A red-tailed hawk in flight on one of the Metropolitan-owned islands in the Sacramento-San Joaquin Delta.

THE METROPOLITAN WATER DISTRICT OF SOUTHERN CALIFORNIA

ANNUAL REPORT FOR THE FISCAL YEAR

July 1, 2017 to June 30, 2018

LOS ANGELES, CALIFORNIA
2018

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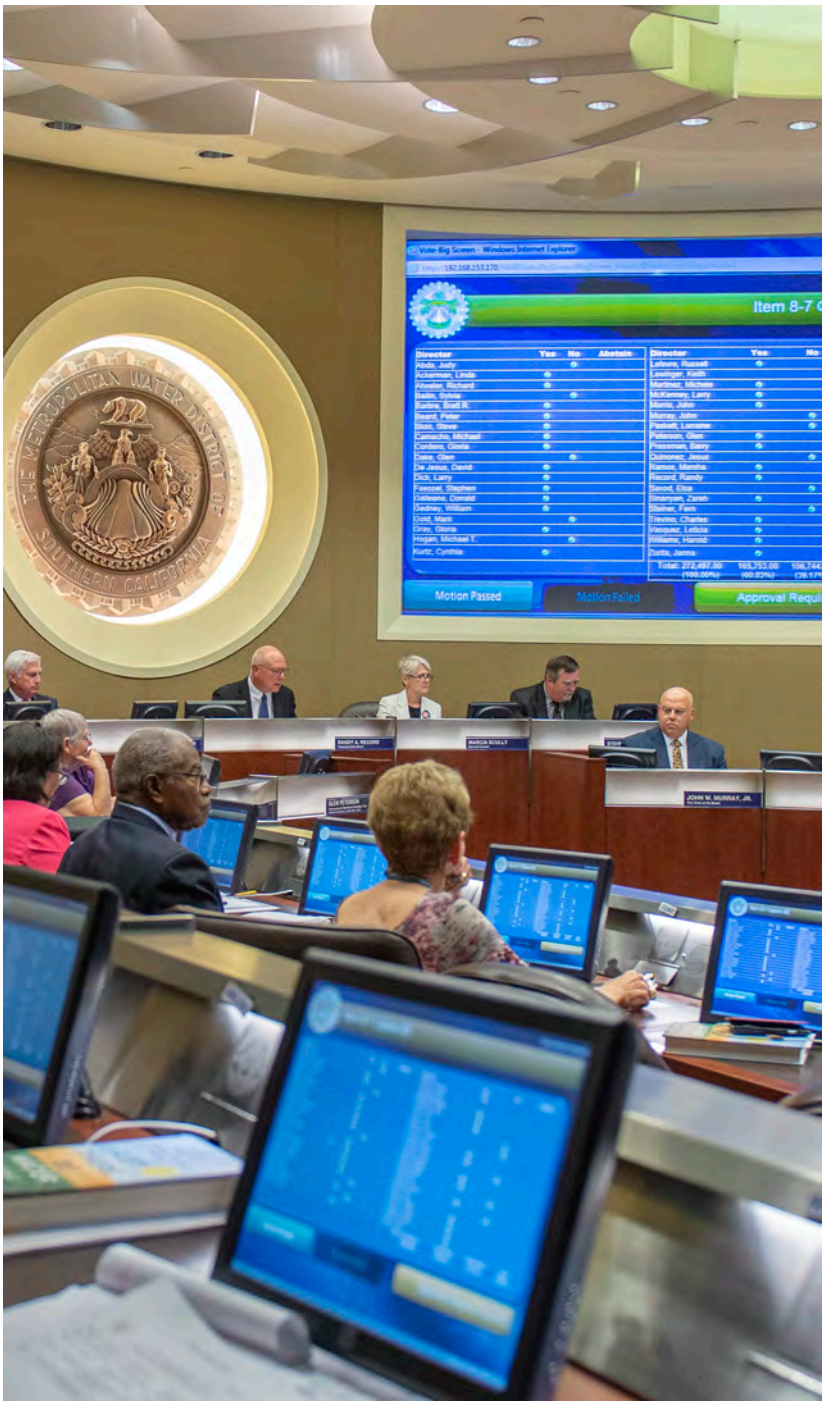
LIST OF ABBREVIATIONS

Abbreviation	Term
AB	Assembly Bill
AEPCO	Arizona Electric Power Cooperative
AF	Acre-feet or acre-foot
AFY	Acre-feet or acre-foot per year
BDI	Bay-Delta Initiatives
CAISO	California Independent System Operator
CalPERS	California Public Employee Retirement System
CARB	California Air Resources Board
CDFW	California Department of Fish and Wildlife
CEQA	California Environmental Quality Act
CFO	Chief Financial Officer
CIP	Capital Investment Plan
CRA	Colorado River Aqueduct
CY	Calendar year
DBP	Disinfection Byproducts
DCA	Delta Conveyance Design and Construction Joint Powers Authority
DCFA	Delta Conveyance Finance Authority
DDW	Division of Drinking Water
DOE	Department of Energy
DPR	Direct potable reuse
DVL	Diamond Valley Lake
DWR	Department of Water Resources
EEO	Equal Employment Opportunity
EIR	Environmental Impact Report
ESA	Endangered Species Act
FY	Fiscal year
GFOA	Government Finance Officers Association
HAA5	Five haloacetic acids
HRIS	Human Resources Information System
IIA	Institute of Internal Auditors
IID	Imperial Irrigation District
IRP	Integrated Water Resources Plan

LIST OF ABBREVIATIONS

Abbreviation	Term
LRP	Local Resources Program
µg/L	Micrograms per liter
MAF	Million acre-feet
MCL	Maximum Contaminant Level
MGD	Million gallons per day
MIB	Methylisoborneol
MOU	Memorandum of Understanding
ND	Not detected
NDMA	N-Nitrosodimethylamine
OFAC	Office of Foreign Assets Control
PCCP	Prestressed Concrete Cylinder Pipe
PPB	Parts per billion
PVID	Palo Verde Irrigation District
RAA	Running Annual Average
RSI	Rate Structure Integrity
SB	Senate Bill
SDCWA	San Diego County Water Authority
SED	Substitute Environmental Document
SIFMA	Securities Industry & Financial Markets Association
SWC	State Water Contractors
SWP	State Water Project
SWRCB	State Water Resources Control Board
T&O	Taste and odor
TCP	1,2,3-trichloropropane
TDS	Total dissolved solids
TOC	Total organic carbon
TTHM	Total trihalomethane
USEPA	U.S. Environmental Protection Agency
WAPA	Western Area Power Administration
WIFIA	Water Infrastructure Finance and Innovation Act
WRF	Water Research Foundation
WRM	Water Resource Management
WSO	Water System Operations
WSR	Water Stewardship Rate

The ceremonial taps begin to flow at the groundbreaking for the regional recycled water demonstration project in Carson.



Metropolitan's Board of Directors takes a vote on California WaterFix.

About Metropolitan

The Metropolitan Water District of Southern California is a regional wholesaler that delivers water to 26 member public agencies serving about 19 million people living in Los Angeles, Orange, Riverside, San Bernardino, San Diego and Ventura counties.

Metropolitan is governed by a 38-member board of directors representing the 26 member agencies consisting of 14 cities, 11 municipal water districts and one county water authority, which directly or through their subagencies serve the residents and businesses of more than 300 cities and numerous unincorporated communities.

Metropolitan directors are selected by their respective member agencies and may serve on the board of that particular member agency. It is a diverse group drawn from a variety of sectors, including business, government, engineering and agriculture. The board operates under a weighted voting system, with voting share determined by assessed property valuation.

The mission of Metropolitan is to provide its 5,200-square-mile service area with adequate and reliable supplies of high-quality water to meet present and future needs in an environmentally and economically responsible way.

To supply Southern California with reliable and safe water, Metropolitan owns and operates an extensive range of facilities including the Colorado River Aqueduct, 16 hydroelectric plants, nine reservoirs, 830 miles of large-scale pipes, and five water treatment plants. Four of these treatment plants are among the 10 largest plants in the nation. In fact, Metropolitan is the largest distributor of treated drinking water in the United States.

The district imports water from the Colorado River and Northern California to supplement local supplies, and helps its member agencies develop increased water conservation, recycling, storage and other local resource programs.

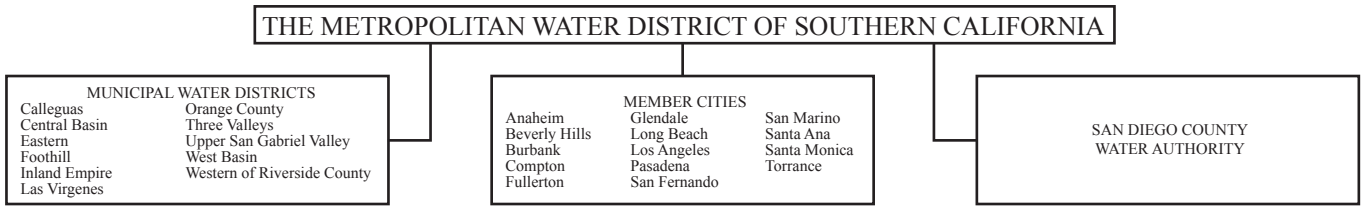
Metropolitan was established in 1928 under an act of the state Legislature to construct and operate the 242-mile Colorado River Aqueduct, which runs from an intake at Lake Havasu on the California-Arizona border, to an endpoint at Metropolitan's Lake Mathews reservoir in Riverside County.

When Metropolitan began delivering water, its service area consisted of approximately 625 square miles. Its service area has increased by 4,575 square miles since that time. The expansion is primarily the result of annexation of the service areas of member agencies.

In 1960, Metropolitan, followed by 30 other public agencies, signed a long-term contract that made possible the construction of the State Water Project's 444-mile California Aqueduct, which currently serves urban and agricultural agencies from the San Francisco Bay Area to Southern California. As the largest of the State Water Contractors, Metropolitan contracts with the state Department of Water Resources, which operates the SWP, for slightly less than half of all SWP allocations.

Water supplies from the SWP travel to Southern California via the California Aqueduct. Metropolitan also has groundwater banking partnerships and water transfer arrangements that secure additional supplies, and provides financial incentives to its member agencies for local investments in water management projects and programs. An increasing percentage of Southern California's water supply comes from these local sources, including conservation, water recycling and recovered groundwater.

Metropolitan's Board of Directors typically meets on the second Tuesday of each month. Board committee meetings usually occur on the Monday preceding the board meeting, and the second and fourth Tuesday of the month. Board and committee meetings are open to the public and are broadcast on the internet through Metropolitan's website, mwdh2o.com. A schedule of board and committee meetings is available on the website.



Calleguas MWD
Berylwood Heights Mutual Water
Brandeis Mutual
Butler Ranch
California American Water Company
California Water Service Company
Camarillo
Camrosa Water District
Crestview Mutual Water Company
Golden State Water Company
Oak Park Water Service
Oxnard
Pleasant Valley Mutual Water Company
Simi Valley
Solano Verde Mutual Water Company
Thousand Oaks
Ventura Co. Waterworks Dists. (Nos.1, 19 and 38)
Zone Mutual Water Company

Central Basin MWD
Bell Gardens
Bellflower-Somerset Mutual Water Co.
California Water Service Company
Cerritos
Commerce
Downey
Golden State Water Company
Huntington Park
La Habra Heights County Water District
Lakewood
Liberty Utilities
L.A. County Rancho Los Amigos
Lynwood
Maywood Mutual Water Co. Nos. 1, 2 and 3
Montebello
Norwalk
Orchard Dale Water District
Paramount
San Gabriel Valley Water Company
Santa Fe Springs
Signal Hill
South Gate
Suburban Water Systems
Vernon
Walnut Park Mutual Water Company
Water Replenishment District of So. Cal.

Eastern MWD
Hemet
Lake Hemet Municipal Water District
Nuevo Water Company
Perris
Rancho California Water District
San Jacinto

Foothill MWD
Crescenta Valley Water District
La Canada Irrigation District
Las Flores Water Company
Lincoln Avenue Water Company
Mesa Crest Water Company
Rubio Canon Land & Water Assoc.
Valley Water Company

Inland Empire Utilities Agency
Chino
Chino Hills
Cucamonga Valley Water District
Fontana Water Company
Monte Vista Water District
Ontario
San Antonio Water Company
Upland
Water Facilities Authority

MWD of Orange County
Brea
Buena Park
East Orange County Water District
El Toro Water District
Emerald Bay Service District
Fountain Valley
Garden Grove
Golden State Water Company
Huntington Beach
Irvine Ranch Water District
La Habra
La Palma
Laguna Beach County Water Dist.
Mesa Water District
Moulton Niguel Water District
Newport Beach
Orange
Orange County Water District
San Clemente
San Juan Capistrano
Santa Margarita Water District
Seal Beach
Serrano Water District
South Coast Water District
Trabuco Canyon Water District
Tustin
Westminster
Yorba Linda Water District

San Diego County Water Authority
Carlsbad Municipal Water District
Del Mar
Escondido
Fallbrook Public Utility District
Helix Water District
Lakeside Water District
National City
Oceanside
Olivenhain Municipal Water District
Otay Water District
Padre Dam Municipal Water District
Camp Pendleton Marine Corps Base
Poway
Rainbow Municipal Water District
Ramona Municipal Water District
Rincon del Diablo Municipal Water District
San Diego
San Dieguito Water District
Santa Fe Irrigation District
South Bay Irrigation District
Sweetwater Authority
Vallecitos Water District
Valley Center Municipal Water District
Vista Irrigation District
Yuima Municipal Water District

Three Valleys MWD
Boy Scouts of America, Firestone Ranch Reserv.
Cal Poly Pomona
Covina
Covina Irrigating Company
Glendora
Golden State Water Co. (Claremont & San Dimas)
La Verne
Mt. San Antonio College
Pomona
Rowland Water District
Suburban Water Systems
Valencia Heights Water Company
Walnut Valley Water District

Upper San Gabriel Valley MWD
Arcadia
Azusa
Monrovia
Main San Gabriel Basin Watermaster/Alhambra
Golden State Water Company
South Pasadena
Suburban Water Systems
Valley County Water District

West Basin MWD
California American Water (L.A. Division)
California Water Service
Golden State Water Company
El Segundo
Inglewood
Lomita
Los Angeles County Waterworks District #29
Manhattan Beach
Water Replenishment Dist. of So. Cal.

Western MWD of Riverside County
Box Springs Mutual Water Company
Corona
Eagle Valley Mutual Water Company
Elsinore Valley MWD
Norco
Rancho California Water District
Riverside
Temescal Valley Water District

Figure 1. Composition of The Metropolitan Water District of Southern California

DIRECTORS
JUNE 30, 2018

Chairman
Randy A. Record
Eastern Municipal Water District

Vice Chair
Linda Ackerman
Municipal Water District of Orange County

Vice Chair
David D. De Jesus
Three Valleys Municipal Water District

Vice Chair
Gloria Gray
West Basin Municipal Water District

Vice Chair
John W. Murray Jr.
Los Angeles

Secretary
Steve Blois
Calleguas Municipal Water District

DIRECTORS
JUNE 30, 2018

Judy Abdo
Santa Monica

Richard W. Atwater
Foothill Municipal Water District

Sylvia Ballin
San Fernando

Brett R. Barbre
Municipal Water District of Orange County

Peter A. Beard
Fullerton

Michael Camacho
Inland Empire Utilities Agency

Gloria Cordero
Long Beach

Glen C. Dake
Los Angeles

Larry D. Dick
Municipal Water District of Orange County

Stephen J. Faessel
Anaheim

Donald Galleano
Western Municipal Water District of Riverside County

William Gedney
Central Basin Municipal Water District

DIRECTORS
JUNE 30, 2018


Mark Gold
Los Angeles


Michael T. Hogan
San Diego County Water Authority


Cynthia Kurtz
Pasadena


Russell Lefevre
Torrance


Keith Lewinger
San Diego County Water Authority


Michele Martinez
Santa Ana


Larry McKenney
Municipal Water District of Orange County


John T. Morris
San Marino


Lorraine A. Paskett
Los Amgeles


Glen D. Peterson
Las Virgenes Municipal Water District


Barry D. Pressman
Beverly Hills


Jesús E. Quiñonez
Los Angeles

DIRECTORS
JUNE 30, 2018

Marsha Ramos
Burbank

Elsa Saxod
San Diego County Water Authority

Zareh Sinanyan
Glendale

Fern Steiner
San Diego County Water Authority

Charles Treviño
Upper San Gabriel Valley Municipal Water District

Harold C. Williams
West Basin Municipal Water District

Leticia Vasquez Wilson
Central Basin Municipal Water District

Janna Zurita
Compton

BOARD OF DIRECTORS
July 1, 2017 to June 30, 2018

OFFICERS OF THE BOARD

Chairman	Randy A. Record
Vice Chair	Linda Ackerman
Vice Chair	Gloria Gray
Vice Chair	John W. Murray Jr.
Vice Chair	David De Jesus
Secretary	Steve Blois

MEMBERS OF THE BOARD

Anaheim	Stephen J. Faessel
Beverly Hills	Robert Wunderlich
Beverly Hills	Barry D. Pressman
Burbank	Marsha Ramos
Calleguas Municipal Water District	Steve Blois
Central Basin Municipal Water District	Leticia Vasquez Wilson
Central Basin Municipal Water District	William C. Gedney
Compton	Janna Zurita
Eastern Municipal Water District	Randy A. Record
Foothill Municipal Water District	Richard W. Atwater
Fullerton	Peter A. Beard
Glendale	Zareh Sinanyan
Inland Empire Utilities Agency	Michael Camacho
Las Virgenes Municipal Water District	Glen D. Peterson
Long Beach	Gloria Cordero
Los Angeles	Glen C. Dake
Los Angeles	John W. Murray Jr.
Los Angeles	Jesús E. Quiñonez
Los Angeles	Lorraine Paskett
Los Angeles	Mark Gold

Municipal Water District of Orange County ..... Linda Ackerman
Municipal Water District of Orange County ..... Brett R. Barbre
Municipal Water District of Orange County ..... Larry D. Dick
Municipal Water District of Orange County ..... Larry McKenney
Pasadena ..... Cynthia Kurtz
San Diego County Water Authority..... Michael Hogan
San Diego County Water Authority..... Keith Lewinger
San Diego County Water Authority..... Fern Steiner
San Diego County Water Authority..... Elsa Saxod
San Fernando ..... Sylvia Ballin
San Marino..... John T. Morris
Santa Ana..... Michele Martinez
Santa Monica ..... Judy Abdo
Three Valleys Municipal Water District..... David D. De Jesus
Torrance..... Russell Lefevre
Upper San Gabriel Valley
Municipal Water District ..... Charles M. Treviño
West Basin Municipal Water District..... Donald L. Dear
West Basin Municipal Water District..... Gloria Gray
West Basin Municipal Water District..... Harold C. Williams
Western Municipal Water District
of Riverside County..... Donald Galleano

Note:
This list includes all officers and members who served on the board at any time during the fiscal year.

BOARD OF DIRECTORS
MEMBERS OF STANDING COMMITTEES
June 30, 2018

EXECUTIVE COMMITTEE

Randy A. Record, Chair
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David D. De Jesus, Vice Chair
Gloria Gray, Vice Chair
John W. Murray Jr., Vice Chair
Steve Blois, Secretary
Michael Camacho
Glen Dake
Larry D. Dick
Michael T. Hogan
Cynthia Kurtz
Glen D. Peterson
Barry D. Pressman
Jesús E. Quiñonez

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Gloria Gray, Vice Chair
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Linda Ackerman
Sylvia Ballin
Brett R. Barbre
Michael Camacho
Donald Galleano
Mark Gold
Russell Lefevre
Keith Lewinger
John T. Morris
John W. Murray Jr.
Glen D. Peterson
Elsa Saxod
Leticia Vasquez-Wilson

ENGINEERING AND OPERATIONS

Glen D. Peterson, Chair
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Peter A. Beard
Michael Camacho
Glen C. Dake
David D. De Jesus
Larry D. Dick
Stephen Faessel
Donald Galleano
William C. Gedney
Russell Lefevre
John T. Morris
Fern Steiner
Charles M. Treviño
Harold C. Williams
Janna Zurita

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David D. De Jesus
William C. Gedney
Cynthia Kurtz
Keith Lewinger
Larry McKenney
Lorraine Paskett
Marsha Ramos
Elsa Saxod
Zareh Sinanyan

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Michael Camacho
Gloria Cordero
Larry D. Dick
John W. Murray Jr.
Lorraine Paskett
Zareh Sinanyan
Fern Steiner

ORGANIZATION, PERSONNEL AND TECHNOLOGY

Michael T. Hogan, Chair
Michael Camacho, Vice Chair
Sylvia Ballin
Gloria Cordero
Stephen Faessel
William C. Gedney
Gloria Gray
Michelle Martinez
Larry McKenney
John W. Murray Jr.
Jesús E. Quiñonez
Marsha Ramos
Charles M. Treviño
Harold C. Williams
Leticia Vasquez-Wilson
Janna Zurita

REAL PROPERTY AND ASSET MANAGEMENT

Michael Camacho, Chair
Charles M. Treviño, Vice Chair
Peter Beard
Glen C. Dake
Larry D. Dick
Michael T. Hogan
Glen D. Peterson
Marsha Ramos

WATER PLANNING AND STEWARDSHIP

Gloria Gray, Chair
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Judy Abdo
Linda Ackerman
Michael Camacho
David D. De Jesus
Larry D. Dick
Keith Lewinger
John T. Morris
Lorraine Paskett
Glen D. Peterson
Barry D. Pressman
Jesús E. Quiñonez
Fern Steiner

HISTORICAL
ROLL OF DIRECTORS
June 30, 2018

ANAHEIM

A. W. Franzen.....March 1, 1929 to April 11, 1930
O. E. Steward.....April 18, 1930 to April 12, 1935
E. P. Hapgood.....May 3, 1935 to June 14, 1960
Charles A. Pearson .....July 12, 1960 to May 8, 1972
Keith A. Murdoch.....June 13, 1972 to May 29, 1979
Joseph C. Truxaw .....August 17, 1979 to November 20, 1990
Bob Kazarian .....November 20, 1990 to July 12, 1994
Edward G. Alario.....November 8, 1994 to April 14, 1998
S. Dale Stanton .....April 14, 1998 to July 8, 2004
Tom Tait .....July 8, 2004 to December 13, 2005
Marcie L. Edwards .....December 13, 2005 to August 18, 2009
Kristine L. Murray.....August 18, 2009 to August 20, 2014
Don Calkins .....October 3, 2014 to June 8, 2015
STEPHEN J. FAESSEL .....June 8, 2015 to

BEVERLY HILLS

Paul E. Schwab.....March 1, 1929 to June 19, 1931
George R. Barker.....June 19, 1931 to August 2, 1935
Arthur Taylor.....August 2, 1935 to August 2, 1951
Floyd E. Fischer.....August 17, 1951 to December 2, 1977
Ellen Stern Harris .....January 10, 1978 to March 10, 1981
Nicholas H. Cominos.....March 10, 1981 to September 1, 1984
Mel Odom.....January 11, 1983 to February 14, 1984
Ina S. Roth .....February 14, 1984 to February 11, 1992
Dan Webster .....March 10, 1992 to September 8, 1999
Betty H. Harris.....September 8, 1999 to June 14, 2007
Robert Wunderlich .....July 6, 2007 to October 10, 2017
BARRY D. PRESSMAN .....October 10, 2017 to

BURBANK

Harvey E. Bruce .....March 1, 1929 to February 11, 1933
James L. Norwood.....March 10, 1933 to April 30, 1943
May 9, 1947 to October 13, 1953
Frank C. Tillson.....May 14, 1943 to May 9, 1947
Walter H. Long.....October 13, 1953 to June 13, 1961
Earle C. Blais.....June 13, 1961 to June 11, 1985
Michael A. Nolan .....June 11, 1985 to July 9, 1991

Larry L. Stamper ..... July 9, 1991 to June 6, 1995
Thomas H. McCauley ..... June 6, 1995 to December 16, 1998
Fred Lantz ..... January 12, 1999 to March 9, 1999
George E. Battey Jr. ..... March 9, 1999 to December 10, 2001
Glenn A. Brown ..... December 10, 2001 to January 13, 2015
MARSHA RAMOS ..... January 13, 2015 to

CALLEGUAS MUNICIPAL WATER DISTRICT

Richard Bard ..... January 10, 1961 to August 22, 1969
Carl E. Ward ..... September 16, 1969 to February 9, 1993
Vincent M. Hardy ..... October 14, 1980 to June 30, 1990
Patrick H. Miller ..... August 21, 1990 to February 1, 1999
Jeffrey A. Borenstein ..... April 7, 1999 to December 31, 2000
Ted Grandsen ..... February 9, 1993 to December 11, 2012
Gail Pringle ..... December 11, 2012 to March 10, 2014
STEVE BLOIS ..... March 10, 2014 to

CENTRAL BASIN MUNICIPAL WATER DISTRICT

Milo Dellmann ..... November 23, 1954 to November 23, 1983
Claire S. Thompson ..... November 23, 1954 to November 30, 1959
Frank H. Wheelock ..... November 23, 1954 to April 10, 1973
Victor H. York ..... November 23, 1954 to November 30, 1963
E. Thornton Ibbetson ..... December 8, 1959 to January 12, 1998
William H. Kent ..... October 10, 1961 to April 7, 1977
Carl Fossette ..... March 13, 1973 to May 30, 1986
Douglas W. Ferguson ..... June 14, 1977 to August 11, 1993
Leonis C. Malburg ..... July 8, 1986 to May 8, 1995
Gary A. Morse ..... August 11, 1993 to February 10, 1997
January 5, 1999 to June 6, 2003
Jorge G. Castro ..... February 10, 1997 to March 9, 1999
Phillip J. Pace ..... May 8, 1995 to January 8, 2008
Richard F. Mayér ..... January 12, 1998 to January 5, 1999
Charles M. Treviño ..... March 9, 1999 to December 31, 2000
Robert Apodaca ..... June 6, 2003 to August 18, 2009
February 11, 2013 to January 4, 2017
Phillip D. Hawkins ..... January 8, 2008 to February 11, 2013
July 7, 2014 to February 10, 2015
February 13, 2017 to March 13, 2017
Edward C. Vasquez ..... August 18, 2009 to July 13, 2010

Rudy C. Montalvo..... July 13, 2010 to February 11, 2013
LETICIA VASQUEZ WILSON.. February 11, 2013 to July 7, 2014
February 10, 2015 to January 4, 2017
March 14, 2017 to
Pedro Aceituno ..... February 14, 2017 to March 13, 2017
WILLIAM C. GEDNEY..... March 14, 2017 to

COASTAL MUNICIPAL WATER DISTRICT
(absorbed into MWDOC in 2001)

C. C. Cravath ..... August 14, 1942 to January 22, 1957
Lynndon L. Aufdenkamp..... January 22, 1957 to February 12, 1991
James E. O'Connor..... December 7, 1976 to July 1, 1979
John Killefer ..... January 12, 1982 to September 9, 1993
Wayne T. McMurray ..... February 12, 1991 to December 31, 2000
Donald C. Simpson ..... October 7, 1996 to December 9, 1996
Langdon W. Owen..... December 9, 1996 to January 17, 2001

COMPTON

C. A. Dickison ..... July 17, 1931 to January 20, 1933
William H. Foster ..... January 20, 1933 to June 28, 1935
Warren W. Butler..... June 28, 1935 to January 24, 1980
Regina Murph ..... March 11, 1980 to March 25, 2003
Kenneth M. Orduna ..... April 8, 2003 to January 14, 2004
Isadore Hall III..... February 9, 2004 to April 13, 2009
Yvonne Arcenaux ..... April 13, 2009 to September 14, 2010
March 11, 2014 to November 10, 2015
Diane Sanchez..... September 14, 2010 to March 11, 2014
JANNA ZURITA..... November 10, 2015 to

EASTERN MUNICIPAL WATER DISTRICT

Irwin E. Farrar..... August 31, 1951 to March 1, 1982
Doyle F. Boen..... March 9, 1982 to October 11, 1994
Chester C. Gilbert ..... October 11, 1994 to June 1, 1999
Clayton A. Record Jr..... June 1, 1999 to January 9, 2001
Marion V. Ashley..... January 9, 2001 to January 6, 2003
RANDY A. RECORD ..... January 14, 2003 to

FOOTHILL MUNICIPAL WATER DISTRICT

Nelson Hayward..... February 8, 1955 to July 4, 1959
Conrad R. Fanton..... November 10, 1959 to November 2, 1964
A. B. Smedley..... April 13, 1965 to August 1, 1990
Brooks T. Morris..... September 11, 1990 to November 27, 1991
William T. O'Neil ..... January 14, 1992 to May 10, 1999
James T. Edwards ..... May 10, 1999 to April 1, 2014
RICHARD W. ATWATER ..... April 3, 2014 to

FULLERTON

Walter Humphreys..... April 10, 1931 to January 19, 1945
H. H. Kohlenberger..... July 27, 1945 to March 7, 1959
Hubert C. Ferry ..... February 23, 1960 to February 8, 1983
Norman L. De Vilbiss..... February 8, 1983 to April 12, 1988
James H. Blake ..... August 23, 1988 to August 3, 2012
Thomas Babcock..... September 6, 2012 to February 11, 2014
Jennifer Fitzgerald ..... February 11, 2014 to July 7, 2014
PETER A. BEARD..... July 7, 2014 to

GLENDALE

W. Turney Fox..... March 1, 1929 to November 27, 1931
Samuel G. McClure ..... November 27, 1931 to January 13, 1933
Frank P. Taggart ..... January 13, 1933 to August 31, 1934
Bernard C. Brennan ..... August 31, 1934 to April 23, 1937
Herman Nelson ..... June 4, 1937 to August 27, 1954
Paul L. Burkhard..... September 28, 1954 to June 10, 1958
Normal C. Hayhurst..... June 10, 1958 to June 9, 1970
Lauren W. Grayson..... June 9, 1970 to May 21, 1972
William H. Fell ..... June 13, 1972 to July 13, 1976
C. E. Perkins ..... July 13, 1976 to July 13, 1988
James M. Rez..... August 23, 1988 to March 9, 2009
Peter Kavounas ..... March 9, 2009 to December 8, 2009
Laura Friedman..... December 8, 2009 to December 4, 2016
ZAREH SINANYAN ..... February 14, 2017 to

INLAND EMPIRE UTILITIES AGENCY
(formerly Chino Basin MWD)

A. C. Reynolds..... February 12, 1952 to March 12, 1963
Ray W. Ferguson ..... March 12, 1963 to December 31, 1980
Carl B. Masingale ..... March 10, 1981 to August 9, 1984
John G. Gilday ..... September 11, 1984 to February 15, 1985
Edward A. Girard..... March 12, 1985 to May 31, 1990
Anne W. Dunihue ..... September 20, 1988 to February 11, 1992
Bill M. Hill..... August 21, 1990 to February 9, 1999
Dwight F. French ..... February 11, 1992 to August 18, 1994
Wyatt L. Troxel..... August 19, 1994 to November 14, 2003
Gene Koopman ..... February 9, 1999 to December 31, 2000
November 14, 2003 to February 10, 2009
Angel Santiago..... February 10, 2009 to February 3, 2011
MICHAEL CAMACHO..... February 3, 2011 to

LAS VIRGENES MUNICIPAL WATER DISTRICT

Earle Brookins ..... December 13, 1960 to March 26, 1963
A. Myron McBride..... March 26, 1963 to May 11, 1965
A. Macneil Stelle ..... June 8, 1965 to October 23, 1967
March 11, 1975 to February 9, 1993
Whitney P. Reeve ..... December 19, 1967 to March 11, 1975
GLEN D. PETERSON..... February 9, 1993 to

LONG BEACH

Nowland M. Reid..... April 10, 1931 to January 27, 1933
W. M. Cook ..... January 27, 1933 to April 30, 1943
Gus A. Walker ..... April 30, 1943 to December 31, 1976
Lloyd C. Leedom ..... May 9, 1947 to June 30, 1979
Samuel C. Rue ..... October 9, 1979 to March 12, 1985
Ida Frances Lowry ..... March 12, 1985 to February 9, 1993
Henry J. Meyer ..... February 9, 1993 to August 19, 1997
Helen Z. Hansen ..... August 19, 1997 to May 13, 2008
Suja Lowenthal ..... May 13, 2008 to September 13, 2016
GLORIA CORDERO……September 13, 2016 to

LOS ANGELES

John R. Haynes ..... March 1, 1929 to February 4, 1930
John R. Richards ..... March 1, 1929 to October 28, 1947
W. P. Whitsett ..... March 1, 1929 to January 10, 1947
John G. Bullock ..... November 1, 1929 to September 15, 1933
O. T. Johnson Jr. ..... November 5, 1929 to August 29, 1930
W. L. Honnold ..... February 28, 1930 to July 21, 1933
J. Eisner ..... August 29, 1930 to July 2, 1937
Walter A. Ham ..... January 20, 1933 to January 4, 1935
D. W. Pontius ..... January 20, 1933 to September 3, 1955
Perry H. Greer ..... July 21, 1933 to August 14, 1950
V. H. Rossetti ..... October 13, 1933 to November 19, 1960
Otto J. Emme ..... January 11, 1935 to October 22, 1947
Louis S. Nordlinger ..... August 13, 1937 to June 8, 1940
Joseph Jensen ..... August 16, 1940 to February 3, 1944
March 8, 1946 to July 8, 1974
Ransom W. Chase ..... March 14, 1947 to February 11, 1975
Gordon B. Crary ..... March 14, 1947 to November 8, 1959
Howard D. Mills ..... March 14, 1947 to March 17, 1965
W. R. Fawcett ..... May 13, 1952 to November 27, 1953
Luther C. Anderson ..... January 12, 1954 to February 11, 1975
Noah Dietrich ..... November 8, 1955 to November 23, 1970
Ferdinand Mendenhall ..... July 29, 1958 to October 8, 1974
Ben P. Griffith ..... August 9, 1960 to June 7, 1961
Pietro Di Carlo ..... February 14, 1961 to November 7, 1967
William S. Peterson ..... February 14, 1961 to August 10, 1979
Aubrey E. Austin Jr. ..... February 28, 1961 to May 13, 1975
Albert F. Bush ..... November 14, 1961 to February 11, 1975
John W. Luhring ..... January 16, 1962 to August 8, 1967
Joseph M. Quinn ..... May 14, 1968 to September 18, 1973
B. Walter Hicks ..... May 8, 1973 to August 20, 1974
Samuel B. Nelson ..... September 18, 1973 to October 9, 1984
Katherine B. Dunlap ..... August 20, 1974 to September 11, 1984
Jerry Godell ..... October 8, 1974 to October 9, 1984
Edward L. Kussman ..... October 8, 1974 to November 8, 1993
Herman Leavitt ..... February 11, 1975 to August 19, 1975
Yolanda M. Nava ..... February 11, 1975 to September 14, 1976
S. Dell Scott ..... February 11, 1975 to October 12, 1993
Willie J. Stennis ..... May 13, 1975 to December 31, 1978
Mladin Zarubica ..... August 19, 1975 to March 16, 1981

Soledad S. Garcia..... September 14, 1976 to September 11, 1984
Mark Lainer ..... November 13, 1979 to February 12, 1991
Mark Nathanson..... April 14, 1981 to September 11, 1984
Michael Glazer..... September 11, 1984 to April 9, 1991
Helen Romero Shaw ..... September 11, 1984 to November 8, 1993
Marilyn L. Garcia..... October 9, 1984 to February 9, 1993
Rachel Levin ..... October 9, 1984 to April 4, 1989
Frank S. Wyle ..... October 9, 1984 to August 1, 1991
Robert Abernethy..... April 4, 1989 to October 13, 1992
February 9, 1993 to November 8, 1993
Vernon R. Watkins..... February 12, 1991 to August 20, 1992
Alf W. Brandt ..... April 9, 1991 to February 13, 1996
Michael J. Gage ..... August 1, 1991 to September 21, 1993
Carolyn L. Green ..... August 20, 1992 to December 31, 1995
April 30, 1996 to May 16, 1997
William G. Luddy ..... October 13, 1992 to May 10, 2005
George Wein ..... October 12, 1992 to August 20, 2002
David Y. Handelman ..... November 8, 1993 to November 14, 1995
Kenneth T. Lombard..... November 8, 1993 to April 11, 1995
Katherine W. Moret ..... November 8, 1993 to December 31, 2000
Christopher C. Pak..... November 8, 1993 to December 19, 1995
Bonny L. Herman..... April 11, 1995 to April 12, 2004
Larry J. Kosmont ..... February 13, 1996 to December 31, 2000
Aaron E. Michaelsen..... February 13, 1996 to January 13, 1997
L. Michael Russell ..... June 11, 1996 to January 12, 1998
S. David Freeman..... January 12, 1998 to December 31, 2000
Ronald R. Gastelum..... January 12, 1998 to November 10, 1998
Jorge G. Castro ..... June 7, 1999 to October 7, 2003
Deborah Dentler..... August 20, 2002 to January 6, 2006
David Farrar..... October 7, 2003 to January 6, 2006
Robert B. Simonds..... April 12, 2004 to January 6, 2006
Ronald F. Deaton ..... May 10, 2005 to January 6, 2006
Aaron A. Grunfeld ..... January 6, 2006 to May 12, 2014
JOHN W. MURRAY JR. ..... January 6, 2006 to
JESÚS E. QUIÑONEZ ..... January 6, 2006 to
Nancy Sutley..... January 6, 2006 to May 12, 2009
David W. Fleming..... May 12, 2009 to January 14, 2014
Paul Koretz ..... January 14, 2014 to April 11, 2016
GLEN C. DAKE ..... May 12, 2014 to
LORRAINE PASKETT ..... December 7, 2015 to
MARK GOLD ..... April 11, 2016 to

MUNICIPAL WATER DISTRICT OF ORANGE COUNTY

Glenn P. Allen..... December 11, 1951 to December 17, 1986
W. B. Hellis ..... August 19, 1955 to February 9, 1975
William J. Teague ..... February 11, 1969 to October 10, 1972
Robert R. Dowling..... September 14, 1971 to May 11, 1976
Doyle Miller..... October 10, 1972 to October 31, 1987
Carl J. Kymla ..... October 9, 1973 to October 20, 1993
Philip J. Reilly..... December 9, 1975 to December 8, 1978
Gerald E. Price..... May 11, 1976 to December 31, 1988
M. Roy Knauft Jr. ..... September 13, 1977 to January 12, 1993
Kenneth H. Witt..... October 13, 1981 to December 31, 2000
William F. Davenport ..... January 13, 1987 to February 14, 1995
John V. Foley..... August 22, 1989 to March 21, 2014
Wesley M. Bannister..... January 12, 1993 to October 31, 2006
Jerry A. King..... January 11, 1994 to July 21, 1999
Robert J. Huntley ..... February 14, 1995 to October 31, 1999
Peer A. Swan..... August 31, 1999 to June 30, 2002
Ed Royce Sr. ..... February 7, 2000 to December 31, 2000
Langdon W. Owen..... January 17, 2001 to April 24, 2003
Ergun Bakall ..... July 1, 2002 to December 8, 2009
LARRY D. DICK ..... August 12, 2003 to
Steve Anderson ..... January 30, 2007 to January 16, 2008
LINDA ACKERMAN ..... April 8, 2008 to
BRETT R. BARBRE ..... December 8, 2009 to
LARRY MCKENNEY ..... October 13, 2014 to

PASADENA

Franklin Thomas..... March 1, 1929 to August 27, 1952
Morris S. Jones ..... September 16, 1952 to October 10, 1961
Robert B. Diemer..... January 16, 1962 to October 27, 1966
Don C. McMillan..... January 10, 1967 to October 26, 1975
Karl A. Johnson ..... December 9, 1975 to April 11, 1980
Martin Goldsmith..... July 8, 1980 to June 11, 1985
Timothy F. Brick..... June 11, 1985 to December 31, 2012
CYNTHIA KURTZ ..... April 8, 2013 to

SAN DIEGO COUNTY WATER AUTHORITY

Fred A. Heilbron ..... January 10, 1947 to February 14, 1973
J. L. Burkholder ..... January 24, 1947 to April 6, 1953

Richard S. Holmgren ..... August 11, 1953 to February 19, 1963
J. William Fisher..... April 12, 1955 to October 11, 1955
Hans H. Doe..... August 20, 1959 to October 20, 1986
Paul Beermann..... February 19, 1963 to July 9, 1963
Harry Griffen ..... February 19, 1963 to October 13, 1997
George R. Henderson..... August 13, 1963 to November 29, 1964
Ralph E. Graham..... September 14, 1971 to January 14, 1975
August 17, 1979 to June 28, 1982
Raymond E. Badger..... September 18, 1973 to May 14, 1979
Lloyd L. Lee ..... November 20, 1973 to December 31, 1980
John M. Cranston..... January 14, 1975 to December 31, 1986
John P. Starkey ..... January 13, 1981 to March 12, 1992
Michael D. Madigan ..... August 18, 1982 to October 13, 1992
Francesca M. Krauel ..... November 8, 1983 to August 20, 2001
John F. Hennigar..... November 18, 1986 to October 31, 1989
Dale Mason..... January 13, 1987 to February 8, 1999
Herbert H. Stickney ..... November 14, 1989 to April 13, 1993
Christine M. Frahm..... April 14, 1992 to March 12, 1999
John M. Leach..... October 13, 1992 to October 25, 1993
Joseph Parker..... April 13, 1993 to January 11, 1999
June 7, 1999 to February 10, 2009
Mark W. Watton ..... December 13, 1993 to January 12, 1998
February 8, 1999 to May 14, 2001
Gordon W. Tinker..... October 12, 1997 to December 31, 2000
Claude A. “Bud” Lewis ..... January 12, 1998 to December 7, 2006
James F. Turner..... January 11, 1999 to December 31, 2000
February 10, 2003 to August 17, 2004
Harold W. Ball..... May 14, 2001 to February 10, 2003
George I. Loveland ..... October 15, 2001 to November 1, 2006
W.D. “Bud” Pocklington ..... August 17, 2004 to December 14, 2010
James H. “Jim” Bond..... November 1, 2006 to February 10, 2009
James M. Barrett..... December 7, 2006 to July 12, 2010
KEITH LEWINGER..... February 10, 2009 to
FERN STEINER..... February 10, 2009 to
Lynne L. Heidel ..... July 12, 2010 to November 5, 2012
James Bowersox ..... December 14, 2010 to December 12, 2011
Douglas Wilson..... December 12, 2011 to August 27, 2013
Vincent Mudd ..... November 5, 2012 to October 13, 2014
MICHAEL T. HOGAN ..... August 27, 2013 to
Yen C. Tu..... October 13, 2014 to July 5, 2016
ELSA SAXOD..... October 11, 2016 to

SAN FERNANDO

Neville R. Lewis ..... December 14, 1971 to August 21, 1984
Pat J. Modugno ..... August 21, 1984 to August 8, 1986
Doude Wysbeek ..... December 9, 1986 to June 10, 1997
Sergio Rascon ..... June 10, 1997 to July 7, 2000
Hugo C. Mejia..... July 7, 2000 to November 8, 2004
Steven Veres ..... November 8, 2004 to September 5, 2007
SYLVIA BALLIN ..... September 5, 2007 to

SAN MARINO

Harry L. Heffner ..... March 1, 1929 to September 29, 1933
John H. Ramboz..... September 29, 1933 to November 18, 1960
Howard A. Miller..... January 10, 1961 to April 26, 1975
Preston Hotchkis ..... June 10, 1975 to September 10, 1986
Preston B. Hotchkis ..... March 10, 1987 to March 13, 1990
JOHN T. MORRIS..... March 13, 1990 to

SANTA ANA

S.H. Finley ..... March 1, 1929 to April 10, 1942
A. H. Allen..... April 10, 1942 to December 10, 1968
Howard W. Crooke ..... December 10, 1968 to September 1, 1977
John Garthe ..... November 8, 1977 to July 9, 1991
Daniel H. Young ..... July 9, 1991 to December 31, 1993
Lee Harry ..... February 8, 1994 to April 8, 1997
Thom Coughran ..... April 8, 1997 to February 3, 2005
Daniel E. Griset..... February 3, 2005 to March 10, 2015
MICHELE MARTINEZ ..... March 10, 2015 to

SANTA MONICA

George H. Hutton..... March 1, 1929 to January 16, 1931
Arthur A. Weber ..... January 16, 1931 to October 12, 1934
William H. Carter ..... February 15, 1935 to March 13, 1936
Edmond S. Gillette..... June 12, 1936 to January 8, 1937
Arthur P. Creel..... January 8, 1937 to March 3, 1941
Samuel G. McClure ..... March 21, 1941 to November 14, 1947
Samuel J. Crawford..... December 5, 1947 to September 15, 1959
Mark T. Gates ..... January 12, 1960 to July 12, 1972
Francis A. Goplen ..... August 18, 1972 to December 9, 1980
Robert Gottlieb ..... December 9, 1980 to December 8, 1987

Christine E. Reed ..... March 8, 1988 to April 24, 1996
JUDY ABDO ..... June 11, 1996 to

THREE VALLEYS MUNICIPAL WATER DISTRICT

Hugh W. Stiles ..... December 8, 1950 to December 31, 1961
Arthur H. Cox ..... January 16, 1962 to April 16, 1974
William C. Leech ..... April 16, 1974 to February 9, 1982
William H. Koch ..... February 9, 1982 to February 12, 1985
Mel Harper ..... February 12, 1985 to February 18, 1986
Richard W. Hansen ..... June 10, 1986 to August 20, 1991
Bruce R. J. Milne ..... August 20, 1991 to February 10, 1997
Henry S. Barbosa ..... February 10, 1997 to February 20, 2002
DAVID D. DE JESUS ..... March 8, 2002 to

TORRANCE

John Dennis ..... March 17, 1931 to April 14, 1933
J. R. Jensen ..... April 14, 1933 to December 31, 1933
Charles T. Rippy ..... January 19, 1934 to August 8, 1950
George W. Stevens ..... September 22, 1950 to June 13, 1961
George A. Bradford ..... June 13, 1961 to October 13, 1964
George Vico ..... November 17, 1964 to August 13, 1968
Ben Haggott ..... August 13, 1968 to November 14, 1982
Marvin Brewer ..... March 8, 1983 to November 27, 1993
Bill D. Wright ..... March 8, 1994 to July 1, 2013
RUSSELL LEFEVRE ..... September 24, 2013 to

UPPER SAN GABRIEL VALLEY MUNICIPAL WATER DISTRICT

J. Ercel Cleminson ..... April 9, 1963 to January 30, 1964
Howard H. Hawkins ..... April 9, 1963 to December 31, 1989
February 9, 1993 to March 4, 1997
Frank E. Vachon ..... March 10, 1964 to March 10, 1970
Robert T. Radford ..... March 10, 1970 to December 31, 1970
Travis L. Manning ..... January 12, 1971 to December 31, 1978
Burton E. Jones ..... January 9, 1979 to February 9, 1993
John E. Maulding ..... January 9, 1990 to February 9, 1993
Anthony R. Fellow ..... February 9, 1993 to February 10, 2009
February 9, 2010 to July 19, 2011
Edward L. Chavez ..... August 30, 2011 to January 9, 2012
Frank F. Forbes ..... March 4, 1997 to December 31, 2000
R. William "Bill" Robinson ..... February 10, 2009 to February 9, 2010

Stephen Millard..... January 9, 2012 to February 8, 2013
Michael Touhey ..... February 8, 2013 to January 3, 2017
CHARLES M. TREVIÑO ..... January 10, 2017

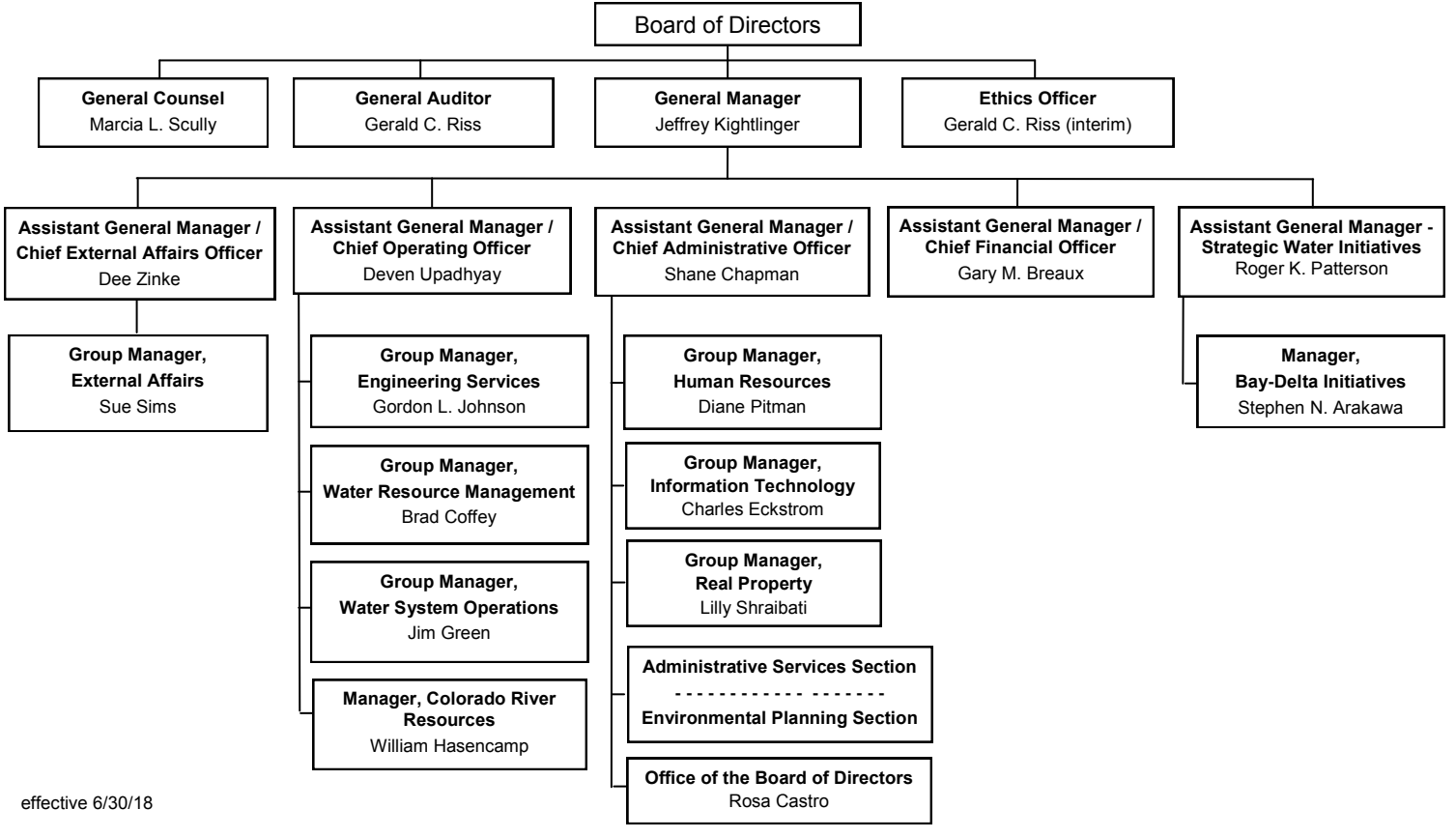
WEST BASIN MUNICIPAL WATER DISTRICT

Robert E. Austin ..... August 20, 1948 to October 21, 1968
Ben Haggott ..... March 10, 1953 to October 8, 1956
W. C. Farquhar..... August 19, 1955 to July 13, 1976
T. V. Tallon..... August 9, 1960 to April 9, 1963
Louis J. Alexander ..... August 13, 1963 to March 30, 1972
Charles D. Barker ..... September 10, 1963 to December 31, 2000
Einar C. Matson ..... November 12, 1968 to February 12, 1984
Lester E. Carlson..... October 8, 1974 to September 2, 1988
E. L. Balmer..... August 19, 1976 to May 23, 1989
Harold E. Crozier..... October 25, 1988 to April 9, 1991
Charles L. Stuart ..... July 11, 1989 to April 11, 1995
Robert Goldsworthy..... April 9, 1991 to March 8, 1994
Edward C. Little..... March 8, 1994 to January 12, 1998
January 5, 1999 to September 5, 2001
April 9, 2007 to September 24, 2013
Bondie O. Gambrell..... April 11, 1995 to February 10, 1997
Mark S. Dymally..... February 10, 1997 to January 5, 1999
Carol W. Kwan ..... January 12, 1998 to January 5, 1999
September 5, 2001 to April 9, 2007
Willard H. Murray Jr..... January 5, 1999 to April 13, 2009
GLORIA GRAY ..... April 13, 2009 to
Donald L. Dear ..... September 24, 2013 to March 13, 2018
HAROLD C. WILLIAMS ..... March 13, 2018 to

