,318	608,803	39,315	20,503	201
2023	3,642	5,412	910,214	104,838	110,113	2,359,805	4,284,515	970,111	40,096	20,819	212
2024	3,678	5,466	919,316	105,886	111,214	2,383,403	4,327,360	979,812	40,497	21,027	214
2025	3,715	5,520	928,509	106,945	112,327	2,407,237	4,370,634	989,610	40,902	21,238	216
2026	3,752	5,576	937,794	108,015	113,450	2,431,310	4,414,340	999,506	41,311	21,450	219
2027	3,790	5,631	947,172	109,095	114,584	2,455,623	4,458,483	1,009,501	41,724	21,664	221
2028	3,828	5,688	956,644	110,186	115,730	2,480,179	4,503,068	1,019,596	42,141	21,881	223
2029	3,866	5,745	966,211	111,288	116,887	2,504,981	4,548,099	1,029,792	42,563	22,100	225
2030	3,905	5,802	975,873	112,401	118,056	2,530,031	4,593,580	1,040,090	42,988	22,321	227
2031	3,944	5,860	985,631	113,525	119,237	2,555,331	4,639,516	1,050,491	43,418	22,544	230
2032	3,983	5,919	995,488	114,660	120,429	2,580,884	4,685,911	1,060,996	43,852	22,770	232
2033	4,023	5,978	1,005,443	115,806	121,634	2,606,693	4,732,770	1,071,606	44,291	22,997	234
2034	4,063	6,038	1,015,497	116,964	122,850	2,632,760	4,780,098	1,082,322	44,734	23,227	237
2035	4,104	6,098	1,025,652	118,134	124,078	2,659,088	4,827,899	1,093,145	45,181	23,460	239
TOTAL	377,840	395,944	27,730,253	2,539,699	3,730,980	44,372,245	96,930,689	17,919,114	1,159,950	349,337	38,840

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)										
	SANTA ANA DIVISION - EAST BRANCH EXTENSION (cont.)			WEST BRANCH							
	Reach 4A	Reach 4B	Subtotal	Reach 29A	Reach 29F	Reach 29G	Reach 29H	Reach 29J	Reach 30	Subtotal	
1961	0	0	1	0	0	0	0	0	0	0	
1962	0	0	0	0	0	0	0	0	0	0	
1963	0	0	0	0	0	0	0	0	0	0	
1964	0	0	0	0	0	0	0	0	0	0	
1965	0	0	0	0	0	0	0	0	0	0	
1966	0	0	0	0	0	0	0	0	0	0	
1967	0	0	0	0	0	0	0	0	0	0	
1968	0	0	0	0	0	0	0	0	0	0	
1969	0	0	0	0	0	0	0	0	0	0	
1970	0	0	0	0	0	0	0	0	0	0	
1971	0	0	0	0	0	0	0	0	0	0	
1972	0	0	0	719,255	159,249	199,145	234,196	88,198	420,789	1,820,832	
1973	0	0	0	779,949	339,363	122,664	264,850	119,743	621,431	2,248,000	
1974	0	0	0	883,312	158,366	112,458	350,160	(4,525)	723,949	2,223,720	
1975	0	0	0	1,049,990	176,676	194,724	801,457	75,870	841,991	3,140,708	
1976	0	0	0	1,220,429	215,588	202,591	624,614	98,268	(650,944)	1,710,546	
1977	0	0	0	1,268,813	116,939	218,129	684,679	184	634,581	2,923,325	
1978	0	0	0	1,174,708	342,479	267,308	415,641	17,764	3,088,954	5,306,854	
1979	0	0	0	1,366,942	285,575	284,188	972,584	29,850	958,068	3,897,207	
1980	0	0	0	1,698,215	224,472	455,619	874,259	288,303	222,549	3,763,417	
1981	0	0	0	1,783,405	123,264	615,047	2,305,110	8,794	1,093,897	5,929,517	
1982	0	0	0	1,919,979	190,500	702,265	2,208,264	414,230	978,624	6,413,862	
1983	0	0	0	2,739,814	149,333	888,475	745,939	579,882	3,698,681	8,802,124	
1984	0	0	0	3,463,038	81,260	2,358,495	537,207	719,282	755,136	7,914,418	
1985	0	0	0	3,866,946	295,836	3,047,591	975,729	614,735	1,753,355	10,554,192	
1986	0	0	0	3,791,427	457,604	2,893,171	1,480,015	1,032,216	1,338,657	10,993,090	
1987	0	0	0	3,423,494	213,106	2,933,342	944,604	459,398	1,406,519	9,380,463	
1988	0	0	0	3,447,403	255,113	3,017,463	883,714	446,468	1,452,589	9,502,750	
1989	0	0	0	4,025,641	405,583	2,738,143	1,398,165	865,738	1,505,029	10,938,299	
1990	0	0	0	4,088,481	383,655	3,232,445	3,153,869	777,713	847,500	12,483,663	
1991	0	0	0	3,862,056	304,143	3,550,063	639,527	763,037	1,191,090	10,309,916	
1992	0	0	0	4,286,050	327,802	3,892,480	1,014,551	872,953	2,259,032	12,652,868	
1993	0	0	0	3,969,075	343,304	4,515,385	1,670,952	852,208	1,157,876	12,508,800	
1994	0	0	0	3,649,861	293,376	3,359,381	1,879,417	872,624	1,674,576	11,729,235	
1995	0	0	0	4,137,046	883,315	4,750,275	1,588,080	754,904	(421,879)	11,691,741	
1996	0	0	0	4,511,858	966,044	3,593,671	4,208,195	877,111	1,574,098	15,730,977	
1997	0	0	0	4,543,506	1,030,809	2,429,066	3,755,901	1,597,361	1,521,491	14,878,134	
1998	0	0	0	4,871,761	464,376	3,473,405	2,398,630	1,996,114	1,291,185	14,495,471	
1999	0	0	0	4,786,534	4,240,173	4,924,246	1,742,110	1,000,376	1,879,721	18,573,160	
2000	0	0	0	5,461,198	782,277	4,278,784	2,354,420	171,269	1,530,358	14,578,307	
2001	0	0	0	5,905,961	1,526,938	5,136,328	4,375,496	240,595	(923,056)	16,262,262	
2002	0	0	0	5,340,367	1,492,047	4,081,169	4,482,544	(51,825)	3,478,036	18,822,338	
2003	93,305	33,614	1,217,171	4,454,323	1,314,151	3,721,548	3,350,502	(628,046)	951,874	13,164,353	
2004	13,434	71,444	924,242	8,915,307	1,377,196	3,483,839	5,122,025	(615,862)	1,507,626	19,790,130	
2005	27,330	216,418	1,304,685	5,759,119	2,598,983	7,383,506	(605,465)	2,649,206	(1,254,893)	16,530,456	
2006	14,842	72,655	1,126,834	6,925,627	2,300,545	5,115,005	3,570,341	(560,871)	(4,319,166)	13,031,481	
2007	39,200	138,358	1,677,699	5,707,758	2,723,832	10,420,367	7,837,161	356,041	12,070,099	39,115,257	
2008	76,668	231,149	2,892,276	8,316,439	835,732	16,217,392	7,458,664	(114,790)	430,211	33,143,648	
2009	140,919	231,789	2,741,489	7,875,311	891,732	8,682,658	5,662,290	246,215	2,846,216	26,204,422	
2010	162,803	356,240	2,933,893	10,050,360	789,729	8,844,421	6,210,114	429,116	5,289,586	31,613,326	
2011	75,147	545,213	2,582,534	6,949,489	935,484	9,611,840	8,034,092	43,741	(255,761)	25,318,885	
2012	18,388	198,585	2,806,871	7,478,933	2,891,752	9,428,975	6,173,583	107,660	6,515,019	32,595,923	
2013	6,155	187,557	2,926,281	8,800,709	3,752,692	12,290,528	7,182,111	401,260	3,653,587	36,080,887	
2014	2,439	322,684	3,286,825	10,789,735	3,099,681	7,291,587	7,268,601	396,860	5,415,774	34,262,238	
2015	19,708	388,026	2,955,386	9,349,000	3,749,493	7,579,683	8,889,741	296,775	288,614	30,153,305	
2016	5,660	496,640	3,265,510	11,711,989	3,739,450	8,295,133	8,773,220	1,268,443	(5,606,066)	28,182,169	
2017	59,786	305,822	5,046,734	10,015,846	2,117,575	8,728,872	9,144,055	(207,352)	16,190,637	45,989,633	
2018	7,901	238,937	6,234,652	9,232,307	5,532,693	8,894,110	5,947,522	(5,228)	6,813,080	36,414,484	
2019	12,004	450,859	9,058,727	11,453,749	7,055,057	8,685,622	7,568,570	738,496	6,197,381	41,698,875	
2020	22,098	471,689	9,259,019	12,749,399	4,113,960	9,397,051	10,890,827	810,884	11,613,782	49,575,903	
2021	21,946	458,227	9,519,347	13,321,766	3,993,221	9,418,935	11,816,577	860,446	(21,270,310)	18,140,635	
2022	21,741	455,317	8,840,310	13,239,749	4,447,525	9,589,276	11,213,735	2,018,400	36,033,056	76,541,741	
2023	22,147	466,361	9,298,285	13,234,674	4,226,751	9,563,105	11,420,116	1,242,209	8,880,098	48,566,953	
2024	22,369	471,025	9,391,267	13,367,021	4,269,019	9,658,736	11,534,318	1,254,631	8,968,899	49,052,624	
2025	22,592	475,735	9,485,180	13,500,691	4,311,709	9,755,324	11,649,661	1,267,178	9,058,588	49,543,151	
2026	22,818	480,493	9,580,034	13,635,698	4,354,826	9,852,877	11,766,157	1,279,849	9,149,174	50,038,581	
2027	23,047	485,298	9,675,833	13,772,055	4,398,374	9,951,406	11,883,819	1,292,648	9,240,665	50,538,967	
2028	23,277	490,151	9,772,592	13,909,776	4,442,358	10,050,920	12,002,657	1,305,574	9,333,072	51,044,357	
2029	23,510	495,052	9,870,319	14,048,874	4,486,781	10,151,429	12,122,684	1,318,630	9,426,403	51,554,801	
2030	23,745	500,003	9,969,022	14,189,362	4,531,649	10,252,943	12,243,911	1,331,816	9,520,667	52,070,348	
2031	23,982	505,003	10,068,712	14,331,256	4,576,966	10,355,473	12,366,350	1,345,134	9,615,873	52,591,052	
2032	24,222	510,053	10,169,399	14,474,568	4,622,735	10,459,027	12,490,013	1,358,586	9,712,032	53,116,961	
2033	24,464	515,153	10,271,092	14,619,314	4,668,963	10,563,618	12,614,913	1,372,172	9,809,152	53,648,132	
2034	24,709	520,305	10,373,804	14,765,507	4,715,652	10,669,254	12,741,062	1,385,893	9,907,244	54,184,612	
2035	24,956	525,508	10,477,542	14,913,162	4,762,809	10,775,946	12,868,473	1,399,752	10,006,316	54,726,458	
TOTAL	1,147,313	12,311,361	209,003,566	463,895,389	133,857,637	377,607,923	349,177,277	42,224,304	243,642,414	1,610,404,945	

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							
	Reach 31A*	Reach 33A	Reach 33B	Reach 34	Reach 35	Subtotal		
1961	[80]	[81]	[82]	[83]	[84]	[85]	[86]	
1961	0	0	0	0	0	0	1	
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	2,160,548	
1969	509,728	0	0	0	0	509,728	3,324,718	
1970	609,988	0	0	0	0	609,988	3,983,062	
1971	699,052	0	0	0	0	699,052	5,614,013	
1972	697,576	0	0	0	0	697,576	12,353,356	
1973	641,626	0	0	0	0	641,626	14,590,688	
1974	669,279	0	0	0	0	669,279	16,598,762	
1975	806,429	0	0	0	0	806,429	19,569,999	
1976	840,927	0	0	0	0	840,927	19,002,859	
1977	872,169	0	0	0	0	872,169	23,267,885	
1978	934,119	0	0	0	0	934,119	24,818,739	
1979	871,688	0	0	0	0	871,688	23,421,881	
1980	1,047,396	4,790	0	30	75	1,052,291	30,105,348	
1981	1,037,469	4,790	0	30	75	1,042,364	33,884,524	
1982	1,015,555	4,790	0	30	75	1,020,450	39,515,188	
1983	1,146,269	4,957	0	30	77	1,151,333	54,543,263	
1984	1,427,192	5,051	0	31	78	1,432,352	63,947,633	
1985	1,849,827	5,051	0	31	78	1,854,987	69,700,009	
1986	1,714,723	5,051	0	31	78	1,719,883	73,437,761	
1987	1,689,141	4,324	0	26	67	1,693,558	71,443,424	
1988	1,964,428	4,509	0	28	70	1,969,035	72,349,117	
1989	1,768,942	4,509	0	28	70	1,773,549	73,894,076	
1990	2,274,772	0	0	0	0	2,274,772	86,130,115	
1991	2,187,841	0	0	0	0	2,187,841	86,877,284	
1992	2,465,364	0	0	0	0	2,465,364	94,167,321	
1993	2,811,441	0	0	0	0	2,811,441	100,019,568	
1994	3,894,639	0	0	0	0	3,894,639	92,336,811	
1995	3,481,049	0	0	0	0	3,481,049	98,887,435	
1996	5,144,684	0	0	0	0	5,144,684	105,119,193	
1997	2,523,741	(33)	0	0	0	2,523,708	107,647,058	
1998	4,302,712	1,878,365	1,386	160,400	88,026	6,430,889	120,649,996	
1999	4,191,384	1,957,943	16,646	184,325	87,373	6,437,670	125,178,646	
2000	2,888,269	2,533,879	20,786	253,538	109,328	5,805,801	122,271,796	
2001	3,114,729	2,233,473	14,426	151,374	57,878	5,571,880	135,885,738	
2002	3,184,840	2,686,500	49,511	189,458	81,857	6,192,165	125,213,225	
2003	3,333,349	2,780,276	44,211	200,986	85,015	6,443,837	126,099,281	
2004	3,537,690	2,673,184	69,895	240,426	109,830	6,631,026	144,513,783	
2005	3,837,275	2,980,035	120,379	292,354	137,878	7,367,920	122,325,281	
2006	2,521,830	3,183,690	56,543	151,861	71,250	5,985,174	127,393,965	
2007	3,221,093	2,947,795	24,929	10,052	6,341	6,210,209	158,631,423	
2008	5,646,012	4,241,709	10,299	4,748	3,344	9,906,111	179,261,643	
2009	5,222,380	3,732,888	20,503	8,205	6,678	8,990,654	160,043,032	
2010	6,455,964	6,377,896	77,603	17,406	17,096	12,945,964	161,543,718	
2011	6,179,264	5,762,931	39,858	12,751	9,608	12,004,412	173,285,496	
2012	5,324,082	6,432,192	24,824	10,251	5,573	11,796,922	192,217,049	
2013	5,966,520	7,967,465	54,228	24,056	16,670	14,028,938	217,889,433	
2014	7,915,286	4,193,303	20,054	7,400	11,139	12,147,183	237,880,556	
2015	10,286,713	6,627,254	429	999	2,664	16,918,058	225,277,555	
2016	4,893,354	10,743,858	0	0	1,242	15,638,454	224,528,251	
2017	5,266,069	14,489,285	0	0	393	19,755,746	225,307,086	
2018	7,921,359	12,537,072	0	0	0	20,458,431	242,694,559	
2019	6,654,869	10,810,667	0	0	1,421	17,466,957	260,533,176	
2020	8,238,919	10,496,788	0	0	0	18,735,707	302,076,464	
2021	8,090,573	10,290,263	0	0	0	18,380,836	259,633,117	
2022	8,043,791	10,203,220	0	0	0	18,247,011	316,488,706	
2023	8,205,672	10,433,391	0	0	0	18,639,063	295,660,089	
2024	8,287,729	10,537,725	0	0	0	18,825,454	298,616,692	
2025	8,370,606	10,643,102	0	0	0	19,013,708	301,602,858	
2026	8,454,312	10,749,533	0	0	0	19,203,845	304,618,885	
2027	8,538,855	10,857,028	0	0	0	19,395,883	307,665,074	
2028	8,624,244	10,965,599	0	0	0	19,589,843	310,741,730	
2029	8,710,486	11,075,255	0	0	0	19,785,741	313,849,147	
2030	8,797,591	11,186,007	0	0	0	19,983,598	316,987,635	
2031	8,885,567	11,297,867	0	0	0	20,183,434	320,157,512	
2032	8,974,423	11,410,846	0	0	0	20,385,269	323,359,085	
2033	9,064,167	11,524,954	0	0	0	20,589,121	326,592,678	
2034	9,154,809	11,640,204	0	0	0	20,795,013	329,858,601	
2035	9,246,357	11,756,606	0	0	0	21,002,963	333,157,189	
TOTAL	297,150,197	294,887,836	666,508	1,920,883	911,346	595,536,770	10,292,401,789	
							11,092,474,539	

* 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 Charge¹ (in dollars)

Sheet 1 of 4

Calendar Year	NORTH BAY AQUEDUCT				SOUTH BAY AQUEDUCT	CALIFORNIA AQUEDUCT		
	Reach 1 Barker Slough Pumping Plant	Reach 3A Cordelia Pumping Plant (Solano)	Reach 3B Cordelia Pumping Plant (Napa) ²	Total		Reach 1 Banks Pumping Plant	Reach 4 Dos Amigos Pumping Plant	Reach 14A Buena Vista Pumping Plant
1962	[1] 0	[2] 0	[3] 0	[4] 0	[5] 36,970	[6] 0	[7] 0	[8] 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	285,779	148,222	149,332	583,333	2,840,740	28,362,247	12,483,038	11,530,722
2006	236,634	117,460	148,249	502,343	2,783,970	23,509,751	10,557,553	11,330,985
2007	452,997	228,703	257,537	939,237	4,247,626	25,256,328	10,920,619	16,173,550
2008	424,401	196,012	302,391	922,805	3,338,056	17,301,735	6,127,334	11,219,859
2009	218,928	103,297	163,097	485,322	2,488,310	9,222,565	4,052,662	6,864,595
2010	260,437	112,275	215,341	588,052	2,374,767	21,167,225	9,473,369	10,604,628
2011	270,039	115,853	228,034	613,926	3,404,860	35,543,413	15,146,928	14,404,786
2012	264,258	119,755	184,383	568,396	3,422,038	26,615,662	11,633,788	13,273,025
2013	432,594	206,271	320,687	959,551	5,409,835	22,329,707	8,520,898	12,207,847
2014	362,691	185,664	447,565	995,919	4,124,446	11,313,773	3,542,879	7,034,863
2015	392,317	241,043	361,719	995,079	5,802,117	17,029,328	5,392,269	9,982,468
2016	278,327	159,315	257,353	694,995	4,406,630	29,733,500	11,797,519	15,871,418
2017	297,764	185,614	186,468	669,846	3,611,263	45,161,314	21,619,171	22,622,629
2018	497,650	310,891	314,948	1,123,489	5,415,132	26,908,365	10,687,238	13,800,939
2019	461,851	265,981	316,379	1,044,211	2,810,374	40,819,610	17,084,657	18,077,901
2020	611,971	179,016	483,745	1,274,732	6,266,802	15,893,678	6,262,890	11,364,684
2021	645,752	0	616,794	1,262,546	6,145,180	42,579,040	17,751,994	22,742,615
2022	661,221	0	631,569	1,292,790	6,082,778	44,390,586	17,417,265	22,231,388
2023	608,675	0	398,867	1,007,542	5,804,532	43,279,658	18,578,187	23,600,976
2024	613,448	0	401,995	1,015,443	5,864,169	37,086,203	18,326,986	23,071,703
2025	619,346	0	405,860	1,025,206	5,920,563	42,161,817	18,689,732	23,630,963
2026	619,103	0	405,701	1,024,804	5,918,233	35,910,119	18,394,722	23,102,510
2027	619,852	0	406,191	1,026,043	5,925,391	29,929,078	18,747,600	23,727,760
2028	618,430	0	405,260	1,023,690	5,911,797	47,494,180	18,467,067	23,243,297
2029	619,243	0	405,792	1,025,035	5,919,577	39,904,482	18,659,183	23,577,208
2030	619,235	0	405,787	1,025,022	5,919,502	36,607,720	18,425,686	23,155,931
2031	619,186	0	405,755	1,024,941	5,928,634	45,858,853	19,386,687	24,921,252
2032	619,255	0	405,800	1,025,055	5,919,687	33,515,264	17,947,580	22,306,894
2033	619,693	0	406,087	1,025,780	5,923,874	38,495,858	19,378,010	24,895,550
2034	618,344	0	405,204	1,023,548	5,910,981	45,364,253	18,036,703	22,477,443
2035	620,094	0	406,349	1,026,443	5,927,701	40,033,168	20,752,320	27,551,490
TOTAL	16,451,768	3,829,145	11,835,848	32,116,761	182,403,398	1,195,107,088	525,365,914	647,950,490

¹ Excludes extra peaking costs assigned directly to contractors. Refer to Appendix B text discussion of Table B-17 under "Project Water Charges."² Costs for the period 1968 through 1987 are for an interim facility.³ 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 Charge¹ (in dollars)

Sheet 2 of 4

Calendar Year	CALIFORNIA AQUEDUCT (continued)						
	Reach 15A	Reach 16A	Reach 17E	Reach 18A	Reach 22B	Reach 23	Reach 24
	Wheeler Ridge Pumping Plant	Chrisman Pumping Plant	Edmonston Pumping Plant	Alamo Powerplant	Pearblossom Pumping Plant	Mojave Siphon Powerplant	Silverwood Lake ⁴
1962	[9]	[10]	[11]	[12]	[13]	[14]	[15]
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	11,794,232	26,730,922	94,583,646	(5,791,742)	17,589,303	(6,359,950)	0
2006	11,506,108	26,216,830	82,299,778	(4,022,339)	16,076,966	(6,347,742)	0
2007	16,703,221	37,761,237	125,962,003	(2,976,651)	19,544,519	(5,872,118)	0
2008	12,277,758	24,909,320	77,923,925	(3,305,736)	10,681,335	(3,203,162)	321,126
2009	7,295,396	15,760,560	71,020,136	(3,096,612)	9,127,440	(2,225,065)	2,054
2010	10,771,635	24,316,069	88,890,130	(4,913,035)	16,723,144	(5,543,596)	0
2011	14,442,662	32,396,776	113,544,712	(6,340,454)	23,118,118	(7,675,700)	495,237
2012	13,351,126	30,196,561	105,700,702	(2,424,628)	16,734,913	(8,836,129)	0
2013	12,411,732	28,098,822	98,795,130	(1,989,602)	11,979,764	(4,750,469)	0
2014	7,247,553	16,399,032	57,358,698	(1,305,981)	5,126,154	(1,023,443)	137,628
2015	10,972,498	24,673,518	89,213,932	(2,190,877)	8,981,891	(2,009,231)	861,715
2016	16,636,283	37,276,860	137,659,912	(7,658,808)	23,738,634	(8,562,408)	0
2017	23,435,889	51,461,199	191,019,390	(14,211,439)	39,475,873	(21,146,267)	630,338
2018	13,922,606	30,942,910	113,505,644	(5,257,816)	19,500,754	(6,327,632)	0
2019	18,747,512	41,578,569	153,616,891	(6,869,814)	32,066,390	(12,482,459)	1,841,152
2020	11,971,729	25,561,035	91,846,883	(4,348,455)	12,470,739	(4,866,476)	0
2021	23,032,573	52,040,208	190,091,960	(12,399,081)	32,051,329	(17,032,140)	0
2022	22,579,383	51,089,350	186,649,421	(12,384,672)	31,562,856	(16,986,622)	0
2023	24,366,156	55,535,174	202,955,742	(11,540,895)	29,603,192	(14,569,719)	0
2024	23,781,890	54,172,773	197,856,646	(11,041,841)	28,363,627	(13,818,114)	0
2025	24,376,542	55,542,118	202,915,710	(11,445,545)	29,848,860	(14,431,183)	0
2026	23,804,071	54,215,524	197,982,432	(11,140,287)	28,919,434	(13,966,770)	0
2027	24,480,589	55,782,599	203,807,618	(11,377,681)	29,668,271	(14,327,479)	0
2028	23,957,928	54,573,089	199,316,072	(11,249,888)	29,216,230	(14,132,907)	0
2029	24,318,412	55,407,487	202,415,335	(11,310,829)	29,437,859	(14,225,578)	0
2030	23,861,669	54,348,784	198,477,165	(11,194,886)	29,089,246	(14,049,449)	0
2031	25,781,493	58,803,709	215,068,075	(11,698,694)	30,608,090	(14,820,351)	0
2032	22,943,670	52,222,989	190,577,878	(10,779,922)	27,852,794	(13,425,241)	0
2033	25,752,270	58,734,901	214,807,971	(11,792,252)	30,918,280	(14,965,113)	0
2034	23,129,478	52,654,330	192,184,769	(10,957,516)	28,338,885	(13,691,213)	0
2035	28,667,262	65,521,464	240,172,105	(11,946,396)	31,409,854	(15,204,733)	0
TOTAL	666,830,337	1,499,433,933	5,425,253,738	(288,821,799)	837,974,139	(360,767,298)	8,050,559

¹Excludes extra peaking costs assigned directly to contractors. Refer to Appendix B text discussion of Table B-17 under "Project Water Charges."

⁴These 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 Charge¹ (in dollars)

Sheet 3 of 4

Calendar Year	CALIFORNIA AQUEDUCT (continued)							
	Reach 26A	Reach EBX2B	Reach EBX2E	Reach EBX3A	Reach EBX4B	Reach 28J	Reach 29A	Reach 29G
	Devil Canyon Powerplant	Greenspot Pump Station	Citrus Pump Station	Crafton Hills Pump Station	Cherry Valley Pump Station	Lake Perris ⁴	Oso Pumping Plant	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)	69,675	0	49,010	2,548	5,167,763	3,429,557	(6,683,632)
2006	(34,389,659)	123,850	0	144,846	16,318	0	2,562,118	(6,870,988)
2007	(28,529,045)	249,356	0	257,067	11,196	592,235	6,212,528	(9,522,236)
2008	(16,403,544)	243,120	0	327,206	7,446	0	4,426,897	(7,184,125)
2009	(13,474,182)	360,468	0	391,371	7,530	418,843	4,330,950	(6,578,744)
2010	(24,427,811)	313,518	0	431,030	19,506	0	3,283,585	(5,697,650)
2011	(31,980,782)	371,784	0	499,615	33,108	0	3,277,052	(5,505,320)
2012	(23,571,258)	436,935	0	533,579	48,171	220,430	5,006,252	(8,230,796)
2013	(14,097,814)	460,795	0	557,947	36,868	0	6,259,263	(8,740,718)
2014	(3,836,008)	317,659	0	440,998	16,594	0	4,422,948	(4,122,547)
2015	(6,410,003)	345,261	0	461,141	15,152	771,806	6,860,947	(6,280,593)
2016	(21,855,057)	705,640	0	781,683	49,119	0	6,134,233	(6,658,921)
2017	(37,596,036)	371,493	1,052,912	1,237,740	86,294	7,986,403	5,186,512	(5,788,402)
2018	(17,953,848)	7,853	1,211,629	956,707	43,801	0	4,786,054	(5,500,049)
2019	(31,031,132)	154,278	1,540,352	1,055,578	52,603	3,105,030	4,161,338	(4,970,310)
2020	(8,770,455)	2,832	288,517	365,388	57,173	0	5,273,970	(4,397,451)
2021	(26,714,064)	0	637,516	561,082	95,584	0	7,843,236	(8,272,015)
2022	(26,641,684)	0	577,117	507,977	86,201	0	8,083,301	(7,815,819)
2023	(22,587,986)	0	598,306	525,967	93,438	0	9,523,026	(8,971,813)
2024	(22,312,578)	0	602,997	530,090	94,171	0	9,436,428	(8,831,990)
2025	(22,195,555)	0	608,796	535,188	95,076	0	9,383,601	(8,697,611)
2026	(22,447,984)	0	608,556	534,978	95,039	0	9,193,972	(8,524,597)
2027	(22,310,392)	0	609,292	535,625	95,154	0	9,560,811	(8,855,213)
2028	(22,494,447)	0	607,894	534,396	94,936	0	9,228,455	(8,566,825)
2029	(22,245,739)	0	608,694	535,099	95,061	0	9,495,780	(8,803,434)
2030	(22,323,812)	0	608,687	535,092	95,059	0	9,181,140	(8,510,825)
2031	(22,392,268)	0	608,637	535,048	95,052	0	10,528,426	(9,765,545)
2032	(21,782,941)	0	608,706	535,109	95,062	0	8,778,244	(8,136,603)
2033	(23,058,962)	0	609,136	535,487	95,130	0	10,347,643	(9,589,302)
2034	(21,702,650)	0	607,810	534,322	94,923	0	8,768,701	(8,138,982)
2035	(23,318,084)	0	609,530	535,833	95,191	0	13,835,097	(12,829,827)
TOTAL	(1,031,473,416)	4,613,072	13,205,085	16,571,113	1,925,794	19,591,529	257,696,211	(371,085,985)

¹ Excludes extra peaking costs assigned directly to contractors. Refer to Appendix B text discussion of Table B-17 under "Project Water Charges."⁴ 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 Charge¹ (in dollars)

Sheet 4 of 4

Calendar Year	CALIFORNIA AQUEDUCT (continued)						Grand Total
	Reach 29H	Reach 29J	Reach 30	Reach 31A	Reach 33A	Total	
	Pyramid Lake ⁴	Castaic Powerplant	Castaic Lake ⁴	Las Perillas and Badger Hill Pumping Plants	Devil's Den, Bluestone, and Polonio Pass Pumping Plants		
	[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	(1,127)	12,582,105	13,499,083
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	4,767,261	(12,763,664)	4,563,293	847,724	1,717,623	163,407,102	166,831,175
2006	533,044	(11,822,176)	6,138,516	854,837	1,433,647	129,852,245	133,138,558
2007	0	(19,017,327)	0	1,309,771	2,319,253	197,355,503	202,542,366
2008	0	(14,961,833)	1,324,089	1,129,260	1,735,720	124,897,730	129,158,591
2009	408,245	(15,570,055)	0	695,407	1,211,312	90,224,877	93,198,509
2010	0	(10,738,810)	0	902,173	1,484,370	137,059,478	140,022,298
2011	0	(11,102,175)	1,987,450	1,110,306	2,125,280	195,892,795	199,911,580
2012	179,901	(15,133,885)	0	975,135	1,967,281	168,676,766	172,667,200
2013	76,352	(15,520,329)	456,770	1,352,516	2,039,956	160,485,437	166,854,823
2014	0	(7,773,330)	2,182,152	1,566,740	2,115,200	101,161,562	106,281,927
2015	199,049	(11,048,588)	5,015,064	1,598,084	1,941,396	156,376,226	163,173,423
2016	429,032	(11,849,796)	10,855,663	1,533,194	3,048,942	239,666,644	244,768,269
2017	0	(10,665,326)	0	1,606,491	2,560,487	326,106,666	330,387,775
2018	1,848,499	(9,835,493)	118,764	1,927,699	3,572,526	198,867,151	205,405,772
2019	0	(8,670,822)	1,319,438	1,748,715	2,331,489	275,276,965	279,131,550
2020	0	(7,349,892)	0	1,702,451	1,699,131	155,028,371	162,569,905
2021	0	(12,957,061)	0	1,680,925	4,514,635	318,248,336	325,656,062
2022	0	(13,422,132)	0	1,656,269	4,449,434	314,029,619	321,405,187
2023	0	(13,850,331)	0	661,877	5,775,750	343,576,705	350,388,779
2024	0	(14,082,474)	0	668,412	5,826,168	329,731,097	336,610,709
2025	0	(13,865,452)	0	674,642	5,882,195	343,709,894	350,655,663
2026	0	(13,584,505)	0	674,415	5,879,881	329,651,510	336,594,547
2027	0	(14,121,558)	0	675,200	5,886,993	332,514,267	339,465,701
2028	0	(13,651,762)	0	672,991	5,873,488	343,184,194	350,119,681
2029	0	(14,037,396)	0	674,514	5,881,217	340,387,355	347,331,967
2030	0	(13,562,150)	0	674,602	5,881,143	331,300,802	338,245,326
2031	0	(15,604,319)	0	674,466	5,880,660	364,469,271	371,422,846
2032	0	(12,954,010)	0	674,596	5,881,326	316,861,395	323,806,137
2033	0	(15,316,791)	0	675,037	5,885,486	356,408,339	363,357,993
2034	0	(12,959,091)	0	672,782	5,872,676	331,287,623	338,222,152
2035	0	(20,639,196)	0	675,439	5,889,288	391,809,805	398,763,949
TOTAL	10,068,906	(687,600,666)	31,956,266	41,143,857	126,088,083	8,589,076,951	8,803,597,110

¹Excludes extra peaking costs assigned directly to contractors. Refer to Appendix B text discussion of Table B-17 under "Project Water Charges."

⁴These 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 ^{1,6}	Total		
	Capital Costs ¹	Capital Cost Credits ²	Operating Costs ³	Application of Oroville Power Revenues to:					
				Capital Costs ⁴	Operating Costs ⁵				
1952	[1] 171,322	[2] 0	[3] 0	[4] 0	[5] 0	[6] 0	[7] 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	11,025,797	0	50,885,567	(14,650,000)	(5,503,289)	2,448,692	44,206,767		
1997	15,306,056	0	51,788,497	(14,650,000)	(5,740,515)	1,699,730	48,403,768		
1998	3,891,340	0	54,726,293	(14,650,000)	(8,155,000)	1,193,198	37,005,831		
1999	7,792,961	0	55,142,858	(14,650,000)	(9,198,000)	9,686	39,097,505		
2000	10,874,282	0	56,234,261	(14,688,338)	(10,297,482)	13,491	42,136,214		
2001	10,975,237	0	75,778,041	(16,223,803)	(14,328,482)	23,866	56,224,858		
2002	20,416,870	0	68,206,261	(19,498,891)	(20,826,560)	24,426	48,322,105		
2003	23,685,736	0	77,724,424	(20,605,664)	(29,982,088)	9,833	50,832,241		
2004	21,679,785	0	91,197,978	(17,530,688)	(35,845,422)	7,548	59,509,201		
2005	6,638,156	0	104,238,543	(15,354,462)	(22,004,805)	0	73,517,432		
2006	11,475,186	0	102,775,835	(15,210,585)	(21,412,577)	0	77,627,859		
2007	8,489,374	0	87,304,555	(14,734,855)	(17,033,961)	0	64,025,112		
2008	7,392,922	0	104,467,627	(14,968,129)	(19,570,602)	0	77,321,818		
2009	7,634,122	0	114,559,203	(15,959,419)	(20,921,647)	0	85,312,258		
2010	8,273,316	0	123,213,819	(15,958,194)	(20,222,025)	0	95,306,915		
2011	13,262,736	0	127,269,776	(15,958,715)	(18,804,228)	0	105,769,569		
2012	28,062,105	0	126,660,140	(16,032,565)	(22,105,563)	0	116,584,117		
2013	101,198,442	0	136,066,014	(16,034,532)	(20,672,157)	0	200,557,767		
2014	83,065,259	0	148,114,523	(15,841,275)	(17,712,411)	0	197,626,097		
2015	41,531,090	0	150,984,269	(20,657,953)	(17,587,782)	0	154,269,624		
2016	85,001,931	0	190,683,405	(20,646,145)	(16,898,173)	0	238,141,019		
2017	213,252,373	0	160,711,534	(21,072,456)	(19,503,596)	0	333,387,855		
2018	263,399,587	0	201,234,849	(23,135,691)	(21,101,689)	0	420,397,056		
2019	147,378,926	0	198,873,136	(29,562,263)	(21,040,527)	0	295,649,272		
2020	177,420,970	0	231,238,181	(34,047,986)	(29,140,785)	0	345,470,380		
2021	109,444,996	0	233,343,536	(33,928,100)	(31,731,991)	0	277,731,441		
2022	134,290,847	0	235,152,974	(37,597,390)	(30,986,939)	0	300,859,493		
2023	112,707,132	0	222,754,836	(39,400,632)	(31,500,553)	0	264,560,783		
2024	437,462	0	217,758,514	(41,972,469)	(31,807,784)	0	144,415,723		
2025	437,462	0	222,127,658	(46,248,462)	(32,118,087)	0	144,198,571		
2026	437,462	0	227,226,205	(46,074,765)	(32,431,493)	0	149,157,409		
2027	437,462	0	222,256,362	(46,063,616)	(32,748,033)	0	143,862,175		
2028	437,462	0	239,467,844	(46,078,685)	(33,067,739)	0	160,758,882		
2029	437,462	0	230,119,943	(45,952,813)	(33,390,642)	0	151,213,950		
2030	437,462	0	235,896,770	(52,580,575)	(33,716,774)	0	150,036,883		
2031	437,462	0	236,814,456	(52,578,600)	(34,046,167)	0	150,627,151		
2032	437,462	0	241,580,721	(52,751,341)	(34,378,854)	0	154,887,988		
2033	437,462	0	235,345,908	(52,728,162)	(34,714,868)	0	148,340,340		
2034	437,462	0	254,709,088	(52,716,177)	(35,054,242)	0	167,376,131		
2035	437,462	0	238,303,740	(52,696,123)	(35,397,010)	0	150,648,069		
TOTAL	2,633,628,586		(11,528,320)	6,946,998,314	(1,567,903,518)	(1,091,955,481)	57,085,905	6,966,325,485	

¹ Reimbursed through the capital cost component of the Delta Water Charge.

² Negotiated settlements as to the magnitude of SWP planning costs from 1952 through 1978.

³ 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.

⁴ Revenues credited through the capital cost component of the Delta Water Charge.

⁵ Revenues credited through the minimum OMP&R component of the Delta Water Charge.

⁶ Under amendments of Articles 22(e) and 22(g), planning and pre-operating costs of additional Project Conservation Facilities incurred through the previous year reflected in the Delta Water Charge.

Tables B-14 through B-31

Note: Where applicable, the projected data values shown in this appendix are shaded and the bill year data are in **bold** type.

TABLE B-14 Capital Costs of Transportation Facilities Allocated to Each Contractor (in dollars)

Sheet 1 of 4

Calendar Year	NORTH BAY AREA			SOUTH BAY AREA				CENTRAL COASTAL AREA		
	Napa	Solano ¹	Total	Alameda-Zone 7	Alameda County	Santa Clara	Total	San Luis Obispo	Santa Barbara	Total
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	258,819	1,273,101	1,531,920
2014	587,364	658,937	1,246,300	(252,836)	(174,519)	(198,598)	(625,953)	335,315	1,565,861	1,901,176
2015	187,630	266,930	454,560	956,892	547,412	1,373,109	2,877,413	254,396	1,368,321	1,622,717
2016	88,532	162,844	251,375	286,716	175,035	433,462	895,213	268,468	1,152,256	1,420,725
2017	26,944	98,292	125,236	217,034	152,879	467,134	837,047	305,093	1,075,914	1,381,007
2018	24,552	60,120	84,672	837,001	496,660	1,621,109	2,954,770	348,436	744,469	1,092,905
2019	36,364	90,818	127,182	659,642	347,406	1,378,073	2,385,121	293,885	1,015,711	1,309,596
2020	197,991	468,930	666,921	1,221,902	707,220	2,936,522	4,865,644	894,185	3,232,664	4,126,849
2021	1,038,221	2,126,266	3,164,487	1,690,055	946,459	3,134,479	5,770,993	1,077,800	5,736,410	6,814,210
2022	395,644	1,938,764	2,334,409	1,628,789	914,916	2,295,485	4,839,191	1,331,752	5,498,207	6,829,959
2023	514,545	999,772	1,514,318	1,635,714	1,015,470	2,554,870	5,206,053	1,909,865	8,365,367	10,275,232
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	57,455,406	58,723,003	116,178,409	37,556,398	35,388,793	109,296,976	182,242,167	46,592,199	473,965,292	520,557,491

Note: Allocated capital costs as a result of permanent water transfers under the Monterey Amendment are not reflected in this

TABLE B-14 Capital Costs of Transportation Facilities Allocated to Each Contractor (in dollars)

Sheet 2 of 4

Calendar Year	SAN JOAQUIN VALLEY AREA										
	Dudley Ridge	Empire ²	Future Contractor San Joaquin Valley	Kern			Agricultural	Kings	Oak Flat	Tulare	Total
				Municipal and Industrial	Municipal and Industrial ³						
	[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	4,972	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	184,417	9,212	69,901	381,331	52,792	4,547,844	9,422	13,022	371,087	5,639,029	
2014	199,232	10,166	96,149	371,154	54,233	4,710,985	10,402	15,319	405,240	5,872,880	
2015	126,316	6,394	60,711	261,678	35,065	3,098,514	6,540	11,412	255,878	3,862,506	
2016	158,644	8,036	83,879	517,219	43,435	6,322,009	8,218	6,108	321,481	7,469,027	
2017	246,106	12,651	111,112	444,185	66,064	5,670,836	12,936	13,173	502,497	7,079,560	
2018	346,398	17,832	159,622	616,440	93,088	7,898,387	18,242	7,135	707,781	9,864,925	
2019	291,360	14,859	108,368	533,875	81,151	6,416,432	15,192	10,242	592,483	8,063,961	
2020	706,414	34,707	320,111	1,470,107	219,722	17,728,776	35,496	32,395	1,409,639	21,957,366	
2021	706,674	33,454	261,176	1,614,944	204,086	18,301,278	34,215	34,706	1,384,402	22,574,933	
2022	906,170	43,146	430,387	2,119,159	270,209	25,029,658	44,105	28,123	1,780,270	30,651,226	
2023	1,814,941	89,499	584,782	3,876,205	519,284	43,108,649	91,471	14,695	3,628,397	53,727,924	
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	11,694,276	246,135	4,321,609	25,971,632	3,396,343	296,040,224	592,387	458,367	23,432,571	366,153,545	

² 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.

