THE METROPOLITAN WATER DISTRICT OF SOUTHERN CALIFORNIA

ANNUAL REPORT 2017

Diamond Valley Lake experienced a major rebound between 2016 (top) and 2017.

THE METROPOLITAN WATER DISTRICT OF SOUTHERN CALIFORNIA

ANNUAL REPORT FOR THE FISCAL YEAR

July 1, 2016 to June 30, 2017

LOS ANGELES, CALIFORNIA
2017

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LIST OF ABBREVIATIONS

Abbreviation	Term
AB	Assembly Bill
ACWA	Association of California Water Agencies
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
CDFW	California Department of Fish and Wildlife
CEQA	California Environmental Quality Act
CFO	Chief Financial Officer
CIP	Capital Investment Plan
CRA	Colorado River Aqueduct
CUEA	California Utilities Emergency Association
CY	Calendar year
DBP	Disinfection Byproducts
DDW	Division of Drinking Water
DOE	Department of Energy
DSOD	Division of Safety of Dams
DVL	Diamond Valley Lake
DWR	Department of Water Resources
EEO	Equal Employment Opportunity
EIR	Environmental Impact Report
EIS	Environmental Impact Statement
ERT	Emergency Response Tool
ESA	Endangered Species Act
FSA	Future Supply Actions
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

LIST OF ABBREVIATIONS

Abbreviation	Term
IRP	Integrated Water Resources Plan
LRP	Local Resources Program
LT2	Long Term 2 Enhanced Surface Water Treatment Rule
µg/L	Micrograms per liter
MAF	Million acre-feet
MCL	Maximum Contaminant Level
MIB	Methylisoborneol
MOU	Memorandum of Understanding
ND	Not detected
NDMA	N-Nitrosodimethylamine
OFAC	Office of Foreign Assets Control
O&M	Operations & Maintenance
PCCP	Prestressed Concrete Cylinder Pipe
PPB	Parts per billion
QSA	Quantification Settlement Agreement
RAA	Running Annual Average
RFP	Request for Proposal
RSI	Rate Structure Integrity
SB	Senate Bill
SDCWA	San Diego County Water Authority
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
TDS	Total dissolved solids
TTHM	Total trihalomethane
USBR	U.S. Bureau of Reclamation
WAPA	Western Area Power Administration
WIIN	Water Infrastructure Improvements for the Nation
WRM	Water Resource Management
WSO	Water System Operations
WSR	Water Stewardship Rate

A balloon soars over Lake Skinner.

The Metropolitan board room served as the site for the State of MWD address (July 2016) and the election of new board officers (November 2016).

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 capital facilities including the Colorado River Aqueduct, 16 hydroelectric facilities, 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.

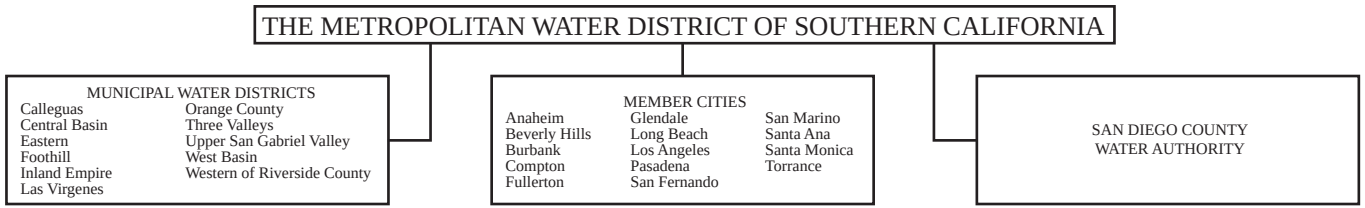
Metropolitan was established in 1928 under an act of the state Legislature to construct and operate the 242-mile Colorado River Aqueduct, which runs from an intake at Lake Havasu on the California-Arizona border, to an endpoint at Metropolitan's Lake Mathews reservoir in Riverside County.

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 State Water Project supplies.

Water supplies from the State Water Project travel to Southern California via the California Aqueduct. Metropolitan also has ground-water 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, www.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, 2017

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, 2017

Judy Abdo
Santa Monica

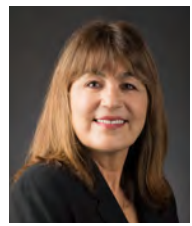
Richard W. Atwater
Foothill Municipal Water District

Sylvia Ballin
San Fernando

Brett R. Barbre
Municipal Water District of Orange County

Peter A. Beard
Fullerton

Michael Camacho
Inland Empire Utilities Agency



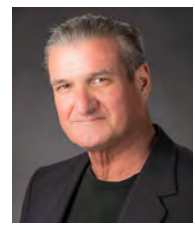
Gloria Cordero
Long Beach

Glen C. Dake
Los Angeles

Donald L. Dear
West Basin Municipal Water District

Larry D. Dick
Municipal Water District of Orange County

Stephen J. Faessel
Anaheim



Donald Galleano
Western Municipal Water District of Riverside County

DIRECTORS
JUNE 30, 2017

William Gedney
Central Basin Municipal Water District

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 Angeles

Glen D. Peterson
Las Virgenes Municipal Water District

Jesús E. Quiñonez
Los Angeles

DIRECTORS
JUNE 30, 2017

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

Leticia Vasquez Wilson
Central Basin Municipal Water District

Robert Wunderlich
Beverly Hills

Janna Zurita
Compton

BOARD OF DIRECTORS
July 1, 2016 to June 30, 2017

OFFICERS OF THE BOARD

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Vice Chair ..... Linda Ackerman
Vice Chair ..... Gloria Gray
Vice Chair ..... John W. Murray Jr.
Vice Chair ..... Michael Touhey
Secretary ..... John T. Morris
Secretary ..... Steve Blois

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Burbank ..... Marsha Ramos
Calleguas Municipal Water District ..... Steve Blois
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Central Basin Municipal Water District ..... Leticia Vasquez Wilson
Central Basin Municipal Water District ..... Phillip D. Hawkins
Central Basin Municipal Water District ..... Pedro Aceituno
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 ..... Laura Friedman
Glendale ..... Zareh Sinanyan
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Las Virgenes Municipal Water District ..... Glen D. Peterson
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Los Angeles ..... John W. Murray Jr.
Los Angeles ..... Jesús E. Quiñonez
Los Angeles ..... Lorraine Paskett
Los Angeles ..... Mark Gold

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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
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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..... Yen C. Tu
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 ..... Michael Touhey
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
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, 2017

EXECUTIVE COMMITTEE

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John W. Murray Jr., Vice Chair
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Glen D. Peterson
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Robert Wunderlich

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Russell Lefevre
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John T. Morris
Fern Steiner
Charles M. Treviño
Janna Zurita

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Stephen Faessel
William C. Gedney
Cynthia Kurtz
Keith Lewinger
Michele Martinez
Larry McKenney
Lorraine Paskett
Marsha Ramos
Elsa Saxod
Zareh Sinanyan

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Gloria Cordero
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Larry D. Dick
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Lorraine Paskett
Zareh Sinanyan
Fern Steiner
Robert Wunderlich

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Brett Barbre
Gloria Cordero
Stephen Faessel
William C. Gedney
Gloria Gray
Michael T. Hogan
Larry McKenney
John W. Murray Jr.
Jesús E. Quiñonez
Charles M. Treviño
Leticia Vasquez Wilson
Janna Zurita

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Donald L. Dear
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Michael T. Hogan
Glen D. Peterson
Marsha Ramos
Charles M. Treviño
Robert Wunderlich

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Michael Camacho
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Larry D. Dick
Keith Lewinger
John T. Morris
Lorraine Paskett
Glen D. Peterson
Jesús E. Quiñonez
Fern Steiner
Robert Wunderlich

HISTORICAL
ROLL OF DIRECTORS
June 30, 2017

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

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

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

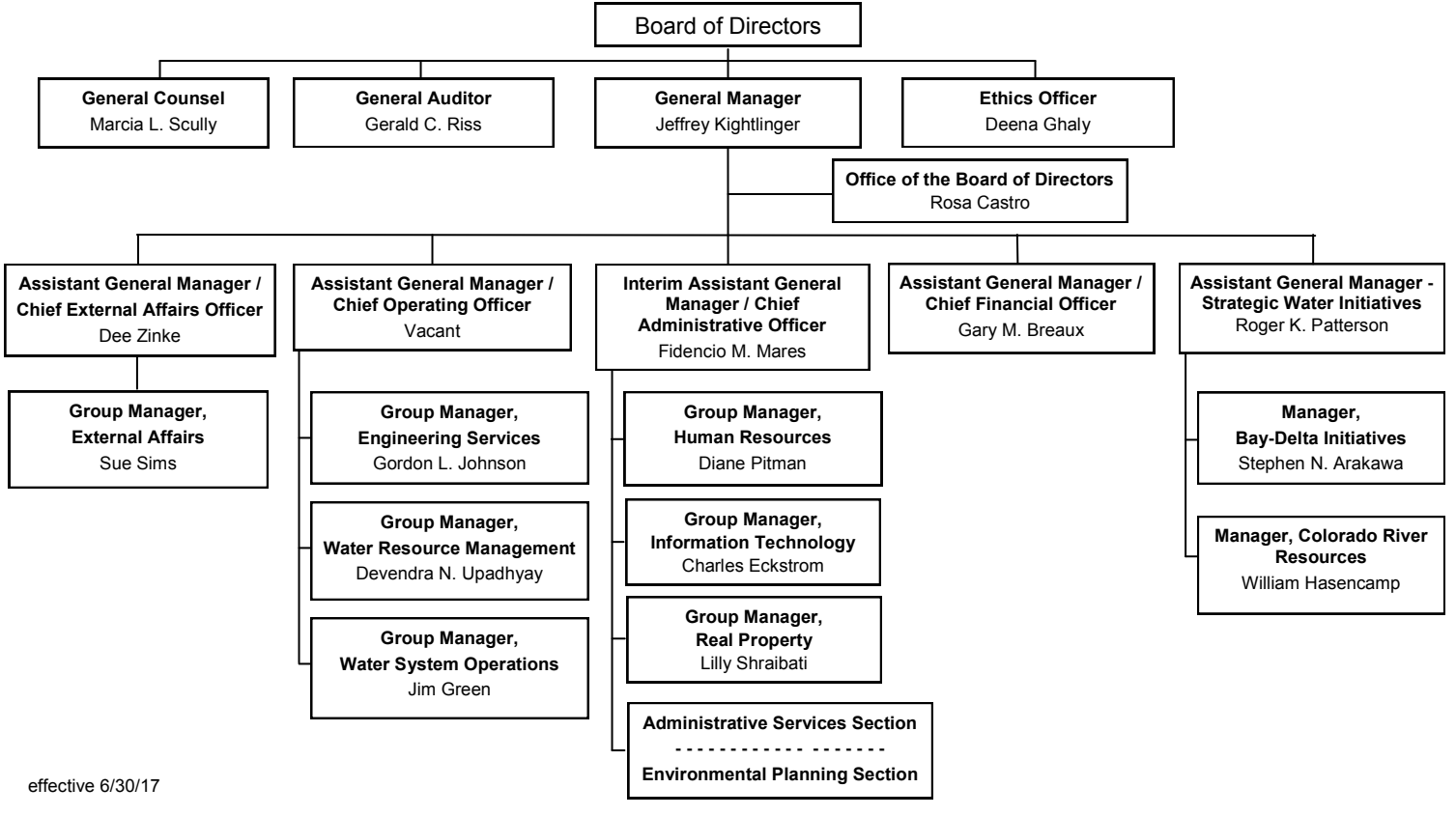
WEST BASIN MUNICIPAL WATER DISTRICT

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

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 6/30/17

STAFF

June 30, 2017

EXECUTIVE MANAGEMENT

General Manager ..... J. Kightlinger
General Counsel ..... M.L. Scully
General Auditor ..... G.C. Riss
Ethics Officer ..... D. Ghaly
Assistant General Manager/Chief Operating Officer ..... Vacant
Interim Assistant General Manager/Chief Administrative Officer ..... F.M. Mares
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 ..... O.T. Tucker
Manager, Environmental Planning Section ..... D. West

CHIEF FINANCIAL OFFICER

Controller ..... H.S. Soper
Manager, Budget & Treasury ..... J.M. Skillman

ENGINEERING SERVICES

Group Manager/Chief Engineer ..... G. Johnson
Manager, Facility Development Section ..... M. Rojas
Manager, Infrastructure Reliability Section ..... J. Bednarski
Manager, Program Management Section ..... Vacant

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 ..... A. Acuña
Executive Strategist ..... T. Philp
Special Projects Manager ..... M. Westford

HUMAN RESOURCES

Group Manager ..... D. Pitman
Manager, Employee Relations Section ..... S. Lem

STAFF
June 30, 2017

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
Manager, Colorado River Resources..... W.J. Hasencamp
Special Projects Manager..... R.D. Neudeck
Executive Strategist..... M.J. Wheeler

WATER RESOURCE MANAGEMENT

Group Manager ..... D. Upadhyay
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. Coffey
Interim Assistant Group Managers..... B. Koch, B.M. Yamasaki
Interim Manager, Conveyance & Distribution Section ..... J. Kostelecky
Interim Manager, Operational Safety & Regulatory Services Section .... D. Guillory
Manager, Operations Support Services Section ..... C. Spradling
Manager, Power Operations & Planning Section..... J. Lambeck
Interim Manager, Water Operations & Planning Section..... G. Boyd
Manager, Water Quality Section ..... M.H. Stewart
Manager, Water Treatment Section..... H. Collins

General Manager Jeffrey Kightlinger greets the crowd at the Spring Green Expo, April 2017.

Metropolitan board chair Randy Record speaks to reporters on evolving water supply situation, October 2016.

Introduction

It was a year punctuated by the spectacular end of California's five-year historic drought, with a record wet winter rapidly filling reservoirs and a dramatic series of events at the State Water Project's Oroville facilities. In Southern California, Metropolitan faced a different challenge—identifying places to store the abundant water supplies. Meanwhile, water agencies throughout the state approached a historic investment decision on the California WaterFix modernization project in the Sacramento/San Joaquin Bay-Delta. The fiscal year drew to a close on June 30 with major progress on a number of fronts.

Drought Ends, Challenges Begin: In April 2017, Gov. Edmund G. Brown Jr. officially ended the drought state of emergency as much of the state sought to manage what would be record precipitation for the year. In February of 2015, Brown had imposed the first-ever statewide requirements for urban communities to reduce water use and report to the State Water Resources Control Board. With the drought's end, the state sought to sustain California's conservation ethic as weather patterns became more favorable. "Gov. Brown's mandate that each and every Californian immediately reduce water use sent the right message that we are one state and we can never take water for granted," Metropolitan General Manager Jeffrey Kightlinger said as the governor declared the drought emergency officially over.

Metropolitan's operations team faced significant challenges to manage and maximize the dramatic increase in available supplies, and to place as much water as possible into local storage. The supply windfall allowed Metropolitan to keep a record amount of its Colorado River supply in Lake Mead, providing a much-welcome increase in reservoir levels. Meanwhile, State Water Project supplies comprised the bulk of deliveries in Metropolitan's service area, as other supplies were banked in the Central Valley, stored in groundwater basins and put in Diamond Valley Lake.

Oroville: The wet start to the California rainy season had Lake Oroville brimming. In February, the high releases from the lake caused severe damage to the 3,000-foot concrete main spillway and prompted its temporary closure as operators inspected the damage. As a series of atmospheric river storms approached, operators once again initiated limited releases down the battered spillway. Despite the actions, higher-than-expected inflows from the storm into the lake caused water to cascade over Oroville's emergency spillway for the first time in the dam's history. Concerns about the emergency spillway's integrity prompted public safety officials to order an evacuation of 180,000 downstream residents as flows down the main spillway increased.

The incident captured national attention and triggered a historic effort to review dam safety in California. Oroville became a national example of aging infrastructure and the need to improve dam safety activities and infrastructure investments to maintain operational reliability and secure public safety. Once the storms had passed, the Department of Water Resources moved swiftly in a race to beat the clock to repair the main spillway and bolster the emergency spillway before the onset of another winter.

Winter storms also underscored the importance of Metropolitan's long-term water strategy of continuing to lower demand through conservation and increase local baseline supplies. It also demonstrated the value of reliably capturing stormwater from the Sierra Nevada and having a diverse portfolio of storage options to increase the reliability of future water deliveries.

Recycling and Conservation: In January 2017, Metropolitan's board reviewed a feasibility study confirming the potential of a large-scale project to treat and purify wastewater in collaboration with the Sanitation Districts of Los Angeles County. Plans progressed toward building a demonstration facility at the Sanitation Districts' wastewater facility in Carson to potentially recycle more than 150,000 acre-feet a year for replenishment of groundwater basins in Los Angeles and Orange counties.

Metropolitan actively promoted conservation and water use efficiencies, ultimately investing $3.5 million for the summer 2016 and spring 2017 advertising campaigns to reinforce the importance of making conservation a California way of life, despite the drought's end.

Efforts to incentivize local supply development advanced in November 2016, with the board approving up to $44 million through Metropolitan's Local Resources Program for four new recycling projects in Los Angeles and Riverside counties. The projects will treat and deliver as much as 5.3 billion gallons per year.

Farther afield, efforts continued to formulate a Colorado River drought contingency plan as voluntary reductions in water deliveries by users in the Lower Basin helped stave off a potential shortage declaration on the river that would have prompted cutbacks in deliveries to Arizona and Nevada. Negotiations with Mexico, meanwhile, brought the Lower Basin closer to a new agreement to further develop conservation, storage and environmental restoration projects.

California WaterFix: The California WaterFix project approached historic milestones as state and federal water agencies prepared for important decisions on the proposed project aimed at modernizing the statewide water delivery system in the Delta.

In December 2016, state and federal officials released the project's final environmental impact report and statement. The identified preferred alternative calls for three new intakes in the northern Delta on the Sacramento River and a twin-tunnel pipeline system capable of transporting as much as 9,000 cubic feet per second of supplies. "After more than 10 years of planning analysis and debate, the time for decisions is finally in sight," General Manager Kightlinger said at the time.

In June 2017, permitting under the federal Endangered Species Act was largely completed with the release of biological opinions from the U.S. Fish and Wildlife Service and the National Marine Fisheries Service. As the fiscal year came to a close, the state Department of Fish and Wildlife was finalizing its companion permit for compliance with California environmental statutes.

Metropolitan's board began its deliberations in the summer of 2017 with a comprehensive set of workshops and policy- based white papers on the construction, operations and financing of the project, coupled with a robust outreach and public participation process. The board was slated to vote on the project in the fall.

Rate structure litigation: Metropolitan and its member agencies achieved an important legal and financial victory when the California Court of Appeal ruled that the State Water Project is an integral part of Metropolitan's system and therefore Metropolitan may recover State Water Project transportation costs in its transportation rates.

The San Diego County Water Authority had challenged the inclusion of these costs in Metropolitan's transportation rates and in the price term of the parties' 2003 Exchange Agreement. Under that agreement, SDCWA makes available to Metropolitan at Lake Havasu an independent supply of conserved water from the Imperial Irrigation District and the lining of canals, and in exchange Metropolitan delivers a like amount of Metropolitan water to SDCWA. SDCWA had requested that the price be based on Metropolitan's generally applicable transportation rates—which are the same blended rates for transportation costs (regional, Colorado River and State Water Project) charged to all member agencies, reflecting the integrated nature of the Metropolitan system and equitable charges to all agencies—but later challenged that price.

On June 21, 2017, the Court of Appeal upheld this key element of Metropolitan's rate structure and its inclusion in the Exchange Agreement price. "The Water Authority's years-long effort to shift costs relating to their own water supply onto ratepayers elsewhere in Southern California has failed," Kightlinger said. "While Metropolitan has prevailed as to the overwhelming majority of costs under challenge in this litigation, nobody is a winner when water districts decide to fight in court rather than resolve their differences in a democratic and collaborative fashion."

Leadership continuity: Metropolitan's board leadership maintained continuity, meanwhile, with the re-election of Randy Record in October 2016 to another two-year term as chairman. Representing the Eastern Municipal Water District since January 2003, Record is the second member of his family to serve on Metropolitan's board (his father, Clayton A. Record, serving from 1999 to 2001).

"These have been incredibly challenging times for Californians and water agencies," Record said at the time of his re-election. "I am grateful for the support of my board and proud of the leadership we have provided during my first term to ensure we prudently manage through the current drought, promote conservation and stewardship, invest in infrastructure and look to the future."

As the fiscal year drew to a close, Metropolitan was better positioned for future challenges and to provide broad regional benefits. It was a year that saw a dramatic rebound in storage reserves, with important steps to promote the development of local supplies and sustain conservation activities. Metropolitan continued to provide strong support for infrastructure investments including an improved Oroville spillway, and the California WaterFix project. Finally, an important appellate court decision upheld a critical element of Metropolitan's rate structure validating Metropolitan's long-standing commitment to regionalism and shared responsibility.

The Sepulveda Feeder was among many Metropolitan facilities shut down for repairs and inspections during 2016 and 2017.

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, 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

Over the past few years, the region has experienced dramatic swings in water supply conditions from the driest to the wettest periods in California's recorded history. As conditions shifted, so did Metropolitan's operations, from implementing extraordinary drought actions to maximizing the delivery and storage of supplies to ensure continued water supply reliability.

In the first half of FY 2016/17, Metropolitan experienced a significant turnaround in its storage reserves, with a gain of over 300,000 AF by the end of December 2016, due in part to a final 2016 SWP allocation of 60 percent, or approximately 1.15 MAF for Metropolitan. By the end of FY 2016/17, northern California had already experienced its wettest water year on record, with the Northern Sierra Eight-Station Index registering 94.2 inches of precipitation (194 percent of normal). The record precipitation led to a SWP allocation of 85 percent, or approximately 1.62 MAF for Metropolitan. Metropolitan was also able to secure 124,000 AF of surplus Article 21 supplies, which are in addition to the regularly allocated SWP supplies, and haven't been available since 2011.