WESTERN MUNICIPAL WATER DISTRICT OF RIVERSIDE COUNTY

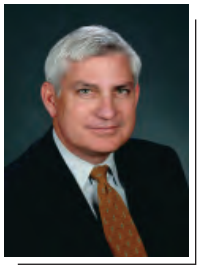
Howard Boylan ..... December 14, 1954 to July 13, 1976
Lois B. Krieger ..... August 19, 1976 to December 31, 2000
John M. Mylne III..... October 12, 1993 to January 7, 2008
S.R. "Al" Lopez..... January 7, 2008 to July 13, 2009
Thomas P. Evans..... July 13, 2009 to May 11, 2015
DONALD GALLEANO..... May 11, 2015 to

Notes:
Current Directors' names are shown in capital letters.
A 2001 reorganization reduced the number of directors on the board from 51 to 37.
In late 2015, a one-seat addition for Los Angeles (based on assessed property valuation) increased the number of directors to 38.



effective 6/30/18

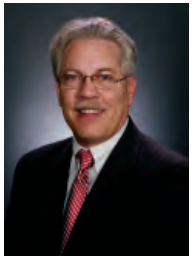
EXECUTIVE MANAGEMENT
JUNE 30, 2018



Jeffrey Kightlinger
General Manager

Marcia L. Scully
General Counsel

Gerald C. Riss
General Auditor



Gerald C. Riss
Interim Ethics Officer

Dee Zinke
Assistant General Manager/
Chief External Affairs Officer

Deven Upadhyay
Assistant General Manager/
Chief Operating Officer

Gary M. Breaux
Assistant General Manager/
Chief Financial Officer

Shane Chapman
Assistant General Manager/
Chief Administrative Officer

Roger K. Patterson
Assistant General Manager/
Strategic Water Initiatives

STAFF
June 30, 2018

EXECUTIVE MANAGEMENT

General Manager ..... J. Kightlinger
General Counsel ..... M.L. Scully
General Auditor ..... G.C. Riss
Interim Ethics Officer ..... G.C. Riss
Assistant General Manager/Chief Operating Officer ..... D. Upadhyay
Assistant General Manager/Chief Administrative Officer ..... S.O. Chapman
Assistant General Manager/Chief Financial Officer ..... G. Breaux
Assistant General Manager/Strategic Water Initiatives ..... R.K. Patterson
Assistant General Manager/Chief External Affairs Officer ..... D. Zinke

ADMINISTRATION

Manager, Administrative Services Section ..... C. Torres
Manager, Environmental Planning Section ..... D. Brand

CHIEF FINANCIAL OFFICER

Controller ..... B.H. Robertson
Manager, Budget & Treasury ..... J.M. Skillman

CHIEF OPERATING OFFICER

Manager, Colorado River Resources ..... W.J. Hasencamp

ENGINEERING SERVICES

Group Manager/Chief Engineer ..... G. Johnson
Manager, Design Section ..... D. Clark
Manager, Engineering Planning Section ..... T. Tellers
Manager, Infrastructure Reliability Section ..... C. Spradling
Manager, Program Management Section ..... M. Rojas
Manager, Water Supply Initiatives ..... J. Bednarski

ETHICS

Assistant Ethics Officer ..... P.E. von Haam

EXTERNAL AFFAIRS

Group Manager ..... S. Sims
State Legislative Representative ..... K. Cole
Federal Legislative Representative ..... B. Hiltscher
Manager, Business Outreach Section ..... J. Arena
Manager, Conservation & Community Services Section ..... Y.L. Martinez
Manager, Legislative Services Section ..... N. Purkiss
Manager, Media Services Section ..... B. Muir
Manager, Member Services & Public Outreach Section ..... C. Schaffer
Executive Strategist ..... T. Philp
Special Projects Manager ..... M. Westford

STAFF
June 30, 2018

HUMAN RESOURCES

Group Manager ..... D. Pitman
Manager, Employee Relations, Inclusion & Analytics Section ..... S. Lem
Manager, HR Services Section ..... O. Tucker

INFORMATION TECHNOLOGY

Group Manager ..... C. Eckstrom
Director, Information Technology Section ..... T.D. Miller

INTERNAL AUDIT

Deputy General Auditor ..... J. Tonsick

LEGAL

Assistant General Counsel ..... H.C. Beatty
Assistant General Counsel ..... A. Kear

OFFICE OF THE BOARD OF DIRECTORS

Board Administrator ..... R. Castro

REAL PROPERTY

Group Manager ..... L.L. Shraibati

STRATEGIC WATER INITIATIVES

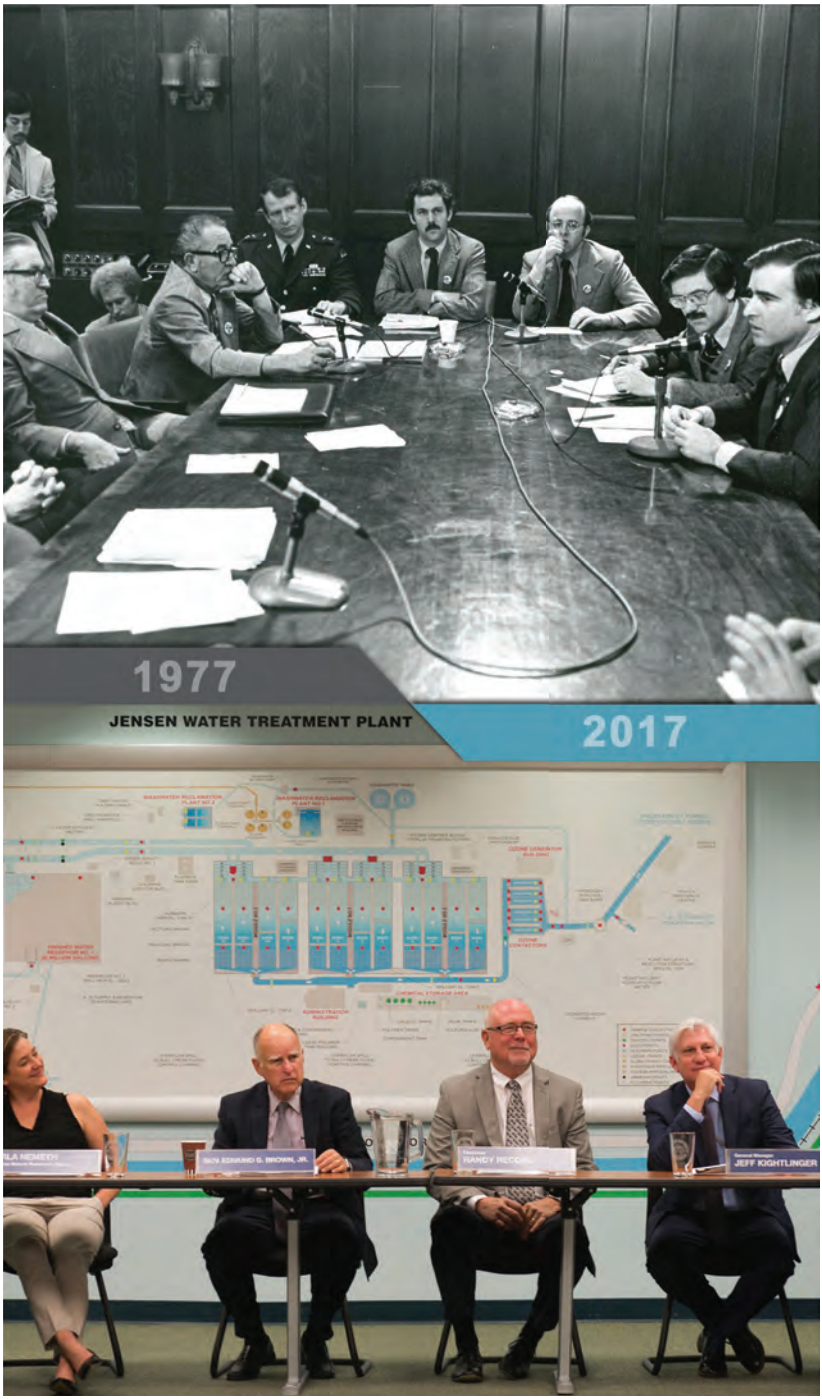
Manager, Bay-Delta Initiatives ..... S.N. Arakawa
Special Projects Manager ..... R.D. Neudeck
Executive Strategist ..... M.J. Wheeler

WATER RESOURCE MANAGEMENT

Group Manager ..... B. Coffey
Manager, Resource Implementation Section ..... K. Donhoff
Manager, Resource Planning & Development Section ..... G.L. Chan

WATER SYSTEM OPERATIONS

Group Manager ..... J.F. Green
Assistant Group Manager ..... B. Yamasaki
Interim Assistant Group Manager ..... M. Chaudhuri
Interim Manager, Conveyance & Distribution Section ..... J. Kostelecky
Manager, Operational Safety & Regulatory Services Section ..... B. Koch
Interim Manager, Operations Support Services Section ..... S. Escalante
Interim Manager, Power Operations & Planning Section ..... H. Esfahani
Interim Manager, Water Operations & Planning Section ..... K. Nobriga
Manager, Water Quality Section ..... M.H. Stewart
Manager, Water Treatment Section ..... H. Collins



Gov. Jerry Brown meets with MWD General Manager John Lauten, others, 1977 (above). Gov. Brown with state water resources director Karla Nemeth, MWD board chair Randy Record and GM Jeffrey Kightlinger in WaterFix meeting with member agencies, October 2017.

Introduction

It was a landmark year in California water, and the Metropolitan Water District was at the center of it all. Metropolitan's Board of Directors made a once-in-a-generation decision to support the California WaterFix project, broke new ground in water recycling, reached a water-quality milestone, stored a record amount of water, and forged new paths in conservation.

California WaterFix: A plan more than a decade in the making, California WaterFix achieved key milestones to modernize the state's badly outdated and increasingly vulnerable water delivery system. WaterFix will upgrade outdated infrastructure in the Sacramento-San Joaquin Delta to secure California's water supplies and improve the Delta's ecosystem.

After completion of an exhaustive state environmental review of the project in July 2017, Metropolitan moved forward with a series of workshops and policy papers in the summer and early fall to address questions regarding project operations, construction and financing, and hosted a visit from Gov. Jerry Brown to discuss the importance of the project. Metropolitan's board initially voted to participate in WaterFix and contribute up to 26 percent of its $17 billion cost, or about $4.3 billion. Several months later, the Metropolitan board voted to provide up to 67 percent of the financing needed for the full construction of the California WaterFix project.

California water watchers gained some new acronyms—DCA and DCFA—shorthand for the Delta Conveyance Design and Construction Joint Powers Authority and the Delta Conveyance Finance Authority. These joint authorities represent partnerships of participating public agencies tasked with designing, building and financing the WaterFix project. The DCA will turn over the project to the California Department of Water Resources after construction is complete.

Regional water recycling facility: As part of its commitment to expand local supply development, Metropolitan and the Sanitation Districts of Los Angeles County broke ground in October on a demonstration advanced purification facility that will generate information needed for the potential future construction of a full-scale recycled water plant. Once it is operational, the demonstration facility will recycle 500,000 gallons of water per day, using water from the Sanitation Districts' Joint Water Pollution Control Plant in Carson. As envisioned, a full-scale program would produce up to 150 million gallons of purified water per day, enough water to serve more than 335,000 homes.

Colorado River, milestones and challenges: Metropolitan and other agencies signed off on Minute 323 to the U.S.-Mexico Water Treaty. Metropolitan and Imperial Irrigation District agreed to fund water conservation projects in Mexico, in return for being able to store a portion of the conserved water in Lake Mead. With a long-term decline in runoff, and Lake Mead edging closer to shortage levels, Metropolitan continued in talks with Arizona and Nevada, the other Basin States and the U.S. Bureau of Reclamation on a series of voluntary reductions, known as the Drought Contingency Plan, that would avoid triggering more draconian cutbacks.

Conservation: Metropolitan funded more than $12 million in rebates, classes, research and advertising to help make conservation a California way of life. The Conservation Credits Program saved more than 200,000 acre-feet of water. Metropolitan's new "Save Water 365" advertising and outreach campaign reinforces how conservation is a way of life, not simply a short-term behavior shift during severe droughts. With the tagline, "Every day is a chance to save water. And money," the campaign encourages viewers to continue to conserve and tell them how to get financial help doing so with rebates available at bewaterwise.com.

Metropolitan's board also approved a new landscape transformation program in April and supported conservation legislation, including Senate Bill 606 and Assembly Bill 1668, which were signed into law in June.

Capital investments: Metropolitan invested nearly $210 million in capital projects during fiscal year 2017/18, shoring up reliability of the Colorado River Aqueduct, and rehabilitating Metropolitan's prestressed concrete cylinder pipelines, such as the Second Lower Feeder running through Orange County to the Long Beach/South Bay area.

Ongoing matters: As the fiscal year ended, Metropolitan continued dealing with important state and regional issues.

Hearings continued before the State Water Resources Control Board on the California WaterFix proposed changes in points of diversion for water exports in the Delta. Metropolitan also participated in hearings to update the state's Water Quality Control Plan.

The state Supreme Court denied San Diego County Water Authority's petition for review in two rate cases, upholding the Court of Appeal decision that Metropolitan's rate structure with respect to incorporation of State Water Project costs is lawful. Metropolitan's sound rate structure and stable financial position resulted in Metropolitan being one of the highest-rated utilities in the country.

As climate change stresses the water supplies upon which Southern California relies, Metropolitan continues to invest in new strategies to promote sustainability and diversify its water supply portfolio to adapt to changing conditions.

Although the nature of the challenges may evolve over time, Metropolitan's commitment to its core value of innovative reliability has never wavered. Each generation of Metropolitan leadership has ultimately come together at crucial inflection points in our state's history to forge a new path.

In October 2017, Weymouth became the final water treatment plant to begin using ozone as its primary disinfectant, capping a $1.2 billion effort.

CHAPTER 1

Delivering Metropolitan's Water Supplies

Metropolitan supplies water to its 5,200-square-mile service area through a conveyance and distribution system that consists of the 242-mile-long Colorado River Aqueduct, five pumping plants, approximately 830 miles of pipeline, five water treatment plants and nine reservoirs, plus a participation right in the State Water Project. Metropolitan also has 16 hydroelectric power recovery plants throughout its system. See Table 1-1 for the rated capacity of Metropolitan's five treatment plants.

TABLE 1-1
METROPOLITAN'S DISTRIBUTION SYSTEM
WATER TREATMENT PLANTS

Plant (Location)	Process/ Water Type	Rated Capacity (MGD)
Joseph Jensen Water Treatment Plant (Granada Hills)	Conventional treatment with ozone SPW	750
Robert A. Skinner Water Treatment Plants 1 , 2, & 3 (Winchester)*	Conventional treatment and direct filtration with ozone, blend of CRW/SPW	630
F. E. Weymouth Water Treatment Plant (La Verne)	Conventional treatment with ozone, blend of CRW/SPW	520
Robert B. Diemer Water Treatment Plant (Yorba Linda)	Conventional treatment with ozone, blend of CRW/SPW	520
Henry J. Mills Water Treatment Plant (Riverside)	Conventional treatment with ozone SPW	220

SPW = State Project Water
CRW = Colorado River Water
MGD = Million Gallons per Day
* Consists of three separately regulated water treatment plants. Skinner Plant 2 is in process of decommissioning. Once complete, the rated capacity of the Skinner plant will be officially reduced to 350 MGD.

In fiscal year 2017/18, water conditions varied from record breaking rainfall in the SWP watershed in 2017, to the second lowest precipitation on record on the Northern Sierra Eight-Station index in February 2018. As conditions shifted, so did Metropolitan's operations to ensure continued water supply reliability.

The final SWP allocation for calendar year 2017 was 85 percent, or about 1.62 MAF, a level that had not been attained for over a decade. The 2017 allocation provided as much SWP supply as the prior three years combined, which had allocations of 5, 20, and 60 percent, respectively. However, by the end of CY 2017 and for the first two months of CY 2018, conditions in Northern California began to turn dry. The final SWP allocation for CY 2018 was 35 percent, or approximately 669,000 AF, and would have been lower if not for a wet March 2018 that was 165 percent of average.

At the beginning of the fiscal year, Metropolitan continued to maximize storage of Colorado River water upstream of the district's service area to free up capacity and take full advantage of the extraordinarily high SWP supplies. Metropolitan reduced diversions on the CRA to maximize storage in its Intentionally Created Surplus account in Lake Mead. In addition, most CRA flows were delivered to the Whitewater River and Mission Creek as part of the Advanced Delivery Account with Desert Water Agency and Coachella Valley Water District. Desert Water and Coachella are both SWP contractors with no physical connection to SWP facilities. Metropolitan has a long-term exchange agreement with the agencies to take delivery of their SWP supplies in exchange for an equal quantity of Colorado River water. Deliveries to those two agencies were the highest ever in a single calendar year (395,000 AF, or 58 percent of Metropolitan's 2017 diversions), far exceeding the prior record of 298,000 AF in 1986. This led to the lowest calendar-year delivery of Colorado River water into the service area since the early 1950s. However, near the end of the fiscal year in mid-June, and facing a lower SWP allocation in 2018, Metropolitan increased CRA pumping to a 7-pump flow, which is just below the maximum rate of 8-pump flow.

Metropolitan's water transactions for FY 2017/18 remained relatively low at about 1.55 MAF due to continued conservation, along with significantly higher-than-normal local supplies from wet

conditions in 2017. This is significantly below the 10-year average of 1.84 MAF. Maximum daily system deliveries to member agencies were about 6,490 AF per day for the fiscal year, compared to 6,400 AF per day for the previous fiscal year. The maximum daily delivery over the last 10 years was 7,600 AF per day in FY 2013/14. Table 1-2 shows Metropolitan's monthly water transactions for FY 2017/18. Additional figures and tables at the end of this chapter show total fiscal year water transactions by category, monthly water transactions by category, a comparison of water transactions by category for the past two fiscal years, historical water transactions by calendar and fiscal year, and water use by member agency.

TABLE 1-2
MONTHLY WATER TRANSACTIONS FOR ALL MEMBER AGENCIES
Fiscal Year 2017/18
(Acre-Feet)

Month	Full Service*	Storage Program**	Totals
July	145,997	1,934	147,930
August	154,418	2,170	156,588
September	131,445	2,833	134,279
October	134,910	1,820	136,730
November	103,628	1,697	105,325
December	121,889	75,980	197,868
January	104,846	5,658	110,504
February	85,915	1,696	87,611
March	80,880	975	81,854
April	134,552	0	134,552
May	124,241	0	124,241
June	132,460	0	132,460
Totals	**1,455,179**	**94,762**	**1,549,941**

*Includes Full Service and Exchange water transactions.
**Includes water transactions from the Conjunctive Use, Cyclic Storage and Soboba Settlement programs.

The abundant amount of SWP supplies, along with extraordinarily low regional demands, led to large surplus conditions in the first half of FY 2017/18. Through strategic operations, Metropolitan was able to take full advantage of these surplus supplies for record-breaking increases in storage of roughly 1.2 million acre-feet of water in 2017,

resulting in the second highest end-of-year dry-year storage balance in Metropolitan's history. By the end of 2017, total dry-year storage reached approximately 2.5 MAF, which includes a single-year record combined delivery of 152,000 AF to the Conjunctive Use and Cyclic Storage programs, and a nearly full Diamond Valley Lake. In CY 2018, it is estimated that supplies will essentially equal demands for balanced conditions, allowing for continued high end-of-year dry-year storage. These conditions also allow for opportunities to reposition storage. For example, by the end of the fiscal year, Metropolitan was able to reduce levels in Diamond Valley Lake to slightly over 700,000 AF to create space in the reservoir for additional operational flexibility. Metropolitan also took delivery of Desert Water Agency and Coachella Valley Water District carryover supplies stored in San Luis Reservoir early in calendar year 2018 to reduce the risk of carryover spill. By the end of FY 2017/18, total dry-year storage reserves totaled about 2.2 MAF. By the end of calendar year 2018, total dry-year storage reserves are expected to climb back up to over 2.4 MAF.

Overall, Metropolitan actions taken this fiscal year to fully maximize storage during high supply conditions and ensure a geographically diverse storage portfolio under balanced conditions left the region well-prepared for future dry spells.

Major Accomplishments for Fiscal Year 2017/18

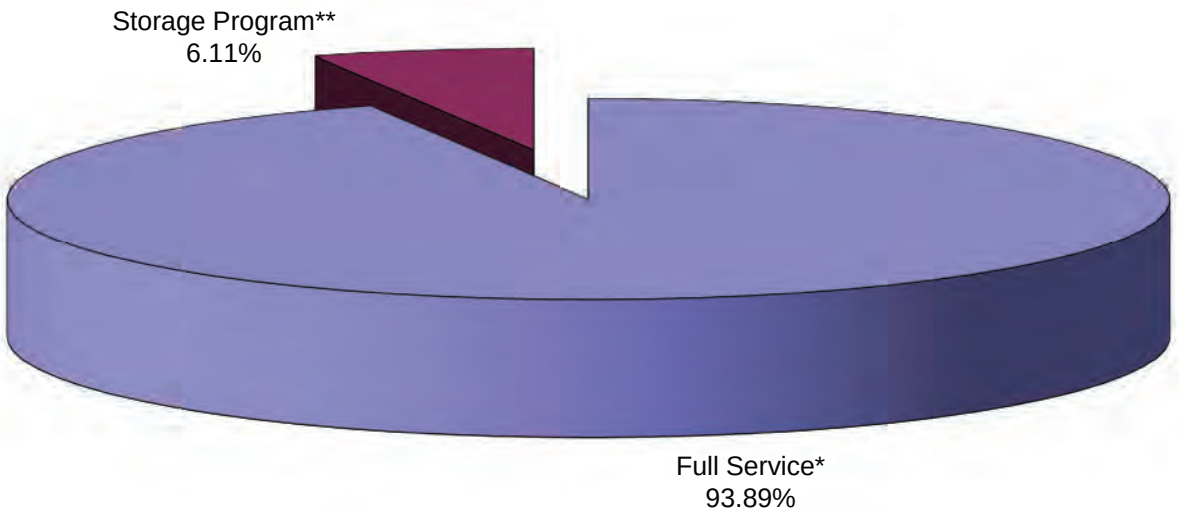
System Operations and Planning

- Effectively managed surplus supplies and refilled storage reserves (a record 1.2 MAF in calendar year 2017).
- Dramatically adjusted system operations to continue maximizing delivery and storage of abundant SWP supplies, after years of SWP supply shortages.

- Worked with DWR to track East Branch deliveries in 2017 when DWR placed capacity constraints on the system due to state shutdowns or outages, and received approval from DWR to carry over an additional amount of approximately 28,000 AF into 2019.
- Successfully managed critical shutdowns for system improvements, maintenance and repairs (major shutdowns and service interruptions are shown in Table 1-5).

Colorado River

- Maximized storage of Colorado River supplies in CY 2017, storing a single calendar-year record amount of about 755,000 AF—roughly three-quarters of the available Colorado River supplies, resulting in the lowest delivery of Colorado River water to Metropolitan's service area since the 1950s.



* Water transactions include water sales, wheeling and exchange water transactions.
** Includes water transactions from the Conjunctive Use, Cyclic Storage and Soboba Settlement Programs.

Figure 1-1. Total Water Transactions for Fiscal Year 2017/18 - All Member Agencies

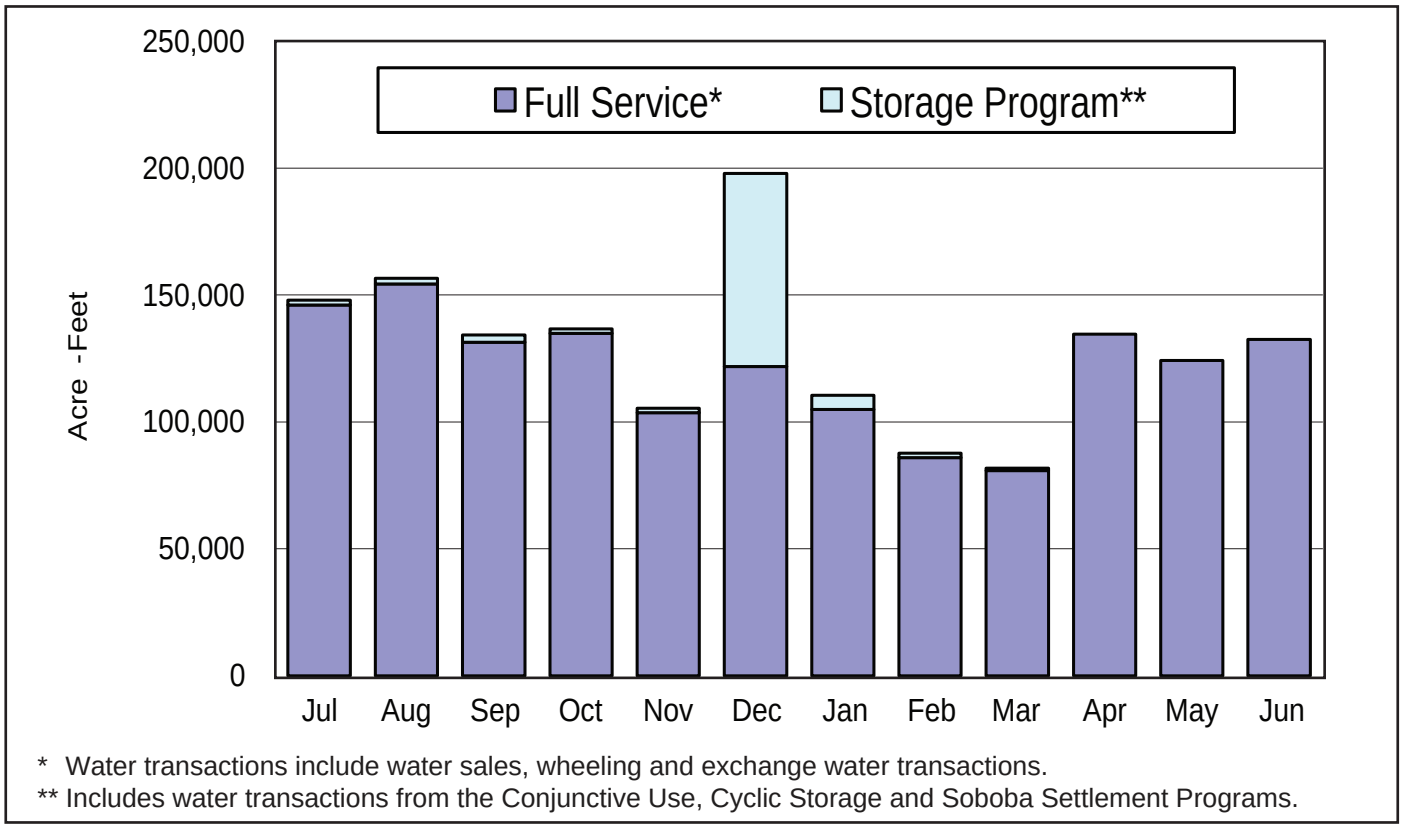
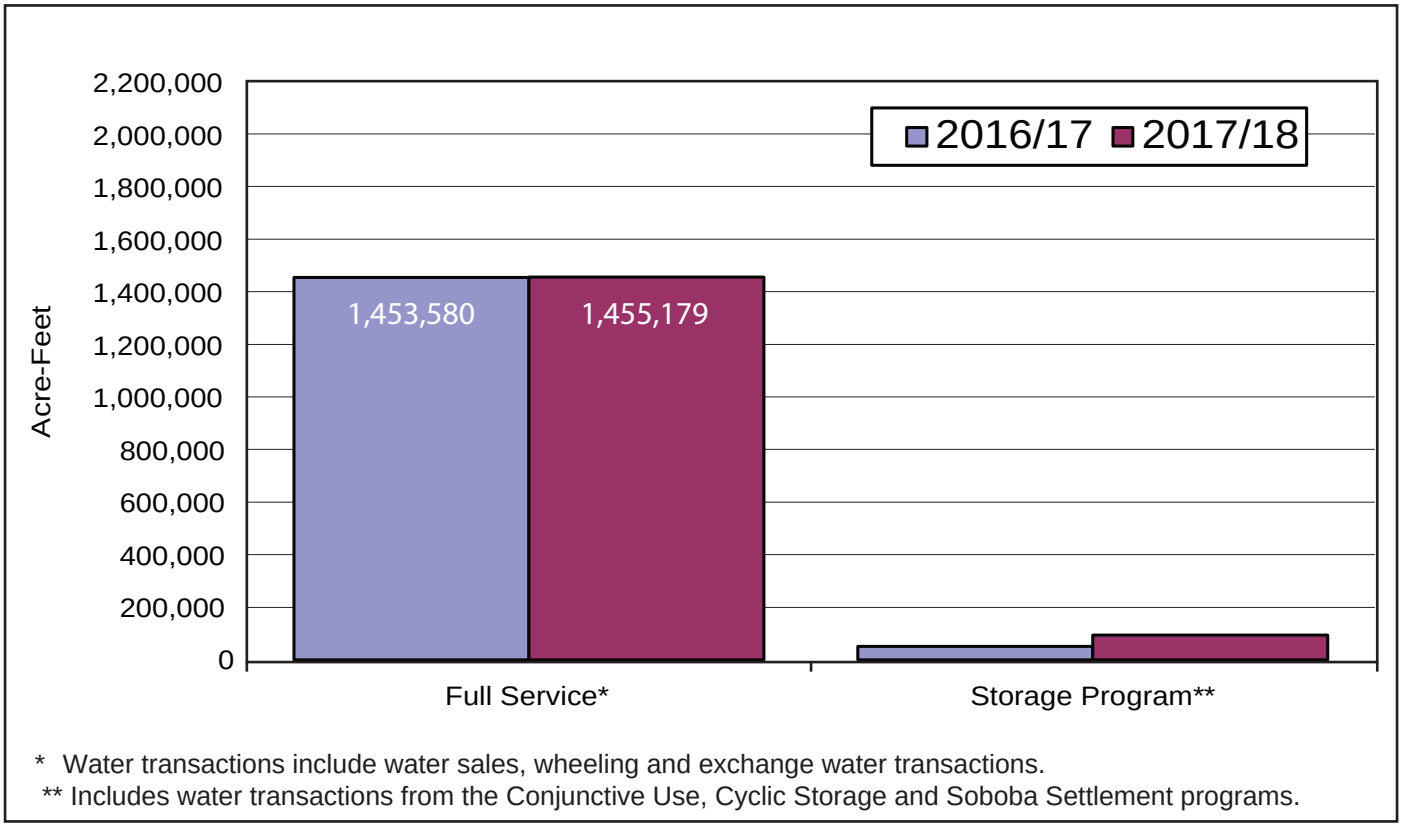


Figure 1-2. Monthly Water Transactions for Fiscal Year 2017/18 - All Member Agencies



* Water transactions include water sales, wheeling and exchange water transactions.
** Includes water transactions from the Conjunctive Use, Cyclic Storage and Soboba Settlement programs.

Figure 1-3. Comparison of Water Transactions with Member Agencies for the Past Two Fiscal Years

TABLE 1-3
COMPARISON OF WATER TRANSACTIONS WITH MEMBER AGENCIES FOR THE PAST TWO FISCAL YEARS
Calendar Year & Fiscal Year Totals
(Acre-Feet)

	Calendar Year	Fiscal Year		Calendar Year	Fiscal Year
1941	4,444		1980	1,295,903	1,282,064
1942	12,391	9,739	1981	1,597,315	1,462,825
1943	16,355	14,566	1982	1,366,664	1,502,949
1944	24,567	15,875	1983	1,180,616	1,226,783
1945	37,883	30,606	1984	1,547,078	1,428,253
1946	54,134	46,686	1985	1,653,414	1,574,216
1947	73,573	59,721	1986	1,685,359	1,642,249
1948	148,178	113,090	1987	1,857,591	1,825,657
1949*	163,817	145,008	1988	2,017,403	1,923,824
1950*	170,825	165,616	1989	2,371,479	2,095,079
1951*	192,416	165,473	1990	2,626,124	2,511,375
1952	203,068	197,210	1991	1,809,606	2,264,864
1953	221,022	219,397	1992	1,989,165	1,888,907
1954	333,968	245,875	1993	1,812,644	1,910,644
1955	386,341	385,946	1994	1,955,411	1,930,529
1956	482,909	405,962	1995	1,458,237	1,591,496
1957	518,754	543,706	1996	1,675,254	1,641,670
1958	578,384	539,734	1997	1,838,675	1,787,857
1959	660,718	601,099	1998	1,413,674	1,569,024
1960	816,722	734,919	1999	1,776,306	1,593,687
1961	977,795	935,228	2000	2,325,836	2,075,680
1962	1,033,361	931,795	2001	2,100,771	2,164,556
1963	943,745	1,020,822	2002	2,438,570	2,326,920
1964	1,122,880	1,064,381	2003	2,251,051	2,271,628
1965	1,105,809	1,148,847	2004	2,440,724	2,437,678
1966	1,115,040	1,059,631	2005	2,003,041	2,076,100
1967	1,008,946	1,059,354	2006	2,129,518	2,116,039
1968	1,208,064	1,077,178	2007	2,390,535	2,351,927
1969	997,623	1,057,335	2008	2,178,630	2,250,184
1970	1,152,914	1,165,866	2009	1,963,448	2,137,979
1971	1,184,697	1,113,968	2010	1,658,597	1,780,030
1972	1,213,417	1,248,710	2011	1,650,260	1,613,529
1973	1,218,156	1,177,860	2012	1,748,167	1,708,565
1974	1,223,256	1,139,175	2013	1,955,799	1,856,537
1975	1,294,650	1,329,636	2014	2,015,848	2,056,396
1976	1,390,822	1,389,248	2015	1,732,324	1,905,480
1977	1,312,876	1,390,466	2016	1,672,077	1,578,495
1978	1,302,312	1,198,325	2017	1,428,465	1,504,654
1979	1,230,068	1,235,193	2018		1,549,941

Note:
* Calendar years 1949, 1950, and 1951 are estimated values.
Figures from 1979 to present consist of billable transactions of treated and untreated water, including exchanges.

TABLE 1-4
WATER USE BY METROPOLITAN'S MEMBER AGENCIES
Fiscal Year 2017/18[1]
(Acre-Feet)

Member Agency	Total Local Production[2]	Total Local Use[3]	MWD Direct Deliveries[4]	MWD Indirect Deliveries[5]	MWD Total Deliveries	Total Water Use[6]	MWD Direct Deliveries as % of Total Use
Anaheim	33,673	33,673	26,209		26,209	59,883	44%
Beverly Hills	0	0	10,313		10,313	10,313	100%
Burbank	13,464	13,464	6,044	12,919	18,962	19,507	31%
Calleguas	52,279	52,279	96,362		96,362	148,641	65%
Central Basin	226,884	226,884	18,166	9,792	27,957	245,050	7%
Compton	7,412	7,412	17.8		17.8	7,430	0%
Eastern	122,839	122,839	95,864	14,421	110,285	218,704	44%
Foothill	7,848	7,848	8,859		8,859	16,707	53%
Fullerton	17,559	17,559	8,868		8,868	26,427	34%
Glendale	9,474	9,474	16,177		16,177	25,651	63%
Inland Empire	171,789	170,941	66,759	36,805	103,563	237,700	28%
Las Virgenes	3,923	3,923	18,906		18,906	22,829	83%
Long Beach	35,926	35,926	24,988		24,988	60,914	41%
Los Angeles	324,234	324,234	183,644		183,644	507,879	36%
MWDOC	326,536	326,536	199,232	66,115	265,347	525,768	38%
Pasadena	13,015	13,009	19,224		19,224	32,232	60%
San Diego CWA	135,560	135,560	368,206		368,206	503,766	73%
San Fernando	2,879	2,879			0	2,879	0%

TABLE 1-4
WATER USE BY METROPOLITAN'S MEMBER AGENCIES
Fiscal Year 2017/18[1]
(Acre-Feet)

Member Agency	Total Local Production[2]	Total Local Use[3]	MWD Direct Deliveries[4]	MWD Indirect Deliveries[5]	MWD Total Deliveries	Total Water Use[6]	MWD Direct Deliveries as % of Total Use
San Marino	3,601	3,601	1,283		1,283	4,884	26%
Santa Ana	22,248	22,248	13,648		13,648	35,897	38%
Santa Monica	7,964	7,964	4,057		4,057	12,021	34%
Three Valleys	47,551	47,551	52,961	12,307	65,267	100,512	53%
Torrance	8,509	8,509	15,474		15,474	23,983	65%
Upper San Gabriel	181,457	143,398	4,204	56,783	60,987	147,601	3%
West Basin	57,521	57,521	114,422		114,422	171,942	67%
Western	123,059	123,059	73,379	2,225	75,604	196,438	37%
	1,957,204	1,918,290	1,447,266	211,365	1,658,631	3,365,556	43%

Footnotes:

[1] Local supply data includes three year averages for those sources unavailable at time of publication.

[2] Total Local Production = groundwater, groundwater recovery, surface water, recycled water, seawater desalination, and Los Angeles Aqueduct supplies produced, but not necessarily used, within a member agency boundary, not including water used for environmental purposes.

[3] Total Local Use = Total Local Production adjusted for inter-agency water transfers and locally produced water, not including water used for environmental purposes.

[4] MWD Direct Deliveries includes SDCWA/IID exchange.

[5] MWD Indirect deliveries: Non-consumptive water being delivered to storage for later use.

[6] Total Water Use = Total Local Use + MWD Direct Deliveries.

TABLE 1-5
2017/18 MAJOR SHUTDOWNS & SERVICE INTERRUPTIONS

FACILITY	DATES	NO. OF DAYS	LIMITS OF SHUTDOWN	PURPOSE
WEST COAST FEEDER	Aug 2-Aug 3, 2017	2	From Budlong Ave. & W. El Segundo Blvd. to S. Aviation & E. El Segundo Blvd.	Replace 4-inch air release valve.
SAN DIEGO PIPELINE 4	Nov 5-Nov 14, 2017	10	From Skinner plant to pipeline terminus	Shutdown to allow SDCWA to perform inspection and maintenance within its jurisdiction.
LOWER FEEDER (Untreated) -Santiago Lateral	Nov 6-Nov 8, 2017	3	Lake Mathews to Diemer plant	Removal of throttling gate at the Corona Control Tower.
SECOND LOWER FEEDER	Nov 13-Nov 16, 2017	4	From Keynote Blvd. & Stevely Blvd. Sectionalizing Valve to San Anseline Blvd. & Conant St. Sectionalizing Valve	Prepare pipeline for relining project, perform PCCP inspection, remove Advanced Fiber Optics (AFO) cable, and replace flange hardware at AFO cable insert points.
SECOND LOWER FEEDER	Nov 16-Jun 26, 2018	223	From valve west of South Coast Feeder to the Sepulveda Feeder Interconnection	Perform relining.
LOWER FEEDER (Treated)	Dec 4-Dec 8, 2017	5	From Diemer plant to Deodara Interconnection	Perform repairs to manifold structures.
LAKE MATHEWS FACILITY -Upper Feeder (Untreated) -Lower Feeder (Untreated) -Santiago Lateral	Jan 6-Jan 20, 2018	15	From Lake Mathews Forebay to Scotchman Stacks	Replace the bellows-type expansion joint at Santa Ana River Bridge.
ORANGE COUNTY FEEDER	Jan 22-Jan 27, 2018	6	From Weymouth plant to Orange County Reservoir	Rebuild the controlling globe valves at Fairplex PCS and Walnut PCS, and perform PCCP inspection.
FOOTHILL FEEDER -San Fernando Tunnel -Jensen Water Treatment Plant -Sepulveda Feeder -East Valley Feeder -West Valley Feeder 1 -West Valley Feeder 2 -Calabasas Feeder	Jan 27-Jan 27, 2018	1	From Castaic Lake to Jensen plant	Install 1.5 MW temporary emergency generator as part of Jensen Plant Electrical Upgrades project.

TABLE 1-5 (Continued)
2017/18 MAJOR SHUTDOWNS & SERVICE INTERRUPTIONS

FACILITY	DATES	NO. OF DAYS	LIMITS OF SHUTDOWN	PURPOSE
MIDDLE FEEDER -Garvey Reservoir	Feb 12-Feb 21, 2018	10	From the Garvey Reservoir Junction Structure to the sectionalizing valve near Nand Ave. and Condor St.	Tie in relocated portion of the Middle Feeder.
COLORADO RIVER AQUEDUCT -San Jacinto Pipeline 1&2	Feb 13-Mar 9, 2018	25	From Whitsett Intake Pumping Plant to Lake Mathews	Perform CRA switch house seismic upgrade, install surge chamber bypass cover, perform tunnel cleaning and electrical testing.
SAN DIEGO CANAL	Feb 16-Feb 21, 2018	6	From Casa Loma Canal turnout to Lake Skinner	Perform inspection and cleaning.
FOOTHILL FEEDER -San Fernando Tunnel -Jensen Water Treatment Plant -Sepulveda Feeder -East Valley Feeder -West Valley Feeder 1 -West Valley Feeder 2 -Calabasas Feeder	Mar 4-Mar 14, 2018	12	From Castaic Lake to Jensen treatment plant	Upgrade switchgear, terminate high voltage feeders, and perform system level testing as part of Jensen Plant Electrical Upgrades project; install equipment in the plant inlet channel, rejection structure, and at Service Connection LA-35.
ALLEN MCCOLLOCH PIPELINE	Mar 5-Mar 12, 2018	8	From OC-70 to El Toro Reservoir	Relocate OC-76 turnout valve and perform PCCP inspection.
SECOND LOWER FEEDER	Apr 9-Apr 13, 2018	5	From Carson & Bataan Sectionalizing Valve to 220th & Western Sectionalizing Valve	Perform inspection.
PALOS VERDES FEEDER	Apr 9-Apr 13, 2018	5	From Appian Way Sectionalizing Valve to the Palos Verdes Reservoir	Install a butterfly valve and master meter.
INLAND FEEDER INTERTIE	Apr 10-May 23, 2018	44	From PC-1 to Lakeview Pipeline	Install two valves at PC-1 between Inland Feeder and Lakeview Pipeline.
BOX SPRINGS FEEDER -Mills Water Treatment Plant -Perris Valley Pipeline	Apr 19-Apr 19, 2018	1	From DWR's Santa Ana Valley Pipeline to the Mills treatment plant Influent Control Structure	Provide redundant power feed to critical process equipment and replace obsolete breakers to support the Mills Stage 1 Electrical Upgrade project.
LA VERNE FEEDER	Apr 23-Apr 30, 2018	1	From Rialto Feeder to Weymouth plant	Repair V-21 MOV 108" Sectionalizing BFV.

TABLE 1-5 (Continued)
2017/18 MAJOR SHUTDOWNS & SERVICE INTERRUPTIONS

FACILITY	DATES	NO. OF DAYS	LIMITS OF SHUTDOWN	PURPOSE
RIALTO FEEDER -Etiwanda Pipeline	Apr 23-Apr 28, 2018	8	From DWR Devil Canyon Facility to Live Oak Reservoir	DWR to perform leak repair near Devil Canyon Facility.
YORBA LINDA FEEDER	Apr 23-Apr 30, 2018	8	From Weymouth plant to Diemer plant	PCCP inspection and small corrective maintenance .
LAKEVIEW PIPELINE	May 28-Jun 8, 2018	12	From Perris Bypass turnout to Lakeview Pipeline Sectionalizing Valve at Inland Feeder Intertie (PC-1)	Install three 60-in. diameter valves in Lakeview Pipeline Intertie valve structures and Perris Pumpback Facility bypass valve structure.
SECOND LOWER FEEDER	Jun 26-Jun 29, 2018	4	From Keynote Blvd. & Stevely Blvd. Sectionalizing Valve to San Anseline Blvd. & Conant St. Sectionalizing Valve	Disinfect section of the Second Lower Feeder near PCCP rehabilitation shutdown and return pipeline to service.

John Jensen poses with his daughter Elizabeth beneath the portrait of his father, longtime board chairman Joseph P. Jensen, during January 2018 visit to the Jensen Water Treatment Plant.

Metropolitan science staff collaborated with various agencies on Delta studies that included sampling vertical fish distribution using a midwater trawl (top); an enclosure being set up for a salmon predation experiment at Bouldin Island.

CHAPTER 2

Strategic Water Initiatives

Metropolitan provides imported water supplies to its member agencies from two primary sources, the Colorado River and Northern California via the State Water Project. The staff of Strategic Water Initiatives coordinates resources throughout the organization to manage and protect Metropolitan's interests in the watersheds that support these two key systems.

Bay-Delta Initiatives

Bay-Delta Initiatives spearheaded efforts leading to Metropolitan's historic vote in October 2017 to support California WaterFix. Management and staff in collaboration with other district organizations continuously provided relevant information and updates to the board and the public. Staff also pursued the best scientific research to protect and restore fish, wildlife, and the Delta's ecosystem, and continued all ongoing activities in the Delta islands. Figure 2-1 shows a map of the Delta region.

Long-Term Actions

California WaterFix

In July 2017, the California Department of Fish and Wildlife issued the incidental take permit for the Construction and Operation of Dual Conveyance Facilities of the State Water Project (California WaterFix) in compliance with Section 2081(b) of the California Endangered Species Act. This represented a significant milestone in the planning process for the project.

California WaterFix has been at the forefront of Bay-Delta Initiatives' efforts this year. Several major accomplishments leading to the board's support to fund the project include the October 10, 2017 vote to provide 25.9 percent of project funding toward its construction and operation. At that time, the expectation was that the project would garner significant participation from public water agencies holding

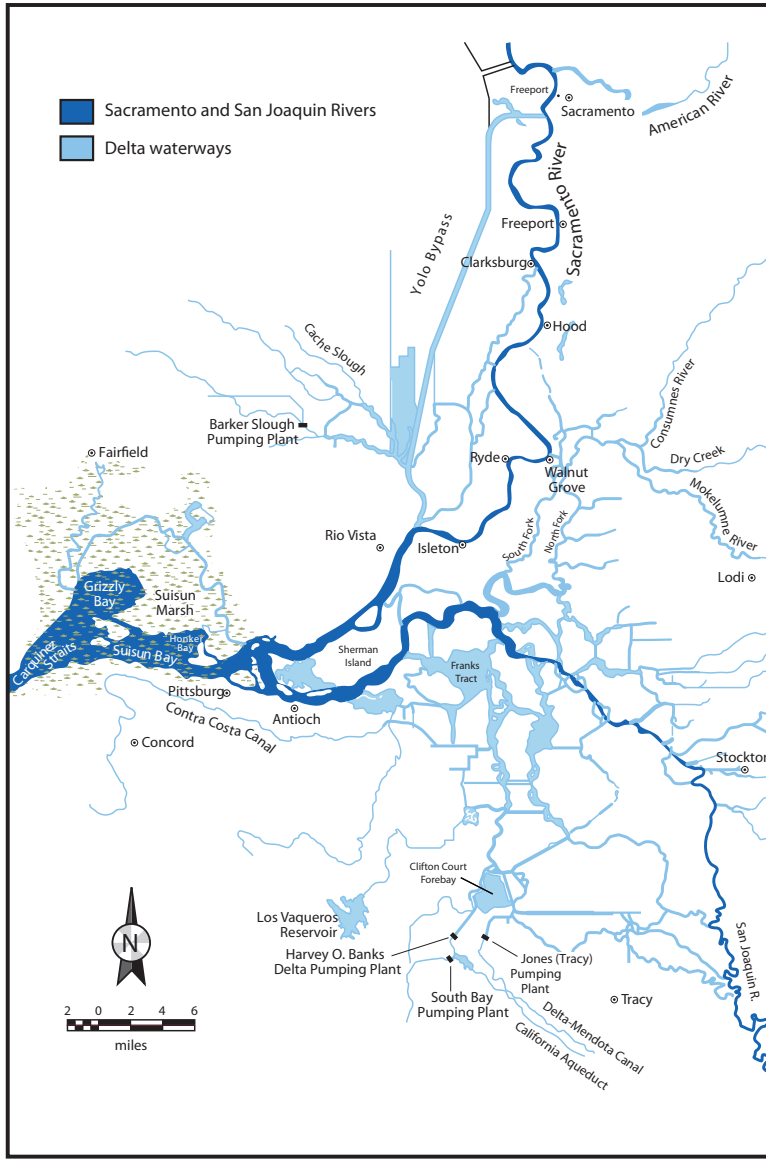


Figure 2-1. Map of the Delta Region

contracts for the State Water Project and the Central Valley Project. However, in the months that followed, sufficient commitment from these public water agencies did not materialize.