³ 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	Coachella	Crestline	Desert	Littlerock	Mojave	Palmdale	San Bernardino	San Gabriel	San Gorgonio
[21]	[22]	[23]	[24]	[25]	[26]	[27]	[28]	[29]	[30]	
1952	3,158	850	254	1,402	70	1,695	418	6,079	1,550	962
1953	10,026	2,668	799	4,401	222	5,318	1,328	19,058	4,852	3,011
1954	12,742	3,465	1,031	5,714	285	6,908	1,691	24,608	6,290	3,904
1955	5,411	1,374	401	2,267	115	2,756	715	9,229	2,377	1,474
1956	9,775	2,196	612	3,622	191	4,449	1,267	13,138	3,438	2,127
1957	26,306	6,343	1,816	10,461	540	12,767	3,450	40,646	10,534	6,526
1958	49,204	11,581	3,290	19,099	991	23,360	6,414	72,708	18,898	11,701
1959	70,247	15,869	4,616	26,171	1,347	31,759	9,030	98,596	25,519	15,815
1960	84,552	22,068	6,797	36,395	1,547	43,260	10,772	147,170	37,469	23,307
1961	126,542	34,613	12,530	57,086	2,245	63,709	16,437	236,164	57,707	36,153
1962	198,558	43,719	13,861	72,102	3,344	84,709	24,943	253,435	64,330	40,012
1963	580,138	116,797	33,149	192,624	9,828	234,926	73,256	610,277	160,624	99,266
1964	1,094,365	209,462	55,445	345,446	18,442	429,605	137,769	1,026,066	276,118	170,012
1965	1,908,076	385,533	103,757	635,825	32,819	786,986	244,587	1,913,090	512,862	316,082
1966	3,960,302	812,655	215,858	1,340,235	69,325	1,664,584	517,269	3,943,586	1,062,417	654,194
1967	4,976,538	1,077,422	296,069	1,776,892	88,301	2,182,240	653,250	5,821,681	1,550,239	958,406
1968	5,924,474	1,350,742	368,156	2,227,646	107,350	2,738,009	783,940	7,982,824	2,122,940	1,314,841
1969	5,822,708	1,690,259	539,851	2,787,631	121,303	3,256,507	865,455	10,898,185	2,769,647	1,726,891
1970	5,032,959	2,050,788	695,345	3,382,251	106,381	3,872,367	736,775	13,795,809	3,457,109	2,160,122
1971	2,577,507	1,071,523	338,581	1,767,179	48,337	2,087,223	347,057	8,137,053	1,987,120	1,237,573
1972	973,436	331,759	92,079	547,138	19,134	668,550	134,360	2,691,137	697,957	434,507
1973	354,407	158,579	82,223	261,557	6,304	238,094	46,102	1,760,570	403,582	256,711
1974	451,450	259,175	74,113	427,433	8,143	518,453	59,145	1,617,394	425,927	264,349
1975	253,438	193,632	52,821	319,337	4,954	392,110	33,995	1,533,664	407,913	253,838
1976	237,539	136,751	37,235	225,529	4,245	277,807	31,002	962,280	255,901	158,850
1977	199,554	91,384	25,858	150,711	3,757	183,609	26,834	591,445	155,537	96,517
1978	302,111	78,573	22,226	129,584	5,233	157,815	38,654	428,989	111,769	69,152
1979	357,678	81,807	21,795	134,915	5,965	166,931	44,410	403,569	108,408	66,847
1980	1,867,517	423,755	113,166	698,855	32,435	864,104	240,899	2,040,757	548,085	337,811
1981	(158,728)	(47,102)	(8,865)	(77,678)	(2,576)	(102,568)	(19,588)	(143,875)	(43,557)	(26,356)
1982	1,557,934	298,770	78,903	492,728	26,237	613,587	196,672	1,421,407	388,261	238,792
1983	2,062,512	396,033	115,678	653,134	34,699	803,945	259,939	2,126,313	581,672	357,812
1984	1,518,361	297,559	85,097	490,731	27,272	606,124	188,562	1,546,628	423,408	260,327
1985	896,226	217,115	62,532	358,064	13,104	441,299	107,533	1,116,949	305,291	187,699
1986	841,555	221,194	58,152	364,790	9,038	454,702	93,309	1,048,625	286,302	176,057
1987	333,052	166,099	43,992	273,928	5,566	340,485	40,716	783,725	213,202	131,163
1988	259,234	65,831	22,723	108,570	3,384	128,339	26,743	429,498	113,644	70,260
1989	1,045,999	323,138	97,036	532,920	16,777	649,616	125,344	1,375,722	372,048	227,772
1990	678,053	332,566	97,789	548,468	7,335	672,344	67,179	1,509,745	409,710	251,185
1991	831,687	367,196	120,925	605,579	11,966	733,443	92,625	1,979,364	540,210	331,235
1992	633,272	270,826	131,328	446,647	9,556	501,634	76,760	2,093,387	573,386	351,492
1993	634,283	222,347	171,095	366,700	10,194	353,470	73,955	3,848,084	1,046,752	646,980
1994	467,409	132,599	93,839	218,685	7,255	218,494	53,209	2,347,599	637,733	394,936
1995	459,990	132,690	78,390	218,835	7,436	232,377	54,544	1,961,308	530,656	332,713
1996	299,764	110,520	44,965	182,270	4,885	211,872	35,808	4,246,828	972,829	1,342,109
1997	438,898	103,382	24,640	170,497	7,397	214,534	54,452	3,947,228	397,103	3,160,731
1998	234,379	62,492	41,136	103,063	3,989	106,009	29,551	5,710,657	303,255	5,614,235
1999	268,224	89,312	40,069	147,294	4,812	167,592	35,399	9,768,138	235,054	10,654,574
2000	139,035	54,795	23,903	90,369	2,665	103,194	19,150	25,569,109	171,107	29,560,816
2001	130,754	50,816	15,641	83,805	2,989	102,254	20,949	33,763,992	96,254	39,529,043
2002	199,807	40,293	12,884	66,452	3,001	80,478	22,664	17,121,707	133,675	19,719,408
2003	76,592	24,945	7,688	41,140	1,245	50,028	9,409	7,154,545	54,302	8,181,827
2004	81,688	23,476	6,416	38,716	1,445	48,028	10,585	3,694,786	42,507	4,101,099
2005	232,323	47,108	14,116	77,691	4,011	93,862	29,628	1,569,017	71,539	1,454,471
2006	334,422	68,325	25,180	112,684	5,626	126,956	42,114	3,375,192	113,701	3,385,371
2007	258,891	57,769	22,068	95,272	4,567	111,771	33,367	3,615,481	108,623	3,865,032
2008	159,067	70,874	60,890	116,900	2,792	83,144	20,471	5,425,622	263,890	5,235,314
2009	577,477	153,560	60,337	253,262	9,826	275,417	73,122	7,871,341	271,508	7,905,557
2010	644,764	193,723	62,817	319,495	10,809	371,033	81,051	9,286,649	285,792	9,811,577
2011	341,088	230,769	59,398	380,581	5,742	474,797	42,964	14,197,480	287,922	15,631,867
2012	257,613	343,375	87,824	566,289	5,062	708,509	35,082	22,092,715	445,112	24,287,392
2013	785,308	347,981	91,200	573,887	15,207	716,458	106,131	66,958,096	487,472	77,096,675
2014	878,563	248,792	64,557	410,306	16,035	513,470	115,184	60,030,057	410,417	69,390,493
2015	1,060,553	271,994	69,827	448,569	20,070	561,613	148,317	32,995,060	387,095	37,545,780
2016	1,348,100	273,943	70,613	451,785	23,495	566,409	175,608	37,122,357	382,569	42,441,137
2017	797,850	169,871	41,238	280,151	13,677	353,931	101,338	12,449,607	194,685	13,990,430
2018	1,146,807	227,788	69,247	375,669	19,292	459,629	144,469	7,827,444	441,441	7,593,561
2019	978,685	228,461	97,136	376,800	16,468	398,335	123,359	2,111,100	472,361	501,199
2020	2,624,679	634,822	183,480	1,046,954	44,732	1,280,645	332,925	4,739,903	1,183,587	906,599
2021	3,226,748	765,609	210,080	1,262,642	55,303	1,563,866	410,204	4,280,547	1,132,882	729,077
2022	4,784,349	1,253,881	339,006	2,067,898	80,595	2,564,188	603,127	6,864,468	1,782,967	1,240,296
2023	6,391,724	1,457,352	397,998	2,403,476	107,604	2,968,332	805,499	7,774,904	2,039,110	1,366,734
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	78,229,708	21,668,230	6,706,703	35,735,525	1,383,738	42,924,254	10,190,652	512,087,714	36,794,596	460,895,430

TABLE B-14 Capital Costs of Transportation Facilities Allocated to Each Contractor (in dollars)

Sheet 4 of 4

Calendar Year	SOUTHERN CALIFORNIA AREA (continued)				FEATHER RIVER AREA				South Bay Area Future Contractor	Grand Total
	Santa Clarita ^{4,5}	Metropolitan ⁶	Ventura	Total	Yuba City	Butte	Plumas	Total		
1952	[31]	[32]	[33]	[34]	[35]	[36]	[37]	[38]	[39]	[40]
1953	1,042	69,020	370	86,871	0	0	0	0	59	99,353
1954	3,327	217,634	1,187	273,833	0	0	0	0	264	311,812
1955	4,193	279,967	1,496	352,294	0	0	0	0	766	402,143
1956	1,881	111,602	670	140,272	0	0	0	0	969	169,342
1957	3,590	179,335	1,299	225,040	0	0	0	0	9,172	351,551
1958	9,255	516,050	3,367	648,059	0	0	0	0	23,172	1,464,452
1959	17,599	945,684	6,390	1,186,917	0	0	2	2	32,888	2,286,623
1960	29,740	1,364,298	9,894	1,702,901	0	0	14	14	57,918	2,967,412
1961	38,760	1,914,521	12,798	2,379,418	0	0	28	28	123,202	4,660,833
1962	54,262	3,212,125	18,770	3,928,343	0	0	10	10	316,220	8,545,244
1963	85,352	3,543,471	29,069	4,456,905	0	0	32	32	228,202	8,875,171
1964	255,252	11,185,928	86,807	13,638,873	0	0	51	51	528,496	24,610,278
1965	501,858	18,065,455	164,709	22,494,750	0	0	7,791	7,791	590,034	41,736,060
1966	947,523	33,763,577	307,475	41,858,192	0	0	3,139	3,139	332,680	62,664,743
1967	2,150,972	74,485,027	681,898	91,558,323	0	0	(48)	(48)	783,728	129,110,330
1968	4,100,531	130,599,417	1,279,076	155,360,062	0	0	47	47	1,479,421	194,146,365
1969	5,998,942	147,502,290	1,360,687	177,782,842	0	0	51,573	51,573	1,254,192	197,978,911
1970	3,079,426	140,096,646	1,085,026	174,739,535	0	0	234,232	234,232	398,183	184,473,490
1971	3,277,778	161,983,078	1,147,609	201,698,371	0	0	16,227	16,227	74,028	207,082,650
1972	2,146,954	133,903,316	738,822	156,388,246	0	0	27,204	27,204	12,457	158,624,739
1973	283,257	43,931,880	66,878	50,872,072	0	0	9	9	13,182	51,936,917
1974	914,303	39,723,010	290,020	44,495,462	0	0	25	25	8,099	45,263,853
1975	280,861	18,896,593	86,362	23,369,399	0	0	45	45	28,570	24,402,166
1976	246,492	16,732,939	83,975	20,509,109	0	0	21	21	8,226	21,318,838
1977	255,238	13,545,451	84,623	16,212,450	0	0	51	51	16,486	17,492,910
1978	371,469	11,769,352	110,833	13,776,859	0	0	28	28	21,181	15,544,382
1979	470,176	15,781,696	174,876	17,770,853	0	0	38	38	28,876	19,073,475
1980	938,985	27,627,424	343,361	30,302,093	0	0	23	23	26,668	31,857,362
1981	1,777,294	59,493,774	641,586	69,080,039	0	0	26	26	59,169	74,974,704
1982	610,795	15,661,179	224,257	15,865,338	0	0	34	34	(6,746)	15,727,602
1983	861,928	30,873,857	316,107	37,365,183	0	0	11	11	16,086	39,705,931
1984	521,349	25,056,047	187,121	33,156,253	0	0	19	19	72,225	38,006,645
1985	295,783	16,317,441	103,160	22,160,455	0	0	26	26	83,252	30,414,886
1986	158,810	10,243,779	56,162	14,164,564	0	0	29	29	16,338	28,581,730
1987	104,860	8,365,310	34,777	12,058,671	0	0	31	31	16,248	41,035,899
1988	105,625	6,955,356	36,142	9,429,050	0	0	32	32	29,062	32,523,660
1989	174,155	6,626,545	57,117	8,086,041	0	0	55	55	50,083	18,140,686
1990	434,394	18,531,680	153,200	23,885,645	0	0	44	44	43,324	33,301,366
1991	374,313	17,430,869	125,376	22,504,929	0	0	63	63	96,419	34,453,743
1992	401,961	20,792,168	132,558	26,940,915	0	0	54	54	149,922	39,811,664
1993	356,952	21,196,762	116,999	26,758,999	0	0	42	42	80,900	35,041,233
1994	332,089	29,471,748	105,693	37,283,389	0	0	30	30	59,324	53,921,787
1995	165,607	16,392,019	50,941	21,180,326	0	0	14	14	34,208	74,225,377
1996	293,308	16,078,395	72,214	20,452,857	0	0	3	3	42,395	191,527,744
1997	206,742	23,237,696	49,282	30,945,569	0	0	0	0	21,388	189,313,700
1998	249,699	13,530,777	72,335	22,371,673	0	0	3	3	34,976	67,960,684
1999	202,650	11,284,364	65,745	23,761,523	0	0	7	7	11,234	37,111,632
2000	175,939	9,063,618	54,504	30,704,530	0	0	2	2	34,616	43,960,817
2001	77,889	5,393,221	24,010	61,229,262	0	0	24	24	16,912	68,128,743
2002	44,790	2,988,800	13,047	76,843,134	0	0	20	20	68,013	80,348,589
2003	121,849	5,787,234	39,607	43,349,059	0	0	14	14	382,151	54,480,638
2004	42,072	5,783,732	13,689	21,441,217	0	0	0	0	590,294	29,900,210
2005	46,992	4,555,521	15,942	12,667,201	0	0	0	0	156,414	18,353,444
2006	126,137	7,322,277	42,941	11,085,122	0	0	0	0	123,949	14,733,944
2007	246,722	13,867,322	90,203	21,793,819	0	0	5	5	120,330	24,642,180
2008	182,329	11,723,751	65,425	20,144,347	0	0	0	0	266,740	27,491,263
2009	175,464	11,885,796	60,480	23,560,704	0	0	4	4	493,279	39,684,825
2010	339,521	22,108,510	122,280	40,021,717	0	0	6	6	1,018,818	55,172,594
2011	340,756	18,059,829	107,451	39,575,748	0	0	(2)	(2)	6,354,636	63,742,722
2012	219,260	12,727,509	55,576	44,654,952	0	0	0	0	2,566,258	66,349,370
2013	144,365	17,420,517	42,735	66,436,590	0	0	0	0	1,004,833	82,246,641
2014	375,675	28,282,290	110,104	175,946,481	0	0	0	0	546,046	191,295,137
2015	464,869	21,900,556	126,679	154,569,980	0	0	0	0	(16,925)	162,947,459
2016	532,215	41,019,199	163,000	115,223,291	0	0	0	0	277,916	124,318,403
2017	701,184	64,449,205	216,722	148,223,128	0	0	0	0	98,270	158,357,738
2018	555,062	35,220,303	153,990	64,322,131	0	0	0	0	77,988	73,822,969
2019	796,117	35,617,710	222,157	54,941,332	0	0	0	0	223,703	69,162,307
2020	821,708	36,870,945	252,978	43,249,535	0	0	0	0	162,340	55,297,737
2021	1,811,682	77,626,974	514,846	92,931,827	0	0	0	0	336,276	124,884,882
2022	2,021,181	96,068,179	616,610	112,342,927	0	0	0	0	606,628	151,274,179
2023	2,895,647	129,654,272	850,460	154,981,154	0	0	0	0	653,503	200,289,442
2024	3,599,911	141,796,374	1,083,291	172,192,310	0	0	0	0	1,448,719	244,364,556
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	48,956,669	2,276,680,195	15,837,846	3,548,091,260	0	0	341,139	341,139	24,918,855	4,758,482,866

⁴ Castaic Lake Water Agency's SWP Water Supply Contract was transferred to Santa Clarita Valley Water Agency effective November 2, 2018.⁵ Costs from Table B-10 allocated to Santa Clarita Valley Water Agency are reduced herein by \$14,088 in 1978 in accordance with a letter of agreement with the agency.⁶ 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)^{1,2,3}

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
[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]
1961	0	0	0	0	0	0	0	0	0
1962	0	0	0	0	0	0	0	0	0
1963	0	0	0	147,972	105,673	364,827	618,472	0	0
1964	0	0	0	208,371	170,929	530,036	909,335	6,696	21,667
1965	0	0	0	274,717	259,943	899,371	1,434,031	13,756	36,029
1966	18,063	0	18,063	310,035	290,808	1,073,270	1,674,113	26,524	61,349
1967	41,574	0	41,574	380,137	320,989	1,187,619	1,888,745	56,469	118,263
1968	121,509	0	121,509	496,558	361,935	1,309,946	2,168,439	104,160	208,037
1969	165,289	0	165,289	598,453	397,386	1,411,701	2,407,539	122,043	242,426
1970	169,077	0	169,077	632,683	412,322	1,450,660	2,495,665	125,963	250,808
1971	171,286	0	171,286	639,837	415,439	1,457,564	2,512,840	128,402	256,371
1972	172,649	0	172,649	641,886	416,368	1,461,847	2,520,100	129,861	260,482
1973	173,649	31,366	205,015	643,551	417,018	1,465,086	2,525,655	130,843	263,040
1974	176,527	32,938	209,466	644,829	417,636	1,467,092	2,529,557	132,015	265,901
1975	184,973	36,291	221,264	647,700	418,879	1,470,816	2,537,394	133,290	269,028
1976	189,650	40,836	230,485	649,259	419,684	1,472,924	2,541,866	134,041	272,155
1977	192,592	45,096	237,688	652,213	421,449	1,478,507	2,552,169	135,754	278,799
1978	195,860	49,178	245,038	656,137	423,747	1,485,299	2,565,183	141,271	292,281
1979	199,390	53,340	252,730	661,713	427,108	1,494,207	2,583,028	142,362	297,569
1980	209,132	67,748	276,880	665,876	429,296	1,499,843	2,595,015	143,530	303,969
1981	222,599	87,408	310,007	676,294	435,629	1,515,357	2,627,280	148,789	327,544
1982	234,191	106,918	341,110	674,741	434,108	1,512,014	2,620,863	148,004	320,657
1983	262,160	151,259	413,419	676,540	434,532	1,513,393	2,624,465	148,213	317,658
1984	326,072	224,245	550,317	687,635	441,230	1,530,671	2,659,536	149,853	323,275
1985	455,836	364,305	820,141	700,178	448,410	1,548,594	2,697,182	151,658	328,761
1986	819,636	692,479	1,512,115	702,520	449,390	1,551,318	2,703,228	152,545	332,779
1987	1,360,688	1,559,243	2,919,931	705,507	451,007	1,555,828	2,712,343	154,805	348,472
1988	1,771,651	2,208,121	3,979,772	710,068	453,514	1,562,985	2,726,566	161,346	417,591
1989	1,891,484	2,433,160	4,324,645	719,029	459,332	1,578,655	2,757,016	169,453	494,247
1990	1,955,330	2,514,151	4,469,481	727,295	464,692	1,592,216	2,784,203	177,387	557,384
1991	1,978,582	2,557,403	4,535,985	744,128	476,459	1,625,032	2,845,618	189,050	639,235
1992	1,983,860	2,562,121	4,545,981	773,904	496,722	1,675,047	2,945,673	204,822	754,678
1993	1,986,897	2,565,427	4,552,324	787,915	505,773	1,698,585	2,992,274	224,056	941,300
1994	1,993,467	2,572,330	4,565,797	798,040	512,498	1,716,961	3,027,499	286,878	1,585,162
1995	1,997,323	2,576,836	4,574,159	802,382	515,639	1,729,387	3,047,407	517,412	4,095,799
1996	1,998,994	2,578,433	4,577,427	810,034	520,936	1,743,439	3,074,409	1,187,010	12,569,247
1997	2,000,110	2,579,484	4,579,594	813,958	523,583	1,750,461	3,088,002	1,808,545	20,578,178
1998	2,001,225	2,585,478	4,586,703	820,497	527,976	1,762,113	3,110,586	1,985,644	22,700,288
1999	2,002,204	2,586,690	4,588,893	822,662	529,331	1,765,656	3,117,649	2,035,260	23,293,767
2000	2,006,043	2,592,730	4,598,773	989,626	533,508	1,777,485	3,300,620	2,088,005	23,838,744
2001	2,329,398	2,786,640	5,116,038	1,051,670	535,165	1,782,101	3,368,936	2,116,046	24,156,352
2002	2,329,837	2,787,480	5,117,317	1,063,787	550,866	1,890,059	3,504,713	2,120,253	24,187,702
2003	2,331,181	2,790,289	5,121,471	1,136,423	621,150	2,236,683	3,994,256	2,124,324	24,210,510
2004	2,334,865	2,791,583	5,126,448	1,254,027	700,643	2,512,474	4,467,144	2,125,494	24,217,560
2005	2,345,413	2,792,921	5,138,334	1,643,388	721,599	2,761,150	5,126,137	2,126,238	24,220,734
2006	2,349,665	2,797,154	5,146,818	2,087,893	742,505	2,855,962	5,686,360	2,126,116	24,210,804
2007	2,412,700	2,798,524	5,211,224	2,986,814	763,106	2,906,021	6,655,941	2,126,644	24,214,870
2008	2,646,515	2,801,521	5,448,036	5,193,153	809,662	3,017,673	9,020,489	2,127,678	24,220,221
2009	3,227,890	2,805,846	6,033,736	7,626,818	897,252	3,227,237	11,751,307	2,129,520	24,226,659
2010	3,317,645	2,807,182	6,148,287	9,118,290	1,081,998	3,667,787	13,868,075	2,130,095	24,229,935
2011	3,348,033	2,807,421	6,155,455	11,742,823	1,318,810	4,260,266	17,321,899	2,135,200	24,239,123
2012	3,363,156	2,810,447	6,173,604	13,760,121	1,583,384	4,897,983	20,241,489	2,142,776	24,255,155
2013	3,402,261	2,843,290	6,245,551	15,077,333	1,664,841	5,007,350	21,749,524	2,148,169	24,278,899
2014	3,456,231	2,896,663	6,352,893	15,640,519	1,690,262	5,123,884	22,454,665	2,160,229	24,349,490
2015	3,506,179	2,949,552	6,455,731	16,115,598	1,588,247	4,739,755	22,443,600	2,178,147	24,451,772
2016	3,502,047	2,971,357	6,473,404	16,632,123	1,599,389	4,671,223	22,902,734	2,184,900	24,531,452
2017	3,483,342	2,984,998	6,468,340	16,951,160	1,583,076	4,591,219	23,125,455	2,176,227	24,214,062
2018	3,395,065	2,993,410	6,388,475	16,908,777	1,554,670	4,507,208	22,970,655	2,153,561	24,564,312
2019	3,347,709	2,998,812	6,346,521	16,936,365	1,561,517	4,543,513	23,041,395	2,165,352	24,593,325
2020	3,347,081	3,007,307	6,354,387	17,043,496	1,577,400	4,626,811	23,247,707	2,187,504	24,675,052
2021	3,365,533	3,052,565	6,418,098	17,193,938	1,639,887	4,892,305	23,726,130	2,268,012	24,969,359
2022	3,479,278	3,266,081	6,745,359	17,416,410	1,731,154	5,193,354	24,340,917	2,371,542	25,524,035
2023	3,524,613	3,435,617	6,960,230	17,649,731	1,824,557	5,426,089	24,900,376	2,507,463	28,594,153
2024	3,585,736	3,552,306	7,138,042	17,985,339	1,934,740	5,702,855	25,622,934	2,714,684	26,996,607
2025	3,576,120	3,548,729	7,124,850	17,983,083	1,933,498	5,699,131	25,615,712	2,713,409	26,993,481
2026	3,570,777	3,543,975	7,114,752	17,981,812	1,932,693	5,697,023	25,611,527	2,712,659	26,990,353
2027	3,567,405	3,539,541	7,106,946	17,979,240	1,930,927	5,691,440	25,601,608	2,710,945	26,983,710
2028	3,563,666	3,535,281	7,098,947	17,975,807	1,928,630	5,684,648	25,589,084	2,705,428	26,970,227
2029	3,559,628	3,530,913	7,090,542	17,970,709	1,925,268	5,675,740	25,571,716	2,704,338	26,964,940
2030	3,548,472	3,515,451	7,063,923	17,967,035	1,923,081	5,670,104	25,560,219	2,703,169	26,958,539
2031	3,533,055	3,494,385	7,027,440	17,957,170	1,916,747	5,654,590	25,528,507	2,697,910	26,934,964
2032	3,519,758	3,473,441	6,993,199	17,959,232	1,918,268	5,657,933	25,535,433	2,698,696	26,941,852
2033	3,487,698	3,425,990	6,913,688	17,958,011	1,917,844	5,656,554	25,532,410	2,698,487	26,944,851
2034	3,414,602	3,349,373	6,763,975	17,947,284	1,911,146	5,639,276	25,497,706	2,696,847	26,939,234
2035	3,266,459	3,203,071	6,469,530	17,935,252	1,903,966	5,621,353	25,460,571	2,695,042	26,933,747
TOTAL	143,968,588	145,144,130	289,112,717	482,525,505	67,558,825	213,074,566	763,158,895	96,378,818	1,005,195,290
									1,101,574,108

¹ Unadjusted for prior overpayments or underpayments of charges.² Determined at the current Project Interest Rate of 4.610 percent per annum.³ Reflects the transfers of permanent aqueduct capacity among contractors.

TABLE B-15 Capital Cost Component of Transportation Charge for Each Contractor (in dollars)^{1,2,3}

Sheet 2 of 4

Calendar Year	SAN JOAQUIN VALLEY AREA									
	Dudley Ridge	Empire	Future Contractor San Joaquin Valley	Kern			Kings	Oak Flat	Tulare	Total
				Municipal and Industrial	Municipal and Industrial ⁴	Agricultural				
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	86,496	2,194	48,950	335,771	48,966	465,956	9,407	5,172	72,922	1,075,834
1969	86,647	6,582	57,418	392,005	52,536	956,924	10,158	5,622	275,914	1,843,805
1970	94,964	6,582	59,224	423,404	53,922	1,163,907	10,446	5,847	204,182	2,022,478
1971	108,271	6,582	60,329	444,522	54,712	1,545,869	10,612	6,296	217,278	2,454,471
1972	120,973	6,582	60,945	454,227	55,075	2,314,805	10,694	12,067	670,289	3,705,656
1973	133,070	6,582	61,370	458,449	55,248	2,669,776	10,736	6,971	259,258	3,661,460
1974	201,964	6,582	61,890	460,485	55,349	2,989,754	10,770	7,805	430,324	4,224,922
1975	245,303	6,582	62,452	462,798	55,490	3,580,900	10,812	8,042	513,479	4,945,858
1976	187,030	6,582	62,720	464,655	55,679	3,860,183	10,853	9,083	367,331	5,024,115
1977	183,879	6,582	63,362	467,359	55,965	4,229,650	10,914	8,320	351,217	5,377,248
1978	196,581	0	65,796	469,216	56,156	4,701,612	11,019	8,770	376,814	5,885,965
1979	233,139	6,582	66,111	471,978	56,491	5,162,579	11,086	8,995	424,086	6,441,047
1980	247,995	6,582	66,399	474,721	56,828	5,633,536	11,157	12,818	426,818	6,936,854
1981	247,995	6,582	67,986	491,115	58,770	6,165,485	11,565	9,670	452,415	7,511,583
1982	247,995	6,582	67,996	488,835	58,707	6,656,454	11,552	10,119	477,417	8,025,658
1983	259,487	6,582	68,332	493,076	59,377	7,215,406	11,685	8,478	56,838	8,179,262
1984	272,794	6,582	68,950	498,702	60,083	7,573,184	11,834	10,794	372,713	8,875,636
1985	285,496	6,582	69,678	506,586	61,243	8,064,139	12,069	11,019	271,146	9,287,959
1986	298,198	6,582	69,966	508,983	61,587	8,193,209	12,141	11,469	578,615	9,740,750
1987	310,900	6,582	70,471	512,652	62,116	9,047,061	12,251	11,693	603,617	10,637,343
1988	323,603	6,582	70,832	515,513	62,526	9,510,025	12,334	12,143	628,619	11,142,176
1989	336,305	6,582	71,717	519,169	63,150	9,843,991	12,501	12,593	654,216	11,520,224
1990	174,503	6,582	73,153	537,527	65,389	10,190,970	12,936	12,818	705,411	11,779,290
1991	323,064	6,582	75,796	566,573	69,966	10,190,970	13,762	12,818	705,411	11,964,943
1992	349,007	6,582	78,990	597,260	74,817	10,190,970	14,756	12,818	705,411	12,030,611
1993	349,007	6,582	80,482	610,123	76,657	10,190,970	15,124	12,818	705,411	12,047,174
1994	349,007	6,582	82,105	619,494	77,936	10,190,970	15,397	12,818	705,411	12,059,720
1995	349,007	6,582	83,398	626,231	78,890	10,190,970	15,608	12,818	705,411	12,068,915
1996	322,817	6,582	87,367	635,384	80,221	9,840,053	15,961	12,818	705,411	11,706,615
1997	322,817	6,582	90,231	639,177	80,707	9,768,771	16,133	12,818	705,411	11,642,646
1998	322,816	6,582	92,940	652,602	82,732	9,517,032	16,588	12,818	705,411	11,409,522
1999	322,816	6,582	94,237	659,509	83,778	9,517,032	16,823	12,818	705,411	11,419,007
2000	322,816	6,582	95,750	667,629	85,008	8,863,551	17,096	12,818	705,411	10,776,662
2001	322,816	6,582	96,315	670,255	85,354	8,718,385	17,172	12,818	705,411	10,635,107
2002	347,309	6,582	96,772	672,352	85,648	8,718,385	17,237	12,818	662,498	10,619,600
2003	347,309	6,582	97,882	681,983	87,121	8,718,385	17,536	12,818	660,050	10,629,666
2004	347,309	6,582	98,185	684,250	87,449	8,705,102	48,200	12,818	568,866	10,558,761
2005	347,309	6,582	98,434	686,336	87,746	8,705,102	48,263	12,818	568,866	10,561,455
2006	347,309	6,582	99,039	692,288	88,653	8,705,102	50,314	12,818	567,000	10,569,105
2007	347,309	6,582	99,161	694,170	88,828	8,705,102	50,350	12,818	567,000	10,571,320
2008	347,309	6,582	99,425	696,491	89,095	8,705,102	50,405	12,818	567,000	10,574,227
2009	347,309	6,582	100,163	703,240	90,159	8,705,102	50,623	12,818	567,000	10,582,996
2010	304,969	6,582	100,376	706,426	90,427	8,514,056	50,677	12,818	524,162	10,310,494
2011	304,969	6,582	102,805	710,984	90,907	8,514,056	50,850	12,818	524,162	10,318,133
2012	304,969	6,582	106,293	715,917	91,573	8,514,056	51,093	12,818	524,162	10,327,463
2013	304,969	6,582	107,943	722,275	92,412	8,514,056	51,287	12,818	524,162	10,336,503
2014	292,914	6,582	110,284	749,908	96,238	8,514,056	52,077	12,818	515,283	10,350,160
2015	274,769	6,582	114,141	713,272	90,993	8,514,056	53,026	12,818	515,283	10,294,940
2016	274,769	6,582	112,791	677,380	85,895	8,514,056	53,640	12,818	515,283	10,253,214
2017	274,769	6,582	105,218	605,356	72,060	8,514,056	54,458	12,818	515,283	10,160,600
2018	274,769	6,582	91,640	539,280	62,863	8,514,056	46,327	12,818	515,283	10,063,618
2019	274,769	6,582	96,766	535,545	67,221	8,514,056	47,452	12,818	515,283	10,070,491
2020	250,574	6,582	104,573	551,509	73,034	8,514,056	48,714	12,818	515,283	10,077,143
2021	276,765	6,582	133,163	666,761	92,625	8,925,327	52,539	12,818	515,283	10,681,863
2022	276,765	6,582	157,988	814,368	112,143	8,925,327	56,323	12,818	515,283	10,877,598
2023	276,765	6,582	201,806	1,027,995	139,747	8,925,327	61,879	12,818	515,283	11,168,203
2024	276,765	6,582	265,094	1,448,908	196,307	8,925,327	73,032	12,818	515,283	11,720,116
2025	276,765	6,582	264,532	1,446,595	196,166	8,925,327	72,990	12,818	515,283	11,717,058
2026	276,765	6,582	264,265	1,444,737	195,977	8,925,327	72,949	12,818	515,283	11,714,704
2027	276,765	6,582	263,622	1,442,034	195,691	8,925,327	72,888	12,818	515,283	11,711,010
2028	276,765	6,582	261,188	1,440,176	195,500	8,925,327	72,782	12,818	515,283	11,706,422
2029	276,765	6,582	260,874	1,437,415	195,165	8,925,327	72,716	12,818	515,283	11,702,944
2030	276,765	6,582	260,585	1,434,671	194,828	8,925,327	72,645	12,818	515,283	11,699,505
2031	276,765	6,582	258,998	1,418,277	192,887	8,925,327	72,237	12,818	515,283	11,679,174
2032	276,765	6,582	258,988	1,420,558	192,949	8,925,327	72,250	12,818	515,283	11,681,519
2033	276,765	6,582	258,652	1,416,316	192,279	8,925,327	72,117	12,818	515,283	11,676,139
2034	276,765	6,582	258,034	1,410,690	191,573	8,925,327	71,968	12,818	515,283	11,669,041
2035	276,765	6,582	257,306	1,402,806	190,414	8,925,327	71,733	12,818	515,283	11,659,033
TOTAL	18,606,734	436,606	8,067,694	50,625,058	6,554,713	526,116,952	2,367,529	793,414	35,311,594	648,880,294

¹ Unadjusted for prior overpayments or underpayments of charges.² Determined at the current Project Interest Rate of 4.610 percent per annum.³ Reflects the transfers of permanent aqueduct capacity among contractors.⁴ 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)^{1,2,3}

Sheet 3 of 4

Calendar Year	SOUTHERN CALIFORNIA AREA									
	AVEK	Coachella	Crestline	Desert	Littlerock	Mojave	Palmdale	San Bernardino	San Gabriel	San Gorgonio
[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	726	0	0	51,729	0	0	0
1964	64,494	19,542	4,370	38,211	1,143	31,079	8,205	82,811	34,987	21,735
1965	121,484	34,348	7,194	42,701	2,082	55,096	15,222	135,069	35,344	21,866
1966	221,012	62,476	12,478	76,886	3,753	99,564	27,679	232,502	61,465	37,964
1967	427,622	121,269	23,472	148,839	7,284	193,330	54,023	433,350	115,574	71,283
1968	689,327	206,952	38,551	245,877	11,781	322,598	87,293	729,849	194,527	120,094
1969	1,003,797	318,583	57,301	368,426	17,249	486,485	127,219	1,136,415	302,649	187,059
1970	1,312,832	451,031	84,796	520,243	23,427	677,267	171,297	1,691,461	443,708	275,010
1971	1,581,850	595,102	120,210	700,914	28,845	896,769	208,821	2,394,083	619,778	385,025
1972	1,720,363	671,098	137,454	795,465	31,306	1,017,778	226,497	2,808,504	720,983	448,055
1973	1,772,377	696,065	142,143	825,044	32,281	1,057,674	233,340	2,945,564	756,530	470,185
1974	1,791,355	707,278	146,331	839,031	32,602	1,072,932	235,688	3,035,230	777,084	483,259
1975	1,815,881	724,295	150,105	861,611	33,017	1,104,111	238,700	3,117,604	798,777	496,722
1976	1,829,760	736,112	152,796	878,290	33,269	1,126,409	240,431	3,195,714	819,552	509,650
1977	1,842,615	744,718	154,692	890,124	33,485	1,143,157	242,010	3,244,723	832,585	517,741
1978	1,853,320	750,463	156,009	898,031	33,676	1,155,303	243,377	3,274,845	840,506	522,656
1979	1,869,355	756,140	157,141	904,987	33,943	1,166,385	245,346	3,296,693	846,199	526,178
1980	1,888,324	762,012	158,251	912,220	34,247	1,178,001	247,607	3,317,247	851,720	529,583
1981	1,987,339	796,384	164,015	950,529	35,899	1,231,140	259,877	3,421,183	879,634	546,787
1982	1,978,809	789,720	163,563	945,667	35,768	1,226,027	258,879	3,413,856	877,416	545,445
1983	2,061,590	809,319	167,582	971,692	37,104	1,262,190	268,895	3,486,248	897,190	557,607
1984	2,171,231	834,564	173,473	1,006,034	38,871	1,303,626	282,134	3,594,542	926,815	575,830
1985	2,251,676	851,720	177,807	1,031,452	40,260	1,337,856	291,738	3,673,311	948,379	589,089
1986	2,299,323	863,875	180,992	1,049,921	40,927	1,371,981	297,214	3,730,198	963,927	598,648
1987	2,344,046	876,261	183,970	1,068,826	41,390	1,389,380	301,992	3,783,895	978,588	607,664
1988	2,362,143	885,509	186,235	1,083,080	41,677	1,409,463	304,089	3,824,257	989,568	614,418
1989	2,376,030	889,631	187,412	1,088,857	41,852	1,418,065	305,475	3,846,509	995,456	618,059
1990	2,432,706	912,986	192,472	1,118,024	42,727	1,456,932	312,010	3,918,238	1,014,854	629,934
1991	2,469,661	932,659	197,604	1,147,282	43,112	1,493,367	315,536	3,997,480	1,036,359	643,118
1992	2,514,880	953,475	203,996	1,179,589	43,744	1,532,861	320,432	4,102,102	1,064,912	660,626
1993	2,549,874	969,784	210,989	1,203,773	44,253	1,560,547	324,519	4,213,571	1,095,444	679,343
1994	2,585,113	983,985	220,171	1,223,934	44,800	1,580,688	328,488	4,420,076	1,151,617	714,062
1995	2,611,217	992,587	225,248	1,236,069	45,193	1,593,247	331,367	4,547,097	1,186,123	735,431
1996	2,637,094	1,001,843	229,526	1,248,440	45,599	1,606,970	334,344	4,654,140	1,215,084	753,590
1997	2,654,359	1,010,118	232,003	1,258,944	45,868	1,619,770	336,316	4,888,049	1,268,666	827,511
1998	2,679,335	1,017,568	233,373	1,268,786	46,279	2,145,501	339,344	5,107,565	1,290,750	1,003,288
1999	2,692,811	1,022,130	235,684	1,274,800	46,503	2,152,930	341,005	5,428,405	1,307,788	1,318,711
2000	2,708,447	1,028,194	237,960	1,283,376	46,776	2,163,832	407,164	5,983,155	1,321,137	1,923,803
2001	2,716,761	1,032,076	239,333	1,288,723	46,930	2,170,782	408,368	7,451,923	1,330,966	3,621,868
2002	2,743,031	1,035,440	240,242	1,293,682	47,103	2,177,292	409,642	9,414,983	1,336,562	5,920,111
2003	2,754,969	1,038,552	241,001	1,297,752	47,280	2,183,053	411,077	10,423,259	1,344,434	7,081,362
2004	2,759,705	1,101,037	241,460	1,300,295	47,354	2,186,610	411,696	10,850,329	1,347,676	7,569,753
2005	2,764,817	6,721,752	241,849	2,061,704	47,442	2,190,235	412,412	11,074,072	1,350,250	7,818,101
2006	2,779,489	6,790,759	242,717	2,075,530	47,688	2,198,162	414,459	11,170,547	1,354,649	7,907,533
2007	2,801,287	6,920,038	244,290	2,099,752	48,040	2,211,449	417,656	11,381,474	1,361,754	8,119,096
2008	2,818,426	7,044,835	245,693	2,122,376	48,330	2,222,306	420,171	11,611,349	1,368,660	8,364,837
2009	2,828,922	7,136,636	249,637	2,141,770	48,511	2,228,483	421,578	11,962,711	1,385,750	8,703,875
2010	2,868,827	7,535,867	253,621	2,246,365	49,160	2,298,772	427,435	12,482,540	1,403,681	9,225,963
2011	2,914,434	7,710,146	257,857	2,290,288	49,889	2,334,731	434,054	13,108,796	1,422,953	9,887,619
2012	2,939,627	7,857,928	261,954	2,334,631	50,285	2,372,681	437,565	14,087,863	1,442,809	10,965,602
2013	2,925,354	8,045,315	268,157	2,382,722	50,643	2,425,415	440,318	15,596,558	1,461,146	12,672,886
2014	2,975,426	8,362,868	270,396	2,456,683	50,602	2,448,659	439,780	20,417,711	1,488,291	18,254,774
2015	2,986,000	8,517,068	272,381	2,489,482	50,857	2,484,269	441,462	24,837,234	1,504,801	23,415,177
2016	2,970,720	9,035,606	272,455	2,561,467	50,726	2,488,661	440,614	27,271,716	1,508,385	26,280,200
2017	2,874,768	9,964,249	267,056	2,656,963	49,057	2,446,939	428,369	30,012,181	1,484,588	29,609,616
2018	2,680,047	10,213,524	255,359	2,626,677	45,681	2,329,873	400,212	30,736,857	1,421,603	30,708,365
2019	2,465,502	10,176,460	242,507	2,544,192	41,857	2,180,707	367,544	30,996,905	1,351,077	31,288,096
2020	2,245,345	9,992,804	223,629	2,416,744	37,140	2,019,853	328,609	30,629,146	1,251,924	31,244,609
2021	2,226,647	10,125,865	205,235	2,364,264	35,872	1,913,741	318,538	30,366,208	1,185,645	31,218,692
2022	2,412,416	10,432,216	208,455	2,436,929	38,797	1,977,161	342,362	30,368,758	1,194,795	31,226,682
2023	2,870,048	11,365,588	238,615	2,736,661	46,107	2,279,463	404,680	30,937,362	1,342,537	31,332,055
2024	3,567,095	12,765,343	277,855	3,159,101	57,528	2,677,048	498,520	31,696,046	1,544,478	31,468,110
2025	3,542,568	12,650,089	274,080	3,123,252	57,113	2,645,277	494,944	31,613,672	1,522,785	31,454,647
2026	3,528,689	12,546,220	271,390	3,094,139	56,860	2,622,561	492,925	31,535,563	1,502,010	31,441,719
2027	3,515,834	12,469,868	269,494	3,073,154	56,644	2,606,122	491,112	31,486,554	1,488,977	31,433,628
2028	3,505,129	12,432,651	268,177	3,060,996	56,453	2,595,261	489,596	31,456,431	1,481,055	31,428,713
2029	3,489,095	12,400,321	267,045	3,050,440	56,186	2,584,876	487,383	31,434,583	1,475,363	31,425,191
2030	3,470,126	12,373,734	265,935	3,040,409	55,883	2,573,976	484,869	31,414,029	1,469,842	31,421,786
2031	3,371,111	12,235,123	260,171	2,988,020	54,231	2,511,980	470,707	31,310,093	1,441,928	31,404,582
2032	3,379,640	12,247,926	260,623	2,993,711	54,362	2,523,208	472,339	31,317,421	1,444,146	31,405,924
2033	3,296,859	12,166,395	256,604	2,959,320	53,026	2,485,797	461,674	31,245,028	1,424,372	31,393,762
2034	3,187,218	12,053,839	250,713	2,913,185	51,258	2,437,719	447,685	31,136,735	1,394,747	31,375,539
2035	3,106,773	11,969,913	246,379	2,878,748	49,869	2,404,036	437,787	31,057,965	1,373,183	31,362,280
TOTAL	174,490,570	343,247,845	14,559,733	119,146,8						