To effectively manage and take full advantage of the extraordinarily high amounts of SWP supplies, Metropolitan reduced the delivery of Colorado River water into the service area to under 300,000 AF, which is the lowest delivery to the service area since the early years of the CRA. This was accomplished by cutting back CRA pumping from the full CRA operations of recent years to only a 3- to 4-pump flow in March through June, leaving the Colorado River supplies in Lake Mead Intentionally Created Surplus to maximize Metropolitan's storage in Lake Mead. An expedited design and construction of a new weir gate in the CRA, downstream of the Whitewater River west of Palm Springs, enabled Metropolitan to also maximize deliveries of Colorado River water into the Advance Delivery Account with Desert Water Agency and Coachella Valley Water District. The 2017 deliveries to this account are on track to be the highest ever in a single calendar year and could well exceed 350,000 AF, far more than the prior record of 298,000 AF in 1986.

Continued conservation, along with significantly higher than normal local supplies due to the wet conditions, suppressed water demands on Metropolitan and reduced Metropolitan's water sales for FY 2016/17 to about 1.5 MAF. This level of sales is significantly

below the 10-year average annual sales of 1.92 MAF. Maximum daily system deliveries were about 6,400 AF per day for the fiscal year compared to 6,050 AF per day last fiscal year and 8,250 AF per day in FY 2006/07. Table 1-2 shows Metropolitan's monthly water sales for FY 2016/17. Additional figures and tables at the end of this chapter show total fiscal year water sales by category, monthly water sales by category, a comparison of water sales by category for the past two fiscal years, historical water sales by calendar and fiscal year, and water use by member agency.

TABLE 1-2
MONTHLY WATER SALES FOR ALL MEMBER AGENCIES
Fiscal Year 2016/17
(Acre-Feet)

Month	Full Service[1]	Storage Program[2]	Totals
July	157,257	1,412	158,669
August	156,321	2,168	158,488
September	145,064	2,349	147,413
October	178,209	10,571	188,780
November	156,101	10,543	166,644
December	118,952	15,963	134,915
January	72,150	1,108	73,258
February	57,791	613	58,404
March	72,004	712	72,716
April	103,879	1,629	105,508
May	112,005	2,275	114,280
June	123,848	1,732	125,580
Totals	**1,453,580**	**51,074**	**1,504,654**

[1] Includes Full Service and Exchange sales.
[2] Includes sales from the Conjunctive Use, Cyclic Storage and Soboba Settlement programs.

The combination of high supplies, low demands, and strategic operations resulted in record-breaking increases to storage. It is estimated that over 1 MAF will be added to storage by the end of calendar year 2017, surpassing the previous record of approximately 700,000 AF added to storage in 2011. By the end of calendar year 2016, storage increased by 364,000 AF to a dry-year storage total of 1.3 MAF. Groundwater storage was also repositioned to surface storage in 2016 to make sure ample storage reserves were easily

accessible in case 2017 turned out to be another extremely dry year. However, as supplies rapidly increased, Metropolitan maximized deliveries into every available storage account. Carryover stored in San Luis Reservoir at the end of 2016 was quickly moved down into Metropolitan's system by March 2017 to avoid carryover spill and to make room for incoming SWP supplies. Castaic Lake, which had been drawn down at the end of 2016 for the Department of Water Resources' shutdown work, was completely refilled. Perris Flexible storage, which had not recovered from the drought, was completely full by the end of February 2017. Metropolitan also pursued water management actions to increase deliveries to local groundwater basins. By the end of FY 2016/17, total dry-year storage reserves climbed to over 1.6 MAF, with over 700,000 AF in Diamond Valley Lake.

Overall, with the success of the Metropolitan actions taken this fiscal year to fully maximize storage recovery under high supply conditions, the region is now better positioned to manage future droughts.

Major Accomplishments for Fiscal Year 2016/17

System Operations and Planning

- Effectively managed surplus supplies and refilled storage reserves (530,000 AF in FY 2016/17).
- Dramatically adjusted system operations to maximize delivery and storage of abundant SWP supplies, after years of SWP supply shortages.
- Worked with DWR to prevent any interruption of SWP deliveries and negotiated special terms to allow surplus Article 21 supplies to remain available during repairs of the damaged DWR Clifton Court facilities.
- 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, positioning Metropolitan to be on track to store a single calendar-year record amount of about 750,000 AF—roughly three-quarters of the available Colorado River supplies—by the end of CY 2017.
- Collaborated with Engineering Services to implement capital projects to deliver record amounts of water to the Advanced Delivery Account with Desert Water Agency and Coachella Valley Water District.

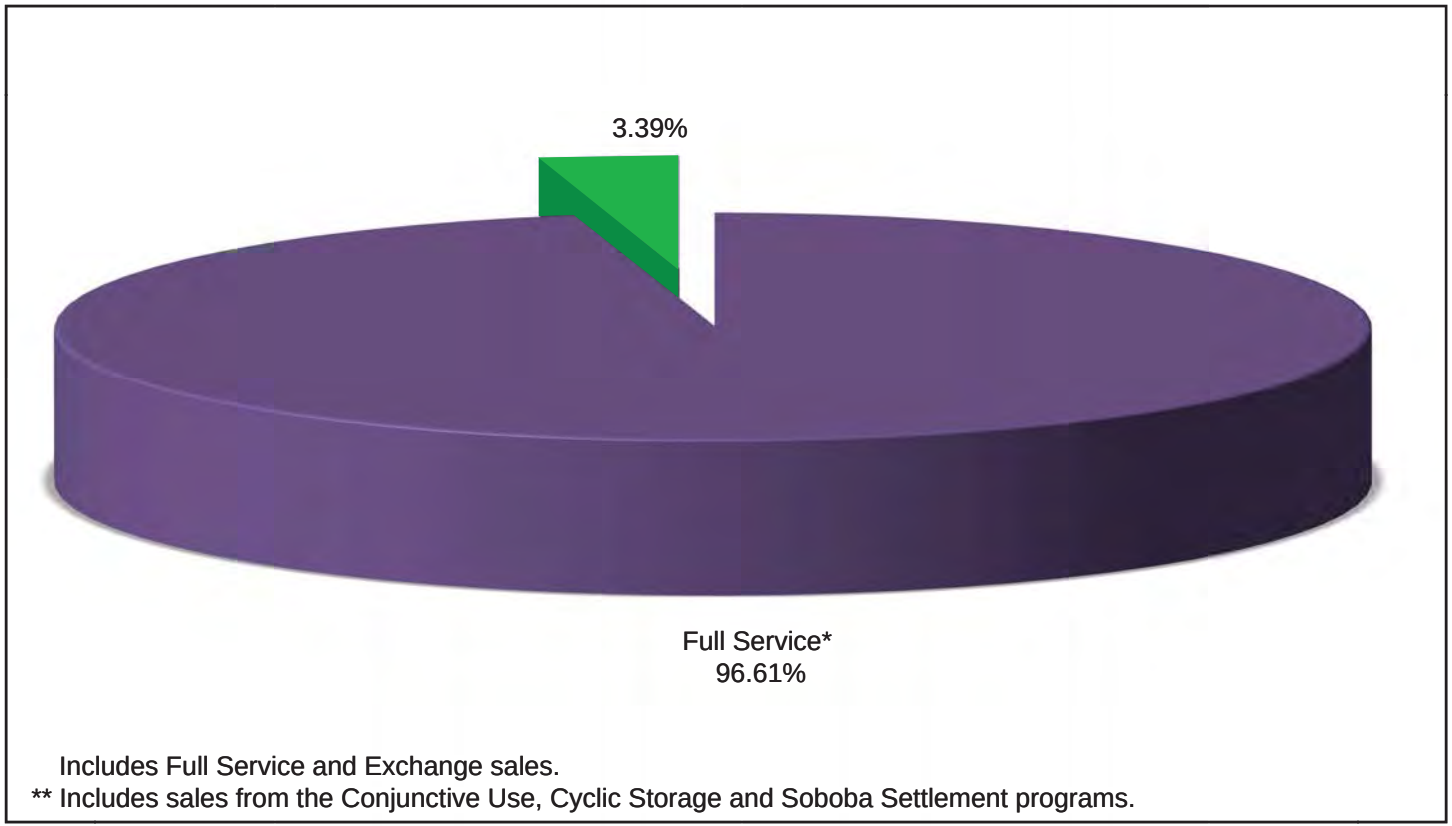


Figure 1-1. Total Water Sales for Fiscal Year 2016/17 - All Member Agencies

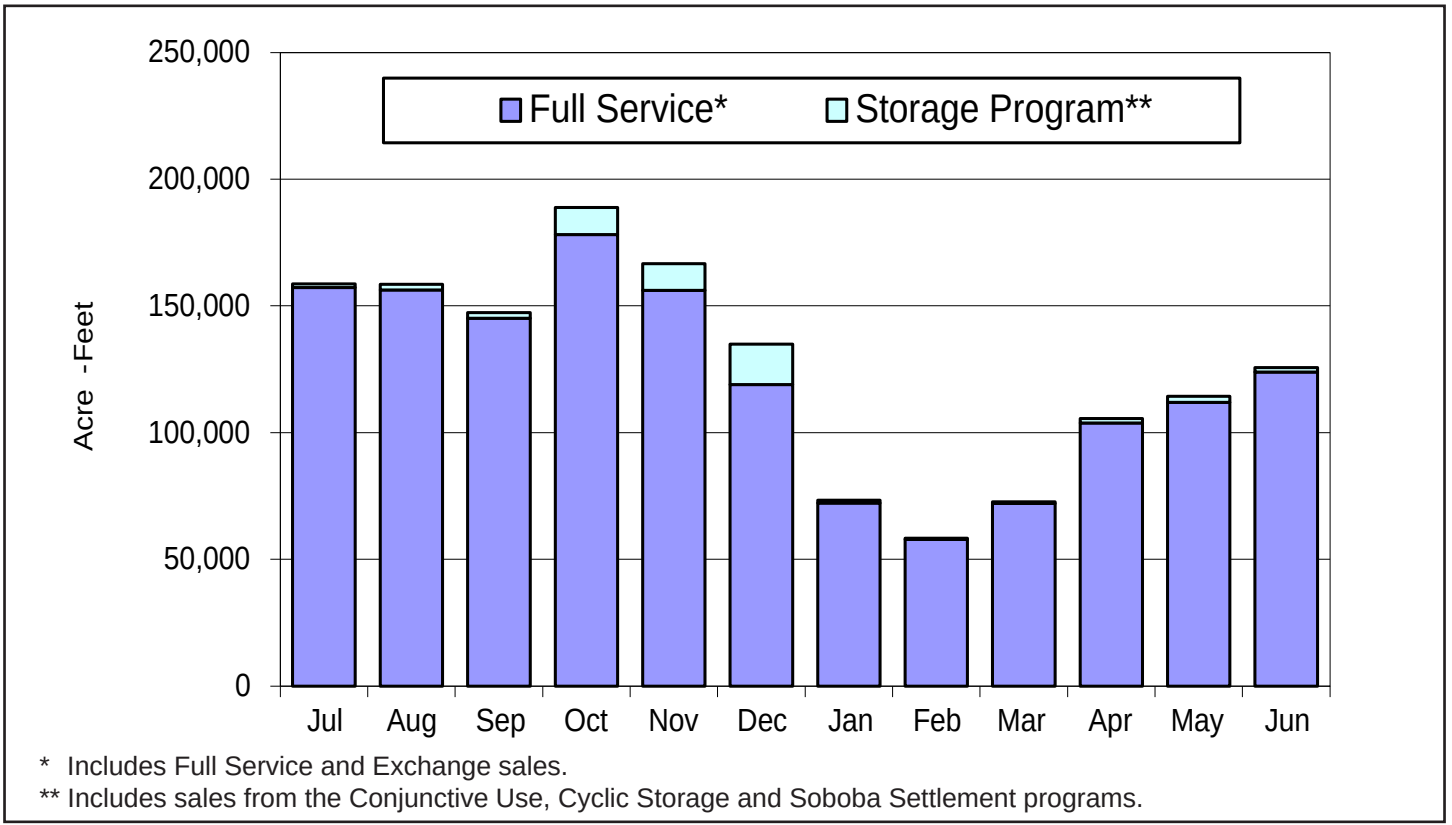


Figure 1-2. Monthly Water Sales for Fiscal Year 2016/17 - All Member Agencies

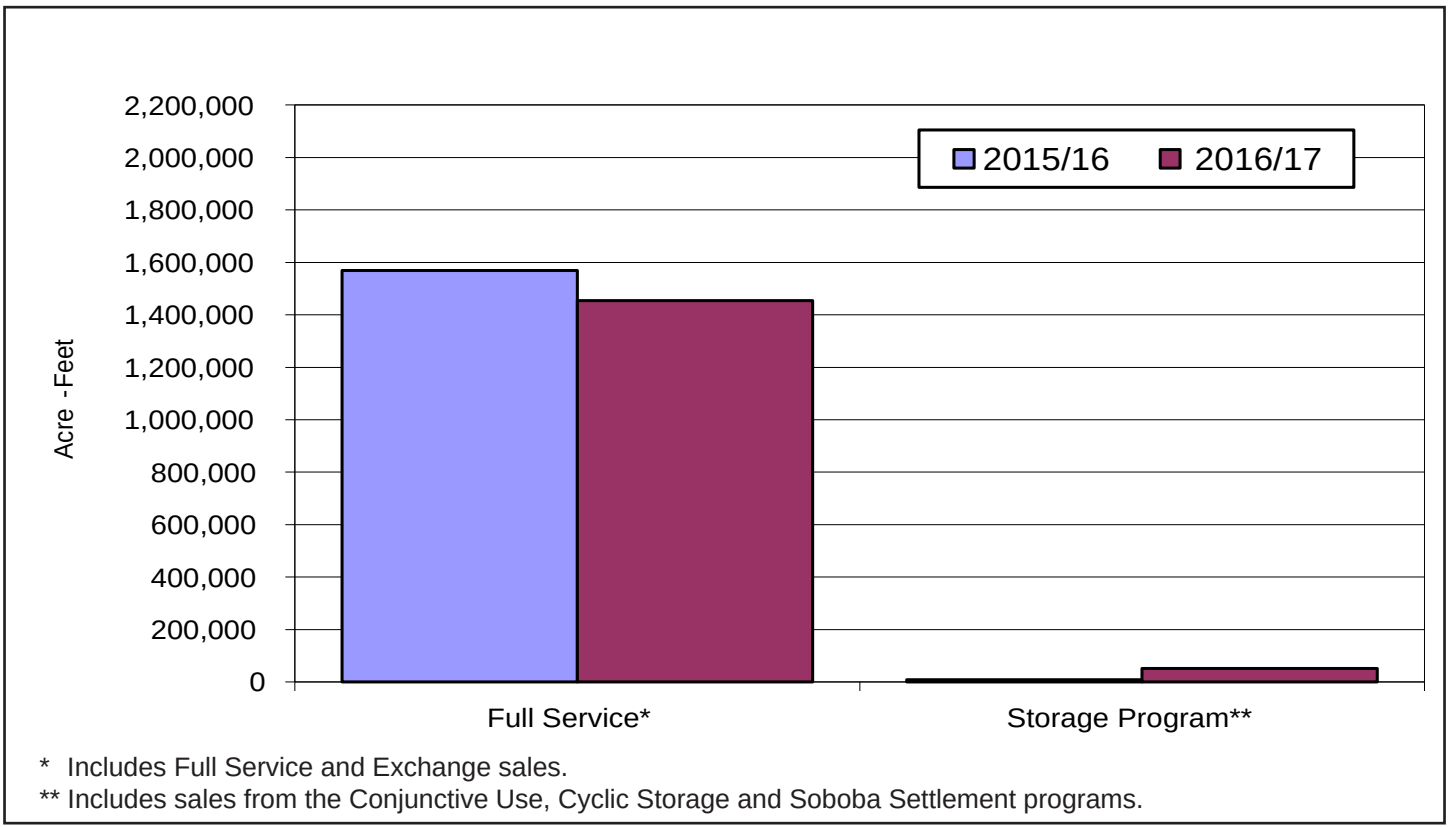


Figure 1-3. Comparison of Water Sales to Member Agencies For The Past Two Fiscal Years

TABLE 1-3
HISTORICAL WATER SALES
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		1,504,654
1979	1,230,068	1,235,193			

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

TABLE 1-4
WATER USE BY METROPOLITAN'S MEMBER AGENCIES
Fiscal Year 2016/17[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	44,806	44,806	12,797		12,797	57,603	22%
Beverly Hills	0	0	9,471		9,471	9,471	100%
Burbank	12,636	12,636	5,271	6,967	12,238	17,907	29%
Calleguas	37,632	46,819	87,293		87,293	134,112	65%
Central Basin	208,589	231,370	18,507	32,689	51,196	249,877	7%
Compton	6,963	6,963	5.2		5.2	6,968	0%
Eastern	115,962	115,962	96,692	10,848	107,540	212,654	45%
Foothill	7,179	7,179	8,102		8,102	15,281	53%
Fullerton	18,673	18,673	6,471		6,471	25,144	26%
Glendale	9,255	9,255	14,111		14,111	23,366	60%
Inland Empire	191,850	190,719	42,604	11,563	54,167	233,323	18%
Las Virgenes	3,340	3,448	18,106		18,106	21,554	84%
Long Beach	39,469	39,469	23,333		23,333	62,802	37%
Los Angeles	178,098	178,098	219,779		219,779	397,877	55%
MWDOC	348,378	360,899	131,900	50,475	182,375	492,799	27%
Pasadena	10,673	10,748	16,865		16,865	27,613	61%
San Diego CWA	104,034	104,034	379,942		379,942	483,976	79%
San Fernando	2,766	2,766	0		0	2,766	0%

TABLE 1-4
WATER USE BY METROPOLITAN'S MEMBER AGENCIES
Fiscal Year 2016/17[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	3,154	3,154	971		971	4,125	24%
Santa Ana	29,104	29,104	8,211		8,211	37,315	22%
Santa Monica	8,681	8,681	3,571		3,571	12,252	29%
Three Valleys	41,322	41,322	51,527	15,311	66,837	92,849	55%
Torrance	7,055	7,055	16,380		16,380	23,435	70%
Upper San Gabriel	168,481	134,054	3,197	40,500	43,696	137,251	2%
West Basin	51,581	54,900	109,896		109,896	164,796	67%
Western	183,933	183,933	63,410		63,410	247,343	26%
	1,833,614	1,846,047	1,348,410	168,352	1,516,762	3,194,457	42%

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] 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
2016/17 MAJOR SHUTDOWNS & SERVICE INTERRUPTIONS

FACILITY	DATES	NO. OF DAYS	LIMITS OF SHUTDOWN	PURPOSE
ETIWANDA PIPELINE	Jul 1-Jun 30, 2017	365	From the Rialto Feeder to the Upper Feeder (Untr)	For Phase 2 of 3 Lining Repair Project
SEPULVEDA FEEDER	Jul 1-Aug 23, 2016	55	From Roscoe Blvd sectionalizing valve to Venice Pressure Control Structure	For repairs and return to service
SECOND LOWER FEEDER -Palos Verdes Reservoir	Aug 22-Aug 29, 2016	8	From Oak Street Pressure Control Structure to Palos Verdes Reservoir/Second Lower Feeder By-Pass Line	For installation of two bulkheads and a relief pipe on by-pass and weir structure
SANTIAGO LATERAL	Oct 4-Oct 6, 2016	3	From Weir Canyon sectionalizing valve to Irvine Lake	For inspection and repairs
MIDDLE FEEDER (South) -Victoria 223rd Street Cross Feeder -Victoria Street Lateral	Oct 24-Oct 28, 2016	5	From sectionalizing valve near Greenleaf Blvd. & Atlantic Dr. on the Middle Feeder to the Victoria St. Lateral/Victoria to 223rd St. Cross Feeder interconnection	For replacement of two plug valves
SAN DIEGO PIPELINE No.3	Nov 6-Nov 10, 2016	5	From Lake Skinner to SDCWA jurisdiction line	SDCWA requested shutdown to perform inspections in its jurisdiction
LAKEVIEW PIPELINE	Nov 7, 2016	1	From PC-1 to San Diego Canal	For inspection
RIALTO FEEDER	Nov 14-Nov 19, 2016	6	From Live Oak Reservoir to DWR's Devil Canyon Power Plant	For visual and electromagnetic inspection, and maintenance work
SECOND LOWER FEEDER	Nov 28-Dec 4, 2016	7	From sectionalizing valve near Carson St. and Bataan Ave. to 223rd St. and Western Ave.	For visual and electromagnetic inspection, and maintenance work
SAN DIEGO PIPELINE No.5	Jan 8-Jan 17, 2017	10	From Red Mountain Pressure Control Structure to SDCWA jurisdiction line	SDCWA requested shutdown to perform inspections and bulkhead installation in its jurisdiction.
PALOS VERDES FEEDER	Jan 30-Feb 7, 2017	9	From Monterey Rd./Kolle Ave. sectionalizing valve to the Ascot Wasteway Tower	For replacement of the sectionalizing valve and the by-pass valves at Collis Ave.
ORANGE COUNTY FEEDER -Irvine Cross Feeder	Feb 6-Feb 9, 2017	4	From the Willits St. Pressure Control Structure to the pipeline terminus	For repair of packing box on Irvine Cross Feeder sectionalizing valve
ORANGE COUNTY FEEDER	Feb 6-Feb 12, 2017	7	From the Lincoln Ave. and East St. Sectionalizing valve to the Willits St. Pressure Control Structure	For lining repair and installation of bulkhead downstream of Service Connection SA-01

TABLE 1-5 (Continued)
2016/17 MAJOR SHUTDOWNS & SERVICE INTERRUPTIONS

FACILITY	DATES	NO. OF DAYS	LIMITS OF SHUTDOWN	PURPOSE
ORANGE COUNTY FEEDER	Feb 13-May 20, 2017	97	From downstream of Service Connection SA-01 to the Willits St. Pressure Control Structure	For re-lining project
COLORADO RIVER AQUEDUCT -San Jacinto Pipeline 1&2	Feb 14-Mar 10, 2017	25	From Whitsett Intake Pumping Plant to Lake Mathews	For sandtrap upgrades at Hinds/Eagle/Iron, concrete damage repair at Eagle Mtn. sand trap, switch house seismic upgrades, electrical testing, and San Jacinto Tunnel seepage measurements
SAN DIEGO PIPELINE No.4	Feb 17-Feb 26, 2017	10	From Skinner plant to SDCWA jurisdiction line	SDCWA requested shutdown to perform inspections in its jurisdiction
MILLS TREATMENT PLANT	Feb 28-Mar 1, 2017	2	Mills plant	For inspection of Reservoirs 1 and 2 effluent slide gates, emergency generator testing, new ammonia feed system tie-in, and service water loop backflow valves replacement
LOWER FEEDER -Santiago Lateral	Mar 6-Mar 12, 2017	7	From Lake Mathews To Diemer plant	For removal of service valve from Service Connection WR-01
ORANGE COUNTY FEEDER	Mar 13-Mar 15, 2017	3	From the Lincoln Ave. & East St. sectionalizing valve to the Willits St. Pressure Control Structure	For replacement of air release/vacuum valve
FOOTHILL FEEDER -San Fernando Tunnel -Jensen Treatment Plant -Sepulveda Feeder -East Valley Feeder -West Valley Feeder No. 1 -West Valley Feeder No. 2 -Calabasas Feeder	Mar 27-Apr 3, 2017	8	From Castaic Lake to Jensen plant	For Jensen switchgear retrofit work, repair of two isolation valves, installation of new flow meter, and inspections
ORANGE COUNTY FEEDER	Jun 19-Jun 23, 2017	5	From the Lincoln Ave. & East St. sectionalizing valve to the Willits St. Pressure Control Structure	For removal of bulkhead and refilling pipeline

Agricultural production continues for Metropolitan-owned Delta islands.