On February 8, 2018, the Department of Water Resources announced that California WaterFix would be constructed in two stages, based primarily on the funding commitments made available by member agencies at that time. The first stage would meet the needs of water agencies that voted to fund the project, while the second stage would be constructed at a time when additional water agencies choose to participate in the project.

Subsequent to this announcement, staff considered the advantages and disadvantages of the project staging and made its recommendation to the board. Among the factors in the board's consideration was that constructing the project in two stages might actually result in serious delays in permitting and could jeopardize the entire project. Consequently, project costs also would rise. In its April 10, 2018 meeting, the board voted to approve increased financial support for a full 9,000-cubic-foot-per-second project. More specifically, the approval was for Metropolitan to fully fund its State Water Project contractor share plus the unsubscribed share of the project up to 64.6 percent of total project costs.

Following the April 10 vote however, after two organizations alleged violations of the Brown Act in connection with the April 10 meeting, the Metropolitan board scheduled a new vote. The scheduled revote on July 10 was to rescind the April 10 action and again approve the financing and funding arrangements for California WaterFix up to 64.6 percent of total project costs.

The Delta Conveyance Design and Construction Joint Powers Authority, a formal partnership of participating public water agencies established for the design and construction of the California WaterFix project held its first public meeting on May 17, 2018. At that meeting, the DCA signed a Joint Exercise of Powers agreement with DWR delineating responsibilities to construct the California WaterFix project. DWR will provide oversight through a newly established Design Conveyance Office to ensure that the project complies with the agreement terms between DWR and the DCA.

The State Water Resources Control Board proceedings on the California WaterFix Petition for an additional point of diversion are

ongoing. The Part 2 presentation of cases in chief, which consider the effects of the proposed project on fish and wildlife, public interest and "appropriate flow" concluded on April 25, 2018. On June 18, the SWRCB issued a notice regarding the schedule for the Part 2 rebuttal phase. Rebuttal testimony will commence in hearings starting on August 2, 2018. Staff is coordinating with the DWR and the State Water Contractors to prepare rebuttal testimony and other items for the hearings.

California EcoRestore

Since the initiation of California EcoRestore three years ago by the governor, seven projects have been completed with other projects under construction or scheduled to start in calendar year 2018. The new projects will address critical needs to restore tidal and subtidal habitats for endangered fish species, flood control and fish passage improvements in the Delta.

The Fremont Weir Adult Fish Passage Modification Project, also mentioned in the Habitat Restoration section, is one of the critical habitat improvement projects included under California EcoRestore. Another notable development that will help further the California EcoRestore initiative's goals and the state's California Water Action Plan is the awarding of $18.9 million of Prop 1 funding by the Delta Conservancy to fund projects that will provide watershed benefits to the Delta region.

Near-Term Actions

Habitat Restoration

Bay-Delta Initiatives staff continues to work with agencies and other stakeholders on projects to meet requirements of the National Marine Fisheries Service's 2009 Biological Opinion. Federal and state lead agencies released environmental documents for public review and comment for the Yolo Bypass Salmonid Habitat Restoration and Adult Fish Passage Project, which is expected to restore and provide increased access to 12,000-17,000 acres of floodplain habitat. Construction commenced for the Fremont Weir Adult Fish Passage Modification Project, which is an important habitat improvement project in the Yolo Bypass. The project will modernize the structure and widen the channel to improve migratory fish passage for adult salmonids and sturgeon.

Science Activities

Staff participated in various science efforts and collaborated with Bay-Delta science teams to advance the development of scientific understanding in the Delta.

Two California Department of Fish and Wildlife grant-funded studies have been progressing on schedule. Staff is working closely with consultants identified by CDFW for the Salmon Predation Study, now in its second year, and the Proposition 1 Longfin Smelt Research, which has been going on for almost a year. The projects are scheduled to be completed in December 2018 and June 2020, respectively.

Science staff worked with researchers to co-author the following scientific papers that were published in science journals.

One scientific paper published in the *Estuaries and Coasts* journal involved a hydrodynamic modeling study conducted by one of BDI's consultants. The study evaluated wind trends in the Bay-Delta estuary and showed that declining breezes led to decreased turbidity (cloudiness), leaving smelt more visible to predators.

Another paper in the journal *Biological Conservation* identified important and overlooked juvenile habitats of winter-run Chinook salmon. The study was in collaboration with scientists from National Oceanic and Atmospheric Administration Fisheries, the University of California, Davis and Lawrence Livermore National Laboratory.

Regulatory Activities

The SWRCB issued its proposed Phase I final Lower San Joaquin River and southern Delta updates to the Bay Delta Water Quality Control Plan, which sets the control measures and flow requirements for the protection of beneficial uses and the Delta's ecosystem. The SWRCB also issued the final substitute environmental document and notice of board meeting to consider adoption of the changes and finalization of the environmental document. In Phase II, which includes the Delta, Sacramento River and its tributaries, the SWRCB released its draft and final Phase II Scientific Basis Reports, and a framework for proposed WQCP amendments. No specific date has been identified for the following Phase II draft SED (Substitute Environmental Document). Staff has prepared comments working

through the SWC for each public comment period for the multiple draft SEDs and Scientific Basis Reports.

Emergency Preparedness Plan

DWR has stated that the Delta Flood Emergency Management Plan will be completed in fall 2018, covering operational and interagency plans, real time planning capabilities and emergency stockpiling needs.

DWR and the U.S. Army Corps of Engineers have finalized a Delta emergency operations plan that integrates personnel, resources and communications in large-scale Delta flood emergencies. The California Office of Emergency Services completed their Northern California Catastrophic Flood Response Plan, defining coordinated federal, state and local roles in major emergencies, including DWR Delta emergency response.

Delta Islands

Since Metropolitan's purchase of Delta islands two years ago, ongoing activities have included continued levee monitoring and inspection, in coordination with superintendents and levee patrol staff at local reclamation districts. In addition, execution of an extensive maintenance and communications plan ensures collaboration among local community, landowners, public agencies and interest groups.

As part of Senate Bill 88's requirements to measure and monitor water diversions in the Delta, local reclamation districts in coordination with Metropolitan have equipped nine siphons with meters, and made two portable meters available as part of the Delta Watermaster experiment. A water balance model to account for water system flows in and off the island including hydraulic system losses is also being developed for the initial Bouldin Island site as electronic data collection for the metered siphons are being gathered and analyzed.

More recently, construction started on the Bacon Island Levee Rehabilitation Project to improve levees along a 4.7-mile stretch on the northwestern side of Bacon Island. This will enhance the water conveyance pathway in the central Delta corridor, and will reduce the risk of a levee failure that would potentially result in salinity intrusion near the export pumps. DWR state levee funding accounts for

97 percent of the estimated total cost of the project estimated at $10.53 million. The non-state share of $315,810 and in-kind services are provided by seven large urban water agencies with Delta reliability interests (six of the agencies are in the San Francisco Bay Area), with Metropolitan contributing $243,800. The project is expected to be completed by the end of 2018.

Colorado River Resources

Very dry conditions returned to the Colorado River Basin in fiscal year 2017/2018, with total storage in the Colorado River system decreasing by about 3.5 million acre-feet during the year. Lake Mead, the largest reservoir in the nation, ended the year with storage measuring only 37 percent of capacity at elevation 1,076.8 feet above sea level. That is just above the 1,075-foot level, which would trigger a first-ever shortage declaration along the Lower Colorado River.

Figure 2-2 shows a map of the Colorado River Basin and the states that rely on the Colorado River system for water. The map also shows California's major water agencies with federal water supply contracts. California has a basic apportionment of 4.4 million acre-feet, most of which is used by higher-priority agricultural users (Palo Verde Irrigation District, Yuma Project Reservation Division, Imperial Irrigation District and Coachella Valley Water District), as well as Metropolitan.

Palo Verde Farmland Leases

Metropolitan is the largest landowner in the Palo Verde Valley, owning about 21,000 acres of irrigable farmland, purchased in 2001 and 2015 to support the reliability of Colorado River water supplies. Metropolitan's goals for its land holdings are to maintain agricultural productivity while reducing consumptive water use below historical levels. In calendar year 2017, Metropolitan's four lessees reduced their consumptive water use by 0.9 acre-feet per irrigated acre (20 percent) below 2016 levels, compared to an overall valley reduction of 0.3 acre-feet per acre (6 percent), saving about 14,000 acre-feet of water in total. The lessees received financial incentives provided by under farm leases signed with Metropolitan in fiscal year 2016/17, which aimed to reduce water use by 25 to 30 percent below the historical level. Due to uncertainties in the PVID irrigation delivery measurements that affected the lessees' rent payments, the board will

consider amendments to the leases in July 2018 that would provide incentives for switching from alfalfa to lower water-using crops. Metropolitan continues to pursue technologies to improve the measurement of water use on its lands.

Minute 323

In September 2017, Metropolitan and other agencies executed agreements to implement Minute 323 to the United States-Mexico Water Treaty. Minute 323 builds on Minute 319, which was adopted in 2012, in which Mexico shares in water surpluses and shortages with water users in the United States and allows Mexico to store water in Lake Mead. Minute 323 continued allowing agencies to fund conservation programs in Mexico and receive a share of the water conserved. Metropolitan participated in this option and agreed to fund water conservation in Mexico through 2026, and will receive water supplies when funds are made available to Mexico.

IID Storage Agreement

In calendar year 2017, Imperial Irrigation District conserved and stored over 23,000 acre-feet with Metropolitan, under an amended intrastate storage agreement that allows IID to temporarily store additional conserved water in Metropolitan's system. The water, less storage losses due to evaporation and other factors, will be returned to IID in a future year.

Colorado Drought Response

Negotiations on the Lower Basin Drought Contingency Plan continued among representatives from Reclamation, Arizona, California, Nevada and water agencies, including Metropolitan. The plan seeks voluntary reductions to reduce the risk of Lake Mead falling below critically low elevations. Cutbacks would be taken first by Arizona and Nevada, and then, if needed, by California. Those reductions would be recoverable when Lake Mead's elevation increases. The plan also would increase flexibility for agencies to meet dry-year water needs by allowing delivery of intentionally created surplus water stored in Lake Mead at lower lake elevations, benefitting water users in California, particularly Metropolitan. The agreement is expected to be finalized and brought to the implementing agencies' boards for approval in fiscal year 2018/19.

Figure 2-2. Map of the Colorado River Basin

Metropolitan provided funding through the Bard Seasonal Fallowing Pilot Program to save water through fallowing in the summer months.

CHAPTER 3

Water Resource Management

The Water Resource Management Group is responsible for planning, securing and managing high-quality water resources for Metropolitan's member agencies in a reliable, cost-effective and environmentally responsible manner. Principal responsibilities include managing imported water supplies and quality, advancing water-use efficiency and local resource development, and providing supply and demand forecasts that are the foundation for resource and facility planning. Other responsibilities include developing and implementing timely resource programs and projects, assisting member agencies in optimizing local resources to benefit the entire Metropolitan service area, and ensuring a fair return on Metropolitan's contractual investments in local and imported resources.

As the fiscal year began, the drought emergency had been over for nearly three months, and State Water Project customers were operating under an 85 percent State Water Project allocation for calendar year 2017. Metropolitan had moved from a Water Supply Alert to a lower-level Water Supply Watch, implementing voluntary conservation efforts consistent with Gov. Brown's call to make conservation a California way of life. By the end of calendar year 2017, Metropolitan put nearly 1.2 million acre-feet into dry-year storage reserves, the largest single year addition to storage programs in its history.

On May 21, 2018, the state Department of Water Resources set the SWP allocation at 35 percent for CY 2018. Even with a relatively low allocation, Metropolitan continued to preserve storage for the balance of the fiscal year as a result of continued conservation and production from local projects. Storage levels remained at about 2.5 million acre-feet in district reservoirs and accounts as the region recovered from the recent severe drought.

State Water Project Resources

Metropolitan holds a State Water Project contract for an allocation of 1,911,500 acre-feet annually with the California Department of Water Resources, subject to availability, and participation rights in the State Water Project. DWR is in the process of finalizing an Environmental Impact Report on amending and extending the SWP contract by 50 years to 2085. DWR circulated a draft EIR in 2016, two years after the signing of an Agreement in Principle. Following an informational legislative hearing planned for 2018, DWR will issue a final EIR. Approval of the contract extension will occur following completion of the CEQA process.

Below average hydrologic conditions during water year 2017/18 led to the 35 percent allocation of SWP contract supplies in CY 2018. Northern Sierra snowpack peaked at only 50 percent of average levels for April 1, after which snowpack typically melts. This followed a water year of record-high precipitation and above-average snowpack that allowed for an 85 percent allocation of SWP contract supplies for CY 2017. SWP supplies managed by Metropolitan for FY 2017/18 spanned half of the 85 percent allocation in 2017 and half of the 35 percent allocation in 2018. As a result, Metropolitan managed nearly 1.71 million AF through the SWP system (Fig. 3-1), about 150,000 AF more water than in the previous fiscal year. (FY 2017/18 deliveries and storage are subject to change based on future DWR reconciliations.) Most of the nearly 490,000 AF of supplies stored or exchanged outside of the service area in the fiscal year occurred in the latter half of CY 2017, when Metropolitan maximized carryover storage and deliveries to San Joaquin Valley groundwater storage programs.

Metropolitan's net SWP payments during FY 2017/18 were $527 million (Table 3-1) on a modified accrual basis. Metropolitan also administered existing storage programs located outside its service area along the SWP system, as described on the following pages.

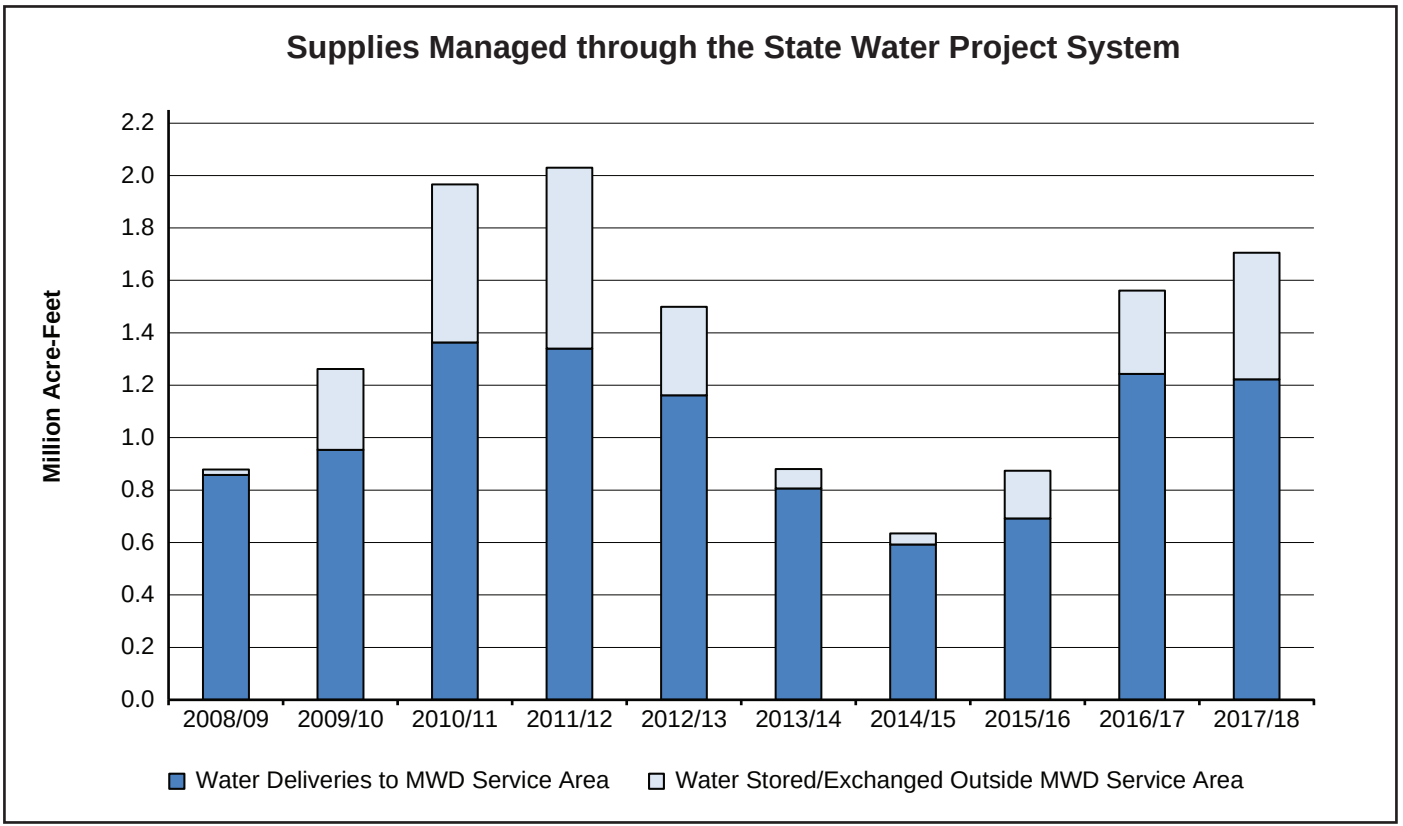


Figure 3-1. Supplies Managed through the State Water Project System

TABLE 3-1
CHARGES, PAYMENTS AND CREDITS UNDER THE STATE WATER AND DEVIL CANYON CASTAIC CONTRACTS

(Millions of Dollars)

Fiscal Year	Conservation (Delta) Capital	Conservation (Delta) Minimum OMP&R [1]	Transportation Capital	Transportation Minimum OMP&R [1]	Transportation Variable	Extra * Capacity Costs	Devil Canyon/ Castaic	Subtotals	Credits	Totals	Accumulated Totals
1963-73	2.50	0.66	197.31	19.33	1.02	39.16	3.56	263.54	(15.62)	247.91	247.91
1973-83	80.68	29.43	484.57	181.61	59.06		70.74	906.09	(49.53)	856.56	1,104.47
1983-93	163.85	127.62	662.42	1,391.73	88.29	85.62	88.50	2,608.03	(373.17)	2,234.86	3,339.33
1993/94	23.50	16.92	74.35	147.75	(5.86)	25.24	9.89	291.79	(101.81)	189.98	3,529.31
1994/95	22.58	17.29	77.05	150.63	8.96	24.01	10.24	310.76	(94.13)	216.63	3,745.94
1995/96	21.85	19.68	81.31	111.87	3.11	26.08	10.60	274.49	(65.33)	209.16	3,955.10
1996/97	21.51	21.19	85.23	109.56	10.00	29.18	10.44	287.11	(38.30)	248.81	4,203.91
1997/98	21.79	22.87	90.07	138.35	6.67	27.58	9.56	316.87	(64.74)	252.14	4,456.05
1998/99	20.56	23.07	90.58	139.60	6.50	29.48	9.40	319.19	(74.96)	244.23	4,700.28
1999/00	19.16	24.11	89.26	164.26	12.05	29.99	10.32	349.15	(70.06)	279.09	4,979.37
2000/01	26.91[2]	24.60	115.99[2]	156.53	35.73	32.99	10.81	403.57	(27.19)	376.38	5,355.75
2001/02	8.46	25.20	60.24	147.23	111.75	38.99	10.53	402.40	(68.44)	333.97	5,689.72
2002/03	16.32	25.90	88.45	161.36	64.83	32.95	10.26	400.07	(57.10)	342.97	6,032.68
2003/04	18.39	27.86	94.86	169.12	110.22	31.49	10.23	462.18	(69.47)	392.71	6,425.39
2004/05	20.60	29.65	98.51	149.53	102.39	28.28	10.99	439.94	(66.68)	373.26	6,798.65
2005/06	17.36	28.37	88.80	140.92	130.82	23.60	11.10	440.97	(41.33)	399.64	7,198.30
2006/07	21.34	25.40	87.95	172.78	88.82	28.64	11.90	436.83	(74.20)	362.63	7,560.92
2007/08	23.95	15.33	80.98	188.78	165.49	36.24	12.12	522.90	(58.60)	464.30	8,025.22
2008/09	23.18	30.50	73.30	224.90	56.72	31.30	13.40	453.30	(58.59)	394.71	8,419.93
2009/10	34.69	39.06	91.87	205.72	71.27	35.93	13.97	492.49	(54.28)	438.22	8,858.15
2010/11	34.70	49.13	97.02	206.13	100.66	36.22	14.10	537.96	(46.08)	491.88	9,350.03
2011/12	26.52	57.29	94.26	197.73	109.67	38.73	14.68	538.88	(59.04)	479.84	9,829.87
2012/13 [3]	34.62	61.06	72.72	170.08	135.15	35.30	14.35	523.28	(42.33)	480.95	10,310.81
2013/14	27.13	60.51	93.50	163.40	91.77	30.64	14.21	481.17	(49.77)	431.40	10,742.21
2014/15	25.74	68.67	97.40	160.18	97.27	26.84	15.63	491.73	(51.74)	439.99	11,182.20
2015/16	33.95	85.43	97.75	193.95	115.63	31.52	16.95	575.17	(63.72)	511.45	11,693.65
2016/17	36.55	91.18	99.40	131.59	148.57	37.96	17.65	562.90	(37.16)	525.74	12,219.39
2017/18	35.93	90.15	97.96	136.63	150.19	37.95	18.66	567.47	(40.18)	527.29	12,746.68
TOTALS	864.34	1,138.15	3,563.11	5,631.24	2,076.75	911.88	474.77	14,660.24	(1,913.55)	12,746.68	

***** Includes costs for excess capacity constructed for Metropolitan on the System and East Branch Enlargement.

[1] Minimum Operations, Maintenance, Power, and Replacement charge.

[2] DWR requested early payment of $36M to manage cash shortages due to 2001 California's energy crisis.

[3] Reporting changed from cash to modified accrual basis in FY 2012/13.

Water Storage Programs

Semitropic/Metropolitan Water Banking and Exchange Program

In 1994, Metropolitan entered into a groundwater storage agreement with Semitropic Water Storage District in Kern County that allows storage of up to 350,000 AF. During FY 2017/18, Metropolitan stored 40,162 AF with Semitropic. The total water in storage on June 30, 2018 was 187,343 AF.

Arvin-Edison/Metropolitan Water Management Program

Under the December 1997 agreement with Arvin-Edison Water Storage District, Metropolitan can store up to 350,000 AF. During FY 2017/18, Metropolitan cycled the program to provide water quality improvements to its SWP deliveries and reduce program put costs by recovering 16,511 AF of high-quality Arvin-Edison water and returning the same amount of water to Arvin-Edison storage within the same program year. This operation will reduce future program put costs by around $800,000. Metropolitan stored 42,153 AF with Arvin-Edison. The total water in storage on June 30, 2018 was 153,233 AF. On December 14, 2017, the State Water Resources Control Board adopted a new Maximum Contaminant Level for 1,2,3-trichloropropane (1,2,3-TCP) at five parts per trillion. Arvin-Edison subsequently sampled groundwater extraction wells showing levels that exceed the MCL. The presence of this compound in the groundwater may affect the overall program yield in the future. Staff is evaluating all options available including exchanges or using only wells that are low in 1,2,3-TCP.

Antelope Valley East-Kern Water Agency/Metropolitan Water Management Program

Under the 2016 agreement with the Antelope Valley East-Kern Water Agency, Metropolitan can store up to 30,000 AF in the groundwater basin. The program is located downstream of the Edmonston Pumping Plant along the East Branch of the California Aqueduct. During FY 2017/18, Metropolitan stored its first 9,000 AF in the program. Staff is looking at whether program expansion could provide additional water supply reliability during emergencies or water supply shortages.

Kern Delta/Metropolitan Water Management Program

A 2003 agreement with the Kern Delta Water District allows Metropolitan to store up to 250,000 AF in the groundwater basin underlying Kern Delta, with a retrieval capacity of 50,000 AF per year. During FY 2017/18, Metropolitan stored 37,892 AF with Kern Delta. Total water in storage on June 30, 2018 was 138,422 AF.

Mojave/Metropolitan Water Storage Program

In 2003, Metropolitan entered into a demonstration agreement with Mojave Water Agency. The agreement allows for the exchange of SWP water on the basis of one acre-foot of return water for each acre-foot of water previously delivered to Mojave. In July 2011, the agreement was amended to extend the term to 2035 and reduce program costs. Metropolitan recovered 1,272 AF during FY 2017/18, leaving 26,167 AF in the exchange account as of June 30, 2018.

Water Transfers and Exchanges

Improved 2017 hydrologic conditions in the SWP watershed resulted in limited need to purchase water transfer supplies in 2018.

San Gabriel Valley Municipal Water District Exchange

Metropolitan entered into a purchase and exchange agreement with San Gabriel Valley Municipal Water District in September 2013. During FY 2017/18, Metropolitan developed 1,059 AF of additional supply by exchange and secured a purchase of 2,883 AF.

Colorado River Resources

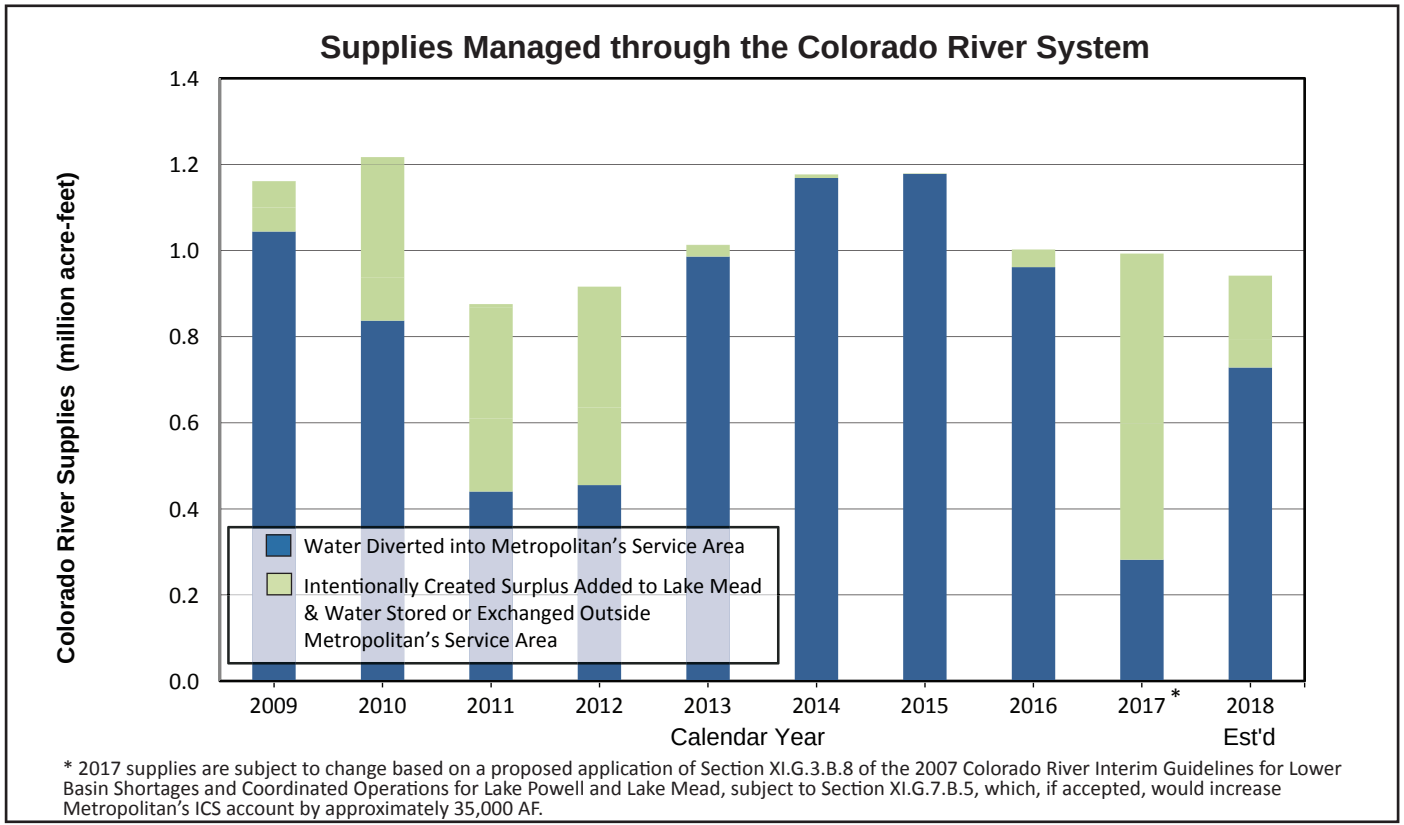
Acquisitions and exchanges made possible by the 2003 Quantification Settlement Agreement continued during FY 2017/18. Metropolitan diverted 677,027 AF into its Colorado River Aqueduct during CY 2017. Figure 3-2 illustrates annual water supplies managed through the CRA. These supplies include diversions into Metropolitan's service area and water stored or exchanged outside Metropolitan's service area since CY 2009. This includes intentionally created surplus left in Lake Mead and storage/exchange programs with Coachella Valley Water District, Desert Water Agency and Imperial Irrigation District, of which the first two are along the CRA.

As of January 2018, Metropolitan had 478,628 AF of intentionally created surplus stored in Lake Mead.

Figure 3-3 illustrates the storage levels of lakes Mead and Powell through FY 2018. Long-term dry conditions through CY 2017 have delayed equalization releases from Lake Powell to Lake Mead. Below-average precipitation throughout the water year resulted in a projected unregulated inflow to Lake Powell of about 39 percent of the April-July average, and about 49 percent of average for the water year.

Water Supply Acquisitions and Exchanges

In CY 2017, Metropolitan obtained 105,000 AF from its agricultural conservation program with IID. An additional 119,379 AF was made available from Metropolitan's land fallowing agreements with farmers in the Palo Verde Valley. Metropolitan continued its two-year seasonal land fallowing pilot program with Bard Water District for additional 2,300 AF of Colorado River water. In CY 2017, 179,326 AF of Metropolitan water was delivered to San Diego County Water Authority in exchange for 100,000 AF of IID conserved water plus 79,326 AF of conserved water from the Coachella Canal and All-American Canal lining projects, which was made available to Metropolitan at Lake Havasu. The lining projects also conserved an additional 16,000 AF that was used by Metropolitan.



* 2017 supplies are subject to change based on a proposed application of Section XI.G.3.B.8 of the 2007 Colorado River Interim Guidelines for Lower Basin Shortages and Coordinated Operations for Lake Powell and Lake Mead, subject to Section XI.G.7.B.5, which, if accepted, would increase Metropolitan's ICS account by approximately 35,000 AF.

Figure 3-2. Supplies Managed through the Colorado River System

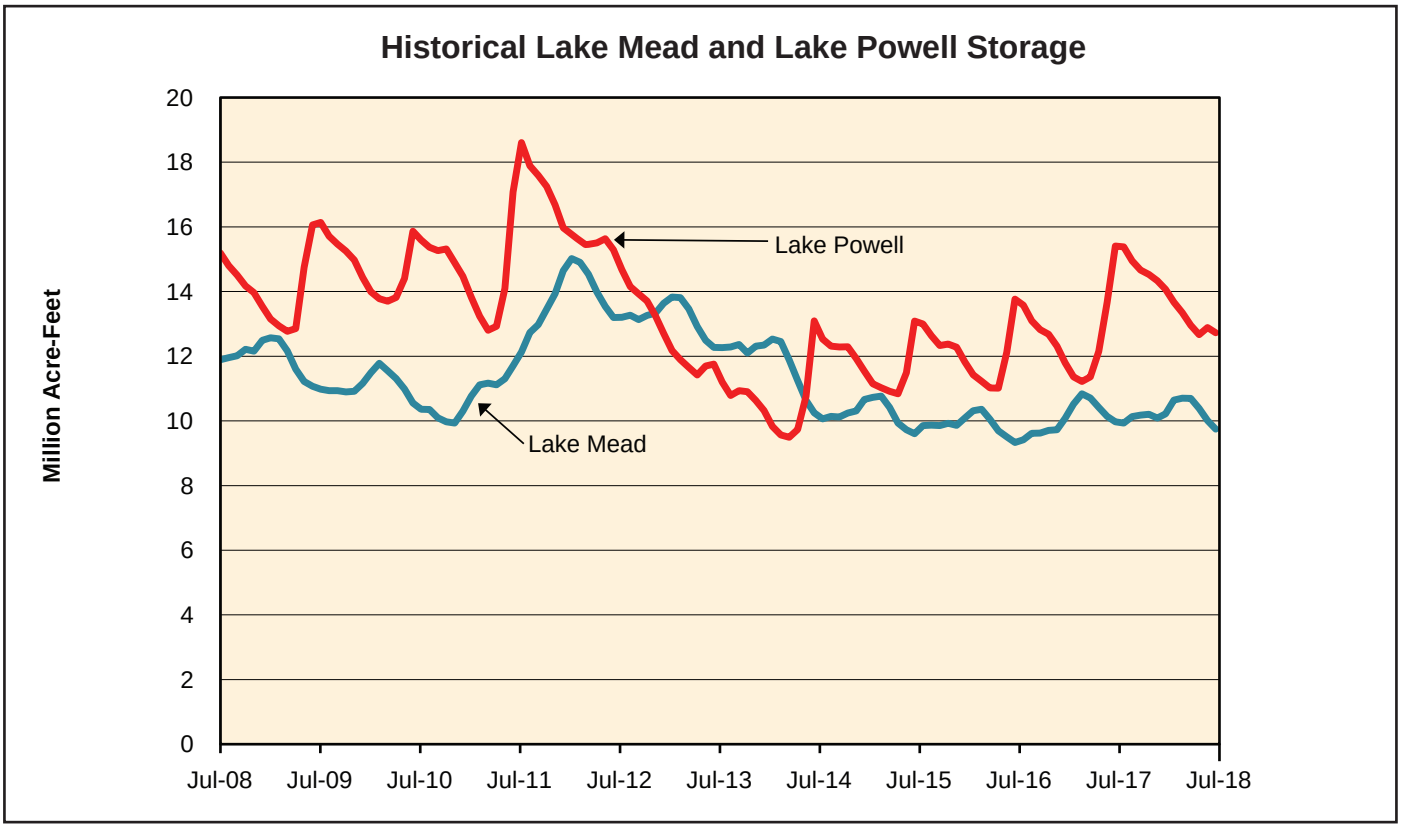


Figure 3-3. Historical Lake Mead and Lake Powell Storage Fiscal Years 2008/09-2017/18

Local Resources

Water Recycling and Groundwater Recovery

Metropolitan's Local Resources Program has provided about $631 million since its inception in 1982, producing about 3.7 MAF of recycled water and recovered groundwater, through financial incentives of up to $340/AF. During FY 2017/18, Metropolitan provided $30 million for production of 188,000 AF under the LRP. Currently, there are 107 projects under contract expected to produce about 429,000 AF per year once fully implemented. In addition, staff is reviewing new LRP applications for several projects submitted by various agencies. Contracts include performance targets that are assessed every year and when targets are not met, reductions to the contract can be made. Including LRP projects, the region used about 450,000 AF of recycled water (Fig. 3-4), and about 98,000 AF of recovered groundwater (Fig. 3-5) in FY 2017/18.

To increase use of recycled water, Metropolitan provides incentives to customers to retrofit their irrigation and industrial potable water systems to recycled water. Since 2014, Metropolitan committed $10.2 million for projects replacing 11,800 AFY of historic potable water use at 354 sites.

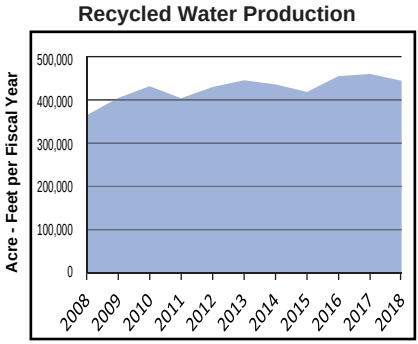


Figure 3-4.

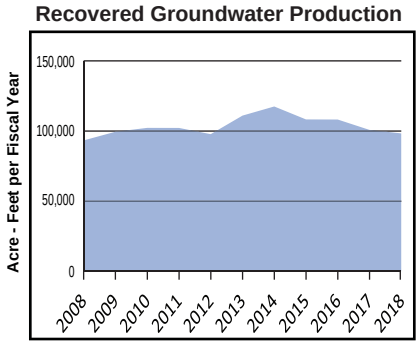


Figure 3-5.

Figures reflect total regional production (including Metropolitan-assisted project production through June 2018), and subject to change due to annual assessments and late invoices. Recycled water production includes Santa Ana River base flows below Prado Dam.

Seawater Desalination

Since 2005, Metropolitan has maintained agreements with its member agencies to fund three local seawater desalination projects representing 46,000 AFY of potential future supplies. Two of the three projects are currently in the environmental review and permitting stage while a third is no longer under consideration. During FY 2017/18, Metropolitan supported member agency desalination efforts and continued coordinating regulatory policy for seawater desalination through financial support and participation in CalDesal, a consortium of California water agencies and other stakeholders working to advance seawater and groundwater desalination. Seawater desalination also has been eligible for LRP incentives since 2014.

Groundwater Storage

Metropolitan's conjunctive use programs store imported supplies to enhance reliability during dry, drought and emergency conditions. In FY 2018, due to improved hydrologic conditions, Metropolitan called upon agencies to store water in the conjunctive use accounts, and a total of 40,830 AF was added, including 35,410 AF in the Chino Basin. Table 3-2 shows the balance of stored water in each in-region groundwater conjunctive use program as of June 30, 2018.

Four new cyclic storage agreements were executed as of June 30, 2018 with Burbank, Calleguas Municipal Water District, Eastern Municipal Water District and the Municipal Water District of Orange County. These cyclic agreements add to existing agreements with Upper San Gabriel Valley Municipal Water District and Three Valleys Municipal Water District. During FY 2017/18, 120,000 acre-feet was delivered under the cyclic program. Metropolitan's board also approved a special in-lieu cyclic program to increase storage for the region and provide a solution to challenges of storing additional water through direct replenishment. Of the 120,000 acre-feet delivered this year, 65,000 acre-feet was delivered through this special in-lieu program.

TABLE 3-2
METROPOLITAN'S CONJUNCTIVE USE PROGRAMS

Conjunctive Use Program	Total Storage Capacity (AF)	2017/18 Beginning Balance (AF)	Change in Storage (AF)	2017/18 Ending (AF)
Los Angeles County				
Claremont	3,000	0	1,050	1,050
Compton	2,289	0	0	0
Foothill	9,000	0	0	0
Live Oak	3,000	0	0	0
Long Beach Phase 1	13,000	0	0	0
Long Beach – Lakewood	3,600	0	0	0
Orange County				
Orange County	66,000	315	0	315
San Bernardino County				
Chino Basin	100,000	6,319	35,410	41,729
Riverside County				
Elsinore Basin	12,000	0	4,370	4,370
TOTAL	**211,889**	**6,634**	**40,830**	**47,464**

Some 2017/18 beginning balances differ from 2016/17 ending balances due to data received after publication of the 2017 Annual Report. 2017/18 data presented in this table includes CUP production data that was received by June 30, 2018 and are subject to change.

Conservation and Water-Use Efficiency

Metropolitan and its member agencies are nationally recognized as longtime leaders in water conservation, reducing overall regional water demand while ensuring greater water reliability and availability. By 2040, conservation and water recycling will account for one-third of Southern California's water supply portfolio in Metropolitan's service area. Metropolitan supports financial incentives, education, outreach programs and appliance/plumbing standards at both the regional and local level. Highlights of 2017/18 included the re-launching of the Innovative Conservation Program and adopting recommendations of a national peer review from water conservation experts. In addition, staff also prepared to launch a new board-adopted Landscape Transformation Program.

In this past fiscal year, Metropolitan paid a total of $12.6 million in conservation incentives to its consumers. The projected lifetime water savings from these conservation expenditures is approximately 76,000 AF of water.

Since 1985, the population within Metropolitan's service area has increased by about 5.8 million, but demands remain flat. Potable per capita water use has declined by about 37 percent during this period, largely attributed to conservation efforts

Water Resource and System Planning

Integrated Water Resources Planning

In July 2017, Metropolitan's board voted to adopt policy principles relating to the district's role in developing local resources, achieving regional reliability, and increasing outdoor water-use efficiency to achieve future conservation.

Throughout the fiscal year, Metropolitan engaged in discussions aimed at developing policy needed to implement the Integrated Water Resources Plan. First adopted by Metropolitan's board in 1996 and updated in 2004, 2010 and 2015, the IRP has fostered supply reliability through diversified investments in water conservation, recycling, groundwater treatment, storage and transfers.

In May 2018, Gov. Brown signed two major water conservation bills, SB 606 (Hertzberg) and AB 1668 (Friedman), culminating a two-year process since the governor issued Executive Order B-37-16, "Making Water Conservation a California Way of Life." The bills focus on long-term water-use efficiency and drought planning, with new reporting requirements and enforcement actions by state agencies. The legislation anticipates significant stakeholder involvement as DWR and the State Water Resources Control Board conduct studies and seek input prior to adopting standards in June 2022 and requiring compliance by November 2023. Metropolitan actively participated in an urban stakeholder group advising the state on new long-term water-use efficiency targets and new requirements for the Water Shortage Contingency Plans. Metropolitan will continue to be engaged with the state's efforts to implement the legislation.

Future Supply Actions Program

Established in 2013, Future Supply Actions are relatively low-cost, low-risk supply development efforts to better prepare the region for unforeseen water supply challenges. In 2018, Metropolitan launched a new round of the program, including $3.5 million for member agency studies and a separate matching fund agreement with the Water Research Foundation. Metropolitan will hold a request for proposals to member agencies in summer 2018.

Under a cooperative research funding agreement with WRF, Metropolitan's board authorized $975,000 to partially fund seven potable and non-potable reuse studies. Metropolitan selected the studies from WRF's Advancing Potable Reuse Initiative, which advances potable reuse in the United States as a reliable and sustainable component of integrated water management.

Water Resource Data

Figure 3-6 displays precipitation for FY 2017/18 compared to average annual precipitation figures for three weather stations within Metropolitan's service area. These figures show that local precipitation was very low throughout the region. For FY 2017/18, downtown Los Angeles recorded precipitation of 4.8 inches, only 32 percent of the average annual precipitation of 14.8 inches. Precipitation in San Diego and Long Beach similarly lagged.

Figure 3-7 displays population within Metropolitan's service area since 1990, with historical population based on state Department of Finance estimates and projections based on regional transportation planning agencies. Since 1990, the population served has increased from about 15 million to nearly 19 million.

Figure 3-8 displays Metropolitan's historical water transactions since FY 1989/90, which ranged between 1.50 and 2.51 MAF (this includes sales, exchanges and wheeling). Variations in water transactions are attributed to many factors that include weather, hydrologic conditions, local supply development, and economic activity.

Figure 3-9 displays Metropolitan's calendar year ending storage reserves for the past 11 years. Ongoing conservation efforts and water-use efficiency achievements, along with record precipitation in northern California, allowed Metropolitan to continue rebuilding storage in CY 2017. In fact, Metropolitan stored nearly 1.2 MAF, the largest annual increase to storage in its history. At the end of CY 2017, Metropolitan had total storage reserves of 3.1 MAF, consisting of 2.5 MAF of dry-year storage and 630,000 AF of emergency storage. This continues an effort that began in CY 2016 following three consecutive years of storage withdrawals during the drought. Despite below normal precipitation during the winter of 2017/18, Metropolitan does not anticipate a significant change in storage levels in CY 2018.