TABLE B-15 Capital Cost Component of Transportation Charge for Each Contractor (in dollars)^{1,2,3}

Sheet 4 of 4

Calendar Year	SOUTHERN CALIFORNIA AREA (continued)				FEATHER RIVER AREA				South Bay Area Future Contractor	Grand Total
	Santa Clarita ⁵	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	1,396,150
1964	27,447	1,260,513	9,378	1,603,916	0	0	0	0	0	2,544,339
1965	53,007	2,180,589	17,766	2,721,767	0	0	405	405	0	4,285,586
1966	101,264	3,900,172	33,426	4,870,643	0	0	565	565	0	6,800,626
1967	210,814	7,693,703	68,155	9,568,718	0	0	562	562	0	11,968,199
1968	421,823	14,345,147	133,299	17,547,119	0	0	564	564	0	21,225,661
1969	627,777	21,857,456	202,599	26,693,015	0	0	3,191	3,191	0	31,477,308
1970	785,575	28,992,595	257,859	35,687,100	0	0	15,121	15,121	0	40,766,212
1971	954,292	37,242,413	316,307	46,044,409	0	0	15,947	15,947	0	51,583,727
1972	1,067,217	44,062,125	353,935	54,060,780	0	0	17,332	17,332	0	60,866,860
1973	1,083,297	46,299,581	357,342	56,671,421	0	0	17,333	17,333	0	63,474,768
1974	1,131,352	48,322,678	372,112	58,946,932	0	0	17,334	17,334	0	66,326,127
1975	1,148,409	49,285,084	376,511	60,150,827	0	0	17,337	17,337	0	68,274,997
1976	1,162,263	50,137,295	380,788	61,202,327	0	0	17,338	17,338	0	69,422,328
1977	1,176,982	50,827,166	385,097	62,035,096	0	0	17,340	17,340	0	70,634,094
1978	1,198,099	51,426,581	390,742	62,743,608	0	0	17,342	17,342	0	71,890,688
1979	1,224,191	52,230,344	399,649	63,656,550	0	0	17,344	17,344	0	73,390,629
1980	1,274,207	53,637,412	417,136	65,207,966	0	0	17,345	17,345	0	75,481,559
1981	1,367,201	56,667,437	449,812	68,757,237	0	0	17,346	17,346	0	79,699,786
1982	1,400,595	57,465,063	461,234	69,562,041	0	0	17,348	17,348	0	81,035,679
1983	1,447,096	59,037,472	477,333	71,481,319	0	0	17,348	17,348	0	83,181,683
1984	1,475,296	60,313,580	486,863	73,182,857	0	0	17,349	17,349	0	85,758,823
1985	1,492,647	61,144,629	492,117	74,322,680	0	0	17,351	17,351	0	87,625,730
1986	1,503,002	61,666,346	494,977	75,061,332	0	0	17,352	17,352	0	89,520,101
1987	1,510,682	62,094,710	496,758	75,678,162	0	0	17,354	17,354	0	92,468,410
1988	1,518,277	62,452,912	498,619	76,170,249	0	0	17,355	17,355	0	94,615,056
1989	1,528,856	62,796,236	501,579	76,594,018	0	0	17,358	17,358	0	95,876,960
1990	1,553,119	63,762,459	509,566	77,856,027	0	0	17,360	17,360	0	97,641,132
1991	1,572,766	64,677,355	516,147	79,042,446	0	0	17,364	17,364	0	99,234,641
1992	1,594,012	65,776,353	523,154	80,470,136	0	0	17,367	17,367	0	100,969,268
1993	1,613,019	66,905,041	529,383	81,899,541	0	0	17,369	17,369	0	102,674,038
1994	1,630,841	68,486,622	535,055	83,905,452	0	0	17,370	17,370	0	105,447,879
1995	1,639,801	69,373,540	537,812	85,054,731	0	0	17,371	17,371	0	109,375,795
1996	1,655,809	70,251,056	541,753	86,175,248	0	0	17,371	17,371	0	119,307,327
1997	1,667,196	71,530,953	544,467	87,884,220	0	0	17,371	17,371	0	129,598,558
1998	1,681,083	72,283,436	548,490	89,644,799	0	0	0	0	0	133,437,542
1999	1,692,468	72,917,423	552,184	90,982,842	0	0	0	0	0	135,437,418
2000	2,846,425	73,432,162	555,279	93,937,710	0	0	0	0	0	138,540,513
2001	2,852,366	73,741,965	556,658	97,458,719	0	0	0	0	0	142,851,198
2002	2,855,659	73,915,736	557,417	101,946,902	0	0	0	0	0	147,496,487
2003	2,864,174	74,256,539	559,749	104,503,201	0	0	17,375	17,375	0	150,600,802
2004	2,867,397	74,601,782	560,566	105,845,662	0	0	17,375	17,375	0	152,358,445
2005	2,871,326	68,499,909	561,532	106,615,400	0	0	17,375	17,375	0	153,805,674
2006	2,882,078	68,876,841	564,172	107,304,625	0	0	17,375	17,375	0	155,061,205
2007	2,907,689	69,605,880	569,809	108,688,214	0	0	17,376	17,376	0	157,485,589
2008	2,926,348	70,216,830	573,969	109,984,131	0	0	17,376	17,376	0	161,392,158
2009	2,942,171	70,888,202	577,886	111,516,132	0	0	17,376	17,376	0	166,257,727
2010	2,978,556	72,113,606	585,961	114,470,355	0	0	17,376	17,376	0	171,151,157
2011	3,014,829	73,157,328	593,207	117,176,133	0	0	17,376	17,376	0	177,363,319
2012	3,036,220	73,889,550	597,040	120,273,753	0	0	17,376	17,376	0	183,431,616
2013	3,049,710	74,246,181	600,058	124,164,462	0	0	17,376	17,376	0	188,940,485
2014	3,047,966	75,377,648	598,659	136,189,463	0	0	17,376	17,376	0	201,874,276
2015	3,059,322	75,923,804	599,707	146,581,565	0	0	16,972	16,972	0	212,422,728
2016	3,057,659	76,765,733	596,555	153,300,496	0	0	16,812	16,812	0	219,663,013
2017	2,988,553	77,000,227	578,998	160,361,564	0	0	16,814	16,814	0	226,874,836
2018	2,756,247	72,879,346	526,485	157,580,277	0	0	16,812	16,812	0	223,737,709
2019	2,545,013	68,346,823	476,105	153,022,787	0	0	14,185	14,185	0	219,254,057
2020	2,410,697	64,572,584	443,288	147,816,374	0	0	2,256	2,256	0	214,360,423
2021	2,366,758	63,299,311	432,598	146,059,374	0	0	1,429	1,429	0	214,124,264
2022	2,446,256	65,527,260	455,034	149,067,123	0	0	44	44	0	218,926,618
2023	2,803,857	75,745,726	539,055	162,641,753	0	0	43	43	0	234,264,759
2024	3,207,756	87,848,028	642,486	179,409,393	0	0	42	42	0	253,601,819
2025	3,189,892	86,997,128	638,088	178,203,536	0	0	40	40	0	252,368,085
2026	3,171,644	86,249,404	633,811	177,146,934	0	0	39	39	0	251,290,968
2027	3,153,132	85,636,429	629,501	176,310,450	0	0	36	36	0	250,424,705
2028	3,125,297	85,072,739	623,856	175,596,353	0	0	35	35	0	249,666,497
2029	3,086,983	84,299,227	614,950	174,671,642	0	0	33	33	0	248,706,155
2030	3,009,769	82,915,673	597,463	173,093,492	0	0	32	32	0	247,078,880
2031	2,866,716	80,003,966	564,787	169,483,414	0	0	30	30	0	243,351,440
2032	2,815,211	79,199,373	553,365	168,667,249	0	0	29	29	0	242,517,976
2033	2,742,660	77,697,261	537,266	166,720,024	0	0	28	28	0	240,485,627
2034	2,700,424	76,520,258	527,736	164,997,055	0	0	27	27	0	238,563,885
2035	2,678,702	75,764,997	522,482	163,853,116	0	0	26	26	0	237,071,065
TOTAL	147,317,249	4,509,079,750	34,514,986	7,298,574,044	0	0	781,778	781,778	0	10,102,081,837

¹Unadjusted for prior overpayments or underpayments of charges.²Determined at the current Project Interest Rate of 4.610 percent per annum.³Reflects the transfers of permanent aqueduct capacity among contractors.⁴Castaic Lake Water Agency's SWP Water Supply Contract was transferred to Santa Clarita Valley Water Agency effective November 2, 2018.

TABLE B-16A Minimum OMP&R Component of Transportation Charge for Each Contractor (in dollars)

Sheet 1 of 4

Calendar Year	NORTH BAY AREA			SOUTH BAY AREA				CENTRAL COASTAL AREA		
	Napa	Solano	Total	Alameda-Zone 7	Alameda County	Santa Clara	Total	San Luis Obispo	Santa Barbara	Total
				[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	606,929	996,487	1,603,417	1,226,141	1,267,512	5,087,144	7,580,797	788,877	3,088,585	3,877,461
2000	777,217	1,495,413	2,272,630	2,181,030	2,199,206	3,763,997	7,244,233	701,204	3,086,687	3,787,891
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	1,098,725	1,874,074	2,972,799	8,265,317	1,360,212	6,066,367	15,691,897	756,677	3,288,267	4,044,944
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	1,618,500	2,346,304	3,964,803	2,575,939	1,277,496	3,530,065	7,383,500	799,416	3,354,831	4,154,247
2005	916,734	1,796,614	2,713,348	2,391,501	1,129,780	2,947,359	6,468,641	848,882	3,682,184	4,531,065
2006	817,694	1,387,010	2,204,704	2,484,947	1,206,246	3,274,333	6,965,526	747,553	3,625,703	4,373,256
2007	775,552	1,515,581	2,291,133	3,227,823	1,569,984	4,009,562	8,807,370	828,266	3,591,151	4,419,418
2008	1,053,607	1,426,060	2,479,667	3,633,947	1,769,391	4,491,445	9,894,783	1,251,033	5,329,976	6,581,010
2009	1,122,116	1,794,992	2,917,108	3,283,890	1,489,943	4,215,097	8,988,929	1,090,330	4,541,745	5,632,075
2010	1,192,954	3,194,351	4,387,305	3,137,567	1,538,577	4,237,248	8,913,393	1,404,674	6,199,702	7,604,376
2011	1,571,339	3,660,569	5,231,908	3,520,560	1,698,451	4,537,408	9,756,419	1,448,671	6,561,390	8,010,061
2012	2,065,428	3,562,754	5,628,181	3,711,463	1,772,346	6,749,351	12,233,159	1,443,005	7,245,845	8,688,850
2013	1,508,317	3,071,687	4,580,004	4,220,252	1,993,375	5,971,417	12,185,044	1,690,759	8,790,520	10,481,279
2014	1,940,801	3,785,853	5,726,654	4,746,021	2,196,841	7,318,446	14,261,309	1,537,290	5,830,017	7,367,306
2015	2,173,423	3,624,541	5,797,965	5,822,398	2,158,532	8,343,133	16,324,063	2,033,397	8,475,915	10,509,312
2016	2,698,217	4,402,720	7,100,937	5,210,984	1,947,619	13,613,621	20,772,223	1,886,195	11,136,873	13,023,067
2017	1,850,828	2,896,012	4,746,840	5,879,147	2,251,274	10,321,944	18,452,364	2,262,426	14,499,497	16,761,923
2018	2,697,757	3,729,708	6,427,465	7,715,998	2,842,275	10,040,715	20,598,988	2,378,689	13,322,338	15,701,028
2019	2,580,852	3,450,112	6,030,964	7,120,235	2,623,144	7,697,951	17,441,330	2,105,515	11,588,072	13,693,587
2020	2,966,581	5,430,546	8,397,128	7,833,332	2,901,292	8,486,541	19,221,164	2,263,719	11,656,084	13,919,804
2021	2,981,931	4,380,334	7,362,265	8,171,069	3,018,897	8,729,237	19,919,202	2,216,456	11,421,709	13,638,166
2022	3,337,702	4,154,156	7,491,859	7,662,785	2,820,229	8,254,636	18,737,650	2,205,306	11,339,105	13,544,410
2023	3,100,059	4,658,291	7,758,350	7,894,904	2,904,552	8,484,430	19,283,885	2,228,127	11,545,808	13,773,934
2024	3,131,059	4,704,874	7,835,933	7,973,853	2,933,597	8,569,273	19,476,723	2,250,408	11,661,266	13,911,674
2025	3,162,370	4,751,923	7,914,293	8,053,591	2,962,933	8,654,966	19,671,490	2,272,912	11,777,878	14,050,790
2026	3,193,994	4,799,442	7,993,436	8,134,128	2,992,563	8,741,517	19,868,207	2,295,641	11,895,657	14,191,298
2027	3,225,934	4,847,436	8,073,369	8,215,469	3,022,488	8,828,932	20,066,889	2,318,597	12,014,613	14,333,211
2028	3,258,193	4,895,911	8,154,104	8,297,623	3,052,713	8,917,221	20,267,557	2,341,783	12,134,760	14,476,544
2029	3,290,775	4,944,870	8,235,645	8,380,599	3,083,240	9,006,392	20,470,232	2,365,201	12,256,108	14,621,309
2030	3,323,682	4,994,318	8,318,000	8,464,406	3,114,072	9,096,457	20,674,935	2,388,853	12,378,668	14,767,522
2031	3,356,919	5,044,262	8,401,182	8,549,049	3,145,213	9,187,421	20,881,684	2,412,742	12,502,455	14,915,197
2032	3,390,488	5,094,704	8,485,193	8,634,540	3,176,665	9,279,295	21,090,500	2,436,869	12,627,480	15,064,349
2033	3,424,393	5,145,651	8,570,044	8,720,886	3,208,432	9,372,089	21,301,407	2,461,238	12,753,754	15,214,992
2034	3,458,638	5,197,107	8,655,745	8,808,095	3,240,516	9,465,810	21,514,420	2,485,850	12,881,292	15,367,143
2035	3,493,224	5,249,079	8,742,302	8,896,175	3,272,922	9,560,467	21,729,564	2,510,709	13,010,105	15,520,814
TOTAL	90,757,886	139,373,058 </								

TABLE B-16A Minimum OMP&R Component of Transportation Charge for Each Contractor (in dollars)

Sheet 2 of 4

Calendar Year	SAN JOAQUIN VALLEY AREA								
	Dudley Ridge	Empire	Future Contractor San Joaquin Valley	Kern		Kings	Oak Flat	Tulare	Total
				Municipal and Industrial	Agricultural				
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	377,305	20,790	272,344	964,787	10,926,029	21,263	21,611	829,227	13,433,358
2000	386,090	21,231	207,591	1,026,678	9,987,766	21,734	22,882	847,556	12,521,529
2001	463,709	25,514	231,713	1,211,557	11,265,338	26,105	31,783	1,018,354	14,274,074
2002	427,983	21,663	224,572	1,084,631	10,267,062	22,173	25,718	817,061	12,890,861
2003	494,752	25,202	242,078	1,177,971	11,268,413	25,794	30,739	944,655	14,209,603
2004	442,383	22,653	244,434	1,124,933	10,643,526	61,739	25,476	732,208	13,297,353
2005	427,294	21,930	257,152	1,013,691	10,307,808	59,689	24,397	708,195	12,820,155
2006	464,498	23,756	196,420	1,109,725	10,328,670	71,730	26,401	765,770	12,986,972
2007	526,641	26,707	234,973	1,268,218	11,676,964	82,394	27,122	863,607	14,706,625
2008	627,522	32,348	372,338	1,529,919	15,130,155	101,771	32,611	1,039,755	18,866,419
2009	514,796	26,167	337,170	1,264,182	12,740,239	83,940	26,765	845,444	15,838,703
2010	501,394	29,131	406,670	1,319,371	13,176,645	94,473	27,761	870,284	16,425,730
2011	602,536	35,286	403,873	1,642,233	15,526,816	111,604	39,522	1,051,529	19,413,399
2012	570,860	33,341	361,578	1,611,466	15,259,886	104,092	31,093	994,398	18,966,714
2013	650,839	38,140	411,666	1,713,675	16,643,564	118,113	30,974	1,136,294	20,743,266
2014	684,763	41,353	520,533	1,826,199	18,741,452	131,391	43,928	1,215,556	23,205,173
2015	649,733	42,371	641,425	1,822,677	19,558,598	137,485	44,332	1,240,620	24,137,241
2016	662,494	43,547	372,162	1,862,320	17,746,879	130,659	45,258	1,271,958	22,135,277
2017	580,280	37,870	375,329	1,616,419	15,894,173	115,892	42,342	1,108,570	19,770,875
2018	659,722	43,141	524,162	1,824,602	18,955,576	135,263	47,222	1,262,090	23,451,778
2019	744,288	48,395	476,407	2,092,817	20,852,335	148,293	52,391	1,418,262	25,833,189
2020	718,024	51,228	564,395	2,227,157	22,572,172	159,036	60,149	1,501,037	27,853,198
2021	765,638	49,441	551,711	2,174,460	22,994,885	153,734	54,174	1,448,683	28,192,726
2022	771,867	49,852	550,526	2,177,231	23,073,784	154,795	53,386	1,460,657	28,292,098
2023	784,704	50,675	561,099	2,143,298	23,462,768	157,414	56,462	1,484,827	28,701,248
2024	792,551	51,182	566,710	2,164,731	23,697,396	158,988	57,027	1,499,676	28,988,261
2025	800,477	51,694	572,377	2,186,378	23,934,370	160,578	57,597	1,514,672	29,278,142
2026	808,482	52,211	578,101	2,208,242	24,173,713	162,183	58,173	1,529,819	29,570,923
2027	816,566	52,733	583,882	2,230,324	24,415,450	163,805	58,755	1,545,117	29,866,633
2028	824,732	53,260	589,721	2,252,628	24,659,605	165,443	59,342	1,560,568	30,165,300
2029	832,979	53,793	595,618	2,275,154	24,906,201	167,098	59,936	1,576,174	30,466,952
2030	841,309	54,331	601,574	2,297,905	25,155,263	168,769	60,535	1,591,936	30,771,622
2031	849,722	54,874	607,590	2,320,884	25,406,815	170,456	61,140	1,607,855	31,079,338
2032	858,219	55,423	613,666	2,344,093	25,660,884	172,161	61,752	1,623,934	31,390,132
2033	866,802	55,977	619,803	2,367,534	25,917,493	173,883	62,369	1,640,173	31,704,033
2034	875,470	56,537	626,001	2,391,210	26,176,667	175,621	62,993	1,656,575	32,021,073
2035	884,224	57,102	632,261	2,415,122	26,438,434	177,378	63,623	1,673,140	32,341,284
TOTAL	30,110,487	1,794,256	19,988,945	79,719,139	855,856,040	4,736,794	1,930,016	57,303,093	1,051,438,770

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	Coachella	Crestline	Desert	Littlerock	Mojave	Palmdale	San Bernardino	San Gabriel	San Gorgonio
	[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	11,697	2,958	19,291	1,089	24,380	8,173	52,315	14,399	8,821
1969	86,339	15,522	3,925	25,598	1,445	32,348	10,844	69,419	19,106	11,704
1970	107,807	19,392	4,904	31,981	1,804	40,391	13,540	86,727	23,865	14,623
1971	178,820	32,228	8,150	53,151	2,992	66,999	22,459	144,136	39,636	24,302
1972	363,555	106,740	30,967	176,037	6,601	213,032	48,102	548,123	144,113	89,131
1973	404,661	121,341	34,674	200,116	7,346	243,320	53,975	724,535	190,156	117,779
1974	434,868	130,627	37,062	215,432	7,677	262,735	56,383	786,107	207,019	128,169
1975	504,791	151,031	43,176	249,082	9,082	303,108	65,580	905,424	238,842	147,899
1976	559,013	160,686	44,454	265,004	10,030	325,512	73,253	964,524	256,570	158,664
1977	675,504	184,813	47,743	304,792	11,890	381,161	87,355	1,069,446	289,793	178,774
1978	600,343	187,028	54,156	308,449	10,711	373,192	78,304	1,148,279	300,751	186,384
1979	661,123	196,264	52,211	323,677	12,124	401,469	87,126	1,125,452	302,508	186,688
1980	858,039	253,090	71,921	417,398	15,435	508,379	112,853	1,518,405	401,223	248,399
1981	1,001,503	284,970	73,534	469,970	18,046	588,024	131,992	1,548,350	420,523	259,244
1982	1,128,643	320,938	89,560	529,292	20,193	649,204	148,012	1,870,559	497,871	307,955
1983	1,744,932	450,049	119,275	742,218	30,643	922,072	225,793	2,373,149	639,682	394,524
1984	2,105,780	548,784	150,179	905,055	36,810	1,112,196	271,187	3,018,294	803,394	496,808
1985	2,157,936	584,697	157,841	964,282	38,972	1,191,309	277,250	3,230,403	860,780	531,765
1986	2,311,841	618,750	162,748	1,020,438	40,051	1,268,806	295,987	3,318,638	893,069	551,066
1987	2,366,343	628,222	167,262	1,036,061	41,773	1,283,836	307,844	3,400,838	913,933	564,352
1988	2,303,274	649,276	175,694	1,070,784	40,604	1,321,553	298,438	3,587,873	960,968	593,787
1989	2,280,051	613,266	169,993	1,011,401	39,501	1,240,888	292,775	3,499,964	932,519	576,852
1990	2,636,186	708,829	201,242	1,169,006	45,472	1,424,445	336,069	4,084,211	1,078,392	667,687
1991	2,737,441	763,989	210,644	1,259,974	48,936	1,546,583	358,165	4,348,900	1,150,633	711,803
1992	2,781,586	750,248	198,232	1,237,307	49,829	1,538,733	362,844	4,131,745	1,115,632	688,558
1993	3,109,819	850,589	234,719	1,402,796	56,125	1,722,415	411,539	5,023,595	1,338,111	828,208
1994	2,825,193	794,991	225,121	1,311,100	51,259	1,634,886	376,180	4,794,820	1,267,565	783,691
1995	3,121,440	848,101	231,718	1,398,686	58,749	1,766,297	444,998	4,828,432	1,272,345	785,191
1996	3,093,678	862,720	228,008	1,422,789	56,813	1,817,427	423,444	4,707,473	1,256,549	773,653
1997	3,250,394	918,428	281,067	1,514,687	59,547	1,853,224	446,127	5,705,741	1,477,757	917,372
1998	3,876,512	1,070,517	299,639	1,765,491	73,835	3,207,848	561,246	6,076,375	1,634,942	1,000,558
1999	3,784,797	1,101,270	307,514	1,816,208	75,057	3,188,633	543,662	6,380,339	1,718,473	1,054,720
2000	3,764,355	1,038,523	292,482	1,712,733	68,662	3,008,461	596,615	5,890,416	1,575,862	966,592
2001	4,461,346	1,111,786	298,240	1,833,547	80,861	3,287,877	700,113	5,761,358	1,556,933	950,095
2002	3,651,746	1,020,593	283,190	1,683,161	62,766	3,008,560	551,276	5,645,507	1,514,835	924,879
2003	4,067,155	1,123,306	298,428	1,852,545	68,043	3,294,891	608,571	6,599,195	1,603,982	1,514,563
2004	4,447,321	1,442,509	323,076	1,909,809	76,842	3,427,748	677,248	7,224,977	1,765,936	1,435,981
2005	3,835,102	5,890,245	289,421	2,246,647	66,848	2,910,063	581,790	6,801,437	1,600,318	1,587,833
2006	4,077,931	8,420,935	307,878	2,811,005	74,610	3,150,008	639,630	7,007,886	1,689,293	1,456,824
2007	4,479,002	8,629,826	328,237	2,900,700	78,720	3,338,150	682,212	8,087,006	1,891,315	1,840,736
2008	4,924,295	9,723,312	372,053	3,296,321	81,987	4,110,929	745,952	9,321,803	2,039,132	2,501,059
2009	4,548,972	8,685,599	355,016	2,992,673	77,711	3,711,446	688,813	9,045,972	1,987,285	2,389,701
2010	4,160,630	9,304,634	360,318	3,205,741	73,335	3,785,371	623,136	8,934,153	1,963,495	2,579,112
2011	4,890,636	10,750,147	411,541	3,647,559	85,877	4,332,220	763,401	9,485,009	2,160,139	2,657,934
2012	5,437,219	11,283,076	454,547	3,926,281	97,147	4,573,608	834,242	10,766,824	2,363,983	2,639,523
2013	6,333,333	11,865,943	491,025	4,284,789	111,584	5,186,816	969,376	11,804,710	2,632,468	2,729,198
2014	6,953,618	15,364,355	528,575	5,011,192	116,445	5,844,154	1,040,481	12,785,441	2,863,180	3,090,067
2015	6,457,165	13,243,729	524,146	4,717,087	110,417	6,008,337	938,563	12,805,322	2,956,507	3,112,070
2016	6,414,569	12,956,803	541,810	4,604,732	104,876	5,473,709	932,988	13,128,732	2,986,038	3,309,920
2017	5,884,928	9,797,530	500,609	3,906,483	97,457	4,963,726	858,806	13,632,150	3,506,933	3,275,900
2018	6,437,440	14,717,644	520,713	4,629,405	108,134	5,323,124	945,814	15,033,716	2,912,403	4,149,090
2019	7,011,710	14,119,139	535,755	4,787,005	113,275	5,800,753	1,014,612	17,102,850	3,024,065	5,261,849
2020	7,759,729	19,354,941	635,813	5,876,117	128,614	6,650,186	1,134,229	19,513,098	3,595,485	5,698,151
2021	7,714,215	17,001,180	619,439	5,554,530	127,629	6,647,442	1,125,746	19,183,832	3,492,992	5,750,411
2022	7,780,156	16,449,105	620,029	5,469,666	128,662	6,640,921	1,135,196	18,822,311	3,499,963	5,472,021
2023	7,697,639	17,777,759	626,089	5,689,772	129,585	6,631,278	1,123,741	19,271,846	3,564,775	5,680,919
2024	7,774,615	17,955,537	632,350	5,746,670	130,881	6,697,591	1,134,979	19,464,563	3,600,423	5,737,729
2025	7,852,361	18,135,092	638,674	5,804,137	132,189	6,764,566	1,146,329	19,659,209	3,636,427	5,795,106
2026	7,930,885	18,316,443	645,060	5,862,178	133,511	6,832,212	1,157,792	19,855,803	3,672,791	5,853,058
2027	8,010,194	18,499,608	651,511	5,920,800	134,846	6,900,534	1,169,370	20,054,359	3,709,519	5,911,589
2028	8,090,296	18,684,604	658,026	5,980,008	136,195	6,969,540	1,181,064	20,254,904	3,746,615	5,970,704
2029	8,171,199	18,871,450	664,606	6,039,808	137,557	7,039,235	1,192,874	20,457,454	3,784,081	6,030,412
2030	8,252,910	19,060,164	671,252	6,100,206	138,932	7,109,627	1,204,803	20,662,028	3,821,921	6,090,716
2031	8,335,440	19,250,766	677,965	6,161,208	140,322	7,180,724	1,216,851	20,868,648	3,860,141	6,151,623
2032	8,418,794	19,443,273	684,744	6,222,820	141,725	7,252,531	1,229,019	21,077,334	3,898,742	6,213,139
2033	8,502,982	19,637,707	691,592	6,285,048	143,142	7,325,056	1,241,310	21,288,108	3,937,730	6,275,270
2034	8,588,012	19,834,083	698,508	6,347,899	144,574	7,398,307	1,253,723	21,500,988	3,977,107	6,338,023
2035	8,673,892	20,032,424	705,493	6,411,378	146,019	7,472,290	1,266,260	21,715,999	4,016,878	6,401,403
TOTAL	285,909,076	483,732,864	22,658,503	186,069,216	4,910,418	228,506,390	41,538,424	605,587,537	126,289,775	157,963,361

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
	Santa Clarita ¹	Metropolitan	Ventura	Total	Yuba City	Butte	Plumas	Total		
1961	[30] 0	[31] 0	[32] 0	[33] 0	[34] 0	[35] 0	[36] 0	[37] 0	[38] 0	[39] 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	28,085	972,734	9,504	1,218,520	0	0	0	0	46,945	2,745,160
1969	70,342	1,295,607	12,610	1,654,810	0	0	0	0	52,963	4,074,939
1970	84,577	1,624,569	15,746	2,069,923	0	0	0	0	69,744	4,676,282
1971	105,979	2,716,584	26,118	3,421,555	0	0	54	54	55,532	6,185,714
1972	202,625	8,038,463	68,369	10,035,857	0	0	40	40	80,412	12,998,869
1973	222,765	9,890,316	78,313	12,289,296	0	0	1	1	54,219	15,194,233
1974	235,528	11,581,491	83,453	14,166,551	0	0	143	143	76,783	17,372,561
1975	289,501	13,584,548	101,893	16,593,957	0	0	1,069	1,069	84,547	20,517,423
1976	262,420	12,862,489	94,799	16,037,419	0	0	139	139	106,717	20,027,213
1977	335,749	16,203,699	121,966	19,892,683	0	0	892	892	98,618	24,213,489
1978	376,946	17,811,770	132,435	21,568,747	0	0	39	39	100,786	26,012,786
1979	349,072	16,414,289	126,756	20,238,761	0	0	3,235	3,235	119,352	24,675,598
1980	415,571	20,926,898	154,096	25,901,706	0	0	416	416	178,812	32,038,398
1981	511,087	23,731,024	186,592	29,224,860	0	0	3,847	3,847	185,347	35,516,366
1982	557,494	27,994,510	209,141	34,323,374	0	0	11,075	11,075	173,894	41,611,655
1983	832,687	38,953,367	326,258	47,754,649	0	0	1,928	1,928	220,926	56,802,781
1984	943,524	45,597,671	382,104	56,371,786	0	0	3,765	3,765	225,959	67,072,552
1985	1,055,744	50,064,444	416,652	61,532,075	0	0	2,888	2,888	340,322	73,228,724
1986	1,102,466	52,858,915	442,334	64,885,109	0	0	2,787	2,787	279,227	76,682,113
1987	1,032,918	50,737,631	411,276	62,892,287	0	0	2,388	2,388	345,116	75,240,981
1988	1,042,113	51,262,231	406,248	63,712,844	0	0	545	545	365,207	76,126,695
1989	1,088,176	52,638,942	431,020	64,815,349	0	0	1,800	1,800	422,329	78,708,338
1990	1,275,150	61,053,824	494,721	75,175,234	0	0	788	788	474,284	91,448,066
1991	1,454,172	60,874,529	470,139	75,935,908	0	0	3,654	3,654	214,683	91,098,893
1992	1,579,025	67,460,598	502,131	82,396,469	0	0	647	647	443,676	100,077,320
1993	1,689,775	68,749,547	538,751	85,955,990	0	0	3,630	3,630	599,571	107,321,034
1994	1,608,731	63,898,029	473,897	80,045,461	0	0	2,279	2,279	609,966	101,233,250
1995	1,720,649	68,079,888	523,512	85,080,005	0	0	2,906	2,906	534,971	107,378,966
1996	1,966,634	72,757,439	561,100	89,927,727	0	0	8,007	8,007	571,857	113,585,948
1997	1,810,292	75,655,465	564,455	94,454,555	0	0	7,449	7,449	428,638	114,939,131
1998	2,050,254	80,540,695	608,294	102,766,204	0	0	0	0	465,095	129,072,817
1999	2,081,972	85,258,838	629,246	107,940,728	0	0	0	0	571,383	135,077,143
2000	3,391,361	82,712,917	637,765	105,656,744	0	0	0	0	0	131,483,026
2001	3,773,156	92,945,584	709,090	117,469,986	0	0	0	0	0	146,246,848
2002	3,506,435	85,660,194	659,466	108,172,608	0	0	0	0	0	143,773,109
2003	3,392,356	82,357,577	621,295	107,401,907	0	0	3,425	3,425	0	138,781,813
2004	4,034,122	99,584,709	762,014	127,112,293	0	0	3,455	3,455	0	155,915,652
2005	3,547,757	74,162,876	652,173	104,172,510	0	0	3,452	3,452	0	130,709,171
2006	3,236,833	76,359,546	600,707	109,833,086	0	0	3,905	3,905	0	136,367,449
2007	4,393,943	105,271,501	864,753	142,786,099	0	0	3,517	3,517	0	173,014,162
2008	5,291,979	113,738,631	982,621	157,130,075	0	0	5,035	5,035	0	194,956,989
2009	4,472,648	99,961,313	829,012	139,746,161	0	0	844	844	0	173,123,820
2010	4,302,956	98,286,801	792,475	138,372,156	0	0	1,070	1,070	0	175,704,030
2011	4,716,346	105,525,751	849,548	150,276,109	0	0	2,753	2,753	0	192,690,649
2012	5,145,509	118,331,096	954,922	166,807,978	0	0	1,092	1,092	0	212,325,975
2013	5,994,916	132,811,951	1,123,328	186,339,438	0	0	288	288	0	234,329,319
2014	6,413,842	145,753,405	1,170,667	206,935,423	0	0	115	115	0	257,495,980
2015	6,007,504	131,905,305	1,047,957	189,834,108	0	0	114	114	0	246,602,803
2016	5,716,927	131,623,582	1,062,551	188,857,238	0	0	5,401	5,401	0	251,894,144
2017	5,800,781	134,730,132	1,126,768	187,532,204	0	0	111	111	0	247,264,318
2018	6,049,714	140,175,006	1,101,576	202,103,777	0	0	47,578	47,578	0	268,330,614
2019	6,817,801	152,558,192	1,277,036	219,424,042	0	0	12,981	12,981	0	282,436,092
2020	7,429,977	179,775,143	1,385,297	258,936,779	0	0	17,602	17,602	0	328,345,675
2021	6,359,721	143,072,129	1,110,608	217,759,874	0	0	17,204	17,204	0	286,889,437
2022	8,337,567	198,659,232	1,625,217	274,640,049	0	0	17,200	17,200	0	342,723,265
2023	7,363,253	173,841,865	1,387,445	250,785,965	0	0	17,508	17,508	0	320,320,891
2024	7,436,885	175,580,285	1,401,319	253,293,826	0	0	17,683	17,683	0	323,524,100
2025	7,511,254	177,336,088	1,415,332	255,826,765	0	0	17,860	17,860	0	326,759,340
2026	7,586,367	179,109,446	1,429,485	258,385,032	0	0	18,039	18,039	0	330,026,935
2027	7,662,230	180,900,542	1,443,780	260,968,882	0	0	18,219	18,219	0	333,327,203
2028	7,738,853	182,709,549	1,458,218	263,578,575	0	0	18,401	18,401	0	336,660,480
2029	7,816,241	184,536,645	1,472,800	266,214,361	0	0	18,585	18,585	0	340,027,084
2030	7,894,403	186,382,009	1,487,528	268,876,501	0	0	18,771	18,771	0	343,427,351
2031	7,973,348	188,245,830	1,502,404	271,565,267	0	0	18,959	18,959	0	346,861,626
2032	8,053,081	190,128,286	1,517,428	274,280,917	0	0	19,149	19,149	0	350,330,240
2033	8,133,612	192,029,572	1,532,602	277,023,729	0	0	19,340	19,340	0	353,833,545
2034	8,214,948	193,949,864	1,547,928	279,793,962	0	0	19,534	19,534	0	357,371,877
2035	8,297,097	195,889,364	1,563,407	282,591,904	0	0	19,729	19,729	0	360,945,597
TOTAL	248,197,745	6,358,692,966	50,710,455	8,800,766,730	0	0	455,329	455,329	8,735,637	11,159,523,828

¹ Castaic Lake Water Agency's SWP Water Supply Contract was transferred to Santa Clarita Valley Water Agency effective November 2, 2018.