CHAPTER 2

Strategic Water Initiatives

Metropolitan provides imported water supplies to its member agencies from two primary sources, the Colorado River and 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 continued collaboration with state, federal and other water agencies to support actions to improve State Water Project water supply reliability related to the Bay-Delta. Staff supported efforts to: complete the California WaterFix planning phase to improve Delta conveyance; implement habitat restoration in the Bay-Delta system; pursue new and improved fishery management through collaborative science; and participate in key regulatory processes. Figure 2-1 shows a map of the Delta region.

Near-Term Actions

Habitat Restoration

BDI has been working with other stakeholders and agencies in evaluating options to improve the floodplain fishery habitat in the Yolo Bypass flood control system. This project, if implemented, will help prevent undesirable flooding impacts to the Yolo Bypass Wildlife Area from subsequent projects designed to provide adult fish passage and salmonid rearing habitat as required by the Yolo Bypass Biological Opinion. BDI has also been involved in the Tule Red Restoration Project through the State and Federal Contractors Water Agency. The objective of this project is to restore about 350 acres of tidal wetlands in the Suisun Marsh.

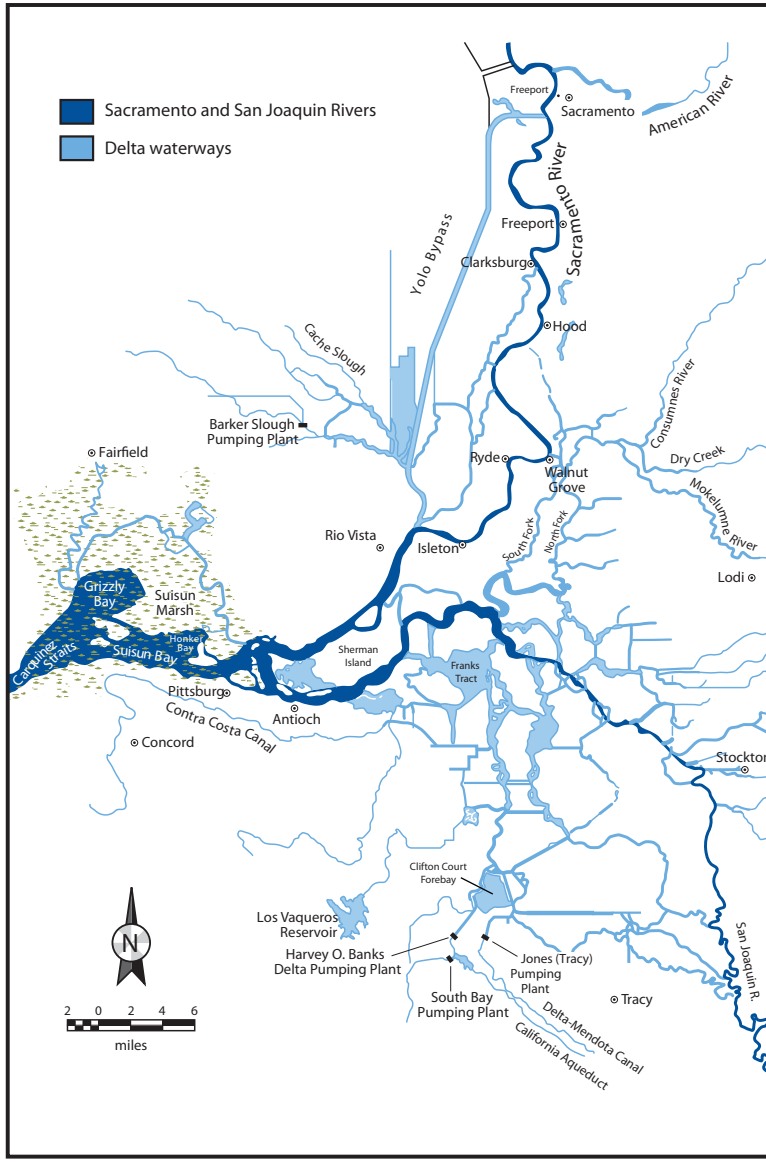


Figure 2-1. Map of the Delta Region

Science Activities

Metropolitan's water supply reliability is affected by regulatory actions related to the SWP in the Bay-Delta system. For that reason, Metropolitan has an interest in participating in efforts to increase scientific understanding and developing measures that can improve the fish and wildlife conditions in the Bay-Delta system while at the same time providing for more reliability of supply. To further this effort, BDI science staff continues to participate in the Collaborative Science and Adaptive Management Program, initiated in 2013 by the participants in the litigation challenging the U.S. Fish and Wildlife Service and National Marine Fisheries Service biological opinions. Staff is assisting on current Delta smelt studies and work plans addressing priority salmon and Delta smelt science questions. In February, this collaborative program released a report summarizing research on salmon survival in the South Delta. Also, the collaborative process is focusing on the state's Delta Smelt Resiliency Strategy actions and monitoring planned for this year. The process is also assessing the scientific basis for the Fall X2 action in the U.S. Fish and Wildlife Service 2008 Biological Opinion (X2 indicates the location of the low-salinity zone which is a parameter for managing Delta outflow). Staff provided input to the Sacramento Valley Salmon Resiliency Strategy released by the California Natural Resources Agency on June 2. The strategy is a science-based document that addresses near- and long-term needs of Sacramento Valley salmon and steelhead, including actions to restore habitat, improve stream flow, remove stream barriers and reintroduce salmon and steelhead to ideal habitat.

Staff worked with consulting scientists to design and conduct a longfin smelt habitat study, which included field survey work in late September 2016. The study mainly seeks to quantify the factors that affect distribution of longfin smelt and food sources like zooplankton and mysid shrimp in San Pablo Bay. Current research has provided findings and a publication that strongly suggests that the relationship between flow and longfin smelt is locally positively influenced by increases in flows in tributaries throughout the San Francisco Bay rather than just through Delta outflow.

In September, a study on the feasibility of implanting PIT tags and acoustic tags into adult Delta smelt was published in the North

American Journal of Fisheries Management. The study was funded by Metropolitan, and staff participated in the study and co-authored the publication. The development of improved tagging and tracking capabilities for Delta smelt will be essential in understanding Delta smelt behavior and habitat, leading to more effective management actions.

Staff also initiated a project to evaluate the reliability of correlations between environmental variables such as water quality or habitat characteristics and fish populations in the Delta. The project will consist of a literature search of environmental correlations that have been used in the Delta, a re-analysis of the correlations to determine if they hold up in the face of updated data, and recommendations for best practices when using environmental correlations as policy tools. A project report is expected by the end of 2017.

In 2016, staff submitted several grant applications of which two were approved for funding by the CDFW. Two grant agreements were executed, one involving the role of striped bass in Chinook salmon mortality, and the other analyzing factors impacting longfin smelt in the Upper San Francisco Estuary. These grant-funded studies will be important to management decisions in the Delta and will facilitate a continued beneficial relationship with well-respected researchers. Field and analytical work will continue for the next two to three years.

BDI's science staff prepared and submitted a Central Valley Project Improvement Act joint charter study proposal to better understand if modifying or eliminating points of contact between predators and juvenile salmonid can increase their survival. The charter was prepared in collaboration with federal fish agencies and the East Bay Municipal Utility District.

Regulatory Activities

The California WaterFix petition proceedings before the State Water Resources Control Board are ongoing, with Part 1 hearings addressing the effects of the proposed project on legal users of water. Part 2 of the hearings are scheduled to begin after the approval of Environmental Impact Report/Environmental Impact Statement, and Endangered Species Act permits. This will address the effects of the proposed project on fish and wildlife, including consideration of

appropriate Delta flow criteria. Staff is participating in collaboration with the State Water Contractors.

Emergency Preparedness Plan

Metropolitan has worked extensively with state and federal agencies on how to develop plans for delivering water through the Delta to the export pumps in the event of a major seismic emergency and levee failures. The Delta Flood Emergency Management Plan is currently planned to be completed in 2017. DWR is documenting results of their Emergency Response Tool simulation runs, which will lead to the completion of the plan. The ERT runs have demonstrated strategies to limit the period of export disruption to less than six months following the breach of multiple levees and island flooding from severe earthquake or storm events.

The state Office of Emergency Services has indicated that work is nearly complete on their Northern California Catastrophic Flood Management Plan, including the Delta region. The plan elements were put into practice at an interagency level during the Oroville Spillway failure emergency operations and performed favorably.

Delta Islands

In July 2016, Metropolitan purchased Bacon Island, Bouldin Island, Webb Tract and parts of Holland Tract and Chipps Island, located in the Sacramento-San Joaquin Delta, and continued with transfer of titles, leases, and other associated activities. In the first year of Metropolitan's ownership of the Delta Islands properties, staff organized an internal multi-disciplinary team and management structure for ongoing status-quo activities. Farming leases on Metropolitan's islands continue with agricultural production as long-term plans are being developed. Recent accomplishments include the execution of the Semitropic Water Storage District master lease for both Bouldin Island and Webb Tract. Staff is currently working on completing the Holland Tract lease for 2017 and preparing for the Bacon Island lease in 2018. Metropolitan, in assuming ongoing regulatory compliance responsibilities for 2016 Senate Bill 88 (measurement and reporting requirements for water diversions), implemented an approved first-year experiment plan for measuring Delta water diversions, which will provide valuable compliance information through coordination with the Delta Watermaster.

Long-Term Actions

California WaterFix

After extensive consultation with the DWR and U.S. Bureau of Reclamation, the National Marine Fisheries Service and U.S. Fish and Wildlife Service released their biological opinions for the proposed construction and operation of California WaterFix on June 26. These agencies are responsible for the protection of species listed under the federal ESA. Both biological opinions found that the construction and operation of California WaterFix as proposed would not jeopardize the continued existence of ESA-listed species, destroy, or adversely modify critical habitat for those species. Action on the final EIR/EIS is expected soon, since the action follows the issuance of the biological opinions. Issuance of the state ESA and other state permits will occur after DWR's action on the final EIR.

California EcoRestore

California EcoRestore is making progress in advancing restoration actions in the Sacramento-San Joaquin Delta geared toward achieving the goal of restoring at least 30,000 acres of tidal, floodplain and riparian habitats by 2020.

DWR initiated a Request for Proposal inviting private sector companies, non-profit groups and individuals to partner in restoration projects in the Delta. This effort is designed to help achieve California EcoRestore's tidal and other habitat restoration goals. The Delta Science Program convened an interagency adaptive management technical team to aid in developing a Delta ecosystem restoration adaptive management program. It will initially support current EcoRestore projects and provide a strong foundation for a long-term program that would support future restoration in the Delta.

Colorado River Resources

For the first time since 2011, precipitation was above normal in the Colorado River Basin in fiscal year 2016/2017, with total storage in the Colorado River system increasing by about 2.4 million acre-feet. Lake Mead, the largest reservoir in the United States, increased by 8 feet during the fiscal year, but still ended the year with storage at

only 38 percent of capacity. The increase in storage in Lake Mead was due to both the improved hydrology and also the ongoing efforts of agencies, including Metropolitan, to fund conservation activities to conserve water and increase storage levels in Lake Mead.

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.

Bard Seasonal Fallowing Pilot Program

During the fiscal year, Metropolitan concluded a two-year seasonal fallowing pilot program with Bard Water District. This pilot program tested the water savings potential of providing financial incentives to farmers to forego planting a crop during a four-month period of spring and summer, when water use is high and crop production is low. The resulting reduction in consumptive water use was made available for use by Metropolitan. In the second year of the program, a total of 1,641 acres were fallowed beginning in the spring of 2017. After the conclusion of the pilot program, Metropolitan will use the information obtained to evaluate whether to explore a longer-term fallowing program with Bard Water District.

Palo Verde Farmland Leases

Metropolitan continues to be the largest landowner in the Palo Verde Valley under a September 2015 purchase of about 12,000 acres of land to support the reliability of Colorado River water supplies, in addition to the 8,000 acres of land it had previously owned. The leases on all of Metropolitan's lands terminated in late calendar year 2016. With fee title to more than 20 percent of the irrigated acres, Metropolitan's goals for its land holdings are to maintain agricultural productivity while improving efficient irrigation practices on its land. In 2017, Metropolitan renewed leases with its long-time tenants on its original land purchase and issued leases of its new land purchase after an open bid process. The leases provide farmers financial incentives to reduce historical water use by 25 to 30 percent.

IID Storage Agreement

In calendar year 2016, Imperial Irrigation District conserved and stored a record volume of over 56,000 acre-feet with Metropolitan, in addition to the 38,000 AF delivered in late 2015, 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.

Managing Colorado River Programs

During the fiscal year, Metropolitan continued partnering with IID to fund and implement their agricultural conservation program, saving a total of 105,000 acre-feet in 2016. In fiscal year 2017, under a maximum fallowing call, Metropolitan received about 130,000 acre-feet of water. In FY 2017/18, the fallowing call will be reduced to 90 percent of the contractual limit, under a decision that was made one year in advance, on July 31, 2016.

Colorado Drought Response

During the fiscal year, representatives from Reclamation, Arizona, California, Nevada, and water agencies, including Metropolitan, negotiated key terms for a Lower Basin Drought Contingency Plan. The plan would use 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 would also increase flexibility for agencies to meet dry-year water needs by allowing them to take delivery of Intentionally Created Surplus water stored in Lake Mead at lower lake elevations, benefitting water users in California, especially Metropolitan. It is anticipated that the agreement will be finalized and brought to the implementing agencies' boards for approval in fiscal year 2018.

Figure 2-2. Map of the Colorado River Basin

Metropolitan provided incentives for retrofit of this irrigation system at Valhalla Memorial Park in Burbank.

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.

On May 9, 2017, in response to continued and significantly improved statewide hydrologic conditions, Metropolitan moved from the Water Supply Alert implemented in the previous fiscal year to a Water Supply Watch. Metropolitan's water supply and dry-year storage reserves had steadily declined to record low levels during the unprecedented drought that extended from water years 2012-13 through 2014-15 (a water year runs from October 1 through September 30). Restrictions on wholesale water deliveries began in July 2015 and were finally lifted in May 2016, several months after precipitation levels in northern California reached normal conditions for the first time since the drought began.

The voluntary conservation efforts supported by the Water Supply Watch are consistent with Gov. Brown's call to make conservation a California way of life. In April 2017, the same month that annual Northern California precipitation exceeded the highest amount on record, Gov. Brown declared an end to the drought emergency initially declared in January 2014. By the end of calendar year 2017, Metropolitan expects to put over 1 million acre-feet into dry-year storage reserves, the largest single year addition to storage programs in its history.

State Water Project Resources

Metropolitan holds a water supply contract for 1,911,500 acre-feet annually with the California Department of Water Resources, subject to availability, and participation rights in the State Water Project. Record high precipitation and above-average snowpack during water year 2016-17 allowed for an 85 percent allocation of State Water Project contract supplies for CY 2017, representing the highest SWP allocation since 2006, and an improvement over the previous year's 60 percent allocation. The SWP supplies managed by Metropolitan for FY 2016/17 spanned half of the 85 percent allocation and half of the 60 percent allocation. In addition to allocated contract supplies, Metropolitan received nearly 124,000 acre-feet of Article 21 supplies in FY 2016/17 (Article 21 provides water supplies to SWP contractors when water in excess of the current SWP need is available.) As a result, Metropolitan managed 1,551,872 AF through the SWP system (Fig. 3-1), almost twice as much water as in the previous fiscal year. (FY 2016/17 deliveries and storage are subject to change based on future reconciliations by the Department of Water Resources.) With improved supply conditions, Metropolitan resumed deliveries to San Joaquin Valley groundwater storage programs that were depleted during the recent drought, and restored 70,000 AF to its flexible storage accounts, bringing them to full capacity.

Metropolitan's net SWP payments during FY 2016/17 were $526 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.

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 2016/17, Metropolitan stored 24,339 AF with Semitropic. The total water in storage on June 30, 2017 was 146,688 AF.

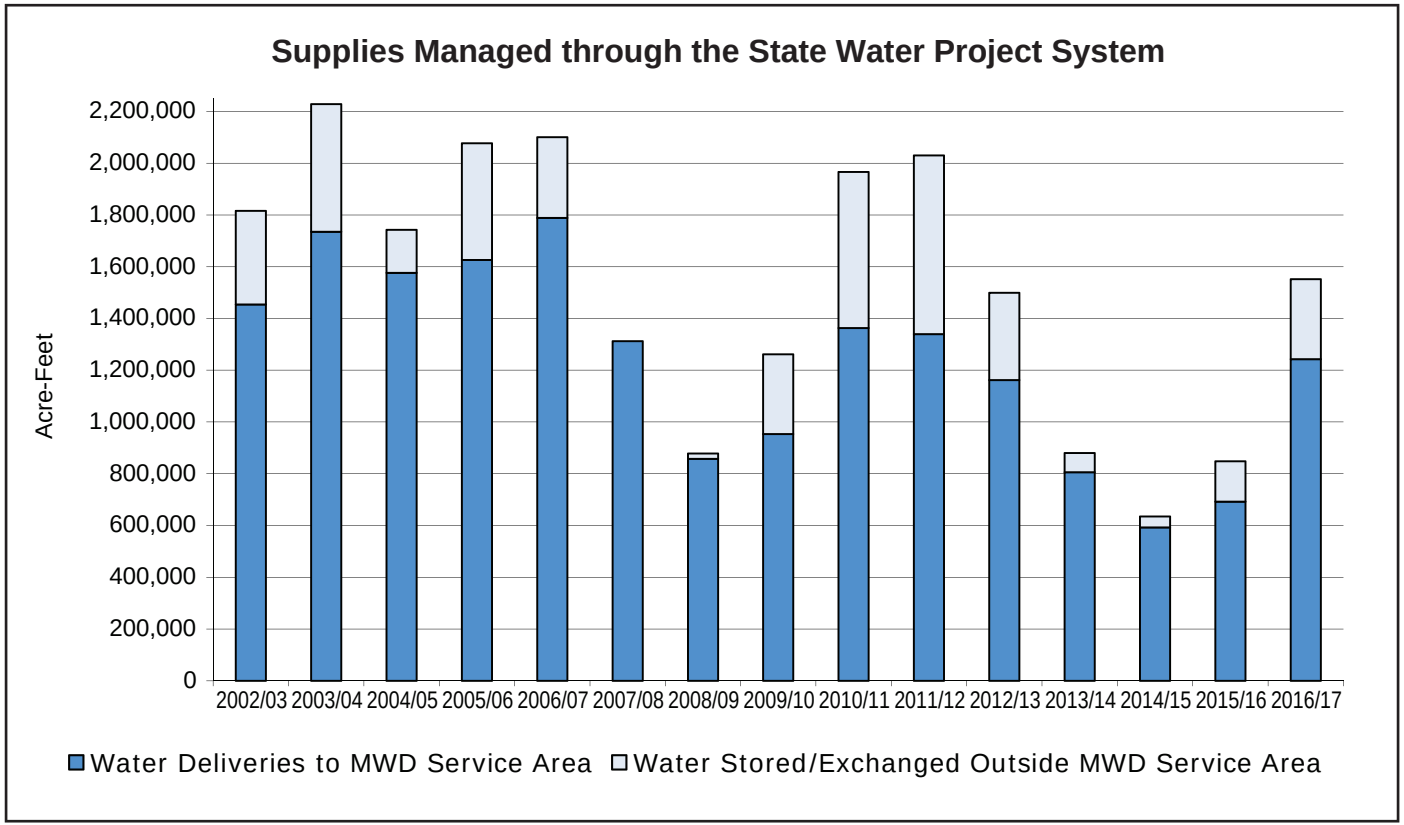


Figure 3-1. Supplies Managed through the State Water Project System

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

(Millions of Dollars)

	Conservation (Delta)		Transportation								
Fiscal Year	Capital	Minimum OMP&R [1]	Capital	Minimum OMP&R [1]	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
TOTALS	828.41	1,047.99	3,465.14	5,494.61	1,926.56	873.93	456.11	14,092.76	(1,873.37)	12,219.39	

* 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

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 2016/17, Metropolitan cycled the program to provide water quality improvements to the SWP deliveries and reduce program put costs by recovering 12,239 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 reduced future program put costs by around $600,000. The total water in storage on June 30, 2017 was 108,125 AF.