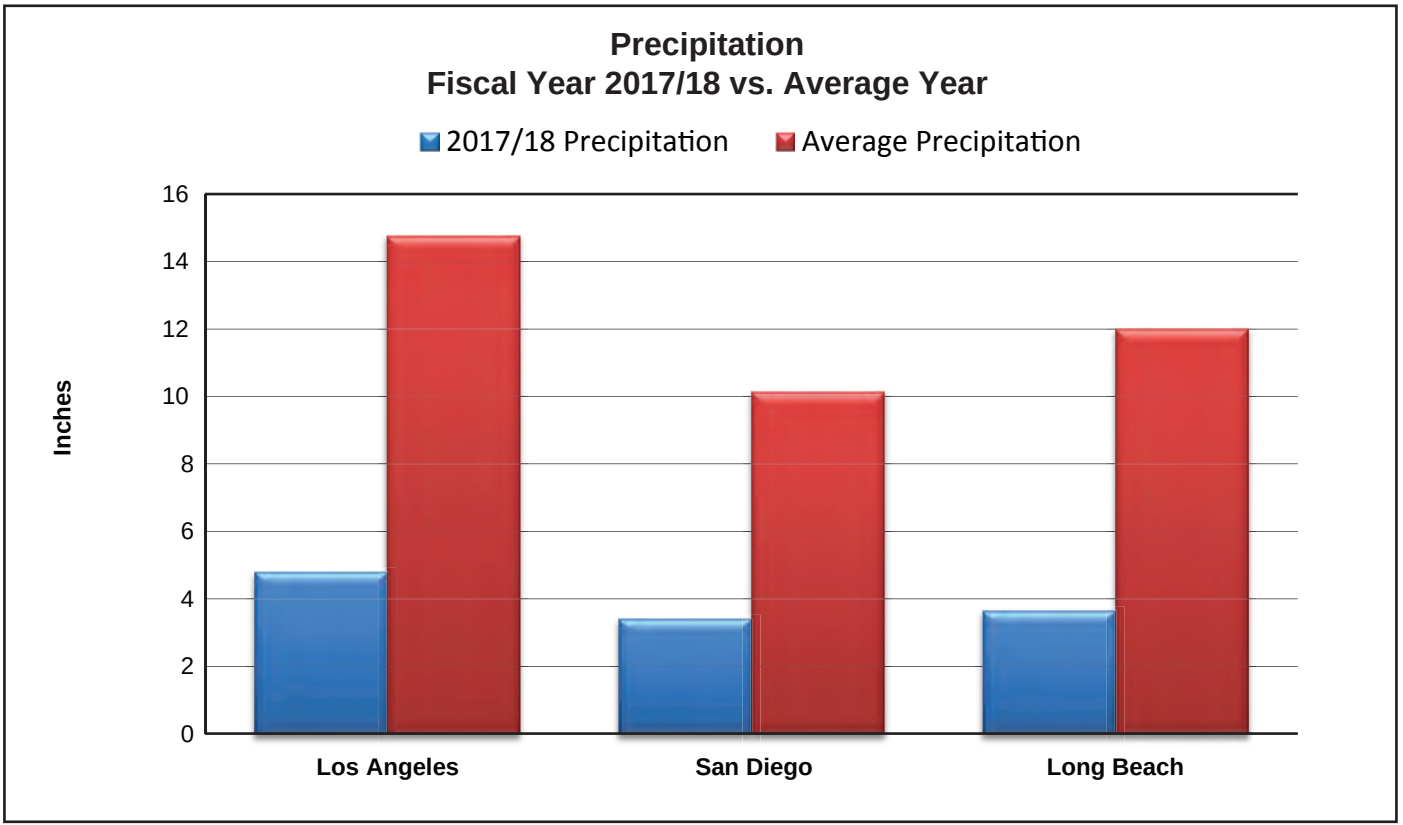


Figure 3-6. Precipitation

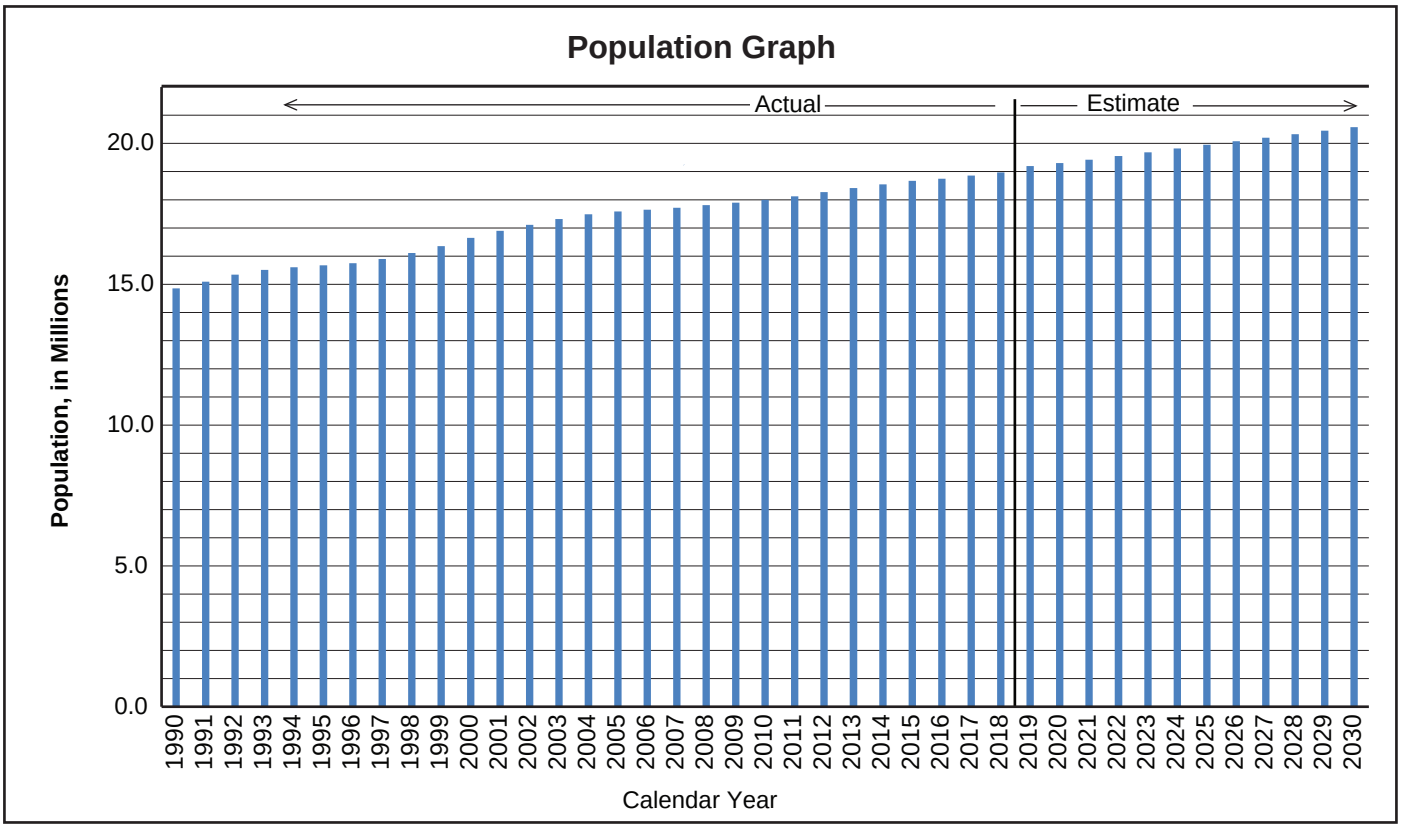


Figure 3-7. Population Growth

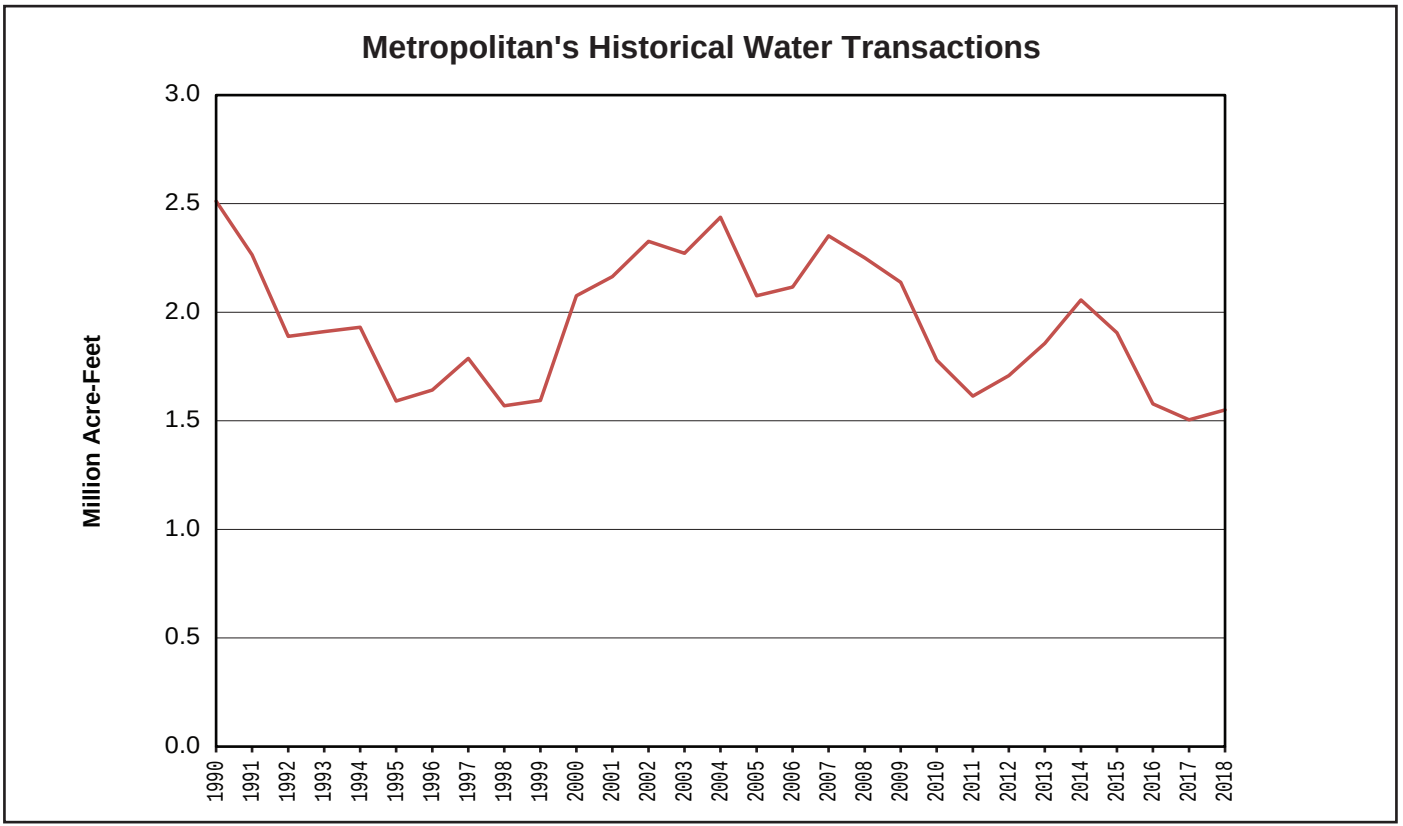


Figure 3-8. Metropolitan's Historical Water Transactions (includes sales, exchanges, and wheeling)

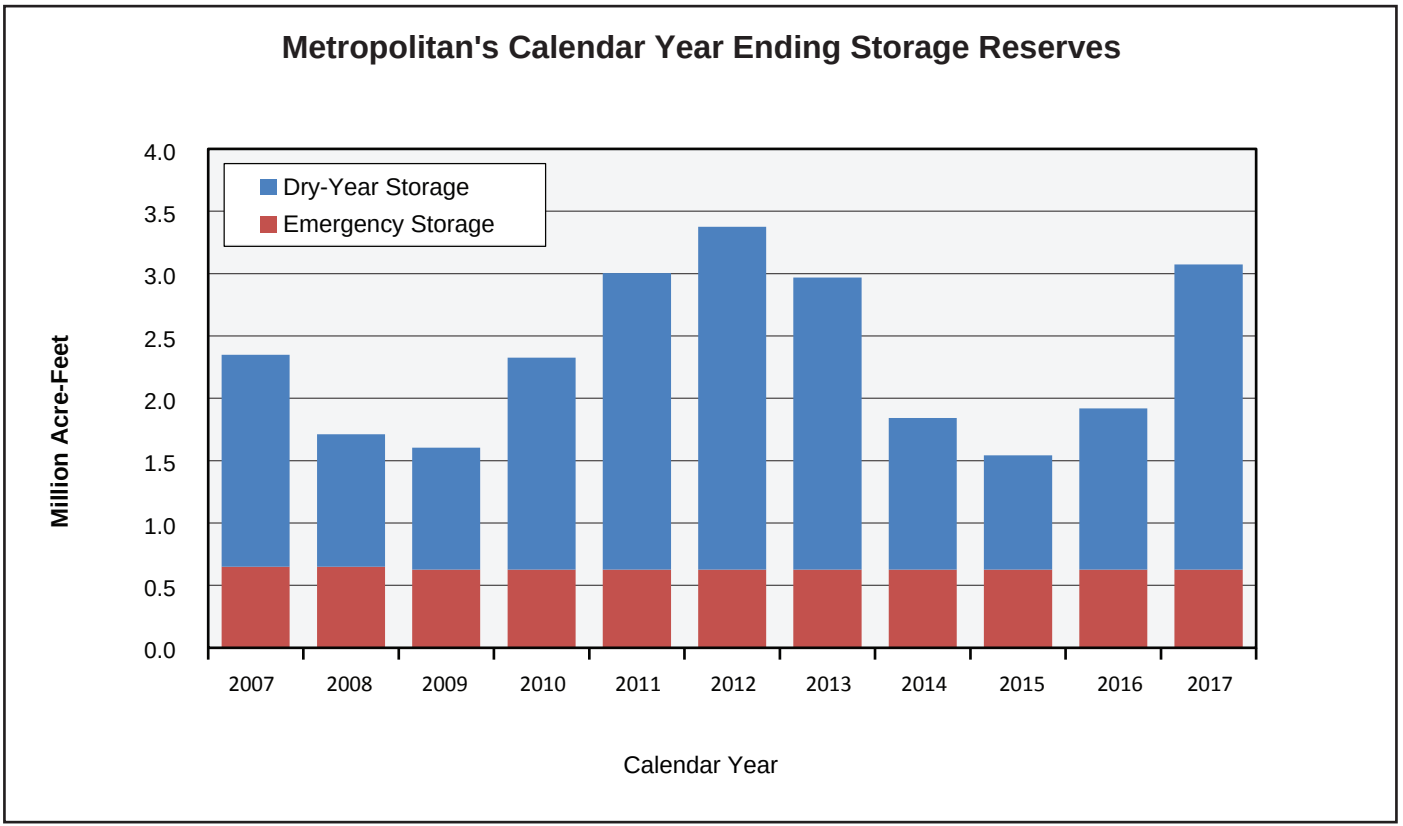


Figure 3-9. Metropolitan's Calendar Year Ending Storage Reserves

Staff reinstalling a pipe coupling at a pressure control structure on the Orange County Feeder.

CHAPTER 4

Water System Operations

The Water System Operations Group conveys, treats and distributes water to member agencies that, directly or through their sub-agencies, serves nearly 19 million Southern Californians. WSO protects and ensures water quality for Metropolitan's six-county service area that meets all primary drinking water standards, operating and maintaining Metropolitan's five treatment plants with a combined capacity of more than 2.3 billion gallons of water per day. WSO balances demand and supply as it operates, manages and maintains Metropolitan's water and power systems. It also oversees security; provides machine and fabrication services to support Metropolitan infrastructure; offers technical advice and support to member agencies, customers and other entities; provides technical training to ensure an effective, efficient and safe work environment; runs Metropolitan's Apprenticeship Program; assists in planning, design and construction of new facilities; and responds to emergencies to restore service in the shortest time possible.

Water Treatment

Metropolitan's five water treatment plants treat water from the Colorado River and Northern California. The Robert B. Diemer Water Treatment Plant provides treated water to areas of Orange County and coastal Los Angeles County. The Joseph Jensen Water Treatment Plant supplements local water supplies in the San Fernando Valley, Ventura County and central Los Angeles, while the F.E. Weymouth Water Treatment Plant generally serves eastern Los Angeles County, the San Gabriel Valley and parts of Orange County. The Henry J. Mills Water Treatment Plant serves western Riverside County and Moreno Valley. The Robert A. Skinner Water Treatment Plant serves parts of Riverside County and meets the supplemental treated water needs of San Diego County. The Jensen and Mills plants only treat

State Water Project supplies, while the other three plants treat a blend of supplies from the SWP and Colorado River.

Ozone officially went into service as the primary disinfectant for the Weymouth plant on October 1, 2017, with member agencies provided prior notification of the switch to ozone. The Weymouth oxidation retrofit completed Metropolitan's $1.2 billion water quality improvement program to install ozone systems at all five treatment plants.

The Jensen plant's ozone system was upgraded with a new programmable logic controller and control system to replace the previous system, which was more than 15 years old and past its service life. The upgrade included new, local-control touch screens and SCADA (Supervisory Control and Data Acquisition) screens for remote control and monitoring. The new system improves the plant's operational reliability. Other Jensen improvements included completing the first stage of electrical upgrades to protect the Jensen plant from outages due to loss of primary power from the Los Angeles Department of Water and Power. The upgrades also allow Jensen staff to perform electrical maintenance without shutting down the treatment process. At Diemer, staff relocated the plant's filter effluent sample points to provide continuous monitoring and reporting of turbidity levels from each of the facility's 48 filters to the area control room. This water quality information is then reported monthly to the State Water Resources Control Board Division of Drinking Water.

In July 2017, Metropolitan's board authorized the removal of Modules 4, 5, and 6 at the Skinner plant, which will reduce the plant capacity from 630 million gallons per day to 350 MGD. Metropolitan, in coordination with the member agencies, determined that the down-sized capacity will meet expected demands at the Skinner plant for over two decades. This action will reduce ongoing operation and maintenance, and defer capital costs associated with excess treated water capacity because of the reduced treated water demands from water conservation and alternate treatment facilities in the region. Skinner staff moved forward with efforts to remove these modules and their associated infrastructure from service. Decommissioning activities continue, with completion expected in 2019. At that time, Metropolitan's operating permit with DDW will be revised to the lower capacity.

During fiscal year 2017/18, Metropolitan invested more than $48.5 million to refurbish and upgrade its five water treatment plants to ensure that treated water reliability goals continue to be met.

Water Quality

Regulations

Metropolitan's treated water supplies met all regulatory requirements and primary drinking water standards during fiscal year 2017/18.

Starting in October 2017, Metropolitan was required to comply with the second round of the U.S. Environmental Protection Agency's Long Term 2 Enhanced Surface Water Treatment Rule by monitoring for *Escherichia coli* in the five desert pumping plant domestic water systems. From inception to June 2018, *E. coli* levels in all five systems have not exceeded the 10 cfu (colony forming units) per 100 mL trigger level that would require additional *Cryptosporidium* monitoring.

California finalized a drinking water Maximum Contaminant Level of 0.005 µg/L, or 5 parts per trillion, for TCP (1,2,3-trichloropropane) in December 2017 and required initial quarterly sampling in public water systems starting January 2018. Metropolitan is required to monitor and report TCP in source and treatment plant effluent waters. Results were non-detect for TCP at all of Metropolitan's monitoring locations. TCP is primarily a concern in some groundwater supplies and has not been detected in any of Metropolitan's source or treated waters since periodic monitoring began in 2005.

Water Quality Monitoring

Water Quality Laboratory staff performed over 180,000 analytical tests using more than 160 methods on nearly 53,000 samples. Treatment plant laboratories performed an additional 150,000 analytical tests. The number of samples and analyses for Metropolitan's sources, treatment plants and distribution system may change each year depending on regulations, monitoring plans, operations and water quality studies.

Chemical/Physical

Staff analyzed Metropolitan's source and treated waters for inorganic and organic compounds, physical properties and other constituents. Table 4-1 lists the locations sampled for organic chemicals. Herbicides, pesticides and synthetic organic compounds are on a three-year monitoring cycle. None of these compounds were detected in 2015 and compliance monitoring will be conducted in the second half of 2018. Tables 4-2, 4-3, and 4-4 show locations and results for trace metals, radiologicals (most recent triennial monitoring results summary), and general minerals and physical analyses, respectively.

TABLE 4-1
SAMPLE LOCATIONS FOR ORGANIC COMPOUNDS
Fiscal Year 2017/18

Source Water	Treated Water
Devil Canyon Afterbay	Diemer Plant Effluent
Diamond Valley Lake	Jensen Plant Effluent
Jensen Plant Influent	Mills Plant Effluent
Lake Havasu Intake	Skinner Reservoir Effluent[1]
Lake Mathews Headworks	Weymouth Plant Effluent
Lake Perris	
Lake Skinner Outlet Conduit	
San Jacinto Tunnel	

[1]Skinner Reservoir Effluent is a combined effluent from Skinner plants 1 and 3.

Total Dissolved Solids

Salinity of supplies delivered through the Colorado River Aqueduct is typically higher than the state project, largely due to natural mineral salt deposits within the Colorado River watershed (Figure 4-1). Changes in salinity tend to occur more rapidly in SWP supplies as opposed to the CRA due to the hydrodynamic fluctuations of the SWP system. Figure 4-2 presents salinity as flow-weighted averages of the total dissolved solids levels in the effluents from all five treatment plants. Salinity levels at all the plants dropped compared to the previous year due to an increased 2017 SWP allocation and, in general, Diemer, Skinner, and Weymouth plants treated higher SWP blends. As such, flow-weighted TDS averages met Metropolitan's water quality goal of below 500 milligrams per liter (mg/L).

TABLE 4-2
TRACE METALS IN METROPOLITAN'S WATER SUPPLIES
Fiscal Year 2017/2018 (in micrograms per liter [µg/L])

Metal	Maximum Contaminant Level (MCL)	Minimum Reporting Level	SOURCE WATERS											TREATMENT PLANT EFFLUENTS				
			Lake Havasu	San Jacinto Tunnel	Lake Mathews	Castaic Lake	Silverwood Lake	Mills Influent	Lake Perris	Weymouth Influent	Diemer Influent	Diamond Valley Lake	Lake Skinner	Weymouth	Diemer	Jensen	Skinner	Mills
Aluminum[1]	1000 (200)	10	15	10	35	40	63	54	50	120	61	ND	28	63	74	43	14	61
Antimony	6	2	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Arsenic	10	0.5	2.5	2.5	2.4	2.4	1.9	1.9	2.1	2.0	2.1	2.6	2.4	1.0	1.2	1.5	ND	0.5
Barium	1000	5	120	120	120	30	27	27	53	91	91	32	66	89	90	29	67	26
Beryllium	4	0.5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Boron[2]	1000	20	120	120	130	170	110	120	170	120	110	150	120	120	110	170	120	120
Cadmium	5	0.1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chromium, Total	50	1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chromium 6[3]	10	0.03	ND	ND	ND	0.07	0.07	0.07	ND	0.04	0.04	ND	ND	0.06	0.05	0.09	0.07	0.09
Copper[4(1)]	1300 (1000)	10	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Iron[1]	300	10	ND	ND	59	62	ND	ND	58	63	ND	ND	ND	ND	ND	ND	ND	ND
Lead[4]	15	1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Lithium	--	10	41	40	41	ND	ND	ND	ND	31	33	ND	18	31	32	ND	19	ND
Manganese[1]	50	5	ND	ND	ND	10	19	14	7	14	6	8	8	ND	ND	ND	18	ND
Mercury	2	0.2	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Molybdenum	--	2	5	6	5	ND	ND	ND	3	4	4	2	3	4	4	3	3	ND
Nickel	100	2	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Selenium	50	5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Silver[1]	100	5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Strontium	--	20	1060	1060	1040	230	170	170	250	780	800	230	520	780	800	230	560	170
Thallium	2	1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Vanadium[2]	50	1	2.4	2.3	2.9	2.9	3.2	3.1	3.6	3.0	3.0	2.2	2.8	2.8	2.9	2.7	ND	2.8
Zinc[1]	5000	20	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

ND = Not Detected

-- = no MCL

[1] Secondary standard based on consumer acceptance rather than health considerations.

[2] California notification level: a health-based advisory level.

[3] California MCL remanded by Sacramento County Superior Court on May 31, 2017.

[4] Action level. The MCL for lead has been replaced with a treatment technique requiring agencies to optimize corrosion control treatment when the action level is exceeded in more than 10 percent of samples collected at the collected at the consumers' tap. Copper has a similar treatment technique requirement in addition to the secondary MCL. (Per EPA's Lead and Copper Rule.)

TABLE 4-3
RADIOLOGICAL COMPLIANCE MONITORING[1]
2018 Four Quarter Ranges (in pCi/L)

LOCATION	GROSS ALPHA	GROSS BETA	COMBINED RADIUM 226 & 228	STRONTIUM 90	TRITIUM	URANIUM
MCL	**15**	**50[3]**	**5**	**8**	**20,000**	**20**
DLR	**3**	**4**	**1**	**2**	**1,000**	**1**
Lake Havasu Intake	3–6	5	ND	ND	ND	2–3
San Jacinto Tunnel West Portal	ND–7	5–6	ND	ND	ND	3–6
Lake Mathews	ND–3	ND-12	ND	ND	ND	3
Silverwood Lake	ND	ND-5	ND	ND	ND	ND
Lake Perris	ND	ND–5	ND	ND	ND	1–2
Diamond Valley Lake	ND-6	ND-5	ND	ND	ND	ND
Lake Skinner	ND–4	ND	ND	ND	ND	ND–1
Jensen Plant Influent	ND	ND	ND	ND	ND	ND–1
Diemer Plant Effluent	ND	ND	ND	ND	ND	ND
Jensen Plant Effluent	ND–3	ND	ND	ND	ND	ND–1
Mills Plant Effluent	ND	ND	ND	ND	ND	ND
Skinner Reservoir Effluent[2]	ND–4	ND–5	ND	ND	ND	ND–3
Weymouth Plant Effluent	ND	ND	ND	ND	ND	ND

[1] Results obtained during Calendar Year 2018 triennial monitoring. Data are reported for three years until the next scheduled monitoring.

[2] This is a combined effluent from Skinner plants 1 and 3.

[3] The gross beta particle activity MCL is 4 millirem/year annual dose equivalent to the total body or any internal organ. The screening level is 50 pCi/L (picoCuries/liter).

DLR = Detection Limits for Purposes of Reporting

MCL = Maximum Contaminant Level

ND = Not Detected. All results less than DLR were reported as ND.

TABLE 4-4
GENERAL MINERAL AND PHYSICAL ANALYSIS OF METROPOLITAN'S WATER SUPPLIES
Fiscal Year 2017/18 Averages

CONSTITUENTS	UNITS	SOURCE WATERS								TREATMENT PLANT EFFLUENTS				
		Lake Havasu	San Jacinto Tunnel	Lake Mathews	Castaic Lake	Silverwood Lake	Lake Perris	Diamond Valley Lake	Lake Skinner	Weymouth	Diemer	Jensen	Skinner	Mills
Silica	mg/L	7.7	7.9	7.9	12.3	9.5	8.3	8.6	8.6	8.9	8.8	12.3	8.6	9.7
Calcium	mg/L	74	74	70	23	16	24	24	39	40	41	23	43	16
Magnesium	mg/L	26	26	27	11	9	12	12	15	17	17	11	16	9
Sodium	mg/L	92	92	97	46	37	63	52	59	70	70	54	70	45
Potassium	mg/L	4.5	4.7	4.8	2.7	2.2	3.7	3.2	3.3	3.4	3.4	2.8	3.6	2.2
Carbonate	mg/L	0	0	0	0	0	0	0	0	0	0	0	0	2
Bicarbonate	mg/L	159	156	146	87	74	100	93	111	98	101	90	107	69
Sulfate	mg/L	232	231	238	46	27	49	51	106	128	134	54	120	35
Chloride	mg/L	89	90	94	62	51	84	68	66	73	73	65	80	56
Nitrate	mg/L	1.4	1.2	0.8	2.2	1.9	0.4	1.2	1.2	1.6	1.5	2.3	1.5	2.6
Fluoride	mg/L	0.3	0.3	0.3	<0.1	<0.1	<0.1	0.1	0.1	0.8	0.8	0.7	0.7	0.8
Total Dissolved Solids (TDS)	mg/L	605	605	611	247	190	296	267	355	392	401	271	396	214
Total Hardness as $CaCO_3$	mg/L	284	282	278	98	76	109	107	156	162	168	100	168	76
Total Alkalinity as $CaCO_3$	mg/L	130	129	119	71	61	83	77	91	81	83	76	87	60
Free Carbon Dioxide	mg/L	1.9	1.2	2.4	4.7	1.3	1.6	3.5	1.4	0.9	1.0	0.7	1.2	0.3
pH	pH	8.18	8.33	8.05	7.53	8.01	8.05	7.80	8.12	8.32	8.26	8.37	8.20	8.64
Specific Conductance	µS/cm	975	979	988	448	344	544	482	605	665	681	488	677	388
Color	CU	3	2	2	10	11	7	8	6	2	1	2	1	1
Turbidity	NTU	0.78	0.46	1.2	1.1	1.4	1.4	0.42	0.77	0.05	0.05	0.04	0.07	0.05
Temperature	°C	19	21	19	15	18	19	17	20	18	21	19	22	21
Bromide	mg/L	0.08	0.08	0.08	0.19	0.16	0.28	0.21	0.13	--	--	--	--	--
Total Organic Carbon	mg/L	3.12	3.05	3.08	3.34	3.51	4.02	2.92	3.23	--	--	--	--	--
Cyanide	mg/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Foaming Agents (MBAS)	mg/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Threshold Odor Number (TON)	--	4	4	7	3	10	12	4	7	3	4	4	3	2
Saturation Index	--	--	--	--	--	--	--	--	--	0.34	0.35	0.23	0.36	0.25
Aggressiveness Index	--	13	13	12	11	11	12	11	12	12	12	12	12	12
State Project Water	%	0	0	0	100	100	100	100	55	57	52	100	53	100

ND = Not Detected
— = Not Reported

mg/L - milligrams per liter
µS/cm - microSiemen per centimeter
NTU - Nephelometric Turbidity Unit
CU - Color Units

Disinfection Byproducts

Metropolitan has monitored for byproducts from disinfection in treatment plant effluents since 1979. Table 4-5 summarizes the levels of disinfection byproducts total trihalomethanes, haloacetic acids and bromate in plant effluents during FY 2017/18. Compliance under the Stage 2 Disinfectants and Disinfection Byproducts Rule began in 2013, requiring drinking water systems to monitor distribution system locations with the highest TTHMs and HAAs in the distribution system and report results as locational running annual averages. The highest locational running annual averages were below the MCLs of 80 µg/L (micrograms per liter) for TTHMs and 60 µg/L for HAA5. Bromate was below 10 µg/L. Figures 4-3 and 4-4 summarize the long-term trends for TTHMs and HAA5, respectively. Locational running annual averages for both TTHMs and HAA5 are higher in the distribution system than running annual averages at treatment plant effluents because the required disinfectant residual in the distribution system can increase DBPs. However, overall DBP trends have declined since Metropolitan began using ozone, although changing source water conditions and operational changes can cause locational averages to periodically increase.

Figure 4-5 exhibits the plant influent levels of the DBP precursors, total organic carbon and bromide. The gap in bromide data for the Skinner plant is due to influent chlorination to control quagga mussels during fiscal years 2008/09 and 2009/10. Bromide levels naturally fluctuate every spring and summer due to mountain snowmelt in the Sierra Nevada and increased outflow from the Sacramento-San Joaquin Delta. Bromate, a byproduct of ozone treatment, was monitored after ozone came online at Mills in 2003, Jensen in 2005, Skinner in 2010, Diemer in 2015, and Weymouth in 2017. Figure 4-6 shows trends in bromate levels. Application of an ammonia-chlorine bromate control strategy began in October 2010 at the Mills plant. The strategy results in lower bromate levels and operating costs when demands justify its use.

Microbiological

Metropolitan complied with state and federal drinking water regulations by monitoring treatment plant influents for total coliforms and *Escherichia coli* (Table 4-6). Coliforms are bacteria that naturally occur in the environment while *E. coli*, a coliform that may indicate fecal contamination, is a factor used in measuring the quality of influent water. The different ranges observed at the plants—from below 100 to almost 10,000—may be influenced by the natural variability of raw water coliforms, storm events, changes in source water, or other factors.

Metropolitan also analyzed nearly 9,000 bacteriological compliance samples in the distribution system to monitor the microbial quality downstream of the water treatment plants. The monthly average of 0.1 percent total coliform-positive samples was well below the regulatory standard of 5.0 percent.

Water Quality staff perform routine testing for microbial pathogens.

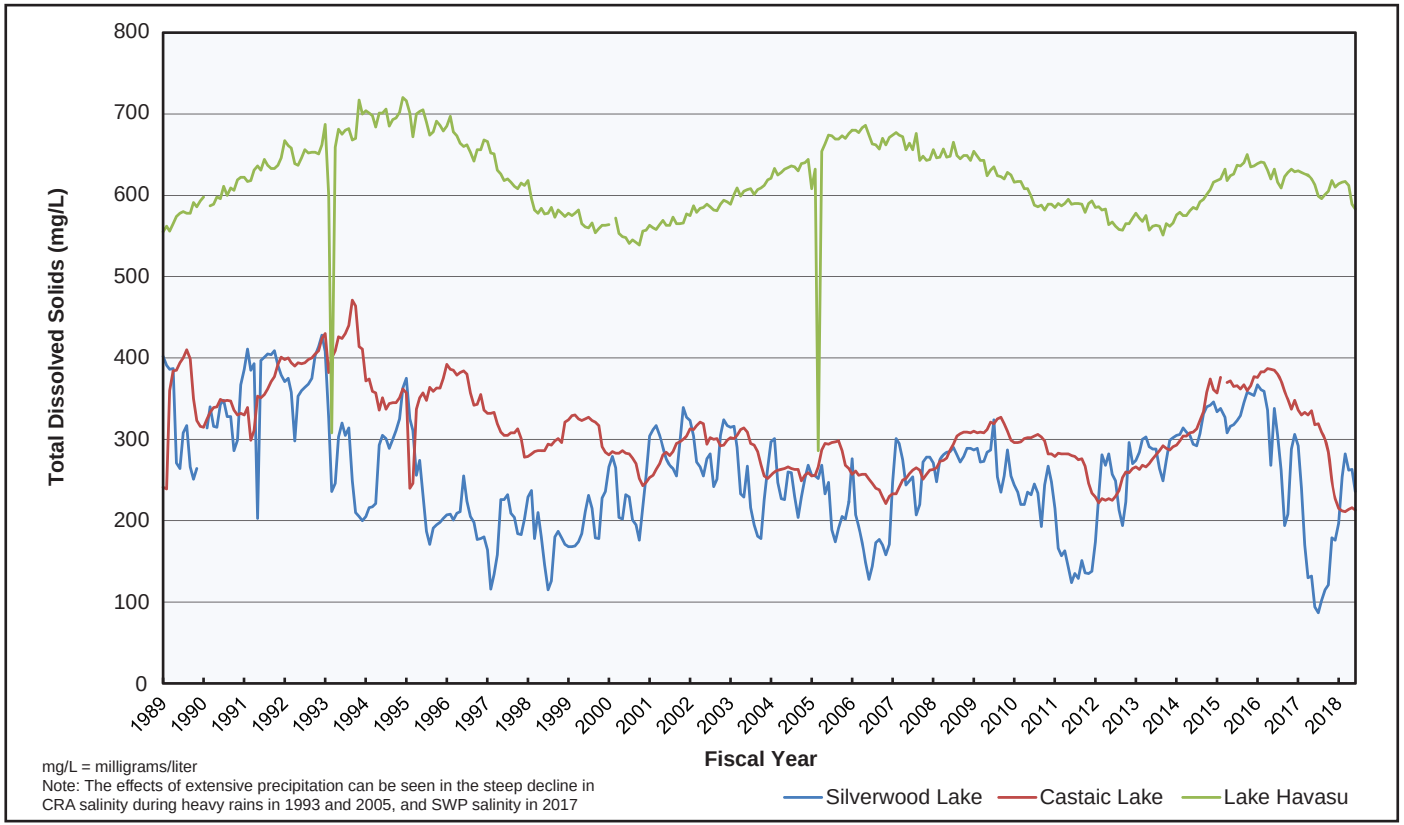


Figure 4-1. Total Dissolved Solids in East Branch State Water Project (Silverwood Lake), West Branch State Water Project (Castaic Lake), and Colorado River Aqueduct (Lake Havasu), 1989 to 2018

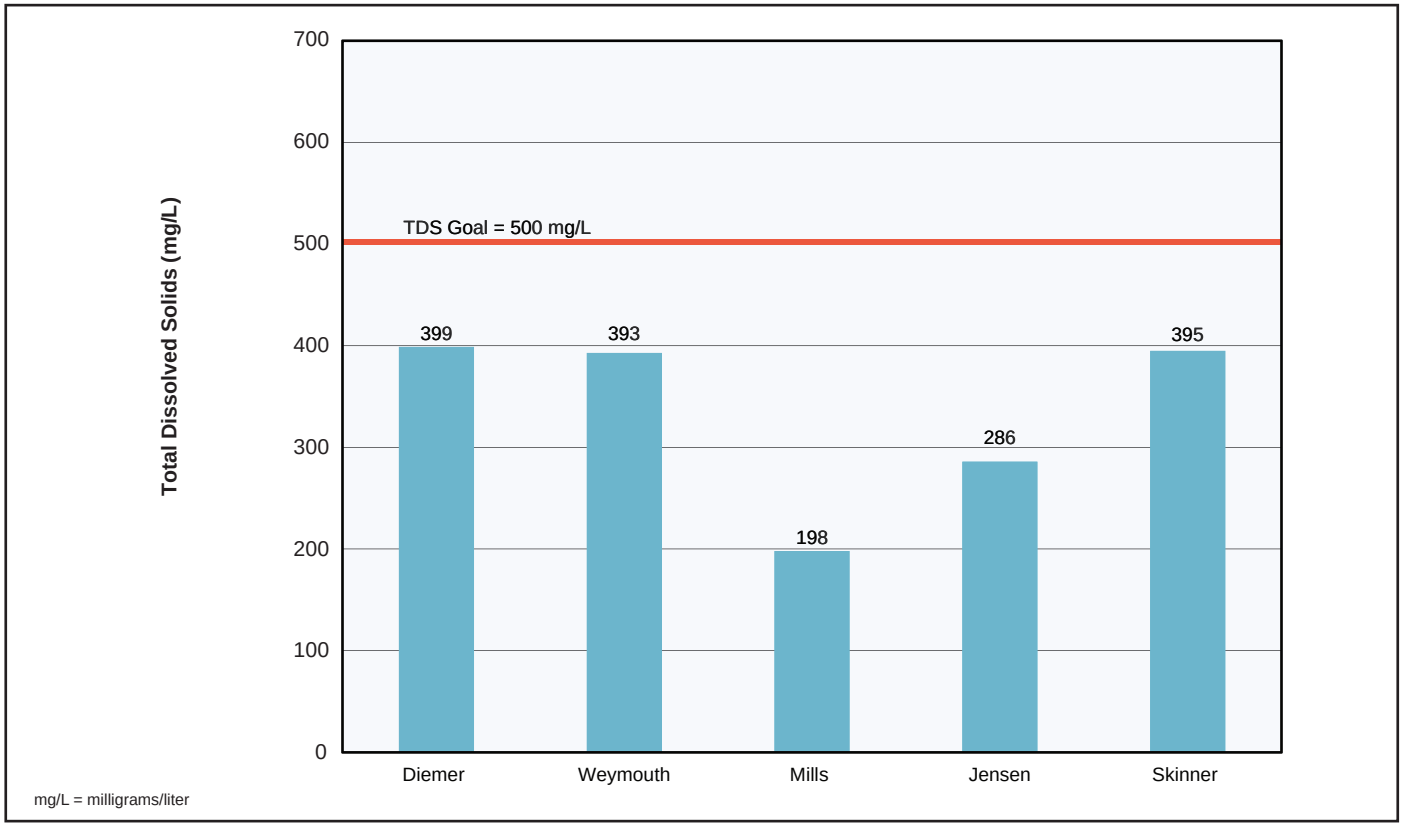


Figure 4-2. TDS (Total Dissolved Solids) in Plant Effluent, Annual Flow-Weighted Averages, FY 2017/18

TABLE 4-5
DISINFECTION BYPRODUCT CONCENTRATIONS
IN PLANT EFFLUENT

Fiscal Year 2017/18 (in µg/L)

	TTHMs MCL = 80		**HAA5** MCL = 60		**Bromate** MCL = 10	
Plant Effluent	**Range**	**Annual Average**	**Range**	**Annual Average**	**Range**	**Annual Average**
Diemer	12-20	16	1-4.1	2.5	ND–4.7	1.9
Jensen	11-17	14	2.7-6.2	4.4	ND-8.2	5.9
Mills	13-27	20	4-19	8.8	ND-10	1.8
Skinner	17-18	18	4-8.2	5.7	ND-11	3.6
Weymouth	12-31	24	4.8-15	8.6	ND-10	NA
Distribution System	**Range**	**LRAA**	**Range**	**LRAA**	**Range**	**LRAA**
	15-84	16-55	1.6–35	3.0–21	NA	NA

µg/L - micrograms per liter

TTHMs = total trihalomethanes

HAA5 = five regulated haloacetic acids

MCL - Maximum Contaminant Level

NA - Not analyzed

ND - Not detected

LRAA - Locational Running Annual Average

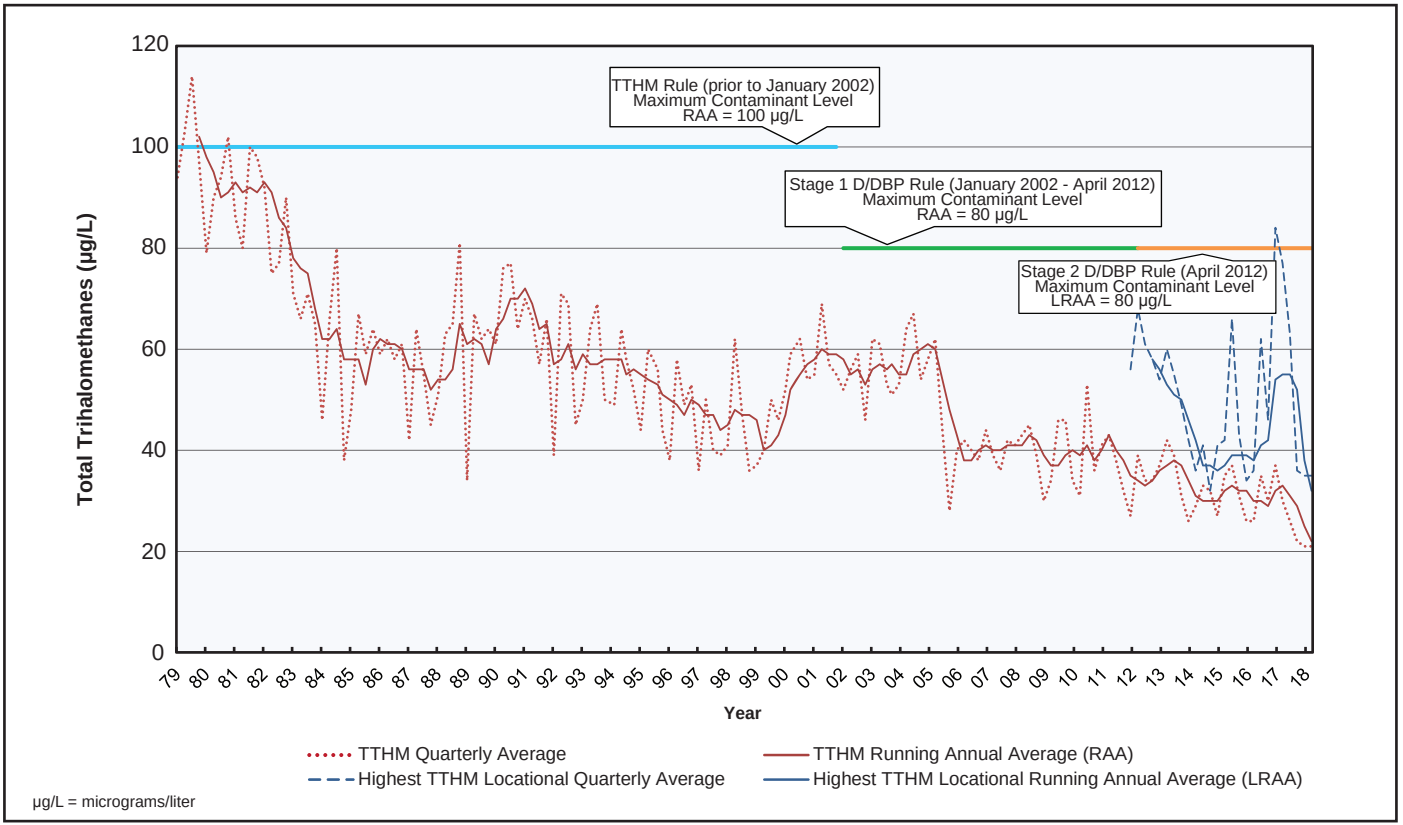


Figure 4-3. TTHM (Total Trihalomethane) Levels Throughout the Distribution System, Quarterly and Running Annual Averages 1979 to 2018

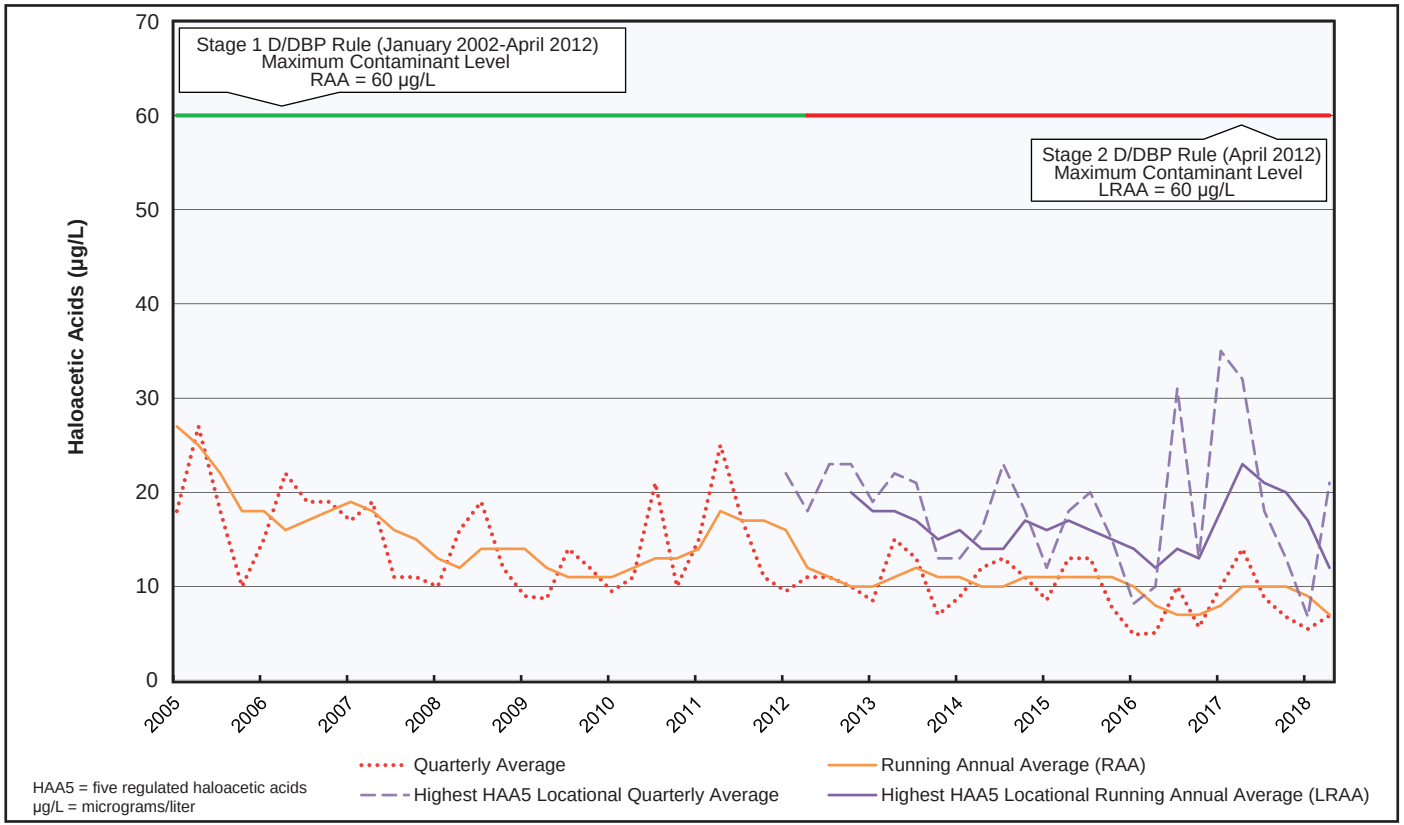


Figure 4-4. Haloacetic Acids Throughout the Distribution System, Quarterly and Running Annual Averages, 2005 to 2018

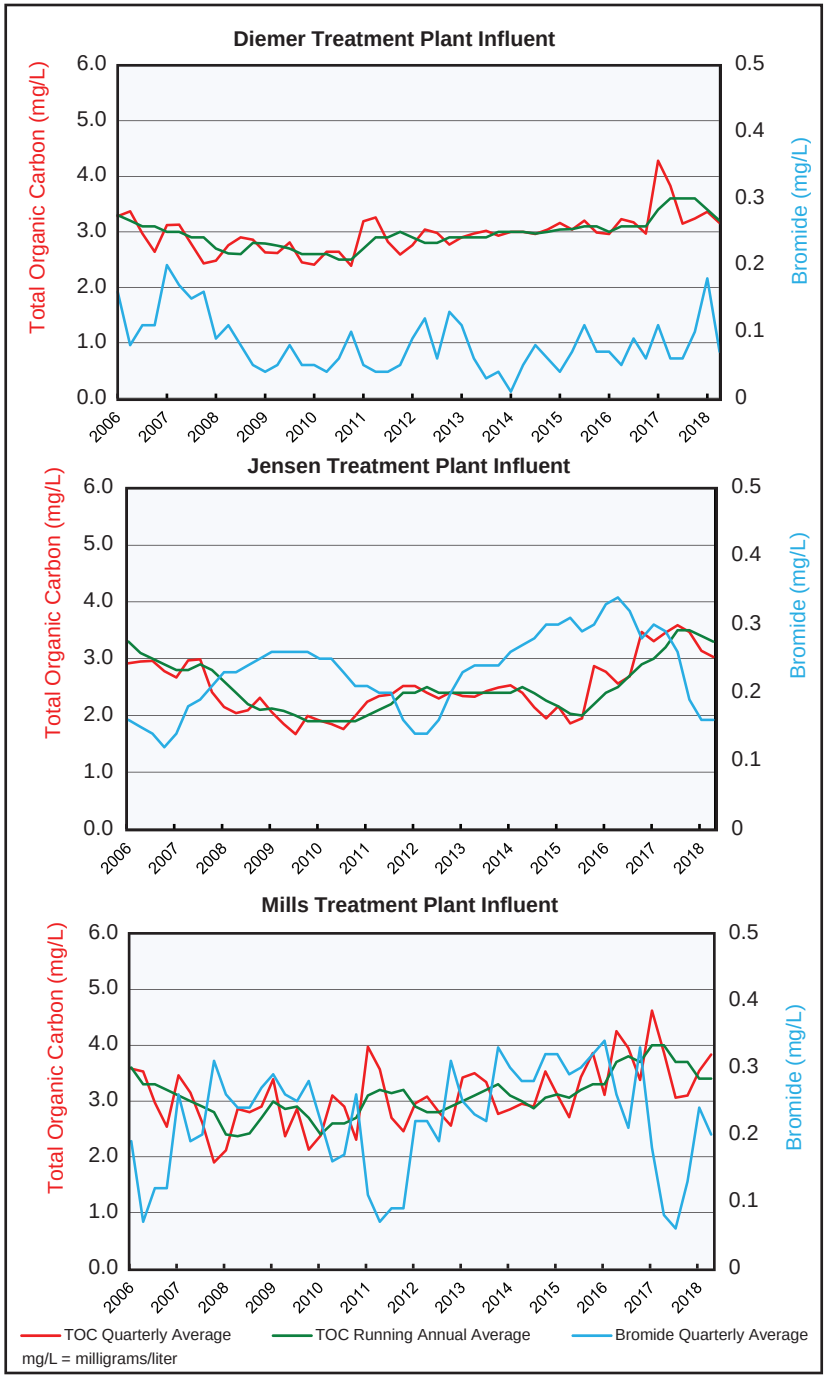


Figure 4-5. Total Organic Carbon and Bromide Levels in Treatment Plant Influent, 2006 to 2018

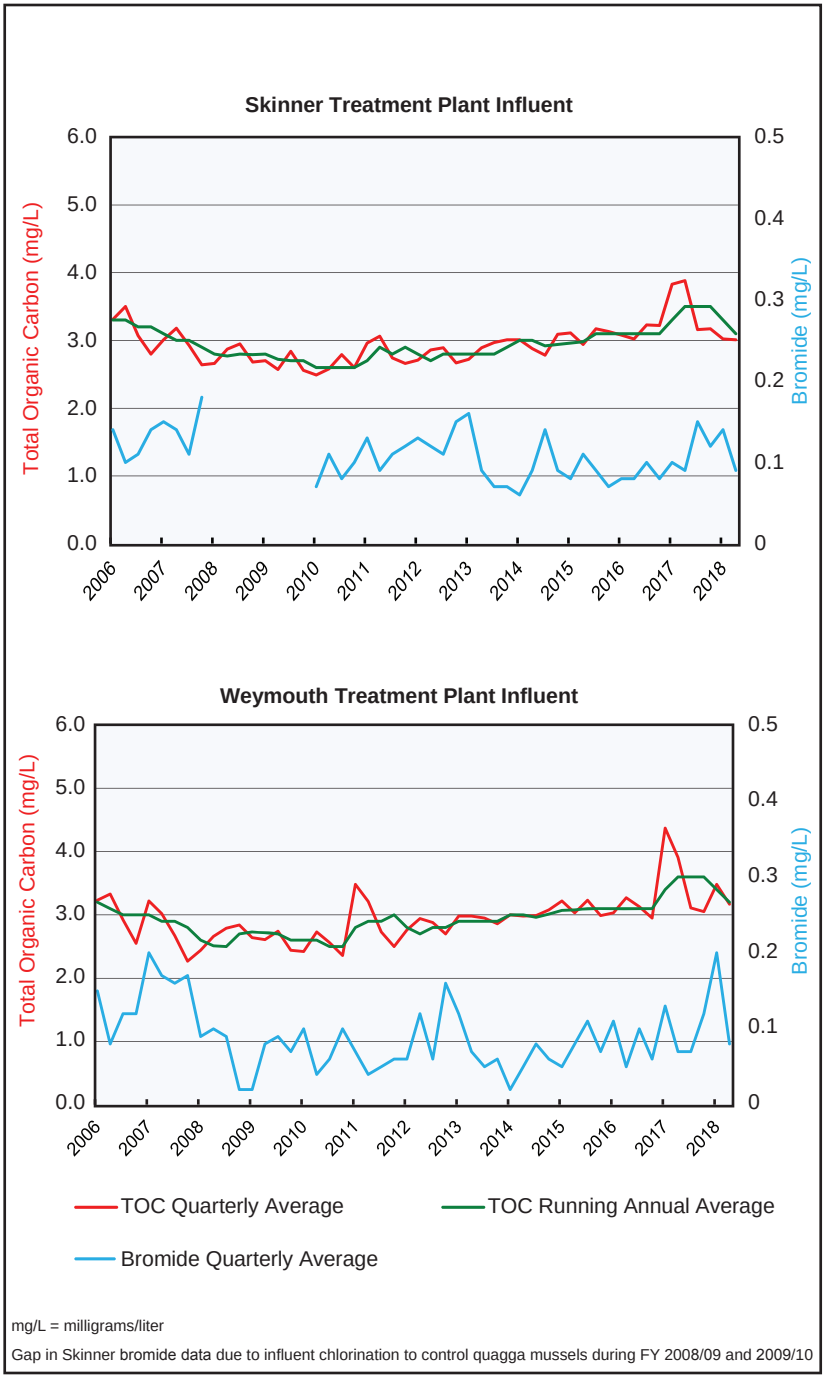


Figure 4-5 (continued). Total Organic Carbon and Bromide Levels in Treatment Plant Influent, 2006 to 2018