TABLE B-16B Minimum OMP&R Component of Transportation Charge for Each Contractor for Off-Aqueduct Power Facilities^{1,2,3} (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	3,166	6,232	9,398	20,284	13,600	45,497	79,381	3,418	19,553	22,971
2018	2,351	4,574	6,925	14,868	9,854	33,347	58,069	2,488	14,447	16,935
2019	2,173	4,236	6,409	13,813	9,157	30,557	53,527	2,319	13,085	15,404
2020	5,960	11,561	17,521	37,208	25,320	84,479	147,007	6,476	34,967	41,443
2021	6,485	12,359	18,844	40,765	27,306	90,566	158,637	7,463	39,003	46,466
2022	289	135	424	1,114	556	1,478	3,148	765	1,630	2,396
2023	289	135	424	1,114	559	1,478	3,151	768	1,630	2,399
2024	289	135	424	1,114	559	1,478	3,151	768	1,630	2,399
2025	289	135	424	1,114	559	1,478	3,151	768	1,630	2,399
2026	289	135	424	1,114	559	1,478	3,151	768	1,630	2,399
2027	289	135	424	1,114	559	1,478	3,151	768	1,630	2,399
2028	289	135	424	1,114	559	1,478	3,151	768	1,630	2,399
2029	289	135	424	1,114	559	1,478	3,151	768	1,630	2,399
2030	289	135	424	1,114	559	1,478	3,151	768	1,630	2,399
2031	289	135	424	1,114	559	1,478	3,151	768	1,630	2,399
2032	289	135	424	1,114	559	1,478	3,151	768	1,630	2,399
2033	289	135	424	1,114	559	1,478	3,151	768	1,630	2,399
2034	289	135	424	1,114	559	1,478	3,151	768	1,630	2,399
2035	289	135	424	1,114	559	1,478	3,151	768	1,630	2,399
TOTAL	2,664,387	4,978,198	7,642,585	16,338,660	11,781,819	39,682,082	67,802,561	2,404,773	12,975,293	15,380,066

¹ For years 1983 through 2018, changes are debt service only and do not include bond cover.² For years 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, 1983–2013.³ 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^{1,2,3} (in dollars)

Sheet 2 of 4

Calendar Year	SAN JOAQUIN VALLEY AREA							
	Dudley Ridge	Empire	Kern		Kings	Oak Flat	Tulare	Total
			Municipal and Industrial	Agricultural				
	[11]	[12]	[13]	[14]	[15]	[16]	[17]	[18]
1971	0	0	0	0	0	0	0	0
1972	0	0	0	0	0	0	0	0
1973	0	0	0	0	0	0	0	0
1974	0	0	0	0	0	0	0	0
1975	0	0	0	0	0	0	0	0
1976	0	0	0	0	0	0	0	0
1977	0	0	0	0	0	0	0	0
1978	0	0	0	0	0	0	0	0
1979	0	0	0	0	0	0	0	0
1980	0	0	0	0	0	0	0	0
1981	0	0	0	0	0	0	0	0
1982	0	0	0	0	0	0	0	0
1983	159,191	0	34,366	2,964,185	13,174	9,673	3,733	3,184,322
1984	389,518	0	816,103	9,095,509	26,774	33,576	49,601	10,411,081
1985	527,952	59,322	1,053,957	11,978,046	38,810	42,297	1,253,257	14,953,641
1986	552,172	12,858	885,988	11,788,714	40,659	38,275	872,008	14,190,674
1987	450,941	24,936	1,192,388	10,448,063	39,134	37,538	911,938	13,104,938
1988	425,261	31,146	1,130,988	9,910,050	35,851	26,779	850,225	12,410,300
1989	331,852	17,226	607,908	7,400,983	22,959	24,306	754,007	9,159,241
1990	219,381	7,731	428,482	5,216,562	12,089	12,046	344,943	6,241,234
1991	13,048	3,111	570,942	146,276	0	1,354	30,685	765,416
1992	244,630	13,395	706,155	5,788,599	18,587	15,716	480,903	7,267,985
1993	471,706	25,543	1,202,455	11,405,212	37,276	36,803	1,159,908	14,338,903
1994	262,029	15,161	901,463	6,786,208	19,257	19,061	567,521	8,570,700
1995	626,214	16,830	1,486,494	12,489,555	41,275	36,377	1,051,178	15,747,923
1996	407,919	13,446	1,226,968	9,219,091	28,668	24,001	1,691,135	12,611,228
1997	423,144	(6)	794,476	7,471,645	(31)	22,025	137,304	8,848,557
1998	471,993	4,597	837,228	8,366,817	127	25,458	175,371	9,881,591
1999	360,554	19,182	874,948	7,723,883	24,159	20,065	1,749,925	10,772,716
2000	193,895	5,762	392,659	4,215,772	11,530	9,847	667,127	5,496,592
2001	200,485	6,563	113,854	2,948,087	7,528	11,821	287,409	3,575,747
2002	153,306	4,540	308,554	2,797,916	9,223	10,767	299,940	3,584,246
2003	125,188	3,901	301,142	2,626,386	10,030	7,904	287,531	3,362,082
2004	168,005	12,193	457,106	2,914,113	30,989	10,807	278,204	3,871,417
2005	315,142	14,807	358,007	5,609,958	76,490	11,047	540,681	6,926,132
2006	287,977	13,112	401,503	5,488,668	38,075	11,559	432,313	6,673,207
2007	189,684	8,758	242,253	3,662,405	24,280	10,224	365,975	4,503,579
2008	184,682	7,887	381,864	3,930,067	31,949	11,276	282,379	4,830,104
2009	181,200	8,817	63,082	4,518,839	28,827	11,595	314,621	5,126,981
2010	250,194	27,117	96,128	5,774,210	40,474	16,580	488,098	6,692,801
2011	362,592	11,506	290,168	7,797,111	39,939	11,233	338,448	8,850,997
2012	139,042	16,387	281,108	5,881,018	53,747	16,121	654,940	7,042,363
2013	174,617	9,247	247,481	4,100,710	25,730	11,818	300,486	4,870,089
2014	121,811	4,353	114,780	2,211,296	10,098	7,131	151,394	2,620,863
2015	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	11,439	483	19,972	241,980	1,103	687	21,598	297,262
2018	8,180	347	14,164	173,270	790	495	15,497	212,743
2019	7,677	328	13,344	163,646	743	461	14,737	200,936
2020	20,820	888	36,562	440,344	2,020	1,264	39,538	541,436
2021	22,617	966	40,185	478,546	2,193	1,373	43,039	588,919
2022	262	17	893	6,172	52	21	482	7,899
2023	262	17	892	6,172	52	21	482	7,898
2024	262	17	892	6,172	52	21	482	7,898
2025	262	17	892	6,172	52	21	482	7,898
2026	262	17	892	6,172	52	21	482	7,898
2027	262	17	892	6,172	52	21	482	7,898
2028	262	17	892	6,172	52	21	482	7,898
2029	262	17	892	6,172	52	21	482	7,898
2030	262	17	892	6,172	52	21	482	7,898
2031	262	17	892	6,172	52	21	482	7,898
2032	262	17	892	6,172	52	21	482	7,898
2033	262	17	892	6,172	52	21	482	7,898
2034	262	17	892	6,172	52	21	482	7,898
2035	262	17	892	6,172	52	21	482	7,898
TOTAL	9,531,141	425,690	19,050,305	205,783,235	851,824	603,692	18,034,391	254,280,278

¹ For years 1983 through 2018, charges are debt service only and do not include bond cover.² For years 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, 1983–2013.³ 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^{1,2,3} (in dollars)

Sheet 3 of 4

Calendar Year	SOUTHERN CALIFORNIA AREA									
	AVEK	Coachella	Crestline	Desert	Littlerock	Mojave	Palmdale	San Bernardino	San Gabriel	San Gorgonio
	[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	565,798	35,432	894,572	1,250	0	0	233,134	28,548	0
1984	2,499,848	1,427,428	102,114	2,263,172	77	0	0	502,967	693,074	0
1985	3,749,257	2,032,672	170,137	3,230,451	0	0	157,601	884,188	601,583	0
1986	3,159,857	2,097,408	173,460	3,340,188	15,873	0	301,486	739,563	1,088,901	0
1987	3,167,759	1,991,841	190,149	3,230,424	95,994	1,786	258,719	1,951,799	1,091,691	0
1988	2,688,113	1,940,156	187,156	3,194,137	30,395	846	126,639	2,000,664	839,774	0
1989	2,357,669	1,326,863	132,076	2,218,516	50,948	13,206	493,424	1,257,332	792,087	0
1990	2,528,625	1,463,452	115,746	2,413,745	110,678	0	545,342	1,192,997	1,054,762	0
1991	1,048,414	1,022,405	125,256	1,686,304	65,111	473,291	488,207	540,119	796,531	0
1992	2,760,199	1,124,775	55,985	1,855,065	22,891	1,130,876	367,996	362,232	853,047	0
1993	3,559,487	2,256,338	29,498	3,721,492	60,615	1,101,799	640,919	425,969	1,406,255	0
1994	3,963,982	1,345,145	74,879	2,218,411	88,549	1,371,116	678,876	871,358	1,452,741	0
1995	4,324,009	2,498,462	44,237	4,120,837	43,892	881,146	636,541	75,278	1,397,623	0
1996	3,572,856	4,652,945	77,384	7,674,388	31,691	760,763	723,670	458,246	1,201,941	0
1997	3,411,379	4,294,703	42,135	4,319,206	24,319	891,191	648,652	625,340	1,175,556	0
1998	3,977,988	7,554,910	16,624	6,174,031	30,365	508,248	657,806	166,952	827,650	0
1999	3,696,973	3,195,685	71,662	3,678,076	18,305	501,486	710,674	815,001	1,375,575	0
2000	2,372,130	1,420,806	40,083	1,954,947	0	374,972	257,146	617,664	508,258	0
2001	2,680,895	460,256	53,460	759,169	0	213,385	445,872	1,339,699	119,363	0
2002	1,668,457	567,521	74,145	936,215	0	140,035	529,674	2,414,011	841,746	0
2003	1,445,146	411,258	44,506	678,236	0	405,376	277,984	780,631	624,561	3,303
2004	1,813,317	554,874	71,974	760,283	0	465,965	368,929	2,072,770	449,963	44,648
2005	2,047,638	1,721,141	32,667	1,987,091	0	542,366	400,828	1,568,493	566,063	41,448
2006	2,845,985	5,071,235	26,843	2,093,821	0	1,417,777	442,278	1,533,665	681,916	265,078
2007	2,990,954	3,225,680	77,880	1,331,802	0	2,023,088	710,515	2,639,102	177,256	248,328
2008	3,547,772	4,059,802	74,029	2,237,582	1,845	2,200,333	1,052,126	3,410,480	629,597	616,986
2009	3,350,539	4,067,070	79,671	1,633,327	3,263	2,559,670	1,152,062	3,948,007	1,025,723	819,589
2010	4,321,133	7,385,867	31,714	2,730,993	177	3,304,241	810,142	4,668,858	1,673,291	1,048,807
2011	4,952,954	5,605,548	13,018	2,290,872	407	309,065	551,068	2,185,513	1,468,910	954,501
2012	5,401,397	8,864,502	48,852	3,451,280	495	848,848	1,072,349	7,388,666	1,677,958	1,225,982
2013	2,563,236	3,520,765	77,123	1,425,559	3,270	475,946	512,798	1,986,377	591,150	679,437
2014	1,148,978	1,021,712	56,389	644,953	3,804	273,011	348,413	787,781	231,637	284,110
2015	530,003	828,767	25,589	460,870	2,214	205,015	131,952	568,141	185,603	90,577
2016	153,406	165,508	3,945	121,267	746	46,118	29,017	118,424	48,184	18,721
2017	119,205	110,299	2,891	95,545	657	29,311	20,939	70,192	34,110	8,651
2018	85,967	85,377	2,116	70,388	469	20,361	15,186	50,970	24,858	6,898
2019	80,243	73,418	1,919	63,854	450	19,771	14,196	48,735	23,344	6,222
2020	215,389	209,038	5,473	177,301	1,245	52,418	38,084	125,381	61,672	15,751
2021	238,509	221,412	6,022	190,951	1,419	58,917	42,358	138,884	67,927	17,496
2022	7,182	7,983	335	3,217	0	2,888	1,589	5,920	1,662	1,477
2023	7,183	7,982	335	3,217	0	2,888	1,589	5,920	1,662	1,477
2024	7,183	7,982	335	3,217	0	2,888	1,589	5,920	1,662	1,477
2025	7,183	7,982	335	3,217	0	2,888	1,589	5,920	1,662	1,477
2026	7,183	7,982	335	3,217	0	2,888	1,589	5,920	1,662	1,477
2027	7,183	7,982	335	3,217	0	2,888	1,589	5,920	1,662	1,477
2028	7,183	7,982	335	3,217	0	2,888	1,589	5,920	1,662	1,477
2029	7,183	7,982	335	3,217	0	2,888	1,589	5,920	1,662	1,477
2030	7,183	7,982	335	3,217	0	2,888	1,589	5,920	1,662	1,477
2031	7,183	7,982	335	3,217	0	2,888	1,589	5,920	1,662	1,477
2032	7,183	7,982	335	3,217	0	2,888	1,589	5,920	1,662	1,477
2033	7,183	7,982	335	3,217	0	2,888	1,589	5,920	1,662	1,477
2034	7,183	7,982	335	3,217	0	2,888	1,589	5,920	1,662	1,477
2035	7,183	7,982	335	3,217	0	2,888	1,589	5,920	1,662	1,477
TOTAL	96,224,104	90,554,597	2,498,924	82,374,354	711,414	23,662,172	16,682,712	51,648,460	28,413,693	6,417,210

¹ For years 1983 through 2018, charges are debt service only and do not include bond cover.² For years 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, 1983–2013.³ 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^{1,2,3} (in dollars)

Sheet 4 of 4

Calendar Year	SOUTHERN CALIFORNIA AREA (continued)				FEATHER RIVER AREA				Total State Water Project
	Santa Clarita ⁴	Metropolitan	Ventura	Total	Yuba City	Butte	Plumas	Total	
	[29]	[30]	[31]	[32]	[33]	[34]	[35]	[36]	[37]
1971	0	0	0	0	0	0	0	0	0
1972	0	0	0	0	0	0	0	0	0
1973	0	0	0	0	0	0	0	0	0
1974	0	0	0	0	0	0	0	0	0
1975	0	0	0	0	0	0	0	0	0
1976	0	0	0	0	0	0	0	0	0
1977	0	0	0	0	0	0	0	0	0
1978	0	0	0	0	0	0	0	0	0
1979	0	0	0	0	0	0	0	0	0
1980	0	0	0	0	0	0	0	0	0
1981	0	0	0	0	0	0	0	0	0
1982	0	0	0	0	0	0	0	0	0
1983	411,247	12,791,358	0	16,045,220	0	0	0	0	20,182,468
1984	1,122,640	39,229,567	0	47,840,887	0	0	0	0	60,556,781
1985	1,572,025	77,446,523	0	89,844,437	0	0	0	0	108,590,343
1986	1,694,487	77,581,287	0	90,192,510	0	0	0	0	107,702,921
1987	1,694,698	68,939,195	0	82,614,055	0	0	0	0	99,411,597
1988	1,776,471	79,936,309	0	92,720,660	0	0	0	0	108,898,833
1989	1,348,806	68,311,546	0	78,302,473	0	0	0	0	89,857,307
1990	1,335,341	83,964,409	277,885	95,002,982	0	0	0	0	104,000,038
1991	531,160	54,214,229	132,209	61,123,236	0	0	0	0	64,233,890
1992	1,548,472	72,401,054	0	82,482,592	0	0	0	0	92,173,695
1993	1,332,392	55,312,615	0	69,847,379	0	0	0	0	87,174,348
1994	1,450,328	72,838,621	0	86,354,006	0	0	0	0	97,722,979
1995	1,901,361	40,862,813	0	56,786,199	0	0	0	0	74,988,898
1996	1,507,542	36,536,259	401	57,198,086	0	0	0	0	71,940,675
1997	1,468,949	37,121,379	108,559	54,131,368	0	0	0	0	65,536,671
1998	1,599,394	30,341,609	149,170	52,004,747	0	0	0	0	65,310,733
1999	1,694,851	42,257,580	106,226	58,122,094	0	0	0	0	72,133,666
2000	994,396	43,977,877	123,318	52,641,597	0	0	0	0	60,213,003
2001	1,418,179	49,405,276	84,868	56,980,422	0	0	0	0	62,827,875
2002	1,384,832	45,412,974	153,549	54,123,159	0	0	0	0	59,683,427
2003	1,353,956	41,917,356	129,134	48,071,447	0	0	0	0	53,245,891
2004	1,677,090	58,676,035	170,851	67,126,699	0	0	0	0	73,135,768
2005	1,443,555	56,220,579	61,131	66,633,000	0	0	0	0	75,946,420
2006	1,617,750	60,701,335	70,268	76,767,951	0	0	0	0	85,894,802
2007	1,864,667	61,354,857	119,861	76,763,990	0	0	0	0	83,828,015
2008	3,303,503	72,144,765	300,729	93,579,549	0	0	0	0	102,461,628
2009	3,010,931	71,530,603	313,357	93,493,812	0	0	0	0	102,494,682
2010	2,663,067	88,263,837	322,003	117,224,130	0	0	0	0	128,041,374
2011	1,811,301	80,381,761	225,564	100,750,482	0	0	0	0	113,077,671
2012	2,619,529	78,031,475	299,385	110,930,718	0	0	0	0	121,679,597
2013	2,266,914	49,351,291	144,019	63,597,885	0	0	0	0	71,469,014
2014	1,191,895	24,242,063	30,070	30,264,816	0	0	0	0	34,698,576
2015	545,173	14,384,861	27,465	17,986,230	0	0	0	0	20,267,259
2016	94,339	3,266,601	7,114	4,073,390	0	0	0	0	4,612,417
2017	68,403	2,367,279	5,183	2,932,665	0	0	0	0	3,341,677
2018	50,099	1,692,245	3,471	2,108,405	0	0	0	0	2,403,077
2019	46,484	1,604,216	3,945	1,986,797	0	0	0	0	2,263,073
2020	127,906	4,294,199	9,557	5,333,414	0	0	0	0	6,080,821
2021	137,684	4,705,113	10,442	5,837,134	0	0	0	0	6,650,000
2022	4,838	97,997	1,047	136,134	0	0	0	0	150,000
2023	4,838	97,992	1,047	136,128	0	0	0	0	150,000
2024	4,838	97,992	1,047	136,128	0	0	0	0	150,000
2025	4,838	97,992	1,047	136,128	0	0	0	0	150,000
2026	4,838	97,992	1,047	136,128	0	0	0	0	150,000
2027	4,838	97,992	1,047	136,128	0	0	0	0	150,000
2028	4,838	97,992	1,047	136,128	0	0	0	0	150,000
2029	4,838	97,992	1,047	136,128	0	0	0	0	150,000
2030	4,838	97,992	1,047	136,128	0	0	0	0	150,000
2031	4,838	97,992	1,047	136,128	0	0	0	0	150,000
2032	4,838	97,992	1,047	136,128	0	0	0	0	150,000
2033	4,838	97,992	1,047	136,128	0	0	0	0	150,000
2034	4,838	97,992	1,047	136,128	0	0	0	0	150,000
2035	4,838	97,992	1,047	136,128	0	0	0	0	150,000
TOTAL	53,749,544	1,865,384,849	3,404,387	2,321,726,420	0	0	0	0	2,666,831,910

¹ For years 1983 through 2018, charges are debt service only and do not include bond cover.² For years 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, 1983–2013.³ 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.⁴ Castaic Lake Water Agency's SWP Water Supply Contract was transferred to Santa Clarita Valley Water Agency effective November 2, 2018.

TABLE B-17 Unit Variable OMP&R Component of Transportation Charge (in dollars per acre-foot)

Sheet 1 of 5

Calendar Year	NORTH BAY AQUEDUCT						SOUTH BAY AQUEDUCT		CALIFORNIA AQUEDUCT	
	Reach 1		Reach 3A		Reach 3B		Reach 1		Reach 1	
	Barker Slough Pumping Plant		Cordelia Pumping Plant Solano		Cordelia Pumping Plant Napa ¹		South Bay and Del Valle Pumping Plants ²		Banks Pumping Plant	
	Unit Rate	Cumulative Unit Rate	Unit Rate	Cumulative Unit Rate	Unit Rate	Cumulative Unit Rate	Unit Rate	Cumulative Unit Rate	Unit Rate	Cumulative Unit Rate
1961	[1]	[2]	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	7.8779698	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	3.0630509	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	4.1919309	4.1919309	5.3026984	9.4946293	8.9411156	13.1330465	18.1280636	24.2060285	6.0779649	6.0779649
2003	4.3522704	4.3522704	7.0890449	11.4413153	12.8010554	17.1532358	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	6.2825152	6.2825152	7.7243202	14.0068354	18.6455213	24.9280365	26.0020232	34.1325784	8.1305553	8.1305553
2006	5.4644637	5.4644637	6.2978001	11.7621638	18.3453434	23.8097071	22.9801792	28.8291644	6.8489852	6.8489852
2007	7.7758446	7.7758446	8.2287853	16.0046299	22.8373486	30.6131932	31.7009562	40.9516060	9.2506498	9.2506498
2008	7.7712063	7.7712063	10.0850134	17.8562197	22.0080859	29.7792922	28.6376013	41.0218578	12.3842566	12.3842566
2009	5.2307531	5.2307531	6.6759788	11.9067319	14.3356351	19.5663881	21.2199838	27.1252031	5.9052194	5.9052194
2010	6.0240210	6.0240210	8.7796927	14.8037137	16.7619335	22.7859545	24.7882685	34.2228072	9.4345207	9.4345207
2011	6.8696533	6.8696533	9.0284149	15.8980682	20.2247175	27.0943708	29.9210149	40.7362625	10.8152476	10.8152476
2012	6.7319945	6.7319945	9.2934146	16.0254090	18.7001369	25.4321314	30.5386453	40.7603812	10.2217358	10.2217358
2013	8.9365933	8.9365933	10.6303355	19.5669288	25.7001699	34.6367632	36.2847047	49.0911967	12.8064920	12.8064920
2014	10.7168590	10.7168590	15.0140628	25.7309218	31.6904879	42.4073469	45.2658760	64.9042288	19.6383528	19.6383528
2015	11.1978550	11.1978550	15.7328654	26.9307204	32.4907231	43.6885781	48.0526192	68.8615073	20.8088882	20.8088882
2016	8.5381757	8.5381757	12.3990287	20.9372044	28.7641321	37.3023078	36.9618577	52.0654473	15.1035896	15.1035896
2017	8.1601406	8.1601406	12.7789522	20.9390927	22.7372528	30.8973934	43.4114257	57.0559126	13.6444869	13.6444869
2018	10.6440007	10.6440007	15.8516085	26.5001093	27.0110094	37.6550102	40.1197872	55.9310868	15.8112996	15.8112996
2019	10.7992457	10.7992457	15.0339634	25.8332091	28.0950937	38.8943394	34.1110323	48.8818222	14.7707899	14.7707899
2020	15.2046154	15.2046154	8.5629006	23.7675160	38.4198952	53.6245106	52.4265059	66.3875680	13.9610621	13.9610621
2021	14.0170642	14.0170642	0.0000000	14.0170642	35.4173938	49.4344580	49.0316082	66.6182081	17.5865999	17.5865999
2022	14.3528404	14.3528404	0.0000000	14.3528404	36.2657865	50.6186269	48.4316876	66.7660079	18.3343834	18.3343834
2023	13.2122507	13.2122507	0.0000000	13.2122507	22.9036739	36.1159246	46.1325189	64.0073313	17.8748125	17.8748125
2024	13.3158500	13.3158500	0.0000000	13.3158500	23.0832377	36.3990876	46.4956342	61.8121128	15.3164786	15.3164786
2025	13.4438855	13.4438855	0.0000000	13.4438855	23.3052239	36.7491094	46.9427676	64.3554579	17.4126903	17.4126903
2026	13.4385950	13.4385950	0.0000000	13.4385950	23.2960390	36.7346340	46.9242959	61.7550557	14.8307598	14.8307598
2027	13.4548569	13.4548569	0.0000000	13.4548569	23.3242250	36.7790819	46.9810509	59.3416606	12.3606097	12.3606097
2028	13.4240026	13.4240026	0.0000000	13.4240026	23.2707233	36.6947259	46.8732695	66.4882078	19.6149383	19.6149383
2029	13.4416522	13.4416522	0.0000000	13.4416522	23.3013203	36.7429725	46.9349523	63.4153708	16.4804185	16.4804185
2030	13.4414788	13.4414788	0.0000000	13.4414788	23.3010333	36.7425121	46.9343595	62.0532259	15.1188665	15.1188665
2031	13.4403946	13.4403946	0.0000000	13.4403946	23.2991389	36.7395335	47.0067604	65.9463144	18.9395540	18.9395540
2032	13.4419124	13.4419124	0.0000000	13.4419124	23.3017796	36.7436920	46.9358224	60.7775150	13.8416926	13.8416926
2033	13.4514094	13.4514094	0.0000000							

TABLE B-17 Unit Variable OMP&R Component of Transportation Charge (in dollars per acre-foot)

Sheet 2 of 5

Calendar Year	CALIFORNIA AQUEDUCT (continued)									
	Reach 4		Reach 14A		Reach 15A		Reach 16A		Reach 17E	
	Dos Amigos Pumping Plant		Buena Vista Pumping Plant		Teerink Pumping Plant		Chrisman Pumping Plant		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	2.2823219	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	2.1288270	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	1.9459529	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	0.86334492	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	5.0159728	18.3231845	11.6145173	29.9377018	43.1577241	73.0954260
2003	3.1186984	9.8441776	5.5847107	15.4288833	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	3.8404797	11.9710350	6.8919336	18.8629686	7.4708789	26.3338474	17.3710070	43.7048544	62.2136403	105.9184947
2006	3.1304521	9.9794374	5.8156675	15.7951048	6.2588030	22.0539079	14.6287519	36.6826597	46.5155773	83.1982370
2007	4.5254433	13.7760931	8.0992436	21.8753367	8.7684262	30.6437629	20.3284682	50.9724111	68.7901583	119.7625693
2008	4.7891758	17.1734324	8.9151266	26.0885610	10.3636881	36.45522491	21.6290386	58.0812876	68.9957991	127.0770868
2009	3.0971058	9.0023252	5.6829553	14.6852804	6.2915371	20.9768175	13.8696060	34.8464235	63.6532861	98.4997096
2010	4.1046451	13.5391658	7.0457731	20.5849389	7.6442713	28.2291561	17.4937007	45.7228568	64.9246308	110.6474876
2011	4.5655551	15.3808027	8.0295979	23.4104006	8.6501186	32.0605192	19.9059635	51.6964827	70.7123833	122.6788660
2012	4.5910132	14.8127490	7.9553554	22.7681045	8.7048110	31.4729155	20.0475227	51.5204382	71.2771280	122.7975662
2013	5.5133566	18.3198486	9.6020369	27.9218855	10.4617288	38.3836143	24.2512836	62.6348978	86.8762318	149.5111296
2014	8.4009024	28.0392551	13.7446113	41.7838665	15.1827311	56.9665976	34.7045230	91.6711207	126.3797167	218.0508374
2015	7.7933236	28.6022207	14.1501362	42.7523569	15.5598316	58.3121885	35.2207624	93.5329509	130.8279476	224.3608984
2016	6.5670011	21.6705907	11.6875457	33.3581363	12.85544122	46.2125485	29.0803807	75.2929292	109.3186220	184.6115512
2017	6.2898721	19.9343590	11.1550215	31.0893805	12.3861658	43.4755464	27.8691379	71.3446843	104.9716855	176.3163697
2018	6.4989821	22.3102817	11.8060175	34.1162992	13.0893838	47.2056379	29.5633931	76.7690310	111.2718165	188.0408925
2019	6.0994849	20.8702749	10.9330130	31.8032878	12.1328981	43.9361860	27.5354761	71.4716620	103.3545434	174.8262055
2020	6.4417184	20.4027805	14.5669510	34.9697315	16.5120238	51.4817553	36.6825118	88.1642671	135.8928957	224.0571629
2021	7.7483893	25.3349892	14.1825604	39.5175496	15.0957838	54.6133334	34.7198126	89.3331460	129.1039160	218.4370620
2022	7.6029673	25.9373507	13.8635720	39.8009228	14.7985547	54.5994744	34.0849484	88.6844260	126.7640536	215.4484796
2023	8.1101886	25.9850010	14.7174408	40.7024418	15.9693667	56.6718085	37.0504717	93.7228202	137.8364346	231.5587148
2024	8.0013596	23.3178382	14.3871557	37.7049939	15.5861784	53.2911723	36.1409142	89.4320865	134.3710348	223.8031213
2025	8.1597304	25.5724207	14.7359013	40.3083220	15.9759017	56.2842237	37.0544613	93.3386850	137.8068135	231.1454985
2026	8.0309323	22.8616921	14.4063663	37.2680584	15.6007156	52.8687741	36.1694355	89.0382096	134.4564607	223.4946703
2027	8.1849949	20.5456046	14.7962623	35.3418669	16.0409017	51.3859586	37.2148963	88.6008549	138.4125383	227.0133922
2028	8.0625175	27.6774559	14.4941587	42.1716145	15.7015506	57.8731651	36.4079818	94.2811469	135.3621795	229.6433263
2029	8.1463932	24.6268117	14.7023809	39.3291926	15.9378045	55.2669971	36.9646438	92.2316408	137.4669927	229.6986335
2030	8.0444507	23.1633172	14.4396788	37.6029960	15.6384641	53.2414601	36.25833			

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		Reach 22B		Reach 23		Reach 26A	
	Alamo Powerplant		Pearblossom Pumping Plant		Mojave Siphon Powerplant		Devil Canyon Powerplant	
	Unit Rate	Cumulative Unit Rate	Unit Rate	Cumulative Unit Rate	Unit Rate	Cumulative Unit Rate	Unit Rate	Cumulative Unit Rate
1961	[21]	[22]	[23]	[24]	[25]	[26]	[27]	[28]
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	100.4167867	17.9460159	118.3628026	-6.6110924	111.7517103	-30.2939296	81.4577807
2006	-3.1387155	80.0595215	13.5370501	93.5965716	-5.4976224	88.0989491	-29.8005787	58.2983704
2007	-2.7809944	116.9815749	20.1504425	137.1320175	-6.1785168	130.9535007	-30.0961198	100.8573810
2008	-5.4028716	121.6742151	19.4997782	141.1739933	-6.0198040	135.1541893	-30.7631237	104.3910656
2009	-6.3446584	92.1550513	21.4425257	113.5975769	-5.4878092	108.1097678	-33.3163094	74.7934583
2010	-5.1343883	105.5130993	18.8695769	124.3826762	-6.4564845	117.9261917	-28.6783430	89.2478487
2011	-5.2103711	117.4684949	20.8125082	138.2810032	-7.1272044	131.1537988	-29.9982569	101.1555419
2012	-2.7221204	120.0754458	21.0412588	141.1167046	-11.4254128	129.6912918	-30.6216868	99.0696050
2013	-3.7638094	145.7473202	25.7024082	171.4497284	-10.3251093	161.1246192	-30.7664075	130.3582117
2014	-8.1801225	209.8707149	38.5993980	248.4701129	-7.8617556	240.6083573	-29.6636049	210.9447523
2015	-9.0636991	215.2971993	40.4252791	255.7224784	-9.3774506	246.3450278	-29.6064491	216.7385787
2016	-9.7489045	174.8626467	32.2787529	207.1413996	-11.8723142	195.2690854	-30.7102289	164.5588565
2017	-10.1318567	166.1845130	30.9511759	197.1356889	-16.8845410	180.2511479	-30.2238617	150.0272862
2018	-7.9692616	180.0716309	32.9530421	213.0246730	-10.7765089	202.2481641	-30.6516186	171.5965455
2019	-5.9684628	168.8577472	30.3374011	199.1951438	-12.0100900	187.1805537	-29.7052389	157.4798149
2020	-14.0633395	209.9938234	43.7502228	253.7440462	-17.5151389	236.2289073	-31.8255554	204.4033519
2021	-13.9716297	204.4654323	41.6054347	246.0708670	-23.0649666	223.0059004	-36.3556074	186.6502930
2022	-13.9552514	201.4932282	40.9707150	242.4639432	-23.0033260	219.4606172	-36.2571042	183.2035130
2023	-13.0042214	218.5544934	38.4257428	256.9802362	-19.7303495	237.2498867	-30.7403609	206.5095259
2024	-12.4416088	211.3615125	36.8161799	248.1776924	-18.7125247	229.4651678	-30.3655529	199.096149
2025	-12.8964900	218.2490085	38.7440222	256.9930307	-19.5427442	237.4502865	-30.2062942	207.2439923
2026	-12.5525354	210.9421349	37.5370212	248.4797562	-18.9138353	229.569208	-30.5498289	199.0160920
2027	-12.8200234	214.1933698	38.5096174	252.7029872	-19.4023080	233.3006792	-30.3625786	202.9381006
2028	-12.6760297	216.9672966	37.9228652	254.8901619	-19.1388179	235.7513439	-30.6130619	205.1382821
2029	-12.7446965	216.9539370	38.2105402	255.1644772	-19.2643131	235.9001641	-30.2745910	205.6255731
2030	-12.6140558	211.6781930	37.7580388	249.4362318	-19.0257985	230.4104333	-30.3808411	200.0295922
2031	-13.1817315	231.9493141	39.7295089	271.6788231	-20.0697565	251.6090666	-30.4740044	221.1350622
2032	-12.1464871	202.7458933	36.1531150	238.8990082	-18.1804943	220.7185139	-29.6447619	191.0737520
2033	-13.2871493	228.5414859	40.1321374	268.6736232	-20.2657929	248.4078304	-31.3813188	217.0265115
2034	-12.3465945	209.0854722	36.7840654	245.8695377	-18.5406755	227.3288622	-29.5354914	197.7933708
2035	-13.4608339	254.9225712	40.7702031	295.6927744	-20.5902878	275.1024866	-31.7339629	243.3685236

TABLE B-17 Unit Variable OMP&R Component of Transportation Charge (in dollars per acre-foot)

Sheet 4 of 5

Calendar Year	CALIFORNIA AQUEDUCT (continued)							
	Reach EBX2B Greenspot Pump Station ³		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
1961	[29]	[30]	[31]	[32]	[33]	[34]	[35]	[36]
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	18.9026723	100.3604529	0.0000000	0.0000000	17.9720829	118.3325358	3.6826445	122.0151803
2006	15.9293183	74.2276888	0.0000000	0.0000000	21.0165830	95.2442718	20.2208674	115.4651392
2007	20.4927605	121.3501415	0.0000000	0.0000000	28.4428779	149.7930193	63.2554802	213.0484996
2008	16.8739520	121.2650176	0.0000000	0.0000000	23.8349468	145.0996444	7.1460269	152.2459912
2009	17.5478707	92.3413290	0.0000000	0.0000000	23.7727395	116.1140685	3.9675922	120.0816607
2010	17.0436537	106.2915024	0.0000000	0.0000000	24.2451243	130.5366267	3.4310537	133.9676803
2011	18.0600345	119.2155764	0.0000000	0.0000000	25.1226812	144.3382575	3.5638138	147.9020713
2012	18.3655399	117.4351449	0.0000000	0.0000000	25.8843213	143.3194663	4.3752116	147.6946779
2013	22.4122237	152.7704354	0.0000000	0.0000000	31.8353926	184.6058280	3.9034336	188.5092615
2014	32.2725826	243.2173349	0.0000000	0.0000000	46.5776827	289.7950176	3.2898236	293.0848412
2015	35.2630732	252.0016520	0.0000000	0.0000000	49.0106122	301.0122642	4.3527636	305.3650277
2016	30.8193702	195.3782267	0.0000000	0.0000000	40.6132597	235.9914864	4.5412833	240.5327697
2017	55.5960371	205.6233233	33.149051	183.1762914	38.9679955	222.1442869	5.7737187	227.9180056
2018	1.8517543	173.4482998	54.0110324	225.6075779	42.6472830	268.2548609	3.4701981	271.7250590
2019	11.3256387	168.8054536	60.5080033	217.9878182	41.4651444	259.4529626	3.7170146	263.1699772
2020	55.5228234	259.9261753	32.8158553	237.2192072	41.5591447	278.7783519	7.1412691	285.9196210
2021	0.0000000	186.6502930	61.4177264	248.0680194	54.0541426	302.1221620	9.5871615	311.7093235
2022	0.0000000	183.2035130	55.5989403	238.8024533	48.9380540	287.7405073	8.6460381	296.3865454
2023	0.0000000	206.5095259	57.6402698	264.1497956	50.6711946	314.8209902	9.3719158	324.1929060
2024	0.0000000	199.0996149	58.0921965	257.1918114	51.0684008	308.2602122	9.4454363	317.7056485
2025	0.0000000	207.2439923	58.6508671	265.8948593	51.5595376	317.4543969	9.5362086	326.9906055
2026	0.0000000	199.0160920	58.6277457	257.6438376	51.5393064	309.1831440	9.5324975	318.7156415
2027	0.0000000	202.9381006	58.6986513	261.6367519	51.6016378	313.2383897	9.5440321	322.7824218
2028	0.0000000	205.1382821	58.5639692	263.7022512	51.4832370	315.1854882	9.5221665	324.7076547
2029	0.0000000	205.6255731	58.6410405	264.2666135	51.5509634	315.8175769	9.5347041	325.3522810
2030	0.0000000	200.0295922	58.6403661	258.6699583	51.5502890	310.2202473	9.5345035	319.7547508
2031	0.0000000	221.1350622	58.6355491	279.7706114	51.5460501	331.3166615	9.5338014	340.8504629
2032	0.0000000	191.0737520	58.6421965	249.7159486	51.5519268	301.2678754	9.5348044	310.8026798
2033	0.0000000	217.0265115	58.6836224	275.7101339	51.5883430	327.2984769	9.5416249	336.8401018
2034	0.0000000	197.7933708	58.5558767	256.3492475	51.4761079	307.8253554	9.5208626	317.3462180
2035	0.0000000	243.3685236	58.7215800	302.0901036	51.6216763	353.7117799	9.5477432	363.2595231

³ Citrus Pump Station began operation during 2017. No planned water deliveries are scheduled for 2020–2035 at Reach EBX-R2C, so no costs or rates are shown for Greenspot Pump Station. 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)

Sheet 5 of 5

Calendar Year	CALIFORNIA AQUEDUCT (continued)									
	Reach 29A		Reach 29G		Reach 29J		Reach 31A		Reach 33A	
	Oso Pumping Plant		Warne Powerplant		Castaic Powerplant		Las Perillas and Badger Hill Pumping Plants		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	-6.8094948	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	-12.5557280	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	10.217225	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	16.2236357	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	-1.876604	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	25.7650103	-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	19.284372
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	5.4525777	14.1545162	42.2356425	56.3901587
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	7.3345862	113.2530808	-14.2938796	98.9592012	-24.7472457	74.2119556	8.2161336	20.1871686	62.2439815	82.4311501
2006	5.2527061	88.4509431	-14.0865037	74.3644394	-23.8861273	50.4783121	7.4054795	17.3849169	52.1629592	69.5478761
2007	8.1663205	127.9288999	-12.5169061	115.4191898	-25.0603889	90.3515949	9.9534234	23.7295166	73.5897011	97.3192177
2008	8.5535144	135.6306012	-13.8809446	121.7496566	-29.0198140	92.7298426	10.5303147	27.7037471	79.6384295	107.3421766
2009	6.9000655	105.3997751	-10.4812488	94.9185263	-24.7607898	70.1577365	6.7838660	15.7861912	62.9155041	78.7016952
2010	7.9652264	118.6127140	-13.8211960	104.7915181	-26.2504816	78.5410364	8.4639527	22.0031185	68.9378650	90.9409836
2011	8.4278727	131.1067387	-14.1584994	116.9482393	-28.7386599	88.2095794	9.7697761	25.1505788	85.4589931	110.6095719
2012	8.4530651	131.2506313	-13.8982775	117.3523539	-25.6245942	91.7277597	8.9148718	23.2726208	84.0072128	107.7348337
2013	10.2850969	159.7962265	-14.3636831	145.4325434	-25.5768325	119.8575109	12.2163090	30.5361575	94.0115337	124.5476913
2014	15.0335064	233.0843438	-14.0124517	219.0718921	-26.4213846	192.6505076	16.6022731	44.6415282	105.9560101	150.5975384
2015	15.5860469	239.9469453	-14.2676550	225.6792904	-25.0847717	200.5945186	16.9599385	45.5621592	128.4756945	174.0378537
2016	12.9510657	197.5626168	-14.0588274	183.5037895	-24.9945598	158.5092297	12.8588071	34.5293978	97.1588605	131.6882583
2017	12.4354723	188.7518421	-13.8955888	174.8562533	-25.6785720	149.0875013	12.1525242	32.0868832	78.5787120	110.6655952
2018	13.2830460	201.3239385	-15.2646424	186.0592961	-26.6439108	159.4153854	16.2155069	38.5257886	119.5824582	158.1082468
2019	12.4111234	187.2373288	-14.8238687	172.4134601	-27.3405902	145.0728699	15.7888936	36.6561968	112.1986877	148.8578562
2020	14.3833461	238.4405090	-11.9937579	226.4467511	-20.3973303	206.0494208	17.1758333	37.5786138	148.1757366	185.7543504
2021	13.4084334	231.8454953	-14.1465326	217.6989628	-22.2306004	195.4683624	17.5937591	42.9287483	111.3405135	154.2692618
2022	13.8185530	229.2670326	-13.3663610	215.9006717	-23.0285285	192.8721432	17.3287962	43.2661469	109.6297745	152.8959214
2023	16.2796233	247.8833831	-15.3433042	232.4950339	-23.7631948	208.7318932	6.9149232	32.9044242	142.0429361	174.9473602
2024	16.1314184	239.9345397	-15.1041826	224.8303572	-24.1614863	200.6688709	6.9851070	30.3029452	143.1561159	173.4590610
2025	16.0411113	247.1866098	-14.8743732	232.3123666	-23.7891388	208.5203978	7.0502107	32.6226314	144.5327807	177.1554120
2026	15.7169440	239.2116143	-14.5784907	224.6312326	-23.3071145	201.3260091	7.0478444	29.9095365	144.4759265	174.3854631
2027	16.3440488	243.3574420	-15.1438994	228.2135426	-24.2285431	203.9849995	7.0560433	27.6016480	144.6506586	172.2523065
2028	15.7758922	245.4192186	-14.6507060	230.7685126	-23.4225088	207.3460038	7.0329618	34.7104176	144.3188296	179.0294272
2029	16.2328797	245.9315132	-15.0553473	230.8761659	-24.0841457	206.7920202	7.0488719	31.6756836	144.5087440	176.1844276
2030	15.6950075	239.9872563	-14.5549379	225.4323183	-23.2687602	202.1635582	7.0497956	30.2131127	144.5069289	174.7200417
2031	17.9981703	263.1292160	-16.7007182	246.4284978	-26.7725351	219.6559627	7.0483737	34.4519412	144.4950578	178.9469990
2032	15.0062640	229.8986443	-13.9149554	215.9836889	-22.2253657	193.7583232	7.0497333	28.7271410	144.5114174	173.2385858
2033	17.6891260	259.5177612	-16.3993136	243.1184475	-26					

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 Contractor¹ (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
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	189,426	393,907	583,333	1,486,725	850,784	2,499,318	4,836,827	350,415	1,924,273	2,274,688
2006	182,948	319,395	502,343	1,306,684	740,195	2,186,379	4,233,258	292,727	1,618,727	1,911,454
2007	332,799	606,438	939,237	1,614,865	902,007	2,711,160	5,228,031	367,477	2,699,635	3,067,112
2008	395,206	527,598	922,805	1,567,709	767,748	1,941,383	4,276,840	365,178	1,974,345	2,339,523
2009	213,145	272,177	485,322	843,241	501,079	1,552,123	2,896,443	299,133	1,215,986	1,515,120
2010	282,374	305,677	588,052	1,351,323	627,657	1,947,175	3,926,156	341,665	1,616,476	1,958,141
2011	306,109	307,816	613,926	1,748,638	948,748	2,961,421	5,658,807	422,418	2,511,286	2,933,704
2012	251,514	316,882	568,396	1,724,618	654,472	2,348,451	4,727,541	424,906	2,098,028	2,522,934
2013	433,372	526,180	959,551	2,128,755	1,087,237	3,112,143	6,328,135	458,460	2,244,100	2,702,560
2014	599,974	395,945	995,919	1,545,098	1,202,782	2,169,620	4,917,500	480,184	2,505,378	2,985,562
2015	488,162	506,917	995,079	1,480,045	941,195	3,145,832	5,567,072	597,780	2,027,653	2,625,433
2016	334,707	360,288	694,995	2,384,152	798,340	4,093,734	7,276,226	552,959	3,921,783	4,474,742
2017	253,892	415,954	669,846	2,107,616	940,155	4,143,032	7,190,804	314,844	4,312,707	4,627,551
2018	439,640	683,848	1,123,489	2,210,564	904,213	4,774,584	7,889,361	383,729	4,359,834	4,743,563
2019	438,609	605,602	1,044,211	2,026,906	690,510	2,396,388	5,113,803	393,282	2,945,664	3,338,947
2020	675,186	599,545	1,274,731	1,421,092	1,496,503	5,227,432	8,145,027	862,643	1,267,402	2,130,045
2021	860,901	401,645	1,262,546	3,015,973	1,545,021	3,997,092	8,558,087	2,044,993	4,210,317	6,255,310
2022	881,523	411,266	1,292,790	3,025,398	1,560,999	4,005,964	8,592,361	2,032,598	4,172,835	6,205,434
2023	628,959	378,584	1,007,543	2,905,987	1,508,499	3,840,440	8,254,926	2,339,046	4,774,663	7,113,710
2024	633,890	381,552	1,015,442	2,797,442	1,463,431	3,708,727	7,969,600	2,325,392	4,734,045	7,059,437
2025	639,986	385,221	1,025,207	2,919,023	1,526,817	3,861,327	8,307,167	2,374,945	4,834,926	7,209,871
2026	639,734	385,070	1,024,803	2,792,687	1,461,016	3,705,303	7,959,007	2,337,812	4,759,328	7,097,140
2027	640,508	385,535	1,026,043	2,676,435	1,400,437	3,560,500	7,637,372	2,309,214	4,701,110	7,010,324
2028	639,039	384,651	1,023,690	3,022,047	1,580,494	3,989,292	8,591,834	2,400,066	4,886,066	7,286,132
2029	639,879	385,157	1,025,036	2,873,522	1,503,113	3,804,922	8,181,557	2,361,928	4,808,425	7,170,354
2030	639,871	385,152	1,025,023	2,807,127	1,468,539	3,723,194	7,998,859	2,342,297	4,768,459	7,110,756
2031	639,819	385,121	1,024,940	2,997,175	1,567,494	3,956,779	8,521,449	2,398,963	4,883,822	7,282,785
2032	639,891	385,165	1,025,056	2,744,369	1,435,876	3,646,651	7,826,896	2,322,436	4,728,027	7,050,463
2033	640,344	385,437	1,025,780	2,848,429	1,489,996	3,772,061	8,110,486	2,359,816	4,804,125	7,163,942
2034	638,950	384,598	1,023,548	2,978,277	1,557,720	3,936,125	8,472,122	2,385,458	4,856,327	7,241,785
2035	640,757	385,686	1,026,443	2,883,456	1,508,155	3,811,976	8,203,587	2,377,680	4,840,493	7,218,173
TOTAL	17,095,115	15,035,194	32,130,309	79,653,041	43,806,718	130,435,525	253,895,284	43,120,117	118,581,084	161,701,201

¹B-18 includes Extra Peaking Charges for additional power shown in Table 9.