San Bernardino/Metropolitan Coordinated Operating Agreement

A July 2000 coordinated operating agreement with San Bernardino Valley Municipal Water District provided for the annual purchase of 20,000 AF and a carryover storage account of 50,000 AF. It also provided Metropolitan with the option to purchase additional water when available. The agreement terminated on December 31, 2016. The program was successful in providing Metropolitan with 223,500 AF of supplies. In addition, the agreement allowed Metropolitan to convey 556,203 AF of Metropolitan's supplies to Diamond Valley Lake during the construction of the Inland Feeder.

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 and retrieves up to 50,000 AF per year. During FY 2016/17, Metropolitan stored 4,322 AF with Kern Delta. Total water in storage on June 30, 2017 was 102,841 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. There was no program activity during FY 2016/17, leaving 27,392 AF in the exchange account on June 30, 2017.

Water Transfers and Exchanges

Improved hydrologic conditions in the SWP watershed resulted in no available capacity to convey water transfer supplies at Banks Pumping Plant. Accordingly, Metropolitan did not pursue north of Delta opportunities, but rather focused on south of the Delta purchases and exchanges.

Multi-Year Water Pool Demonstration Program

In summer 2016, Metropolitan purchased 6,871 AF of SWP supplies made available under the Multi-Year Water Pool Demonstration Program. This two-year demonstration program terminated on December 31, 2016.

Central Coast Water Authority/Castaic Lake

In February 2017, Metropolitan entered into exchange agreements with Central Coast Water Authority and Castaic Lake Water Agency, which had 46,000 AF of supplies at risk of spilling as DWR filled up San Luis Reservoir. By returning two AF of supplies for every three AF received, Metropolitan secured 17,940 AF of additional supplies.

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 2016/17, Metropolitan developed 2,471 AF of additional supply by exchange and secured a purchase of 58 AF.

Colorado River Resources

Acquisitions and exchanges made possible by the 2003 Quantification Settlement Agreement continued during FY 2016/17. Metropolitan conveyed 997,023 AF in its Colorado River Aqueduct during CY 2016. As of January 2017, Metropolitan had 85,049 AF of intentionally created surplus stored in Lake Mead. 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 for Coachella Valley Water District, Desert Water Agency and IID (including

intentionally created surplus supplies) since CY 2004. This figure has been updated with new information since the last annual report.

Figure 3-3 illustrates the storage levels of lakes Mead and Powell through fiscal year 2017. Long-term dry conditions through CY 2016 have delayed equalization releases from Lake Powell to Lake Mead. Above-average precipitation from December 2016 through February 2017 resulted in a projected unregulated inflow to Lake Powell of approximately 116 percent of the April-July average, and approximately 114 percent of average for the water year.

Water Supply Acquisitions and Exchanges

In CY 2016, Metropolitan obtained 90,374 AF from its agricultural conservation program with IID, while an additional 125,432 AF was made available from Metropolitan's land fallowing agreements with farmers in the Palo Verde Valley. Metropolitan continued its two-year pilot program with Bard Water District that could provide up to 3,775 AF of Colorado River water in CY 2017. In CY 2016, 178,278 AF of Metropolitan water was delivered to San Diego County Water Authority in exchange for 100,000 AF of IID conserved water plus 78,278 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.

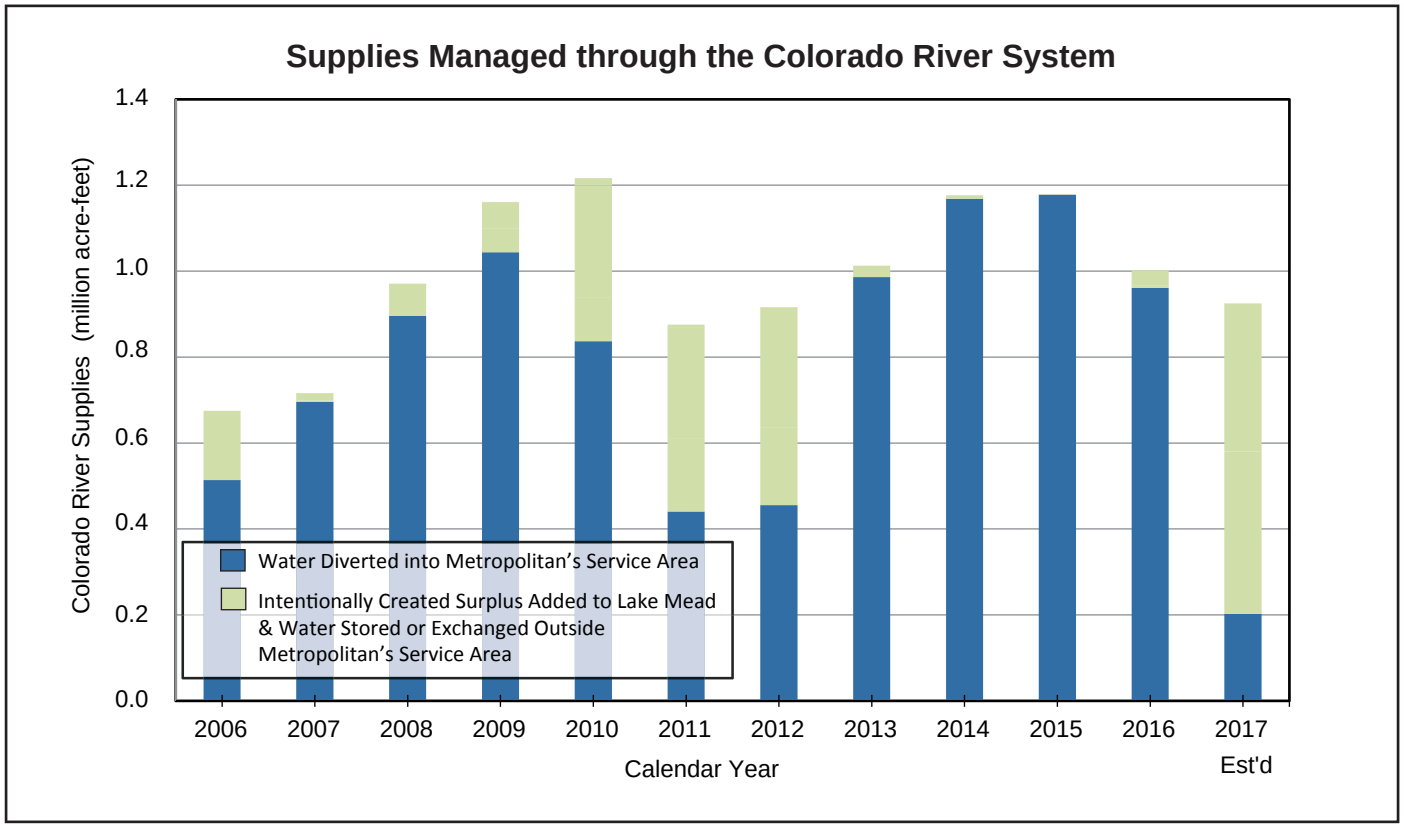


Figure 3-2. Supplies Managed through the Colorado River System

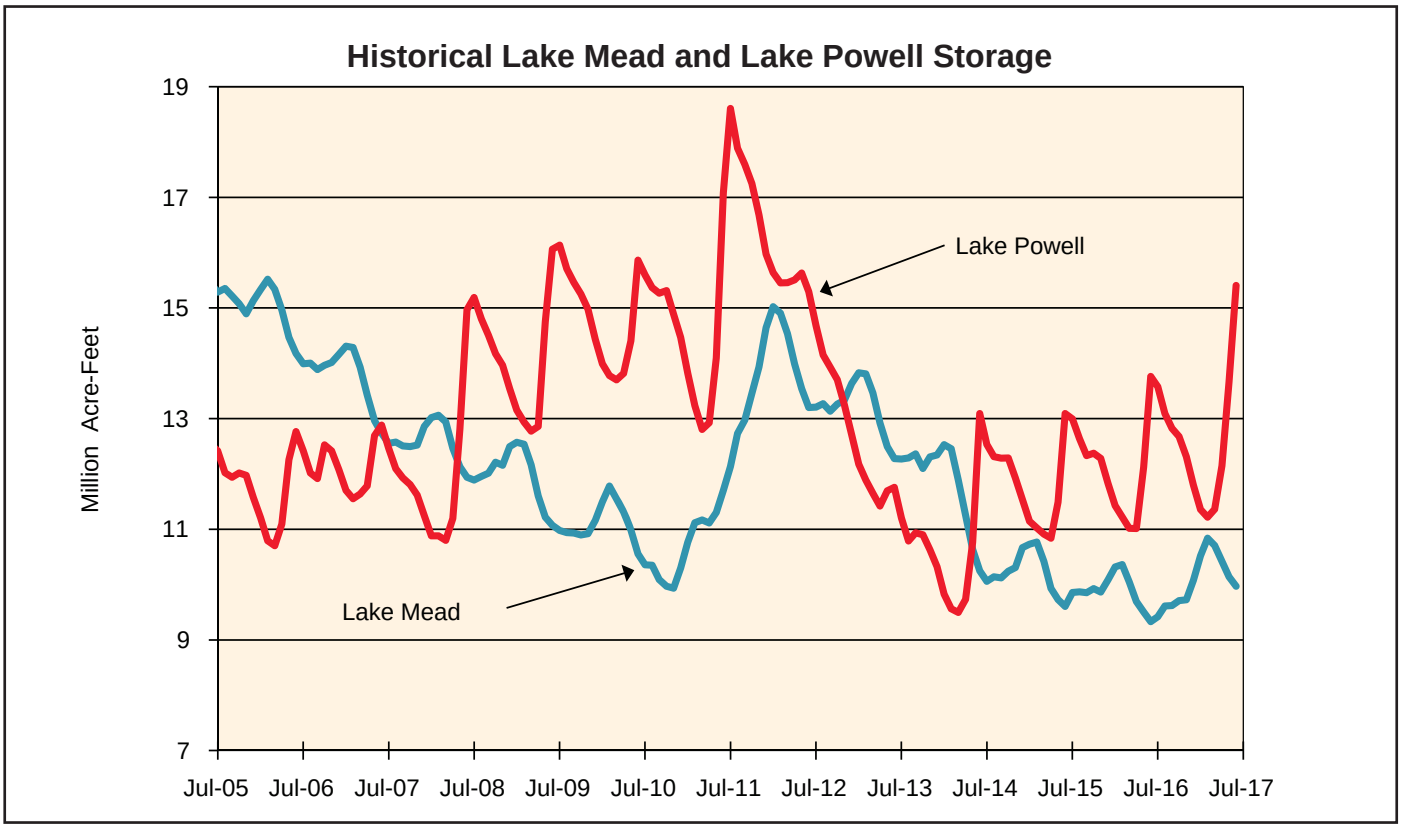


Figure 3-3. Historical Lake Mead and Lake Powell Storage Fiscal Years 2005/06 - 2016/17

Local Resources

Water Recycling and Groundwater Recovery

Metropolitan's Local Resources Program provided about $607 million since its inception in 1982, producing about 3.53 MAF of recycled water and recovered groundwater, through financial incentives of up to $340/AF. During FY 2016/17, Metropolitan provided $36 million for production of 228,815 AF under the LRP. Currently, there are 107 projects under contract expected to produce about 441,000 AF per year once fully implemented. 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 460,000 AF of recycled water (Fig. 3-4), and about 89,000 AF of recovered groundwater (Fig. 3-5).

To help 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 has committed to provide $8.6 million for 9,800 AFY of recycled water at 305 sites.

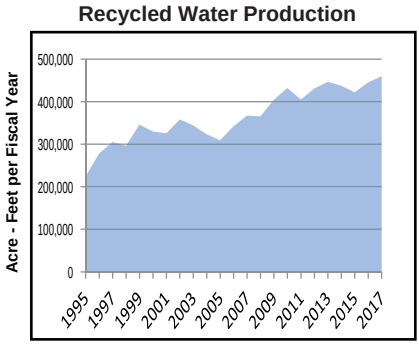


Figure 3-4.

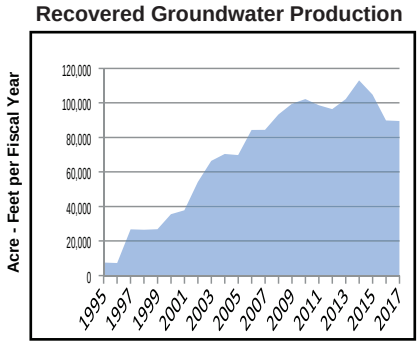


Figure 3-5.

Figures reflect total regional production (including Metropolitan-assisted project production through June 2017), 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 2001, Metropolitan has maintained agreements with its member agencies to fund three local seawater desalination projects representing 46,000 AFY of potential future supplies. The three projects are currently in the planning stages. During FY 2016/17, 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 has also 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 2017, due to improved hydrologic conditions, Metropolitan called upon agencies to store water in the conjunctive use accounts. Continued storage over the coming year will increase storage in these accounts. Table 3-2 shows the balance of stored water in each in-region groundwater conjunctive use program as of June 30, 2017.

On April 11, 2017, the board authorized the General Manager to enter into Cyclic Storage Agreements with Metropolitan's member agencies. No new cyclic agreements have been executed as of June 30, 2017. Under the existing cyclic agreements with Upper San Gabriel Valley Municipal Water District and Three Valleys Municipal Water District, 26,532 acre-feet was stored.

TABLE 3-2
METROPOLITAN'S CONJUNCTIVE USE PROGRAMS

Conjunctive Use Program	Total Storage Capacity (AF)	2016/17 Beginning Balance (AF)	Change in Storage (AF)	2016/17 Ending (AF)
Los Angeles County				
Claremont	3,000	0	0	0
Compton	2,289	0	0	0
Foothill	9,000	0	0	0
Live Oak	3,000	667	0	667
Long Beach Phase 1	13,000	0	0	0
Long Beach – Lakewood	3,600	0	0	0
Orange County				
Orange County	66,000	177	1,556	1,733
San Bernardino County				
Chino Basin	100,000	0	6,315	6,315
Riverside County				
Elsinore Basin	12,000	0	0	0
TOTAL	**211,889**	**844**	**7,871**	**8,715**

Some 2016-17 beginning balances differ from 2015-16 ending balances due to data received after publication of the 2016 Annual Report. 2016/17 data presented in this table includes CUP production data that was received by June 30, 2017 and are subject to change.

Conservation and Water-Use Efficiency

The past fiscal year saw California continue to endure one of its worst droughts, followed by one of the wettest years ever on record. Metropolitan's conservation program saw numerous changes from the previous two years of record high conservation activity, as focus shifted from providing incentives and rebates to developing additional training and research programs. The new focus teaches customers the benefits of water efficient landscaping. Ongoing efforts include turf removal classes and development of a residential landscape design assistance program, along with research studies in cooling tower water use and the effects on household water pressure. Metropolitan continues to search for opportunities to increase water-use efficiency in its service territory.

In this past fiscal year, Metropolitan paid a total of $41.2 million in conservation incentives to its customers. The projected lifetime water savings from these conservation expenditures is approximately 91,000 AF of water.

Since 1985, the population within Metropolitan's service area has increased by about 5.5 million, but demands remain flat. Potable per capita water use has declined by about 38 percent during this period, largely attributed to conservation efforts.

Water Resource and System Planning

Integrated Water Resources Planning

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.

Fiscal year 2016/17 built on a process launched late in the previous fiscal year, during an April 2016 board workshop. The board's Integrated Resources Planning Committee held a series of meetings to review and discuss Metropolitan's historic and current role and

activities in the areas of local resources and conservation development. The committee worked to develop policy principles to be considered by the board early fiscal year 2017/18 relating to the role of Metropolitan in developing local resources, achieving regional reliability, and increasing outdoor water use efficiency to achieve future conservation.

In response to the governor's Executive Order B-37-16 directing state agencies to establish a long-term framework for water conservation and drought planning, Metropolitan participated in an urban stakeholder group advising the state on new long-term water use efficiency targets and new requirements for Water Shortage Contingency Plans. In April 2017, the governor's administration released a package of proposed legislation to implement Executive Order B-37-16 and a report "Making Water Conservation a California Way of Life, Implementing Executive Order B-37-16." Some of the actions described in the report would require additional legislation and expansion of state authority, while others could be implemented under existing authorities.

Future Supply Actions

The Future Supply Actions Program consisted of 13 technical studies and pilot projects in the areas of groundwater, recycled water, seawater desalination and stormwater – all of which were completed by 2017. Under the FSA Program, Metropolitan funded up to $500,000 per project per member agency, with participating member agencies providing dollar-for-dollar matching funds. Metropolitan provided approximately $3 million of funding.

Future Supply Actions are relatively low-cost, low risk supply development efforts to better prepare the region for unforeseen water supply challenges. Collectively, the projects funded by this program reduce barriers and enhance regional understanding of the challenges and technical requirements necessary to develop future water supplies.

Water Resource Data

Figure 3-6 displays precipitation for FY 2016/17 compared to average annual precipitation figures for three weather stations within Metropolitan's service area. Above-normal annual precipitation

figures for these stations reflect significant easing of drought conditions throughout the service area. For FY 2016/17, downtown Los Angeles recorded precipitation of 19 inches, about 129 percent of the average annual precipitation of 14.77 inches.

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 approximately 15 million to nearly 19 million.

Figure 3-8 displays Metropolitan's historical water sales and exchanges since FY 1989/90, which have ranged between 1.5 MAF and 2.51 MAF. Variations in sales are attributed to many factors that include weather, hydrologic conditions and economic activity.

Figure 3-9 displays Metropolitan's calendar year ending storage reserves for the past 10 years. While long-range forecasts suggested that a strong El Niño favored a wet year for the southwestern United States and the Colorado River Basin in CY 2016, these conditions did not materialize. Southern California received well below-normal precipitation while northern California received above-normal precipitation. These improved supply conditions along with ongoing conservation efforts and water use efficiency achievements allowed Metropolitan to store water for the first time in three years, resulting in storage of about 400,000 AF and allow for rebuilding of its dry-year storage accounts. At the end of CY 2016, Metropolitan had total storage reserves of 1.9 MAF, consisting of 1.3 MAF of dry-year storage and 630,000 AF of emergency storage. Record precipitation and above-average snowpack during the winter of 2016/17 should further rebuild Metropolitan's storage in CY 2017.