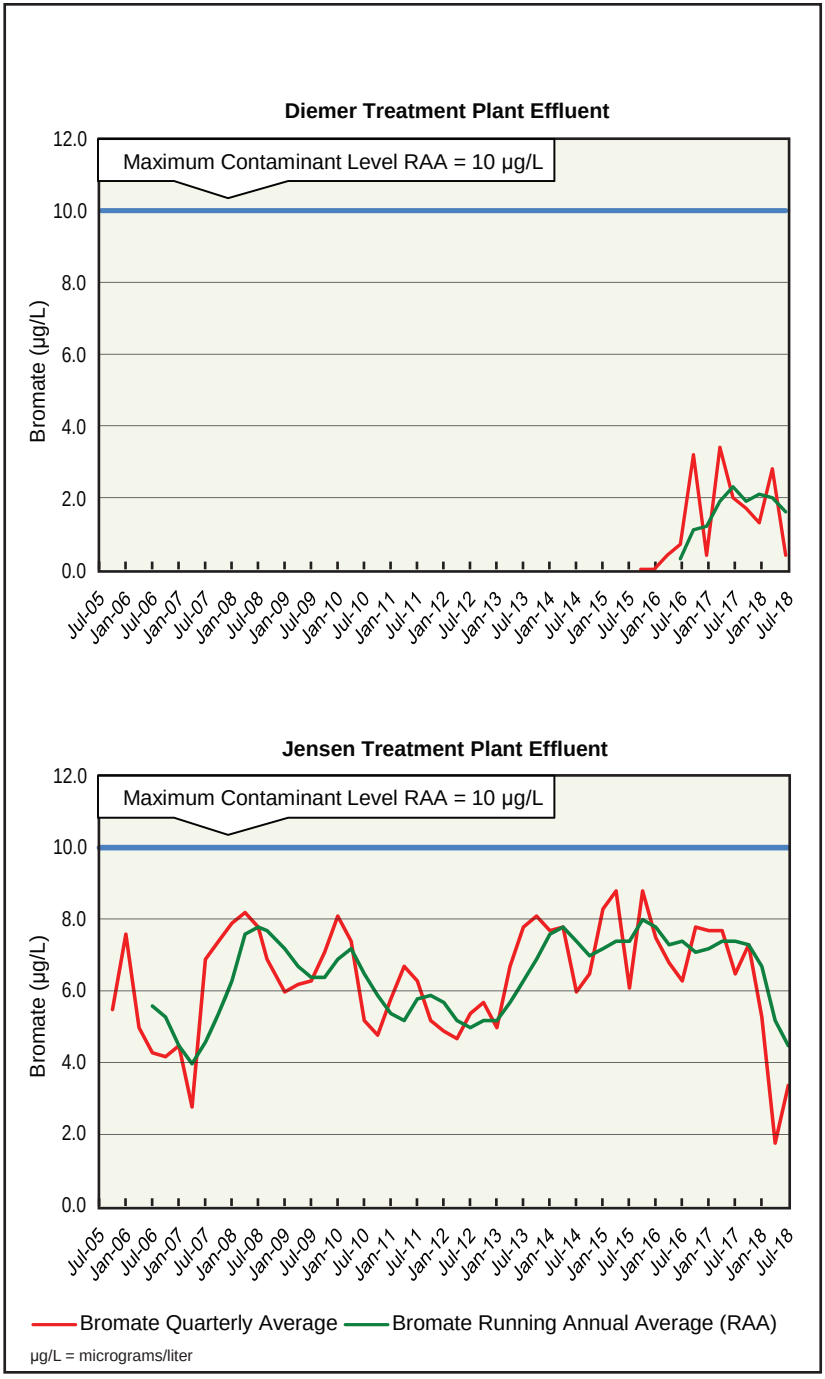


Figure 4-6. Bromate Levels in Treatment Plant Effluent, 2005 to 2018 (Ozone came online at Mills, Jensen, Skinner, Diemer and Weymouth in 2003, 2005, 2010, 2015 and 2017, respectively)

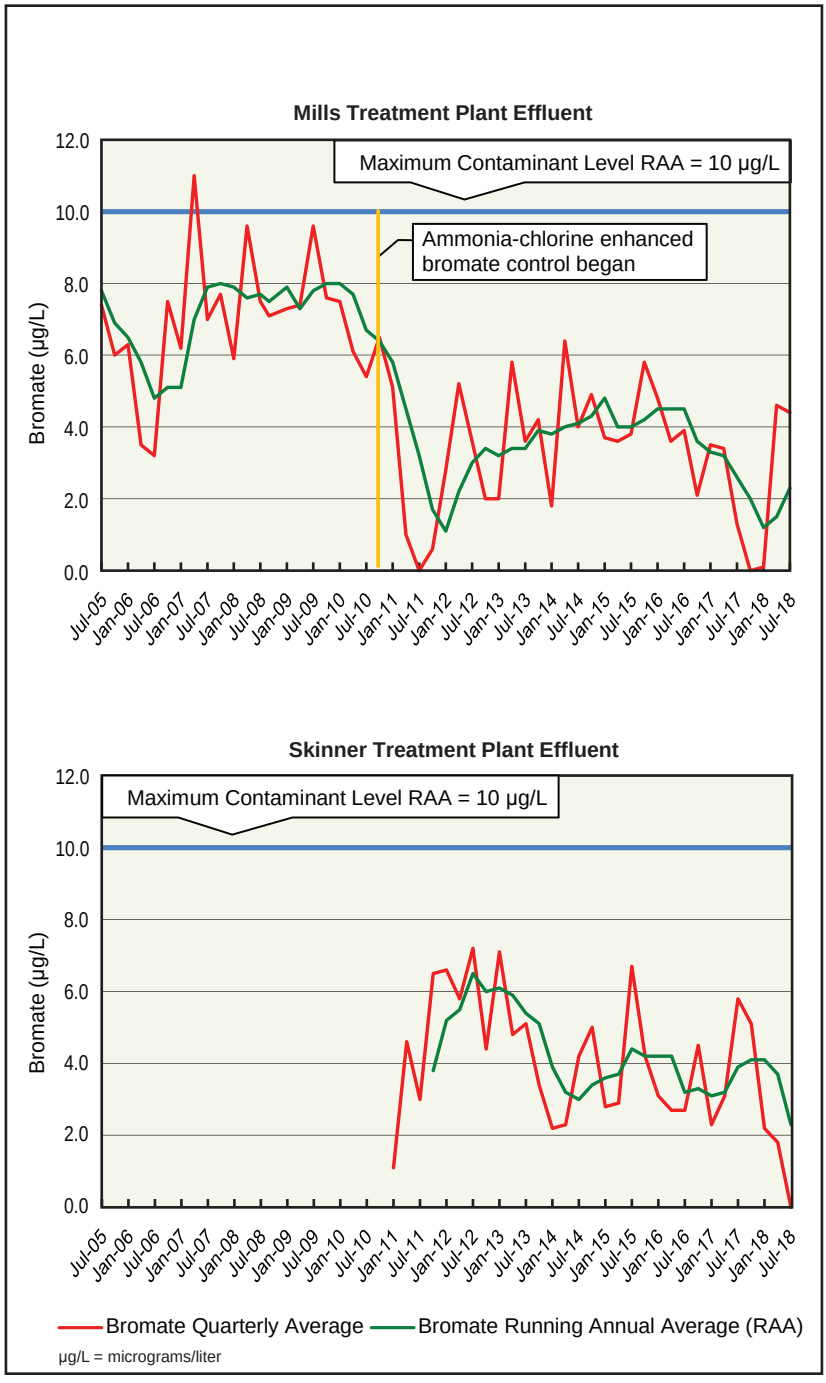


Figure 4-6 (continued). Bromate Levels in Treatment Plant Effluent, 2005 to 2018 (Ozone came online at Mills, Jensen, Skinner, Diemer and Weymouth in 2003, 2005, 2010, 2015 and 2017, respectively)

TABLE 4-6
RAW WATER COLIFORM RESULTS
Fiscal Year 2017/18

	Treatment Plant Influent[1]				
	Diemer	**Jensen**	**Mills**	**Skinner**	**Weymouth**
	(CFU/100 mL)				
Total Coliforms					
Range	43-4,000	77-1,900	150-3,600	210-9,200	47-3,800
Average[2]	1,000	470	1,000	2,300	1,000
E. coli					
Range	ND-23	ND-2	ND-6	1-15	ND-15
Average[2]	7	ND	2	4	5

Notes:
[1] Samples were collected weekly and analyzed by membrane filtration.
[2] Annual average of monthly averages.
CFU/100 mL = Colony-forming units per 100 milliliters
ND = Not Detected; method detection limit is 1 CFU/100 mL.

Metropolitan tests all five treatment plant influents and effluents monthly for the protozoan parasites *Cryptosporidium* and *Giardia*. During FY 2017/18, neither parasite was detected in treatment plant influent samples. A single *Giardia* cyst was detected in a plant effluent sample (1 cyst in 200 L of water) but there was no regulatory violation. In the last 18 years of monitoring, less than one percent of monthly plant influent samples tested positive for *Cryptosporidium* or *Giardia,* and only a single treated water sample has tested positive for either microbe.

System Management Monitoring

Cyanobacteria and Algae Control Program

Staff analyzed nearly 2,700 samples for the earthy/musty taste-and-odor compounds MIB (2-methylisoborneol) and geosmin to monitor and manage T&O events in Metropolitan's source water (Fig. 4-7). In addition to what is listed in the chart, analysis of almost 400 samples from various SWP locations was requested by the California Department of Water Resources, as part of Metropolitan's close collaboration with the state. DWR treated its lakes several times during the year. Metropolitan treated Lake Skinner twice during the year with a total of 12 tons of copper sulfate; no treatments were conducted on Lake Mathews or Diamond Valley Lake during the current reporting period (Figure 4-8).

Metropolitan received zero T&O complaints from its treated water customers, but three raw water Metropolitan member agencies received complaints relating to a persistent geosmin-producing cyanobacterial bloom in Silverwood Lake in June 2018.

Metropolitan analyzed over 400 samples for cyanotoxins during the past year. The frequency of cyanobacterial blooms that produce these naturally occurring cyanotoxins appears to be increasing both nationally and within Metropolitan's region, possibly due to climatic changes and increased nutrient runoff into source waters. USEPA published non-enforceable drinking water health advisories for cyanotoxins in 2015, and many states, including California, have developed voluntary guidelines for recreational water. Diamond Valley Lake was closed to all public access and recreation in June 2018 because high levels of cyanotoxins were detected throughout the lake. Closure was based on the state's voluntary guideline for managing cyanotoxins in recreational water. The quality of Metropolitan's treated water was not affected by this cyanotoxin event at DVL because water was not being withdrawn from the lake at that time. It was solely a recreational water issue primarily impacting water at the lake's surface. Metropolitan has an active monitoring program for cyanotoxins and continues to research and optimize control methods to ensure the safety of its treated water, including being awarded a grant from the Water Research Foundation to improve and standardize cyanotoxin detection methods.

Ozone, which is Metropolitan's primary disinfectant, is very effective at inactivating cyanotoxins in drinking water supplies.

Quagga Mussel Control Program

Staff continued to monitor invasive quagga mussels in the Colorado River Aqueduct and at various locations in the southern portion of the SWP. Chlorination of the CRA system for mussel control continued to be effective, demonstrated by the continued operation of the CRA with no reports of damaged infrastructure or out-of-service equipment. Staff also analyzed samples for quagga mussel veligers (microscopic mussel larvae) as part of their work in support of shutdowns, raw water discharges, and maintenance. Metropolitan analyzed over 320 samples for veligers by microscopy, with about 200 analyzed using molecular methods developed at the Water Quality

Laboratory. A few adult quagga mussels were discovered in the southern SWP in late 2016 and suspect but unconfirmed veligers were detected in the East Branch SWP in early 2017. However, there are currently no restrictions on Metropolitan's use of water from either the west or east branches of the SWP.

N-Nitrosodimethylamine

Since 1999, Metropolitan has monitored its distribution system for NDMA (N-nitrosodimethylamine), a byproduct of the chloramine disinfection process. Table 4-7 shows NDMA levels in the distribution system for FY 2017/18. Concentrations were all below the notification level of 10 nanograms per liter (ng/L) established in 2002. Seven other nitrosamines were analyzed but not detected at any of the monitoring locations.

TABLE 4-7
N-NITROSODIMETHYLAMINE LEVELS
IN THE DISTRIBUTION SYSTEM
Fiscal Year 2017/18 [in nanograms per liter (ng/L) or parts per trillion]

Sample Location[1]	Range[2]
Diemer Plant	NF
Jensen Plant	2
Mills Plant	ND
Skinner Plant	3
Weymouth Plant	ND
Central Pool Sites[3]	ND-3

ND - Not Detected; NDMA reporting level is 2 ng/L.
NF – No flow on the day of collection.
[1] Plant locations are distribution system sites associated with each treatment plant.
[2] SWRCB-DDW notification level is 10 ng/L
[3] Sample locations in the distribution system that can receive water from multiple plants

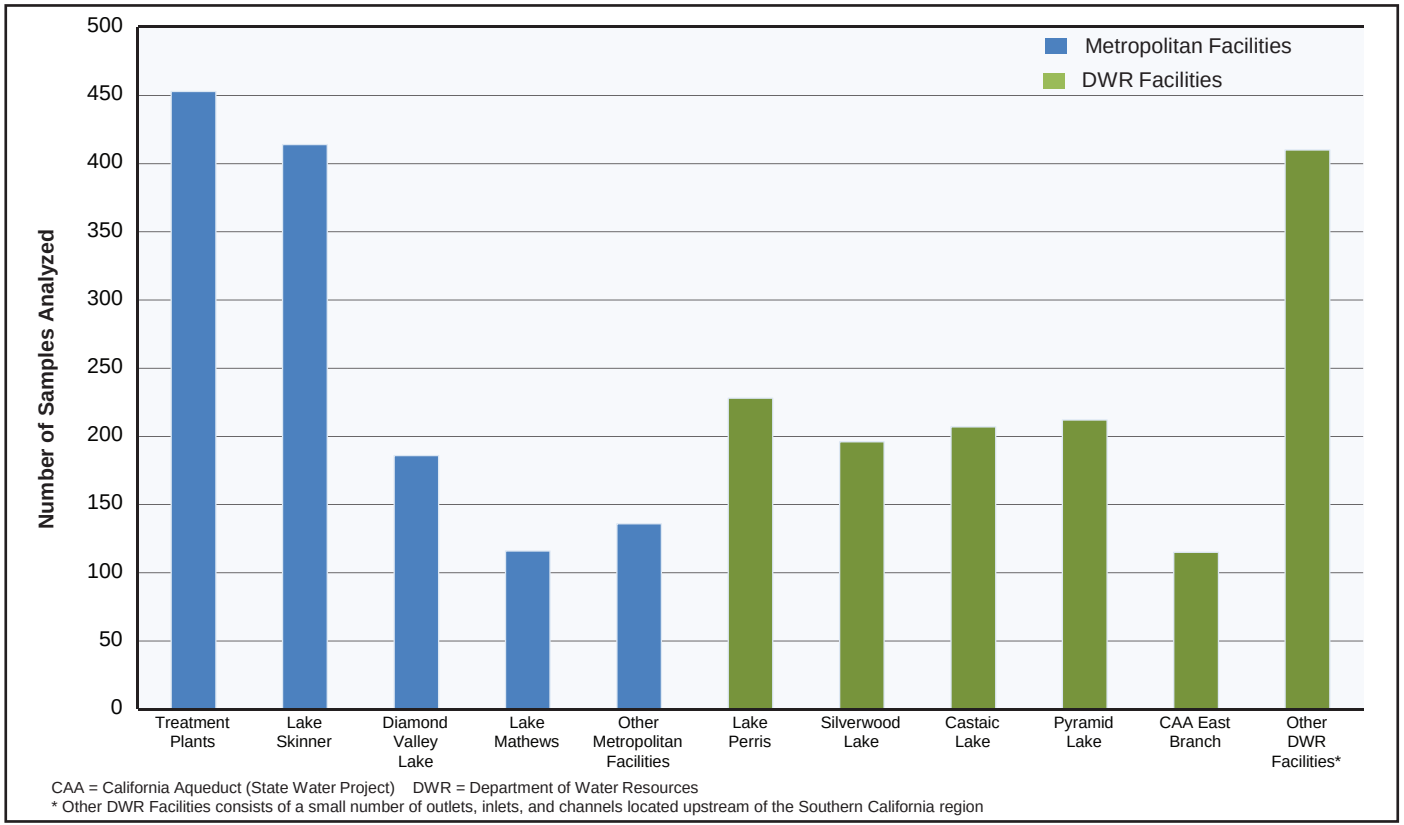


Figure 4-7. Number of Samples Analyzed for the Taste-and-Odor Compounds Geosmin and MIB (2-Methylisoborneol) in Source and Treated Water, FY 2017/18

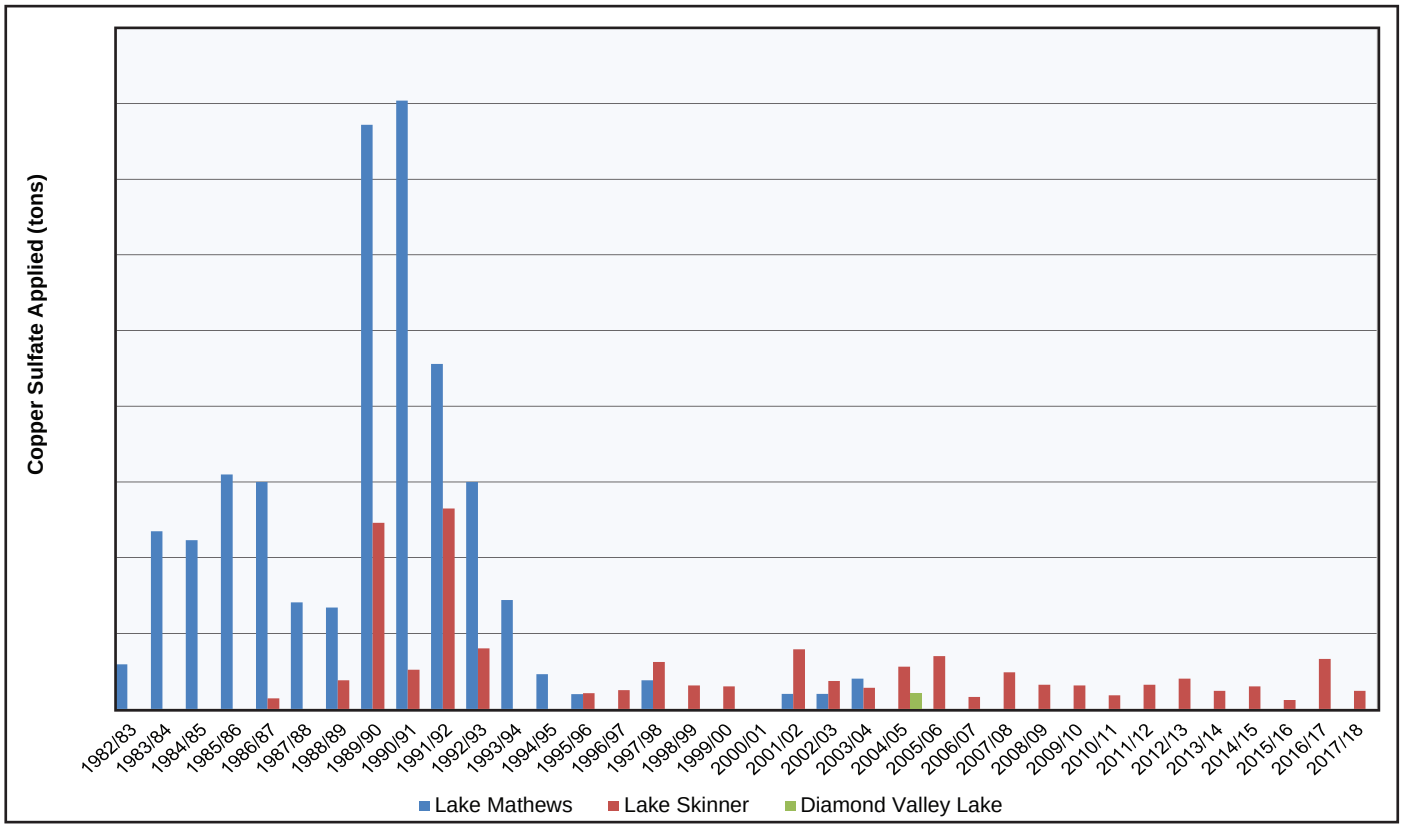


Figure 4-8. Copper Sulfate Usage in Metropolitan's Reservoirs, FY 1982/83 to 2017/18

Source Water Protection

Watershed Management and Protection

Metropolitan continued its oversight and coordination on water quality issues with key Colorado River stakeholders through active participation in the Lower Colorado River Water Quality Partnership and Clean Colorado River Sustainability Coalition. Staff also collaborated with DWR and the State Water Contractors on Delta and SWP water quality monitoring and forecasting programs.

Salinity Control

In June 2018, Metropolitan launched an effort with the U.S. Bureau of Reclamation and the Southern California Salinity Coalition to further enhance the modeling of economic impacts from salinity. This effort is expected to be completed in 2020. It is part of a larger effort to update the 1999 Salinity Management Study. Metropolitan continued to engage in salinity control efforts through the Colorado River Basin Salinity Control Forum to mitigate salt loading into the Colorado River.

Uranium Mill Tailings Cleanup

Metropolitan and other stakeholders successfully advocated for increased federal funding in the federal FY 2018 budget to expedite removal of the uranium mill tailings pile along the banks of the Colorado River near Moab, Utah. Since 2009, the U.S. Department of Energy has shipped over 9 million tons of mill tailings via rail to an engineered disposal site about 30 miles northwest of Moab. Increased funding will help meet DOE's targeted completion date of 2025. Metropolitan continued to monitor remedial efforts.

Chromium 6 Remediation

Metropolitan continued working with stakeholders to support Pacific Gas & Electric's chromium 6 groundwater remediation efforts along the Colorado River near Topock, Arizona. Metropolitan reviewed and provided comments on the groundwater model used to measure effectiveness of the final remedy and the Final Subsequent Environmental Impact Report, which was certified in April 2018.

Construction of the project is expected to begin in October 2018 with expected completion in 2023, followed by operation of the treatment system for an estimated 30 years.

Interim measures, consisting of groundwater extraction and treatment, have been in place since 2004 to prevent chromium 6 migration to the Colorado River. Levels of chromium 6 in the river typically remain at non-detect levels (less than three parts per billion).

Perchlorate Remediation

Perchlorate loading into Las Vegas Wash has dropped more than 90 percent since 1998 as a result of remediation at the former Tronox, Inc. site, now owned by the Nevada Environmental Response Trust (Figure 4-9). Levels have consistently remained below 2 ppb at Metropolitan's Lake Havasu intake (Figure 4-10).

The next project milestone will be completion of feasibility studies in 2022 followed by remedial design. Metropolitan continued to monitor the current groundwater remediation system and the development of the long-term treatment remedy for the perchlorate plume. Staff monitored site operations including disbursement of funds from a $1.1 billion settlement between Tronox and its predecessors for site cleanup. The remedial plan has a goal to reduce perchlorate loading into Las Vegas Wash to meet the interim federal goal of 15 ppb. This would help ensure compliance with any potential reduction in California's perchlorate MCL of 6 ppb, in light of a 1 ppb public health goal adopted in February 2015.

Technology Assessment

Treatment Process Optimization and Development

Staff held an October 2017 corrosion control workshop with drinking water treatment and corrosion experts to discuss strategies for treating low alkalinity source water, as experienced in early 2017 with SWP snowmelt. A final report was completed in March 2018.

Staff studied other source water challenges, such as the potential impacts of cyanobacterial bloom events. Staff evaluated PACI (polyaluminum chloride) as an alternative coagulant to meet TOC

removal and turbidity reduction goals and studied cyanotoxin reduction using ozone. The PACI and ozone study findings were presented at American Water Works Association conferences in November 2017 and June 2018. In response to the new drinking water standard for TCP finalized in December 2017, staff examined the efficacy of ozone in removing TCP. Staff also completed a review of the aging domestic water systems at the CRA pumping plants, which are in their final design phase. Staff held workshops in January 2018 to inform Desert staff on proposed replacement treatment systems.

Staff updated the Operations, Maintenance and Monitoring Plan for the Weymouth plant to include ozone systems, and submitted the plan to DDW in September 2017.

Potable Reuse

Metropolitan, in partnership with the Sanitation Districts of Los Angeles County, continued its efforts to develop a Regional Recycled Water Program. During the past year, staff supported the conceptual planning studies and prepared for an upcoming demonstration project at the Regional Recycled Water Advanced Purification Center in Carson. The center will be used to collect data to facilitate regulatory acceptance of the proposed treatment process. Construction of the center is scheduled to be completed by the end of 2018, with testing to begin in early 2019. Staff partnered with consultants to prepare a testing and monitoring plan for the demonstration project. Staff also commissioned an independent scientific advisory panel to provide objective review of the scientific, technical, and regulatory issues associated with the project. Finally, staff continued its engagement with Division of Drinking Water and Regional Water Quality Control Boards. Metropolitan will be seeking regulatory approval of the testing and monitoring plan by the end of 2018.

Funded Projects

Metropolitan managed two externally-funded grants for water quality projects in FY 2017/18. A National Science Foundation grant supports the study of engineering solutions for disinfection byproducts in drinking water, while a Water Research Foundation-funded project will refine analytical techniques for reliably and accurately detecting cyanotoxins (Table 4-8).

Service to Member Agencies and Drinking Water Industry

Staff conducted a member agency workshop on chloramine optimization and nitrification control in the distribution system. In addition, updates were provided to member agencies on cyanobacterial issues in Metropolitan's reservoirs, the advantages and challenges of temporarily switching to free chlorine as the residual disinfectant, and monitoring requirements for retail agencies under the fourth Unregulated Contaminant Monitoring Rule. Staff also provided an informational update on *Legionella* and its regulation through the Surface Water Treatment Rule, in light of recent Legionnaire's outbreaks, including a local Anaheim outbreak in September 2017.

Metropolitan continued its involvement with the industry's principal advocates, most notably the Association of California Water Agencies, American Water Works Association, Association of Metropolitan Water Agencies, and the California Municipal Utilities Association. These organizations provided regulatory and legislative input on behalf of Metropolitan and other member agencies on federal, state and local drinking water issues.

TABLE 4-8
ACTIVE WATER QUALITY GRANTS[1]
Fiscal Year 2017/18

Prime Funding Agency	Title of Grant Project	Total Project Budget[2]	Amount of Award to MWD[3]
National Science Foundation	Drinking Water Safety and Sustainability: Identifying Key Chemical Drivers of Toxicity for Long-Term Solutions in the United States	$ 330,000	$ 50,000
Water Research Foundation	Refinement and Standardization of Cyanotoxin Analytical Techniques for Drinking Water	670,753	416,000
	TOTALS	**$1,000,753**	**$466,000**

Notes:
[1] Externally-funded grant projects managed by Water Quality's principal investigators during the fiscal year.
[2] Reimbursable dollars plus total cost-share and in-kind commitments from all participating agencies; includes payments to sub awardees and/or subcontractors as applicable.
[3] Amount managed by Metropolitan; award amounts may occasionally change from prior years due to realigned budgets.

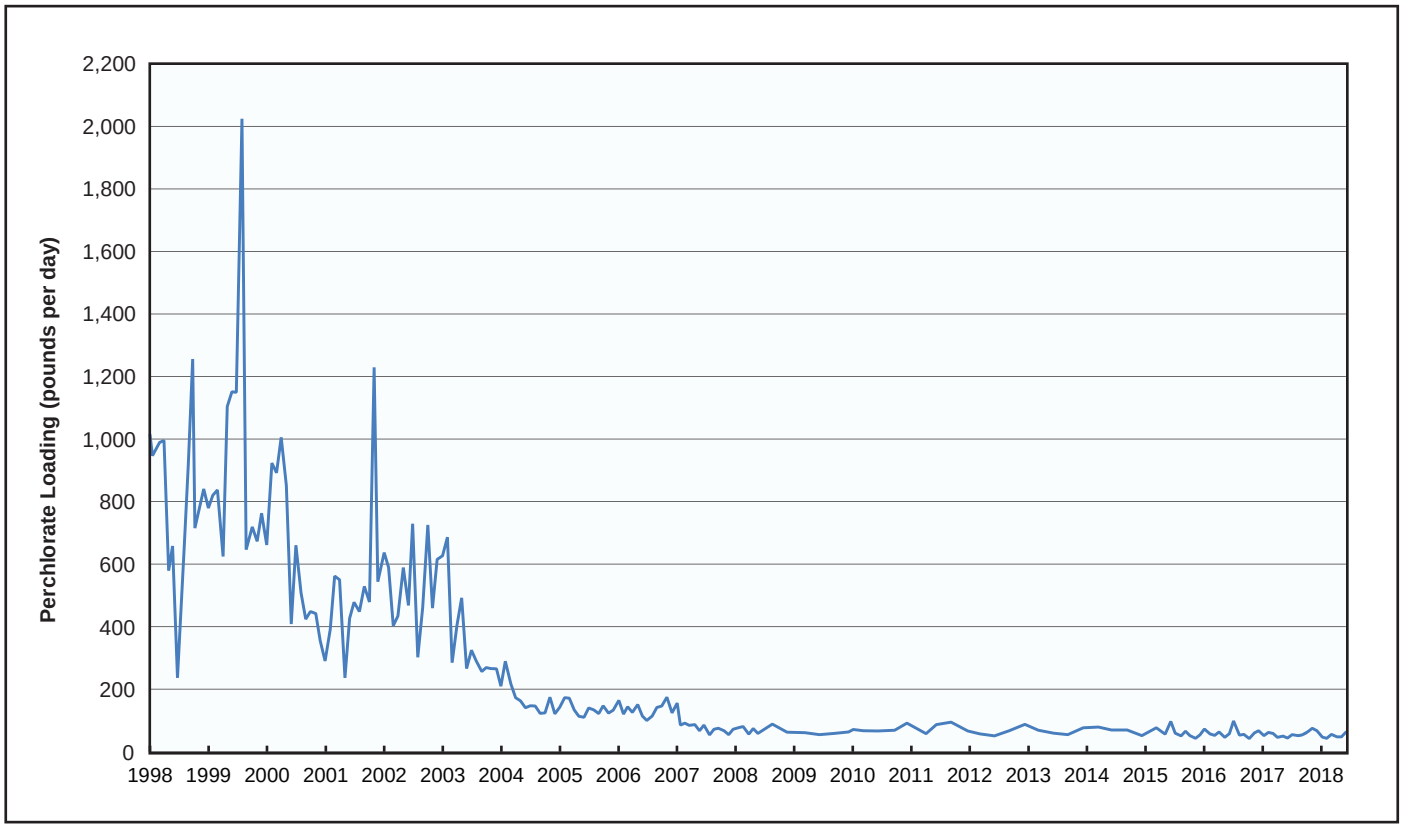


Figure 4-9. Perchlorate Loading in Las Vegas Wash, half a mile upstream of Lake Mead, 1998 to 2018

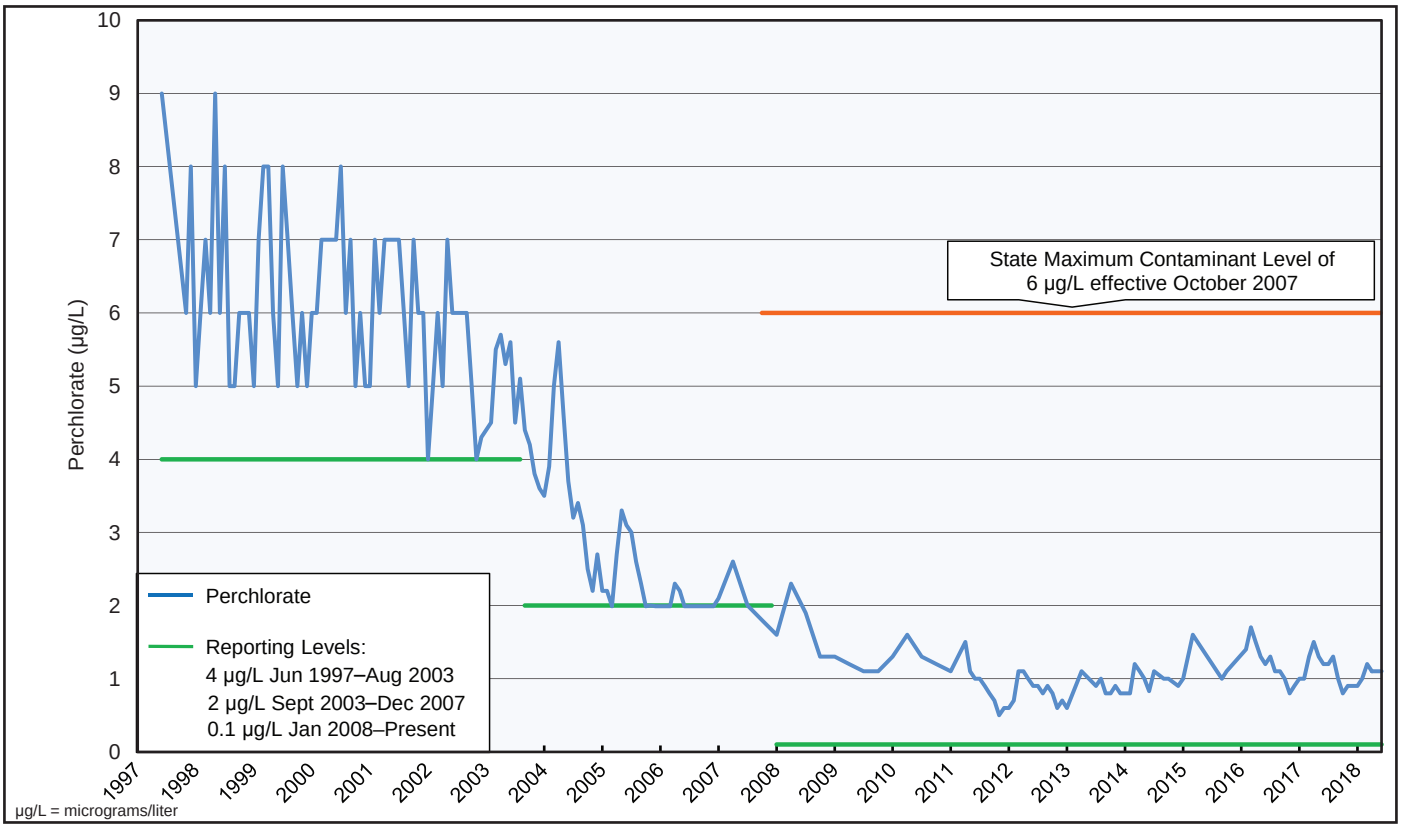


Figure 4-10. Perchlorate Levels at Lake Havasu, 1997 to 2018

Conveyance, Distribution and Support

Conveyance and Distribution

Conveyance and Distribution staff performs preventive and corrective maintenance activities throughout the year with the objective of ensuring reliable deliveries to member agencies. In addition, staff plan and perform shutdowns to complete pipeline and facility inspections, perform repairs on pipelines or equipment, and support capital investment plan projects.

Staff successfully completed shutdowns on the CRA and pipelines throughout Metropolitan's service area during FY 2017/18. Using visual inspections and eddy-current inspection technology, staff inspected approximately 18 miles of pipeline to assess the condition of steel mortar-lined and prestressed concrete cylinder pipe. As part of Metropolitan's PCCP Rehabilitation Program, the first major construction contract was awarded to line about 23,100 feet of PCCP within the western portion of the Second Lower Feeder. Completed over a seven-month period, the repairs involved the insertion of steel reinforcement sleeves. Operational flexibility within the distribution system allowed this work to be completed without affecting member agency deliveries.

Throughout FY 2017/18, WSO maintained an eight-pump flow capability on the CRA. To ensure consistent operation and reliability, refurbishment work took place during a 24-day shutdown of the CRA. Work performed included survey and engineering inspections of siphons; seismic upgrades at pumping plant switch houses; sand trap improvements to prevent sediment from flowing into the pump units; chemical storage tank inspections at Copper Basin; installation of cooling system isolation valves; and repairs and testing of high-voltage transformers at Iron Mountain and Hinds pumping plants. Tunnel cleaning, canal scraping and debris removal also were performed to maintain the hydraulic capacity of the CRA.

The Coatings Program protects Metropolitan's physical assets from corrosion and harsh environments to maximize the useful life of pumps, valves, meters, pipes, buildings and delivery lines. When not focusing on shutdown activities, staff coated equipment and structures

at pumping plants, treatment plants, pressure control structures, including over 200 valves. Structures that are particularly vulnerable to water damage, such as vaults located below road grade, were sealed to prevent water intrusion that could accelerate corrosion.

During FY 2017/18, crews performed nearly 256,300 hours of maintenance on conveyance and distribution infrastructure, including shutdowns. See Table 1-5 for a full list of shutdowns that occurred during the year.

Operations Support Services

Operations Support Services provides a wide range of support services to Metropolitan's core operational functions and, on a reimbursable contract basis, to DWR, member agencies and other public entities. Services include maintenance engineering, manufacturing, rehabilitation, new construction and emergency response.

Manufacturing Services

Manufacturing services provided by the La Verne shops include fabrication, machining and coating services, valve and pump testing and repairs, equipment refurbishment, diving inspections, floating reservoir cover maintenance, as well as crane maintenance and annual certification.

The La Verne shops refurbished a wide variety of critical equipment for Metropolitan's conveyance and distribution system, including the hydroelectric plants. The shops manufactured parts for the LA-35 service connection slide gate that controls water flow of about 500 cubic feet per second. The shops also refurbished a throttling gate for the Corona Tower that regulates flow on the Lower Feeder.

Using a reimbursable agreement, the La Verne shops provided support for DWR's SWP facilities. The shops manufactured a 78-inch diameter thimble for DWR to be installed at the Castaic Outlet Valve Structure. The shops also manufactured 12 stop log slot covers for Hyatt Pumping Plant to replace covers that were corroded and warped. Work included fabrication, coating, and installation of new seals.

Construction Services

Construction Services staff and equipment are deployed throughout Metropolitan's service area to perform general construction, install and transport large equipment, maintain pipeline easements and access roads, support shutdown activities, and respond to emergency construction needs.

Staff completed installation of telecommunications and control automation equipment as part of the start-up for the newly constructed chlorine unloading facility. This facility is used to transfer chlorine delivered in a rail car to shipping trucks for delivery to various water treatment plants. Staff also installed new sanitation facilities and monument entrance signs at the Diamond Valley Lake recreation area. The new sanitation facility replaces temporary facilities and further improves public facilities at the lake. Staff completed repair of service connection Santa Ana SA-02, damaged when a vehicle struck the above-ground equipment. In addition, staff relocated service connection Central Basin CenB-29 electrical and control cabinets as a result of a street improvement project.

Staff completed seismic upgrades to the Carbon Creek Pressure Control Structure as part of the overall facility seismic upgrade project. Staff repaired about 3,600 square feet of the Casa Loma Canal due to panel shifting and cracking. During the outage, staff removed damaged sections, re-compacted subgrade soil to ensure a solid foundation, and installed new concrete panels restoring canal integrity.

Staff replaced eight 24-inch diameter isolation valves and two 24-inch globe valves within the Fairplex and Walnut pressure control structures on the Orange County Feeder. These new valves replaced leaking valves and restored system isolation capabilities.

Power Equipment and Reliability

Power Equipment and Reliability staff evaluate maintenance and reliability engineering issues, and maintain hydroelectric power plants, high voltage systems, and HVAC (heating, ventilation, and air conditioning) systems throughout Metropolitan's facilities. Staff also perform technical investigations related to water billing meters.

Member agencies have been more frequently requesting installation of customized flow meters for greater, more economical operating flexibility. Staff hosted workshops with several member agencies to discuss testing and validation issues. This resulted in April 2018 board approval of major changes to Metropolitan's administrative code.

Metropolitan certified its compliance for calendar year 2017 with all national electric reliability standards for the CRA 230 kilovolt (kV) transmission system, as well as with the delegated requirements from AEPCO (Arizona Electric Power Cooperative), which is registered as the system's transmission operator. Metropolitan must comply with applicable reliability standards due to its ownership of the CRA transmission system. In January 2018, Metropolitan's board appropriated $1.7 million and authorized staff to rehabilitate the 4.1 MW turbine-generator at Valley View hydroelectric plant. The plant had been in continuous service since commissioning in 1986 and had recently been removed from service due to wear on some of the components. Refurbishment work is slated for completion in fall 2018. This year, staff also completed electrical and mechanical testing and maintenance at several other hydroelectric plants. In addition, staff designed and constructed a temporary voltage regulator for Etiwanda hydroelectric plant that allowed the plant to operate and generate over $4 million in revenue. This allowed staff to plan a more permanent repair at a later time when there is less impact to operations.

Staff continued to implement improvements to enhance infrastructure reliability of Metropolitan facilities. Staff completed the initial roll-out of condition-based maintenance practices at all facilities. This initial roll-out focused on over 320 large pumps that are now proactively monitored using vibration and oil analysis. This is a multi-year effort that will incorporate other types of equipment such as emergency generators and motors.

In addition, staff continued to provide member agency support on several service connections. LADWP and Metropolitan completed construction of service connection LA-29. Staff completed the design, construction, third-party testing, and commissioning of the new acoustic meter at this service connection to meet LADWP's accelerated schedule. Staff also provided technical support for several

service connections including Burbank B-06 and LADWP LA-35 flow meter installation.

Fleet Services

Staff maintained more than 1,420 fleet assets and about 580 facility assets. In FY 2017/18, staff completed more than 5,880 preventive maintenance work orders and 2,595 corrective work orders on Metropolitan equipment and strategically replaced aging vehicles and equipment while meeting all applicable air quality regulations.

Additionally, staff obtained approval from the South Coast Air Quality Management District for replacement of a 17-year-old diesel dump truck and a 26-year-old diesel stake-bed truck with the cleanest diesel technology available. These new engines are rated at a reduction of 99 percent NOx (nitrogen oxides) and 96 percent PM (particulate matter) over the engines they replaced.

Fleet Services staff also received training on how to comply with California Air Resources Board regulations to reduce emissions from engines using large, spark-ignited diesel engines. New requirements involve database management, online-reporting and labeling each piece of equipment. Fleet met all of the required timelines and successfully received a certificate of compliance for 2017 from CARB.

Security and Emergency Management

Protecting critical infrastructure and safeguarding people and assets are primary Metropolitan objectives. Security professionals provide 24/7 security monitoring and response working with a contracted guard force and a physical security system that protects 72 facilities with more than 1,000 monitoring points, which include card readers, door alarms, motion detectors, and closed-circuit cameras.

Staff executed a number of immediate security enhancements: Card reader access control for elevators at the Los Angeles headquarters building at Union Station, and a two-locked-door

minimum at all control rooms at the Eagle Rock facility and the treatment plants.

Staff also implemented visitor security screening at the headquarters building in December 2017. The screening utilizes an x-ray machine for baggage screening and a walk-through metal detector. Staff provided updated Personal Security Awareness training to all new hires and to over 1,600 employees and to the board, familiarizing them with security protocols and mitigation of manmade disasters in the workplace.

In March 2018, a cybersecurity workgroup comprised of staff across Metropolitan began sharing information about cybersecurity protection, incident reviews, vulnerability and threat assessments, project and initiative updates, and board-related security items.

Metropolitan maintains a maintenance agreement for the physical security system. Staff completed a contract to upgrade the electronic physical security system. The upgrade features encrypted access card readers, computer servers, network controllers, and the software for access control and video surveillance. In addition, personnel photos were taken for new encryption access control badges.

Staff has worked to develop and maintain partnerships with local, state, and federal law enforcement. Partnerships provide actionable intelligence and tools that enable improved responses to incidents and emergencies. In February 2018, staff hosted a visit from the FBI and the Department of Homeland Security to foster this network and partnership.

Metropolitan performed over 50 emergency exercises this year, including a functional exercise in October 2017 in which over 100 Metropolitan staff participated in a regional emergency exercise to practice how various utility agencies would coordinate their response following a large earthquake. Five Metropolitan member agencies participated: LADWP, Long Beach Water, city of Torrance, city of Santa Monica, and West Basin Municipal Water District. Metropolitan's exercise was part of a larger exercise involving regional utilities, along with state, county and federal emergency agencies.

In early December 2017, Southern California experienced one of the strongest Santa Ana wind events of the year, which led to numerous brushfires in the region. Staff monitored the fires and kept management advised of changing conditions. These fires did not significantly impact Metropolitan operations, but caused some power outages and other related problems, which staff quickly addressed.

Metropolitan staff continues its joint planning efforts with staff from LADWP and the DWR to plan a coordinated response to a catastrophic earthquake in the Southern California area. These three agencies are part of the Seismic Resilience Water Supply Task Force, and are developing plans, agreements and exercises jointly to ensure that the agencies are ready to respond as a team when needed.

Energy Management

Hydroelectric Power Recovery Plant Operations

Metropolitan has 16 small-conduit hydroelectric power recovery plants that generated a total of 322 million kilowatt-hours for FY 2017/18 (Table 4-9), and earned revenues of $16.3 million. This was about 80 million kilowatt-hours more generation and $1.1 million more revenue compared to FY 2016/17. The boost in energy production was mostly due to increased generation at the Etiwanda hydroelectric power plant and the Yorba Linda power plant coming back online after extensive repairs. Generation from all 16 power plants was sold under contractual agreements with Pacific Gas & Electric, Southern California Public Power Authority, LADWP, and two separate DWR agreements. The averaged revenue for the energy generated from Metropolitan's 16 hydroelectric plants was about $51/megawatt-hour.

Solar Power Energy Production

Metropolitan has four solar photovoltaic energy facilities. The facility at the Skinner plant is rated at 1 megawatt, the Diamond Valley Lake Visitor Center facility is rated at 0.52 megawatts, the Weymouth plant is rated 3 megawatts, and the newest facility, which came online in January 2018 at the Jensen plant, has a rating of 1 megawatt. During FY 2017/18, the Skinner plant produced

2,209 megawatt-hours (MWh) of energy, the DVL Visitor Center produced 640 MWh, the Weymouth plant produced 5,908 MWh, and the Jensen plant produced 880 MWh, all of which offsets retail energy purchases at the four locations from the local energy utility company.

Greenhouse Gases

Power utilities that emit greenhouse gases from power plants or import energy into California that emitted greenhouse gases when the energy was produced, are obligated to surrender permits or allowances to CARB to cover the amount of gas emitted. In November 2017, Metropolitan submitted allowances to cover its obligation for energy imported into California to serve the CRA pumping load in calendar year 2016. This was the third year Metropolitan made such a submittal.

Colorado River Aqueduct Power

In FY 2017/18, Metropolitan pumped nearly 785,000 AF through the CRA, requiring about 1.5 billion kilowatt-hours of electricity. Energy costs for pumping Colorado River water are shown in Table 4-10. The current and historical energy resources used to meet CRA water delivery energy requirements are shown in Table 4-11 and Figures 4-11 and 4-12.

During FY 2017/18, SWP deliveries were similar to FY 2016/17 with relatively low CRA pumping demand. CRA energy usage remained consistent, at about1.5 billion kWh from year to year.

Due to the expiration of the 1987 Service and Interchange Agreement with Southern California Edison on September 30, 2017, Metropolitan could no longer utilize the Benefit Energy available from SCE through the 1987 Agreement. Since Benefit Energy was no longer available, Metropolitan supplemented its energy usage by purchasing third-party energy from the open market. Energy purchases increased significantly from 32 million kWh in FY 2016/17 to 93 million kWh in FY 2017/18. Energy costs increased slightly from $20 million in FY 2016/17 to $23 million in FY 2017/18, due to Metropolitan's ability to execute scheduling and trading accurately, and capturing the lowest market pricing for energy.

TABLE 4-9
HYDROELECTRIC POWER RECOVERY PLANTS[1]
PRODUCTION FOR THE PAST TWO FISCAL YEARS

Power Plant[2]	Nameplate Capacity (Megawatts)	2017/18 Production (kWh)	2016/17 Production (kWh)
Greg Ave.	1	192,000	1,968,000
Lake Mathews	5	9,633,343	18,706,183
Foothill Feeder	9	56,499,724	42,852,309
San Dimas	10	27,627,925	64,728,518
Yorba Linda	5	19,222,295	8,289,209
Sepulveda Canyon	9	14,883,448	13,457,422
Venice	10	2,224,520	0
Temescal	3	0	8,582,271
Corona	3	386	11,809,510
Perris	8	20,182,693	19,322,860
Rio Hondo	2	1,092,316	1,735,277
Coyote Creek	3	0	3,649,966
Red Mountain	6	32,486,571	29,887,522
Valley View	4	0	5,844,349
Etiwanda	24	117,080,868	4,623,000
Wadsworth (DVL)	30	20,500,660	5,939,451
TOTAL[3]	**131**	**321,626,748**	**242,395,847**

[1] Annual Power generation varies significantly, depending on: Member Agency demands, mix of water sources (Colorado River Aqueduct vs. State Water Project), what shutdowns/outages are taking place and each generator's operational constraints.

[2] Power Plants are listed in the order they became operational. Greg Avenue was first and Wadsworth last.

[3] Nameplate Capacity may be off due to rounding.

TABLE 4-10
ENERGY COST FOR PUMPING
COLORADO RIVER WATER
Fiscal Year 2017/18

Energy Source	Cost ($)
Hoover Power Plant	17,858,110
Parker Power Plant	3,169,480
Energy Purchases/Sales [1]	2,919,765
Exchange (Edison & DWR) [2]	0
Colorado River Water Pumping Revenue [3]	(953,796)
Benefit Energy and Exchange Surcharge [4]	23,977
Reduction in Energy Surcharge [5]	44,887
TOTAL	**22,972,649**

Notes:

[1] Energy Purchases/Sales. A negative number indicates net revenue to Metropolitan.
[2] Cost of exchanging energy with another utility.
[3] Payments received for energy costs associated with moving non-Metropolitan water on the CRA.
[4] Tax paid to state of California for Edison Benefit and Exchange energy.
[5] Reduction in tax due to transmission losses and small hydro generation.