TABLE B-18 Variable OMP&R Component of Transportation Charge for Each Contractor¹ (in dollars)

Sheet 2 of 4

Calendar Year	SAN JOAQUIN VALLEY AREA								
	Dudley Ridge	Empire	Future Contractor San Joaquin Valley	Kern		Kings	Oak Flat	Tulare	Total
				Municipal and Industrial	Agricultural				
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	569,441
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	156,815	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	979,573	45,897	0	838,412	17,679,307	237,098	34,100	1,675,969	21,490,356
2006	719,318	32,753	0	995,639	13,811,204	95,104	29,053	1,079,845	16,762,915
2007	621,784	28,709	0	774,011	12,144,363	79,645	32,997	1,199,664	14,881,172
2008	380,804	16,263	0	758,463	7,720,180	65,877	24,583	582,248	9,548,418
2009	191,017	9,308	0	65,782	5,123,824	30,527	11,769	331,320	5,763,548
2010	403,762	44,124	0	144,037	9,138,524	65,686	27,417	785,379	10,608,929
2011	933,415	29,454	0	710,131	19,628,670	103,162	29,363	851,153	22,285,349
2012	271,281	33,210	0	534,102	11,583,129	109,688	32,791	1,322,095	13,886,297
2013	495,479	28,707	0	620,817	11,996,975	85,096	36,114	808,436	14,071,623
2014	524,070	14,468	0	218	7,092,279	35,178	29,850	250,346	7,946,410
2015	445,070	17,848	0	498,828	9,334,046	35,152	22,411	495,827	10,849,183
2016	453,089	39,484	0	279,749	13,592,988	79,314	28,017	918,551	15,391,192
2017	1,084,398	33,849	0	832,561	25,715,339	153,172	39,474	1,205,995	29,064,787
2018	759,997	35,496	0	107,910	14,116,018	82,838	36,192	879,885	16,018,335
2019	689,345	40,447	0	302,530	22,299,846	108,348	32,259	2,015,346	25,488,122
2020	317,265	22,606	0	352,765	9,557,462	87,232	31,315	490,482	10,859,127
2021	662,991	45,603	0	2,054,714	17,476,314	144,665	60,146	1,329,656	21,774,090
2022	678,755	46,687	0	2,079,661	17,720,341	147,979	62,704	1,361,270	22,097,397
2023	680,001	46,773	0	2,125,513	17,405,345	146,341	61,132	1,363,771	21,828,875
2024	610,205	41,972	0	1,953,298	15,911,329	131,462	52,382	1,223,790	19,924,438
2025	669,205	46,030	0	2,101,288	17,194,571	144,061	59,551	1,342,117	21,556,824
2026	598,268	41,151	0	1,926,775	15,674,619	128,927	50,721	1,199,850	19,620,311
2027	537,658	36,982	0	1,805,579	14,524,762	115,997	42,273	1,078,295	18,141,547
2028	724,291	49,819	0	2,216,139	18,264,051	155,810	67,083	1,452,596	22,929,790
2029	644,459	44,328	0	2,043,801	16,682,321	138,781	56,363	1,292,489	20,902,542
2030	606,161	41,694	0	1,946,047	15,843,075	130,611	51,707	1,215,680	19,834,975
2031	717,124	49,326	0	2,243,552	18,350,204	154,284	64,773	1,438,221	23,017,485
2032	567,276	39,019	0	1,835,920	14,933,031	122,315	47,339	1,137,695	18,682,596
2033	637,448	43,846	0	2,062,237	16,721,584	137,287	54,373	1,278,427	20,935,202
2034	696,355	47,898	0	2,132,974	17,588,645	149,850	64,075	1,396,568	22,076,365
2035	669,764	46,069	0	2,205,283	17,749,479	144,182	56,545	1,343,239	22,214,560
TOTAL	25,050,568	1,420,946	0	48,717,524	577,839,934	3,958,139	1,735,292	46,398,293	705,120,697

1 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 Contractor¹ (in dollars)

Sheet 3 of 4

Calendar Year	SOUTHERN CALIFORNIA AREA									
	AVEK	Coachella	Crestline	Desert	Littlerock	Mojave	Palmdale	San Bernardino	San Gabriel	San Gorgonio
[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	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	780	0	12,785	0	4,496	1,515	0	32,107	0	0
1973	286	102,812	6,896	159,536	3,855	0	0	301,444	0	0
1974	15,558	100,955	9,890	157,742	4,932	221	0	177,173	5,961	0
1975	99,186	108,253	12,758	170,111	6,391	0	0	136,066	50,723	0
1976	385,090	135,276	17,835	213,594	8,164	0	0	139,354	65,476	0
1977	199,166	0	23,598	0	1,974	1,702	0	239,663	74,838	0
1978	581,729	174,116	20,875	264,178	2,731	0	0	37,043	67,462	0
1979	1,058,904	228,437	28,603	340,510	2,328	90,803	0	236	3,668	0
1980	1,390,117	256,759	29,229	401,038	3,667	94,362	0	0	16,504	0
1981	1,480,362	274,149	33,632	430,304	23,861	90,590	0	254,649	57,523	0
1982	923,973	292,674	27,190	461,216	0	230,608	0	126,461	189,895	0
1983	333,772	172,336	10,792	272,477	385	0	0	(71,602)	(8,768)	0
1984	485,847	273,597	19,572	433,785	15	0	0	(66,353)	(91,433)	0
1985	821,069	413,406	34,603	657,011	0	0	32,464	(47,544)	(32,348)	0
1986	1,109,047	728,808	60,274	1,160,650	5,548	0	105,375	69,170	101,843	0
1987	1,019,605	668,383	63,601	1,083,530	32,651	585	157,843	88,076	49,930	0
1988	1,019,793	688,891	66,914	1,134,141	11,991	300	50,654	92,465	38,688	0
1989	1,736,901	978,885	97,114	1,633,489	38,269	8,951	350,953	340,460	210,334	0
1990	2,442,558	1,402,619	110,934	2,313,410	90,472	0	446,408	599,573	530,099	0
1991	286,485	277,078	33,945	456,999	17,978	128,405	132,700	35,339	52,116	0
1992	587,340	240,119	11,952	396,022	4,871	241,338	78,306	(22,718)	(53,500)	0
1993	(190,611)	(809,033)	(2,389)	(1,334,429)	(3,246)	(61,112)	(29,466)	(157,452)	(519,798)	0
1994	1,841,902	189,616	34,480	312,714	41,201	731,185	315,446	122,829	204,783	0
1995	761,209	(251,547)	7,960	(414,889)	7,727	165,622	114,342	(7,579)	(140,714)	0
1996	1,883,530	508,274	18,313	838,330	16,510	289,044	385,745	49,537	133,848	0
1997	2,121,818	365,342	24,076	330,153	15,099	414,596	438,212	61,553	115,882	0
1998	(577,005)	(3,979,131)	(2,991)	(3,279,862)	(4,405)	(46,209)	(84,367)	(87,188)	(432,227)	0
1999	1,309,467	(633,767)	20,018	(729,435)	6,484	180,423	263,297	(161,631)	(222,717)	0
2000	1,743,925	(425,149)	24,166	(584,980)	0	283,085	189,047	(184,824)	(152,086)	0
2001	10,748,924	1,496,563	206,495	2,468,506	0	850,559	1,788,151	4,356,149	388,120	0
2002	3,940,517	737,683	162,410	1,216,924	0	332,521	1,250,873	3,146,998	1,094,131	0
2003	5,100,245	907,298	145,685	1,496,291	0	1,429,259	981,068	1,640,399	1,377,877	7,287
2004	5,218,767	1,018,471	192,767	1,395,500	0	1,344,202	1,061,772	3,812,245	825,907	98,114
2005	6,008,037	3,463,503	90,184	3,998,681	0	1,584,002	1,176,081	2,655,846	1,139,106	84,435
2006	6,435,505	7,059,933	56,471	2,914,919	0	3,169,772	1,000,104	2,155,121	949,331	423,773
2007	9,394,122	7,385,584	231,526	3,049,322	0	6,192,750	2,228,955	6,077,974	405,850	600,632
2008	5,837,461	4,833,042	114,611	2,615,449	3,042	3,538,967	1,734,466	4,009,847	752,868	719,161
2009	4,116,175	3,415,138	96,644	1,365,953	3,871	3,229,706	1,413,478	3,402,537	861,597	750,289
2010	6,171,356	7,525,268	42,100	2,783,016	0	4,662,917	1,157,373	4,795,987	1,711,774	1,095,127
2011	11,047,442	9,132,221	62,167	3,679,937	0	659,640	1,268,372	3,567,845	2,386,360	1,549,093
2012	10,124,786	11,590,047	80,927	4,468,138	0	1,559,236	2,005,909	9,803,820	2,185,277	1,626,118
2013	7,440,013	8,371,628	220,418	2,710,278	0	1,249,652	1,540,112	4,628,208	1,206,074	1,780,470
2014	3,672,568	2,574,663	296,572	643,171	0	849,317	1,763,898	2,507,832	253,016	1,478,065
2015	2,758,646	7,876,783	308,650	2,431,157	0	2,216,654	1,256,412	5,660,368	1,248,393	1,062,913
2016	6,842,657	11,066,440	211,672	3,602,687	0	4,484,836	1,838,856	10,817,066	2,647,423	2,601,602
2017	15,599,041	12,480,904	161,685	4,746,263	0	6,651,058	2,310,002	13,167,960	3,309,002	3,572,060
2018	9,924,410	23,407,533	241,282	8,193,049	0	1,136,921	1,838,531	8,374,087	2,926,579	3,540,131
2019	10,687,350	5,446,912	14,039	2,194,954	44,229	4,299,591	2,044,870	13,647,736	3,656,681	3,736,891
2020	3,932,482	22,265,248	476,946	7,407,169	86,307	2,007,972	880,294	4,874,642	928,604	2,289,072
2021	17,795,493	15,493,841	776,061	6,243,452	282,162	7,881,018	3,839,861	11,496,118	3,225,317	3,231,612
2022	17,537,786	15,207,724	763,723	6,128,158	278,061	7,769,747	3,784,043	11,283,918	3,165,757	3,072,947
2023	19,020,662	17,142,356	825,630	6,907,744	301,605	8,243,646	4,104,453	12,717,737	3,568,485	3,361,280
2024	18,395,150	16,527,259	798,539	6,659,882	291,679	7,966,989	3,969,369	12,261,522	3,440,441	3,293,912
2025	18,994,842	17,203,324	826,327	6,932,312	301,184	8,249,489	4,098,716	12,762,864	3,581,176	3,390,253
2026	18,359,023	16,520,326	798,889	6,657,088	291,100	7,976,152	3,961,493	12,256,410	3,438,998	3,304,360
2027	18,642,309	16,845,892	811,886	6,788,279	295,587	8,111,453	4,022,551	12,497,819	3,506,770	3,346,568
2028	18,882,896	17,028,529	820,415	6,861,876	299,415	8,182,385	4,074,646	12,633,303	3,544,790	3,366,561
2029	18,882,013	17,068,979	820,933	6,878,175	299,396	8,190,996	4,074,395	12,663,245	3,553,210	3,373,247
2030	18,423,119	16,604,456	801,828	6,690,990	292,116	8,006,795	3,975,316	12,318,774	3,456,511	3,315,145
2031	20,186,537	18,356,422	875,600	7,396,968	320,090	8,721,873	4,356,008	13,618,042	3,821,214	3,534,119
2032	17,645,711	15,861,032	768,100	6,391,417	279,789	7,668,562	3,807,568	11,767,332	3,301,754	3,222,223
2033	19,890,546	18,015,371	864,459	7,259,537	315,387	8,624,731	4,292,009	13,365,267	3,750,218	3,492,488
2034	18,197,042	16,418,828	791,104	6,616,188	288,538	7,892,648	3,926,625	12,180,974	3,417,869	3,290,150
2035	22,185,001	20,202,021	957,357	8,140,677	351,793	9,494,758	4,787,446	14,986,939	4,205,408	3,766,719
TOTAL	452,910,435	409,033,376	16,570,727	173,211,451	4,969,300	177,276,790	94,561,037	304,009,235	83,547,871	77,376,819

¹ 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 Contractor¹ (in dollars)

Sheet 4 of 4

Calendar Year	SOUTHERN CALIFORNIA AREA (continued)				FEATHER RIVER AREA				South Bay Area Future Contractor	Grand Total
	Santa Clarita ²	Metropolitan	Ventura	Total	Yuba City	Butte	Plumas	Total		
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	30,401	0	0	30,401	0	0	0	0	0	1,117,912
1969	30,627	0	0	30,627	0	0	0	0	0	773,646
1970	39,430	0	0	39,430	0	0	0	0	0	1,103,799
1971	34,871	0	0	34,871	0	0	0	0	0	1,513,434
1972	47,571	848,011	0	947,266	0	0	0	0	0	3,297,202
1973	28,968	1,083,328	0	1,687,126	0	0	0	0	0	3,174,991
1974	28,982	1,872,297	0	2,373,712	0	0	0	0	0	3,926,489
1975	28,568	3,887,152	0	4,499,209	0	0	0	0	0	6,057,701
1976	38,365	5,485,263	0	6,488,418	0	0	0	0	0	8,477,311
1977	21,006	(796,686)	0	(234,739)	0	0	0	0	0	1,152,444
1978	45,550	3,696,428	0	4,890,112	0	0	0	0	0	7,632,606
1979	83,940	4,021,960	0	5,859,389	0	0	0	0	0	9,873,798
1980	51,143	5,362,245	0	7,605,064	0	0	0	0	0	10,425,875
1981	118,583	10,862,932	0	13,626,585	0	0	0	0	0	17,576,025
1982	132,575	7,685,168	0	10,069,760	0	0	0	0	0	13,566,611
1983	(335,712)	(8,994,497)	0	(8,620,817)	0	0	0	0	0	(7,441,457)
1984	(142,910)	(7,633,741)	0	(6,721,621)	0	0	0	0	0	(4,008,601)
1985	(335,343)	(15,739,366)	0	(14,196,048)	0	0	0	0	0	(10,310,371)
1986	54,812	1,135,478	0	4,531,005	0	0	0	0	0	11,629,559
1987	(40,745)	(3,007,097)	0	116,362	0	0	0	0	0	6,746,470
1988	(74,006)	(3,407,929)	0	(378,098)	0	0	0	0	0	6,351,151
1989	178,359	9,488,536	0	15,062,251	0	0	0	0	0	24,661,302
1990	422,502	30,759,725	204,582	39,322,882	0	0	0	0	0	48,184,400
1991	(3,054)	184,870	22,623	1,625,484	0	0	0	0	0	2,463,685
1992	(208,900)	(9,471,028)	0	(8,196,198)	0	0	0	0	0	(5,499,060)
1993	(491,161)	(21,473,875)	0	(25,072,572)	0	0	0	0	0	(24,652,636)
1994	66,338	4,059,683	0	7,920,177	0	0	0	0	0	13,514,307
1995	(247,735)	(4,895,977)	0	(4,901,581)	0	0	0	0	0	(99,701)
1996	72,171	1,859,275	0	6,054,577	0	0	0	0	0	15,893,938
1997	22,440	2,428,729	(921)	6,336,979	0	0	0	0	0	14,932,641
1998	(733,387)	(14,593,773)	(68,568)	(23,889,113)	0	0	0	0	0	(24,030,879)
1999	(448,290)	(9,194,693)	(30,003)	(9,640,848)	0	0	0	0	0	(2,621,509)
2000	(360,679)	(14,982,560)	6,226	(14,443,828)	0	0	0	0	0	(7,179,265)
2001	4,442,763	157,946,899	265,404	184,958,532	0	0	0	0	0	207,765,068
2002	1,972,925	59,841,457	279,778	73,976,216	0	0	0	0	0	88,828,838
2003	3,152,927	94,319,451	358,003	110,915,789	0	0	0	0	0	129,407,240
2004	3,252,013	107,156,248	416,820	125,792,825	0	0	0	0	0	144,109,361
2005	3,021,174	114,294,615	123,563	137,639,226	0	0	0	0	0	166,824,430
2006	2,267,127	83,188,003	93,385	109,713,444	0	0	0	0	0	133,123,414
2007	4,254,344	138,275,265	318,419	178,414,742	0	0	0	0	0	202,530,295
2008	3,787,162	83,673,640	409,647	112,029,363	0	0	0	0	0	129,116,948
2009	2,596,689	60,903,211	350,974	82,506,261	0	0	0	0	0	93,166,693
2010	2,755,830	89,821,474	402,744	122,924,965	0	0	0	0	0	140,006,243
2011	2,817,663	131,808,061	425,260	168,404,061	0	0	0	0	0	199,895,847
2012	3,549,784	103,464,475	480,008	150,938,527	0	0	0	0	0	172,643,696
2013	5,686,557	107,522,589	403,726	142,759,724	0	0	0	0	0	166,821,594
2014	5,146,067	70,203,891	17,917	89,406,976	0	0	0	0	0	106,252,367
2015	5,454,777	112,508,845	216,398	142,999,994	0	0	0	0	0	163,036,762
2016	5,015,534	167,126,887	522,767	216,778,427	0	0	0	0	0	244,615,582
2017	7,425,300	217,217,860	2,193,655	288,834,789	0	0	0	0	0	330,387,776
2018	6,697,085	109,043,077	308,339	175,631,024	0	0	0	0	0	205,405,771
2019	6,327,915	188,714,633	3,330,665	244,146,467	0	0	0	0	0	279,131,550
2020	10,859,217	82,203,472	1,949,545	140,160,972	0	0	0	0	0	162,569,903
2021	10,860,074	204,293,387	2,387,636	287,806,031	0	0	0	0	0	325,656,064
2022	10,717,645	201,149,709	2,357,990	283,217,205	0	0	0	0	0	321,405,187
2023	11,571,108	221,869,327	2,549,695	312,183,727	0	0	0	0	0	350,388,780
2024	11,121,474	213,461,883	2,453,692	300,641,791	0	0	0	0	0	336,610,708
2025	11,559,038	222,109,831	2,547,239	312,556,594	0	0	0	0	0	350,655,663
2026	11,156,909	213,712,575	2,459,963	300,893,286	0	0	0	0	0	336,594,547
2027	11,298,856	216,988,829	2,493,612	305,650,413	0	0	0	0	0	339,465,699
2028	11,498,333	220,562,668	2,532,421	310,288,235	0	0	0	0	0	350,119,682
2029	11,461,728	220,259,139	2,527,023	310,052,480	0	0	0	0	0	347,331,969
2030	11,203,682	214,717,040	2,469,941	302,275,713	0	0	0	0	0	338,245,326
2031	12,176,341	235,526,502	2,686,472	331,576,187	0	0	0	0	0	371,422,846
2032	10,737,413	205,403,119	2,367,106	289,221,127	0	0	0	0	0	323,806,138
2033	12,015,005	231,585,828	2,651,738	326,122,585	0	0	0	0	0	363,357,996
2034	11,106,104	212,837,010	2,445,249	299,408,330	0	0	0	0	0	338,222,150
2035	13,000,986	255,138,967	2,883,113	360,101,186	0	0	0	0	0	398,763,949
TOTAL	260,122,827	5,549,379,724	50,813,844	7,653,783,437	0	0	0	0	0	8,806,630,928

¹B-18 includes Extra Peaking Charges for additional power shown in Table 9.²Castaic Lake Water Agency's SWP Water Supply Contract was transferred to Santa Clarita Valley Water Agency effective November 2, 2018.

TABLE B-19 Total Transportation Charge for Each Contractor¹ (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
1961	0	0	0	0	11,750	43,787	0	0	0	0
1962	0	0	0	193,920	190,272	447,723	831,915	0	0	0
1963	0	0	0	255,449	277,455	621,356	1,154,260	6,696	21,667	28,363
1964	0	0	0	364,163	404,324	1,158,090	1,926,577	13,756	36,029	49,785
1965	0	0	0	409,118	421,723	1,412,954	2,243,794	26,524	61,349	87,873
1966	18,063	0	18,063	527,991	498,441	1,686,098	2,712,530	56,469	118,263	174,731
1967	41,574	0	41,574	784,687	549,393	2,338,620	3,672,700	206,557	402,724	609,281
1968	128,628	0	128,628	652,515	603,483	1,985,220	3,241,218	115,961	229,807	345,768
1969	254,715	0	254,715	775,723	539,340	2,083,253	3,398,316	185,156	358,861	544,017
1970	277,547	0	277,547	811,363	532,567	2,202,767	3,546,697	200,150	387,675	587,825
1971	227,474	0	227,474	776,750	552,113	2,169,897	3,498,760	202,413	392,912	595,325
1972	224,978	0	224,978	819,130	678,520	2,320,421	3,818,071	209,057	406,589	615,646
1973	221,091	31,366	252,457	784,687	549,393	2,338,620	3,672,700	206,557	402,724	609,281
1974	240,498	32,938	273,437	808,763	564,593	2,506,358	3,879,714	208,545	407,090	615,635
1975	237,459	36,291	273,750	859,193	605,731	2,409,923	3,874,847	225,895	439,873	665,768
1976	271,292	40,836	312,127	950,197	734,812	2,500,506	4,185,514	228,976	447,299	676,275
1977	293,627	45,096	338,723	914,660	713,558	2,476,399	4,104,618	238,699	468,721	707,420
1978	273,870	49,178	323,048	970,350	692,587	2,785,987	4,448,924	245,331	484,259	729,590
1979	289,479	53,340	342,819	1,035,800	736,358	2,813,578	4,585,736	243,110	483,437	726,547
1980	310,846	67,748	378,594	1,154,194	866,372	3,028,204	5,048,770	269,858	537,074	806,932
1981	347,781	87,408	435,189	1,120,139	879,357	2,917,582	4,917,077	288,997	586,257	875,254
1982	438,335	106,918	545,254	1,158,600	850,483	3,262,104	5,271,187	290,049	582,757	872,806
1983	354,787	151,259	506,046	1,170,720	900,363	3,795,446	5,866,529	319,214	633,181	952,395
1984	467,336	224,245	691,581	1,462,865	1,097,480	5,737,801	8,298,147	351,620	695,559	1,047,179
1985	736,074	364,305	1,100,379	1,913,443	1,789,369	6,551,546	10,254,358	394,593	776,994	1,171,586
1986	1,084,728	692,479	1,777,207	1,741,101	1,528,732	6,863,230	10,133,063	385,545	762,684	1,148,229
1987	1,773,801	1,559,243	3,333,044	2,231,376	2,011,876	6,675,355	10,918,607	385,289	812,310	1,197,599
1988	2,231,563	2,333,792	4,565,355	2,233,358	2,210,523	6,368,850	10,812,730	420,153	978,621	1,398,774
1989	2,397,272	3,326,436	5,723,708	2,149,746	1,872,030	5,916,714	9,938,490	414,224	1,162,723	1,576,947
1990	2,746,135	3,433,320	6,179,455	2,569,267	2,261,914	6,668,440	11,499,621	487,609	1,234,409	1,722,018
1991	2,748,636	3,682,311	6,430,947	1,748,620	1,621,188	4,527,928	7,897,736	491,419	1,476,387	1,967,806
1992	2,554,528	3,528,958	6,083,486	2,068,978	2,003,328	5,385,858	9,458,164	551,042	1,491,156	2,042,198
1993	2,592,888	3,504,240	6,097,128	2,873,872	2,011,222	6,511,865	11,396,959	610,115	1,675,438	2,285,553
1994	2,718,329	3,537,459	6,255,788	2,900,317	2,642,460	7,314,515	12,857,291	767,900	2,473,449	3,241,348
1995	2,649,273	3,509,935	6,159,208	3,028,544	2,289,027	5,893,667	11,211,239	995,341	4,977,122	5,972,462
1996	2,699,210	3,891,715	6,590,926	2,577,434	2,137,443	6,675,492	11,390,368	1,837,384	13,766,531	15,603,915
1997	2,641,891	3,631,175	6,273,066	2,650,564	2,007,332	6,551,469	11,209,365	2,294,917	21,860,553	24,155,470
1998	2,538,764	3,478,062	6,016,827	2,256,770	2,064,166	6,296,050	10,616,985	2,976,896	26,690,793	29,667,689
1999	2,683,387	3,833,119	6,516,506	2,866,909	2,437,215	8,336,951	13,641,075	3,025,727	27,466,891	30,492,619
2000	2,833,873	4,310,123	7,143,996	3,920,951	2,307,396	7,040,166	13,268,513	2,948,233	27,838,201	30,786,434
2001	3,349,932	4,916,183	8,266,115	7,318,054	2,795,685	8,451,441	18,565,180	3,501,499	29,990,590	33,492,089
2002	3,559,088	5,055,509	8,614,596	10,780,203	2,781,258	9,930,188	23,491,649	3,214,148	29,618,300	32,832,449
2003	3,668,513	5,396,549	9,065,063	7,416,860	2,507,040	8,729,606	18,653,506	3,294,613	29,872,238	33,166,850
2004	4,145,470	5,622,259	9,767,728	5,603,497	2,812,814	8,202,885	16,619,196	3,307,566	30,301,509	33,609,075
2005	3,505,027	5,132,770	8,637,798	5,974,510	2,967,415	8,980,247	17,922,173	3,432,436	30,414,226	33,846,662
2006	3,409,546	4,631,267	8,040,813	6,355,819	2,966,249	9,114,772	18,436,841	3,275,894	30,060,736	33,336,630
2007	3,603,776	5,103,496	8,707,272	8,274,752	3,481,959	10,366,954	22,123,665	3,425,718	31,264,770	34,690,489
2008	4,295,513	5,059,682	9,355,195	11,256,376	3,775,539	10,525,477	25,557,392	3,928,390	32,522,049	36,450,440
2009	4,730,337	5,110,584	9,840,921	12,462,359	3,306,729	10,273,899	26,042,986	3,728,667	30,837,534	34,566,201
2010	4,979,477	6,528,696	11,508,173	14,483,272	3,655,781	11,118,481	29,257,534	4,079,856	33,009,235	37,089,091
2011	5,347,154	6,921,306	12,268,460	17,697,626	4,338,708	12,993,133	34,969,467	4,153,934	34,140,833	38,294,768
2012	5,810,297	6,875,088	12,685,385	20,026,365	4,329,429	15,131,433	39,487,228	4,196,747	34,519,243	38,715,990
2013	5,458,818	6,613,467	12,072,285	22,036,148	5,073,141	15,137,698	42,246,986	4,419,214	35,921,272	40,340,486
2014	6,094,019	7,173,271	13,267,290	22,249,084	5,325,362	15,153,816	42,728,262	4,261,203	33,127,670	37,388,873
2015	6,202,831	7,128,884	13,331,715	23,558,406	4,780,531	16,355,596	44,874,534	4,847,800	35,110,565	39,958,365
2016	6,539,505	7,742,646	14,282,151	24,257,369	4,363,034	22,442,203	51,062,606	4,629,541	39,623,245	44,252,786
2017	5,591,229	6,303,196	11,894,425	24,958,207	4,788,105	19,101,692	48,848,004	4,756,915	43,397,592	48,154,507
2018	6,534,813	7,411,540	13,946,353	26,850,207	5,311,012	19,355,854	51,517,073	4,918,467	42,260,932	47,179,399
2019	6,369,344	7,058,762	13,428,105	26,097,319	4,884,327	14,668,410	45,650,055	4,666,468	39,140,146	43,806,614
2020	6,994,808	9,048,959	16,043,767	26,335,128	6,000,515	18,425,262	50,760,905	5,320,343	37,633,505	42,953,848
2021	7,214,850	7,846,903	15,061,754	28,421,745	6,231,111	17,709,200	52,362,056	6,536,924	40,640,388	47,177,312
2022	7,698,793	7,831,639	15,530,431	28,105,706	6,112,938	17,445,431	51,674,076	6,160,212	41,037,606	47,647,817
2023	7,253,920	8,472,627	15,726,547	28,451,736	6,238,167	17,752,436	52,442,338	7,075,404	42,408,791	49,484,195
2024	7,350,974	8,638,867	15,989,842	28,757,748	6,332,328	17,982,333	53,072,409	7,291,253	43,393,548	50,684,801
2025	7,378,765	8,686,008	16,064,774	28,956,811	6,423,807	18,216,902	53,597,519	7,362,035	43,607,915	50,969,950
2026	7,404,794	8,728,622	16,133,416	28,909,741	6,386,831	18,145,321	53,441,892	7,346,879	43,646,969	50,993,848
2027	7,434,136	8,772,647	16,206,783	28,872,258	6,354,412	18,082,350	53,309,020	7,339,525	43,701,063	51,040,589
2028	7,461,187	8,815,979	16,277,166	29,296,592	6,562,396	18,592,638	54,451,626	7,448,046	43,992,684	51,440,730
2029	7,490,571	8,861,076	16,351,647	29,225,944	6,512,180	18,488,532	54,226,656	7,432,236	44,031,103	51,463,339
2030	7,512,314	8,895,057	16,407,371	29,239,681	6,506,251	18,491,232	54,237,164	7,435,088	44,107,298	51,542,385
2031	7,530,082	8,923,904	16,453,986	29,504,509	6,630,014	18,800,267	54,934,790	7,510,384	44,322,871	51,833,255
2032	7,550,427	8,953,444	16,503,872	29,339,254	6,531,369	18,585,356	54,455,980	7,458,769	44,298,989	51,757,758
2033	7,552,725	8,957,213	16,509,937	29,528,4						

TABLE B-19 Total Transportation Charge for Each Contractor¹ (in dollars)

Sheet 2 of 4

Calendar Year	SAN JOAQUIN VALLEY AREA								
	Dudley Ridge	Empire	Future Contractor San Joaquin Valley	Kern		Kings	Oak Flat	Tulare	Total
				Municipal and Industrial	Agricultural				
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	193,279	9,333	54,588	445,439	1,584,964	13,770	12,005	216,193	2,529,570
1969	188,900	8,918	87,576	525,094	2,475,437	12,625	11,045	384,643	3,694,239
1970	211,751	15,685	94,675	573,998	3,016,267	12,790	13,600	314,140	4,252,905
1971	209,365	16,643	95,695	605,889	3,958,086	17,763	14,937	470,571	5,388,948
1972	233,204	17,511	98,788	631,615	5,195,762	15,220	21,696	1,148,752	7,362,548
1973	217,007	13,582	97,550	639,250	5,159,769	15,483	12,298	435,218	6,590,157
1974	303,896	13,551	98,460	698,247	5,490,479	15,590	13,448	641,265	7,274,937
1975	375,406	14,496	106,703	715,606	6,664,391	16,620	15,153	780,437	8,688,811
1976	324,385	15,042	108,084	774,291	7,043,002	16,993	16,912	601,868	8,900,577
1977	286,039	12,152	112,554	797,859	7,250,564	18,457	14,630	547,122	9,039,377
1978	376,213	4,441	115,521	890,945	8,745,750	18,921	18,708	543,387	10,713,886
1979	409,974	14,889	114,253	896,194	9,912,070	20,202	25,659	997,051	12,390,291
1980	432,639	13,239	125,950	888,893	10,511,694	20,749	25,361	781,701	12,800,226
1981	496,130	31,080	134,169	1,079,315	12,004,381	24,939	23,761	955,660	14,749,436
1982	490,639	14,230	135,057	1,004,667	12,880,780	22,955	23,264	795,615	15,367,207
1983	665,023	15,824	149,202	1,027,258	16,138,805	39,971	29,877	433,971	18,499,932
1984	938,963	16,238	164,505	2,063,179	24,301,086	54,427	60,564	822,702	28,421,665
1985	1,128,713	88,799	184,905	2,350,593	28,651,962	69,483	71,113	2,198,830	34,744,399
1986	1,294,154	35,255	180,445	2,365,159	31,231,593	80,769	77,012	2,242,487	37,506,874
1987	1,153,933	52,050	179,872	2,804,776	30,104,510	78,018	75,277	2,304,048	36,752,484
1988	1,140,745	62,845	193,735	2,750,424	30,058,766	74,168	61,191	2,264,240	36,606,113
1989	1,177,467	50,527	187,913	2,435,635	30,150,668	67,048	69,694	2,510,233	36,649,185
1990	883,721	35,689	221,392	2,541,316	28,297,333	51,058	50,142	1,942,336	34,022,985
1991	616,253	24,594	220,282	2,055,250	18,496,725	27,930	27,911	1,302,901	22,771,846
1992	988,366	40,430	241,455	2,369,788	26,794,846	55,795	51,965	1,980,041	32,522,687
1993	1,200,656	54,957	264,959	2,799,482	32,309,015	72,889	70,648	2,713,629	39,486,235
1994	1,055,746	45,083	306,359	2,808,829	30,184,826	60,460	58,415	2,189,559	36,709,276
1995	1,552,434	47,941	304,297	3,499,611	37,308,381	88,875	81,238	2,843,669	45,726,447
1996	1,379,423	49,573	389,203	3,560,139	37,260,930	86,092	74,886	4,389,560	47,189,806
1997	1,420,952	26,730	276,681	3,107,763	33,426,295	36,715	69,746	1,743,637	40,108,519
1998	1,264,836	35,685	381,847	2,654,434	30,183,420	41,835	61,042	1,873,881	36,496,979
1999	1,256,358	56,965	366,582	3,057,015	32,210,571	75,357	66,255	4,241,216	41,330,319
2000	1,097,669	39,366	303,341	2,322,844	27,326,608	61,948	55,895	2,858,441	34,066,112
2001	1,774,394	64,215	328,028	2,237,334	34,783,254	80,120	102,196	3,130,408	42,499,947
2002	1,354,264	45,011	321,344	2,334,754	29,797,173	73,468	78,994	2,619,274	36,624,282
2003	1,420,889	49,821	339,960	2,741,740	32,580,765	89,704	80,152	2,934,153	40,237,184
2004	1,478,106	79,197	342,620	3,760,286	31,204,149	236,920	82,766	2,440,873	39,624,916
2005	2,069,318	89,215	355,586	2,984,191	42,302,175	421,540	82,362	3,493,710	51,798,098
2006	1,819,102	76,203	295,459	3,287,808	38,333,644	255,223	79,832	2,844,928	46,992,199
2007	1,685,418	70,756	334,134	3,067,480	36,188,834	236,669	83,161	2,996,246	44,662,696
2008	1,540,317	63,080	471,763	3,455,832	35,485,504	250,002	81,288	2,471,382	43,819,168
2009	1,234,322	50,875	437,333	2,186,445	31,088,004	193,917	62,947	2,058,385	37,312,228
2010	1,460,319	106,954	507,046	2,356,389	36,603,436	251,310	84,576	2,667,923	44,037,953
2011	2,203,512	82,828	506,678	3,444,422	51,466,654	305,555	92,936	2,765,293	60,867,878
2012	1,286,152	89,520	467,872	3,234,165	41,238,089	318,620	92,824	3,495,595	50,222,837
2013	1,625,903	82,676	519,609	3,396,660	41,255,305	280,225	91,725	2,769,378	50,021,480
2014	1,623,558	66,756	630,817	2,787,343	36,559,083	228,744	93,727	2,132,578	44,122,606
2015	1,426,927	69,166	755,566	3,215,035	38,620,850	230,782	82,743	2,344,885	46,745,955
2016	1,404,411	90,266	484,953	2,928,666	40,162,862	265,060	86,944	2,732,690	48,155,851
2017	1,950,886	78,784	480,547	3,146,368	50,365,548	324,625	95,321	2,851,446	59,293,524
2018	1,702,668	85,565	615,802	2,548,818	41,758,920	265,218	96,727	2,672,755	49,746,474
2019	1,716,079	95,751	573,173	3,011,458	51,829,882	304,836	97,930	3,963,629	61,592,738
2020	1,306,684	81,304	668,968	3,241,027	41,084,034	297,002	105,546	2,546,340	49,330,904
2021	1,728,011	102,592	684,874	5,028,745	49,875,072	353,132	128,511	3,336,661	61,237,598
2022	1,727,648	103,138	708,513	5,184,296	49,725,625	359,150	128,929	3,337,692	61,274,991
2023	1,741,733	104,047	762,905	5,437,446	49,799,612	365,686	130,433	3,364,363	61,706,224
2024	1,679,783	99,753	831,805	5,764,136	48,540,224	363,534	122,248	3,239,230	60,640,713
2025	1,746,709	104,323	836,909	5,931,319	50,060,439	377,681	129,988	3,372,554	62,559,922
2026	1,683,776	99,960	842,366	5,776,624	48,779,831	364,111	121,733	3,245,434	60,913,836
2027	1,631,251	96,313	847,504	5,674,520	47,871,711	352,743	113,867	3,139,177	59,727,087
2028	1,826,051	109,678	850,909	6,105,335	51,855,155	394,088	139,265	3,528,929	64,809,410
2029	1,754,466	104,720	856,492	5,952,426	50,520,021	378,647	129,138	3,384,427	63,080,337
2030	1,724,497	102,623	862,160	5,874,345	49,929,837	372,077	125,081	3,323,381	62,314,000
2031	1,843,873	110,799	866,588	6,176,493	52,688,518	397,029	138,753	3,561,841	65,783,895
2032	1,702,523	101,041	872,654	5,794,412	49,525,414	366,778	121,930	3,277,394	61,762,146
2033	1,781,276	106,422	878,455	6,039,259	51,570,576	383,338	129,582	3,434,365	64,323,273
2034	1,848,852	111,033	884,035	6,127,339	52,696,811	397,492	139,907	3,568,907	65,774,376
2035	1,831,016	109,769	889,567	6,214,516	53,119,412	393,344	133,007	3,532,144	66,222,775
TOTAL	83,298,930	4,077,499	28,056,639	204,666,740	2,165,596,160	11,914,286	5,062,414	157,047,371	2,659,720,039

1 Capital charges repaid through bond debt service prior to 2019 exclude bond cover; 2020 and after includes both bond debt service and bond cover.