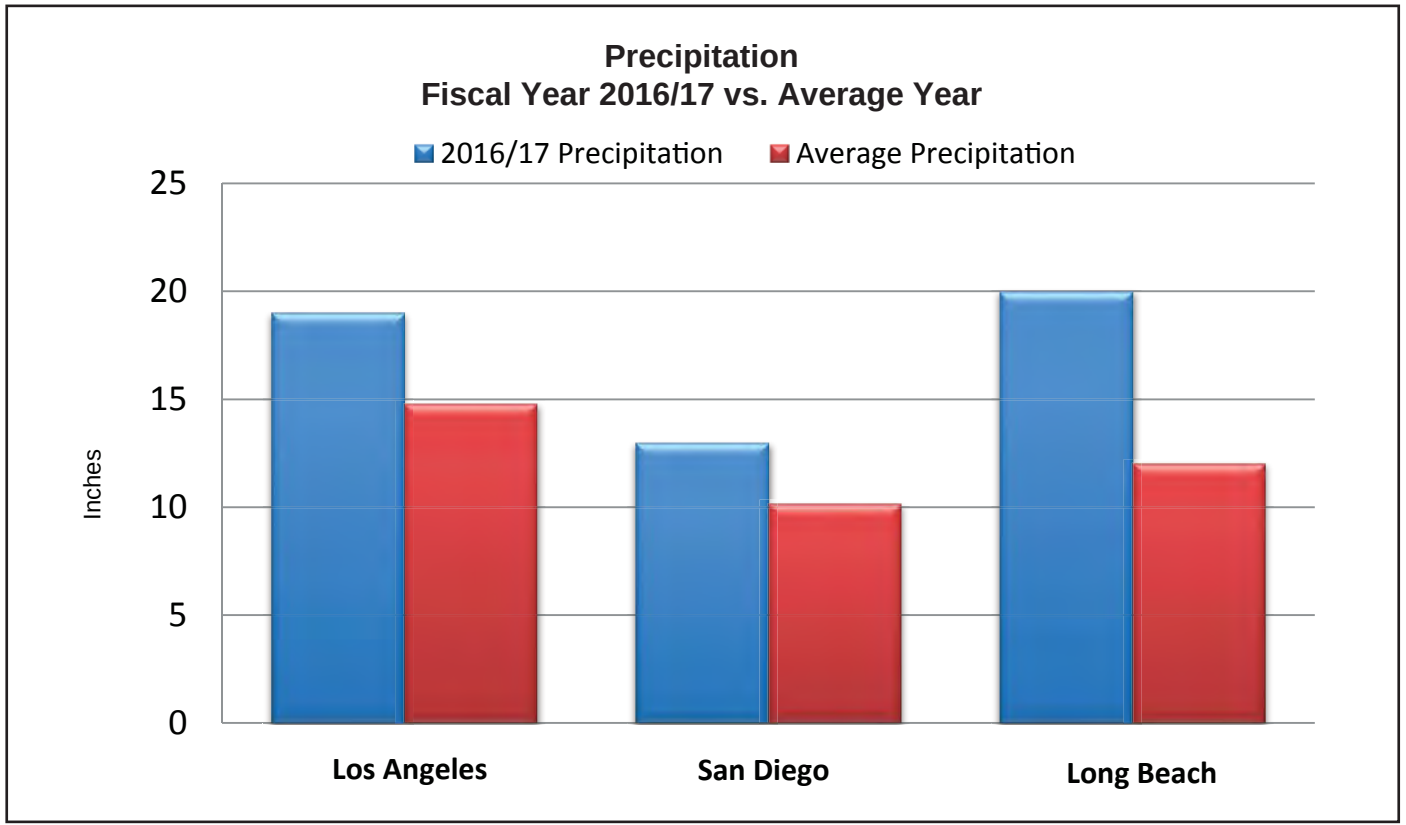


Figure 3-6. Precipitation

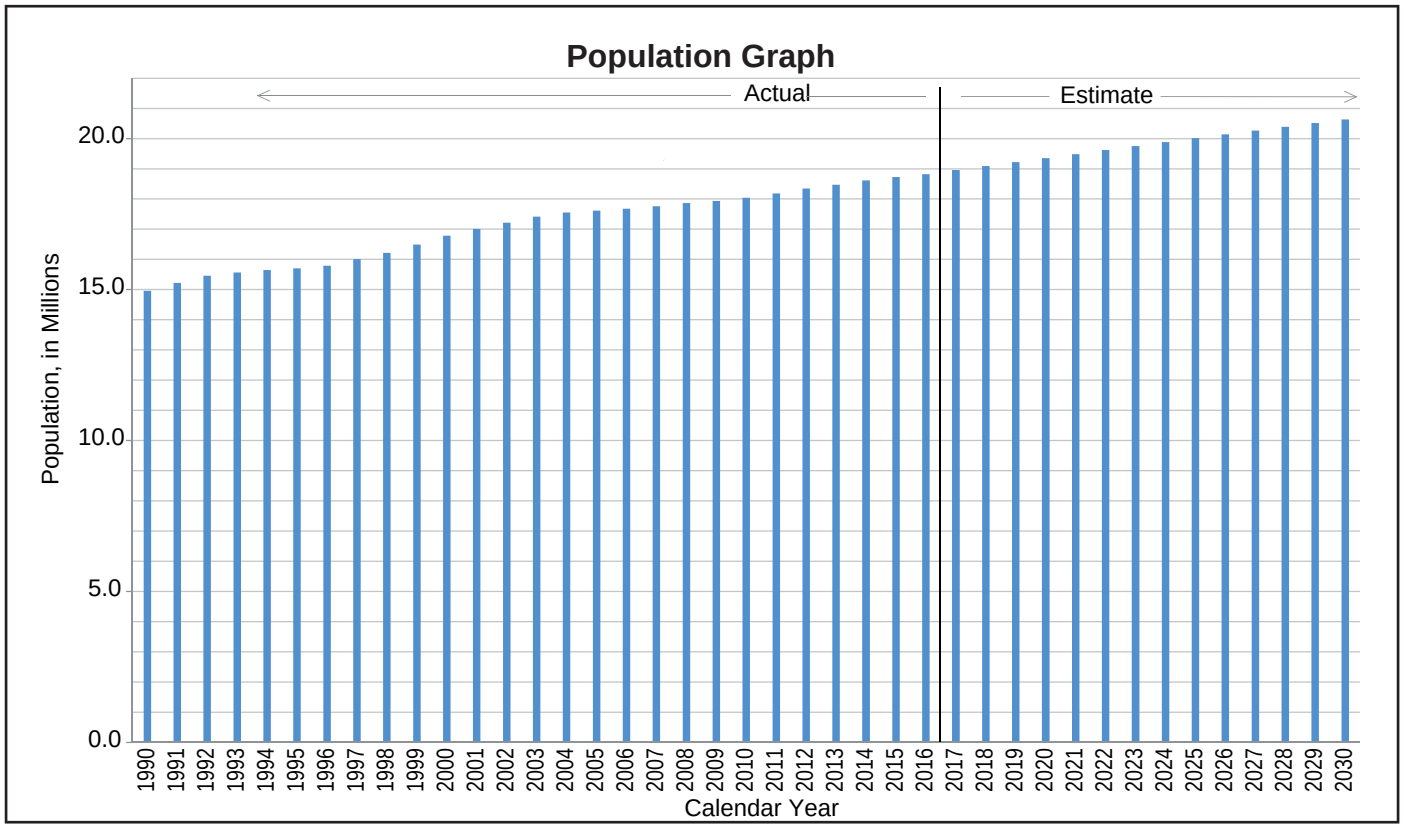


Figure 3-7. Population Growth

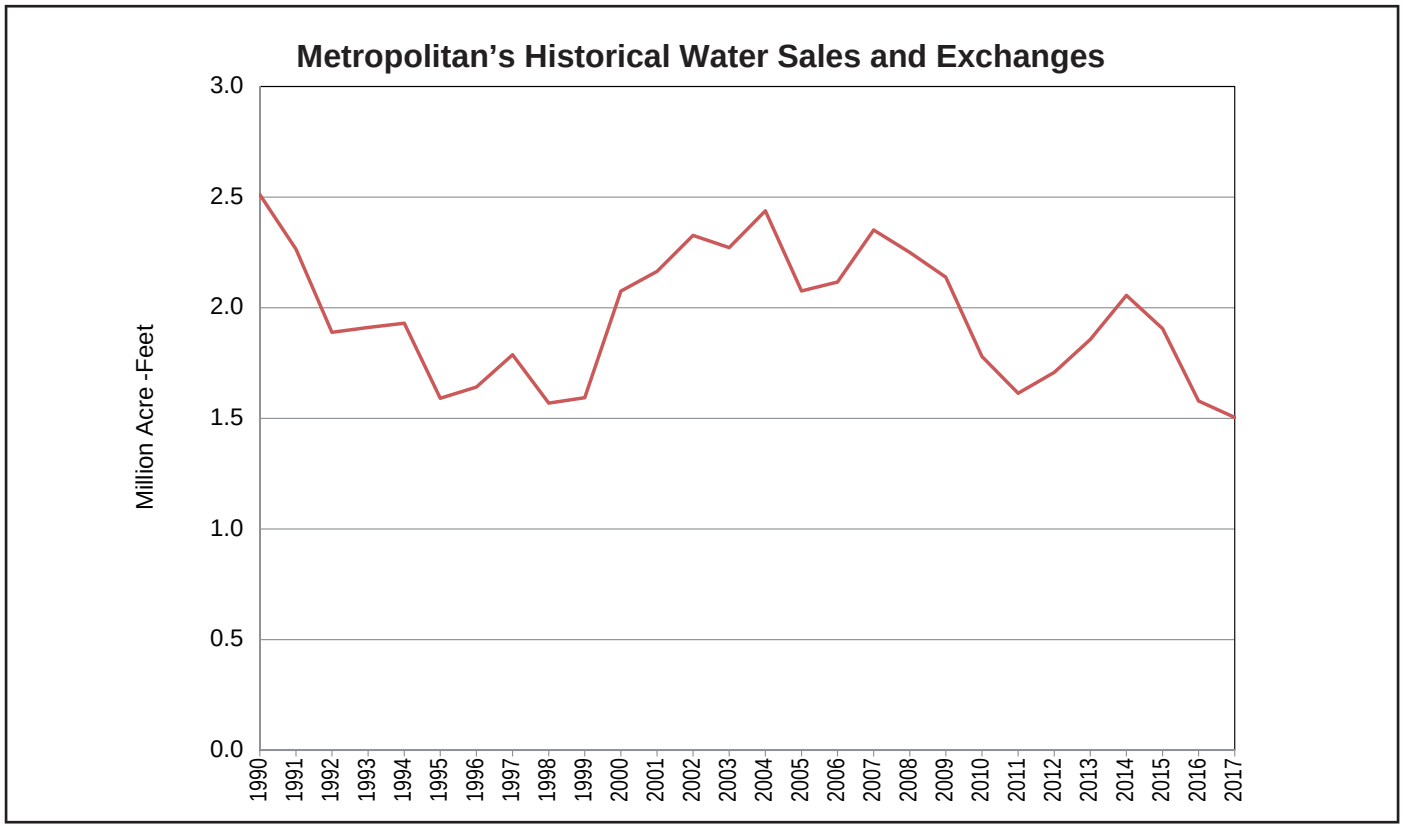


Figure 3-8. Metropolitan's Historical Water Sales and Exchanges

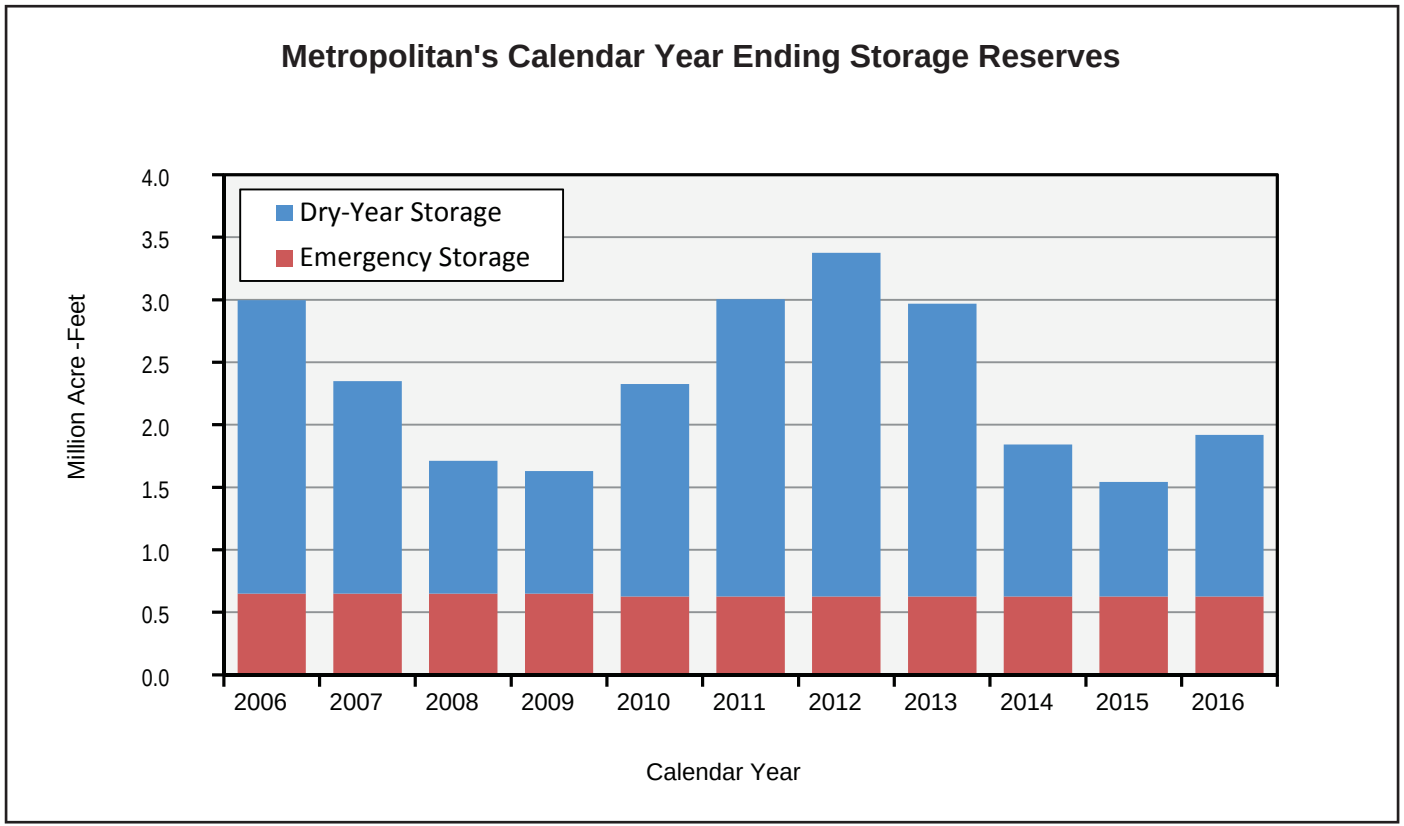


Figure 3-9. Metropolitan's Calendar Year Ending Storage Reserves

A student intern cleans an oil sump vent pipe at Gene Pumping Plant.

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, serve nearly 19 million Southern Californians. WSO ensures excellent water quality for Metropolitan's six-county service area that meets all primary drinking water standards, and operates and maintains Metropolitan's five treatment plants with a combined capacity of more than 2.6 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. 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.

Construction of ozone facilities continued throughout the year at the Weymouth plant, with a scheduled start date of late calendar year 2017. The Weymouth oxidation retrofit will complete Metropolitan's $1.2 billion water quality improvement program to install ozone systems at all five water treatment plants. Crews installed and integrated ozone mechanical, electrical and instrumentation equipment and added sulfuric acid, liquid oxygen, hydrogen peroxide and ammonia feed equipment. Ozone testing and startup activities commenced this year, involving commissioning of ozone generators and extensive performance testing to ensure ozone production meets design standards.

At the Weymouth plant, rehabilitation of 48 filters was completed in June 2017. Each filter received a new underdrain system and filter media. The backwash troughs were raised to allow more effective backwashing with fewer filter media losses. This upgrade will allow more efficient filtering of the finished water and higher turbidity removal.

The Diemer plant is undergoing a major rehabilitation project on the original east side of the plant, which includes modernizing and improving the four basins, replacing flocculators, and improving flow characteristics through the plant. This project is expected to be completed in August 2017. Staff also completed replacement of the filter valves and seismic improvements to the filter building on the east side of the plant in October 2016. Staff replaced the filter influent, effluent, backwash, surface wash and drain valves for filters 1 through 24, as well as isolation and metering valves on the backwash and surface wash headers. These replacements will improve filter performance and increase reliability. Once work on the east side of the plant is complete, the west side of the plant will be rehabilitated. Work has also begun at the Diemer plant to reinforce the main administration building against damage from earthquakes, with completion expected in early 2018.

At the Jensen plant, rehabilitation projects continued to improve treatment plant performance, power reliability, and solids handling. The November 2016 replacement of module 1 filter valves and controls improved filter performance and increased plant reliability. Following a major shutdown of the Jensen plant in March 2017, the connection of new high-voltage electrical switchgear improved

emergency power reliability for the site. During this shutdown, adjustments to the effluent weir plate and cleaning of jet mix pumps allowed for increased flow of SWP supplies through the Jensen plant in response to increased water supply from Northern California. Completion of a permanent solids transfer pipeline to the Los Angeles Aqueduct Filtration Plant's solids handling lagoons will ensure delivery and storage of solids produced by the Jensen plant treatment process. This replaces a temporary pipeline to the lagoons, which are owned by the L.A. Department of Water and Power, and will ensure long-term plant reliability with improved plant performance, especially under variable water quality conditions. The new solids transfer system will be completed in July 2017.

The Skinner plant continued to optimize plant efficiency and treatment process effectiveness with the installation of an ammonia jet mixing system on the finished water reservoir inlet channel which improved chemical mixing. This project was completed in February 2017. Skinner relocated electrical equipment and pumps for the main mixing process to better protect them from the heat and weather, improving both the efficiency of the units and their reliability for water treatment.

The Mills plant completed construction of a new industrial waste water collection system in May 2017. The system allowed the plant to treat plant runoff water prior to pumping it into the sanitary sewer, resulting in significant savings when compared to hauling the material offsite. Mills plant also upgraded chemical feed systems to provide better control and optimized water treatment across widely varying flow rates. Replacement of coagulant pump needle valves and ammonia feed lances provided finer flow control and better mixing at lower flow ranges.

During fiscal year 2016/17, Metropolitan invested about $59.5 million in refurbishing and upgrading its five water treatment plants to ensure that treated water reliability goals continue to be met. Another $22.9 million was invested in water quality improvement projects, with a major portion of the funds dedicated to construction of the Weymouth ozone facilities.

Water Quality

Regulations

Metropolitan's treated water supplies met all regulatory requirements during fiscal year 2016/17.

On May 31, 2017, the Sacramento County Superior Court invalidated the state's chromium 6 maximum contaminant level for drinking water, which had been set at 10 parts per billion in 2014. The court also ordered the State Water Resources Control Board, Division of Drinking Water to adopt a new MCL for chromium 6. Metropolitan's source and treated water supplies remain below the invalidated MCL and will require no additional treatment. The total chromium MCL of 50 ppb remains in effect.

Metropolitan began compliance monitoring of its potable water system under the federal Revised Total Coliform Rule in April 2016. California has not yet adopted the revised federal rules, so utilities must adhere to the current and revised standards. Based on Metropolitan's past low coliform bacteria results, no compliance issues with the federal and the future state standards are expected.

In March 2017, Metropolitan completed the monthly two-year monitoring of treatment plant influents for *Cryptosporidium* under round 2 of the Long Term 2 (LT2) Enhanced Surface Water Treatment Rule. During 24 months of monitoring, no *Cryptosporidium* oocysts were detected in any of the samples, meaning that no additional surface water treatment will be required.

Water Quality Monitoring

Water Quality Laboratory staff performed 164,396 analytical tests using 183 methods on nearly 45,000 samples this year. Treatment plant laboratory staff performed an additional 150,000 analytical tests using 13 methods in FY 2016/17. The number of samples and analyses for Metropolitan's sources, treatment plants, and distribution system may change each year depending on regulations, monitoring plan, operations and water quality studies. The water quality data presented here represent FY 2016/17 rather than calendar year data that are reported in the annual Water Quality Report. As such, minor differences in reported metrics may be observed.

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. No herbicides, pesticides, or synthetic organic compounds were detected. 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 2016/17

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 three Skinner plants.

Total Dissolved Solids

Salinity of the Colorado River Aqueduct is typically higher than the State Water Project, largely due to natural mineral salt deposits within the geology of the Colorado River watershed (Figure 4-1). Changes in salinity tend to occur more rapidly in water from the SWP as opposed to supplies from the CRA, due to the hydrodynamic fluctuations of the system. Figure 4-2 presents salinity as flow-weighted averages of the total dissolved solids levels in the effluents from all five treatment plants. While salinity levels dropped compared to the previous year, during a portion of FY 2016/17, the Diemer, Skinner and Weymouth plants treated lower blends of SWP supply due to its limited availability during the last stages of the drought. As such, flow-weighted TDS averages were above Metropolitan's water quality goal of 500 milligrams per liter (mg/L).

TABLE 4-2
TRACE METALS IN METROPOLITAN'S WATER SUPPLIES
Fiscal Year 2016/2017 (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 at Jensen Influent	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	11	ND	64	66	120	150	72	210	140	ND	40	160	130	80	ND	74
Antimony	6	2	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Arsenic	10	0.5	2.6	2.6	2.6	3.8	2.4	2.5	2.8	2.4	2.4	3.3	2.5	1.1	1.4	2.7	ND	1.0
Barium	1000	5	130	120	130	37	25	25	56	80	87	38	87	80	88	36	83	24
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	210	100	100	220	120	120	180	120	120	110	220	130	100
Cadmium	5	0.1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chromium	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	0.33	0.08	0.08	ND	ND	ND	0.07	ND	0.05	0.04	0.34	0.05	0.10
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	50	ND	ND	64	78	97	135	84	139	97	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	42	46	45	ND	ND	ND	ND	24	23	ND	27	24	23	ND	28	ND
Manganese[1]	50	5	ND	ND	ND	12	20	21	8	10	6	ND	7	ND	ND	ND	14	ND
Mercury	2	0.2	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Molybdenum	--	2	5	7	5	4	ND	ND	5	3	3	3	4	3	4	4	4	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	1120	1080	1140	290	140	150	300	610	680	280	680	630	690	280	690	140
Thallium	2	1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Vanadium[2]	50	1	2.5	2.4	2.9	5.2	3.9	3.8	4.7	3.1	3.3	2.9	3.1	2.4	2.7	5.0	ND	3.2
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 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]
2014 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	ND–3	4–6	ND	ND	ND	2–3
San Jacinto Tunnel West Portal	ND–4	5–6	ND	ND	ND	2–3
Lake Mathews	ND–4	5–6	ND	ND	ND	2–3
Silverwood Lake	ND–4	ND	ND	ND	ND	2–4
Lake Perris	ND	ND–4	ND	ND	ND	2
Diamond Valley Lake	ND	ND	ND	ND	ND	1
Lake Skinner	ND–6	ND–5	ND	ND	ND	2–3
Jensen Plant Influent	ND–5	ND–4	ND	ND	ND	2–3
Diemer Plant Effluent	ND–4	4–6	ND	ND	ND	2–3
Jensen Plant Effluent	ND–5	ND–5	ND	ND	ND	2–3
Mills Plant Effluent	ND–4	ND	ND	ND	ND	ND-4
Skinner Reservoir Effluent[2]	ND–5	5–6	ND	ND	ND	1–3
Weymouth Plant Effluent	ND–4	4–6	ND	ND	ND	2–3

[1] Results obtained during Calendar Year 2014 triennial monitoring. Data are reported for three years until the next scheduled monitoring.