TABLE 4-11
METROPOLITAN'S HISTORICAL CRA ELECTRIC ENERGY USE
Kilowatt Hours

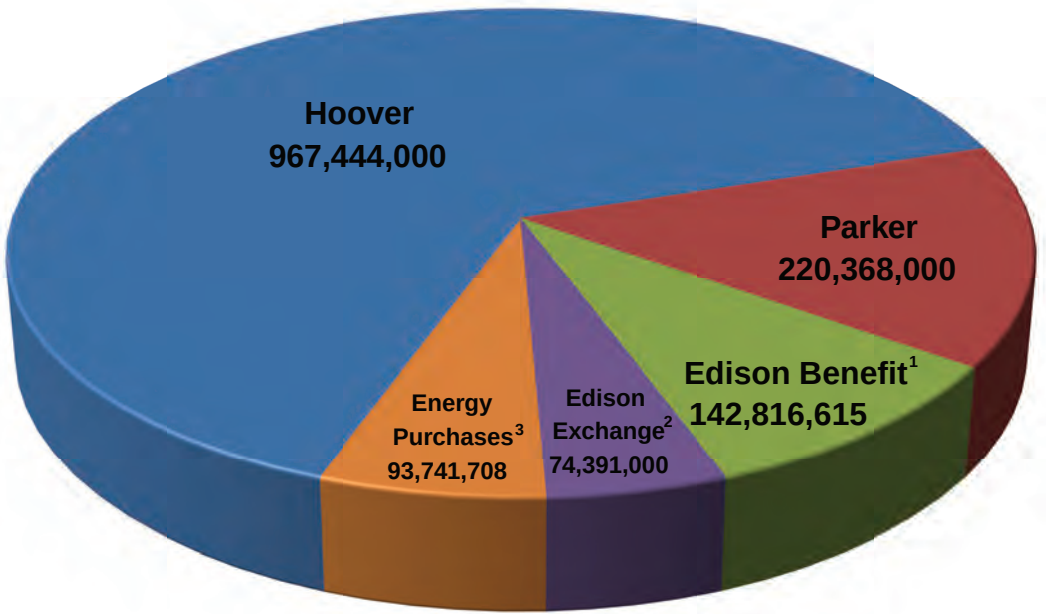
	Hoover	Parker	Edison Benefit [1]	Edison Exchange [2]	DWR Exchange [2]	Edison & DWR Exchange & Edison Benefit	Energy Purchases/Sales [3]	Total
1987/88*	1,432,001,000	290,400,000	216,981,190	1,764,000	0	218,745,190	832,498,639	2,773,644,829
1988/89	1,231,206,000	237,142,000	215,485,363	(27,764,000)	0	187,721,363	735,276,330	2,391,345,693
1989/90	1,205,476,000	230,545,000	219,139,828	24,777,000	0	243,916,828	754,629,485	2,434,567,313
1990/91	1,130,155,000	223,831,000	221,837,010	13,298,000	0	235,135,010	871,799,953	2,460,920,963
1991/92	1,086,888,000	206,513,000	210,490,214	16,145,000	0	226,635,214	891,296,400	2,411,332,614
1992/93	966,614,000	182,606,000	208,800,738	(28,220,000)	0	180,580,738	1,035,586,974	2,365,387,712
1993/94	1,256,009,000	214,961,000	199,304,945	(16,175,000)	0	183,129,945	914,591,730	2,568,691,675
1994/95	1,166,517,000	217,365,000	186,648,325	(88,977,000)	0	97,671,325	680,010,352	2,161,563,677
1995/96	1,357,937,000	237,627,000	286,971,075	(32,150,000)	0	254,821,075	401,318,041	2,251,703,116
1996/97	1,292,375,000	243,993,000	253,134,785	47,302,000	0	300,436,785	595,050,513	2,431,855,298
1997/98	1,370,317,000	302,069,000	200,076,045	90,000,000	(123,316,955)	166,759,090	327,992,313	2,167,137,403
1998/99	1,411,403,000	297,219,000	212,312,000	13,490,000	108,417,736	334,219,736	329,691,494	2,372,533,230
1999/00	1,392,515,000	262,383,000	263,326,907	(26,405,000)	3,967,942	240,889,849	646,961,000	2,542,748,849
2000/01	1,311,068,000	243,647,000	173,785,599	21,586,000	0	195,371,599	788,937,000	2,539,023,599
2001/02	1,322,037,000	241,048,000	199,205,189	(54,931,000)	0	144,274,189	804,044,166	2,511,403,355
2002/03	1,193,682,000	230,871,000	284,085,067	50,371,800	(162,807,504)	171,649,363	232,051,017	1,828,253,380
2003/04	1,179,118,000	229,886,000	164,721,756	(61,823,800)	105,280,095	208,178,051	(141,923,768)	1,475,258,283
2004/05	931,893,000	198,606,000	381,481,989	18,022,000	5,059,196	404,563,185	(39,632,380)	1,495,429,805
2005/06	1,158,901,000	212,687,000	405,612,265	(116,265,000)	37,054,891	326,402,156	74,465,049	1,772,455,205
2006/07	1,143,870,000	229,881,000	387,630,441	(38,400,000)	68,876	349,299,317	(421,365,512)	1,301,684,805
2007/08	1,117,068,000	217,106,000	431,283,980	70,272,000	0	501,555,980	(250,140,000)	1,585,589,980
2008/09	1,075,217,000	223,056,000	260,209,614	90,363,000	0	350,572,614	371,765,025	2,020,610,639
2009/10	994,222,000	195,063,000	233,871,837	21,870,000	0	255,741,837	595,894,000	2,040,920,837
2010/11	1,094,130,000	225,236,000	227,018,084	(160,574,000)	0	66,444,084	583,958,000	1,969,768,084
2011/12	1,165,206,000	214,680,000	35,860,567	(33,725,000)	0	2,135,567	33,603,000	1,415,624,567
2012/13	1,075,958,000	236,045,000	234,852,498	53,437,000	0	288,289,498	(100,968,000)	1,499,324,498
2013/14	1,099,377,000	224,957,000	574,836,315	90,393,000	0	665,229,315	203,715,000	2,193,278,315
2014/15	1,023,690,000	214,130,000	401,355,532	44,943,000	0	446,298,532	709,652,000	2,393,770,532
2015/16	1,023,789,000	214,109,000	289,902,322	(41,954,000)	0	247,948,322	689,547,000	2,175,393,322
2016/17	939,410,000	211,118,000	340,445,225	(15,061,000)	0	325,384,225	32,092,255	1,508,004,480
2017/18	967,444,000	220,368,000	142,816,615	74,391,000	0	217,207,615	93,741,708	1,498,761,323

* Includes June 1987 data

[1] Energy provided by Southern California Edison at no cost pursuant to 1987 Service and Interchange Agreement

[2] Energy exchanged with Edison. Negative number indicates net energy banked with Edison.
Positive number indicates net energy received from Edison. These numbers represent what is in the Exchange Balance as of June 30.

[3] Energy Purchases/Sales. A negative number indicates net energy sold to others.



Notes:

1 Energy provided by Edison at no cost pursuant to 1987 Service and Interchange Agreement, which terminated on September 30,

2 Energy exchanged with Edison. Negative number indicates net energy banked with Edison. Positive number indicates net energy received from Edison.

3 Energy Purchases/Sales. A negative number indicates net energy sold to others.

Figure 4-11. Metropolitan's CRA Electric Energy Use (kWh) Fiscal Year 2017/2018

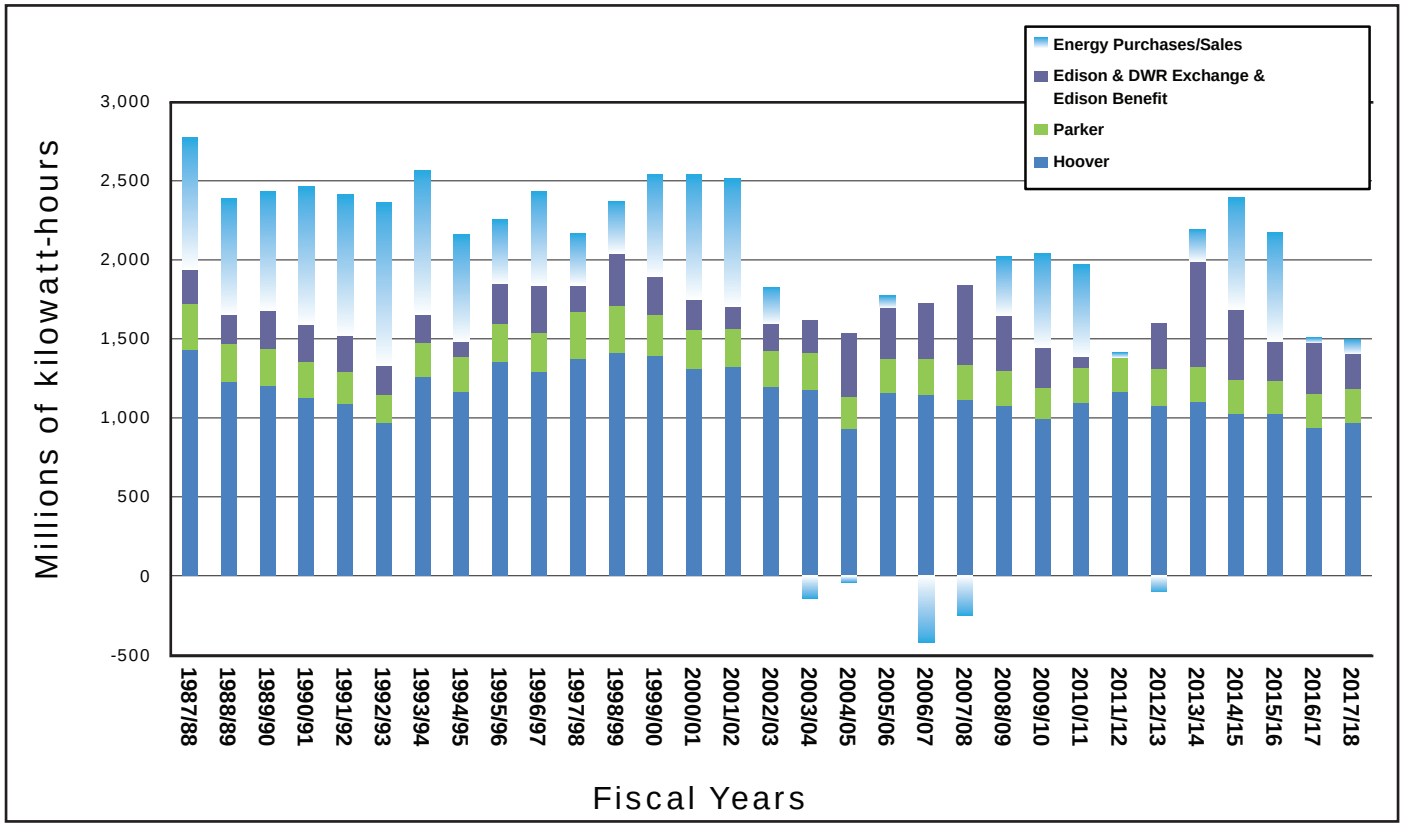


Figure 4-12. CRA Energy Mix 1987 to 2018

New Agreements for CRA Operations

The 1987 agreement with SCE terminated on September 30, 2017. In addition to its agreement with AEPCO and SCE, Metropolitan successfully negotiated, executed, and implemented agreements with CAISO (California Independent System Operator) and WAPA (Western Area Power Administration) to replace energy, interconnection, and transmission services provided to Metropolitan under the SCE 1987 Agreement. This ensured that Metropolitan would continue to receive its energy resources from Hoover and Parker dams. New long-term agreements with CAISO and AEPCO were executed for CRA power deliveries that began on October 1, 2017. The operating agreement with CAISO establishes the operational relationship between CAISO and Metropolitan, for Metropolitan's operation within the region controlled by CAISO. The agreements with AEPCO provided for energy scheduling and trading services as well as power system operations services. The operations services agreement establishes AEPCO as the transmission operator for the CRA and identifies tasks to be delegated to Metropolitan to comply with the national electricity reliability standards.

Hoover Electric Service Contract

The previous Hoover Electric Service Contract terminated on September 30, 2017. Metropolitan and the other Hoover power contractors successfully negotiated a new contract with WAPA and the Bureau of Reclamation in 2017. The new Energy Service Contract and Implementation Agreement provides Metropolitan with 95 percent of its previous share of the Hoover project, energy and capacity, for a period of 50 years (2017–2067). This ensures a continuing source of reliable and economic energy to power CRA pumps for another 50 years.

Safety and Regulatory Services

Operational Safety and Regulatory Services staff continued to oversee compliance with environmental and safety regulations and procedures. Staff conducted numerous site inspections to proactively address environmental and safety issues. In addition, there were 77 routine regulatory inspections in the areas of air quality, wastewater, hazardous materials, hazardous waste, stormwater, underground and aboveground petroleum storage tanks, and safety. Staff coordinated and tracked all identified corrective actions.

Regulatory

Staff provided all required compliance reporting for air quality, wastewater, stormwater, underground storage tanks, and hazardous materials/hazardous waste. Staff negotiated with and secured dewatering permits from regulatory agencies in support of Metropolitan's shutdown projects. Staff also managed 395 air quality permits for portable and stationary equipment.

Staff prepared and submitted over 180 wastewater, stormwater, hazardous materials, and air quality reports, plans, and permits to comply with regulatory requirements. Staff continued to update and implement 20 plans for oil spill prevention control and countermeasures to comply with regulations for aboveground fuel tanks. Staff submitted annual disclosures and business plans dealing with hazardous materials for 38 Metropolitan facilities.

Staff led several important regulatory compliance-related activities involving Metropolitan's chlorine systems, including four successful regulatory inspections for the chlorine systems at three treatment plants and the Chemical Unloading Facility. Regulatory authorities found that Metropolitan was 100 percent compliant with the federal Risk Management Program and California Accidental Release Program regulations. Regulators praised the treatment plants' operations, appearance, housekeeping, and high degree of compliance.

Staff provided comments on the SWRCB policies involving direct potable reuse, constituents of emerging concern and the state's recycled water policy. SWRCB's direct potable reuse framework is

the first step in developing raw water augmentation (one form of DPR) regulations by 2023. Staff also provided comments on the Southern California Coastal Water Research Project Authority draft final report that serves as the basis for CEC monitoring requirements proposed by the SWRCB in the 2018 Recycled Water Policy. Staff submitted comments on the SWRCB's proposed amendment to the Recycled Water Policy. The goal of the proposed amendment is to increase development and use of recycled water, add new strategies to monitor for CECs, and provide statewide consistency for permit requirements.

Several California regulatory agencies proposed regulatory actions that impact enforcement, fees and permitting. These include, but are not limited to, revisions to SWRCB's Enforcement Policy and Cal/OSHA penalty structure, Division of Drinking Water fee increases for environmental laboratories (such as Metropolitan's Water Quality Laboratory) and for drinking water system permits, and SCAQMD equipment permitting exemptions. Staff worked directly with the applicable regulatory agencies and with water industry associations to help ensure that Metropolitan's interests were protected, excessive permits were not required, and costs were not unduly increased in the final regulations.

Health & Safety

Staff provided safety coverage during the FY 2017/18 shutdown season to successfully minimize accidents and injuries. This included safe work practices and ventilation monitoring for all underground operations.

Staff proactively addressed safety performance through site inspections, safety training and toolbox talks, safety committee communications, and revision of safety procedures. Staff prepared a book of general and specialized safety talks for managers to use when conducting weekly safety toolbox meetings. Table 4-12 shows the injuries, illnesses and incidents that required time off from work during FY 2017/18 for each Metropolitan facility. The Occupational Health and Safety Administration defines Total Incident Rate (also known as injury/illness rate) as the number of recordable incidents in a year per 100 employees. Overall, Metropolitan's Total Incident Rate is below the average federal and state rate for water utilities. A recordable incident is generally defined as a new work-related injury

or illness that results in death, lost time from work, work restriction, or medical treatment beyond first aid.

Staff investigated each incident and worked with managers to implement proactive measures to protect employees. In addition, staff provided training courses to ensure employee safety and compliance with regulations. Course curriculum was updated in accordance with regulatory changes and was provided through a combination of classroom and online eLearning opportunities. About 655 classes covering nearly 100 individual topics were presented. Online courses continued to provide flexibility for diverse work schedules and accounted for over 40 percent of training provided.

Apprenticeship Program Training

The Apprenticeship Program trains industrial mechanics and electricians to ensure skilled trade persons are available to repair and maintain Metropolitan's water treatment and conveyance and distribution system. The state Department of Apprenticeship Standards continues to recognize Metropolitan's curriculum as meeting the breadth and level commensurate with journey-level mechanical and electrical trades.

Metropolitan's Apprenticeship Program has several classes in progress to train electricians and mechanics to the journey level. During a four-year period, apprentices attend over 700 hours of classroom instruction, must pass more than 90 tests, and complete over 7,200 hours of on-the-job training. To date, the Apprenticeship Program has supplied Metropolitan with a total of 104 journey-level mechanical and electrical craft persons which comprises over 40 percent of the current apprenticeable trades workforce. A new class of 16 apprentices began work in FY 2017/18.

TABLE 4-12
ACCIDENT INCIDENTS
Fiscal Year 2017/18

Location	Total* Incident Rate	DART** Incident Rate
Diemer Plant	5.1	4.4
Diamond Valley Lake	11.5	8.6
Eagle Mountain	31.3	31.3
Eagle Rock	0	0
Gene Camp	0	0
Hinds	19.1	19.1
Iron Mountain	10.0	5.0
Jensen Plant	0	0
La Verne	5.2	4.0
Lake Mathews	13.4	10.4
Lake Skinner	10.9	9.5
Mills Plant	6.1	4.1
Sacramento	6.0	6.0
San Diego	0	0
Soto Street	27.0	13.5
Sunset	0	0
Union Station	0.7	0.4
Washington, D.C.	0	0
AVERAGE RATE	**4.1**	3.0
Federal Utility Average	**6.0**	3.5
State Utility Average	**6.8**	4.9

*Total Incident Rate – Number of recordable incidents in a year per 100 employees. Total Incident Rate is calculated by multiplying the number of recordable incidents by 200,000 and then dividing that number by the number of total labor hours at the facility.

**DART Incident Rate – Number of incidents with days away, restriction, and/or transfer in a year per 100 employees.

Welding joints on the steel liner of the Second Lower Feeder while rehabilitating prestressed concrete cylinder pipe.

CHAPTER 5

Engineering Services

The Engineering Services Group is a full-service engineering organization that provides technical resources and delivers projects so that Metropolitan can treat and distribute water reliably to its member agencies. Engineering Services provides a wide range of technical services with a focus on cost-effectiveness and customer service. Its key functions include program management, engineering design, construction management, facility planning, geodetics and field survey, dam surveillance and corrosion engineering. In addition to performing its core operation and maintenance activities, Engineering Services provides oversight of Metropolitan's Capital Investment Plan, which represents the district's commitment to constructing and rehabilitating facilities that enable long-term, reliable water deliveries. Highlights of the year included completing construction of ozonation facilities at Metropolitan's water treatment plants, launching a demonstration water recycling project and providing support for California WaterFix.

Capital Investment Plan

Each year, Engineering Services manages and executes capital projects that range in cost from less than $100,000 to more than $100 million. Projects within Metropolitan's CIP are prioritized and scheduled to reflect the strategic goals of providing a reliable supply of high-quality water at the lowest cost possible. The CIP is comprised of 12 major capital programs based on project type, business driver and location.

During fiscal year 2017/18, expenditures totaled about $208.9 million for all capital programs. With the exception of $600,000 for continuing survey and legal efforts associated with the Delta Islands purchase, capital expenditures for the fiscal year are

depicted in Figure 5-1, while Figure 5-2 shows long-term expenditures for each capital program. During the year, 18 construction contracts were completed with a total value of $110 million, while 25 construction contracts (as shown in Table 5-2) remained underway with a total value of $147 million along with 16 procurement contracts with a total value of $40 million.

For a detailed list of projects that completed construction during the year or were under construction or design, see Tables 5-1 through 5-3.

Below are highlights of Engineering Services' major activities for each capital program during FY 2017/18.

Water Quality/Oxidation Retrofit Program

Metropolitan initiated the Oxidation Retrofit Program in 1990 to use ozone as the primary disinfectant, reduce the level of disinfection byproducts, and improve the water quality at Metropolitan's five treatment plants. The F.E. Weymouth Water Treatment Plant began using ozone as the primary disinfectant in October 2017, representing the final step for the Oxidation Retrofit Program. Ozone is now employed as the primary disinfectant at the F.E. Weymouth, Joseph Jensen, Henry J. Mills, Robert A. Skinner and Robert B. Diemer treatment plants.

Regional Recycled Water Program

This program involves the design and construction of an Advanced Water Treatment Demonstration Plant, which represents the initial step to develop a potential regional recycled water system. The system would purify wastewater for recharge of groundwater basins throughout Southern California. This work is being undertaken in collaboration with the Sanitation Districts of Los Angeles County. During fiscal year 2017/18, construction began on the 500,000 gallon-per-day demonstration plant. Conceptual planning efforts are continuing for the potential full-scale program, including evaluation of nitrogen management and boron removal options, and alternative alignments for potential delivery pipelines and locations of groundwater replenishment facilities.

Treatment Plant Reliability Program

Projects under this program maintain reliability and improve the operating efficiency of Metropolitan's water treatment plants. Completed projects included: rehabilitating equipment and structural components for the east basins at the Diemer plant; replacing 48 filters at the Weymouth plant; and replacing the communication modules that control and operate the Jensen ozonation system. Metropolitan also awarded a contract to procure replacement filter valves at the Weymouth plant; completed seismic upgrades to the east filters at the Diemer plant and continued seismic upgrades to the plant's Administration Building. Metropolitan initiated seismic upgrades of the filter outlet conduit at the Diemer plant and to the west washwater tank at the Weymouth plant; and continued electrical system upgrades at the Jensen and Mills plants.

Distribution System Reliability Program

Projects within this program maintain delivery reliability to Metropolitan's member agencies. Completed projects included: upgrades to replace a deteriorated expansion joint with a new bellows-type expansion joint along the Upper Feeder at the Santa Ana River Bridge; electrical upgrades at the Diamond Valley Lake East Dam; and relining the second of three reaches of the Orange County Feeder. Metropolitan also completed design and awarded a contract for the Orange County Region Service Center; the Lake Mathews Forebay/Outlet Tower repairs; and continued construction to rehabilitate Palos Verdes Reservoir.

Colorado River Aqueduct Reliability Program

Projects within this program maintain the reliability of the Colorado River Aqueduct and pumping plants. Completed projects included: upgrades to replace the original sand trap equipment at the Iron Mountain, Eagle Mountain, and Hinds pumping plants; repairing expansion joints on the pump delivery lines at the five CRA pumping plants; upgrades to provide erosion protection of the CRA Whitewater siphons; installation of an isolation coupling on one of the nine pump discharge lines at Gene Pumping Plant; and construction of 10 new houses at the CRA pumping plant villages. Metropolitan also continued structural upgrades to the 6.9 kV switch houses at each CRA pumping plant.

PCCP Reliability Program

This long-term, comprehensive program will rehabilitate 100 miles of Metropolitan's 163 miles of prestressed concrete cylinder pipe. Through FY 2017/18, eight miles of PCCP have been rehabilitated, leaving 92 miles that remain to be lined or replaced. Specific accomplishments included: completion of the steel liner pipe fabrication for Reach 1 of the Second Lower Feeder and award of a contract to procure steel liner pipe for the next two reaches; completion of electromagnetic inspections along portions of the Second Lower Feeder, Allen-McColloch Pipeline and Jensen Washwater/Los Angeles Aqueduct; and substantial completion of the initial construction contract to line approximately 4.4 miles of an existing Second Lower Feeder PCCP segment with steel liner.

Right of Way and Infrastructure Protection Program

This comprehensive program protects access rights, minimizes erosion and secures programmatic environmental permits along all of Metropolitan's pipelines throughout the distribution system. This effort enables rehabilitation work and operational activities to proceed with a minimum of delays over a 10- to 15-year period, and will provide relief from escalating permitting costs. During the year, staff continued to execute various phases of the program, including design, preparation of programmatic environmental documentation, and identification and resolution of right-of-way issues.

System Flexibility/Supply Reliability Program

In response to the recent drought and the reduced availability of State Water Project supplies to Metropolitan, staff continues to execute projects that expand the reach of CRA water throughout Metropolitan's distribution system. During FY 2017/18, staff substantially completed the design to rehabilitate the Greg Avenue Pump Station, which will provide a long-term, reliable backup supply to the Jensen service area.

System Reliability Program

Projects within this program improve or modify facilities located throughout Metropolitan's service area to utilize new processes and/or technologies as well as improve facility and overall reliability. Specific accomplishments included: completion of final design of the

Headquarters building improvements, with a planned board action to authorize construction in early FY 2018/19; and continued upgrades to the control and protection systems for nine pump/turbine units at the Hiram W. Wadsworth Pumping Plant at Diamond Valley Lake.

Regulatory Compliance Program

This program provides for prudent use and management of Metropolitan's assets in compliance with regulations and codes other than water quality. During FY 2017/18, staff continued to design the replacement of the existing deteriorating wastewater systems at the Iron Mountain, Gene and Intake pumping plants. The wastewater system replacements at Hinds and Eagle Mountain pumping plants are complete.

Cost Efficiency and Productivity Program

This program provides economic savings through enhanced business and operating processes, and through reduced energy costs. Construction of a 1-megawatt solar generating facility at the Jensen plant was completed in FY 2017/18. This project will provide a long-term hedge against utility power cost increases at the plant.

Minor Capital Projects Program

Minor capital projects involve refurbishments, replacements, or upgrades at Metropolitan facilities that cost less than $250,000. During FY 2017/18, 24 projects were authorized under this program.

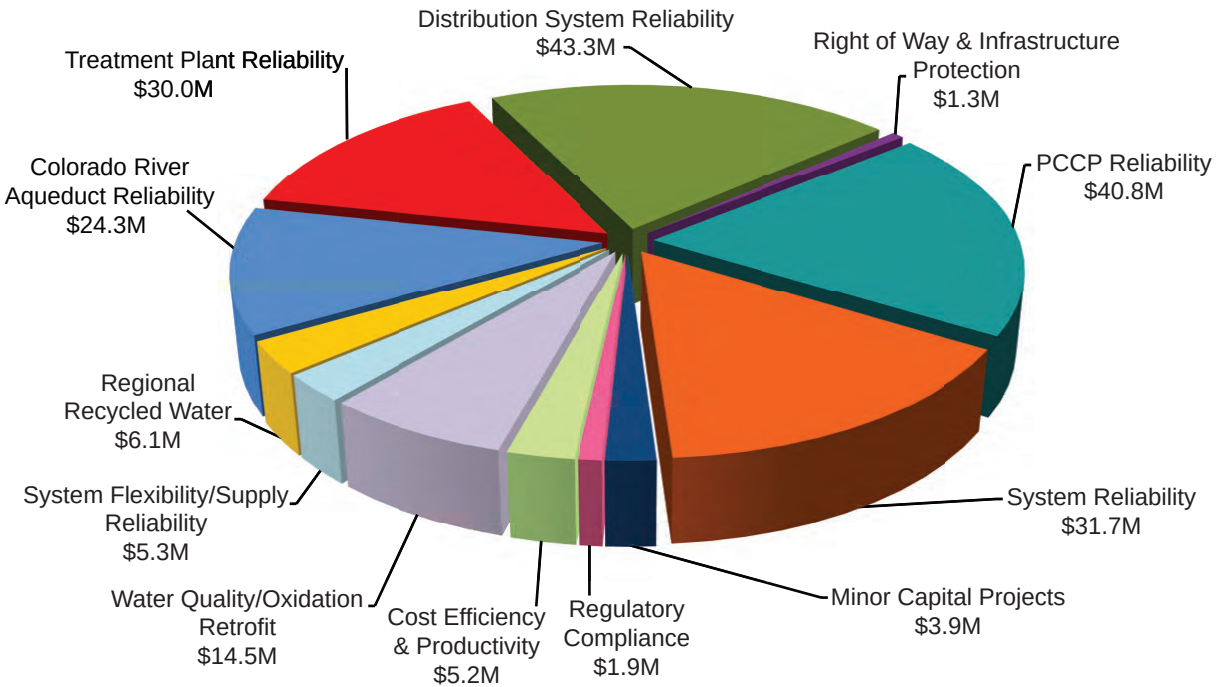


Figure 5-1. Fiscal Year 2017/18 Capital Investment Plan Expenditures

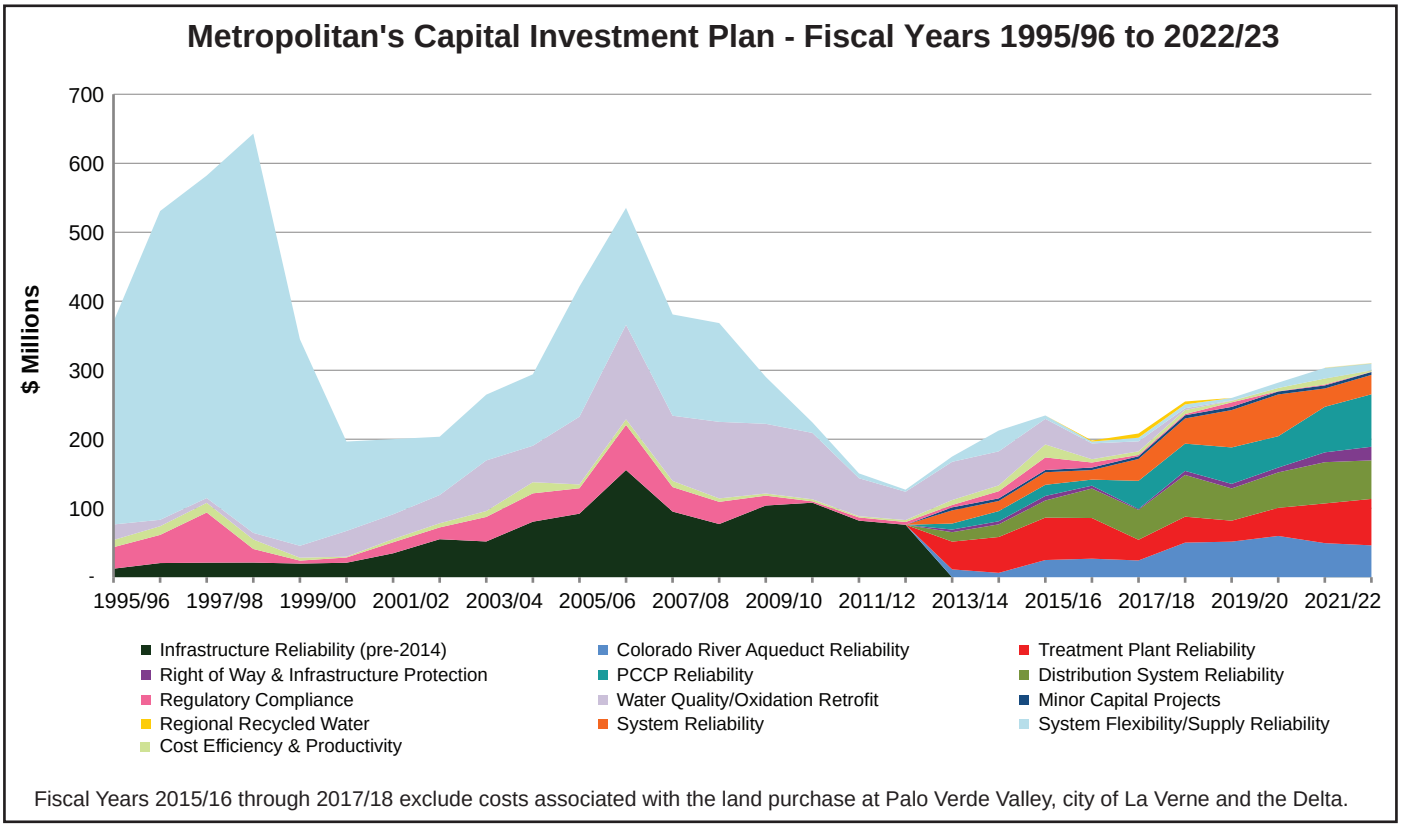


Figure 5-2. Metropolitan's Capital Investment Plan - Fiscal Years 1995/96 to 2022/23

TABLE 5-1
CONSTRUCTION CONTRACTS COMPLETED AS OF JUNE 30, 2018 (Unaudited)

Completion Date	Contract / Spec. No.	Project	Base Bid Amount ($)	Final Amount ($)
7/5/17	1785/1709	Chemical Unloading Facility Chlorine Containment and Handling Facilities	22,888,888	23,653,136
9/8/17	1834/1844	Diamond Valley Lake East Dam Electrical Upgrades	708,000	770,015
9/18/17	1845/1842	Orange County Feeder Extension Relining - Reach 1	4,580,000	4,744,119
9/22/17	1803/1786	LADWP Lagoon Refurbishment	3,067,900	3,529,091
9/27/17	1814/1800	Diemer Water Treatment Plant East Basin Rehabilitation	21,524,084	21,862,277
10/18/17	1848/1870	CRA Pumping Plants Delivery Pipe Expansion Joint Repairs - Phase 2	1,109,254	1,067,512
10/20/17	1835/1848	La Verne Maintenance Shops Fire Sprinkler System	268,000	268,000
10/26/17	1842/1768	Allen McColloch Pipeline Cathodic Protection	1,171,293	1,207,093
11/7/17	1836/1876	Diamond Valley Lake East Marina Restroom Facility	204,000	220,440
12/19/17	1849/1851	Lake Mathews Power Plant Powerhouse Repair	207,800	211,800
12/27/17	1809/1777	Weymouth Water Treatment Plant Filter Rehabilitation	31,762,914	34,212,632
1/25/18	1822/1704	Colorado River Aqueduct Sand Trap Equipment Replacement	9,777,000	9,886,319
3/20/18	1847/1849	AMP Flow Control Structures Seismic Upgrade	1,092,092	1,092,092
3/21/18	1858/1911	Upper Feeder Santa Ana River Crossing Expansion Joint Replacement	1,296,091	1,345,091
5/11/18	1853/1907	Employee Housing Rehabilitation at Julian Hinds and Eagle Mountain Pumping Plants	1,219,809	1,239,746
5/31/18	1837/1805	Diamond Valley Lake Inlet/Outlet Tower Fish Screen Replacement	1,885,150	1,928,561
6/11/18	1864/1889	Allen McColloch Pipeline OC-76 Turnout Relocation	787,906	787,906
6/21/18	1854/1908	Employee Housing Rehabilitation at Iron Mountain and Gene Pumping Plants	1,219,809	1,836,071

TABLE 5-2
MAJOR CONSTRUCTION CONTRACTS IN PROGRESS
AS OF JUNE 30, 2018 (UNAUDITED)
Accrual Basis

Contract No.	Project	Percent Contract Complete through 6/30/2018	Estimated Contract Completion Date	Contract Earnings ($) through 6/30/2018 [1]	Base Bid Amount ($)
1818	Weymouth Water Treatment Plant Chemical Upgrades (Fed Funds)	99%	Aug. 2018	10,511,801	10,267,000
1825	Palos Verdes Reservoir Cover and Liner Replacement	86%	Nov. 2018	27,126,512	29,560,000
1827	Jensen Electrical Upgrades	99%	Feb. 2019	15,792,460	15,800,000
1841	Jensen Water Treatment Plant Solar Power Facility	97%	Aug. 2018	4,519,754	4,503,635
1843	Diemer Plant Admin. Building Seismic Upgrades	97%	Jul. 2018	4,472,743	4,426,000
1844	CRA Pumping Plants Seismic Retrofit of 6.9kV Switch Houses	91%	Sep. 2018	8,786,276	9,595,000
1850	CRA Whitewater Siphons Erosion Protection	99%	Dec. 2018	5,242,751	5,285,000
1856	Advanced Water Treatment Demonstration Facility	51%	Dec. 2018	7,082,100	13,856,000
1857	Mills Electrical Upgrades - Stage 1A	26%	May. 2019	790,332	3,097,927
1859	Garvey Reservoir Drainage and Erosion Improvements - Areas 1 and 5	99%	Aug. 2018	347,276	280,238
1860	Inland Feeder and Lakeview Pipeline Intertie Valve Installation	90%	Oct. 2018	687,666	767,201
1862	Second Lower Feeder PCCP Rehabilitation - Contract 1	97%	Jul. 2018	18,866,321	19,362,000
1866	Lake Mathews Headworks Forebay Liner and Outlet Tower Repair	79%	Sep. 2018	2,561,874	3,248,000
1869	Diemer Plant Filter Outlet Conduit Seismic Upgrade - Northeast Slope	9%	Jul. 2019	395,750	4,394,400

TABLE 5-2 (Continued)
MAJOR CONSTRUCTION CONTRACTS IN PROGRESS
AS OF JUNE 30, 2018 (UNAUDITED)
Accrual Basis

Contract No.	Project	Percent Contract Complete through 6/30/2018	Estimated Contract Completion Date	Contract Earnings ($) through 6/30/2018 [1]	Base Bid Amount ($)
1870	Colorado River Aqueduct Surge Chamber Discharge Line Bypass Covers	4%	Apr. 2019	89,800	2,560,232
1871	Eagle Mountain Pumping Plant Reservoir Spillway Radial Gate Replacement	31%	Dec. 2018	446,763	1,433,000
1872	Gene Pumping Plant Renovation of Houses 12 and 47	90%	Aug. 2018	304,043	339,500
1876	Eagle Rock Operation Control Center Building Roof Replacement	66%	Aug. 2018	129,217	194,517
1877	F. E. Weymouth Water Treatment Plant - West Washwater Tank Seismic Upgrades	6%	May. 2019	163,500	2,591,576
1879	Joseph Jensen Water Treatment Plant Inlet Water Quality Instrumentation Enclosure	4%	Mar. 2019	36,000	985,000
1880	Orange County Region Service Center	6%	Sep. 2019	531,510	9,257,483
1881	Julian Hinds Pumping Plant Renovation of Houses 42 and 149	3%	Nov. 2018	10,000	349,000
1882	Weymouth Plant Domestic Water System Improvements	0%	Feb. 2020	0	3,740,000
1889	CRA Pumping Plants Uninterruptible Power Supply Replacement	0%	Jul. 2019	18,720	939,000
1918	Eagle Mountain Pumping Plant Renovation of Houses 41 and 146	41%	Jul. 2018	154,578	378,985

[1] Earnings reflected represent the value of work performed by the contractor as of the date indicated and include contract retention and other similar deductions from amounts earned by the contractor but otherwise required to be withheld by Metropolitan by law or contract.

TABLE 5-3
MAJOR PROJECTS UNDER DESIGN DURING FISCAL YEAR 2017/18

Appropriation Number	Appropriation Title	Appropriation Estimate	Project Description	Estimated Or Actual Completion Date for Final Design
Cost Efficiency & Productivity Program				
15490	Project Controls and Reporting System	$4,300,000	Project Controls and Reporting System	October 2017
Colorado River Aqueduct Reliability Program				
15320	Cabazon Radial Gate Facility Improvements	$5,000,000	Cabazon Radial Gate Facility Improvements	September 2019
15373	CRA Conveyance Reliability	$186,000,000	Copper Basin & Gene Wash Dam Discharge Valve Replacement	July 2019
			Iron Mountain Tunnel Rehabilitation	June 2020
15384	CRA Electrical/Power Systems Reliability	$48,600,000	CRA Auxiliary Power Systems	May 2024
			CRA Main Transformer Replacement/Rehabilitation	October 2020
			CRA Power Cable Replacement	November 2018
			CRA UPS Replacement	May 2018
			Iron Mountain Auxiliary Power System Rehabilitation	March 2020
15438	CRA Reliability - FY2006/07 Through FY2011/12	$110,200,000	CRA Intake 23000V Power Line Relocation	June 2018
			CRA Pumping Plant Sump System Rehabilitation	August 2018
			CRA Radial Gates and Slide Gate Rehabilitation	September 2018
			Iron Mountain Pumping Plant Generator Replacement	August 2020
			Seismic Evaluation of CRA Structures	July 2020
15481	CRA Main Pump Reliability	$177,200,000	CRA Discharge Line Isolation Couplings	July 2018
			CRA Overhead Crane Replacement	December 2018
15483	CRA Reliability - FY2012/13 Through FY2017/18	$67,600,000	CRA and Iron Mountain Reservoir Panel Repairs	May 2018
			CRA Conduit Erosion Control Improvements	June 2019
			CRA Conduit Structural Protection	April 2019
			CRA Domestic Water Treatment System Replacement	December 2019
			CRA Pumping Plant Drainage Improvements	November 2019
			CRA Pumping Plant Storage Buildings at Hinds, Eagle Mountain and Iron Mountain	August 2019
			CRA Water Distribution System Replacement - Intake	August 2018
			CRA Water Distribution System Replacement - Iron Mountain and Gene	August 2018
			Whitewater Tunnel No. 2 Seismic Upgrades	June 2019

TABLE 5-3 (Continued)
MAJOR PROJECTS UNDER DESIGN DURING FISCAL YEAR 2017/18

Appropriation Number	Appropriation Title	Appropriation Estimate	Project Description	Estimated Or Actual Completion Date for Final Design
Distribution System Reliability Program				
15377	Conveyance and Distribution System Rehabilitation	$119,500,000	Coyote Creek Hydroelectric Plant Rehabilitation	July 2019
			Orange County Feeder Relining	June 2019
			Orange County Feeder Station 1920+78 Blow-Off	October 2018
			West Valley Feeder No. 1 Access Roads & Structures Improvements - Stage 3	September 2019
15425	Perris Valley Pipeline	$151,000,000	Perris Valley Pipeline - Tunnels	October 2018
15417	Reservoir Cover and Replacement	$41,500,000	Jensen Finished Water Reservoir No. 1 Cover Rehabilitation	December 2018
			Jensen Finished Water Reservoir No. 2 Floating Cover Rehabilitation	March 2019
			Mills Finished Water Reservoirs Rehabilitation	December 2020
15419	Dam Rehabilitation & Safety Improvements	$8,900,000	Dam Monitoring Upgrades Lake Mathews	December 2019
			Dam Monitoring Upgrades Lake Skinner	December 2019
			DVL Dam Monitoring System Upgrade	December 2018
15441	Conveyance and Distribution System Rehabilitation - FY2006/07 Through FY2011/12	$182,700,000	Etiwanda Pipeline Mortar Lining Repair	March 2019
			Lake Mathews Forebay Repairs	December 2020
			OC-88 Pump Plant Surge Tank Upgrade	June 2019
			Orange County Feeder Cathodic Protection	June 2018
			San Gabriel Tower Seismic Upgrade	June 2020
			Santiago Lateral Sectionalizing Valve Replacement	December 2019
			Sepulveda Canyon Control Facility Water Storage Tanks Seismic Upgrade	July 2020
15458	Hydroelectric Power Plant Improvements	$39,300,000	Foothill Hydroelectric Plant Rehabilitation	February 2019
			Foothill Hydroelectric Plant Seismic Upgrades	December 2018
			Red Mountain Hydroelectric Plant Rehabilitation	December 2018
			San Dimas Hydroelectric Plant Rehabilitation	March 2020
			Sepulveda Canyon Hydroelectric Plant Rehabilitation	March 2019
			Valley View Hydroelectric Plant Generator Refurbishment	April 2018
			Valley View Hydroelectric Plant Rehabilitation	October 2019

TABLE 5-3 (Continued)
MAJOR PROJECTS UNDER DESIGN DURING FISCAL YEAR 2017/18

Appropriation Number	Appropriation Title	Appropriation Estimate	Project Description	Estimated Or Actual Completion Date for Final Design
15480	Conveyance and Distribution System Rehabilitation - FY2012/13 Through FY2017/18	$332,500,000	C & D System Electrical Structures Rehabilitation	September 2023
			Casa Loma Siphon Barrel No. 1 Project No. 2 - Permanent Repairs	July 2019
			Corona HEP Seepage Remediation	March 2021
			East Lake Skinner Bypass #2 Screening Structure Upgrade	December 2021
			East Orange County Feeder No. 2 Service Connection A-6 Rehabilitation	December 2018
			Electrical Upgrades at 15 Structures in the Orange County Region	June 2018
			Fairplex PCS and Walnut PCS Valve Replacement	November 2017
			Garvey Reservoir Drainage and Erosion Improvements	June 2019
			Lake Mathews Electrical Upgrades	December 2020
			Lake Skinner Pipelines Cathodic Protection	June 2019
			Lakeview Pipeline Repair	December 2019
			Live Oak Pipelines Cathodic Protection	June 2019
			North Portal of the Hollywood Tunnel Equipment Replacement	November 2019
			Olinda PCS and Santiago Tower Emergency Generators	October 2019
			Orange County and Riverside/San Diego County Operating Regions Valve Replacement	December 2018
			Rialto Pipeline Service Connections CB-12 and CB-16 Valve Replacement & Electrical Improvements	June 2018
			San Diego Canal Radial Gate VO-8 Rehabilitation	October 2019
			San Dimas and Red Mountain Power Plants Standby Diesel Engine Generator Replacement	April 2019
			Santa Monica Feeder Cathodic Protection	June 2019
			Sepulveda Canyon Control Facility Reliability Improvements	May 2020
			Wadsworth Pumping Plant Yard Piping Lining Repairs	June 2018
			West OC Feeder Valve Replacement	October 2018
			West Orange County Feeder Cathodic Protection	June 2019
			West Orange County Feeder OC-09 Rehabilitation	March 2019

TABLE 5-3 (Continued)
MAJOR PROJECTS UNDER DESIGN DURING FISCAL YEAR 2017/18

Appropriation Number	Appropriation Title	Appropriation Estimate	Project Description	Estimated Or Actual Completion Date for Final Design
Minor Capital Projects Program				
15476	Capital Program for Projects Costing Less Than $250,000 for FY2012/13 Through FY2013/14	$10,000,000	Various	N/A
15489	Capital Program for Projects Costing Less Than $250,000 for FY2014/15 Through FY2015/16	$8,000,000	Various	N/A
16810	Capital Program for Projects Costing Less Than $250,000 for FY2016/17 Through FY2017/18	$10,000,000	Various	N/A
System Reliability Program				
15395	La Verne Shop Facilities Upgrades	$60,900,000	La Verne Machine and Fabrication Shop Equipment Design and Procurement	December 2017
			La Verne Shops - Stage 4 Building Completion & Equipment Installation	September 2018
15473	Headquarters Building Improvements	$42,200,000	Headquarters Building Improvements	June 2019
PCCP Reliability Program				
15497	Second Lower Feeder PCCP Rehabilitation	$606,400,000	Second Lower Feeder PCCP Rehabilitation - Preliminary Design	December 2018
			Second Lower Feeder PCCP Rehabilitation - Package 2	October 2018
			Second Lower Feeder PCCP Rehabilitation - Package 3	October 2019
			Second Lower Feeder Pipe Procurement - Package 4	July 2018
			Second Lower Feeder PCCP Rehabilitation ROW Acquisition	December 2030
			Second Lower Feeder PCCP Rehabilitation Valve Procurement	December 2018
15502	Allen McColloch Pipeline, Calabasas Feeder, and Rialto Pipeline PCCP Rehabilitation	$986,976,000	Allen McColloch Pipeline PCCP Rehabilitation	March 2020
			Calabasas Feeder PCCP Rehabilitation	December 2022
			Rialto Feeder PCCP Rehabilitation	June 2028
15496	Sepulveda Feeder PCCP Rehabilitation	$754,200,000	Sepulveda Feeder PCCP Rehabilitation	August 2027
Regulatory Compliance Program				
15385	CRA Discharge Containment	$19,800,000	CRA Pumping Plant Wastewater System Replacement - Gene & Iron Mountain	June 2019

TABLE 5-3 (Continued)
MAJOR PROJECTS UNDER DESIGN DURING FISCAL YEAR 2017/18

Appropriation Number	Appropriation Title	Appropriation Estimate	Project Description	Estimated Or Actual Completion Date for Final Design
Right of Way & Infrastructure Protection Program				
15474	Right of Way and Infrastructure Protection	$71,200,000	Infrastructure Improvements for Los Angeles County Region	January 2026
			Infrastructure Improvements for Orange County Region	December 2018
			Infrastructure Improvements for Riverside / San Diego County Region	May 2023
			Infrastructure Improvements for Western San Bernardino County Region	September 2020
System Flexibility/Supply Reliability Program				
15402	Hayfield Groundwater Storage	$32,310,000	Lake Perris Seepage Water Conveyance Pipeline	January 2019
15495	Operation Support Facilities Improvement	$35,100,000	CRA Housing Improvements Renovation	December 2020
			La Verne Seismic Upgrades Building 40 and 50	October 2019
			Lake Mathews Wastewater System Replacement	December 2018
15499	Metropolitan Security System Enhancements	$9,731,000	Headquarters Building Physical Security Improvements	June 2019
15488	Water Delivery System Improvements	$40,500,000	Greg Avenue Pump Station Rehabilitation	September 2018
Treatment Plant Reliability Program				
15369	Weymouth Improvements - FY2000/01 Through FY2005/06	$240,700,000	Weymouth Administration Building Seismic Upgrades	August 2019
			Weymouth Filter Valve Replacement - Two Phases	March 2021
15371	Jensen Improvements - FY2000/01 Through FY2005/06	$75,100,000	Jensen Bulk Chemical Tank Farm Facility Upgrades	April 2019
			Jensen Modules Nos. 2 & 3 Travelling Bridge Repairs	May 2021
			Washwater Return Pump Modifications - Phase 2	December 2018
15380	Diemer Improvements	$238,000,000	Diemer Main Washwater Reclamation Plant	July 2021
			Diemer West Basin Rehabilitation	July 2018
15381	Mills Improvements	$8,200,000	Mills Solid Removal Automation	December 2018
15436	Diemer Improvements - FY2006/07 Through FY2011/12	$79,500,000	Diemer Chemical Feed System Improvements	December 2019
			Diemer Filter Building Seismic Upgrades	April 2018
			Diemer Filter Valve Replacement	October 2017
			Diemer Water Sampling System Improvements	September 2018

TABLE 5-3 (Continued)
MAJOR PROJECTS UNDER DESIGN DURING FISCAL YEAR 2017/18

Appropriation Number	Appropriation Title	Appropriation Estimate	Project Description	Estimated Or Actual Completion Date for Final Design
15440	Weymouth Improvements - FY2006/07 Through FY2011/12	$57,000,000	Weymouth Treatment Basins Nos. 5-8 Refurbishment	March 2021
15442	Jensen Improvements - FY2006/07 Through FY2011/12	$146,000,000	Jensen Electrical Systems Reliability - Three Stages	July 2024
			Jensen Modules 2 & 3 Flocculator Refurbishment	September 2018
15452	Mills Improvements - FY2006/07 Through FY2011/12	$27,500,000	Mills Electrical Improvements	August 2021
			Mills Fluoride Tank Replacement	December 2019
			Mills Module Influent Flash Mix Chemical Containment	December 2017
15477	Weymouth Improvements - FY2012/13 Through FY2017/18	$81,000,000	Water Quality Instrumentation Improvements	January 2019
			Weymouth Basin Inlet Channel Seismic Upgrades	March 2021
			Weymouth Chlorine System Upgrade	August 2018
			Weymouth Domestic Water System Improvements	January 2018
			Weymouth Filter Building Sump Sparger Rehabilitation	March 2021
			Weymouth ODP Rehabilitation	May 2020
			Weymouth Storm Water Management Improvements	September 2020
			Weymouth Washwater Pump Station Improvements	December 2019
15478	Diemer Improvements - FY2012/13 Through FY2017/18	$10,400,000	Diemer Chemical Tank Farm Improvements	May 2021
15479	Mills Improvements - FY2012/13 Through FY2017/18	$36,500,000	Mills Fluoride Tank Replacement	June 2019
			Mills Plant Perimeter Security and Environmental Improvements	December 2018
15486	Jensen Improvements - FY2012/13 Through FY2017/18	$16,300,000	Jensen Chemical Containment Upgrades	March 2019
			Jensen Filter Backwash Biological Control System	February 2018
			Jensen Fluoride Tank Replacement	August 2018
			Jensen Inlet Water Quality Instrumentation Enclosure	February 2018
			Jensen Ozone System PLC Control & Communication Equipment Upgrade	February 2018
			Jensen Tank Farm Caustic Metering and Control Facilities	March 2019
Water Quality/Oxidation Retrofit Program				
15472	Enhanced Bromate Control	$13,300,000	Mills Bromate Control Facilities	July 2020

Following are highlights of Engineering Services' operation and maintenance activities during fiscal year 2017/18:

California WaterFix

Engineering Services provided direct support for California WaterFix in collaboration with Metropolitan's Bay-Delta Initiatives office. Key activities during the fiscal year included: provided testimony before the State Water Resources Control Board during the WaterFix Change of Point of Diversion hearings; provided program management leadership to the Department of Water Resources for WaterFix planning; developed a new conceptual engineering report as part of DWR's supplemental Environmental Impact Report/ Environmental Impact Statement; and made presentations to various State Water Contractors and other program stakeholders on the design and construction aspects of the program.