TABLE B-19 Total Transportation Charge for Each Contractor¹ (in dollars)

Calendar Year	SOUTHERN CALIFORNIA AREA									
	AVEK	Coachella	Crestline	Desert	Littlerock	Mojave	Palmdale	San Bernardino	San Gabriel	San Gorgonio
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	726	0	0	0	51,729	0	0
1964	64,494	19,542	4,370	38,211	1,143	31,079	8,205	82,811	34,987	21,735
1965	121,484	34,348	7,194	42,701	2,082	55,096	15,222	135,069	35,344	21,866
1966	221,012	62,476	12,478	76,886	3,753	99,564	27,679	232,502	61,465	37,964
1967	427,622	121,269	23,472	148,839	7,284	193,330	54,023	433,350	115,574	71,283
1968	754,401	218,649	41,509	265,168	12,870	346,978	95,466	782,163	208,927	128,915
1969	1,090,136	334,105	61,226	394,024	18,693	518,832	138,063	1,205,834	321,755	198,764
1970	1,420,639	470,423	89,700	552,223	25,231	717,657	184,837	1,778,187	467,573	289,633
1971	1,760,670	627,331	128,360	754,065	31,837	963,768	231,280	2,538,219	659,414	409,327
1972	2,084,699	777,838	181,206	971,501	42,404	1,232,325	274,599	3,388,734	865,095	537,186
1973	2,177,324	920,218	183,713	1,184,696	43,482	1,300,994	287,315	3,971,543	946,686	587,963
1974	2,241,780	938,860	193,283	1,212,205	45,212	1,335,887	292,071	3,998,510	990,064	611,428
1975	2,419,858	983,580	206,040	1,280,804	48,490	1,407,219	304,281	4,159,094	1,088,341	644,621
1976	2,773,862	1,032,075	215,084	1,356,888	51,463	1,451,921	313,685	4,299,592	1,141,598	668,315
1977	2,717,286	929,532	226,032	1,194,916	47,348	1,526,020	329,365	4,553,831	1,197,216	696,515
1978	3,035,392	1,111,606	231,040	1,470,658	47,118	1,528,495	321,681	4,460,167	1,208,720	709,040
1979	3,589,381	1,180,841	237,955	1,569,175	48,396	1,658,657	332,472	4,422,382	1,152,375	712,866
1980	4,136,480	1,271,861	259,401	1,730,656	53,348	1,780,741	360,461	4,835,652	1,269,447	777,981
1981	4,469,204	1,355,504	271,181	1,850,802	77,806	1,909,754	391,869	5,224,182	1,357,680	806,031
1982	4,031,426	1,403,332	280,313	1,936,175	55,961	2,105,839	406,891	5,410,876	1,565,182	853,400
1983	5,224,176	1,997,502	333,081	2,880,959	69,381	2,184,262	494,688	6,020,929	1,556,652	952,131
1984	7,262,706	3,084,372	445,339	4,608,046	75,773	2,415,821	553,321	7,049,449	2,331,849	1,072,639
1985	8,979,937	3,882,496	540,388	5,883,196	79,232	2,529,164	759,052	7,740,359	2,378,394	1,120,854
1986	8,880,068	4,308,841	577,474	6,571,197	102,400	2,640,787	1,000,062	7,857,569	3,047,741	1,149,714
1987	8,897,753	4,164,707	604,982	6,418,841	211,809	2,675,587	1,026,398	9,224,608	3,034,142	1,172,015
1988	8,373,323	4,163,832	615,999	6,482,143	124,667	2,732,162	779,820	9,505,259	2,828,998	1,208,206
1989	8,750,651	3,808,646	586,595	5,952,262	170,570	2,681,110	1,442,627	8,944,266	2,930,395	1,194,911
1990	10,040,074	4,487,886	620,394	7,014,185	289,349	2,881,377	1,639,830	9,795,019	3,678,107	1,297,621
1991	6,542,001	2,996,131	567,450	4,550,559	175,137	3,641,646	1,294,608	8,921,839	3,035,638	1,354,921
1992	8,644,005	3,068,616	470,165	4,667,984	121,335	4,443,807	1,129,578	8,573,361	2,980,091	1,349,184
1993	9,028,570	3,267,678	472,817	4,993,632	157,747	4,323,649	1,347,511	9,505,683	3,320,012	1,507,550
1994	11,216,190	3,313,737	554,651	5,066,159	225,809	5,317,874	1,698,990	10,209,083	4,076,706	1,497,753
1995	10,817,875	4,087,603	509,163	6,340,703	155,561	4,406,312	1,527,248	9,443,228	3,715,377	1,520,622
1996	11,187,158	7,025,782	553,232	11,183,947	150,612	4,474,204	1,867,203	9,869,395	3,807,422	1,527,243
1997	11,437,950	6,588,591	579,281	7,422,990	144,833	4,778,780	1,869,307	11,280,683	4,037,862	1,744,883
1998	9,956,830	5,663,864	546,645	5,928,447	146,074	5,815,388	1,474,029	11,263,703	3,321,115	2,003,846
1999	11,484,048	4,685,317	634,878	6,039,649	146,348	6,023,472	1,858,637	12,462,115	4,179,119	2,373,431
2000	10,588,857	3,062,374	594,691	4,366,076	115,438	5,830,350	1,449,972	12,306,410	3,253,171	2,890,395
2001	20,607,925	4,100,681	797,527	6,349,945	127,791	6,522,603	3,342,504	18,909,129	3,395,382	4,571,962
2002	12,003,751	3,361,237	759,988	5,129,982	109,869	5,658,408	2,741,465	20,621,499	4,787,274	6,844,991
2003	13,367,514	3,480,415	729,620	5,324,825	115,323	7,312,579	2,278,700	19,443,483	4,950,854	8,606,514
2004	14,239,111	4,116,891	829,278	5,365,886	124,197	7,424,525	2,519,645	23,960,321	4,389,481	9,148,496
2005	14,655,594	17,796,642	654,120	10,294,124	114,290	7,226,666	2,571,112	22,099,848	4,655,736	9,531,816
2006	16,138,910	27,342,862	633,909	9,895,275	122,299	9,935,720	2,496,471	21,867,220	4,675,188	10,053,208
2007	19,665,365	26,161,128	881,933	9,381,576	126,760	13,765,437	4,039,338	28,185,556	3,836,175	10,808,791
2008	17,127,953	25,660,992	806,386	10,271,728	135,204	12,072,535	3,952,715	28,353,478	4,790,258	12,202,043
2009	14,844,608	23,304,443	780,967	8,133,723	133,355	11,729,306	3,675,931	28,359,226	5,260,355	12,663,454
2010	17,521,945	31,751,635	687,753	10,966,115	122,672	14,051,301	3,018,086	30,881,538	6,752,240	13,949,010
2011	23,805,466	33,198,062	744,584	11,908,657	136,173	7,635,656	3,016,895	28,347,163	7,438,363	15,049,147
2012	23,903,029	39,595,552	846,280	14,180,331	147,927	9,354,374	4,350,065	42,047,173	7,670,027	16,457,226
2013	19,261,936	31,803,650	1,056,723	10,803,348	165,496	9,337,829	3,462,604	34,015,853	5,890,838	17,861,991
2014	14,750,590	27,323,597	1,151,932	8,755,999	170,851	9,415,142	3,592,572	36,498,765	4,836,123	23,107,016
2015	12,731,814	30,466,346	1,130,765	10,098,596	163,488	10,914,274	2,768,389	43,871,065	5,895,305	27,680,737
2016	16,381,352	33,224,356	1,029,882	10,890,153	156,347	12,493,324	3,241,475	51,335,938	7,190,030	32,210,444
2017	24,477,943	32,352,982	932,241	11,405,254	147,171	14,091,033	3,618,116	56,882,482	7,553,600	36,697,260
2018	19,127,863	48,424,078	1,019,471	15,519,518	154,284	8,810,278	3,199,743	54,195,629	7,285,444	38,404,484
2019	20,244,804	29,815,929	794,220	9,590,004	199,811	12,300,822	3,441,222	61,796,225	8,055,167	40,293,058
2020	14,152,945	51,822,032	1,341,861	15,877,331	253,306	10,730,429	2,381,216	55,142,267	5,837,685	39,247,584
2021	27,974,864	42,842,297	1,606,757	14,353,197	447,082	16,501,118	5,326,503	61,185,042	7,971,881	40,218,211
2022	27,737,541	42,097,027	1,592,542	14,037,969	445,520	16,390,716	5,263,190	60,480,907	7,862,177	39,773,128
2023	29,595,532	46,293,686	1,690,669	15,337,393	477,297	17,157,274	5,634,463	62,932,864	8,477,458	40,375,731
2024	29,744,043	47,256,121	1,709,078	15,568,870	480,087	17,344,515	5,604,457	63,428,051	8,587,003	40,501,228
2025	30,396,953	47,996,487	1,739,416	15,862,917	490,486	17,662,221	5,741,578	64,041,665	8,742,050	40,641,482
2026	29,825,779	47,390,971	1,715,674	15,616,622	481,472	17,433,813	5,613,799	63,653,695	8,615,461	40,600,614
2027	30,175,519	47,823,350	1,733,226	15,785,450	487,078	17,620,997	5,684,623	64,044,651	8,706,928	40,693,263
2028	30,485,503	48,153,766	1,746,952	15,906,096	492,063	17,750,074	5,746,894	64,350,557	8,774,121	40,767,455
2029	30,549,489	48,348,732	1,752,918	15,971,640	493,140	17,817,994	5,756,241	64,561,201	8,814,315	40,830,327
2030	30,153,337	48,046,337	1,739,350	15,834,821	486,931	17,693,286	5,666,577	64,400,750	8,749,936	40,829,124
2031	31,900,270	49,850,293	1,814,070	16,549,413	514,642	18,417,464	6,045,155	65,802,702	9,124,944	41,091,800
2032	29,451,327	47,560,214	1,713,802	15,611,165	475,876	17,447,189	5,510,515	64,168,007	8,646,304	40,842,762
2033	31,697,570	49,827,454	1,812,990	16,507,122	511,555	18,438,472	5,996,581	65,904,323	9,113,981	41,162,997
2034	29,979,454	48,314,732	1,740,66							

TABLE B-19 Total Transportation Charge for Each Contractor¹ (in dollars)

Sheet 4 of 4

Calendar Year	SOUTHERN CALIFORNIA AREA (continued)				FEATHER RIVER AREA				South Bay Area Future Contractor	Grand Total
	Santa Clarita ²	Metropolitan	Ventura	Total	Yuba City	Butte	Plumas	Total		
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	1,622,219
1964	27,447	1,260,513	9,378	1,603,916	0	0	0	0	13,938	2,803,202
1965	53,007	2,180,589	17,766	2,721,767	0	0	405	405	28,937	4,807,069
1966	101,264	3,900,172	33,426	4,870,643	0	0	565	565	31,321	7,401,629
1967	210,814	7,693,703	68,155	9,568,718	0	0	562	562	47,718	12,839,702
1968	480,309	15,317,881	142,803	18,796,040	0	0	564	564	46,945	25,088,733
1969	728,746	23,153,064	215,209	28,378,452	0	0	3,191	3,191	52,963	36,325,893
1970	909,583	30,617,164	273,605	37,796,454	0	0	15,121	15,121	69,744	46,546,293
1971	1,095,142	39,958,997	342,425	49,500,836	0	0	16,001	16,001	55,532	59,282,875
1972	1,317,413	52,948,599	422,304	65,043,903	0	0	17,372	17,372	80,412	77,162,930
1973	1,335,030	57,273,225	435,655	70,647,843	0	0	17,334	17,334	54,219	81,843,991
1974	1,395,863	61,776,466	455,565	75,487,195	0	0	17,477	17,477	76,783	87,625,178
1975	1,466,477	66,756,784	478,403	81,243,992	0	0	18,406	18,406	84,547	94,850,121
1976	1,463,048	68,485,047	475,587	83,728,164	0	0	17,477	17,477	106,717	97,926,852
1977	1,533,737	66,234,179	507,063	81,693,040	0	0	18,232	18,232	98,618	96,000,027
1978	1,620,595	72,934,779	523,177	89,202,467	0	0	17,381	17,381	100,786	105,536,081
1979	1,657,203	72,666,594	526,405	89,754,701	0	0	20,579	20,579	119,352	107,940,025
1980	1,740,920	79,926,555	571,232	98,714,736	0	0	17,761	17,761	178,812	117,945,832
1981	1,996,872	91,261,394	636,404	111,608,682	0	0	21,193	21,193	185,347	132,792,177
1982	2,090,664	93,144,741	670,375	113,955,175	0	0	28,423	28,423	173,894	136,213,945
1983	2,355,319	101,787,700	803,591	126,660,372	0	0	19,276	19,276	220,926	152,725,475
1984	3,398,550	137,507,077	868,967	170,673,909	0	0	21,114	21,114	225,959	209,379,555
1985	3,785,074	172,916,230	908,769	211,503,144	0	0	20,239	20,239	340,322	259,134,426
1986	4,354,767	193,242,026	937,311	234,669,956	0	0	20,139	20,139	279,227	285,534,694
1987	4,197,552	178,764,439	908,034	221,300,866	0	0	19,742	19,742	345,116	273,867,458
1988	4,262,855	190,243,523	904,868	232,225,655	0	0	17,900	17,900	365,207	285,991,735
1989	4,144,197	193,235,261	932,599	234,774,090	0	0	19,158	19,158	422,329	289,103,907
1990	4,586,112	239,540,417	1,486,755	287,357,125	0	0	18,148	18,148	474,284	341,273,636
1991	3,555,044	179,950,983	1,141,118	217,727,074	0	0	21,018	21,018	214,683	257,031,109
1992	4,512,610	196,166,977	1,025,285	237,152,999	0	0	18,014	18,014	443,676	287,721,223
1993	4,144,025	169,493,328	1,068,135	212,630,338	0	0	20,999	20,999	599,571	272,516,784
1994	4,756,237	209,282,955	1,008,952	258,225,096	0	0	19,649	19,649	609,966	317,918,415
1995	5,014,076	173,420,265	1,061,324	222,019,354	0	0	20,277	20,277	534,971	291,643,958
1996	5,202,156	181,404,029	1,103,254	239,355,638	0	0	25,378	25,378	571,857	320,727,888
1997	4,968,877	186,736,527	1,216,560	242,807,122	0	0	24,820	24,820	428,638	325,007,000
1998	4,597,344	168,571,967	1,237,386	220,526,637	0	0	0	0	465,095	303,790,213
1999	5,021,001	191,239,148	1,257,653	247,404,815	0	0	0	0	571,383	339,956,718
2000	6,871,503	185,140,396	1,322,589	237,792,222	0	0	0	0	0	323,057,277
2001	12,486,464	374,039,724	1,616,021	456,867,658	0	0	0	0	0	559,690,989
2002	9,719,851	264,830,361	1,650,209	338,218,885	0	0	0	0	0	439,781,861
2003	10,763,413	292,850,922	1,668,182	370,892,344	0	0	20,800	20,800	0	472,035,747
2004	11,830,623	340,018,775	1,910,251	425,877,479	0	0	20,830	20,830	0	525,519,225
2005	10,883,812	313,177,979	1,398,398	415,060,137	0	0	20,827	20,827	0	527,285,694
2006	10,003,788	289,125,726	1,328,532	403,619,106	0	0	21,281	21,281	0	510,446,869
2007	13,420,642	374,507,503	1,872,842	506,653,046	0	0	20,893	20,893	0	616,858,061
2008	15,308,993	339,773,866	2,266,967	472,723,118	0	0	22,411	22,411	0	587,927,723
2009	13,022,439	303,283,330	2,071,229	427,262,366	0	0	18,220	18,220	0	535,042,923
2010	12,700,410	348,485,718	2,103,183	492,991,606	0	0	18,447	18,447	0	614,902,804
2011	12,360,140	390,872,902	2,093,579	536,606,786	0	0	20,129	20,129	0	683,027,486
2012	14,351,041	373,716,596	2,331,355	548,950,976	0	0	18,468	18,468	0	690,080,884
2013	16,998,097	363,932,012	2,271,132	516,861,510	0	0	17,664	17,664	0	661,560,411
2014	15,799,771	315,577,007	1,817,313	462,796,677	0	0	17,491	17,491	0	600,321,199
2015	15,066,776	334,722,815	1,891,527	497,401,897	0	0	17,085	17,085	0	642,329,552
2016	13,884,458	378,782,803	2,188,987	563,009,551	0	0	22,212	22,212	0	720,785,156
2017	16,283,037	431,315,498	3,904,604	639,661,222	0	0	16,925	16,925	0	807,868,607
2018	15,553,145	323,789,674	1,939,871	537,423,482	0	0	64,390	64,390	0	699,877,171
2019	15,737,213	411,223,865	5,087,752	618,580,093	0	0	27,166	27,166	0	783,084,772
2020	20,827,797	330,845,398	3,787,687	552,247,539	0	0	19,858	19,858	0	711,356,822
2021	19,724,237	415,369,939	3,941,284	657,462,412	0	0	18,633	18,633	0	833,319,765
2022	21,506,306	465,434,198	4,439,288	707,060,510	0	0	17,244	17,244	0	883,205,069
2023	21,743,055	471,554,911	4,477,241	725,747,573	0	0	17,551	17,551	0	905,124,430
2024	21,770,953	476,988,189	4,498,544	733,481,139	0	0	17,725	17,725	0	913,886,628
2025	22,265,022	486,541,041	4,601,705	746,723,023	0	0	17,900	17,900	0	929,933,087
2026	21,919,757	479,169,418	4,524,306	736,561,380	0	0	18,078	18,078	0	918,062,450
2027	22,119,057	483,623,792	4,567,940	743,065,873	0	0	18,255	18,255	0	923,367,607
2028	22,367,319	488,442,948	4,615,542	749,599,291	0	0	18,436	18,436	0	936,596,659
2029	22,369,790	489,193,003	4,615,820	751,074,611	0	0	18,618	18,618	0	936,215,208
2030	22,112,692	484,112,714	4,555,978	744,381,834	0	0	18,803	18,803	0	928,901,557
2031	23,021,242	503,874,291	4,754,709	772,760,996	0	0	18,989	18,989	0	961,785,911
2032	21,610,543	474,828,771	4,438,945	732,305,421	0	0	19,178	19,178	0	916,804,354
2033	22,896,115	501,410,653	4,722,653	770,002,466	0	0	19,368	19,368	0	957,827,167
2034	22,026,313	483,405,124	4,521,960	744,335,476	0	0	19,561	19,561	0	934,307,911
2035	23,981,624	526,891,321	4,970,048	806,682,333	0	0	19,755	19,755	0	996,930,611
TOTAL	709,387,365	18,282,537,288	139,443,672	26,074,850,632	0	0	1,237,107	1,237,107	8,735,637	32,735,068,503

¹ Capital charges repaid through bond debt service prior to 2019 exclude bond cover; 2020 and after includes both bond debt service and bond cover.² Castaic Lake Water Agency's SWP Water Supply Contract was transferred to Santa Clarita Valley Water Agency effective November 2, 2018.

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 2020 at 4.610 percent per annum)

Procedure	Capital Cost Component	Minimum Operation, Maintenance, Power and Replacement Component ¹		Total Delta Water Rate	
	[1]	[2]		[3]	
Commencing in 2021					
Total Costs of "Initial" Project Conservation Facilities to be Reimbursed and Project Water Table A Amounts During the Project Repayment Period	\$10,891.05 ^a	558.19 af	\$9,604.65 ^b	558.19 af	\$20,495.70
Less, Project Power Revenues to be Realized During the Project Repayment Period	(\$5,560.99)		(\$5,544.89)		(\$11,105.88)
Less, Delta Water Charges Paid and Project Water Table A Amounts, Prior to 2021	(\$3,845.66) ^c	(513.72) af	(\$1,739.04)	(513.72) af	(\$5,584.70)
TOTAL	\$1,484.40	44.48 af	\$2,320.72	44.48 af	\$3,805.12
Rate Applicable in 2021		\$33.37 per acre-foot		\$52.18 per acre-foot	\$85.55 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 ¹		Total Delta Water Rate	
	[4]	[5]		[6]	
Commencing in 2021					
Total Costs of "Initial" Project Conservation Facilities to be Reimbursed and Project Water Table A Amounts during the Project Repayment Period	\$10,866.74 ^a	558.19 af	\$9,564.59 ^b	558.19 af	\$20,431.33
Less, Project Power Revenues to be Realized During the Project Repayment Period	(\$5,560.99)		(\$5,544.89)		(\$11,105.88)
Less, Delta Water Charges Paid and Project Water Table A Amounts, Prior to 2021	(\$3,845.66) ^c	(513.72) af	(\$1,739.04)	(513.72) af	(\$5,584.70)
TOTAL	\$1,460.10	44.48 af	\$2,280.66	44.48 af	\$3,740.76
Rate Applicable in 2021		\$32.83 per acre-foot		\$51.28 per acre-foot	\$84.11 per acre-foot

¹ 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.

^a 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.

^b Includes conservation power costs and credits at San Luis Reservoir.

^c 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 [1]	Minimum Operation, Maintenance, Power and Replacement Component [2]	Total Delta Water Rate [3]
Initial Conservation Facilities			
Oroville Division			
Water Supply and Power Costs ¹	148.22	97.18	245.40
Less, Oroville Power Revenues	<u>-83.16</u>	<u>-39.10</u>	<u>-122.26</u>
Subtotal	65.05	58.09	123.14
Delta Facilities ²	43.78	73.51	117.29
California Aqueduct portion			
Reach1	8.80	16.23	25.03
Reach 2A	4.87	1.90	6.77
Reach 2B	2.52	1.40	3.92
Reach 3	<u>1.70</u>	<u>0.75</u>	<u>2.45</u>
Subtotal	17.89	20.28	38.17
San Luis Facilities	27.62	24.07	51.69
Planning and Preoperating Costs through 2019	6.82	0.00	6.82
45,000 acre-feet Relinquished Costs	0.55	0.90	1.45
Less, Capital Cost Credits	-3.30	0.00	-3.30
Less, Delta Water Charges paid prior to 2021	<u>-125.03</u>	<u>-124.67</u>	<u>-249.70</u>
Rate Applicable in 2021	33.37	52.18	85.55

¹ Includes revenue received from non-SWP water contractors.² 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

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
1964	[1]	[2]	[3]	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	4,396,652	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	2,368,518	3,897,017	6,265,535	6,578,726	3,427,312	8,160,269	18,166,307	2,040,067	3,711,780	5,751,847
2021	2,483,174	4,085,666	6,568,840	6,897,192	3,593,223	8,555,293	19,045,708	2,138,823	3,891,460	6,030,283
2022	2,483,174	4,085,666	6,568,840	6,897,192	3,593,223	8,555,293	19,045,708	2,138,823	3,891,460	6,030,283
2023	2,483,174	4,085,666	6,568,840	6,897,192	3,593,223	8,555,293	19,045,708	2,138,823	3,891,460	6,030,283
2024	2,483,174	4,085,666	6,568,840	6,897,192	3,593,223	8,555,293	19,045,708	2,138,823	3,891,460	6,030,283
2025	2,483,174	4,085,666	6,568,840	6,897,192	3,593,223	8,555,293	19,045,708	2,138,823	3,891,460	6,030,283
2026	2,483,174	4,085,666	6,568,840	6,897,192	3,593,223	8,555,293	19,045,708	2,138,823	3,891,460	6,030,283
2027	2,483,174	4,085,666	6,568,840	6,897,192	3,593,223	8,555,293	19,045,708	2,138,823	3,891,460	6,030,283
2028	2,483,174	4,085,666	6,568,840	6,897,192	3,593,223	8,555,293	19,045,708	2,138,823	3,891,460	6,030,283
2029	2,483,174	4,085,666	6,568,840	6,897,192	3,593,223	8,555,293	19,045,708	2,138,823	3,891,460	6,030,283
2030	2,483,174	4,085,666	6,568,840	6,897,192	3,593,223	8,555,293	19,045,708	2,138,823	3,891,460	6,030,283
2031	2,483,174	4,085,666	6,568,840	6,897,192	3,593,223	8,555,293	19,045,708	2,138,823	3,891,460	6,030,283
2032	2,483,174	4,085,666	6,568,840	6,897,192	3,593,223	8,555,293	19,045,708	2,138,823	3,891,460	6,030,283
2033	2,483,174	4,085,666	6,568,840	6,897,192	3,593,223	8,555,293	19,045,708	2,138,823	3,891,460	6,030,283
2034	2,483,174	4,085,666	6,568,840	6,897,192	3,593,223	8,555,293	19,045,708	2,138,823	3,891,460	6,030,283
2035	2,483,174	4,085,666	6,568,840	6,897,192	3,593,223	8,555,293	19,045,708	2,138,823	3,891,460	6,030,283

TABLE B-21 Total Delta Water Charge for Each Contractor (in dollars)

Sheet 2 of 4

Calendar Year	SAN JOAQUIN VALLEY AREA								
	Dudley Ridge	Empire	Future Contractor San Joaquin Valley	Kern		Kings	Oak Flat	Tulare	Total
				Municipal and Industrial	Agricultural				
1964	[11] 0	[12] 0	[13] 0	[14] 0	[15] 0	[16] 0	[17] 0	[18] 0	[19] 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	3,374,271	240,881	0	10,983,721	69,209,686	759,313	465,136	7,137,868	92,170,876
2021	3,537,614	252,318	0	11,515,425	72,560,010	796,070	487,652	7,483,401	96,632,490
2022	3,537,614	252,318	0	11,515,425	72,560,010	796,070	487,652	7,483,401	96,632,490
2023	3,537,614	252,318	0	11,515,425	72,560,010	796,070	487,652	7,483,401	96,632,490
2024	3,537,614	252,318	0	11,515,425	72,560,010	796,070	487,652	7,483,401	96,632,490
2025	3,537,614	252,318	0	11,515,425	72,560,010	796,070	487,652	7,483,401	96,632,490
2026	3,537,614	252,318	0	11,515,425	72,560,010	796,070	487,652	7,483,401	96,632,490
2027	3,537,614	252,318	0	11,515,425	72,560,010	796,070	487,652	7,483,401	96,632,490
2028	3,537,614	252,318	0	11,515,425	72,560,010	796,070	487,652	7,483,401	96,632,490
2029	3,537,614	252,318	0	11,515,425	72,560,010	796,070	487,652	7,483,401	96,632,490
2030	3,537,614	252,318	0	11,515,425	72,560,010	796,070	487,652	7,483,401	96,632,490
2031	3,537,614	252,318	0	11,515,425	72,560,010	796,070	487,652	7,483,401	96,632,490
2032	3,537,614	252,318	0	11,515,425	72,560,010	796,070	487,652	7,483,401	96,632,490
2033	3,537,614	252,318	0	11,515,425	72,560,010	796,070	487,652	7,483,401	96,632,490
2034	3,537,614	252,318	0	11,515,425	72,560,010	796,070	487,652	7,483,401	96,632,490
2035	3,537,614	252,318	0	11,515,425	72,560,010	796,070	487,652	7,483,401	96,632,490
TOTAL	117,990,452	7,782,769	0	337,938,833	2,209,049,750	21,069,396	14,680,093	237,883,554	2,946,394,847

TABLE B-21 Total Delta Water Charge for Each Contractor (in dollars)

Calendar Year	SOUTHERN CALIFORNIA AREA									
	AVEK	Coachella	Crestline	Desert	Littlerock	Mojave	Palmdale	San Bernardino	San Gabriel	San Gorgonio
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	160,756	41,797	4,662	64,303	1,367	67,518	13,021	369,739	85,202	0
1973	222,207	51,552	7,279	79,994	2,577	95,104	26,131	54,908	14,338	0
1974	279,090	59,539	10,791	93,030	3,721	121,869	39,631	465,150	114,427	0
1975	319,822	63,964	13,250	100,515	4,752	140,722	50,989	479,733	119,705	0
1976	431,018	74,449	17,045	117,550	6,269	174,366	67,591	538,772	137,142	0
1977	469,922	79,144	19,079	122,180	6,861	189,848	77,255	540,410	139,097	0
1978	600,180	97,313	24,428	147,413	9,687	236,913	98,345	631,768	165,313	0
1979	720,173	115,033	29,836	171,470	11,889	284,640	117,285	714,457	189,760	0
1980	857,818	134,920	35,949	210,736	14,256	337,177	138,590	811,952	215,694	84,294
1981	1,355,100	218,713	57,637	343,292	22,946	534,813	211,396	1,237,658	330,644	140,930
1982	1,551,434	254,298	66,408	400,739	26,335	313,057	235,100	1,341,923	364,482	167,929
1983	1,110,994	184,283	47,759	291,367	19,002	434,517	163,925	943,775	252,096	124,148
1984	450,405	202,914	52,247	321,718	20,719	472,282	174,500	1,003,760	266,383	138,982
1985	565,881	240,344	61,540	381,970	24,474	551,734	200,605	1,152,983	308,405	166,935
1986	635,066	275,347	70,160	438,498	27,822	625,994	223,785	1,285,253	350,799	195,056
1987	652,450	288,131	73,104	467,095	29,064	648,002	228,654	1,319,729	364,779	207,598
1988	711,641	319,496	80,756	525,996	32,024	711,641	248,146	1,438,752	402,232	233,604
1989	2,083,593	362,565	91,333	605,021	36,301	803,932	276,155	1,607,864	454,180	268,530
1990	2,207,667	386,049	96,930	636,731	38,438	848,974	289,119	1,696,277	481,308	289,119
1991	2,454,678	409,704	102,869	675,746	40,793	900,994	306,835	1,819,725	510,800	306,835
1992	2,804,695	468,125	117,538	772,102	46,610	1,029,469	350,587	2,079,203	583,636	350,587
1993	2,811,318	469,230	117,815	773,925	46,720	1,031,900	351,415	2,084,113	585,014	351,415
1994	2,694,116	449,668	112,905	741,661	44,772	988,880	336,766	1,997,227	560,625	336,766
1995	2,883,156	481,220	120,826	793,702	47,914	1,058,269	360,394	2,137,369	599,963	360,394
1996	2,834,460	473,093	118,785	780,296	47,104	1,040,394	354,307	2,101,269	589,830	0
1997	3,133,957	523,081	131,336	862,744	52,082	1,150,325	391,745	2,323,295	652,153	0
1998	3,155,093	526,609	132,222	868,562	52,433	1,728,006	394,387	2,338,963	656,551	0
1999	3,262,870	544,598	136,739	898,233	54,224	1,787,034	407,859	2,418,863	678,979	47,152
2000	3,314,278	553,178	138,893	912,384	55,078	1,815,190	510,073	2,456,972	689,676	71,841
2001	3,315,004	553,299	138,924	912,584	55,090	1,815,587	510,185	2,457,510	689,827	95,809
2002	3,437,351	561,548	140,995	926,188	55,912	1,842,654	517,791	2,494,146	700,112	97,237
2003	3,365,016	549,731	138,028	906,698	54,735	1,803,877	506,894	2,441,659	685,379	118,989
2004	3,686,201	602,201	151,202	993,241	59,960	1,976,053	555,277	2,674,711	750,797	156,416
2005	3,650,179	596,316	149,725	983,535	59,374	1,956,744	549,850	2,648,574	743,459	167,795
2006	3,802,076	3,256,234	155,955	1,344,440	61,844	2,038,171	572,732	2,758,791	774,397	188,222
2007	3,855,524	3,302,008	158,148	1,363,339	62,714	2,066,822	580,783	2,797,573	785,284	204,501
2008	3,943,904	3,377,700	161,772	1,394,591	64,151	2,114,200	594,096	2,861,701	803,284	482,528
2009	4,310,140	3,691,358	176,795	1,524,095	70,109	2,310,528	649,264	3,127,443	877,878	527,337
2010	5,385,764	5,269,593	220,916	2,123,453	87,605	3,153,757	811,293	3,907,916	1,096,959	658,937
2011	5,928,431	5,800,554	243,174	2,337,412	96,432	3,471,528	893,038	4,301,676	1,207,488	725,331
2012	6,189,558	6,056,050	253,886	2,440,367	100,679	3,624,437	932,373	4,491,150	1,260,674	757,280
2013	6,550,942	6,409,638	268,709	2,582,850	106,557	3,836,054	986,811	4,753,371	1,334,279	801,494
2014	6,368,143	6,082,630	255,000	2,451,078	101,120	3,640,346	936,466	4,510,863	1,266,208	760,603
2015	8,666,793	8,278,222	347,045	3,335,822	137,621	5,133,874	1,274,493	6,139,108	1,723,258	1,035,151
2016	10,359,280	9,894,827	414,817	3,987,255	164,497	6,136,437	1,523,381	7,337,978	2,059,784	1,237,301
2017	9,976,357	9,529,073	399,484	3,839,869	158,416	5,909,610	1,467,071	7,066,735	1,983,645	1,191,565
2018	10,062,381	9,611,239	402,928	3,872,979	159,782	5,960,566	1,479,721	7,127,671	2,000,749	1,201,839
2019	10,149,831	9,694,768	406,431	3,906,638	161,170	6,012,368	1,492,581	7,189,615	2,018,138	1,212,284
2020	11,819,659	11,289,731	473,296	4,549,349	187,686	7,327,921	1,738,137	8,372,436	2,350,157	1,411,727
2021	12,391,829	11,836,248	496,207	4,769,576	196,772	7,682,654	1,822,278	8,777,731	2,463,925	1,480,066
2022	12,391,829	11,836,248	496,207	4,769,576	196,772	7,682,654	1,822,278	8,777,731	2,463,925	1,480,066
2023	12,391,829	11,836,248	496,207	4,769,576	196,772	7,682,654	1,822,278	8,777,731	2,463,925	1,480,066
2024	12,391,829	11,836,248	496,207	4,769,576	196,772	7,682,654	1,822,278	8,777,731	2,463,925	1,480,066
2025	12,391,829	11,836,248	496,207	4,769,576	196,772	7,682,654	1,822,278	8,777,731	2,463,925	1,480,066
2026	12,391,829	11,836,248	496,207	4,769,576	196,772	7,682,654	1,822,278	8,777,731	2,463,925	1,480,066
2027	12,391,829	11,836,248	496,207	4,769,576	196,772	7,682,654	1,822,278	8,777,731	2,463,925	1,480,066
2028	12,391,829	11,836,248	496,207	4,769,576	196,772	7,682,654	1,822,278	8,777,731	2,463,925	1,480,066
2029	12,391,829	11,836,248	496,207	4,769,576	196,772	7,682,654	1,822,278	8,777,731	2,463,925	1,480,066
2030	12,391,829	11,836,248	496,207	4,769,576	196,772	7,682,654	1,822,278	8,777,731	2,463,925	1,480,066
2031	12,391,829	11,836,248	496,207	4,769,576	196,772	7,682,654	1,822,278	8,777,731	2,463,925	1,480,066
2032	12,391,829	11,836,248	496,207	4,769,576	196,772	7,682,654	1,822,278	8,777,731	2,463,925	1,480,066
2033	12,391,829	11,836,248	496,207	4,769,576	196,772	7,682,654	1,822,278	8,777,731	2,463,925	1,480,066
2034	12,391,829	11,836,248	496,207	4,769,576	196,772	7,682,654	1,822,278	8,777,731	2,463,925	1,480,066
2035	12,391,829	11,836,248	496,207	4,769,576	196,772	7,682,654	1,822,278	8,777,731	2,463,925	1,480,066
TOTAL	355,433,807	290,298,797	14,590,456	130,918,396	5,783,268	207,494,908	52,550,998	260,518,454	72,933,844	39,075,451

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
	Santa Clarita ¹	Metropolitan	Ventura	Total	Yuba City	Butte	Plumas	Total		
1964	[30]	[31]	[32]	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	13,060	0	0	13,060	0	1,050	875	1,925	0	583,631
1969	17,804	0	0	17,804	0	1,225	929	2,154	0	827,578
1970	37,905	0	0	37,905	0	3,848	1,995	5,843	0	2,160,886
1971	48,508	0	0	48,508	0	4,546	3,186	7,732	0	2,696,792
1972	74,751	2,043,211	0	2,926,327	0	4,929	3,778	8,707	0	7,206,052
1973	107,163	2,317,893	0	2,979,146	0	7,059	4,444	11,503	0	7,456,998
1974	143,266	4,231,933	0	5,562,447	0	8,336	4,931	13,267	0	10,683,514
1975	166,307	5,073,286	0	6,533,045	0	9,416	5,117	14,533	0	12,440,851
1976	207,673	6,422,167	0	8,194,042	0	7,004	5,780	12,784	0	15,299,760
1977	226,502	7,104,278	0	8,974,576	0	16,917	5,827	22,744	0	15,869,924
1978	274,819	9,016,389	0	11,302,568	0	12,635	6,844	19,479	0	19,425,531
1979	320,077	10,935,192	0	13,609,812	0	16,575	7,773	24,348	0	23,095,855
1980	376,845	13,102,796	12,396	16,333,423	0	19,834	8,801	28,635	0	27,557,096
1981	592,631	20,910,099	36,136	25,991,995	0	21,682	13,370	35,052	0	43,335,911
1982	664,082	23,998,560	57,248	29,441,595	0	16,117	14,694	30,811	0	49,027,703
1983	472,521	17,203,307	50,672	21,298,366	0	15,202	10,134	25,336	0	34,186,736
1984	509,602	18,766,458	64,344	22,444,314	20,590	15,442	10,681	46,713	0	37,051,405
1985	591,346	22,050,974	84,882	26,382,073	24,050	16,976	12,166	53,192	0	43,235,458
1986	659,259	25,089,658	120,965	29,997,662	31,753	18,145	13,457	63,355	0	49,817,447
1987	676,176	26,095,043	148,284	31,198,109	37,071	17,794	13,642	68,507	0	51,663,899
1988	742,582	28,781,238	201,116	34,429,224	46,722	18,565	14,852	80,139	0	57,062,086
1989	830,453	32,505,376	265,215	40,190,518	61,184	19,891	16,576	97,651	0	65,617,116
1990	869,029	33,616,369	334,242	41,790,252	63,506	20,055	17,381	100,942	0	68,658,631
1991	961,298	35,676,185	354,722	44,521,184	170,267	21,283	19,155	210,705	0	73,265,317
1992	1,098,371	40,763,329	405,303	50,869,555	194,545	24,318	22,697	241,560	0	83,873,685
1993	1,100,964	40,859,579	406,260	50,989,668	195,005	24,376	23,563	242,944	0	84,237,281
1994	1,055,065	39,156,173	389,323	48,863,947	186,875	23,360	23,360	233,595	0	80,866,329
1995	1,129,097	41,903,674	416,641	52,292,619	199,987	24,999	26,040	251,026	0	86,725,209
1996	1,110,027	41,195,923	409,604	51,055,092	196,610	24,576	26,624	247,810	0	83,007,946
1997	1,227,316	45,548,810	447,746	56,444,590	214,918	27,173	30,223	272,314	0	93,062,361
1998	1,235,593	45,855,992	450,529	57,394,940	107,459	27,356	31,537	166,352	0	93,159,618
1999	1,277,800	47,422,430	466,491	59,403,272	226,327	28,291	33,820	288,438	0	96,994,387
2000	2,279,763	48,169,576	478,942	61,445,844	229,892	69,207	35,708	334,807	0	98,699,723
2001	2,280,263	48,180,135	479,047	61,483,264	229,942	83,833	37,187	350,962	0	98,781,493
2002	2,314,256	48,898,394	486,188	62,472,772	233,371	85,083	39,185	357,639	0	100,275,854
2003	2,265,555	47,869,376	475,957	61,181,894	228,460	83,293	39,743	351,496	0	98,210,650
2004	2,481,798	52,438,419	521,386	67,047,662	250,266	92,048	0	342,314	0	107,579,616
2005	2,457,547	51,925,988	516,291	66,405,377	247,820	717,290	0	965,110	0	107,188,794
2006	2,559,814	51,397,939	537,776	69,448,391	258,133	32,606	8,699	299,438	0	110,967,023
2007	2,595,798	52,120,469	545,336	70,438,299	268,738	33,950	19,600	322,288	0	112,569,420
2008	2,655,301	53,315,217	557,837	72,326,282	274,736	794,785	56,138	1,125,659	0	116,229,451
2009	2,901,877	58,266,144	609,638	79,042,606	292,626	844,842	63,417	1,200,885	0	127,004,742
2010	3,626,059	72,806,845	761,778	99,910,875	365,653	1,054,033	81,825	1,501,511	0	158,911,895
2011	3,991,418	80,142,822	838,533	109,977,837	414,001	1,185,940	92,561	1,692,502	0	174,964,623
2012	4,167,227	83,672,846	875,468	114,821,995	424,826	1,216,951	100,037	1,741,814	0	182,648,119
2013	4,410,535	88,558,170	926,583	121,525,993	444,760	1,274,052	109,975	1,828,787	0	193,299,795
2014	4,185,518	84,040,101	879,310	115,477,386	431,273	1,235,416	108,033	1,774,722	0	183,479,164
2015	5,696,327	114,375,290	1,196,707	157,339,711	574,420	1,645,472	153,363	2,373,255	0	249,669,412
2016	6,808,728	136,710,965	1,430,405	188,065,655	686,595	1,966,807	190,584	2,843,986	0	298,433,393
2017	6,557,049	131,657,554	1,377,531	181,113,959	703,970	2,016,581	183,222	2,903,773	0	287,566,604
2018	6,613,589	132,792,806	1,389,410	182,675,660	671,729	1,924,226	184,502	2,780,457	0	289,897,532
2019	6,671,066	133,946,873	1,401,484	184,263,247	687,783	1,970,211	186,062	2,844,056	0	292,456,341
2020	7,768,576	155,983,533	1,632,054	214,904,262	783,386	2,244,074	216,793	3,244,253	0	340,503,080
2021	8,144,639	163,534,433	1,711,058	225,307,416	821,308	2,352,706	227,085	3,401,099	0	356,985,836
2022	8,144,639	163,534,433	1,711,058	225,307,416	821,308	2,352,706	227,085	3,401,099	0	356,985,836
2023	8,144,639	163,534,433	1,711,058	225,307,416	821,308	2,352,706	227,085	3,401,099	0	356,985,836
2024	8,144,639	163,534,433	1,711,058	225,307,416	821,308	2,352,706	227,085	3,401,099	0	356,985,836
2025	8,144,639	163,534,433	1,711,058	225,307,416	821,308	2,352,706	227,085	3,401,099	0	356,985,836
2026	8,144,639	163,534,433	1,711,058	225,307,416	821,308	2,352,706	227,085	3,401,099	0	356,985,836
2027	8,144,639	163,534,433	1,711,058	225,307,416	821,308	2,352,706	227,085	3,401,099	0	356,985,836
2028	8,144,639	163,534,433	1,711,058	225,307,416	821,308	2,352,706	227,085	3,401,099	0	356,985,836
2029	8,144,639	163,534,433	1,711,058	225,307,416	821,308	2,352,706	227,085	3,401,099	0	356,985,836
2030	8,144,639	163,534,433	1,711,058	225,307,416	821,308	2,352,706	227,085	3,401,099	0	356,985,836
2031	8,144,639	163,534,433	1,711,058	225,307,416	821,308	2,352,706	227,085	3,401,099	0	356,985,836
2032	8,144,639	163,534,433	1,711,058	225,307,416	821,308	2,352,706	227,085	3,401,099	0	356,985,836
2033	8,144,639	163,534,433	1,711,058	225,307,416	821,308	2,352,706	227,085	3,401,099	0	356,985,836
2034	8,144,639	163,534,433	1,711,058	225,307,416	821,308	2,352,706	227,085	3,401,099	0	356,985,836
2035	8,144,639	163,534,433	1,711,058	225,307,416	821,308	2,352,706	227,085	3,401,099	0	356,985,836
TOTAL	226,275,541	4,867,932,279	48,705,650	6,572,511,849	22,998,869	56,380,265	5,747,161	85,126,295	0	10,504,518,407

1 Castaic Lake Water Agency's SWP Water Supply Contract was transferred to Santa Clarita Valley Water Agency effective November 2, 2018.

TABLE B-22 Water System Revenue Bond Surcharge for Each Contractor¹ (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
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	338,720	407,420	746,140	663,813	291,679	815,189	1,770,681	203,076	1,287,864	1,490,940
2019	475,087	572,818	1,047,905	933,259	411,075	1,149,033	2,493,367	285,188	1,802,011	2,087,199
2020	814,641	983,302	1,797,943	1,554,751	703,389	1,963,800	4,221,940	490,403	3,100,875	3,591,278
2021	812,164	980,417	1,792,581	1,549,328	700,813	1,957,771	4,207,912	489,161	3,097,503	3,586,664
2022	809,599	977,320	1,786,919	1,544,435	698,600	1,951,588	4,194,623	487,616	3,087,720	3,575,336
2023	828,534	1,000,179	1,828,713	1,580,557	714,939	1,997,232	4,292,728	499,021	3,159,937	3,658,958
2024	825,400	996,395	1,821,795	1,574,578	712,234	1,989,677	4,276,489	497,133	3,147,983	3,645,116
2025	811,813	979,994	1,791,807	1,548,659	700,510	1,956,925	4,206,094	488,950	3,096,165	3,585,115
2026	781,526	943,432	1,724,958	1,490,882	674,376	1,883,917	4,049,175	470,708	2,980,654	3,451,362
2027	813,597	982,146	1,795,743	1,552,061	702,049	1,961,224	4,215,334	490,024	3,102,967	3,592,991
2028	731,591	883,152	1,614,743	1,395,623	631,287	1,763,545	3,790,455	440,632	2,790,206	3,230,838
2029	752,327	908,184	1,660,511	1,435,180	649,180	1,813,531	3,897,891	453,122	2,869,293	3,322,415
2030	620,477	749,019	1,369,496	1,183,656	535,407	1,495,698	3,214,761	373,709	2,366,431	2,740,140
2031	619,951	748,384	1,368,335	1,182,652	534,953	1,494,430	3,212,035	373,392	2,364,424	2,737,816
2032	620,453	748,990	1,369,443	1,183,610	535,387	1,495,641	3,214,638	373,695	2,366,340	2,740,035
2033	619,847	748,259	1,368,106	1,182,454	534,864	1,494,179	3,211,497	373,330	2,364,028	2,737,358
2034	619,815	748,220	1,368,035	1,182,393	534,836	1,494,102	3,211,331	373,311	2,363,906	2,737,217
2035	619,124	747,385	1,366,509	1,181,074	534,239	1,492,435	3,207,748	372,894	2,361,269	2,734,163
TOTAL	19,259,844	24,674,179	43,934,023	37,490,844	17,996,230	50,346,144	105,833,218	12,892,118	78,220,678	91,112,796

¹ For years 1988 through 2019, charges are debt service only and do not include bond cover; 2020 charges and after include bond cover.

TABLE B-22 Water System Revenue Bond Surcharge for Each Contractor¹ (in dollars)

Sheet 2 of 4

Calendar Year	SAN JOAQUIN VALLEY AREA								
	Dudley Ridge	Empire	Future Contractor San Joaquin Valley	Kern		Kings	Oak Flat	Tulare	Total
				Municipal and Industrial	Agricultural				
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	218,340	11,422	0	591,662	4,666,806	35,882	21,535	424,302	5,969,949
2019	309,576	16,159	0	835,016	6,609,829	50,629	30,431	602,169	8,453,809
2020	528,665	27,768	0	1,432,915	11,298,222	87,085	52,320	1,029,251	14,456,226
2021	528,049	27,705	0	1,427,065	11,282,062	86,576	52,128	1,028,505	14,432,090
2022	526,381	27,617	0	1,422,558	11,246,428	86,303	51,963	1,025,257	14,386,507
2023	538,692	28,263	0	1,455,829	11,509,466	88,321	53,179	1,049,236	14,722,986
2024	536,655	28,157	0	1,450,322	11,465,927	87,987	52,978	1,045,267	14,667,293
2025	527,821	27,693	0	1,426,449	11,277,189	86,539	52,105	1,028,061	14,425,857
2026	508,129	26,660	0	1,373,231	10,856,463	83,310	50,162	989,706	13,887,661
2027	528,980	27,754	0	1,429,582	11,301,962	86,729	52,220	1,030,319	14,457,546
2028	475,662	24,956	0	1,285,489	10,162,793	77,987	46,956	926,469	13,000,312
2029	489,145	25,664	0	1,321,925	10,450,849	80,197	48,287	952,729	13,368,796
2030	403,419	21,166	0	1,090,249	8,619,271	66,142	39,825	785,757	11,025,829
2031	403,077	21,148	0	1,089,325	8,611,962	66,086	39,791	785,091	11,016,480
2032	403,403	21,165	0	1,090,207	8,618,940	66,140	39,823	785,727	11,025,405
2033	403,009	21,145	0	1,089,142	8,610,519	66,075	39,784	784,960	11,014,634
2034	402,989	21,143	0	1,089,086	8,610,075	66,072	39,782	784,919	11,014,066
2035	402,539	21,120	0	1,087,871	8,600,469	65,998	39,738	784,043	11,001,778
TOTAL	14,440,464	721,296	0	36,893,154	276,638,196	2,070,092	1,351,993	27,866,757	359,981,952

¹ For years 1988 through 2019, charges are debt service only and do not include bond cover; 2020 charges and after include bond cover.