[2] This is a combined effluent from Skinner plants 1, 2, 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 2016/17 Averages

CONSTITUENTS	UNITS	SOURCE WATERS								TREATMENT PLANT EFFLUENTS				
		Lake Havasu	San Jacinto Tunnel	Lake Mathews	Castaic Lake at Jensen Influent	Silverwood Lake at Devil Canyon	Lake Perris	Diamond Valley Lake	Lake Skinner	Weymouth	Diemer	Jensen	Skinner	Mills
Silica	mg/L	7.7	7.9	8.0	13.6	10.3	7.3	7.8	7.9	8.8	8.8	13.5	8.3	10.4
Calcium	mg/L	76	75	74	29	17	27	28	54	49	51	29	59	17
Magnesium	mg/L	25	25	26	13	10	14	13	19	18	19	13	21	9
Sodium	mg/L	96	95	100	72	46	79	62	76	78	80	83	89	54
Potassium	mg/L	4.7	4.7	4.9	3.2	2.7	3.9	3.6	4.0	3.9	3.9	3.2	4.4	2.7
Carbonate	mg/L	0	0	0	0	0	0	0	0	0	0	0	0	2
Bicarbonate	mg/L	158	155	151	104	73	107	104	124	104	109	108	127	66
Sulfate	mg/L	241	238	247	67	29	64	64	166	163	172	81	181	38
Chloride	mg/L	92	92	96	92	66	103	80	79	77	78	93	94	70
Nitrate	mg/L	1.4	1.2	0.9	2.8	1.5	0.2	0.6	1.0	1.4	1.4	2.9	1.3	2.2
Fluoride	mg/L	0.3	0.3	0.3	0.1	< 0.1	0.1	0.1	0.2	0.7	0.8	0.7	0.7	0.7
Total Dissolved Solids (TDS)	mg/L	623	616	633	344	218	352	312	469	452	468	374	522	239
Total Hardness as $CaCO_3$	mg/L	292	285	288	122	80	121	125	212	194	200	123	229	81
Total Alkalinity as $CaCO_3$	mg/L	129	127	124	85	60	87	87	102	86	89	89	104	57
Free Carbon Dioxide	mg/L	2.5	1.7	2.8	4.8	2.5	2.4	2.6	1.8	1.2	1.2	1.0	1.6	0.3
pH	pH	8.04	8.19	8.00	7.61	7.72	7.92	7.98	8.07	8.29	8.27	8.29	8.14	8.62
Specific Conductance	µS/cm	992	975	1000	613	402	636	559	770	742	763	656	850	434
Color	CU	3	2	2	7	12	7	5	6	1	1	1	1	1
Turbidity	NTU	0.64	0.92	2.1	1.6	2.4	1.9	0.69	0.95	0.05	0.05	0.04	0.07	0.07
Temperature	°C	20	21	20	15	17	19	18	20	20	22	19	23	21
Bromide	mg/L	0.08	0.06	0.07	0.29	0.20	0.34	0.25	0.10	—	—	—	—	—
Total Organic Carbon	mg/L	3.03	3.01	2.94	3.25	4.06	4.58	3.14	3.66	—	—	—	—	—
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)	-	5	4	5	2	7	10	7	10	3	2	2	3	3
Saturation Index	-	—	—	—	—	—	—	—	—	0.36	0.41	0.28	0.47	0.22
Aggressiveness Index	-	12	13	12	11	11	12	12	12	12	12	12	12	12
State Project Water	%	0	0	0	100	100	100	100	34	44	43	100	30	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 2016/17. 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 micrograms per liter (µg/L) 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 HAAs 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. This conservative monitoring and reporting framework provides the most representative DBP water quality for Metropolitan's customers.

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 and Diemer in July 2015. 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.

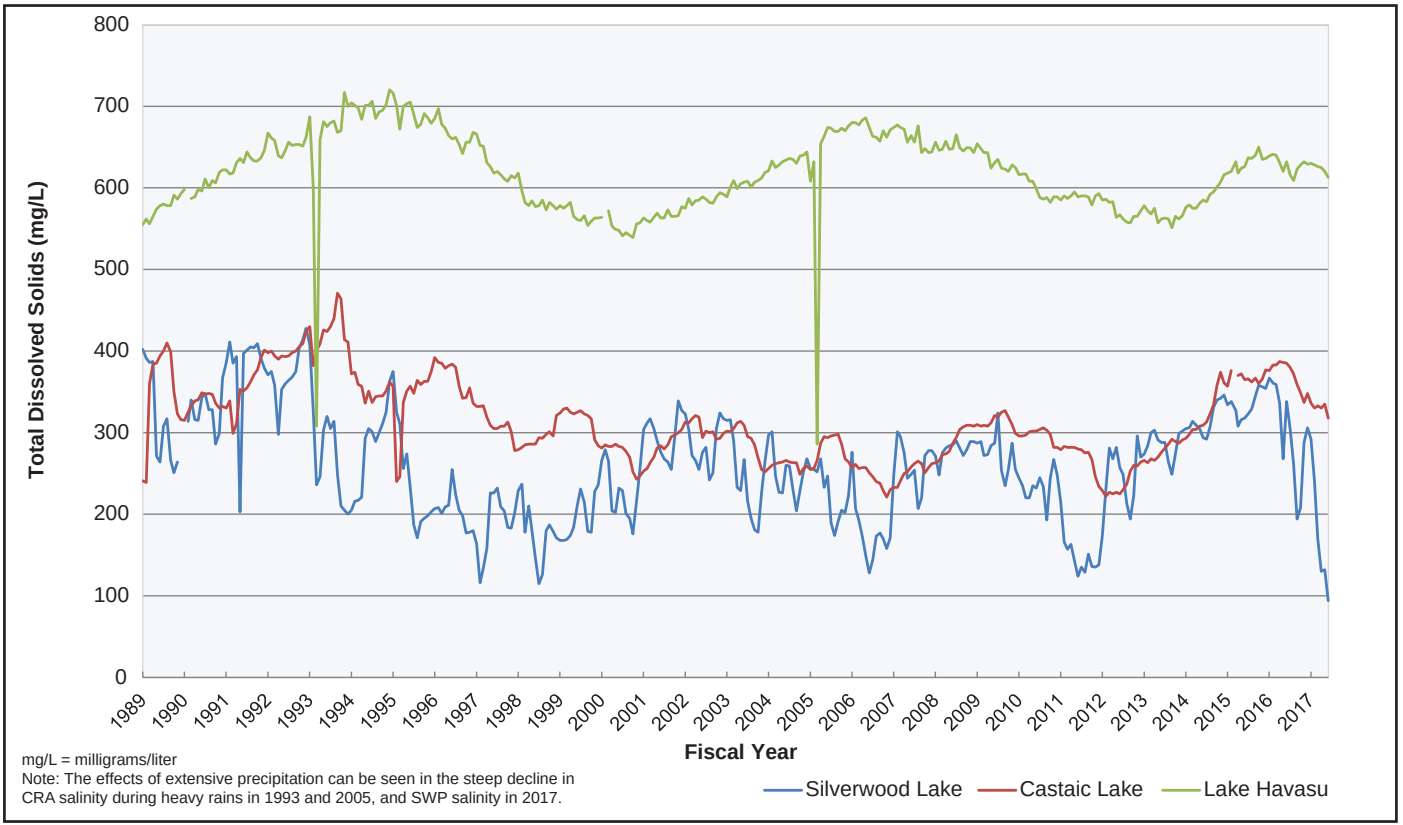


Figure 4-1. Total Dissolved Solids in East Branch State Water Project (Silverwood Lake), West Branch State Water Project (Castaic Lake), and Colorado River Aqueduct (Lake Havasu), 1989 to 2017

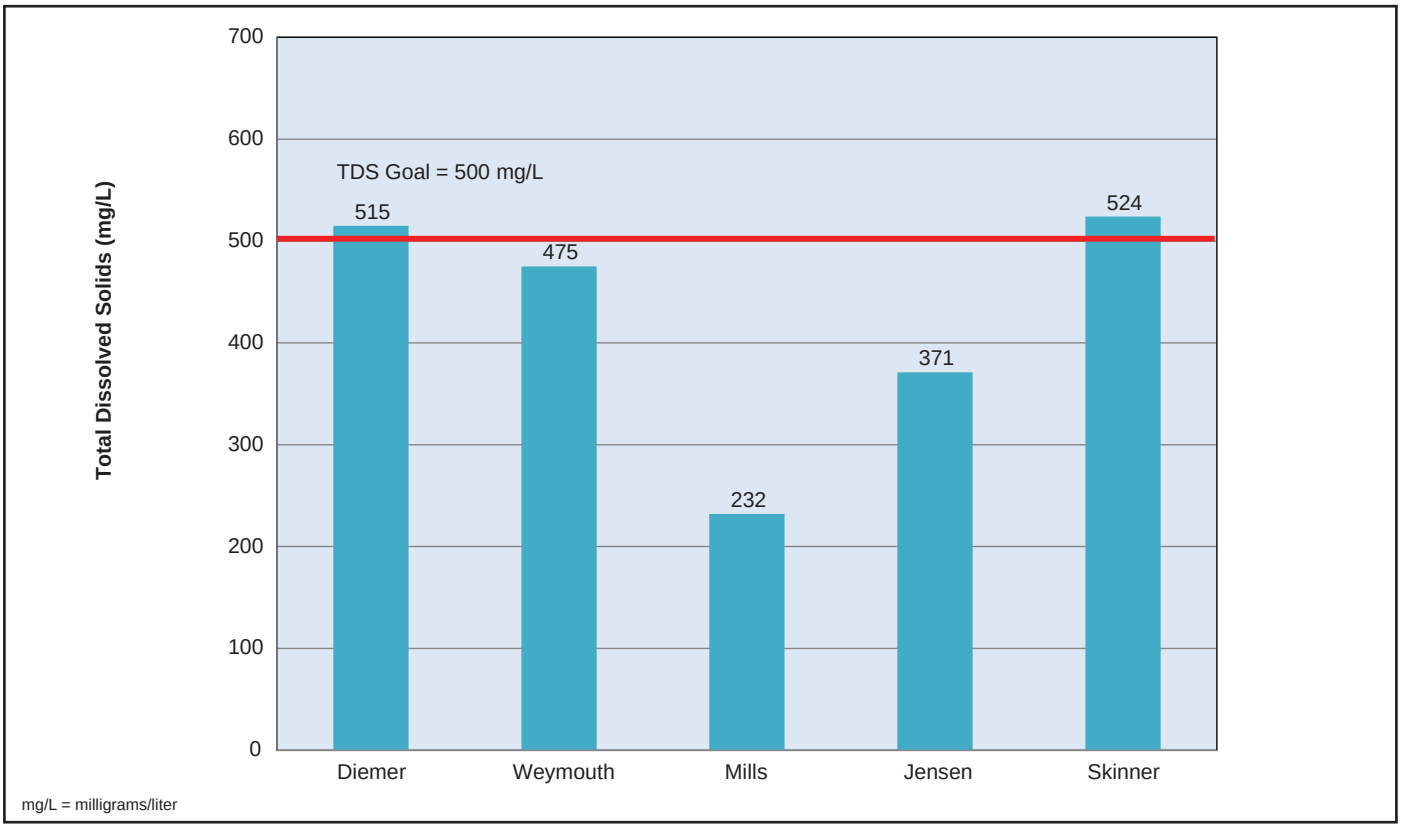


Figure 4-2. Total Dissolved Solids (TDS) in Plant Effluent, Annual Flow-Weighted Averages, FY 2016/17

TABLE 4-5
DISINFECTION BYPRODUCT CONCENTRATIONS
IN PLANT EFFLUENT

Fiscal Year 2016/17 (in µg/L)

	TTHMs MCL = 80		**HAA5** MCL = 60		**Bromate** MCL = 10	
Plant Effluent	**Range**	**Annual Average**	**Range**	**Annual Average**	**Range**	**Annual Average**
Diemer	11–26	19	ND–5.2	4.2	0.4–3.4	2.3
Jensen	13–20	18	2.7–6.4	4.8	6.5–7.8	7.4
Mills	22–33	27	4–11	7.7	1.2–3.5	2.6
Skinner	14–19	17	1.6–8.8	4.8	2.3–5.8	3.9
Weymouth	26–45	36	7.4–22	14	NA	NA
Distribution System	**Range**	**LRAA**	**Range**	**LRAA**	**Range**	**LRAA**
	15–61	18–44	1.9–26	4.4–17	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

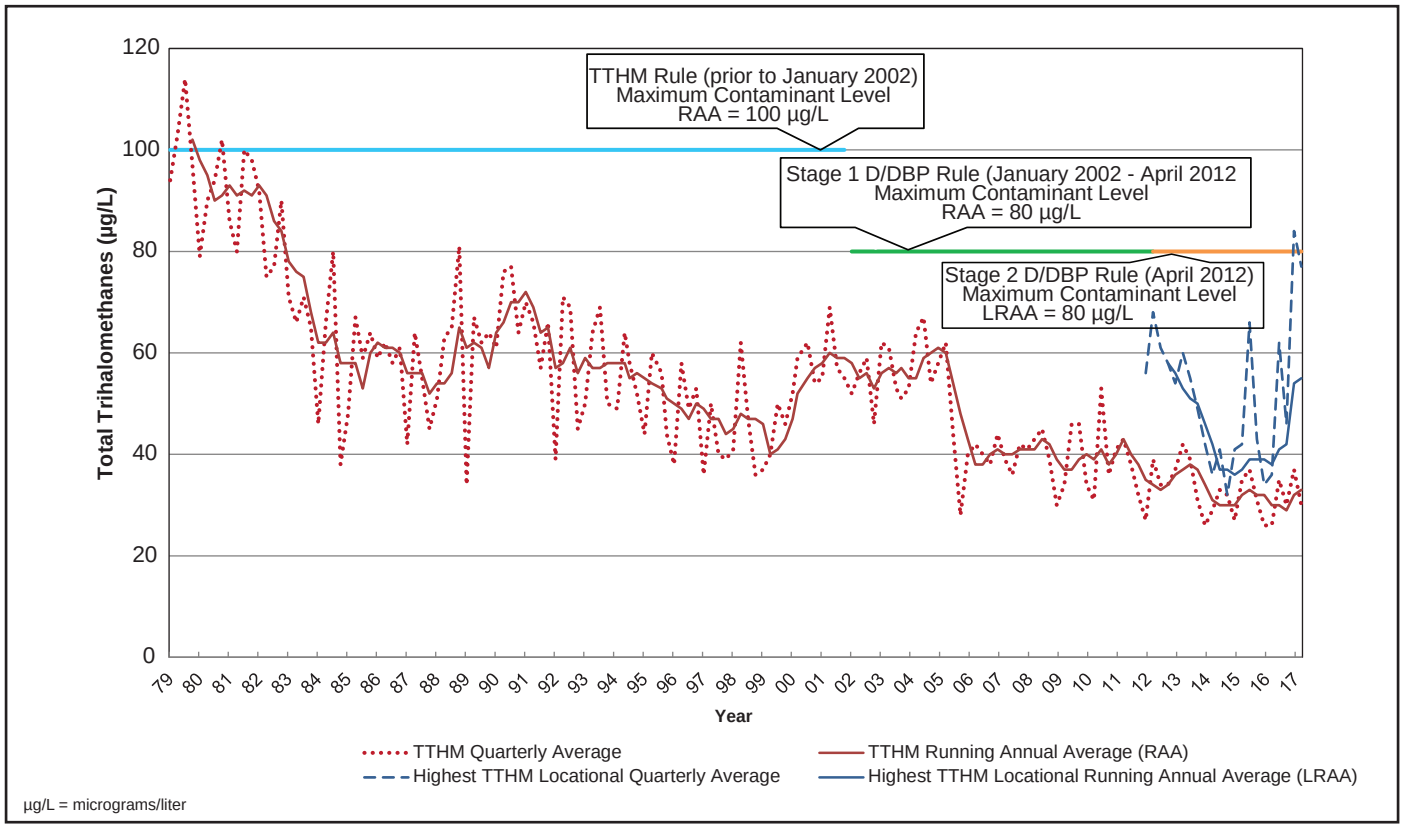


Figure 4-3. Total Trihalomethane (TTHM) Levels Throughout the Distribution System, Quarterly and Running Annual Averages 1979 to 2017

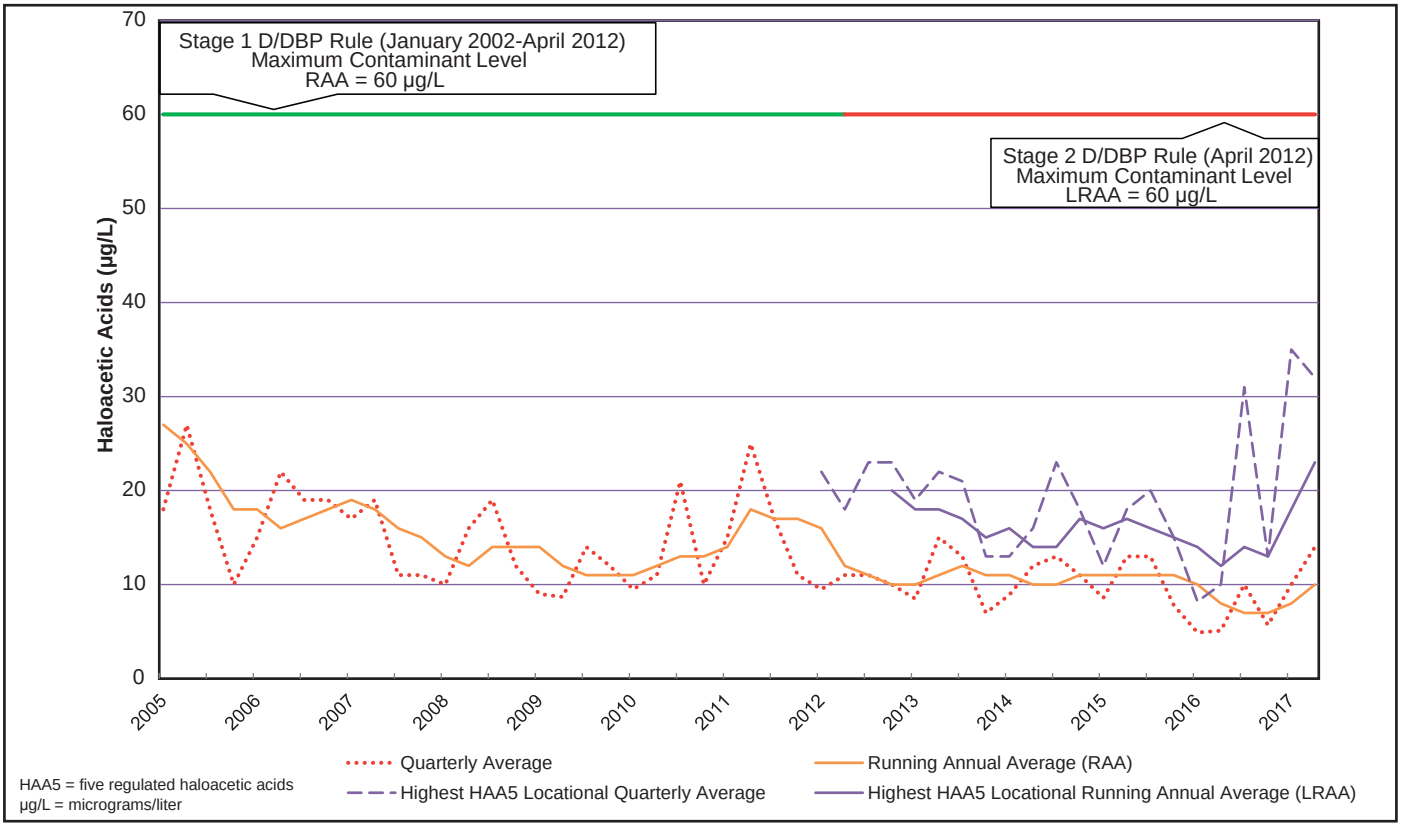


Figure 4-4. Haloacetic Acids Throughout the Distribution System, Quarterly and Running Annual Averages, 2005 to 2017