Infrastructure Protection

Engineering Services regularly monitors critical facilities, including dams, reservoirs, pipelines and chemical storage tanks to assess their condition and identify needed repairs to maintain reliable operation. Staff also reviews third-party requests for crossings or use of Metropolitan's right of way. Key activities during the fiscal year included: external corrosion monitoring of the 450 miles of electrically continuous pipelines within the distribution system; monitoring over 100 miles of pipelines for corrosion by stray current interference; maintenance of existing cathodic protection systems at all five treatment plants and other facilities; and completed installation and start-up of a new cathodic protection system on the Allen-McColloch Pipeline.

Dam Safety

Engineering Services regularly performs inspections of Metropolitan's dams and conducts deformation monitoring to ensure public safety and avoid unplanned outages. Key activities during the fiscal year included: maintained a continuous safety/surveillance program for all of Metropolitan jurisdictional dams; completed 38 detailed field inspections; initiated comprehensive spillway assessments at Lake Mathews and Lake Skinner; and prepared and submitted Emergency Action Plans to the State of California Office of Emergency Services for Metropolitan dams classified as extreme high hazard by California Division of Safety of Dams.

Seismic Resilience

Engineering Services has developed a proactive seismic resilience strategy with the goal of minimizing interruptions of water deliveries after a major seismic event. This approach involves regularly assessing the seismic resilience of specific facilities and performing upgrades as needed; evaluating the seismic vulnerability of the system as a whole and increasing operational flexibility when needed; and improving the seismic resilience of the distribution system over time by incorporating new, seismic-resilient components, such as flexible pipe joints, where effective and economical. Key activities during the fiscal year included: conducted a second aqueduct workshop with DWR and Los Angeles Department of Water and Power aimed at improving the overall seismic resilience of imported water supplies to Southern California; prepared the first Biennial Report on Seismic Resilience; and updated Metropolitan's board on seismic resilience achievments and near-term goals.

Cooperative Education Program

Engineering Services continued to offer summer and year-round student intern positions for the 16th consecutive year. This program is designed to provide engineering students with an opportunity to augment their studies with practical work experience in the water industry. Fourteen students participated during FY 2017/18.

Technical Leadership

Engineering Services' staff continued participating in technical and professional organizations, including publication of a number of technical papers and presentations with a highlight on seismic resilience and tunneling. Staff continued active participation on committees of professional organizations, including the American Water Works Association, American Society of Civil Engineers, American Society of Mechanical Engineers, American Concrete Institute, Chlorine Institute, Greenbook Committee of Public Works Standards, Inc., International Society of Automation, Steel Structures Painting Council and Society of American Value Engineers.

Installing an expansion joint on the Santa Ana River Bridge.

The Legal Department obtained numerous favorable court decisions in the trial and appellate courts.

CHAPTER 6

Legal

The Legal Department represents Metropolitan, its directors, officers and, on occasion, employees in litigation and administrative proceedings; renders legal advice; prepares or reviews contracts; and monitors litigation, administrative proceedings, and state and federal legislative and regulatory proposals that could affect Metropolitan.

Major Events

California WaterFix

Additional Points of Diversion

Metropolitan continued to support Department of Water Resources' efforts in proceedings before the state board (State Water Resources Control Board) for additional points of diversion for the State Water Project as part of the California WaterFix. Metropolitan is participating as a party in the petition proceedings through the State Water Contractors. The first part of the proceedings, assessing the potential injury to legal users of water, is now complete. The second part, covering potential injury to fish and wildlife and the public interest, is ongoing.

Approval, Pre-Construction Implementation, Litigation

Staff provided legal advice to the General Manager and the Bay-Delta Initiatives team on a variety of topics regarding the approval of California WaterFix and activities furthering its implementation. Staff drafted a variety of legal memoranda and agreements and provided assistance on topics involving financing, joint powers agencies, implementation agreements, California water rights and various permitting proceedings. Metropolitan attorneys represented the district's legal position in meetings with state and federal agencies, other public water agencies, environmental representatives, and in water rights proceedings before the state board.

Legal staff represented Metropolitan in multiple state and federal lawsuits regarding California WaterFix, including a complaint filed by DWR (Department of Water Resources) seeking validation of its authority to issue revenue bonds to finance design and construction. The challenges in court include 17 cases challenging the validity of the final Environmental Impact Report under CEQA (California Environmental Quality Act). There were also two cases in federal district court challenging the federal Endangered Species Act biological opinions issued by the National Marine Fisheries Service and U.S. Fish & Wildlife Service, and two cases challenging the California Endangered Species Act incidental take permit issued by the state Department of Fish and Wildlife. The 20 state court cases have been consolidated in Sacramento County Superior Court.

State Water Project

SWP Contract Amendments

Staff attorneys provided legal advice and support in connection with proposed amendments to Metropolitan's long-term SWP contract with DWR. The first set of amendments, referred to as the Contract Extension, would extend the contract term and improve the project's overall financial integrity and management. The second set would provide greater flexibility with respect to water storage, transfers and exchanges, and would help implement California WaterFix. Legal also participated in the SWC attorney group working with DWR legal counsel to draft contract amendment language for the Contract Extension amendments, which were previously agreed to in principle. Staff provided legal counseling and assistance in support of ongoing public negotiations between SWC and DWR concerning the second set of amendments.

Colorado River

Additional Conservation Agreements

Metropolitan attorneys assisted in negotiations with the Bureau of Reclamation, the Central Arizona Water Conservation District, Denver Water, the Southern Nevada Water Authority and the Upper Colorado River Commission. Staff attorneys negotiated and drafted multiple agreements with various water users throughout the Colorado River basin to implement a pilot program for the creation of Colorado River System water to maintain water levels in Lake Mead and prevent shortage through voluntary water conservation and reductions in use.

Legislation

Legal staff analyzed and prepared reviews of numerous proposed federal and state bills that could affect Metropolitan. This included numerous bills on energy policies; the Clean Water Act; the ESA; Colorado River rights; invasive species; Salton Sea issues; water quality issues; public agencies; public employment reform; public finance; Bay-Delta reforms; development of Delta conveyance improvements; CEQA; groundwater; recycled water; drought; water rights; water transfers; and water conservation and water-use efficiency measures.

Water Quality

Legal staff monitored activities of Regional Water Quality Control Boards considering adoption of municipal stormwater discharge permits with potential impact on Metropolitan's operations. Legal assisted water quality staff regarding the proposed remediation plan for chromium 6 groundwater contamination adjacent to Colorado River at Pacific Gas & Electric's Topock compressor station site.

Legal staff provided legal assistance regarding detections of quagga mussels in Colorado River and State Water Project supplies. Activities included the development of quagga mussel control plans and other operational measures to address potential water supply impacts from invasive species, particularly potential impacts to groundwater recharge or replenishment.

Finance

In-house counsel, with special counsel, assisted in the closing of Metropolitan financial transactions totaling over $1.29 billion. As part of due diligence associated with debt issuance, legal staff researched methods of compliance with laws, regulations and executive orders relating to terrorism; trade embargoes or money laundering, including executive orders on terrorist financing; the Patriot Act; and regulations administered by OFAC (the Office of Foreign Assets Control) of the U.S Department of Treasury.

San Diego County Water Authority v. Metropolitan et al.

Legal staff continued to represent Metropolitan in conjunction with outside counsel in litigation challenging the validity of Metropolitan's rates adopted in 2010, 2012, 2014, 2016 and 2018, as well as charges adopted in 2016, 2017 and 2018, and other finance-related matters. The 2014 and 2016 cases are stayed pending resolution of the 2010 and 2012 cases, and the parties have agreed to stay the 2017 case. The 2018 case was filed in June 2018. The 2016-2018 cases raise new finance-related challenges that have not yet been litigated.

In these cases, SDCWA alleged that Metropolitan's allocation of SWP transportation costs and demand management costs funded by its Water Stewardship Rate to its transportation rates and wheeling rate is unlawful. SDCWA also alleged breach of the water Exchange Agreement between Metropolitan and SDCWA due to the price term based on Metropolitan's transportation rates, miscalculation of preferential rights, and that a Rate Structure Integrity clause used in certain contracts was unlawful.

In September 2017, the California Supreme Court denied SDCWA's petition for review in the 2010 and 2012 cases. As a result, the Court of Appeal's June 2017 published decision stands, in which it held that Metropolitan's allocation of SWP transportation costs to its transportation rates and wheeling rate is lawful, but that the administrative record for the years 2011-2014 did not sufficiently support the allocation of the WSR to those rates. The court held that due to the inclusion of the WSR in the Exchange Agreement price, the agreement was breached. The court also held Metropolitan miscalculated preferential rights and the RSI clause was invalid and unenforceable.

The Court of Appeal remanded to the trial court for redetermination of contract damages based on WSR overcharges, entry of declaratory judgment on the RSI claim, and redetermination of attorneys' fees if there is a prevailing party. Through June 2018, the parties engaged in initial remand proceedings in the 2010 and 2012 cases.

Several other claims in the 2010 and 2012 cases were previously decided in Metropolitan's favor during pre-trial proceedings and at trial. Nine member agencies have joined the rate challenges in all of these cases in support of Metropolitan.

Other Litigation

Copper Pitting Cases

Staff attorneys worked on multiple lawsuits alleging Metropolitan and other defendant water agencies were liable for delivering "aggressive and/or corrosive" water to consumers that resulted in pinhole leaks in residential copper plumbing. Metropolitan, with the other agencies, prevailed in a "legal issues trial." The trial court ruled in the water agencies' favor on all key legal issues. Some of the plaintiffs appealed the trial court's decision. On May 3, 2018, the Fourth District Court of Appeal, in a published decision, ruled that as a matter of law, plaintiffs cannot state a cause of action in nuisance or inverse condemnation based on the treatment and delivery of water.

The appellate court considered four legal issues that were decided in favor of the water districts during trial. Affirming the trial court on all grounds, the appellate court held that the water districts' use of chloramines in their water, in compliance with Safe Drinking Water Act standards, was authorized by a permit and regulations and is therefore not a nuisance. In addition, the appellate court rejected the appellants' argument that pinhole leaks are a constitutionally compensable damage, determining that appellants' claim was rooted in tort liability and further that the Legislature has not authorized tort liability arising out of the treatment and delivery of water. One of the plaintiffs filed a petition for review to the California Supreme Court challenging only the inverse condemnation ruling. Metropolitan worked with the other involved water agencies and outside counsel to file an answer to the petition.

Construction Litigation – Shimmick Construction Company, Inc. et al. v. Metropolitan Water District

In early 2018, Metropolitan settled a lawsuit filed against Metropolitan by Shimmick/Obayashi, a joint venture relating to the Diemer Oxidation Retrofit Program project. In a breach of contract complaint filed in October 2014, Shimmick/Obayashi alleged that it was damaged by Metropolitan's project changes, delays, disruptions and interference and that Metropolitan improperly withheld $2.5 million from contract payments. The complaint sought monetary and equitable relief in excess of $10 million, plus interest. In advance of the January 30, 2018 trial date, the judge ruled in Metropolitan's favor on a number of pre-trial motions. Subsequent to these rulings and prior to the scheduled trial, the

parties entered into a settlement in which Metropolitan agreed to release the $2.5 million in liquidated damages and pay Shimmick/Obayashi an additional $1.5 million in exchange for the company dismissing its lawsuit with prejudice. A dismissal was entered by the court on February 7, 2018.

Real Estate Matters

Delta Wetlands and Litigation

In fiscal year 2017/2018, Metropolitan prevailed at the trial court level in a CEQA case and an intentional interference with contract case concerning Metropolitan's purchase of 20,000 acres of land in the Sacramento/San Joaquin Delta from Delta Wetlands Properties. These cases and two other CEQA cases were filed in 2016 shortly after the board authorized the purchase. Metropolitan settled with the plaintiffs in the other two CEQA cases in September 2016. In the remaining CEQA case, *County of San Joaquin, et al. v. Metropolitan Water District of Southern California, et al*., Metropolitan prevailed on the merits after a hearing before the trial court judge. The plaintiffs appealed, and the case is pending in the Court of Appeal for the Third Appellate District in Sacramento. In the *Central Delta Water Agency, et al. v. Delta Wetlands Properties, et al*. interference with contract case, Metropolitan successfully moved to dismiss all causes of action alleged against it, including the intentional interference with contract claim, and won a post-judgment motion to recover over $393,000 in attorneys' fees and other costs. Plaintiffs have appealed both the dismissal and fee award. The Court of Appeal for the First Appellate District in San Francisco consolidated the appeals, and briefing is expected to begin in summer or fall 2018.

Managing Energy Costs

Metropolitan attorneys assisted in completing the negotiation, drafting and board approval of three sets of agreements necessitated by the September 30, 2017 termination of the Metropolitan/Southern California Edison Service and Interchange Agreement. These include an interconnection agreement and six facilities agreements with SCE, an operating agreement with the California Independent System Operator, and both a scheduling and trading and a power system operations agreement with the Arizona Electric Power Cooperative. These long-term agreements will govern the operation of Metropolitan's Colorado River

Aqueduct power system, and the procurement and delivery of energy necessary to operate Metropolitan's pumping plants.

Workforce Matters

Metropolitan participated in several matters related to grievances filed by AFSCME (American Federation of State, County and Municipal Employees) including hearing officer appeal hearings. Two evidentiary administrative hearings are currently underway, so decisions have not yet been issued. On a third matter, Metropolitan succeeded in reversing an adverse hearing officer decision before the Superior Court. That trial court decision was affirmed by the Court of Appeal in a published decision, and AFSCME in response recently filed a petition for review now pending before the California Supreme Court. The appellate court affirmed the trial court's ruling that a grievance on appeal must be based on an actual controversy meriting hearing officer intervention. The purpose of this requirement is to limit matters brought before hearing officers to grievances that involve an actual injury. Grievances that raise only hypothetical or abstract questions are not considered "ripe" for hearing officer review. The Court of Appeal also determined that a hearing officer's interpretation of a Memorandum of Understanding is subject to independent review by the courts; that the hearing officer's authority is limited to the scope of the issue before him/her; and that the hearing officer in this matter exceeded his authority by issuing a remedy modifying the terms and conditions of the MOU.

Public Records Act Requests

Legal staff coordinated Metropolitan's responses to 194 requests under the Public Records Act, including review of all documents for responsiveness and privilege. Requests related to all areas of Metropolitan's business including: Data and maps for Metropolitan's facilities; construction of desert housing; final reports of ethics investigations; water supply and deliveries, including data on meters and operations; communications between directors and elected officials; conservation data, including water-saving rebates; employee salaries and job descriptions; bids, proposals, contracts and agreements; purchase order data; farm leases; land purchases; easements; maps of Metropolitan's service area; emergency and inundation records for dams; water quality and blend data; energy use and costs; data on uncashed checks; water rates and charges; investments and bonds; the Bay-Delta Water Quality Control Plan Update, and California WaterFix.

Metropolitan continues to upgrade its facilities by investing in new cost-saving technologies.

CHAPTER 7

Finance

The Office of the Chief Financial Officer is responsible for providing innovative, proactive and strategic financial direction in support of the mission of Metropolitan, the Board of Directors, management and employees. The Office of the CFO maintains Metropolitan's strong financial position and high credit ratings; helps achieve equitable water rates and charges that generate sufficient revenues; assists in the efficient management of Metropolitan's financial resources; and ensures adequate financial controls are in place to accurately record financial transactions, communicate financial results and protect Metropolitan assets.

Finance Overview

The roles and responsibilities of the Office of the CFO include:

- Providing comprehensive financial analyses and development of the biennial revenue requirement, supporting cost-of-service studies, the recommended water rates and charges, and long-range financial forecasts.
- Developing a biennial budget that supports Metropolitan's mission and business planning and performance measurement programs.
- Maintaining Metropolitan's official accounting records, cash control and accounting services related to vendor, payroll and other payments.
- Collecting, investing, safekeeping and disbursing Metropolitan's funds.
- Maintaining effective financial controls to safeguard assets.

- Administering the debt portfolio, including issuing debt to efficiently fund Metropolitan's capital expenditures at the lowest possible cost.
- Continuing and improving relations with Metropolitan's bond investors, including investors supporting Metropolitan's diversified variable rate bond portfolio.
- Developing and maintaining accounting guidelines and policies for accurate and timely financial reporting and control.
- Accounting for all assets, liabilities, revenues and expenditures, and determining the availability of funds for investment.
- Providing timely financial reporting, preparing the annual tax levy and annexation fee calculations, and administering rates and charges.
- Managing Metropolitan's Business Continuity Program to ensure critical business processes can continue in the event of a disaster.
- Providing risk management to prevent, control, transfer and minimize exposure to liability risk to protect Metropolitan's assets.

Details on the biennial budget, rates and charges, financial statements, financial policies and financing documents can be found at the financial information webpage.

FY 2017/18 Major Financial Activities and Accomplishments

Security Sales/Debt Administration

Metropolitan maintained S&P Global Ratings' highest long-term water revenue bond rating of AAA, and the second highest credit rating for Moody's and Fitch Ratings of Aa1 and AA+ on its senior lien debt. Metropolitan's long-term subordinate lien debt is rated AA + by S&P Global Ratings and AA+ by Fitch Ratings. Metropolitan's variable rate debt is rated in the highest short-term rating category from each rating agency. Senior-lien variable rate debt is rated MIG 1, A-1+, and F1+, from Moody's, S&P Global Ratings, and Fitch

Ratings, respectively. Subordinate variable rate debt is rated A-1+ by S&P Global Ratings and F1+ by Fitch Ratings.

In July 2017, Metropolitan issued $178.2 million Subordinate Water Revenue Refunding Bonds, 2017 Series B (Fixed Rate Bonds), $95.6 million Subordinate Water Revenue Refunding Bonds, 2017 Series D (SIFMA Index Mode), and $95.6 million Subordinate Water Revenue Refunding Bonds, 2017 Series E (SIFMA Index Mode), to refund several series of outstanding fixed and variable rate debt. The three refunding bond issues are projected to provide $119.4 million in estimated net present value debt service savings. Metropolitan also issued $80 million Subordinate Lien Water Revenue Bonds, 2017 Series C (SIFMA Index Mode), which provided proceeds to fund a portion of fiscal year 2017/18 capital expenditures. The three series of SIFMA Index Bonds were priced, for a one-year term, at a rate equal to the SIFMA Index plus 5 basis points. SIFMA stands for the Securities Industry and Financial Markets Association.

In November 2017, Metropolitan prepaid $125 million Taxable Flexible Rate Refunding Notes, Series A-1 and $125 million Index Notes (Taxable and Refunding), Subseries B-1, proceeds of which were used to replenish financial reserves.

In December 2017, Metropolitan issued $198.3 million of Tax-Exempt Flexible Rate Revolving Notes, Series 2016 B-2, to refund various series of variable rate bonds.

In June 2018, Metropolitan issued $99.1 million Subordinate Water Revenue Refunding Bonds, 2018 Series A, to refund two series of fixed-rate bonds for estimated net present value debt service savings of $12.2 million, and $64.3 million Subordinate Water Revenue Bonds, 2018 Series B, which provided $80 million in proceeds to fund a portion of Metropolitan's FY 2018/19 capital expenditures. Metropolitan issued $210 million Serial Variable Rate Water Revenue Refunding Bonds, 2018 Series A-1 and 2018 Series A-2, to refund the Series 2016 B-2 notes and a series of fixed-rate bonds, for estimated net present value savings of $980,000.

In June 2018, Metropolitan successfully repriced the 2017 Series C, D and E SIFMA Index Bonds. The bonds were repriced at a rate equal to the SIFMA Index minus 3 basis points.

Treasury Operations

- Successfully managed short-term and bond reserve portfolios averaging $672.3 million, complying with the state Government Code and Metropolitan's Statement of Investment Policy.
- Earned total returns of 1.42 and 0.14 percent respectively for the short-term and long-term portfolios.
- Monitored performance by the external managers of the $345.9 million long-term portfolio to ensure compliance with Metropolitan's Statement of Investment Policy.
- Provided the necessary liquidity to fund approximately $1.9 billion in expenditures during the fiscal year.
- Managed, calculated and coordinated approximately $347.1 million in debt service, swap payments and debt administration expenses.
- Managed net interest exposure within board-approved parameters.

Accounting Operations

- Provided accurate, timely and transparent financial reports to the board and member agencies.
- Recorded and reported Metropolitan's financial activities in a timely manner, ensuring sufficient financial controls to protect Metropolitan's assets.
- Completed the FY 2016/17 external audit with an unmodified (i.e. "clean") opinion.
- Achieved internal financial audit reviews with ratings of generally satisfactory or higher and no major findings.
- Continued the documentation and testing of internal controls over financial reporting, concluding that the controls were effective for the fiscal year ending June 30, 2017.
- Received the Award of Excellence for financial reporting from the Government Finance Officers Association for FY 2016/17.

Budget and Financial Planning

- Completed Metropolitan's biennial budget and water rates and charges for FY 2018/19 and 2019/20.
- Updated the 10-year long-range financial forecast that supports Metropolitan's financial metrics and incorporates the implementation of the California WaterFix while mitigating cost impacts to Metropolitan's member agencies.
- Provided financial analyses to support the potential Regional Recycled Water Program.
- Worked with the Legal Department to maintain Metropolitan's ad valorem property tax assessment at the FY 2015/16 rate to offset a portion of State Water Contract costs; prepared the analysis to support the updated annexation fee.
- Received the GFOA Distinguished Budget Presentation Award for the FY 2016/17 and 2017/18 biennial budget.

Business Continuity

- Completed business impact analyses and identified 113 critical business processes based on operational and financial impacts; assisted Information Technology with strategies for backing up data and recovering critical applications following a disaster.
- Completed updates for all 31 business continuity plans, containing distribution, employee and vendor rosters, recovery teams, critical timeframes and recovery strategies in the event of impacts to Metropolitan facilities, IT systems or staffing levels.
- Conducted periodic testing of the MetAlert Emergency Notification System with employees and the board, reaffirming Metropolitan's ability to communicate important information during an emergency.

Risk Management

- Completed incident reports involving Metropolitan property damage, liability issues, workplace injuries, regulatory visits, criminal activity and spills; and managed Metropolitan's self-insured liability and property claims program.

- Completed risk assessments of professional service agreements, purchase orders, construction contracts, entry permits, easements, special events and film permits within required timeframes.

- Collaborated with the Legal Department to accurately manage liability reserves and provided feedback into the claims settlement and litigation process; renewed excess and specialty insurance coverages below anticipated premium costs and within budget.

Financial Information

Metropolitan operates as a utility enterprise and maintains its accounting records in accordance with generally accepted accounting principles for proprietary funds as prescribed by the Governmental Accounting Standards Board. Metropolitan's financial reports can be found at the financial information webpage.

Revenues

Metropolitan's principal revenue source is revenues received by Metropolitan from charges for water transactions and availability of water, including Metropolitan's water rates, readiness-to-serve charge and capacity charge (revenues from water transactions include sales, exchanges and wheeling). Other sources of revenue include property taxes, investment income and power sales. Water rates and charges are established biennially by the board and are not subject to regulation by the California Public Utilities Commission or any other governing body.

The rate structure implemented on January 1, 2003 unbundled Metropolitan's previous water rate into separate rates and charges (a power rate, a treatment surcharge, a system access rate, a water

stewardship rate and a capacity charge) to provide transparency regarding the cost of specific functions to member agencies. This rate structure also includes a two-tiered block pricing structure for water supply. Effective January 1, 2018, the full service Tier 1 rate (including all rate elements), which is based on recovering the cost of maintaining a reliable amount of supply, was $695 per acre-foot for untreated water. Likewise, the full service Tier 2 rate of $781 per acre-foot is set at Metropolitan's cost of purchasing water transfers north of the Delta and encourages member agencies to maintain existing local supplies and develop cost-effective local supply resources and conservation. A complete list of current water rates and charges is available in Table 7-1. Overall, Metropolitan increased rates and charges 4 percent effective January 1, 2018.

Metropolitan is empowered under the Metropolitan Water District Act to levy and collect taxes on all taxable property within its boundaries for the purpose of carrying on its operations and paying obligations. Property taxes are levied annually by the board to pay Metropolitan's general obligation bond debt service and part of its State Water Contract costs.

Metropolitan’s revenues in fiscal year 2017/18 totaled $1.632 billion. Sources of revenues include water transactions, readiness-to-serve charges, capacity charges, power sales, property taxes, investment income and other income, such as rents. Total revenues were $148 million higher than the prior fiscal year, primarily due to a higher level of water transactions.

TABLE 7-1
WATER RATE TABLE

(Dollars per acre-foot-unless otherwise specified)

	Calendar Year [1]										
	2018	2017	2016	2015	2014	2013	2012	2011	2010	2009	2008
Tier 1 Supply Rate	$ 209	$ 201	$ 156	$ 158	$ 148	$ 140	$ 106	$ 104	$ 101	$ 109	$ 73
Delta Supply Surcharge [2]	--	n/a	n/a	n/a	n/a	n/a	58	51	69	--	--
Tier 2 Supply Rate	295	295	290	290	290	290	290	280	280	250	171
Water Supply Surcharge	--	--	--	--	--	--	--	--	--	25	--
System Access Rate	299	289	259	257	243	223	217	204	154	143	143
Water Stewardship Rate	55	52	41	41	41	41	43	41	41	25	25
System Power Rate	132	124	138	126	161	189	136	127	119	110	110
Full Service Untreated:											
Tier 1	695	666	594	582	593	593	560	527	484	412	351
Tier 2	781	760	728	714	735	743	686	652	594	528	449
Replenishment Water Rate [3]:											
Untreated	--	n/a	n/a	n/a	n/a	n/a	422	409	366	294	258
Treated	--	n/a	n/a	n/a	n/a	n/a	651	601	558	436	390
Interim Agricultural Water Program [4]:											
Untreated	--	n/a	n/a	n/a	n/a	n/a	537	482	416	322	261
Treated	--	n/a	n/a	n/a	n/a	n/a	765	687	615	465	394
Treatment Surcharge	320	313	348	341	297	254	234	217	217	167	157
Full Service Treated:											
Tier 1	1,015	979	942	923	890	847	794	744	701	579	508
Tier 2	1,101	1,073	1,076	1,055	1,032	997	920	869	811	695	606
Capacity Charge ($ per cubic foot second)	8,700	8,000	10,900	11,100	8,600	6,400	7,400	7,200	7,200	6,800	6,800
Readiness-to-Serve Charge ($Millions)	140	135	153	158	166	142	146	125	114	92	82

[1] Rates are set on a calendar year basis.

[2] The Delta Supply Surcharge was suspended after 2012.

[3] The Replenishment Program was discontinued after 2012.

[4] The Interim Agricultural Water Program was discontinued after 2012.

Table 7-2 lists revenues by source and the change in revenues from the prior year.

TABLE 7-2
REVENUES
(Dollars in Millions)

	Year Ended June 30,		
	2018	**2017**	**Change**
Water Revenues [1]	$ 1,285	$ 1,151	$ 134
Capacity Charge [2]	35	40	(5)
Readiness-To-Serve Charges	137	144	(7)
Power Sales [3]	24	21	3
Taxes (Net)	127	115	12
Investment Income (loss)	11	6	5
Other	13	7	6
Total	**$ 1,632**	**$ 1,484**	**$ 148**

[1] Water Revenues includes revenues from water sales, exchanges and wheeling.
[2] Previously reported as part of water revenues.
[3] Previously referred to as power recoveries or hydroelectric power sales.

Expenses

Metropolitan continued its efforts to manage finances, control costs, enhance productivity, support conservation and local resource programs, and procure additional supplies during the fiscal year. Major components of Metropolitan operations and maintenance costs include labor, chemicals, utilities, outside services, materials and operating equipment. Table 7-3 lists expenses by function and the changes from the prior year, while Table 7-4 summarizes changes in net position (revenues and expenses).

Metropolitan is one of 29 contractors to the State Water Project. Under the contract, Metropolitan is obligated to pay the state Department of Water Resources its portion of the costs for construction of the system as well as the minimum operations, maintenance, power and replacement costs of the project regardless of the amount of water actually delivered. Variable power charges are based on actual deliveries of SWP supplies.

In addition, Metropolitan has an obligation to pay its share of the ongoing capital and remediation costs of certain off-aqueduct power facilities regardless of the amount of water delivered.

Metropolitan also buys power to pump Colorado River water into its service area. The power is secured by Metropolitan under federal energy contracts and from purchases of supplemental energy from a variety of sources as available. In addition, Metropolitan has entered into, and is negotiating, a number of agreements with entities along the Colorado River that have higher priority rights to water on the Colorado River. These agreements give Metropolitan firm rights to water that it otherwise would not have.

Construction requirements to rehabilitate and repair facilities, and provide enhanced water treatment capability are being funded by a combination of long-term debt as well as from operating revenues. General obligation bond debt service is funded from ad valorem property taxes. Tables 7-5 and 7-6 show assessed valuations and property tax rates for FY 2017/18 and the preceding nine years, while Table 7-7 shows property tax levies and collections. Revenue bond debt service is funded from water revenues. Table 7-8 is a 10-year summary of net operating income and revenue bond service coverage, while Table 7-9 is a listing of Metropolitan's 10 largest water customers.

TABLE 7-3
EXPENSES
(Dollars in Millions)

	Year Ended June 30,		
	2018	**2017**	**Change**
Power and Water Costs	$ 447	$ 455	$ (8)
Operations and Maintenance	507	488	19
Depreciation and Amortization	330	302	28
Bond Interest	125	135	(10)
Loss on Disposal of Plant Assets	89	21	68
Other	68	9	59
Total	**$ 1,566**	**$ 1,410**	**$ 156**

Fiscal year 2017/18 expenses totaled $1.566 billion. Expenses include power and water costs, operations and maintenance costs, depreciation and amortization, interest on debt obligations, loss on disposal of plant assets and other miscellaneous expenses. Total expenses were $156 million more than prior year mainly due to $68 million more of loss on disposal of plant assets related to the

write-off of Skinner Modules 4, 5 and 6 and $59 million more in other expenses, of which $19 million related to an increase in the write-off of construction-in-progress programs upon determination that no operational asset would result from the costs incurred and $40 million related to a recalculation of previously capitalized interest on construction.

Budget Process

Metropolitan combines elements of program budgeting and performance reporting in its budget system. These elements provide for funding, analysis, review and control. The biennial budget for fiscal years 2018/19 and 2019/20 was presented to and discussed by the board during February and March 2018, and approved in April 2018.

The biennial budget process begins in July of odd-numbered years (e.g., July 2017 for the FY 2018/19 and FY 2019/20 biennial budget) when each group identifies major maintenance and capital projects. Project requests are submitted to Engineering Services beginning in July, giving staff adequate time to plan project design and construction schedules, and to allow Water System Operations to plan for system shutdowns. Each department and group prepares operating budgets from August to November. Each program is analyzed and reviewed as to resources required and the extent to which the program is consistent with the priorities and strategies of the General Manager's Business Plan. All recommended programs are then incorporated into the overall budget. The proposed biennial budget includes a 10-year forecast of revenues, expenditures, unrestricted reserve balances and projected rates and charges. These forecasts incorporate projected costs associated with the repair and replacement of existing infrastructure, and also the projected costs of the California WaterFix, to help member agencies and the general public understand long-term cost trends and potential future water rate impacts.

Budgetary control is maintained through monthly variance reports, which compare budget estimates with actual revenues and expenses for board and management information and form the basis for corrective actions. All major expense categories are controlled via the board-approved biennial budget and authorized appropriations. Since adopting a biennial budget, a mid-cycle update is provided to the Metropolitan board at the midpoint of the two-year period.

TABLE 7-4

TEN-YEAR SUMMARY OF CHANGES IN NET POSITION (UNAUDITED) - ACCRUAL BASIS[1]

(Dollars in Millions)

	Fiscal Year Ended June 30,									
	2018[2] As Adjusted	2017	2016	2015	2014[3] As Adjusted	2013	2012[4] As Adjusted	2011[4] As Adjusted	2010	2009[5] As Adjusted
Water Revenues[6]	$ 1,285.2	$ 1,150.5	$ 1,166.0	$ 1,382.9	$ 1,484.6	$ 1,282.5	$ 1,123.3	$ 1,001.0	$ 1,010.9	$ 999.5
Readiness-to-serve charges	137.5	144.0	155.5	162.0	154.0	144.0	135.5	119.5	103.0	87.0
Capacity charge	34.6	39.7	44.7	37.5	28.5	28.7	33.0	34.4	33.4	32.6
Power recoveries	23.7	20.9	7.5	8.4	14.6	24.5	31.5	22.9	18.3	17.4
Operating revenues	1,481.0	1,355.1	1,373.7	1,590.8	1,681.7	1,479.7	1,323.3	1,177.8	1,165.6	1,136.5
Taxes, net	127.3	115.4	107.9	102.3	94.5	94.8	79.2	79.3	98.1	105.6
Investment income	10.6	6.2	19.4	(3.6)	5.7	(0.4)	4.1	2.0	40.6	27.3
Other, net	12.9	7.3	10.2	5.4	—	6.1	0.6	22.0	6.4	6.0
Nonoperating revenues	150.8	128.9	137.5	104.1	100.2	100.5	83.9	103.3	145.1	138.9
Total revenues	1,631.8	1,484.0	1,511.2	1,694.9	1,781.9	1,580.2	1,407.2	1,281.1	1,310.7	1,275.4
Power and water costs	(446.5)	(455.4)	(552.3)	(473.6)	(510.1)	(371.3)	(384.0)	(364.8)	(433.7)	(402.1)
Operations and maintenance	(507.4)	(487.5)	(650.1)	(543.4)	(439.7)	(419.8)	(433.5)	(394.9)	(395.6)	(440.0)
Depreciation and amortization	(330.3)	(301.7)	(376.5)	(374.8)	(261.5)	(265.4)	(290.1)	(286.4)	(246.4)	(226.1)
Operating expenses	(1,284.2)	(1,244.6)	(1,578.9)	(1,391.8)	(1,211.3)	(1,056.5)	(1,107.6)	(1,046.1)	(1,075.7)	(1,068.2)
Bond interest	(124.5)	(134.6)	(126.9)	(132.5)	(146.7)	(150.2)	(135.8)	(135.7)	(133.3)	(103.4)
Interest and adjustments on OAPF[7]	—	(0.6)	(0.8)	(1.2)	(1.6)	(2.1)	(2.6)	(3.0)	(3.4)	(3.8)
Loss on disposal of plant assets	(88.7)	(20.9)								
Other, net	(68.2)	(9.4)	(4.6)	—	(23.7)					
Nonoperating expenses	(281.4)	(165.5)	(132.3)	(133.7)	(172.0)	(152.3)	(138.4)	(138.7)	(136.7)	(107.2)
Total expenses	(1,565.6)	(1,410.1)	(1,711.2)	(1,525.5)	(1,383.3)	(1,208.8)	(1,246.0)	(1,184.8)	(1,212.4)	(1,175.4)
Contributed capital	1.5	—	2.1	2.3	2.2	1.7	13.6	17.7	4.6	66.1
Cumulative effect of change in accounting principle	(138.9)	—	—	(491.0)	—	—	—	(8.2)	—	0.5
Change in net position	$ (71.2)	$ 73.9	$ (197.9)	$ (319.3)	$ 400.8	$ 373.1	$ 174.8	$ 105.8	$ 102.9	$ 166.6

[1] Metropolitan implemented Governmental Accounting Standards Board (GASB) Statement No. 63, *Financial Reporting of Deferred Outflows of Resources, Deferred Inflows of Resources and Net Position*, in fiscal 2012. This pronouncement requires that the difference between assets and liabilities be reported as net position, therefore, net assets are now referred to as net position.

[2] Adjustment relates to Metropolitan's implementation of GASB Statement No. 75 (GASB 75), *Accounting and Financial Reporting for Postemployment Benefits Other Than Pension.* GASB 75 requires the reporting of a net Other Postemployment Benefit (OPEB) liability in the basic financial statements when an organization's OPEB liability exceeds the net position available for paying benefits.

[3] Adjustment relates to Metropolitan's implementation of GASB Statement No. 68 (GASB 68),*Accounting and Financial Reporting for Pensions - an amendment of GASB Statement No. 27,* and GASB Statement No. 71. (GASB 71), *Pension Transition for Contributions Made Subsequent to the Measurement Date - an amendment of GASB Statement No. 68.* GASB 68 requires the reporting of net pension liability in the basic financial statements when an organization's pension liability exceeds the net position available for paying benefits while GASB 71 requires the recognition of beginning deferred outflow of resources for pension contributions made after the measurement date. Fiscal years 2009 through 2014 have not been adjusted.

[4] Adjustment relates to the adoption of GASB No. 65, *Items Previously Reported as Assets and Liabilities*. This pronouncement requires debt issuance costs (except prepaid insurance costs) to be recognized as expense in the period incurred. Fiscal years 2009 through 2010 have not been adjusted.

[5] Adjustment relates to implementation of GASB Statement No. 53,*Accounting and Financial Reporting for Derivative Instruments* . This pronouncement requires derivative instruments to be reported at their fair value on the statements of net position along with a related deferred outflow to be recorded for effective hedges.

[6] Water Revenues includes revenues from water sales, exchanges, and wheeling.

[7] Off-Aqueduct Power Facilities. The State relieved Metropolitan of its obligation during the year ended June 30, 2018.

Treasury Operations and Cash Management

Annually, Metropolitan's board approves the Statement of Investment Policy and delegates to the Treasurer the authority to invest Metropolitan funds.

Investments by the Treasurer are limited to those instruments specified in the board-approved Statement of Investment Policy, which sets out, in order of priority, three fundamental criteria to be followed: safety, liquidity and return.

Metropolitan is permitted by state law and board policy to invest in a variety of instruments, including U.S. Treasury securities; federal agencies; repurchase agreements; negotiable certificates of deposit; bankers' acceptances; prime commercial paper; asset and mortgage-backed securities; and California local agency securities, including securities issued by Metropolitan. Investments also can be made in corporate notes, time deposits, investment contracts, shares of beneficial interest, and the Local Agency Investment Fund.

Treasury activities during the year included the management of the short-term and bond reserve portfolios and oversight of the firms managing the long-term investment portfolios. Metropolitan's total portfolio averaged about $1.1 billion during fiscal year 2017/18, with cash basis investment earnings of approximately $15.6 million. As of June 30, 2018, the market value of Metropolitan's investment portfolio was approximately $1 billion.

TABLE 7-5
TEN MEMBER AGENCIES WITH LARGEST ASSESSED VALUATIONS
YEAR ENDED JUNE 30, 2018
(Dollars in Billions)

Member Agency	Assessed Valuation	*Percent of Total
Los Angeles	$557.4	20.34
San Diego County Water Authority	479.7	17.50
MWD of Orange County	469.8	17.14
West Basin MWD	187.4	6.84
Central Basin MWD	139.4	5.09
Inland Empire Utilities Agency	104.2	3.80
Upper San Gabriel Valley MWD	99.4	3.63
Calleguas MWD	99.2	3.62
Western MWD	99.0	3.61
Eastern MWD	73.9	2.70
	$2,309.4	**84.27**
Total Gross Assessed Valuation (All 26 Member Agencies)	**$2,740.6**	

*Total may not foot due to rounding.

TABLE 7-6
TEN-YEAR SUMMARY OF ASSESSED VALUATIONS AND PROPERTY TAX RATES
(Dollars in Billions)

Fiscal Year Ended June 30,	Gross Assessed Valuation [1]	Homeowner's Exemption	Net Assessed Valuation [2]	Secured Property Percentage Tax Rate
2018	$ 2,740.6	$ 15.6	$ 2,725.0	0.0035
2017	2,583.4	15.8	2,567.6	0.0035
2016	2,451.0	15.9	2,435.1	0.0035
2015	2,314.9	16.2	2,298.8	0.0035
2014	2,183.4	16.3	2,167.0	0.0035
2013	2,097.4	16.7	2,080.7	0.0035
2012	2,067.5	16.9	2,050.5	0.0037
2011	2,049.1	17.1	2,031.9	0.0037
2010	2,081.9	17.2	2,064.7	0.0043
2009	2,120.9	17.2	2,103.7	0.0043

[1] Gross assessed valuations (before deduction of Homeowner's and Business Inventory Exemptions), as of August each year, of all secured and unsecured property within Metropolitan's service area, as certified by the County Auditor-Controllers for the respective counties.

[2] May not foot due to rounding.

TABLE 7-7
TEN-YEAR SUMMARY OF PROPERTY TAX LEVIES AND COLLECTIONS (UNAUDITED)
CASH BASIS

(Dollars in Thousands)

Fiscal Year Ended June 30,	Total Tax Levy	Tax Collections			Outstanding Delinquent Taxes [2]	Percent of Current Taxes Collected to Total Tax Levy	Percent of Total Tax Collections to Total Tax Levy	Percent of Delinquent Taxes to Total Tax Levy
		Current	Delinquent	Total [1]				
2018	$ 121,647	$ 121,647	$ 8,019	$ 129,666	$ -	100.0 %	106.6 %	0.0 %
2017	112,727	112,727	2,410	115,137	-	100.0	102.1	0.0
2016	104,829	104,829	5,825 [3]	110,654 [3]	-	100.0	105.6 [3]	0.0
2015	100,066	97,687	5,320 [3]	103,007 [3]	2,379	97.6	102.9 [5]	2.4
2014	94,963	94,963	3,744	98,707	-	100.0	103.9	0.0
2013	92,247	89,576	7,078	96,654	2,671	97.1	104.8	2.9
2012	94,810	80,775	9,478	90,253	4,076	85.2	95.2	4.3
2011	95,385	71,069	16,987	88,056	9,478	74.5	92.3	9.9
2010	107,867	82,164	15,083	97,247	16,987	76.2	90.2	15.7
2009	109,755	91,632	12,951	104,583	15,083	83.5	95.3	13.7

[1] Total tax collections exclude cash payments on new annexations.

[2] Delinquent taxes shown are net of the "Allowance for Uncollectibles" - determined by historical trends of collections and payments.

[3] Amounts were updated subsequent to the Annual Report submission deadline.

TABLE 7-8
TEN-YEAR SUMMARY OF NET OPERATING INCOME AND REVENUE BOND DEBT SERVICE COVERAGE[1] (UNAUDITED)
(Dollars in Millions)

	Fiscal Year Ended June 30,									
	2018	2017	2016	2015	2014	2013	2012	2011	2010	2009
Water Revenues [2]	$ 1,285	$ 1,151	$ 1,166	$ 1,383	$ 1,485	$ 1,283	$ 1,062	$ 996	$ 1,011	$ 988
Additional Revenues [2]	172	184	200	199	182	173	168	153	135	120
Total Revenues	1,457	1,335	1,366	1,582	1,667	1,456	1,230	1,149	1,146	1,108
Operating Expenses	(963)	(927)	(1,201)	(1,005)	(854)	(793)	(792)	(853)	(825)	(782)
Net Operating Revenues	494	408	165	577	813	663	438	296	321	326
Hydroelectric Power Revenue & Other	51	39	30	29	34	48	87	96	52	43
Transfer from Reserve Funds	1	33	222	142	—	—	—	—	—	—
Interest on Investments [3]	8	4	18	13	19	(2)	11	17	19	32
Adjusted Net Operating Revenues	554	484	435	761	866	709	536	409	392	401
Senior and Subordinate Bonds Debt Service [4]	(340)	(306)	(309)	(280)	(343)	(298)	(297)	(277)	(244)	(223)
Subordinate Revenue Obligations	—	(2)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)
Funds Available from Operations	$ 214	$ 176	$ 125	$ 480	$ 522	$ 410	$ 238	$ 131	$ 147	$ 177
Ratios										
Debt Service Coverage on all Senior and Subordinate Bonds	1.63	1.57	1.41	2.71	2.51	2.37	1.80	1.47	1.60	1.79
Bonds and Additional Bonds Debt Service Coverage [5, 6]	—	1.58	1.41	2.72	2.52	2.38	1.81	1.48	1.61	1.80

[1] Prepared on a modified accrual basis for fiscal years 2013-2018 and on a cash basis for fiscal years 2009-2012.

[2] Water Revenues include revenues from water sales, exchanges and wheeling. Fiscal years 2009-2011 restated to include exchange sales in Water Revenues. They were previously reported under Additional Revenue.

[3] Excludes interest applicable to Bond Construction accounts, Excess Earning account(s), Other Trust accounts, and the Deferred Compensation Trust account.

[4] Previously reported as Bonds and Additional Bonds Debt Service for fiscal years 2009-2017.

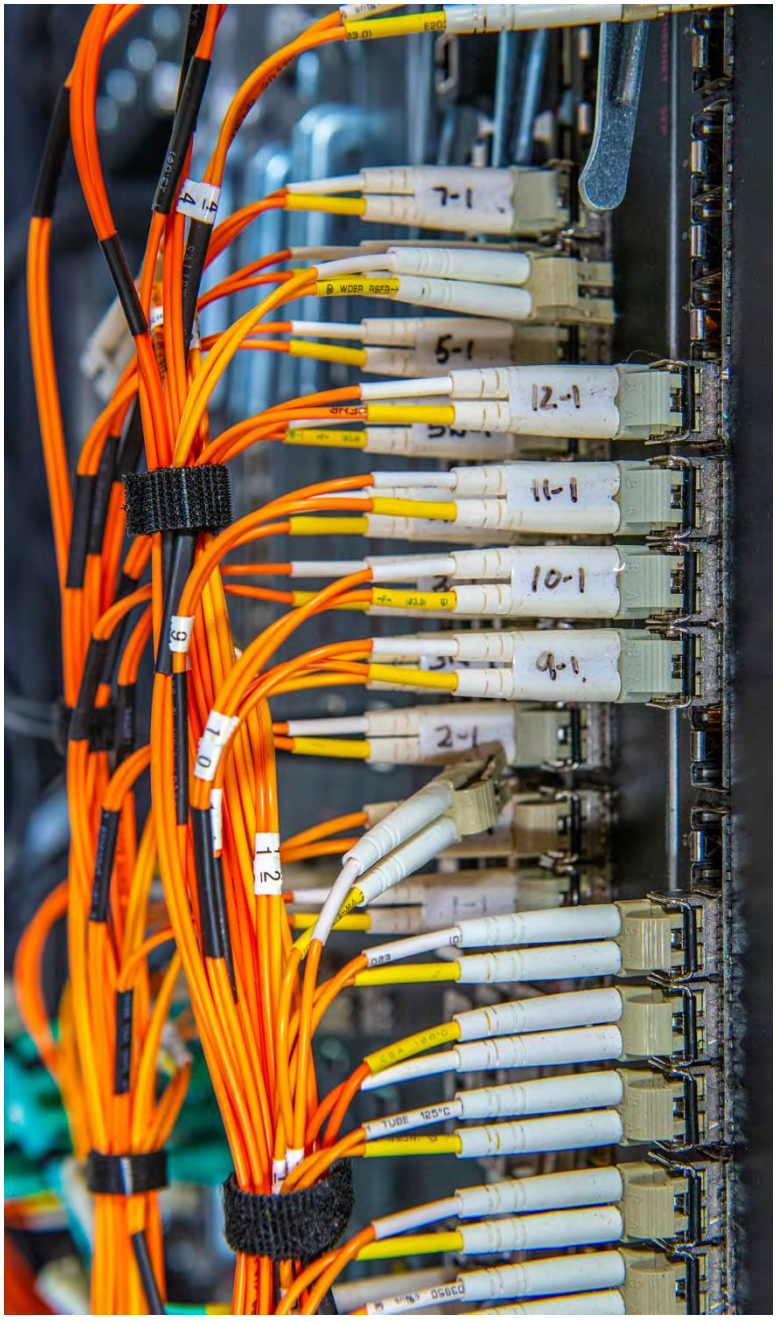
[5] Previously reported as Bonds and Additional Bonds Debt Service Coverage for fiscal years 2009-2017.

[6] State Revolving Fund Loan paid off at the end of fiscal year 2017, therefore the ratio is the same as Debt Service Coverage on all Senior and Subordinate Bonds and is not presented.