TABLE B-22 Water System Revenue Bond Surcharge for Each Contractor¹ (in dollars)

Sheet 3 of 4

Calendar Year	SOUTHERN CALIFORNIA AREA									
	AVEK	Coachella	Crestline	Desert	LittleRock	Mojave	Palmdale	San Bernardino	San Gabriel	San Gorgonio
[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	27,032	7,656	44,492	2,154	55,996	16,240	151,182	39,907	24,019
1989	205,668	46,993	13,263	78,104	3,763	97,138	27,981	259,860	69,104	42,040
1990	185,010	42,449	11,905	69,970	3,385	87,327	24,956	231,650	61,851	38,023
1991	296,854	65,947	18,548	108,704	5,236	135,623	38,641	363,310	96,172	59,122
1992	402,015	89,358	25,192	147,297	7,053	183,813	52,160	491,537	130,372	80,131
1993	424,871	93,981	26,566	154,919	7,437	193,361	55,045	517,379	137,298	84,371
1994	424,023	94,502	26,865	155,776	7,431	194,191	54,968	525,394	139,422	85,698
1995	500,084	111,730	31,822	184,170	8,769	229,530	64,852	623,848	165,593	101,792
1996	606,388	135,428	38,634	223,237	10,640	278,178	78,696	760,333	201,821	124,074
1997	626,151	139,565	39,802	230,058	10,972	286,779	81,146	808,482	207,472	28,259
1998	602,091	134,202	38,273	221,218	10,550	275,761	78,028	777,418	199,501	27,174
1999	826,108	184,524	52,650	304,166	14,475	642,815	107,060	1,041,566	277,200	53,545
2000	940,325	210,453	60,212	346,906	16,486	736,157	121,898	1,191,538	316,860	70,117
2001	925,355	207,102	59,254	341,384	16,224	724,438	135,581	1,172,568	311,816	69,001
2002	974,814	213,483	61,079	351,902	16,724	746,758	139,071	1,208,696	321,423	71,126
2003	1,015,056	222,296	63,601	366,429	17,415	777,586	144,812	1,258,593	334,692	74,063
2004	1,016,092	222,523	63,666	366,803	17,432	778,379	144,960	1,259,877	335,033	74,138
2005	959,268	210,078	60,105	346,290	16,457	734,849	136,853	1,189,420	316,297	69,992
2006	1,038,026	1,213,645	65,040	501,286	17,809	795,182	148,089	1,287,074	342,266	75,738
2007	666,215	1,036,396	41,723	354,543	11,413	520,847	95,550	825,932	219,727	45,192
2008	999,433	1,157,440	61,924	478,719	17,175	757,686	144,009	1,367,672	325,069	250,631
2009	1,080,062	1,262,793	67,674	521,586	18,529	827,383	154,087	1,339,196	356,126	78,805
2010	1,033,467	1,283,384	64,754	524,108	17,731	824,481	147,438	1,281,421	340,762	75,405
2011	1,116,181	1,386,101	69,937	566,054	19,149	890,469	159,239	1,383,979	368,035	81,440
2012	1,090,934	1,073,158	67,263	523,945	18,453	731,452	154,732	1,323,822	351,925	215,055
2013	1,186,869	1,172,413	73,154	570,092	20,052	795,549	168,130	1,438,513	382,372	233,662
2014	1,345,233	1,276,763	79,660	621,395	21,838	866,523	183,142	1,568,301	416,868	254,740
2015	1,288,246	1,228,651	76,255	595,985	20,924	868,542	175,577	1,500,551	398,955	243,775
2016	1,287,598	1,232,122	76,009	595,354	20,895	867,266	175,457	1,495,424	397,690	242,979
2017	1,186,800	1,209,316	70,025	549,319	19,257	799,852	161,746	1,377,995	366,493	223,908
2018	1,000,779	967,480	59,054	464,006	16,235	675,054	136,374	1,161,768	308,992	188,763
2019	1,406,999	1,357,845	82,987	651,764	22,823	948,853	191,687	1,632,103	434,085	265,182
2020	2,399,719	2,322,312	141,024	1,110,574	38,873	1,683,202	326,815	2,772,218	737,671	450,529
2021	2,384,196	2,302,386	139,663	1,100,987	38,591	1,671,669	324,423	2,745,788	730,914	446,336
2022	2,376,666	2,295,114	139,222	1,097,510	38,469	1,666,389	323,398	2,737,116	728,605	444,926
2023	2,432,252	2,348,794	142,478	1,123,179	39,369	1,705,364	330,962	2,801,133	745,646	455,332
2024	2,423,051	2,339,908	141,939	1,118,930	39,220	1,698,912	329,710	2,790,536	742,826	453,610
2025	2,383,166	2,301,392	139,603	1,100,511	38,574	1,670,947	324,283	2,744,602	730,598	446,143
2026	2,294,256	2,215,532	134,394	1,059,454	37,135	1,608,608	312,185	2,642,207	703,341	429,499
2027	2,388,401	2,306,447	139,909	1,102,929	38,659	1,674,618	324,995	2,750,631	732,203	447,123
2028	2,147,665	2,073,971	125,807	991,760	34,762	1,505,826	292,238	2,473,384	658,402	402,056
2029	2,208,539	2,132,756	129,373	1,019,871	35,748	1,548,508	300,521	2,543,490	677,063	413,452
2030	1,821,478	1,758,977	106,700	841,132	29,483	1,277,122	247,853	2,097,727	558,404	340,992
2031	1,819,934	1,757,486	106,609	840,419	29,458	1,276,039	247,643	2,095,949	557,930	340,703
2032	1,821,408	1,758,909	106,696	841,100	29,482	1,277,073	247,843	2,097,647	558,382	340,979
2033	1,819,629	1,757,191	106,591	840,278	29,453	1,275,825	247,601	2,095,597	557,837	340,646
2034	1,819,535	1,757,100	106,586	840,235	29,451	1,275,759	247,588	2,095,489	557,808	340,628
2035	1,817,505	1,755,140	106,467	839,297	29,418	1,274,336	247,312	2,093,151	557,186	340,248
TOTAL	61,078,681	52,492,568	3,667,613	27,428,147	1,011,031	42,418,015	8,373,575	72,393,067	19,206,015	10,085,162

¹ For years 1988 through 2019, charges are debt service only and do not include bond cover; 2020 charges and after include bond cover.

TABLE B-22 Water System Revenue Bond Surcharge for Each Contractor¹ (in dollars)

Sheet 4 of 4

Calendar Year	SOUTHERN CALIFORNIA AREA (continued)				FEATHER RIVER AREA				South Bay Area Future Contractor	Grand Total
	Santa Clarita ²	Metropolitan	Ventura	Total	Yuba City	Butte	Plumas	Total		
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	57,111	2,642,354	18,118	3,150,527	1,336	552	853	2,741	0	4,317,328
1989	98,720	4,587,641	34,565	5,564,840	0	918	1,454	2,372	0	7,583,021
1990	87,808	4,037,980	34,994	4,917,308	2,535	800	1,283	4,618	0	6,750,020
1991	140,371	6,259,893	54,115	7,642,536	9,945	1,243	2,027	13,215	0	10,510,679
1992	234,421	8,435,312	72,892	10,351,553	13,671	1,710	2,806	18,187	0	14,255,669
1993	247,076	8,885,273	76,858	10,904,435	14,608	1,827	3,026	19,461	0	15,068,309
1994	247,222	8,926,755	76,794	10,959,041	14,409	1,801	3,070	19,280	0	15,145,690
1995	290,998	10,539,430	90,436	12,943,054	16,958	2,119	3,705	22,782	0	18,013,188
1996	353,132	12,810,359	109,783	15,730,703	20,640	2,579	4,620	27,839	0	21,369,059
1997	362,776	13,168,230	112,960	16,102,652	21,382	2,674	4,872	28,928	0	21,970,360
1998	348,838	12,662,268	108,619	15,483,941	20,562	2,571	4,685	27,818	0	21,126,192
1999	479,470	17,454,651	149,123	21,587,353	28,348	3,543	6,765	38,656	0	29,200,538
2000	1,150,965	19,805,800	168,259	25,135,976	32,271	9,794	7,996	50,061	0	33,737,389
2001	1,132,642	19,490,499	165,580	24,751,444	31,757	9,638	7,869	49,264	0	33,419,720
2002	1,167,539	20,091,004	170,682	25,534,301	32,736	9,935	8,112	50,783	0	34,452,492
2003	1,215,738	20,920,403	177,728	26,588,412	34,087	10,345	8,446	52,878	0	35,874,763
2004	1,216,978	20,941,743	177,910	26,615,534	34,121	10,356	8,456	52,933	0	35,911,363
2005	1,148,920	19,770,593	167,960	25,127,082	32,213	9,776	7,983	49,972	0	33,903,044
2006	1,243,248	20,330,228	181,750	27,239,381	34,858	10,579	8,638	54,075	0	36,735,870
2007	820,799	12,752,863	116,415	17,507,615	22,362	7,007	5,579	34,948	0	23,537,874
2008	1,167,531	19,303,204	173,561	26,204,054	32,180	9,751	7,973	49,904	0	35,188,221
2009	1,293,596	21,153,536	189,110	28,342,483	36,270	11,008	8,988	56,266	0	38,172,245
2010	1,237,788	20,240,944	180,952	27,252,635	34,705	10,532	8,600	53,837	0	36,525,441
2011	1,336,855	21,860,932	195,434	29,433,805	37,482	11,375	9,289	58,146	0	39,448,763
2012	915,850	22,686,017	191,051	29,343,657	35,313	101,156	12,344	148,813	0	41,009,352
2013	996,745	23,602,562	207,636	30,847,749	38,359	109,882	13,628	161,869	0	43,244,214
2014	1,085,473	25,718,327	226,122	33,664,385	41,861	119,916	15,370	177,147	0	47,156,965
2015	1,039,717	24,614,514	216,476	32,268,168	40,374	115,656	15,317	171,347	0	45,203,527
2016	1,037,955	24,546,439	215,981	32,191,169	40,634	116,401	15,914	172,949	0	45,130,172
2017	957,063	22,620,590	198,956	29,741,320	37,618	107,762	14,712	160,092	0	41,778,269
2018	806,189	19,059,037	167,437	25,011,168	31,806	91,109	12,436	135,351	0	35,124,229
2019	1,132,290	26,781,888	235,142	35,143,648	44,930	128,706	17,513	191,149	0	49,417,077
2020	1,930,898	45,564,172	400,428	59,878,435	77,388	221,683	29,705	328,776	0	84,274,598
2021	1,919,680	45,221,634	397,585	59,423,852	77,030	220,657	29,542	327,229	0	83,770,328
2022	1,913,617	45,078,803	396,329	59,236,164	76,787	219,960	29,449	326,196	0	83,505,745
2023	1,958,374	46,133,133	405,599	60,621,615	78,583	225,105	30,137	333,825	0	85,458,825
2024	1,950,965	45,958,617	404,064	60,392,288	78,285	224,253	30,023	332,561	0	85,135,542
2025	1,918,851	45,202,100	397,413	59,398,183	76,997	220,562	29,529	327,088	0	83,734,144
2026	1,847,263	43,515,718	382,587	57,182,179	74,124	212,333	28,428	314,885	0	80,610,220
2027	1,923,066	45,301,400	398,286	59,528,667	77,166	221,046	29,594	327,806	0	83,918,087
2028	1,729,233	40,735,297	358,141	53,528,542	69,388	198,766	26,611	294,765	0	75,459,655
2029	1,778,246	41,889,905	368,293	55,045,765	71,355	204,400	27,365	303,120	0	77,598,498
2030	1,466,597	34,548,430	303,747	45,398,642	58,849	168,578	22,570	249,997	0	63,998,865
2031	1,465,354	34,519,134	303,489	45,360,147	58,799	168,435	22,550	249,784	0	63,944,597
2032	1,466,541	34,547,101	303,735	45,396,896	58,847	168,571	22,569	249,987	0	63,996,404
2033	1,465,108	34,513,350	303,439	45,352,545	58,790	168,406	22,547	249,743	0	63,933,883
2034	1,465,033	34,511,570	303,423	45,350,205	58,787	168,398	22,545	249,730	0	63,930,584
2035	1,463,398	34,473,065	303,084	45,299,607	58,721	168,210	22,520	249,451	0	63,859,256
TOTAL	52,714,048	1,188,414,698	10,393,041	1,549,675,661	1,980,227	4,212,384	680,013	6,872,624	0	2,157,410,274

¹ For years 1988 through 2019, charges are debt service only and do not include bond cover; 2020 charges and after include bond cover.² Castaic Lake Water Agency's SWP Water Supply Contract was transferred to Santa Clarita Valley Water Agency effective November 2, 2018.

TABLE B-23 Total Transportation and Delta Water Charge for Each Contractor¹ (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
1961	[1] 0	[2] 0	[3] 0	[4] 0	[5] 0	[6] 0	[7] 0	[8] 0	[9] 0	[10] 0
1962	0	0	0	11,750	43,787	21,132	76,669	0	0	0
1963	0	0	0	193,920	190,272	447,723	831,915	0	0	0
1964	0	0	0	255,449	277,455	621,356	1,154,260	6,696	21,667	28,363
1965	0	0	0	364,163	404,324	1,158,090	1,926,577	13,756	36,029	49,785
1966	18,063	0	18,063	409,118	421,723	1,412,954	2,243,794	26,524	61,349	87,873
1967	41,574	0	41,574	541,991	548,491	1,863,198	2,953,680	56,469	118,263	174,731
1968	128,628	0	128,628	671,671	633,184	2,178,465	3,483,320	115,961	229,807	345,768
1969	254,715	0	254,715	806,047	583,436	2,298,736	3,688,219	185,156	358,861	544,017
1970	277,547	0	277,547	892,271	640,297	2,787,967	4,320,535	200,150	387,675	587,825
1971	227,474	0	227,474	834,070	675,193	2,807,017	4,316,280	202,413	392,912	595,325
1972	224,978	0	224,978	918,798	822,397	3,027,749	4,768,944	209,057	406,589	615,646
1973	221,091	31,366	252,457	905,567	716,492	3,120,787	4,742,846	206,557	402,724	609,281
1974	240,498	32,938	273,437	946,447	746,932	3,325,022	5,018,401	208,545	407,090	615,635
1975	237,459	36,291	273,750	1,005,397	793,055	3,214,046	5,012,498	225,895	439,873	665,768
1976	271,292	40,836	312,127	1,118,686	943,464	3,362,542	5,424,691	228,976	447,299	676,275
1977	293,627	45,096	338,723	1,087,591	922,203	3,303,461	5,313,256	238,699	468,721	707,420
1978	273,870	49,178	323,048	1,176,728	935,818	3,712,581	5,825,127	245,331	484,259	729,590
1979	289,479	53,340	342,819	1,273,571	1,009,566	3,819,533	6,102,670	243,110	483,437	726,547
1980	310,846	86,073	396,919	1,426,911	1,173,798	4,119,071	6,719,780	282,254	540,553	822,807
1981	347,781	112,848	460,629	1,535,703	1,349,125	4,507,566	7,392,393	307,065	596,671	903,736
1982	438,335	141,835	580,171	1,616,588	1,369,536	4,941,393	7,927,517	328,215	682,545	1,010,760
1983	354,787	163,294	518,081	1,487,423	1,260,138	4,910,241	7,657,802	357,218	702,083	1,059,301
1984	467,336	246,698	714,034	1,797,452	1,478,394	6,870,249	10,146,096	409,529	801,057	1,210,586
1985	736,074	386,306	1,122,380	2,295,413	2,225,097	7,796,485	12,316,995	500,696	969,931	1,470,626
1986	1,120,086	714,246	1,834,332	2,164,479	2,014,104	8,193,845	12,372,428	536,751	1,038,031	1,574,782
1987	1,773,801	1,582,227	3,356,028	2,661,400	2,505,662	7,980,255	13,147,317	570,644	1,148,974	1,719,618
1988	2,349,572	2,524,763	4,874,335	2,722,908	2,774,430	7,830,285	13,327,622	673,071	1,439,620	2,112,691
1989	2,548,764	3,701,385	6,250,149	2,706,942	2,515,471	7,578,850	12,801,263	772,570	1,814,759	2,587,329
1990	2,900,024	3,848,934	6,748,958	3,142,461	2,929,775	8,355,392	14,427,628	933,367	2,046,370	2,979,737
1991	2,941,321	4,170,227	7,111,548	2,414,118	2,384,246	6,430,834	11,229,198	979,709	2,366,841	3,346,550
1992	2,797,727	4,144,993	6,942,720	2,887,770	2,927,115	7,656,940	13,471,825	1,118,807	2,526,861	3,645,668
1993	2,855,497	4,172,491	7,027,988	3,744,198	2,977,354	8,849,995	15,571,547	1,185,665	2,726,057	3,911,722
1994	2,987,938	4,225,291	7,213,229	3,780,985	3,586,255	9,613,545	16,980,784	1,335,974	3,518,042	4,854,015
1995	2,961,322	4,405,219	7,366,541	4,029,491	3,313,350	8,393,828	15,736,670	1,647,817	6,195,415	7,843,231
1996	3,045,021	4,898,210	7,943,232	3,637,077	3,178,398	9,228,554	16,044,028	2,592,043	15,232,542	17,824,585
1997	3,028,005	4,734,808	7,762,813	3,863,460	3,145,550	9,338,016	16,347,026	3,002,832	23,737,164	26,739,996
1998	2,936,062	4,588,897	7,524,960	3,470,110	3,201,607	9,077,806	15,749,522	3,254,940	28,393,640	31,648,580
1999	3,156,582	5,072,994	8,229,576	4,178,461	3,675,424	11,386,347	19,240,232	3,803,953	29,663,363	33,467,317
2000	3,463,380	5,623,325	9,086,705	5,810,119	3,598,049	10,229,605	19,637,773	3,765,269	30,291,477	34,056,746
2001	4,081,117	6,372,679	10,453,796	9,748,302	4,082,024	11,628,753	25,459,079	4,315,191	32,422,390	36,737,581
2002	4,329,536	6,572,789	10,902,324	13,286,567	4,091,231	13,167,304	30,545,102	4,043,387	32,107,699	36,151,087
2003	4,447,723	6,917,268	11,364,992	9,908,514	3,807,457	11,948,846	25,664,817	4,120,206	32,395,489	36,515,694
2004	4,983,510	7,261,330	12,244,839	8,272,973	4,208,939	11,650,128	24,132,040	4,190,181	32,929,549	37,119,730
2005	4,332,169	6,738,265	11,070,435	8,666,410	4,335,996	12,355,021	25,357,428	4,295,770	32,950,021	37,245,791
2006	4,290,108	6,320,529	10,610,637	9,184,467	4,403,295	12,662,103	26,249,866	4,183,980	32,757,185	36,941,165
2007	4,405,395	6,664,809	11,070,204	10,914,704	4,824,670	13,644,608	29,383,982	4,259,867	33,480,899	37,740,767
2008	5,197,194	6,768,784	11,965,978	14,278,672	5,235,279	14,117,748	33,631,699	4,849,344	35,160,629	40,009,974
2009	5,732,748	6,991,291	12,724,039	15,607,444	4,907,147	14,215,304	34,729,894	4,736,132	33,757,085	38,493,217
2010	6,358,021	8,753,574	15,111,595	18,211,956	5,561,878	15,782,048	39,555,882	5,266,909	36,208,659	41,475,568
2011	6,858,941	9,363,848	16,222,789	21,788,374	6,430,512	18,048,885	46,267,771	5,455,725	37,632,227	43,087,953
2012	7,463,912	9,414,947	16,878,859	24,308,597	6,498,267	20,441,820	51,248,685	5,520,393	37,966,370	43,486,763
2013	7,219,745	9,317,008	16,536,753	26,591,350	7,379,005	20,784,109	54,574,463	5,827,056	39,612,300	45,439,356
2014	7,824,556	9,812,202	17,636,758	26,687,894	7,563,978	20,654,043	54,905,915	5,632,101	36,850,290	42,482,391
2015	8,376,034	10,507,091	18,883,125	29,236,300	7,668,995	23,572,457	60,477,753	6,604,451	39,481,451	46,085,902
2016	9,050,736	11,679,054	20,729,790	30,875,008	7,741,216	30,641,956	69,258,180	6,677,923	44,520,868	51,198,791
2017	7,991,428	10,073,115	18,064,543	31,354,524	8,026,593	26,955,730	66,336,847	6,719,219	48,048,083	54,767,302
2018	8,889,914	11,136,592	20,026,506	33,114,660	8,520,451	27,118,090	68,753,201	6,858,304	46,708,730	53,567,034
2019	8,878,335	10,978,045	19,856,379	32,679,892	8,238,519	22,824,865	63,743,275	6,703,512	44,129,553	50,833,065
2020	10,177,967	13,929,278	24,107,245	34,468,605	10,131,216	28,549,331	73,149,152	7,850,813	44,446,160	52,296,973
2021	10,510,188	12,912,986	23,423,175	36,868,265	10,525,147	28,222,264	75,615,676	9,164,908	47,629,351	56,794,259
2022	10,991,566	12,894,625	23,886,190	36,547,333	10,404,761	27,962,312	74,914,407	9,236,651	48,016,786	57,253,436
2023	10,565,628	13,558,472	24,124,100	36,929,485	10,546,329	28,304,961	75,780,774	9,713,248	49,460,188	59,173,436
2024	10,659,548	13,720,928	24,380,477	37,229,518	10,637,785	28,527,303	76,394,606	9,927,209	50,432,991	60,360,200
2025	10,673,752	13,751,668	24,425,421	37,402,662	10,717,540	28,779,120	76,849,321	9,989,808	50,595,540	60,585,348
2026	10,669,494	13,757,720	24,427,214	37,297,815	10,654,430	28,584,531	76,536,775	9,956,410	50,519,083	60,475,493
2027	10,730,907	13,840,459	24,571,366	37,321,511	10,649,684	28,598,867	76,570,062	9,968,372	50,695,490	60,663,863
2028	10,675,952	13,784,797	24,460,749	37,589,407	10,786,906	28,911,476	77,287,789	10,027,501	50,674,350	60,701,851
2029	10,726,072	13,854,926	24,580,998	37,558,316	10,754,583	28,857,356	77,170,255	10,024,181	50,791,856	60,816,037
2030	10,615,965	13,729,742	24,345,707	37,320,529	10,634,881	28,542,223	76,497,633	9,947,620	50,365,189	60,312,808
2031	10,633,207	13,757,954	24,391,161	37,584,353	10,758,190	28,849,990	77,192,533	10,022,599	50,578,755	60,601,354
2032	10,654,054	13,788,100	24,442,155	37,420,056	10,659,979	28,636,290	76,716,326			

TABLE B-23 Total Transportation and Delta Water Charge for Each Contractor¹ (in dollars)

Sheet 2 of 4

Calendar Year	SAN JOAQUIN VALLEY AREA								
	Dudley Ridge	Empire	Future Contractor San Joaquin Valley	Kern		Kings	Oak Flat	Tulare	Total
				Municipal and Industrial	Agricultural				
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	233,974	19,802	54,588	445,439	1,750,486	16,947	20,078	314,801	2,856,114
1969	250,167	12,199	87,576	525,094	2,813,123	16,825	19,850	487,121	4,211,956
1970	316,156	35,635	94,675	573,998	3,981,182	21,435	30,890	542,235	5,095,205
1971	338,961	38,363	95,695	605,889	5,335,858	27,175	35,209	734,831	7,211,980
1972	393,960	41,624	98,788	631,615	7,371,597	26,473	64,827	2,053,809	10,682,693
1973	412,548	40,246	97,550	1,025,888	7,532,936	28,816	39,851	808,525	9,986,360
1974	528,098	41,460	98,460	1,144,792	8,272,074	29,544	43,218	1,086,403	11,244,050
1975	705,094	41,909	106,703	1,197,166	9,705,439	31,240	48,855	1,608,028	13,444,433
1976	738,630	44,430	108,084	1,323,840	10,974,787	32,666	52,878	1,479,019	14,754,334
1977	598,571	40,347	112,554	1,367,404	11,321,782	34,434	54,919	1,173,332	14,703,343
1978	718,421	36,029	115,521	1,565,884	13,696,709	38,927	59,773	1,209,903	17,441,167
1979	805,497	49,183	114,253	1,668,951	15,814,056	43,065	71,384	1,768,664	20,335,052
1980	987,980	50,918	125,950	1,770,264	17,495,720	48,021	96,019	1,715,182	22,290,054
1981	1,236,919	85,284	134,169	2,430,802	23,145,111	66,495	101,453	2,328,828	29,529,062
1982	1,273,035	71,478	135,057	2,523,660	25,584,216	70,662	109,137	2,326,058	32,093,303
1983	1,208,485	53,828	149,202	2,085,047	25,280,120	75,442	88,150	512,477	29,452,752
1984	1,519,342	29,810	164,505	3,396,379	34,042,709	94,320	122,334	1,578,834	40,948,234
1985	1,796,453	131,240	184,905	3,891,204	40,055,882	117,583	140,433	2,843,213	49,160,914
1986	2,039,601	80,617	180,445	4,079,838	44,156,706	136,715	154,127	3,712,212	54,540,261
1987	1,916,113	96,535	179,872	4,570,841	43,515,327	137,332	152,385	3,807,649	54,376,054
1988	2,002,400	110,913	193,735	4,734,502	45,493,030	138,278	147,582	3,964,668	56,785,107
1989	2,158,361	103,040	187,913	4,677,357	47,714,481	137,085	167,446	4,448,662	59,594,345
1990	1,901,358	88,244	221,392	4,827,893	46,521,643	121,154	149,768	4,031,837	57,863,287
1991	1,721,879	81,533	220,282	4,535,869	38,397,298	103,909	135,778	3,572,847	48,769,395
1992	2,270,231	106,352	241,455	5,550,167	49,594,394	143,783	176,761	4,611,677	62,694,821
1993	2,492,386	121,355	264,959	5,806,060	55,495,561	161,522	196,326	5,365,531	69,903,700
1994	2,297,209	108,860	306,359	5,210,309	52,966,101	145,625	179,138	4,738,231	65,951,831
1995	2,893,669	116,778	304,297	6,621,491	61,426,256	180,802	211,471	5,597,065	77,351,830
1996	2,083,574	126,467	389,203	6,671,115	59,475,984	178,474	191,083	7,162,831	76,278,731
1997	2,794,837	101,872	276,681	6,521,956	58,249,115	138,117	213,283	4,784,961	73,080,822
1998	2,640,518	121,164	381,847	5,733,156	54,824,906	143,433	204,893	5,038,261	69,088,177
1999	2,733,375	137,312	366,582	6,362,560	58,405,985	184,036	219,802	7,510,948	75,920,600
2000	2,627,064	122,044	303,341	6,103,419	52,167,191	174,236	214,383	6,242,577	67,954,255
2001	3,300,068	146,820	328,028	5,650,458	59,354,784	192,167	260,364	6,506,467	75,739,154
2002	3,021,781	129,036	321,344	6,172,131	54,353,627	187,442	239,864	5,852,089	70,277,314
2003	3,070,363	132,766	339,960	6,533,590	56,838,354	202,324	239,027	6,131,449	73,487,833
2004	3,258,123	169,415	342,620	7,858,474	57,433,330	358,643	254,612	5,881,626	75,556,842
2005	3,818,781	178,082	355,586	7,015,136	68,041,162	693,356	251,456	6,721,814	87,075,374
2006	3,652,265	169,259	295,459	7,509,019	65,282,676	539,949	256,851	5,960,945	83,666,423
2007	3,436,121	160,348	334,134	7,121,053	62,065,726	524,474	253,812	5,897,647	79,793,313
2008	3,411,101	158,103	471,763	7,773,242	63,066,501	550,615	262,366	5,592,626	81,286,317
2009	3,285,321	154,910	473,333	6,915,665	61,292,329	523,588	261,409	5,479,378	78,349,933
2010	3,635,035	233,040	507,046	8,082,484	72,539,660	649,778	325,331	6,495,810	92,468,184
2011	4,592,020	220,423	506,678	9,735,055	90,948,523	743,259	357,460	6,969,738	114,073,156
2012	3,761,028	231,587	467,872	9,792,553	83,814,098	766,057	366,296	7,898,834	107,098,325
2013	4,244,301	233,388	519,609	10,356,734	86,229,322	754,910	381,842	7,410,171	110,130,276
2014	4,051,983	211,451	630,817	9,495,307	80,037,150	685,416	372,734	6,539,598	102,024,456
2015	4,418,899	260,629	755,566	12,027,359	95,318,416	833,364	451,171	8,118,842	122,184,247
2016	4,926,804	316,620	484,953	13,315,180	106,783,673	976,564	522,133	9,530,513	136,856,439
2017	5,332,729	295,889	480,547	13,118,679	114,314,808	1,008,526	513,389	9,382,931	144,447,497
2018	5,071,494	301,990	615,802	12,491,205	105,345,717	947,523	514,243	9,173,708	134,461,683
2019	5,203,521	318,645	573,173	13,278,464	117,871,759	1,007,505	527,784	10,695,260	149,476,111
2020	5,209,620	349,953	668,968	15,657,663	121,591,942	1,143,400	623,002	10,713,459	155,958,006
2021	5,793,674	382,615	684,874	17,971,235	133,717,144	1,235,778	668,291	11,848,567	172,302,178
2022	5,791,643	383,073	708,513	18,122,279	133,532,063	1,241,523	668,544	11,846,350	172,293,988
2023	5,818,039	384,628	762,905	18,408,700	133,869,088	1,250,077	671,264	11,897,000	173,061,700
2024	5,754,052	380,228	831,805	18,729,883	132,566,161	1,247,591	662,878	11,767,898	171,940,496
2025	5,812,144	384,334	836,909	18,873,193	133,897,638	1,260,290	669,745	11,884,016	173,618,269
2026	5,729,519	378,938	842,366	18,665,280	132,196,304	1,243,491	659,547	11,718,541	171,433,987
2027	5,697,845	376,385	847,504	18,619,527	131,733,683	1,235,542	653,739	11,652,897	170,817,123
2028	5,839,327	386,952	850,909	18,906,249	134,577,958	1,268,145	673,873	11,938,799	174,442,212
2029	5,781,225	382,702	856,492	18,789,776	133,530,880	1,254,914	665,077	11,820,557	173,081,623
2030	5,665,530	376,107	862,160	18,480,019	131,109,118	1,234,289	652,558	11,592,539	169,972,319
2031	5,784,564	384,265	866,588	18,781,243	133,860,490	1,259,185	666,196	11,830,333	173,432,865
2032	5,643,540	374,524	872,654	18,400,044	130,704,364	1,228,988	649,405	11,546,522	169,420,041
2033	5,721,899	379,885	878,455	18,643,826	132,741,105	1,245,483	657,018	11,702,726	171,970,397
2034	5,789,455	384,494	884,035	18,731,850	133,866,896	1,259,634	667,341	11,837,227	173,420,932
2035	5,771,169	383,207	889,567	18,817,812	134,279,891	1,255,412	660,397	11,799,588	173,857,043
TOTAL	215,729,846	12,581,564	28,056,639	579,498,727	4,651,284,106	35,053,774	21,094,500	422,797,682	5,966,096,838

¹ Capital charges repaid through bond debt service prior to 2018 exclude bond cover; capital charges for 2019 and after include both bond debt service and bond cover.

TABLE B-23 Total Transportation and Delta Water Charge for Each Contractor¹ (in dollars)

Calendar Year	SOUTHERN CALIFORNIA AREA									
	AVEK	Coachella	Crestline	Desert	Littlerock	Mojave	Palmdale	San Bernardino	San Gabriel	San Gorgonio
[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	726	0	0	0	51,729	0	0
1964	64,494	19,542	4,370	38,211	1,143	31,079	8,205	82,811	34,987	21,735
1965	121,484	34,348	7,194	42,701	2,082	55,096	15,222	135,069	35,344	21,866
1966	221,012	62,476	12,478	76,886	3,753	99,564	27,679	232,502	61,465	37,964
1967	427,622	121,269	23,472	148,839	7,284	193,330	54,023	433,350	115,574	71,283
1968	754,401	218,649	41,509	265,168	12,870	346,978	95,466	782,163	208,927	128,915
1969	1,090,136	334,105	61,226	394,024	18,693	518,832	138,063	1,205,834	321,755	198,764
1970	1,420,639	470,423	89,700	552,223	25,231	717,657	184,837	1,778,187	467,573	289,633
1971	1,760,670	627,331	128,360	754,065	31,837	963,768	231,280	2,538,219	659,414	409,327
1972	2,245,455	819,635	185,868	1,035,804	43,771	1,299,843	287,620	3,758,473	950,297	537,186
1973	2,399,531	971,770	190,992	1,264,690	46,059	1,396,098	313,446	4,026,451	961,024	587,963
1974	2,520,870	998,399	204,074	1,305,235	48,933	1,457,756	331,702	4,463,660	1,104,491	611,428
1975	2,739,680	1,047,544	219,290	1,381,319	53,242	1,547,941	355,270	4,638,827	1,208,046	644,621
1976	3,204,880	1,106,524	232,129	1,474,438	57,732	1,626,287	381,276	4,838,364	1,278,740	668,315
1977	3,187,208	1,008,676	245,111	1,317,096	54,209	1,715,868	406,620	5,094,241	1,336,313	696,515
1978	3,635,572	1,208,919	255,468	1,618,071	56,805	1,765,408	420,026	5,091,935	1,374,033	709,040
1979	4,309,554	1,295,874	267,791	1,740,645	60,285	1,943,297	449,757	5,136,839	1,342,135	712,866
1980	4,994,298	1,406,781	295,350	1,941,392	67,604	2,117,918	499,051	5,647,604	1,485,141	862,275
1981	5,824,304	1,574,217	328,818	2,194,094	100,752	2,444,567	603,265	6,461,840	1,688,324	946,961
1982	5,582,860	1,657,630	346,721	2,336,914	82,296	2,418,896	641,991	6,752,799	1,929,664	1,021,329
1983	6,335,170	2,181,785	380,840	3,172,326	88,383	2,618,779	658,613	6,964,704	1,808,748	1,076,279
1984	7,713,111	3,287,286	497,586	4,929,764	96,492	2,888,103	727,821	8,053,209	2,598,232	1,211,621
1985	9,545,818	4,122,840	601,928	6,265,166	103,706	3,080,898	959,657	8,893,342	2,686,799	1,287,789
1986	9,515,134	4,584,188	647,634	7,009,695	130,222	3,266,781	1,223,847	9,142,822	3,398,540	1,344,770
1987	9,550,203	4,452,838	678,086	6,885,936	240,873	3,323,589	1,255,052	10,544,337	3,398,921	1,379,613
1988	9,149,230	4,510,360	704,411	7,052,631	158,845	3,499,799	1,044,206	11,095,193	3,271,137	1,465,829
1989	11,039,912	4,218,204	691,191	6,635,387	210,634	3,582,180	1,746,763	10,811,990	3,453,679	1,505,481
1990	12,432,751	4,916,384	729,229	7,720,886	331,172	3,817,678	1,953,905	11,722,946	4,221,266	1,624,763
1991	9,293,533	3,471,782	688,867	5,335,009	221,166	4,678,263	1,640,084	11,104,874	3,642,610	1,720,878
1992	11,850,715	3,626,099	612,895	5,587,383	174,998	5,657,089	1,532,325	11,144,101	3,694,099	1,779,902
1993	12,264,759	3,830,889	617,198	5,922,476	211,904	5,548,910	1,753,971	12,107,175	4,042,324	1,943,336
1994	14,334,329	3,857,907	694,421	5,963,596	278,012	6,500,945	2,090,724	12,731,704	4,776,753	1,920,217
1995	14,201,115	4,680,553	661,811	7,318,575	212,244	5,694,111	1,952,494	12,204,445	4,480,933	1,982,808
1996	14,628,006	7,634,303	710,651	12,187,480	208,356	5,792,776	2,300,206	12,730,997	4,599,073	1,651,317
1997	15,198,058	7,251,237	750,419	8,515,792	207,887	6,215,884	2,342,198	14,412,460	4,897,487	1,773,142
1998	13,714,014	6,324,675	717,140	7,018,227	209,057	7,819,155	1,946,444	14,380,084	4,177,167	2,031,020
1999	15,573,026	5,414,439	824,267	7,242,048	215,047	8,453,321	2,373,556	15,922,544	5,135,298	2,474,128
2000	14,843,460	3,826,005	793,796	5,625,366	187,002	8,381,697	2,081,943	15,954,920	4,259,707	3,032,353
2001	24,848,284	4,861,082	995,705	7,603,913	199,105	9,062,628	3,988,270	22,539,207	4,397,025	4,736,772
2002	16,415,916	4,136,268	962,062	6,408,072	182,505	8,247,820	3,398,327	24,324,341	5,808,809	7,013,354
2003	17,747,586	4,252,442	931,249	6,597,952	187,473	9,894,042	2,930,406	23,143,735	5,970,925	8,799,566
2004	18,941,404	4,941,615	1,044,146	6,725,930	201,589	10,178,957	3,219,882	27,894,909	5,475,311	9,379,050
2005	19,265,041	18,603,036	863,950	11,623,949	190,121	9,918,259	3,257,815	25,937,842	5,715,492	9,769,603
2006	20,979,012	31,812,741	854,904	11,741,001	201,952	12,769,073	3,217,292	25,913,085	5,791,851	10,317,168
2007	24,187,104	30,499,532	1,081,804	11,099,458	200,887	16,353,106	4,715,671	31,809,061	4,841,186	11,058,484
2008	22,071,290	30,196,132	1,030,082	12,145,038	216,530	14,994,421	4,690,820	32,582,851	5,918,611	12,935,202
2009	20,234,810	28,258,594	1,025,436	10,179,404	221,993	14,867,217	4,479,282	32,825,865	6,494,359	13,269,596
2010	23,941,176	38,304,612	973,423	13,613,676	228,008	18,029,539	3,976,817	36,070,875	8,189,961	14,683,352
2011	30,850,078	40,384,717	1,057,695	14,812,123	251,754	11,997,653	4,069,172	34,032,818	9,013,886	15,855,918
2012	31,183,521	46,724,760	1,167,429	17,144,643	267,059	13,710,263	5,437,170	47,862,145	9,282,626	17,429,561
2013	26,999,747	39,385,701	1,398,586	13,956,290	292,105	13,969,432	4,617,545	40,207,737	7,607,489	18,897,147
2014	22,463,966	34,682,990	1,486,592	11,828,472	293,809	13,922,011	4,712,180	42,577,929	6,519,199	24,122,359
2015	22,686,853	39,973,219	1,554,065	14,030,403	322,033	16,916,690	4,218,459	51,510,724	8,017,518	28,959,663
2016	28,028,230	44,351,305	1,520,708	15,472,762	341,739	19,497,027	4,940,313	60,169,340	9,647,504	33,690,724
2017	35,641,100	43,091,371	1,401,750	15,794,442	324,844	20,800,495	5,246,933	65,327,212	9,903,738	38,112,733
2018	30,191,023	59,002,797	1,481,453	19,856,503	330,301	15,445,898	4,815,838	62,485,068	9,595,185	39,795,086
2019	31,801,634	40,868,542	1,283,638	14,148,406	383,804	19,262,043	5,125,490	70,617,943	10,507,390	41,770,524
2020	28,372,323	65,434,075	1,956,181	21,537,254	479,865	19,741,552	4,446,168	66,286,921	8,925,513	41,109,840
2021	42,750,889	56,980,931	2,242,627	20,223,760	682,445	25,855,441	7,473,204	72,708,561	11,166,720	42,144,613
2022	42,506,036	56,228,389	2,227,971	19,905,055	680,761	25,739,759	7,408,866	71,995,754	11,054,707	41,698,120
2023	44,419,613	60,478,728	2,329,354	21,230,148	713,438	26,545,292	7,787,703	74,511,728	11,687,029	42,311,129
2024	44,558,923	61,432,277	2,347,224	21,457,376	716,079	26,726,081	7,756,445	74,996,318	11,793,754	42,434,904
2025	45,171,948	62,134,127	2,375,226	21,733,004	725,832	27,015,822	7,888,139	75,563,998	11,936,573	42,567,691
2026	44,511,864	61,442,751	2,346,275	21,445,652	715,379	26,725,075	7,748,262	75,073,633	11,782,727	42,510,179
2027	44,955,749	61,966,045	2,369,342	21,657,955	722,509	26,978,269	7,831,896	75,573,013	11,903,056	42,620,452
2028	45,024,997	62,063,985	2,368,966	21,667,432	723,597	26,938,554	7,861,410	75,601,672	11,896,448	42,649,577
2029	45,149,857	62,317,736	2,378,498	21,761,087	725,660	27,049,156	7,879,040	75,882,422	11,955,303	42,723,845
2030	44,366,644	61,641,562	2,342,257	21,445,529	713,186	26,653,062	7,736,708	75,276,208	11,772,265	42,650,182
2031	46,112,033	63,444,027	2,416,886	22,159,408	740,872	27,376,157	8,115,076	76,676,382	12,146,799	42,912,569
2032	43,664,564	61,155,371	2,316,705	21,221,841	702,130	26,406,916	7,580,636	75,043,385	11,668,611	42,663,807
2033	45,909,028	63,420,893	2,415,788							

TABLE B-23 Total Transportation and Delta Water Charge for Each Contractor¹ (in dollars)