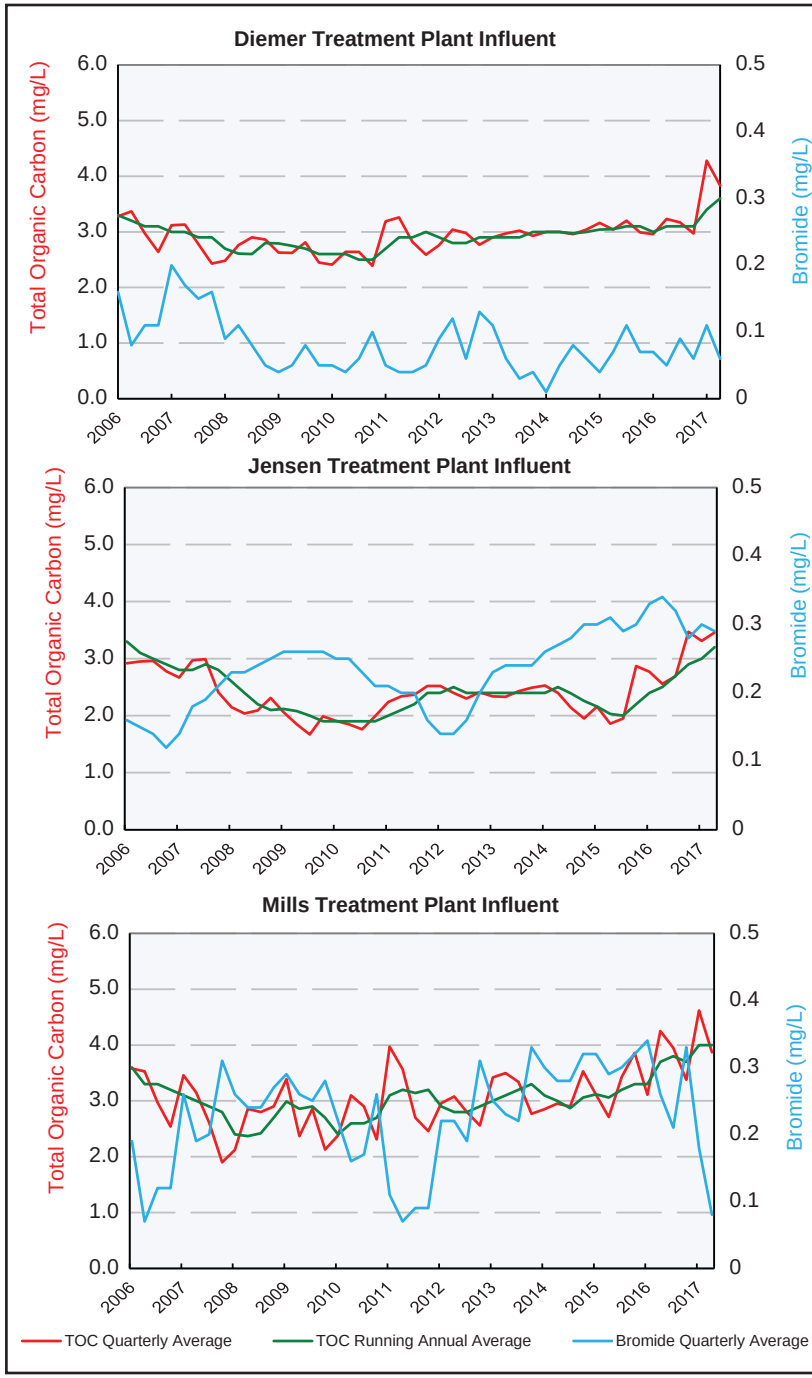


Figure 4-5. Total Organic Carbon (TOC) and Bromide Levels in Treatment Plant Influent, 2006 to 2017

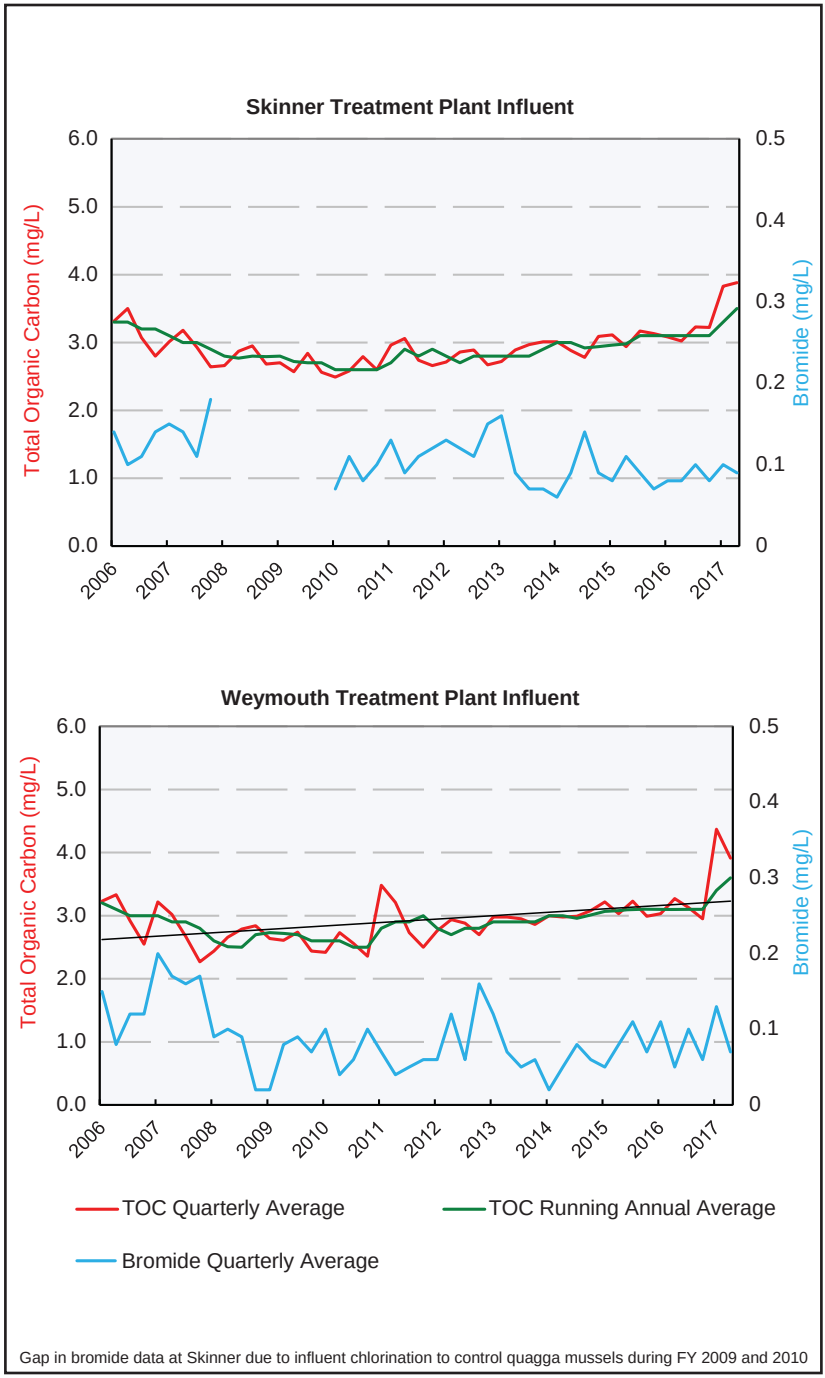


Figure 4-5 (continued). Total Organic Carbon (TOC) and Bromide Levels in Treatment Plant Influent, 2006 to 2017

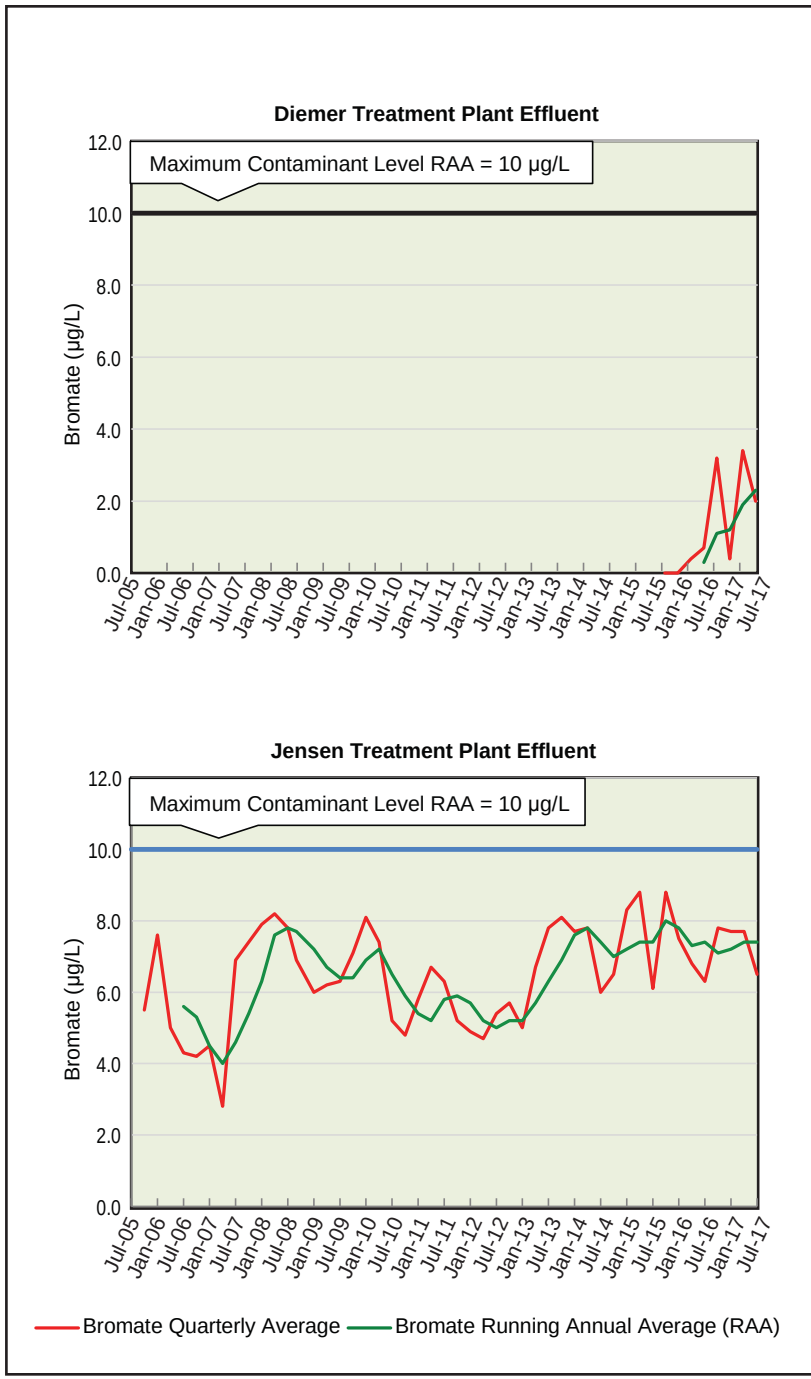


Figure 4-6. Bromate Levels in Treatment Plant Effluent, 2005 to 2017 (Jensen, Skinner, and Diemer Ozone came online in 2005, 2010, and 2015, respectively)

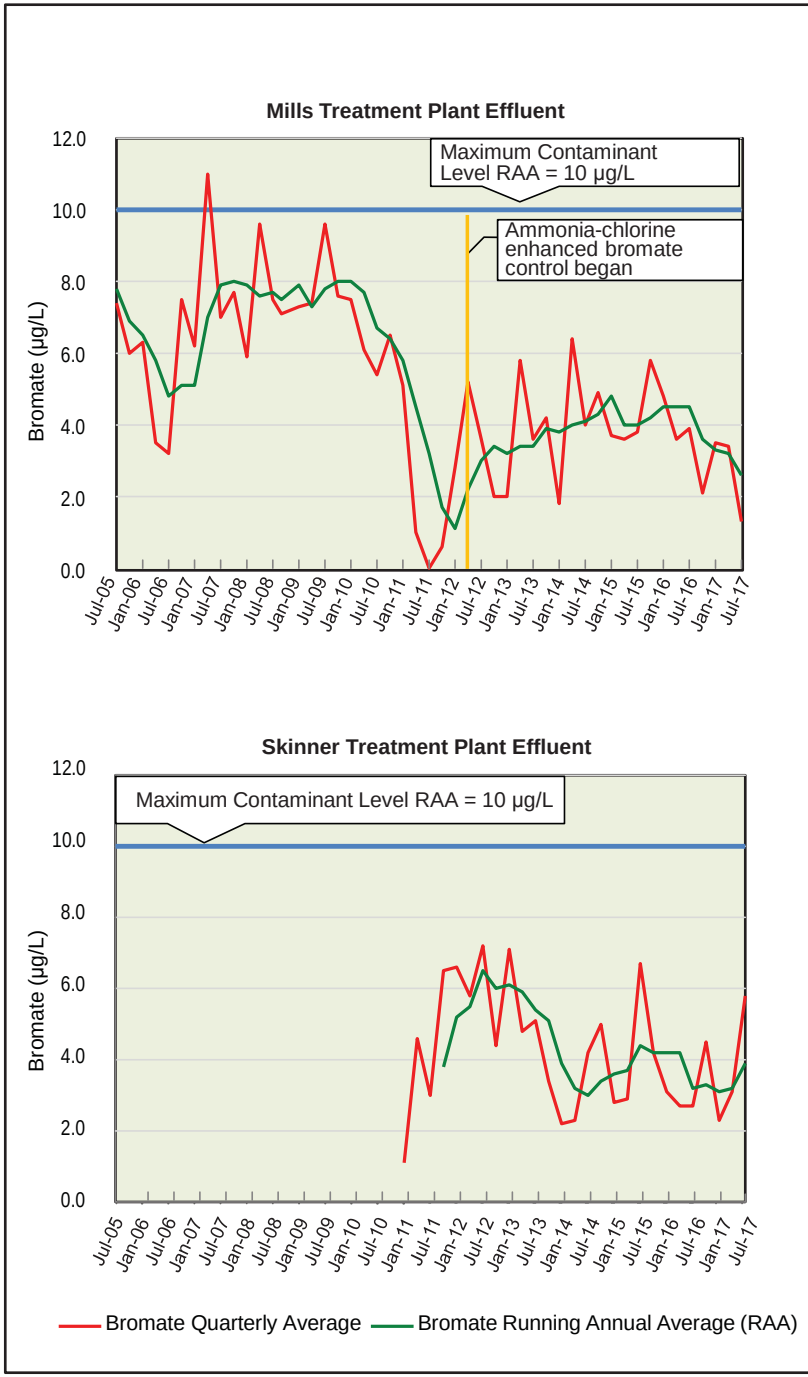


Figure 4-6 (continued). Bromate Levels in Treatment Plant Effluent, 2005 to 2017 (Jensen, Skinner, and Diemer Ozone came online in 2005, 2010, and 2015, respectively)

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 tens of thousands—may be influenced by the natural variability of raw water coliforms, storm events, changes in source water, or other factors.

Metropolitan also analyzed nearly 8,000 bacteriological compliance samples in the distribution system to monitor the microbial quality downstream of the water treatment plants. The monthly average of 0.07 percent total coliform-positive samples was well below the regulatory standard of 5.0 percent.

TABLE 4-6
RAW WATER COLIFORM RESULTS
Fiscal Year 2016/17

	Treatment Plant Influent[1]				
	Diemer	**Jensen**	**Mills**	**Skinner**	**Weymouth**
	(CFU/100 mL)				
Total Coliforms					
Range	43-42,000	30-2,600	110-6,800	97-4,000	23-28,000
Average[2]	4,600	640	1,900	1,200	4,100
E. coli					
Range	ND-7	ND-1	ND-6	1-11	ND-8
Average[2]	2	ND	2	3	2

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 influent and effluent sites monthly for the protozoan parasites *Cryptosporidium* and *Giardia*. During the fiscal year 2016/17, *Giardia* was detected in one treatment plant influent sample, at a concentration of 1 cyst per 10 liters. In the last 16 years of monitoring, less than one percent of monthly plant influent samples tested positive for either microbe, and all treated water samples were negative.

System Management Monitoring

Cyanobacteria and Algae Control Program

Staff analyzed more than 2,900 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). Half of the samples were used to evaluate T&O problems caused by cyanobacteria in the State Water Project. This reflects the high cyanobacterial production potential of SWP supplies, which resulted in the California Department of Water Resources treating their lakes several times during the year. Metropolitan treated Lake Skinner five times during the year with a total of 33 tons of copper sulfate. No treatments were conducted on Lake Mathews or Diamond Valley Lake during the current reporting period. (Figure 4-8).

The U.S. Environmental Protection Agency published non-enforceable health advisories for cyanobacterial toxins (cyanotoxins) in drinking water in 2015, and many states, including California, have developed guidelines for recreational water. During FY 2016/17, DWR posted warning and cautionary notices at Pyramid, Castaic, and Silverwood lakes, closing the swim beaches and sometimes the entire lake to bathers and swimmers. However, water delivered to Metropolitan's treatment plants is withdrawn from the deeper parts of the lakes away from the recreational areas, and is usually not impacted by the relatively high concentrations of cyanotoxins that initiate the recreational warnings. Metropolitan has an active monitoring program for cyanotoxins and continues to research and optimize control methods to ensure the safety of its treated water. Ozone, which is Metropolitan's primary disinfectant at four of the treatment plants (all five plants by the end of 2017), is very effective at inactivating cyanotoxins in drinking water supplies.

Quagga Mussel Control Program

With the discovery of invasive quagga mussels in the SWP for the first time during FY 2016/17, Metropolitan has intensified its monitoring program and is developing potential control strategies for SWP facilities, in case of confirmed detections and subsequent imposition of regulatory restrictions. Metropolitan's program for monitoring and controlling quagga mussels has been in effect since their detection in the Lower Colorado River in 2007. Quagga control

strategies in the CRA system include chlorination at strategic sites along with desiccation and removal of mussels during shutdowns. Mussel populations in the CRA continue to show seasonal fluctuations but the control measures have successfully limited further population increases. In December 2016, however, a few adult quagga mussels were found in DWR's Angeles Tunnel that connects Pyramid Lake to Castaic Lake on the west branch of the SWP. A few weeks later, suspect but unconfirmed quagga mussel larvae (veligers) were found at two locations downstream of Silverwood Lake. Since the larvae were not confirmed, state regulations on control of invasive mussels weren't triggered. Therefore, as of June 2017, there are no regulatory restrictions on the movement and use of raw water from the Santa Ana Valley and Rialto pipelines and the Inland Feeder, which deliver water from Silverwood Lake on the east branch of the SWP.

N-Nitrosodimethylamine

Since 1999, Metropolitan has monitored its distribution system for NDMA (N-nitrosodimethylamine), a byproduct of the disinfection process that occurs during chloramination. Table 4-7 shows NDMA levels in the distribution system for FY 2016/17. The concentrations were all below the notification level of 10 nanograms per liter (ng/L) established in 2002.

TABLE 4-7
N-NITROSODIMETHYLAMINE LEVELS
IN THE DISTRIBUTION SYSTEM
Fiscal Year 2016/17 [in nanograms per liter (ng/L) or parts per trillion]

Sample Location[1]	Range[2]
Diemer Plant	ND-2
Jensen Plant	2-3
Mills Plant	ND-4
Skinner Plant	3
Weymouth Plant	ND
Central Pool Sites[3]	ND-5

ND - Not Detected; NDMA reporting level is 2 ng/L.
[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

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, Lake Mead Water Quality Forum 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.

Metropolitan completed the 2015 Update of the Colorado River Watershed Sanitary Survey and submitted it to Division of Drinking Water in December 2016. Metropolitan and other State Water Contractors also prepared the 2016 Update of the SWP Watershed Sanitary Survey for submission to DDW in July 2017. These sanitary surveys identify potential sources of watershed contamination, analyze water quality data, assess effects on treatment, and recommend strategies to protect source waters.

Salinity Control

Metropolitan continued to engage in salinity control efforts through the Colorado River Basin Salinity Control Forum to mitigate salt loading into the Colorado River. Metropolitan also continued to work with the federal Bureau of Reclamation and the Southern California Salinity Coalition on technical studies to update the 1999 Salinity Management Study that estimated economic damages from salinity. Metropolitan updated water supply and water usage information in the salinity economic impact model used to conduct an economic damage assessment for the forum's 2017 Triennial Review. Metropolitan also coordinated with USBR and the forum to restructure the economic impact model to facilitate future uses and validate the current model. A comprehensive model update is anticipated to begin in 2018.