TABLE 7-9
TEN LARGEST WATER CUSTOMERS
Year Ended June 30, 2018
Accrual Basis (Dollars In Millions)

Agency		Water Revenues[1]	* Percent of Total	Water Sales and Exchanges in Acre-Feet	* Percent of Total
MWD of Orange County	$	232.3	18.1%	266,545	16.5%
San Diego CWA		222.9	17.3	365,215	22.7
City of Los Angeles		151.3	11.8	183,527	11.4
West Basin MWD		113.9	8.9	114,422	7.1
Calleguas MWD		95.3	7.4	95,772	5.9
Eastern MWD		88.0	6.8	101,620	6.3
Western MWD of Riverside		63.8	5.0	73,688	4.6
Three Valleys MWD		56.6	4.4	65,779	4.1
Inland Empire Utilities Agency		46.0	3.6	67,977	4.2
City of Long Beach		24.8	1.9	24,988	1.6
Total	**$**	**1,094.9**	**85.2%**	**1,359,531**	**84.4%**
Total Revenue	**$**	**1,285.2**	**Total Acre-Feet**	**1,610,969**	

* Total may not foot due to rounding.
[1] Water Revenues includes revenues from water sales, exchanges and wheeling.



Fiber-optic cables connected to servers located inside the Data Center at Metropolitan's Headquarters.

CHAPTER 8

Information Technology

Information Technology Group provides innovation and value to its customers for a wide range of technical services and enterprise business solutions. The group collaboratively works with customers to deliver information technology options, services and solutions in the areas of enterprise and business applications, Engineering Services and Water System Operations applications, data analytics, mobile/wireless computing, telecommunications, network services, information security and personal computing.

IT Infrastructure

The Infrastructure Unit oversees day-to-day operations, and manages telecommunications, audio and visual equipment, network services, databases, servers, storage, iHub/service desk, unmanned aerial vehicles, and data center operations.

Highlights for Fiscal Year 2017/18

- Completed key deployment of the Voice over Internet Protocol (VoIP) telephone project.
- Developed strategy to relocate Metropolitan's data center to enhance resiliency/operational reliability by defending against earthquakes and power outages.
- Completed conceptual design of a microwave radio project at Diamond Valley Lake to replace Metropolitan's end-of-life microwave radios located throughout Metropolitan's 5,200-square-mile-service area, covering the entire distribution system and the Colorado River Aqueduct.
- Completed preliminary design and procurement phase of the IT Disaster Recovery project as part of upgrades to Metropolitan's disaster recovery facility.

- Conducted unmanned aerial vehicle missions to support business operations.
- Implemented Oracle Recovery Manager to streamline data backup process and reduce operational disruption.

Enterprise Business Systems

The Enterprise Business Systems Unit develops and supports enterprise and business software applications and ancillary systems.

Highlights for Fiscal Year 2017/18

- Completed migration of Office 365 to the Microsoft Cloud for Government to provide enhanced security compliance.
- Deployed web services for water meter usage and developed a prototype for a mobile-friendly dashboard.
- Kept enterprise applications current by performing upgrades including: Oracle, PeopleSoft and Cognos.
- Created Laboratory Information Management System and Maximo dashboards to monitor and analyze data trends, while enhancing drill-down capability, charts and graphs.
- Initiated Metropolitan's Enterprise Content Management program by working collaboratively with different teams to clean up file-share data; designed taxonomy, record retention schedule and thesaurus.

Enterprise Water Systems

The Enterprise Water Systems Unit provides services, solutions and systems that support business functions in Engineering and Water Systems Operations. This unit provides software support and project delivery for functions and systems that include computerized maintenance management, water quality lab and treatment plant functions, geographic information systems and spatial analysis, real time operations monitoring and control systems, 3D printing, and document management for Engineering.

Highlights for Fiscal Year 2017/18

- Completed design, conducted testing, and began field deployment of Remote Terminal Unit computers to improve system reliability and enhance security for Metropolitan's control system.
- Completed Phase 3 planning as part of replacement of control and electrical protection system at Wadsworth Pumping Plant in preparation for major installation activities.
- Initiated the Maximo Upgrade project, which will upgrade the software used for Metropolitan's Maintenance Management System.
- Launched conceptual design phase of the Systemwide Control System Upgrade, which will make several planning-level decisions for the program.

Cybersecurity Services

The Cybersecurity Unit focuses on security standards and policies to enhance Metropolitan's cybersecurity posture and to ensure protection against evolving threats.

Highlights for Fiscal Year 2017/18

- Enhanced Metropolitan's cybersecurity capabilities related to network access control, firewall enhancements, and improving endpoint protection and management.
- Implemented cybersecurity tools to enhance threat detection capabilities and mitigate potential vulnerabilities.
- Initiated pilot of mobile device management system to centrally manage Metropolitan-owned mobile devices securely, as well as employee access to MWD data and applications on their personal mobile devices.

Activities for the year included protecting habitat for the Quino checkerspot butterfly, the launch of the MetFit program, and multiple awards for Spring Green contestants.

CHAPTER 9

Administration

This year, Information Technology was reorganized to the group level, with administrative services, annexation administration and environmental planning reporting directly to the Chief Administrative Officer.

Administrative Services

The Administrative Services Section focuses on business process sustainability and achieving cost reduction and efficiencies. These include contracting; warehousing; procurement of goods and nonprofessional services; inventory; records and E-Forms management; Enterprise Content Management; reprographics; technical writing; Rideshare Program and Spring Green Expo.

Highlights for Fiscal Year 2017/18

- Hosted the 11th Annual Spring Green Expo and ECO Innovators Showcase college competition, featuring more than 65 exhibits of sustainable products/services and over 30 sustainability concept projects designed by nearly 100 college students.
- Collaborated with Human Resources to launch a staff development program in support of succession planning.
- Co-hosted event to connect small businesses with pre-qualified prime contractors for the upcoming Headquarters building retrofit.
- Piloted an Enterprise Content Management project that effectively removed about 70 percent of HR's electronic redundant, obsolete and trivial files from network drives.

- Launched new application that makes it easier to search and identify operating equipment; replaced over 140 copiers districtwide with multi-functional printers, providing cost savings and greater user functionality.

Annexations

Metropolitan's Board of Directors approved two member agencies' requests for annexation of four areas in Ventura and Riverside counties, totaling 91.5 acres. These territories are pending final approval by the local county Local Agency Formation Commission.

Four annexations were completed and recorded in Riverside and San Diego counties, totaling about 706.61 acres, with a potential use of approximately 285 acre-feet of water annually, as follows: Campus Park West Annexation to Metropolitan and San Diego County Authority;105th, 106th and 107th Fringe Areas to Metropolitan and Eastern Municipal Water District.

Newly annexed areas also pay past fees and charges and assure compliance with current water use efficiency requirements, and the policies and practices within the MWD Administrative Code.

Environmental Planning

The Environmental Planning Section ensures Metropolitan activities comply with CEQA (California Environmental Quality Act) and other applicable environmental laws and regulations. It also obtains permits or approvals from federal and state environmental regulatory agencies for Metropolitan's activities; conducts studies, monitoring and training; reviews legislation and federal rulemaking; and participates in management of Metropolitan and non-Metropolitan reserve planning efforts. EPS also provides environmental planning support to customers, member agencies and outside agencies.

Highlights for Fiscal Year 2017/18

EPS participated in outreach activities that promote environmental stewardship and support Metropolitan's tradition of supplying environmentally responsible high-quality water. Among the activities:

- Hosted environmental conferences and presenting at regional conferences and universities;
- Served as board member for the Natural Communities Coalition and on committees managing the Lake Mathews Reserve, Southwestern Riverside County Multi-Species Reserve, and Lower Colorado River Multi-Species Conservation Program.

EPS developed a first-of-its-kind Cultural Resources Treatment Plan for the F.E. Weymouth Water Treatment Plant, which is designated a historic landmark by the city of La Verne and is eligible for the California Register of Historic Resources. The plan documented all historic architectural structures at the plant and defined the characteristic features that warrant preservation. EPS progressed toward mapping known archaeological resources within Metropolitan fee property. EPS staff coordinated all tribal cultural resource efforts among nine state and federally recognized tribes within the Metropolitan service area.

Reserve management activities included a controlled burn of approximately 500 acres at the Lake Mathews Reserve. Reserve endowment funds were used for habitat restoration projects to support the endangered Quino Checkerspot butterfly and the state-protected burrowing owl. New technology allowed mapping of inaccessible areas of the reserve using Metropolitan's fixed-wing drones and remote sensing capabilities, which proved a cost-effective way to support invasive species management activities.

EPS worked with Legal staff and outside professional associations to draft responses to federal executive orders and federal and state rulemaking proposing regulatory changes to environmental laws, including the Clean Water Act, Endangered Species Act and the Migratory Bird Treaty Act.

Staff provided CEQA language for 122 board letters, procurement of permits for capital and operations and maintenance projects; 87 Water System Operations projects environmental clearances; 38 Engineering Services projects; 54 bill reviews, and 41 Real Property actions. EPS also reviewed 186 external projects with the potential to impact Metropolitan.

Metropolitan employees learn about Colorado River Aqueduct infrastructure as part of a comprehensive employee education program.

CHAPTER 10

Human Resources

The Human Resources Group maintained its focus on effective people management, while building strong partnerships with management on selecting, engaging, motivating and developing staff. Employee development, a strategic priority of the General Manager, was focused on preparing the workforce to meet current and future business needs. HR met monthly with group managers to identify areas of needed support and worked closely with management on the effective deployment of HR initiatives and early resolution of issues. Work continued on updating HR systems, policies and processes to meet changing compliance requirements and to further improve the delivery and effectiveness of Human Resources services.

Major Activities and Accomplishments

HR continued to emphasize the importance of effective leadership in engaging, motivating, developing and recognizing the workforce, while complying with laws and regulations and consistently providing cost-effective HR services. It expanded recruitment outreach to fill 288 job openings with diverse and capable talent, and increased talent development throughout the organization. Demographically this year, minority representation in the workforce grew to 52 percent.

Orientation for new hires being brought on board and employees who passed probation focused on speeding employee integration into Metropolitan. Groups also initiated Career Launch efforts to introduce their new employees to group practices and operations, and to meet their colleagues early in their careers.

Several events recognized employees for their contributions and commitment to Metropolitan. The General Manager's annual Employee Appreciation Day took place at locations throughout Metropolitan, designed and organized by local employee committees with HR support. Service Awards luncheons recognized 80 employees for Metropolitan service ranging from 20 to 40 years. The Office of the General Manager

and HR launched a pilot MetFit employee wellness program, which recognized the value of supporting healthier behaviors to foster positive lifestyle changes. The full-scale program was slated to launch in summer 2018. And during the holiday season, the 12 Floors of Metropolitan event provided staff at the Headquarters building opportunities to get better acquainted.

Strategic Priority: Employee Development

With the General Manager making employee development a strategic priority, HR implemented several initiatives to ensure that Metropolitan's workforce has the skills and experiences to prepare the organization for continuing retirements, of which there were 84 this past year. These initiatives included strengthening capabilities for effectively managing and motivating employees and offering a business-oriented training curriculum to the workforce. HR staff also provided the board and management with workforce analytics to help plan for pending workforce retirements and expand diversity outreach efforts. Staff participated in regional workforce development committees, informing them of potential job opportunities at Metropolitan, and met with universities and colleges to help align their educational curriculum with Metropolitan business needs.

All groups are addressing the loss of employees—primarily due to retirements. HR staff continued efforts with management to ensure talent is available to fill critical positions. HR expanded training opportunities and worked with local management to identify and assess skill gaps, facilitating various leadership and management development workshops and succession planning. Staff also expanded internship and mentoring programs, and the use of job rotations in Engineering Services, Water Resource Management, Water System Operations and HR. There were more than 4,200 participants in various training activities.

Organizational Development and Training

HR expanded management development programs to address varied needs. For employees aspiring to become managers, Management Academies introduced them to managerial roles and responsibilities. For new managers, the Metropolitan Management University is mandatory, and this six-day management development program is strongly encouraged for existing managers. Staff, in-house experts and expert consultants teach how to lead, engage, motivate and recognize employees. To date, 77 percent of team managers have completed MMU, and 17 percent of unit managers have completed a more advanced version of the program,

MMU-Graduate. One senior manager completed an Executive Development rotation to Metropolitan's Sacramento office to broaden his experience with legislative issues.

Staff also facilitated various initiatives at the group level, such as the Water Resource Management Group's leadership workshops; the Engineering Group's Career Launch; the Water System Operations manager workshop on Motivating and Engaging Employees; and the Leading Technical People course for managers of technical staff in various groups. Staff also conducted conflict resolution interventions, as needed.

Training curriculum focused on topics such as: improved teamwork and collaboration; communication and business writing; effective performance conversations; conflict resolution; project management; problem-solving; and basic and advanced Microsoft Office skills. Comprehensive online and mobile learning offerings provided all employees and managers with 24/7 access to videos, readings and courses on topics relevant to their work or career needs. Staff hosted a post-probation, "Day-2" orientation focused on early career financial planning for 84 new employees. And 86 employees participated in two-day employee inspection trips of the desert region, treatment plants and conveyance and distribution facilities to enhance their understanding of Metropolitan operations and history.

Staff facilitated group leadership forums and management workshops, and supported team-building, conflict resolution, organizational planning, and mentoring for new associate engineers in Engineering Services. HR also arranged for workshops by the law firm of Liebert Cassidy Whitmore on legal aspects of managing people. Eight external coaches as well as internal staff provided coaching support to 25 managers on issues ranging from transition management to personal development and succession planning.

Eighty-eight percent of managers completed mandatory reasonable-suspicion training, 92 percent of Metropolitan's non-management employees completed drug and alcohol awareness training and 91 percent of employees completed personal security awareness training to combat workplace violence.

This year, 131 employees participated in Metropolitan's Tuition Reimbursement program, a 24 percent increase over the prior year. Staff established partnering agreements with eight local universities to provide tuition discounts, grants and other additional educational benefits for

employees. Staff also supported on-site certificate programs, such as the Augmented Leader programs from Rady School of Management at the University of California, San Diego.

Fifty-two managers attended in-depth workshops by leading management experts through the Institute of Management Studies, which provided access to state-of-the-art management approaches. Internally, 117 managers attended presentations on leadership development; motivating and engaging employees; persuasive communication; executive decision-making; business-case writing; collaborative management; and leading technical staff.

Performance Management

The MyPerformance Evaluation process completed its seventh year of providing a year-round performance planning procedure that sets clear expectations for work products, goals and performance factors for both employees and managers. MyPerformance aligns with Metropolitan business planning cycles and fosters ongoing performance conversations and progress check-ins throughout the year.

HR also facilitated the Department Head Performance Evaluations of executive staff who report directly to the board. In July 2017, 84 percent of the board participated by providing direct feedback about strategic and operational leadership, board relationships and business results during the previous fiscal year. Department heads met with their respective home-committees to discuss follow-up goals and actions to the performance evaluation feedback.

Recruitment and Classification/Compensation

Recruitment successfully filled 288 positions during fiscal year 2017/18—a 39 percent increase over the 207 positions filled in the previous year. Of the 288 filled positions, 63 were promotional opportunities for employees, 23 were employee transfers, 110 were filled by external candidates, and the rest were temporary assignments.

In preparation for the upcoming Desert Pre-Apprentice recruitment, staff worked with External Affairs to develop a new outreach brochure and supporting material for social media, including short video vignettes that offered a glimpse into the life and job duties of mechanics and electricians at desert facilities. Equal Employment Opportunity staff prepared for

extending outreach to desert locations by arranging visits to surrounding areas in Arizona and California.

EEO also participated in several job fairs and hosted outreach efforts at the Headquarters building to promote the hiring of military veterans, and individuals with disabilities. Staff also supported student intern recruiting efforts for many groups.

Staff continued to optimize technologies such as Skype for remote interviews, and eSkill online pre-employment skills testing for some entry-level positions and PreEmploy for background checks. To speed the recruitment of each position, HR held strategy sessions with hiring managers at the start of each recruitment. As part of a new recruitment system implementation planning process, staff established a working committee made up of representatives who are involved in recruitments from the various groups; committee members shared and offered ideas to speed and improve the recruitment process. This partnership will increase the effectiveness of the new system once deployed.

Classification staff analyzed more than 100 job-promotion requests to ensure the proper classification of employees. Staff reviewed, modified or created job descriptions, as needed, keeping them current with business needs. HR also completed market salary surveys for department heads, in support of negotiations, and for various other positions based on requests from management or other agencies.

Benefits

Staff coordinated with the contracting services unit and HYAS Investment Consulting Group to develop a request for proposal to select a new deferred compensation record-keeper to better fit the needs of Metropolitan's deferred compensation participants. Empower Retirement was selected, along with TD Ameritrade, to provide an enhanced self-directed brokerage platform. The complete transition to the new deferred compensation record-keeper was expected by August 2018.

Staff conducted open enrollment for all employees and met with 755 employees in one-on-one sessions at 16 of Metropolitan's locations. Staff sent 1,794 benefits-confirmation statements and provided documentation to complete the closing of CalPERS audit findings. A patient care advocacy program assisted employees with medical referrals, pre-authorizations and claim issues. Benefits also sent every employee a 2017 Total Compensation Statement to convey the value of benefits and salary

provided by Metropolitan. Benefits and technology staff created an electronic version of the required 2017 IRS-mandated 1095-C forms to enable employee self-service and reduced paperwork.

To meet fiduciary responsibilities, Benefits hosted instructor-led workshops and webcasts available to all employees on financial planning, budgeting, investment basics, pre-retirement and retirement issues at various Metropolitan locations. More than 475 employees participated in these workshops to help participants with their financial planning and transition into retirement or to simply seek more value from the benefits that Metropolitan provides. Staff coordinated with Payroll and Information Technology to respond and close a CalPERS audit.

Employee Relations-Equal Employment Opportunity Program

Employee Relations successfully negotiated two five-year Memoranda of Understanding with the American Federation of State, County and Municipal Employees (AFSCME Local 1902) and the Supervisors Association. Along with similar five-year MOUs with Metropolitan's other two bargaining units, the Management and Professional Employees Association and the Association of Confidential Employees in early 2017, this successfully concluded the current round of MOU negotiations. Staff conducted the bargaining process without consultant involvement, which led to productive interactions with the bargaining units and resulted in mutually beneficial agreements for Metropolitan and its employees.

Staff responded to all grievances within the prescribed timeframes and worked collaboratively with the bargaining units to resolve grievances, whenever possible. Staff also was involved in a number of single-item negotiations, primarily over new or revised job descriptions. In addition, Employee Relations continued to partner with Legal on unfair labor practice charges, hearing officer appeals and employment litigation.

EEO staff conducted 10 formal investigations and 25 informal investigations of unlawful discrimination allegations within the timeframes prescribed by Metropolitan procedures. EEO staff also worked successfully with outside agencies, such as the state Department of Fair Employment and Housing, to favorably resolve complaints filed against Metropolitan within those offices.

Staff presented semi-annual reports on Equal Employment Opportunity and Affirmative Action to the Organization, Personnel and Technology Committee. The reports included an assessment of workforce diversity, outreach efforts, updates on Metropolitan's Affirmative Action Plan for Protected Veterans and Individuals with Disabilities, as well as the nondiscrimination program for women and minorities.

Metropolitan also held a successful veterans job fair at the Los Angeles Headquarters building. Additional outreach and inclusion efforts involved Metropolitan's employee resource groups. The partnership with Women in Non-Traditional Employment Roles continued, providing opportunities for women in the skilled trades. EEO achieved a 91 percent completion rate on mandatory workforce training, and is currently developing updated training courses.

Human Resources staff worked with WSO and the bargaining units in the Desert Housing Workgroup to improve living conditions and bolster recruitment and retention at select desert facilities.

Workers' Compensation and Medical Screening

Staff reduced outstanding funding reserves (based on total incurred reserves-per-claim) by 2.2 percent and total workers' compensation payments by 1.9 percent during fiscal year 2017/18. Staff continued to work with employees on workers' compensation or personal medical leave to ensure their timely return to work, with accommodations as necessary.

Human Resources Information Systems

Staff updated HR systems to comply with changes required by new and revised tax laws, MOU agreements, the Affordable Care Act, CalPERS and other technical and security requirements. This required creating new benefits structures, leave plans, and records to ensure compliance.

HRIS staff processed all Metropolitan employee job actions, open enrollment processing, salary adjustments and organizational changes keeping MyHR, the employee data system of record, up-to-date and provided reports and analyses for effective people management.

The playground and marina at Lake Skinner.

CHAPTER 11

Real Property

The Real Property Group applies strategic approaches to the acquisition, management and protection of Metropolitan's real property assets, and seeks to effectively optimize revenues and control land management expenses. Real Property reports to the Office of the Chief Administrative Officer, in accordance with policy and principles adopted by the board in August 2011 on managing Metropolitan's real property assets. During fiscal year 2017/18, the group achieved key organizational objectives as outlined in the General Manager's Business Plan.

Planning and Acquisition

The Planning and Acquisition Unit performs property planning, research, valuation, acquisition and disposition in support of strategic water resources management, environmental mitigation requirements, near and long-term water conveyance, treatment and operational needs. Staff is responsible for ensuring that all rights, interests, and benefits inherent in the ownership of real estate are utilized by Metropolitan. Typical processes include performing initial visual inspections to identify environmental concerns; determining historical property uses as part of a qualitative assessment; performing qualitative assessments to identify risk management and implementation; applying real estate valuation principles in conducting highest and best use appraisals; identifying right-of-way needs; and conducting complex and detailed property negotiations.

Accomplishments for Fiscal Year 2017/18

- Executed 25 permanent and temporary easements, entry permits, licenses, consent letters, settlement and release of claims agreements, and leases for pipeline repair and rehabilitation projects, fallowing easements in support of the

Palo Verde Irrigation District forbearance and fallowing program, groundwater mitigation agreements at Diamond Valley Lake, and a residential lease for an emergency responder at Lake Mathews.

- Prepared an appraisal for a land lease in support of the Orange County Feeder Relining Program; also completed six cost studies for temporary construction easements and pipeline easements in support of the Second Lower Feeder prestressed concrete cylinder pipe Relining Project, Lake Perris Seepage Water Conveyance Pipeline, potential buffer properties surrounding Lake Mathews, and properties in the Sacramento-San Joaquin Delta.
- Received the 2018 Large Employer of the Year award from the Los Angeles chapter of the International Right of Way Association, honoring contributions to local programs and advancement of the right-of-way field.

Land Management

The Land Management Unit ensures protection of Metropolitan's real property assets and rights, working in conjunction with internal stakeholders and external law enforcement as required. In addition, the unit identifies surplus properties and seeks revenue generating opportunities in such market segments as agriculture, telecommunications, energy development, film production, sustainable technology and research. During fiscal year 2017/18, Metropolitan generated over $6.8 million in related revenue.

Land Management Accomplishments

- Executed 45 transactions, including secondary use requests, access permits, license agreements, lease agreements, telecommunication uses, filming permits, infrastructure permits, and easements.
- Executed four farm lease agreements for about 19,000 acres within the Delta islands.

- Continued to support the state's proposed delta improvements, including California WaterFix, EcoRestore and scientific research.
- Successfully negotiated five Southern California Edison license agreements to coincide with the existing 30-year Service and Interchange Agreement between SCE and Metropolitan at select properties (Iron Mountain, Eagle Mountain, Camino Switching Station, Gene, and Hinds).

Facility Asset Management

The Facility Asset Management Unit is responsible for maintaining and operating the Headquarters building, the Diamond Valley Lake Visitor Center, employee housing, and leased office spaces in an energy efficient and sustainable manner.

Fiscal Year 2017/18 Highlights

- Performed facility condition assessments of the Headquarters building and the Diamond Valley Lake Visitor Center, providing an in-depth analysis of the expected useful life for HVAC, fire life safety, furnishings, and other pertinent building systems to assist in project planning and budgeting.
- Received overall rating of 97 out of 100 possible points in the annual Energy Star Audit at Metropolitan's Headquarters.
- Completed a District Housing Management Plan outlining the approach, management plan; and responsibility matrix for both Water System Operations and Real Property.
- Completed renovations for the Sacramento office, including carpet, paint, new furniture for the reception area, and installation of video conference monitors.

Diamond Valley Lake Recreation Area

The DVL Recreation Area contains public recreation and education facilities, including the Diamond Valley Marina, the Lakeview and North Hills trails, the Western Science Center, Valley-Wide Recreation and Park District's DVL Community Park and DVL Aquatic Center and a Multi-Species Reserve.

The reservoir has hosted about 29,500 visitors at its marina facilities and approximately 47,000 private boats have launched. DVL is rated No. 7 in 2018's Bassmaster 100 Best Bass Lakes and No. 2 in the Western Region.

Visitor numbers increased at the marina throughout the year as the water level rose. Ten night fishing tournaments took place from July to September 2017, with each tournament attracting up to 100-plus participants and dozens of boat launchings, with the largest bass topping out at 9 pounds.

The Reserve Management Committee, which ensures that mitigation agreements at DVL remain in force, authorized construction of minor improvements to Angler Avenue. The upgrades allow public evening access to the marina, while providing crossing access to the local species within the reserve.

The Lake Elsinore Bass Club, in conjunction with National Bass West held its 11th annual Bass Fishing Tournament at DVL to honor veterans of Operation Iraqi Freedom and Operation Enduring Freedom.

Staff installed new signage on the Wildflower and Lakeview trails with a map of the trail network, and guidelines for visitors.

On June 21, all recreational activities at DVL were temporarily suspended because of a bloom of cyanobacteria (blue-green algae) covering the lake. Metropolitan's treated drinking water was not affected.

New trail signage has been installed on the Lakeview and Wildflower trails at Diamond Valley Lake.


A NEW SOURCE OF WATER FOR SOUTHERN CALIFORNIA
Regional Recycled Water Advanced Purification Center
Water is too precious to use just once. So the Metropolitan Water District of Southern California is making a major investment in a potential water recycling project that will reuse water currently sent to the ocean. The Regional Recycled Water Program, a partnership with the Sanitation Districts of Los Angeles County, will purify wastewater to produce high quality water that can be used again.
MODERNIZING THE SYSTEM:
CALIFORNIA WATERFIX – PROJECT IMPLEMENTATION
Overview
An Important Investment
Cheaper Than Any Alternative
For Some, No Alternative
Approximate average household Cost of California WaterFix within the MWD Service Area
UP TO:
$4.80
PER MONTH
WHO IS METROPOLITAN
OUR MISSION
BE INFORMED.
BE INVOLVED
Sunday
Los Angeles Times
EDITORIALS
October 8, 2017
We need the delta tunnels
Southern California's water supply is unreliable. Stop waffling over the project and start digging.
and that reverse the flow of a portion of the San Joaquin River and suck migratory fish to their doom. So does the entire state, even those portions that don't directly use delta water, because they are economically interlaced with agricultural industries and urban areas that do rely on that water. California should not for a moment slow work on
THE METROPOLITAN WATER DISTRICT OF SOUTHERN CALIFORNIA
"KEEP SAVING WATER FOR THE BIRDS AND THE BEES. AND ME.
H2O"
A THANKFUL BUTTERFLY
Achievements in Conservation, Recycling and Groundwater
FEBRUARY 2018
worldwaterforum
Metropolitan Water District of Southern California College Grant Program
bewaterwise.com®
MENÚ
Sugerencias para ahorrar agua
Cómo elegir dispositivos de uso eficiente del agua
Materiales de jardinería California Friendly®
Videos prácticos
Widget de uso público

CHAPTER 12

External Affairs

The External Affairs Group is responsible for Metropolitan's communication, outreach, education, legislative and innovation activities. With a focus on sound water management, conservation and California WaterFix, External Affairs worked with the general public, news media, legislators, regulators, educators, community groups, labor, business, Metropolitan public member agencies and other stakeholders to communicate the district's interests and its board-adopted policies, using an evolving set of tools to reach a diverse audience.

Major Activities and Accomplishments

Advertising and Outreach Campaign

Metropolitan's multilingual H2Love campaign concluded with a successful 12-week paid media flight featuring outdoor billboards, radio ads, community newspapers and a sponsorship with Major League Soccer's "LA Galaxy." With nearly 2 billion media impressions delivered and a toolkit of informational resources and files, the campaign successfully reached its target audiences as demonstrated in a post-campaign public survey. Outreach efforts increased traffic to the district's bewaterwise.com conservation website by more than 300 percent and the number of social media views grew more than one-hundred fold. While social media and search engine optimization continued to increase visibility, Metropolitan began work on a new three-year water conservation outreach media campaign with refreshed messaging and marketing to promote rebate programs. The board awarded a $14.7 million contract to the Los Angeles-based firm Quigley-Simpson & Heppelwhite, who produced Metropolitan's award-winning Take a Turn and H2Love campaigns. The launch date for the new "Save Water 365" campaign was July 2018.

Media Activities

Over the past fiscal year, Metropolitan conducted editorial board meetings, press conferences and briefings. The Press Office issued more than two dozen press releases, including statements from the general manager and board chairman. External Affairs regularly prepared informational materials, videos, talking points and other tools to communicate Metropolitan's operations, policies, news and programs. The Press Office responded to more than 150 media requests for information and interviews on California WaterFix, water supply conditions, the Ethics Office, conservation campaigns and rebates, snowpack, Solar Cup, World Water Forum, San Diego County Water Authority rate litigation, finance, engineering, the Regional Water Recycling Program, algae blooms, shutdowns, passage of landmark water conservation legislation, and the Minute 323 binational agreement with Mexico. The Press Office also assisted with the general manager's blog and media inspection trips of the Sacramento-San Joaquin Delta.

Web and Social Media Activities

Metropolitan's online water-saving portal, bewaterwise.com, was redesigned to support Metropolitan's new "Save Water 365" advertising and outreach conservation campaign. The redesigned mobile-friendly website was transformed to a sleeker, visually appealing and more intuitive site in multiple languages to encourage visitors to conserve water and promote Metropolitan's rebate program.

An enhanced California WaterFix website provided updated information, fact sheets and other resources on the state's proposed two-tunnel WaterFix project. Staff also updated content on Metropolitan's key initiatives, created microsites and updated web pages to provide information on capital investments such as the Second Lower Feeder Relining Project and the Innovative Conservation Program.

Metropolitan took advantage of the growing reach of several social media platforms to reach a broader audience on many topics, with a focus on California WaterFix and water conservation. Social media chatter around Metropolitan spiked in October 2017 during a board vote on WaterFix funding, with nearly 2,000 mentions of

Metropolitan on Twitter and Facebook for that month alone. The use of short videos and animated gifs helped reach a wider demographic. Videos posted on Facebook received nearly 8 million views—with the top five, in terms of views, all focused on saving water.

Metropolitan continued its distribution of several e-newsletters, covering a variety of topics, including California WaterFix, water education, and key Metropolitan projects and initiatives.

Legislative and Policy Activities

In Washington, Metropolitan worked this year to maintain existing funding levels for Colorado River salinity control and to support efforts to clarify in federal law that water conservation rebates should not be taxed. Metropolitan also supported legislation to continue providing water resources development, State Revolving Fund, WIFIA (the Water Infrastructure Finance and Innovation Act), and other funding opportunities for water infrastructure as well as environmentally protective flexibility in water delivery operations.

In Sacramento this year, Gov. Jerry Brown signed into law two landmark bills that build on the ongoing efforts to "make water conservation a California way of life." Senate Bill 606 (Hertzberg, D-Los Angeles) and Assembly Bill 1668 (Friedman, D-Friedman) establish guidelines for efficient water use and for implementing water efficiency standards and drought planning for the future.

Water Stewardship Education

Education staff worked with member agencies to hold more than 200 events and engaged nearly 250,000 students, teachers, parents and participants through activities, social media and curriculum materials. Metropolitan continues to develop multilingual K-12 water education curriculum aligned to Common Core and Next Generation Science Standards. Staff utilizes educational technologies, including virtual reality tours of the Colorado River Aqueduct and augmented reality watershed exhibits, to encourage critical thinking about regional water issues. During FY 2017/18, more than 14,000 public visitors and students toured the Diamond Valley Lake Visitor Center to learn more about Metropolitan's water systems and programs.

The World Water Forum College Grant Program concluded during Metropolitan's Spring Green event at the Los Angeles headquarters building, showcasing water conservation and treatment projects. Solar Cup, the nation's largest high school solar boat race, engaged 38 teams and more than 600 high school students in the STEAM (science, technology, engineering, art and math) topics of water stewardship and renewable energy. Metropolitan's "Water is Life" Student Art Exhibit and Calendar annually compiles over 12,000 pieces of art generated by K-12 students throughout Metropolitan's service area.

Inspection trips of State Water Project facilities and the Sacramento-San Joaquin Delta as well as Metropolitan's Colorado River Aqueduct, Diamond Valley Lake and other district facilities helped inform and engage elected officials, community leaders and the public about Southern California's water resources. This year, over 1,900 participants visited these facilities on 64 inspection trips.

Publications, Video

External Affairs designed, wrote, distributed and posted dozens of new publications. The materials covered a wide range of topics, including California WaterFix and the regional water recycling demonstration project. The "Your Water" newsletter was issued to more than 12,000 recipients, while Metropolitan Today and Tomorrow kept more than 1,400 federal, state and local officials updated on progress and current activities. Metropolitan also launched WaterTalk, a weekly employee newsletter, and disseminated California WaterFix Update, Business Outreach, and Conservation Update e-newsletters to wide-ranging audiences.

Staff produced the annual Water Quality Report, the 2017 Annual Report, and the SB 60 annual progress report to the state legislature on conservation, recycling and reuse. Metropolitan also helped design, create and disseminate promotional materials for meetings, special events and other forums, and wrote employee/retiree obituaries.

Metropolitan produced informational videos on California WaterFix, innovation and solar technology, along with the general manager's H20Talk video blog.

Community Partnerships

More than 50 Community Partnering Program-sponsored projects provided opportunities throughout the district to showcase community gardens and signage, water resource conferences, Earth Day events, garden classrooms, publications, and educational materials on conservation messaging, watershed issues and recycling. External Affairs staffed more than 30 booths at these events distributing promotional items and literature.

External Affairs maintained a strong speakers bureau, providing presentation materials and arranging speakers for more than 200 presentations to service organizations and various community groups in all six Southland counties. The most requested topics were California WaterFix, water supply updates, Metropolitan's history and regional benefits as well as conservation programs and water-saving rebates.

Outreach for Infrastructure Projects

External Affairs provided community outreach for major capital and system maintenance projects, including pipeline relining, valve replacements, cathodic protection and maintenance shutdowns. More than 5,000 notices were provided, along with community meetings and briefings for city officials.

Business Outreach, Innovation

Metropolitan again co-hosted the Annual California Construction Expo, which generated more than 700 attendees and represented over $150 billion in construction projects. The district's Connect 2 MET event promoted contracting opportunities to Orange County businesses. More than 160 business owners and four member agency representatives attended.

Metropolitan also hosted the second Canadian Water Roadshow, at which water technology companies made presentations to member agency staff, and sponsored the "Pilots and Trials" conference featuring technologies pioneered by Metropolitan and its member agencies, as well as other water utilities. The mwdinnovates.com website generated more than 2,000 unique page views for the year.

Developing the audit plan.

CHAPTER 13

Internal Audit

Internal Audit provides independent, objective assurance and consulting services designed to add value and improve operations. Internal Audit responsibilities are carried out by a team of audit professionals, who evaluate the extent to which internal controls mitigate risks. Internal Audit also determines whether activities are consistent with policies, procedures, regulatory requirements and contracts. In this way, the audit staff assists management and the Board of Directors in assessing risks that could impact the achievement of their objectives.

Audits are performed in accordance with The Institute of Internal Auditors' International Standards for the Professional Practice of Internal Auditing. These standards help define Internal Audit's responsibilities and establish expectations for auditor professionalism and independence. This independence is assured through the Internal Audit Department Charter, which establishes the General Auditor's reporting line to the Board of Directors and the Audit and Ethics Committee.

The Audit and Ethics Committee directs the focus of Internal Audit resources by review and approval of the General Auditor's Annual Audit Plan. The fiscal year 2017/18 Audit Plan resulted from an internal assessment of risks and input from key stakeholders including board members, management, and staff.

Major Activities and Accomplishments

During FY 2017/18, Internal Audit contributed to governance activities through the following major actions, which took place while the General Auditor assumed the additional role of Interim Ethics Officer:

- Successfully carried out the FY 2017/18 Audit Plan, including significant audits of the Supervisory Control and Data Acquisition network and accounting for and billing of reimbursable projects.

- Reassessed the Audit Plan quarterly to evaluate whether it met the needs and requests of the Board of Directors and management; focused on highest risks and areas of greatest concern, and ascertained whether sufficient progress was being achieved.
- Completed and issued 21 audits and four special projects.

	Number of Reports
Audits:	**21**
Accounting for and Billing of Reimbursable Projects	
Accounts Payable and Disbursements	
Accounts Receivable and Cash Receipts	
Assist External Auditors	
Black & Veatch, AECOM, Stantec	
Consulting Contracts Less Than $250,000	
CRA Sand Trap and Equipment Replacement	
CRA Seismic Retrofit of 6.9kV Switch House	
Employee and Director Expense Reports	
Energy Management – Greenhouse Gas Reporting	
Etiwanda Pipeline Lining Repairs	
External Affairs – Quigley-Simpson & Heppelwhite Inc.	
ICF Jones & Stokes, SoCal Bio Environmental	
Metropolitan Social Media Review	
OC Feeder Stage 2 Lining Repairs	
Palos Verdes Reservoir Cover and Linear Replacement	
PCCP Rehabilitation and Replacement Program	
Purchasing – Professional Services Contracting	
SCADA Cybersecurity	
Software License Compliance and Tracking	
Treatment Plants – Skinner Business Support and Administration	
Monitoring:	**4**
Colorado River Water Users Association	
IT Business System Data Backup and Recovery	
Quarterly Consulting Contract Reporting	
Turf Removal Program Follow-up Review	

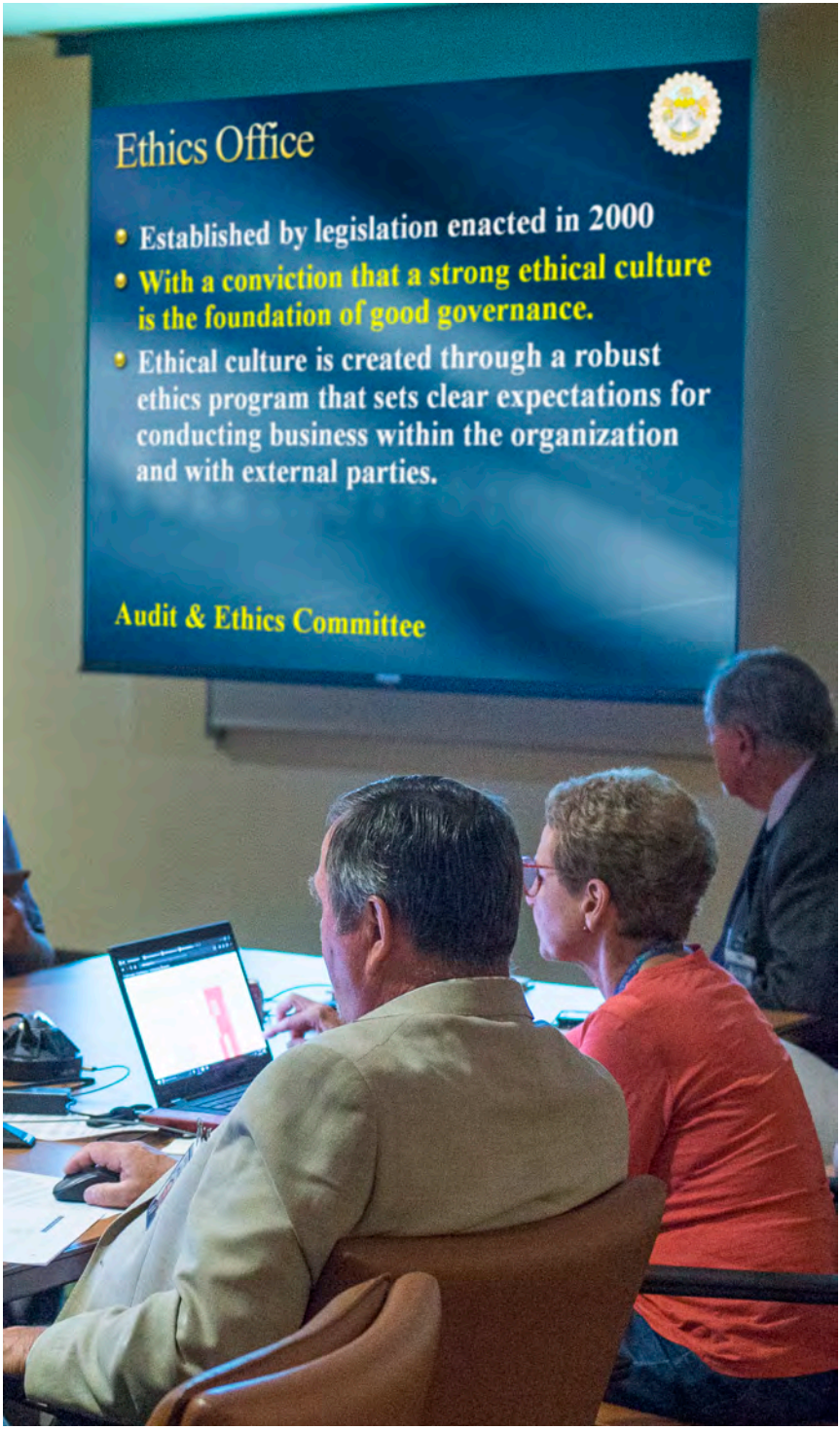
- Evaluated management's response to all significant control issues noted in audit reports; tracked and reviewed management responses on 29 recommendations included in audit reports and ensured timely responses to all reports.
- Assisted the external auditors MGO with the performance of the June 30, 2017, Annual Financial Audit.
- Assisted KPMG with preparation for their June 30, 2018, Annual Financial Audit.
- Completed additional enhancements to the Internal Audit organization structure to better meet business and customer needs.
- Conducted department-wide training on internal controls, workpaper standards, auditing for internal controls, and fraud detection.

Quality Assurance Activities

On May 30, 2017, the Institute of Internal Auditors completed an external review of Internal Audit's compliance with IIA professional auditing standards. The broad objectives of this review were to:

- Assess conformity to IIA Standards
- Assess effectiveness in carrying out the department's mission, as set forth in the Audit Department Charter
- Identify opportunities to strengthen the department's value to Metropolitan

The IIA judged the department to be in "general conformance" with IIA standards, the highest possible rating. During FY 2017/18, Internal Audit worked to implement recommended enhancements to compliance efforts.



The Ethics Office reports directly to Metropolitan's Board of Directors, through the Audit and Ethics Committee.

CHAPTER 14

Ethics

Created by state legislation in 1999, the Ethics Office promotes an ethical culture at Metropolitan by administering the district's governmental ethics policies. The office is committed to maintaining the role of ethics in Metropolitan's strategic plan and safeguarding a valuable district asset—its integrity.

Preventing ethical missteps is the cornerstone of Metropolitan's ethics program. The office carries out this mission by providing education on ethics and advice to Metropolitan officials; supporting compliance with state ethics laws; and developing tailored ethics policies. To promote employee accountability and institutional growth, potential violations of governmental ethics policies are addressed through a fair and objective investigation process.

Advice and Education

To help maintain a solid foundation of ethics-centered practices at Metropolitan, the Ethics Office advises directors and employees on how to comply with ethics policies and provides many supplemental training programs.

For instance, staff routinely helps directors and employees assess whether their intended course of action conforms to ethics rules, and advises how they can meet ethics standards given their situation. Moreover, staff provides directors with a monthly bulletin that helps them determine whether they have a conflict of interest in any matter appearing on the agenda for the next regularly scheduled board meeting.

This fiscal year, staff also advised on how to minimize ethical risks in the contract award process and other core Metropolitan functions. Specifically, staff consulted on enhancing disclosure forms

issued to contractors and bid evaluation panelists. This helped identify and avoid conflicts of interest and strengthen the integrity of — and confidence in — the contracting process as a whole.

Educational programs are made available to reinforce awareness and understanding of ethics policies and principles. Programs include in-person training through Metropolitan's Management University program; web-based training for officials who report personal financial interests pursuant to state law; and an ethics primer for new employees at orientation.

Policies and Procedures

The Ethics Office regularly evaluates its policies and procedures to ensure that they meet the highest standards for effectively implementing Metropolitan's governmental ethics program. This year, the office collaborated with consultants to identify opportunities for enhancing policies and procedures, including conflict of interest policies, the advice process, and investigation procedures.

Compliance

One of the Ethics Office's core functions is to ensure that Metropolitan continues complying with state-mandated ethics requirements. This year the office implemented Metropolitan's new conflict of interest code, under which it administers state-mandated financial disclosure filings for about 700 district officials.

As Metropolitan's administrator for state-mandated financial disclosure forms, Ethics staff provided advice on what personal financial interests to disclose, monitored fluctuating filing deadlines, and helped ensure timely filing submissions. During fiscal year 2017/18, the office handled over 1,100 state financial disclosure reports.

Investigations

An essential role of the Ethics Office is to independently and objectively investigate alleged violations of Metropolitan's ethics rules and report on the results of investigations. Investigations not only

promote individual accountability but also identify opportunities for enhancing ethics training, education and compliance programs.

This year, the Ethics Office undertook investigations involving alleged misuse of governmental authority and conflicts of interest. Other complaints involved allegations of retaliation, failure to report financial interests, and improper outside employment.

After certain investigations revealed systemic areas of risk, staff consulted and collaborated with senior management on risk mitigation strategies. Other investigations prompted policy recommendations, such as clarifying an existing ethics rule, adopting a new rule, or enhancing training on lesser known rules. This holistic approach to investigations supports the office's mission to prevent ethics missteps and promote an ethics-centered culture at Metropolitan.

Staffing and Professional Resources

Early in the fiscal year, Metropolitan's General Auditor assumed the role of Interim Ethics Officer. The transition coincided with a board decision to engage with outside consultants to review the process and procedures of the Ethics Office. The transition was marked by increased collaboration with senior management and a greater emphasis on advice, compliance and internal processes.

This fiscal year, the Ethics Office benefitted from the addition of a permanent administrative support position to help manage state filing officer responsibilities and administrative operations.

In support of the office's ongoing effort to operate in accordance with best practices in the industry, the Assistant Ethics Officer attended the Council on Governmental Ethics Laws conference, where experts on governmental ethics engaged with attendees on current and emerging issues in the field.

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THE METROPOLITAN WATER DISTRICT OF SOUTHERN CALIFORNIA

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METROPOLITAN'S MEMBER AGENCIES

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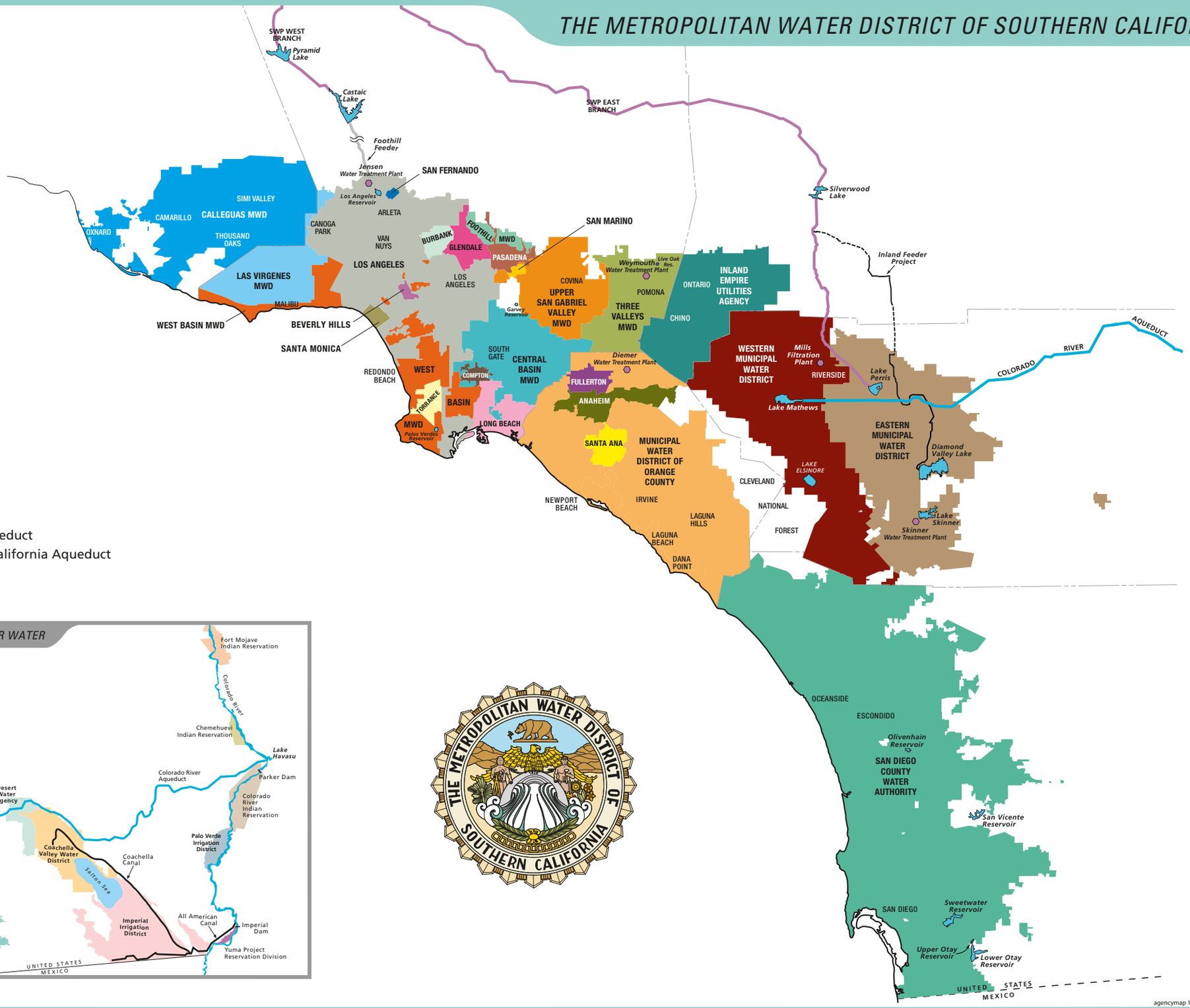
- Department of Water Resources' California Aqueduct
- Water Treatment Plants



CALIFORNIA ENTITIES USING COLORADO RIVER WATER

THE METROPOLITAN WATER DISTRICT OF SOUTHERN CALIFORNIA

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