Sheet 4 of 4

Calendar Year	SOUTHERN CALIFORNIA AREA (continued)				FEATHER RIVER AREA				South Bay Area Future Contractor	Grand Total
	Santa Clarita ²	Metropolitan	Ventura	Total	Yuba City	Butte	Plumas	Total		
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	1,622,219
1964	27,447	1,260,513	9,378	1,603,916	0	0	0	0	13,938	2,803,202
1965	53,007	2,180,589	17,766	2,721,767	0	0	405	405	28,937	4,807,069
1966	101,264	3,900,172	33,426	4,870,643	0	0	565	565	31,321	7,401,629
1967	210,814	7,693,703	68,155	9,568,718	0	0	562	562	47,718	13,080,852
1968	493,369	15,317,881	142,803	18,809,100	0	1,050	1,439	2,489	46,945	25,672,364
1969	746,550	23,153,064	215,209	28,396,256	0	1,225	4,120	5,345	52,963	37,153,471
1970	947,488	30,617,164	273,605	37,834,359	0	3,848	17,116	20,964	69,744	48,707,179
1971	1,143,650	39,958,997	342,425	49,549,344	0	4,546	19,187	23,733	55,532	61,979,667
1972	1,392,164	54,991,810	422,304	67,970,230	0	4,929	21,150	26,079	80,412	84,368,982
1973	1,442,193	59,591,118	435,655	73,626,989	0	7,059	21,778	28,837	54,219	89,300,989
1974	1,539,129	66,008,399	455,565	81,049,642	0	8,336	22,408	30,744	76,783	98,308,692
1975	1,632,784	71,830,070	478,403	87,777,037	0	9,416	23,523	32,939	84,547	107,290,972
1976	1,670,721	74,907,214	475,587	91,922,206	0	7,004	23,257	30,261	106,717	113,226,612
1977	1,760,239	73,338,457	507,063	90,667,616	0	16,917	24,059	40,976	98,618	111,869,951
1978	1,895,414	81,951,168	523,177	100,505,035	0	12,635	24,225	36,860	100,786	124,961,612
1979	1,977,280	83,601,786	526,405	103,364,513	0	16,575	28,352	44,927	119,352	131,035,880
1980	2,117,765	93,029,351	583,628	115,048,159	0	19,834	26,562	46,396	178,812	145,502,928
1981	2,589,503	112,171,493	672,540	137,600,677	0	21,682	34,563	56,245	185,347	176,128,088
1982	2,754,746	117,143,301	727,623	143,396,770	0	16,117	43,117	59,234	173,894	185,241,648
1983	2,827,840	118,991,007	854,263	147,958,738	0	15,202	29,410	44,612	220,926	186,912,211
1984	3,908,152	156,273,535	933,311	193,118,223	20,590	15,442	31,795	67,827	225,959	246,430,960
1985	4,376,420	194,967,204	993,651	237,885,217	24,050	16,976	32,405	73,431	340,322	302,369,884
1986	5,014,026	218,331,684	1,058,276	264,667,618	31,753	18,145	33,596	83,494	279,227	335,352,141
1987	4,873,728	204,859,482	1,056,318	252,498,975	37,071	17,794	33,384	88,249	345,116	325,531,357
1988	5,062,548	221,667,115	1,124,102	269,805,406	48,058	19,117	33,605	100,780	365,207	347,371,149
1989	5,073,370	230,328,278	1,232,379	280,529,448	61,184	20,809	37,188	119,181	422,329	362,304,044
1990	5,542,949	277,194,766	1,855,991	334,064,685	66,041	20,855	36,812	123,708	474,284	416,682,287
1991	4,656,713	221,887,061	1,549,955	269,890,794	180,212	22,526	42,200	244,938	214,683	340,807,105
1992	5,845,402	245,365,618	1,503,480	298,374,107	208,216	26,028	43,517	277,761	443,676	385,850,577
1993	5,492,065	219,238,180	1,551,253	274,524,441	209,613	26,203	47,588	283,404	599,571	371,822,374
1994	6,058,524	257,365,883	1,475,069	318,048,084	201,284	25,161	46,079	272,524	609,966	413,930,434
1995	6,434,171	225,863,369	1,568,401	287,255,027	216,945	27,118	50,022	294,085	534,971	396,382,355
1996	6,665,315	235,410,311	1,622,641	306,141,433	217,250	27,155	56,622	301,027	571,857	425,104,893
1997	6,558,969	245,453,567	1,777,266	315,354,364	236,300	29,847	59,915	326,062	428,638	440,039,721
1998	6,181,775	227,090,227	1,796,534	293,405,518	128,021	29,927	36,222	194,170	465,095	418,076,023
1999	6,778,271	256,116,229	1,873,267	328,395,440	254,675	31,834	40,585	327,094	571,383	466,151,643
2000	10,302,231	253,115,772	1,969,790	324,374,042	262,163	79,001	43,704	384,868	0	455,494,389
2001	15,899,369	441,710,358	2,260,648	543,102,366	261,699	93,471	45,056	400,226	0	691,892,202
2002	13,201,646	333,819,759	2,307,079	426,225,958	266,107	95,018	47,297	408,422	0	574,510,207
2003	14,244,706	361,640,701	2,321,867	458,662,650	262,547	93,638	68,989	425,174	0	606,121,160
2004	15,529,399	413,398,937	2,609,547	519,540,675	284,387	102,404	29,286	416,077	0	669,010,204
2005	14,490,279	384,874,560	2,082,649	506,592,596	280,033	727,066	28,810	1,035,909	0	668,377,532
2006	13,806,850	360,853,893	2,048,058	500,306,878	292,991	43,185	38,618	374,794	0	658,149,762
2007	16,837,239	439,380,835	2,534,593	594,598,960	291,100	40,957	46,072	378,129	0	752,965,355
2008	19,131,825	412,392,287	2,998,365	571,253,454	306,916	804,536	86,522	1,197,974	0	739,345,395
2009	17,217,912	382,703,010	2,869,977	534,647,455	328,896	855,850	90,625	1,275,371	0	700,219,910
2010	17,564,257	441,533,507	3,045,913	620,155,116	400,358	1,064,565	108,872	1,573,795	0	810,340,140
2011	17,688,413	492,876,656	3,127,546	676,018,428	451,483	1,197,315	121,979	1,770,777	0	897,440,872
2012	19,434,118	480,075,459	3,397,874	693,116,628	460,139	1,318,107	130,849	1,909,095	0	913,738,355
2013	22,405,377	476,092,744	3,405,351	669,235,252	483,119	1,383,934	141,267	2,008,320	0	898,104,420
2014	21,070,762	425,335,435	2,922,745	611,938,448	473,134	1,355,332	140,894	1,969,360	0	830,957,328
2015	21,802,820	473,712,619	3,304,710	687,009,776	614,794	1,761,128	185,765	2,561,687	0	937,202,491
2016	21,731,141	540,040,207	3,835,373	783,266,375	727,229	2,083,208	228,710	3,039,147	0	1,064,348,721
2017	23,797,149	585,593,642	5,481,091	850,516,501	741,588	2,124,343	214,859	3,080,790	0	1,137,213,480
2018	22,972,923	475,641,517	3,496,718	745,110,310	703,535	2,015,335	261,328	2,980,198	0	1,024,898,932
2019	23,540,569	571,952,626	6,724,378	837,986,988	732,713	2,098,917	230,741	3,062,371	0	1,124,958,190
2020	30,527,271	532,393,103	5,820,169	827,030,236	860,774	2,465,757	266,356	3,592,887	0	1,136,134,500
2021	29,788,556	624,126,006	6,049,927	942,193,680	898,338	2,573,363	275,260	3,746,961	0	1,274,075,929
2022	31,564,562	674,047,434	6,546,675	991,604,090	898,095	2,572,666	273,778	3,744,539	0	1,323,696,650
2023	31,846,068	681,222,477	6,593,898	1,011,676,604	899,891	2,577,811	274,773	3,752,475	0	1,347,569,091
2024	31,866,557	686,481,239	6,613,666	1,019,180,843	899,593	2,576,959	274,833	3,751,385	0	1,356,008,006
2025	32,328,512	695,277,574	6,710,176	1,031,428,622	898,305	2,573,268	274,514	3,746,087	0	1,370,653,067
2026	31,911,659	686,219,569	6,617,951	1,019,050,975	895,432	2,565,039	273,591	3,734,062	0	1,355,658,506
2027	32,186,762	692,459,625	6,677,284	1,027,901,956	898,474	2,573,752	274,934	3,747,160	0	1,364,271,530
2028	32,241,191	692,712,678	6,684,741	1,028,435,249	890,696	2,551,472	272,132	3,714,300	0	1,369,042,150
2029	32,292,675	694,617,341	6,695,171	1,031,427,792	892,663	2,557,106	273,068	3,722,837	0	1,370,799,542
2030	31,723,928	682,195,577	6,570,783	1,015,087,892	880,157	2,521,284	268,458	3,669,899	0	1,349,886,258
2031	32,631,235	701,927,858	6,769,256	1,043,428,559	880,107	2,521,141	268,624	3,669,872	0	1,382,716,344
2032	31,221,723	672,910,305	6,453,738	1,003,009,733	880,155	2,521,277	268,832	3,670,264	0	1,337,786,594
2033	32,505,862	699,458,436	6,737,150	1,040,662,427	880,098	2,521,112	269,000	3,670,210	0	1,378,746,886
2034	31,635,985	681,451,127	6,536,441	1,014,993,097	880,095	2,521,104	269,191	3,670,390	0	1,355,224,331
2035	33,589,661	724,898,819	6,984,190	1,077,289,356	880,029	2,520,916	269,360	3,670,305	0	1,417,775,703
TOTAL	988,376,954	24,338,884,265	198,542,363	34,197						

TABLE B-24 Equivalent Unit Charge for Water Supply for Each Contractor¹ (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			
FEATHER RIVER AREA	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]
Yuba City	0.00	0.00	0.00	0.00	0.00	165.12	14.67	179.79
Butte	0.00	0.00	0.00	0.00	0.00	614.45	42.58	657.03
Plumas	45.60	9.09	0.00	0.00	54.69	97.85	11.13	163.68
Feather River Area	9.68	1.93	0.00	0.00	11.61	272.60	21.48	305.69
NORTH BAY AREA								
Napa	182.96	85.59	4.95	14.44	287.94	49.51	16.43	353.89
Solano	107.13	70.13	5.31	8.26	190.84	54.29	12.89	258.02
North Bay Area	134.94	75.80	5.18	10.53	226.45	52.54	14.19	293.18
SOUTH BAY AREA								
Alameda-Zone 7	123.06	67.09	9.17	20.97	220.30	49.76	9.06	279.12
Alameda County	31.40	35.43	7.45	13.69	87.97	33.57	4.83	126.36
Santa Clara	25.31	25.79	6.53	11.38	69.00	21.46	3.25	93.71
South Bay Area	42.23	34.08	7.11	13.32	96.73	28.04	4.45	129.22
SAN JOAQUIN VALLEY AREA								
Kings	6.96	9.51	3.85	8.23	28.55	41.12	3.82	73.48
Dudley Ridge	5.94	5.87	3.33	4.90	20.03	21.86	2.15	44.04
Empire	2.70	5.56	2.55	4.58	15.39	24.95	1.78	42.12
Kern	10.61	11.62	5.07	6.97	34.28	27.59	2.80	64.67
Oak Flat	2.39	3.15	2.05	3.06	10.65	23.81	1.80	36.26
Tulare	6.17	6.06	3.26	4.79	20.29	23.11	2.22	45.62
San Joaquin Valley Area	9.83	10.68	4.77	6.62	31.90	26.85	2.70	61.46
CENTRAL COASTAL AREA								
San Luis Obispo	493.79	333.72	15.32	125.68	968.51	253.64	55.18	1,277.33
Santa Barbara	1,146.54	327.56	20.57	100.71	1,595.39	113.59	76.25	1,785.23
Central Coastal Area	1,018.82	328.77	19.54	105.60	1,472.72	141.00	72.13	1,685.85
SOUTHERN CALIFORNIA AREA								
AVEK	60.74	60.12	33.59	66.91	221.36	60.51	9.66	291.52
Coachella	91.23	104.17	44.19	81.19	320.78	59.27	11.04	391.10
Crestline	175.00	165.15	36.69	79.96	456.80	92.11	20.98	569.89
Desert	56.36	58.58	53.24	45.33	213.50	36.25	7.18	256.93
Littlerock	109.52	108.19	32.92	62.27	312.90	105.63	16.77	435.29
Mojave	238.63	260.23	39.13	132.47	670.45	197.13	39.40	906.98
Palmdale	65.71	68.64	41.71	102.43	278.50	73.44	10.70	362.63
San Bernardino	379.93	236.83	31.56	82.93	731.25	102.38	24.94	858.58
San Gabriel	127.96	123.76	48.46	51.26	351.45	64.11	14.91	430.48
San Gorgonio	2,901.09	683.81	34.20	241.30	3,860.40	167.88	39.87	4,068.15
Santa Clarita ²	65.11	65.41	25.89	45.95	202.36	52.95	12.34	267.64
Metropolitan	94.94	80.58	39.93	44.68	260.13	53.02	11.53	324.68
Ventura	315.63	270.17	22.78	141.51	750.09	197.84	42.34	990.27
Southern California Area	104.36	86.09	39.51	49.51	279.48	56.17	12.01	347.66
ALL AREAS	60.32	48.37	20.61	26.85	156.14	41.06	7.44	204.65

¹ 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.

² Castaic Lake Water Agency's SWP Water Supply Contract was transferred to Santa Clarita Valley Water Agency effective November 2, 2018.

TABLE B-25 Equivalent Unit Transportation Costs of Water Delivered from or through Each Aqueduct Reach¹ (in dollars per acre-foot)

Aqueduct Reach	Unit Cost of Reach ²						Cumulative Unit Costs from the Delta					
	Capital Costs	Water System Revenue Bond Surcharge ³	Minimum OMP&R	Off-Aqueduct Costs	Variable OMP&R	Total	Capital Costs	Water System Revenue Bond Surcharge ³	Minimum OMP&R	Off-Aqueduct Costs	Variable OMP&R	Total
NBA												
1	46.86	12.52	17.56	2.53	1.46	80.93	46.86	12.52	17.56	2.53	1.46	80.93
2	49.87	13.32	7.67	0.00	0.00	70.86	96.73	25.84	25.23	2.53	1.46	151.79
3A	8.89	2.37	15.26	5.57	2.36	34.45	105.62	28.21	40.49	8.10	3.82	186.24
3B	57.18	15.27	34.50	3.88	5.23	116.06	153.91	41.11	59.73	6.41	6.69	267.85
SBA												
1	8.19	2.19	20.58	5.63	5.46	42.05	10.48	2.80	24.63	8.37	8.01	54.29
2	0.77	0.21	2.32	0.00	0.00	3.30	11.25	3.01	26.95	8.37	8.01	57.59
4	2.58	0.69	3.96	0.00	0.00	7.23	13.83	3.70	30.91	8.37	8.01	64.82
5	5.41	1.44	3.11	0.00	0.00	9.96	19.24	5.14	34.02	8.37	8.01	74.78
6	0.31	0.08	0.33	0.00	0.00	0.72	19.55	5.22	34.35	8.37	8.01	75.50
7	2.40	0.64	0.60	0.00	0.00	3.64	21.95	5.86	34.95	8.37	8.01	79.14
8	3.25	0.87	1.00	0.00	0.00	5.12	25.20	6.73	35.95	8.37	8.01	84.26
9	6.72	1.79	3.74	0.00	0.00	12.25	31.92	8.52	39.69	8.37	8.01	96.51
CA												
1	2.29	0.61	4.05	2.74	2.55	12.24	2.29	0.61	4.05	2.74	2.55	12.24
2A	1.46	0.39	0.80	0.00	0.00	2.65	3.75	1.00	4.85	2.74	2.55	14.89
2B	0.75	0.20	0.40	0.00	0.00	1.35	4.50	1.20	5.25	2.74	2.55	16.24
3	0.65	0.17	0.30	0.00	0.00	1.12	5.15	1.37	5.55	2.74	2.55	17.36
4	1.04	0.28	2.01	1.30	1.15	5.78	6.19	1.65	7.56	4.04	3.70	23.14
5	0.79	0.21	0.40	0.00	0.00	1.40	6.98	1.86	7.96	4.04	3.70	24.54
6	0.20	0.05	0.20	0.00	0.00	0.45	7.18	1.91	8.16	4.04	3.70	24.99
7	1.19	0.32	0.48	0.00	0.00	1.99	8.37	2.23	8.64	4.04	3.70	26.98
8C	0.02	0.01	0.09	0.00	0.00	0.12	8.39	2.24	8.73	4.04	3.70	27.10
8D	0.46	0.12	0.39	0.00	0.00	0.97	8.85	2.36	9.12	4.04	3.70	28.07
9	0.39	0.10	0.36	0.00	0.00	0.85	9.24	2.46	9.48	4.04	3.70	28.92
10A	0.41	0.11	0.47	0.00	0.00	0.99	9.65	2.57	9.95	4.04	3.70	29.91
11B	0.60	0.16	0.30	0.00	0.00	1.06	10.25	2.73	10.25	4.04	3.70	30.97
12D	0.57	0.15	0.27	0.00	0.00	0.99	10.82	2.88	10.52	4.04	3.70	31.96
12E	0.40	0.11	0.46	0.00	0.00	0.97	11.22	2.99	10.98	4.04	3.70	32.93
13B	0.86	0.23	0.53	0.00	0.00	1.62	12.08	3.22	11.51	4.04	3.70	34.55
14A	3.30	0.88	4.06	2.31	2.17	12.72	15.38	4.10	15.57	6.35	5.87	47.27
14B	0.52	0.14	0.50	0.00	0.00	1.16	15.90	4.24	16.07	6.35	5.87	48.43
14C	0.43	0.11	0.37	0.00	0.00	0.91	16.33	4.35	16.44	6.35	5.87	49.34
15A	2.44	0.65	4.24	2.83	2.36	12.52	18.77	5.00	20.68	9.18	8.23	61.86
16A	4.05	1.08	6.56	6.13	5.50	23.32	22.82	6.08	27.24	15.31	13.73	85.18
17E	13.66	3.65	18.43	21.46	20.31	77.51	36.48	9.73	45.67	36.77	34.04	162.69
17F	3.54	0.95	0.23	0.00	0.00	4.72	40.02	10.68	45.90	36.77	34.04	167.41
18A	3.18	0.85	2.21	0.00	-2.13	4.11	43.20	11.53	48.11	36.77	31.91	171.52
19	2.35	0.63	1.34	0.00	0.00	4.32	45.55	12.16	49.45	36.77	31.91	175.84
19C	2.55	0.68	0.00	0.00	0.00	3.23	48.10	12.84	49.45	36.77	31.91	179.07
20A	1.87	0.50	2.21	0.00	0.00	4.58	49.97	13.34	51.66	36.77	31.91	183.65
20B	2.26	0.60	1.45	0.00	0.00	4.31	52.23	13.94	53.11	0.00	31.91	151.19
21	1.14	0.30	1.01	0.00	0.00	2.45	53.37	14.24	54.12	0.00	31.91	153.64
22A	1.19	0.32	0.53	0.00	0.00	2.04	54.56	14.56	54.65	0.00	31.91	155.68
22B	11.71	3.13	14.26	6.51	6.70	42.31	66.27	17.69	68.91	6.51	38.61	197.99
23	3.22	0.86	0.98	0.00	-2.72	2.34	69.49	18.55	69.89	6.51	35.89	200.33
24	6.24	1.67	2.77	0.00	0.00	10.68	75.73	20.22	72.66	6.51	35.89	211.01
25	4.55	1.22	0.16	0.00	0.00	5.93	80.28	21.44	72.82	6.51	35.89	216.94
26A	4.97	1.33	9.24	0.00	-18.57	(3.03)	85.25	22.77	82.06	6.51	17.32	213.91
28G	9.26	2.47	3.49	0.00	0.00	15.22	94.51	25.24	85.55	6.51	17.32	229.13
28H	8.91	2.38	3.67	0.00	0.00	14.96	103.42	27.62	89.22	6.51	17.32	244.09
28J	99.97	26.70	50.96	0.00	0.00	177.63	203.39	54.32	140.18	6.51	17.32	421.72
EBX												
1	N/A	0.00	0.17	0.00	0.00	0.17	N/A	22.77	82.23	6.51	17.32	128.83
2A	N/A	0.00	1.14	0.00	0.00	1.14	N/A	22.77	83.37	6.51	17.32	129.97
2B	N/A	0.00	55.64	10.57	12.44	78.64	N/A	22.77	139.01	17.08	29.76	208.61
2C	N/A	0.00	4.24	0.00	0.00	4.24	N/A	22.77	143.25	17.08	29.76	212.85
2D	N/A	0.00	8.96	0.00	0.00	8.96	N/A	22.77	152.20	17.08	29.76	221.81
2E	N/A	0.00	72.95	0.36	23.54	96.85	N/A	22.77	225.15	17.44	53.30	318.66
3A	N/A	0.00	184.80	8.20	36.38	229.38	N/A	22.77	409.95	25.64	89.68	548.04
3B	N/A	0.00	47.70	0.00	0.00	47.70	N/A	22.77	457.65	25.64	89.68	595.74
3C	N/A	0.00	6.55	0.00	0.00	6.55	N/A	22.77	464.21	25.64	89.68	602.29
3D	N/A	0.00	1.40	0.00	0.00	1.40	N/A	22.77	465.61	25.64	89.68	603.69
3E	N/A	0.00	0.22	0.00	0.00	0.22	N/A	22.77	465.83	25.64	89.68	603.91
4A	N/A	0.00	5.44	0.00	0.00	5.44	N/A	22.77	471.26	25.64	89.68	609.35
4B	N/A	0.00	48.72	1.02	6.75	56.49	N/A	22.77	519.99	26.66	96.43	665.84
WB												
29A	4.64	1.24	10.58	2.82	2.39	21.67	44.66	11.92	56.48	39.59	36.43	189.08
29F	3.38	0.90	1.27	0.00	0.00	5.55	48.04	12.82	57.75	39.59	36.43	194.63
29G	11.24	3.00	6.02	0.00	-8.59	11.67	59.28	15.82	63.77	39.59	27.84	206.30
29H	7.00	1.87	5.70	0.00	0.00	14.57	66.28	17.69	69.47	39.59	27.84	220.87
29J	11.73	3.13	1.64	0.00	-16.06	0.44	78.01	20.82	71.11	39.59	11.78	221.31
30	18.82	5.03	5.12	0.00	0.00	28.97	96.83	25.85	76.23	39.59	11.78	250.28
CB												
31A	8.51	2.27	24.16	2.10	2.05	39.09	17.36	4.63	33.28	6.14	5.75	67.16
33A	318.17	84.98	45.57	15.33	26.82	490.87	335.53	89.61	78.85	21.47	32.57	558.03
34	227.32	60.71	1.27	0.00	0.00	289.30	562.85	150.32	80.12	21.47	32.57	847.33
35	0.00	0.00	0.00	0.00	0.00	0.00	562.85	150.32	80.12	21.47	32.57	847.33

¹ 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.

² 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.

³ The Water System Revenue Bond (WSRB) Surcharge equivalent unit rate is calculated by multiplying Column 1 by the ratio of the 2021 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
1952	[1] 0	[2] 0	[3] 0	[4] 0	[5] 0	[6] 0	[7] 0	[8] 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]	0	[12]	[13]	0	[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	1,313,761	0
2001	347	146	183	116	108	48	1,034,428	0
2002	1,639	690	861	546	510	226	1,536,755	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	1,474,313	0
2005	1,243	16,250	10,833	10,922	6,038	4,973	1,027,856	0
2006	3,279	42,860	28,573	28,807	15,926	13,116	1,465,303	0
2007	0	0	0	0	0	0	1,410,503	0
2008	0	0	0	0	0	0	2,068,150	0
2009	(4)	(46)	(31)	(31)	(17)	(14)	1,723,868	0
2010	(1)	(8)	(5)	(5)	(3)	(2)	1,815,041	0
2011	0	0	0	0	0	0	1,899,939	0
2012	4	54	36	36	20	17	1,912,303	0
2013	0	0	0	0	0	0	1,994,461	0
2014	231	3,023	2,015	2,032	1,123	925	2,461,152	0
2015	(697)	(9,108)	(6,072)	(6,122)	(3,385)	(2,787)	2,626,141	0
2016	0	0	0	0	0	0	2,907,631	0
2017	0	0	0	0	0	0	2,395,016	0
2018	0	0	0	0	0	0	1,839,457	0
2019	0	0	0	0	0	0	2,532,639	0
2020	0	0	0	0	0	0	2,517,974	0
2021	0	0	0	0	0	0	2,668,698	0
2022	0	0	0	0	0	0	2,571,665	0
2023	0	0	0	0	0	0	2,571,665	0
2024	0	0	0	0	0	0	2,571,665	0
2025	0	0	0	0	0	0	2,571,665	0
2026	0	0	0	0	0	0	2,571,665	0
2027	0	0	0	0	0	0	2,571,665	0
2028	0	0	0	0	0	0	2,571,665	0
2029	0	0	0	0	0	0	2,571,665	0
2030	0	0	0	0	0	0	2,571,665	0
2031	0	0	0	0	0	0	2,571,665	0
2032	0	0	0	0	0	0	2,571,665	0
2033	0	0	0	0	0	0	2,571,665	0
2034	0	0	0	0	0	0	2,571,665	0
2035	0	0	0	0	0	0	2,571,665	0
TOTAL	13,855	84,122	57,959	56,926	32,445	25,812	84,612,384	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*	Reach 26B	Subtotal		
1971	[9]	[10]	[11]	[12]	[13]	[14]	[15]	[16]	
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	735,813	0	2,061,726	0	1,409,986	0	1,409,986	3,471,712	
2001	812,064	0	1,847,440	0	798,363	0	798,363	2,645,802	
2002	727,721	0	2,268,948	0	1,134,663	0	1,134,663	3,403,611	
2003	899,530	0	2,717,859	0	1,234,283	0	1,234,283	3,952,142	
2004	913,452	0	2,473,958	0	1,807,612	0	1,807,612	4,281,570	
2005	1,036,431	0	2,114,547	0	1,849,498	0	1,849,498	3,964,045	
2006	838,336	0	2,436,201	0	1,760,915	0	1,760,915	4,197,116	
2007	1,308,106	0	2,718,609	0	2,799,174	0	2,799,174	5,517,783	
2008	1,068,707	0	3,136,857	0	2,733,426	0	2,733,426	5,870,283	
2009	1,545,401	0	3,269,126	0	2,857,684	0	2,857,684	6,126,810	
2010	1,426,937	0	3,241,954	0	2,398,820	0	2,398,820	5,640,773	
2011	1,815,469	0	3,715,408	0	2,104,260	0	2,104,260	5,819,668	
2012	1,258,656	0	3,171,127	0	2,341,679	0	2,341,679	5,512,806	
2013	1,506,347	0	3,500,808	0	2,761,246	0	2,761,246	6,262,053	
2014	1,858,270	0	4,328,771	0	3,220,765	0	3,220,765	7,549,536	
2015	1,954,400	0	4,552,369	0	4,427,902	0	4,427,902	8,980,272	
2016	2,222,393	0	5,130,024	0	3,950,789	0	3,950,789	9,080,813	
2017	2,256,333	0	4,651,349	0	3,942,319	0	3,942,319	8,593,668	
2018	2,694,444	0	4,533,902	0	4,773,603	0	4,773,603	9,307,504	
2019	2,850,074	0	5,382,714	0	4,861,516	0	4,861,516	10,244,230	
2020	3,185,198	0	5,703,172	0	5,457,081	0	5,457,081	11,160,253	
2021	3,183,263	0	5,851,961	0	5,158,477	0	5,158,477	11,010,438	
2022	3,219,829	0	5,791,494	0	5,252,684	0	5,252,684	11,044,178	
2023	3,219,829	0	5,791,494	0	5,252,684	0	5,252,684	11,044,178	
2024	3,219,829	0	5,791,494	0	5,252,684	0	5,252,684	11,044,178	
2025	3,219,829	0	5,791,494	0	5,252,684	0	5,252,684	11,044,178	
2026	3,219,829	0	5,791,494	0	5,252,684	0	5,252,684	11,044,178	
2027	3,219,829	0	5,791,494	0	5,252,684	0	5,252,684	11,044,178	
2028	3,219,829	0	5,791,494	0	5,252,684	0	5,252,684	11,044,178	
2029	3,219,829	0	5,791,494	0	5,252,684	0	5,252,684	11,044,178	
2030	3,219,829	0	5,791,494	0	5,252,684	0	5,252,684	11,044,178	
2031	3,219,829	0	5,791,494	0	5,252,684	0	5,252,684	11,044,178	
2032	3,219,829	0	5,791,494	0	5,252,684	0	5,252,684	11,044,178	
2033	3,219,829	0	5,791,494	0	5,252,684	0	5,252,684	11,044,178	
2034	3,219,829	0	5,791,494	0	5,252,684	0	5,252,684	11,044,178	
2035	3,219,829	0	5,791,494	0	5,252,684	0	5,252,684	11,044,178	
TOTAL	83,061,994	0	167,945,497	0	145,941,832	0	145,941,832	313,887,329	

* 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	
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	315,744,216	399,041,132

TABLE B-29 Capital Cost Component of East Branch Enlargement Facilities
Transportation Charge for Each Contractor^{1,2} (in dollars)

Calendar Year	SOUTHERN CALIFORNIA AREA							Total
	AVEK	Coachella	Desert	Mojave	Palmdale	San Bernardino ³	Metropolitan	
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	44,173	2,924,487	870,981	1,215,968	8,115	0	20,682,969	25,746,693
2005	33,110	2,192,035	652,839	911,423	6,083	0	15,502,813	19,298,303
2006	46,946	3,108,066	925,655	1,292,298	8,625	0	21,981,299	27,362,889
2007	45,254	2,996,035	892,290	1,245,717	8,314	0	21,188,982	26,376,592
2008	42,479	2,812,362	837,587	1,169,348	7,804	0	19,889,980	24,759,560
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	45,830	3,034,222	903,663	1,261,595	8,420	0	21,459,047	26,712,777
2018	43,516	2,880,977	858,023	1,197,877	7,995	0	20,375,245	25,363,633
2019	43,094	2,853,093	849,718	1,186,283	7,917	0	20,178,047	25,118,152
2020	61,497	4,137,833	1,241,126	1,692,849	11,299	0	29,207,394	36,351,998
2021	62,760	4,229,163	1,269,335	1,727,650	11,531	0	29,846,788	37,147,227
2022	60,366	4,066,181	1,220,208	1,661,729	11,091	0	28,697,920	35,717,495
2023	49,648	3,345,503	1,004,110	1,366,683	9,121	0	23,610,510	29,385,575
2024	52,180	3,513,608	1,054,238	1,436,381	9,587	0	24,798,986	30,864,980
2025	59,617	4,006,894	1,201,276	1,641,086	10,952	0	28,286,855	35,206,680
2026	22,827	1,555,089	468,935	628,373	4,194	0	10,960,682	13,640,100
2027	23,456	1,599,254	482,423	645,686	4,309	0	11,270,861	14,025,989
2028	15,304	1,040,818	313,629	421,286	2,812	0	7,337,426	9,131,275
2029	15,948	1,085,246	327,103	438,997	2,929	0	7,650,083	9,520,306
2030	3,373	223,320	66,510	92,854	620	0	1,579,389	1,966,066
2031	3,361	222,515	66,270	92,519	617	0	1,573,702	1,958,984
2032	3,367	222,922	66,391	92,689	619	0	1,576,583	1,962,571
2033	3,363	222,620	66,301	92,563	618	0	1,574,441	1,959,906
2034	3,367	222,934	66,395	92,693	619	0	1,576,658	1,962,666
2035	3,369	223,015	66,419	92,726	619	0	1,577,233	1,963,381
TOTAL	1,719,710	114,388,935	34,138,424	47,339,263	315,946	0	808,540,359	1,006,442,637

¹ For years 1988 through 2018, charges are debt service only and do not include bond cover; 2019 charges and after include both debt service and bond cover.

² East Branch Enlargement Phase 2 debt service schedule started in 2017, and this table is the sum of East Branch Enlargement Phase 1 and Phase 2 capital charges for each contractor.

³ 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	
1971	0	0	0	0	0	0	0	0
1972	0	0	0	0	0	0	0	0
1973	0	0	0	0	0	0	0	0
1974	0	0	0	0	0	0	0	0
1975	0	0	0	0	0	0	0	0
1976	0	0	0	0	0	0	0	0
1977	0	0	0	0	0	0	0	0
1978	0	0	0	0	0	0	0	0
1979	0	0	0	0	0	0	0	0
1980	0	0	0	0	0	0	0	0
1981	0	0	0	0	0	0	0	0
1982	0	0	0	0	0	0	0	0
1983	0	0	0	0	0	0	0	0
1984	0	0	0	0	0	0	0	0
1985	0	0	0	0	0	0	0	0
1986	0	0	0	0	0	0	0	0
1987	0	0	0	0	0	0	0	0
1988	0	0	0	0	0	0	0	0
1989	0	0	0	0	0	0	0	0
1990	0	0	0	0	0	0	0	0
1991	0	0	0	0	0	0	0	0
1992	0	0	0	0	0	0	0	0
1993	0	0	0	0	0	0	0	0
1994	0	320,415	101,486	95,075	0	70,133	2,174,776	2,761,885
1995	0	278,176	86,604	86,479	0	59,461	1,895,643	2,406,363
1996	0	287,293	82,991	106,208	0	55,287	1,990,213	2,521,992
1997	0	389,636	123,446	100,643	0	62,571	2,642,077	3,318,373
1998	0	429,772	135,927	109,979	0	66,278	2,915,152	3,657,108
1999	37	236,006	75,040	60,907	11	39,144	1,599,082	2,010,227
2000	132	403,587	121,508	120,201	40	57,719	2,768,525	3,471,712
2001	10	307,323	89,527	93,873	3	32,682	2,122,384	2,645,802
2002	49	389,719	108,153	139,732	15	46,448	2,719,495	3,403,611
2003	0	451,900	123,861	164,862	0	50,526	3,160,993	3,952,142
2004	1,278	499,455	153,176	141,346	265	73,996	3,412,054	4,281,570
2005	745	471,807	156,939	97,668	154	75,710	3,161,022	3,964,045
2006	1,965	487,751	147,506	144,658	407	72,084	3,342,745	4,197,116
2007	0	658,904	223,589	127,886	0	114,586	4,392,818	5,517,783
2008	0	686,504	214,688	187,512	0	111,895	4,669,684	5,870,283
2009	(2)	727,864	240,416	156,285	0	116,981	4,885,267	6,126,811
2010	0	664,487	210,990	164,562	0	98,197	4,502,537	5,640,773
2011	0	685,366	213,781	172,261	0	86,139	4,662,122	5,819,669
2012	2	645,792	200,983	173,397	1	95,858	4,396,773	5,512,806
2013	0	738,071	235,758	180,831	0	113,033	4,994,360	6,262,053
2014	139	888,229	280,915	223,977	29	131,844	6,024,403	7,549,536
2015	(418)	1,064,701	351,566	235,595	(87)	181,259	7,147,655	8,980,271
2016	0	1,069,974	340,889	263,625	0	161,728	7,244,597	9,080,813
2017	0	1,021,613	337,557	217,148	0	161,381	6,855,969	8,593,668
2018	0	1,125,491	397,804	166,777	0	195,411	7,422,021	9,307,504
2019	0	1,226,032	415,739	229,626	0	199,009	8,173,824	10,244,230
2020	0	1,341,739	463,206	228,296	0	223,389	8,903,623	11,160,253
2021	0	1,319,220	448,318	241,962	0	211,166	8,789,772	11,010,438
2022	0	1,325,903	454,247	233,164	0	215,022	8,815,842	11,044,178
2023	0	1,325,903	454,247	233,164	0	215,022	8,815,842	11,044,178
2024	0	1,325,903	454,247	233,164	0	215,022	8,815,842	11,044,178
2025	0	1,325,903	454,247	233,164	0	215,022	8,815,842	11,044,178
2026	0	1,325,903	454,247	233,164	0	215,022	8,815,842	11,044,178
2027	0	1,325,903	454,247	233,164	0	215,022	8,815,842	11,044,178
2028	0	1,325,903	454,247	233,164	0	215,022	8,815,842	11,044,178
2029	0	1,325,903	454,247	233,164	0	215,022	8,815,842	11,044,178
2030	0	1,325,903	454,247	233,164	0	215,022	8,815,842	11,044,178
2031	0	1,325,903	454,247	233,164	0	215,022	8,815,842	11,044,178
2032	0	1,325,903	454,247	233,164	0	215,022	8,815,842	11,044,178
2033	0	1,325,903	454,247	233,164	0	215,022	8,815,842	11,044,178
2034	0	1,325,903	454,247	233,164	0	215,022	8,815,842	11,044,178
2035	0	1,325,903	454,247	233,164	0	215,022	8,815,842	11,044,178
TOTAL	3,937	37,379,469	12,441,821	7,695,667	838	5,974,223	250,391,374	313,887,329

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	
1971	0	0	0	0	0	0	0	0
1972	0	0	0	0	0	0	0	0
1973	0	0	0	0	0	0	0	0
1974	0	0	0	0	0	0	0	0
1975	0	0	0	0	0	0	0	0
1976	0	0	0	0	0	0	0	0
1977	0	0	0	0	0	0	0	0
1978	0	0	0	0	0	0	0	0
1979	0	0	0	0	0	0	0	0
1980	0	0	0	0	0	0	0	0
1981	0	0	0	0	0	0	0	0
1982	0	0	0	0	0	0	0	0
1983	0	0	0	0	0	0	0	0
1984	0	0	0	0	0	0	0	0
1985	0	0	0	0	0	0	0	0
1986	0	0	0	0	0	0	0	0
1987	0	0	0	0	0	0	0	0
1988	18,266	1,209,293	360,156	502,810	3,356	0	8,552,529	10,646,410
1989	19,176	1,269,524	378,094	527,854	3,523	0	8,978,504	11,176,675
1990	19,186	1,270,244	378,308	528,153	3,525	0	8,983,597	11,183,013
1991	19,187	1,270,261	378,314	528,160	3,525	0	8,983,717	11,183,164
1992	38,420	2,543,616	757,549	1,057,606	7,059	0	17,989,315	22,393,565
1993	40,029	2,650,139	789,274	1,101,897	7,354	0	18,742,682	23,331,375
1994	39,705	2,949,121	884,376	1,188,061	7,295	70,133	20,765,875	25,904,566
1995	39,632	2,902,004	868,042	1,177,437	7,281	59,461	20,452,246	25,506,103
1996	39,825	2,923,960	868,252	1,202,504	7,317	55,287	20,637,619	25,734,764
1997	41,743	3,153,265	946,520	1,249,728	7,669	62,571	22,187,399	27,648,895
1998	42,642	3,252,898	976,720	1,283,802	7,834	66,278	22,881,260	28,511,434
1999	44,775	3,197,893	957,160	1,292,426	8,230	39,144	22,546,557	28,086,185
2000	49,163	3,649,696	1,088,276	1,469,896	9,048	57,719	25,726,111	32,049,909
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	3,560,567	1,052,506	1,458,134	8,814	46,448	25,144,813	31,319,225
2003	40,765	3,150,771	927,648	1,287,022	7,489	50,526	22,248,330	27,712,551
2004	45,451	3,423,942	1,024,157	1,357,314	8,380	73,996	24,095,023	30,028,263
2005	33,855	2,663,842	809,778	1,009,091	6,237	75,710	18,663,835	23,262,348
2006	48,911	3,595,817	1,073,161	1,436,956	9,032	72,084	25,324,044	31,560,005
2007	45,254	3,654,939	1,115,879	1,373,603	8,314	114,586	25,581,800	31,894,375
2008	42,479	3,498,866	1,052,275	1,356,860	7,804	111,895	24,559,664	30,629,843
2009	43,668	3,619,046	1,101,478	1,358,406	8,023	116,981	25,332,691	31,580,293
2010	44,839	3,633,106	1,095,115	1,398,880	8,238	98,197	25,497,621	31,775,996
2011	43,190	3,544,785	1,065,383	1,361,175	7,935	86,139	24,884,907	30,993,514
2012	43,706	3,539,241	1,062,720	1,376,460	8,030	95,858	24,860,232	30,986,247
2013	37,663	3,231,540	978,372	1,217,587	6,919	113,033	22,629,020	28,214,134
2014	40,124	3,535,453	1,069,321	1,324,662	7,375	131,844	24,746,470	30,855,249
2015	44,224	4,020,269	1,231,804	1,464,487	8,115	181,259	28,050,440	35,000,598
2016	44,525	4,017,776	1,218,814	1,489,287	8,180	161,728	28,092,453	35,032,763
2017	45,830	4,055,835	1,241,220	1,478,743	8,420	161,381	28,315,016	35,306,445
2018	43,516	4,006,468	1,255,827	1,364,654	7,995	195,411	27,797,266	34,671,137
2019	43,094	4,079,125	1,265,457	1,415,909	7,917	199,009	28,351,871	35,362,382
2020	61,497	5,479,572	1,704,332	1,921,145	11,299	223,389	38,111,017	47,512,251
2021	62,760	5,548,383	1,717,653	1,969,612	11,531	211,166	38,636,560	48,157,665
2022	60,366	5,392,084	1,674,455	1,894,893	11,091	215,022	37,513,762	46,761,673
2023	49,648	4,671,406	1,458,357	1,599,847	9,121	215,022	32,426,352	40,429,753
2024	52,180	4,839,511	1,508,485	1,669,545	9,587	215,022	33,614,828	41,909,158
2025	59,617	5,332,797	1,655,523	1,874,250	10,952	215,022	37,102,697	46,250,858
2026	22,827	2,880,992	923,182	861,537	4,194	215,022	19,776,524	24,684,278
2027	23,456	2,925,157	936,670	878,850	4,309	215,022	20,086,703	25,070,167
2028	15,304	2,366,721	767,876	654,450	2,812	215,022	16,153,268	20,175,453
2029	15,948	2,411,149	781,350	672,161	2,929	215,022	16,465,925	20,564,484
2030	3,373	1,549,223	520,757	326,018	620	215,022	10,395,231	13,010,244
2031	3,361	1,548,418	520,517	325,683	617	215,022	10,389,544	13,003,162
2032	3,367	1,548,825	520,638	325,853	619	215,022	10,392,425	13,006,749
2033	3,363	1,548,523	520,548	325,727	618	215,022	10,390,283	13,004,084
2034	3,367	1,548,837	520,642	325,857	619	215,022	10,392,500	13,006,844
2035	3,369	1,548,918	520,666	325,890	619	215,022	10,393,075	13,007,559
TOTAL	1,723,647	151,768,404	46,580,245	55,034,930	316,784	5,974,223	1,058,931,733	1,320,329,966

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 x 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 x 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 x 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 x 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
<ul style="list-style-type: none"> ● 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 acre-foot=approximately 325,851 gallons=43,560 cubic feet		
1 cubic foot per second (cfs)=450 gallons per minute (gpm)		1 million gallons=3.07 acre-feet		
1 cfs=646,320 gallons per day=1.98 af a day		1 million gallons per day (mgd)=1,120 af a year		



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