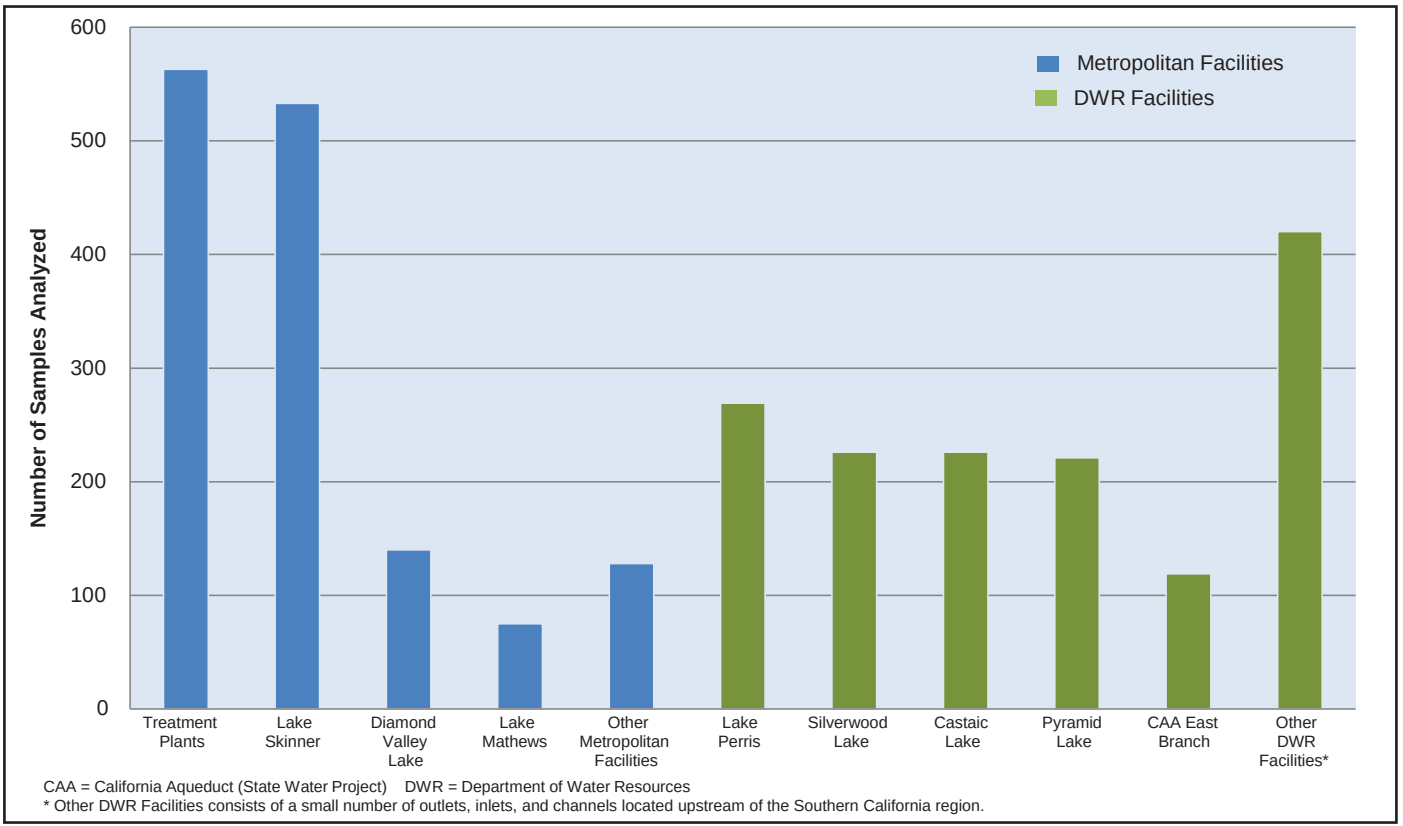


Figure 4-7. Number of Samples Analyzed for the Taste-and-Odor Compounds 2-Methylisoborneol (MIB) and Geosmin in Source and Treated Water, FY 2016/17

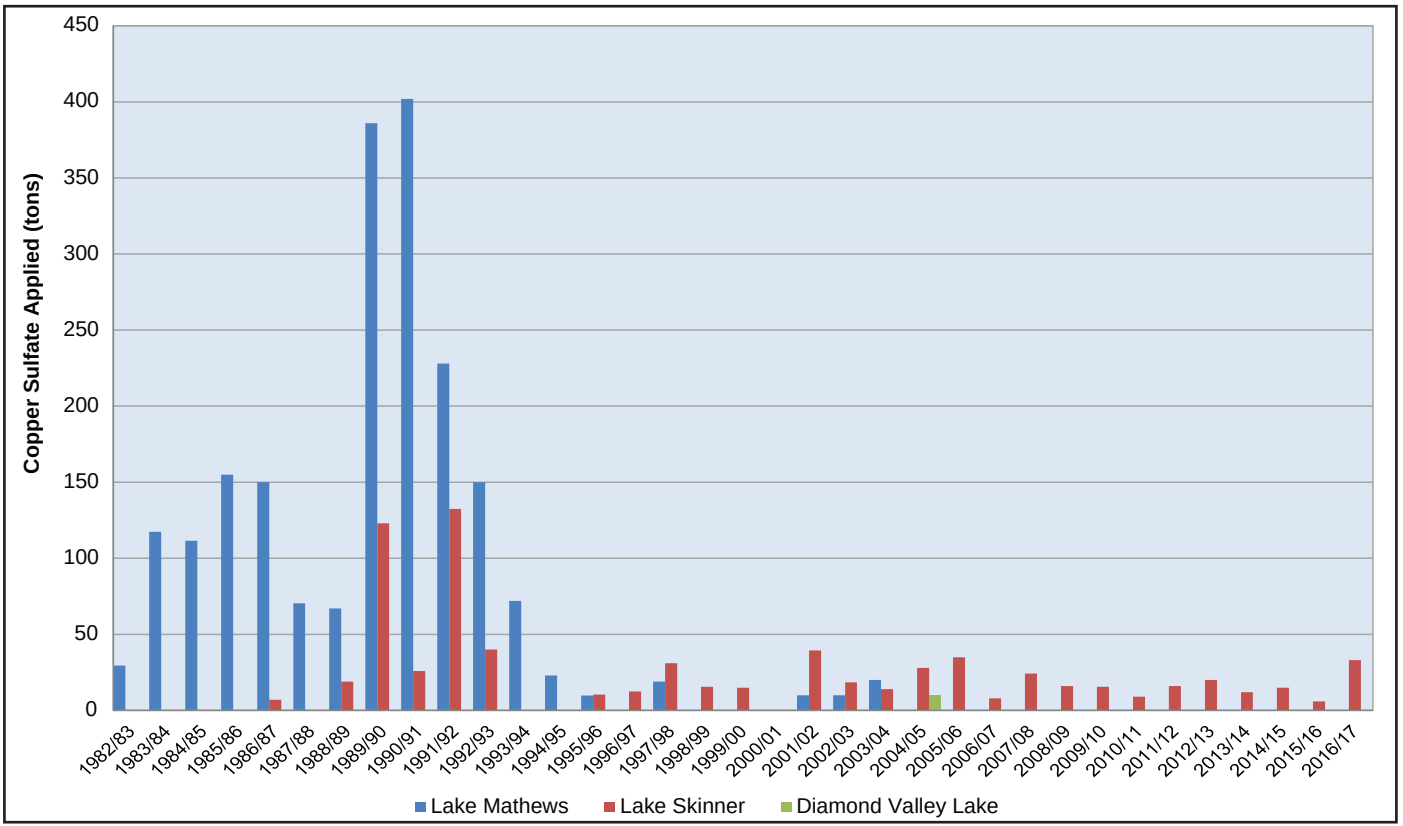


Figure 4-8. Copper Sulfate Usage in Metropolitan's Reservoirs, FY 1982/83 to 2016/17

Uranium Mill Tailings Cleanup

Metropolitan continued to monitor remedial efforts and advocate for increased funding 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 7 million tons of mill tailings via rail to an engineered disposal site approximately 30 miles northwest of Moab. With revised figures showing the DOE less than halfway toward removing the 16 million-ton pile, Metropolitan sent a letter to the Secretary of Energy and the California, Arizona and Utah congressional delegations in June 2017 advocating for increased fiscal year 2017/18 funding to expedite cleanup and meet the targeted completion date of 2025.

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 provided comments on the final design for the selected groundwater treatment remedy involving biological treatment within the groundwater basin, the groundwater model used to measure effectiveness of the final remedy, and the subsequent Environmental Impact Report. Metropolitan also provided a presentation to Topock stakeholders on Colorado River water quality and emphasized the importance of expeditiously implementing the groundwater remedy to ensure protection of Colorado River supplies.

Approval of the final design and certification of the Subsequent Environmental Impact Report is anticipated in fall 2017. Construction is expected to be completed in 2022, 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 the 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 trust is currently conducting remedial investigations for long-term soil and groundwater cleanup. Metropolitan continued to monitor performance of the current groundwater remediation system and the development of the long-term treatment remedy for the perchlorate plume. Staff reviewed and commented on remedial documents, participated in stakeholder meetings and technical roundtables, and monitored site operations including disbursement of funds from a $1.1 billion settlement between Tronox and its predecessors for site cleanup. The Nevada Division of Environmental Protection is also conducting a regional investigation of downstream perchlorate-contaminated areas to further reduce loading into the Las Vegas Wash. The remedial plan has a goal to reduce perchlorate loading into the Las Vegas Wash to meet the federal Interim Drinking Water Health Advisory and Preliminary Remediation Goal of 15 ppb. This would further lower perchlorate levels in the Colorado River and 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 conducted pilot testing of an alternative coagulant while investigating future options for reducing potential formation of NDMA through the water treatment process. Staff continued laboratory studies to treat cyanotoxins using ozone, and investigations to improve and optimize ozone and biofiltration operations at Metropolitan's water treatment plants. Staff conducted a review of the existing domestic water systems at the CRA pumping plants, evaluated technology alternatives, and developed process design criteria for replacement systems. Staff also completed an extensive update of the Operations, Maintenance, and Monitoring Plan for the Weymouth plant. The Operations Plan is required by the Division of Drinking Water for the permit on how Weymouth staff operates, monitors and maintains the facility. The Weymouth plant is the last of

Metropolitan's five treatment plants to add disinfection by ozone, which is anticipated to be the primary disinfectant in fall 2017. This will help improve the aesthetics of the water by reducing taste-and-odor compounds and minimizing the formation of disinfection byproducts associated with chlorine disinfection.

Service to Member Agencies and Drinking Water Industry

Metropolitan hosted a Member Agency Water Quality Managers meeting in March 2017, and conducted a specialty workshop on the use of chloramine disinfection and nitrification prevention and control in the distribution system. In addition, staff provided an update to member agency general managers on the occurrence, detection, and control of cyanotoxins, as well as an overview of Metropolitan's response plan. Metropolitan also conducted a workshop on invasive quagga mussels in the SWP, with participants from Metropolitan member agencies, the California Department of Fish and Wildlife, DWR, and other utilities that use water from the SWP.

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
Fiscal Year 2016/17

Prime Funding Agency	Title of Grant Project	Total Project Budget	Amount of Award to MWD
	Several grant proposals were submitted but no new projects were initiated and there were no active grants during FY 2016/17.		
	TOTALS	$ –	$ –

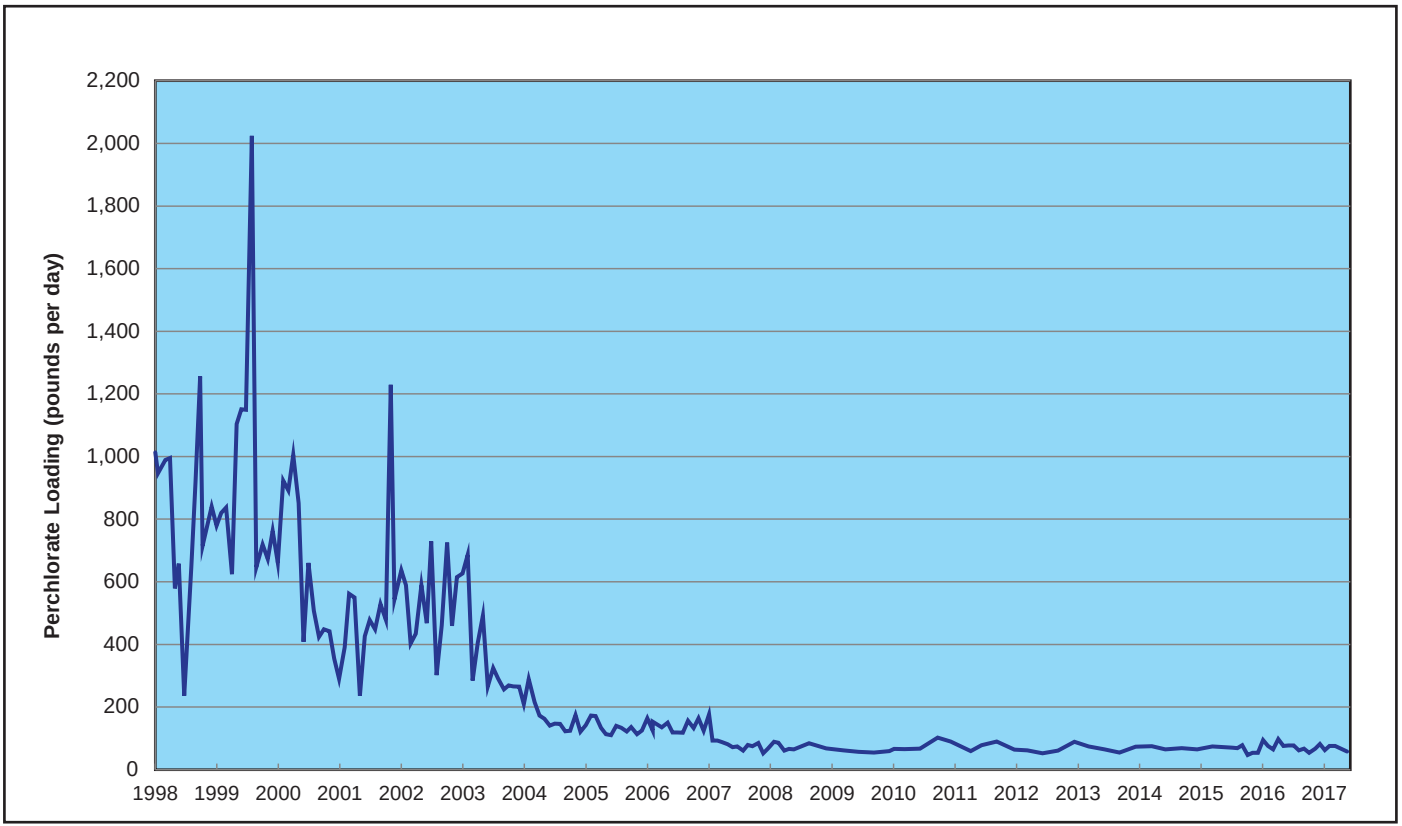


Figure 4-9. Perchlorate Loading in Las Vegas Wash, half a mile upstream of Lake Mead, 1998 to 2017

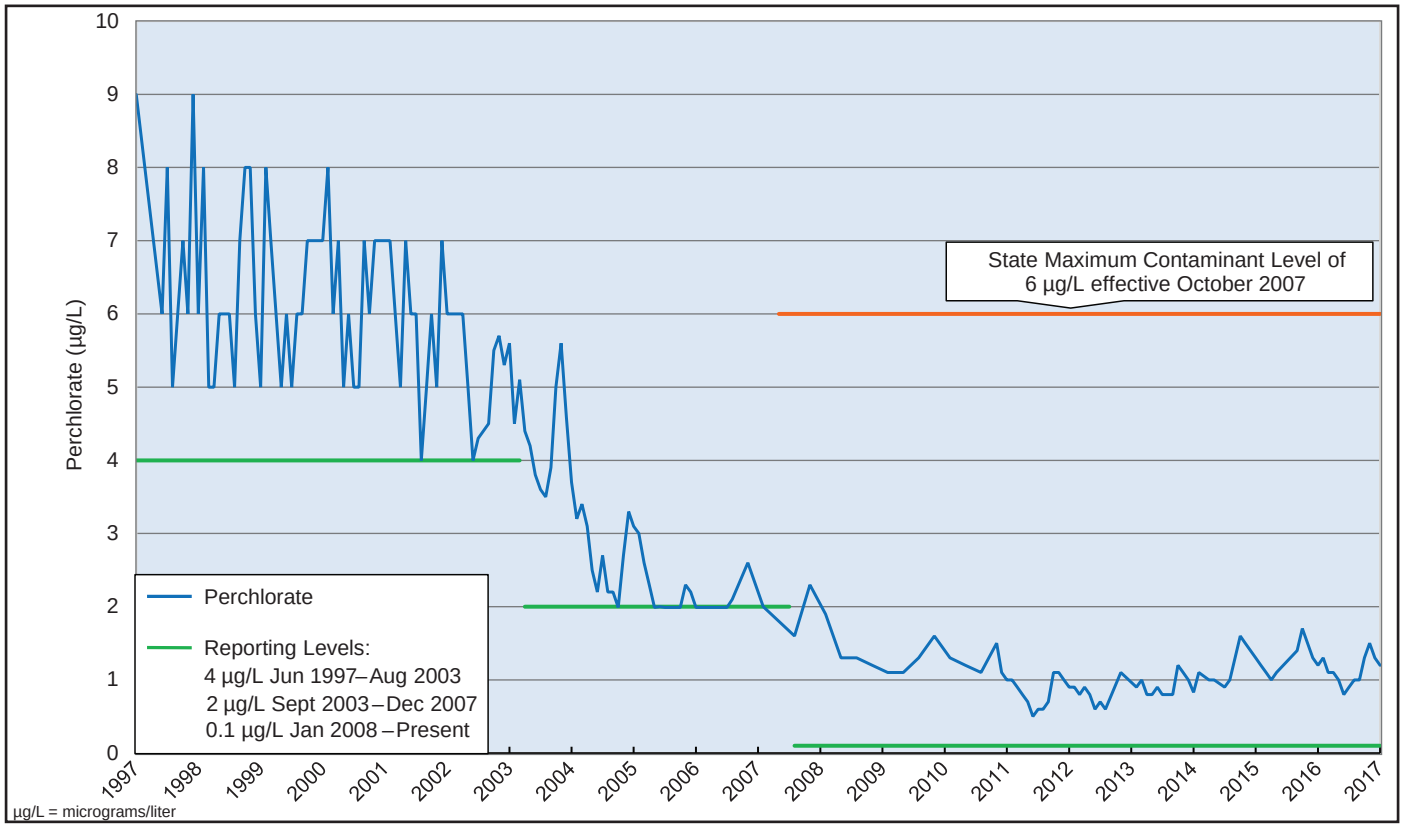


Figure 4-10. Perchlorate Levels at Lake Havasu, 1997 to 2017

Conveyance, Distribution and Support

Conveyance and Distribution

Water System Operations' Conveyance and Distribution Section performs preventive and corrective maintenance activities throughout the year with the objective of ensuring reliable deliveries to member agencies. In addition, the section plans and performs shutdowns to complete pipeline and facility inspections, performs local repairs on pipelines or equipment, and supports capital improvement program projects. A description of fiscal year 2016/17 activities follows:

Staff successfully completed shutdowns on the CRA and pipelines throughout Metropolitan's service area. Using visual inspections and eddy-current inspection technology, staff inspected approximately 26 miles of pipeline to assess the condition of steel mortar-lined and pre-stressed concrete cylinder pipe. Electromagnetic inspections revealed excessive wire breaks on 80 feet of PCCP on the Sepulveda Feeder that required urgent repairs. Completed over a 2-week period, the repairs involved the insertion of steel reinforcement sleeves where the PCCP had become weakened. Operational flexibility within the distribution system allowed this work to be completed without affecting member agency deliveries.

Throughout FY 2016/17, WSO maintained an eight-pump flow capability on the Colorado River Aqueduct. 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 the San Andreas Siphon, Big Morongo Siphon, and other areas along the CRA; seismic upgrades; sand trap improvements to prevent abrasive sediment from flowing into the pump units; Copper Basin storage tank inspections; installation of isolation valves and lateral lines; and repairs and testing of high-voltage equipment. No tunnel cleaning was performed during this shutdown, due to the low likelihood of high CRA flows in calendar year 2017.

Although quite rare, one leak was detected in Metropolitan's distribution system this year. During the CRA shutdown, staff installed 15 new internal seals and adjusted three existing seals in the Casa

Loma Siphon No. 1 pipeline to address this small leak. This section of the CRA is located in the city of San Jacinto. In late 2016, staff identified a leak that was small enough to allow repairs to be deferred until the scheduled CRA shutdown, instead of shutting down the CRA at the time the leak was found. Inspection of previously installed seals revealed that they were in good condition, needing only minor adjustments to ensure continued reliability.

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 2016/17 shutdown activities, staff coated 820 pieces of equipment and structures. Structures that are particularly vulnerable to water damage—such as vaults located below road grade—were sealed to prevent water intrusion that accelerates corrosion.

During FY 2016/17, crews performed nearly 228,000 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 the Department of Water Resources, 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, repairing and testing of valves and pumps, refurbishing equipment, diving inspections, floating reservoir cover maintenance, as well as crane maintenance and annual certification.

As part of the Colorado River Aqueduct Whitewater Flow Augmentation Project, the La Verne shops manufactured three 16-foot-long stainless steel gate guides and a 16-by-16-foot weir gate.

Installing the weir gate and gate guides in the Whitewater siphon transition structure enabled the delivery of a record amount of Colorado River water to groundwater storage programs being operated under an existing agreement with Desert Water Agency and Coachella Valley Water District.

Using a reimbursable agreement, the La Verne shops provided support for DWR's SWP facilities. The shops manufactured new pump components for the Gianelli Pump/Generating Plant Unit No. 3. The shops also fabricated two 12-by-10-foot steel trash gates for Oso Pumping Plant. The new gates replaced two existing ones which had extensive corrosion damage from many years of service.

The La Verne shops also maintained Metropolitan's infrastructure by fabricating 92-inch diameter steel liner pipe for urgent PCCP repair work on the Sepulveda Feeder. Use of Metropolitan's pipe fabrication facility at La Verne expedited the repairs and was less costly than other potential sources for the pipe.

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 installed a new 16-inch-diameter potable water and fire line as part of the Weymouth plant upgrades to support the ozone facilities. Staff also completed electrical improvements which will connect to the newly constructed bromate tank farm at the Weymouth plant.

In February 2017, staff constructed a new 24-inch blow off structure along the Orange County feeder that will provide safer access to the pipeline and reduce the amount of discharge water required during future shutdowns. In March 2017, staff installed a new acoustic meter at the LA-29 meter structure on the Sepulveda Feeder.

During heavy rainstorms in early 2017, Metropolitan's patrol roads suffered major erosion damage. Staff surveyed the damaged areas throughout the distribution system and made several repairs and

improvements to reestablish the existing patrol roads and mitigate future storm impacts.

Power Equipment and Reliability

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

The North American Electric Reliability Corporation sets reliability standards for owners of large electric transmission systems. The CRA's 230-kilovolt electrical transmission system, a key part of the Metropolitan system, was maintained by staff in compliance with the applicable reliability standards. Staff supported compliance activities required for Metropolitan's power operations, which included implementing recommendations from Southern California Edison-MWD annual transmission reliability assessments, successfully achieving self-certification for 2016, and supporting the Critical Infrastructure Protection cybersecurity training program.

Staff completed quarterly inspections at all 16 hydroelectric plants, including transformer and equipment oil testing, as part of its predictive maintenance program. At the OC-88 pump station, staff refurbished two of the older 12 kV transformers. Transformers are part of the high voltage transmission system into the plant that convert higher voltage power (12 kV) from Southern California Edison to a lower voltage (900 V) that the pumps can utilize for operation. Staff refurbished these transformers after testing and inspections indicated signs of degradation. Staff also completed 2-year maintenance work at Lake Mathews, Foothill, and Rio Hondo hydroelectric power plants. Six-year maintenance and high voltage testing work were completed at Etiwanda, Perris, Corona, and Temescal hydroelectric plants.

Protection relays are critical devices on high voltage systems that shut off power and protect equipment when a malfunction is detected. Two-year testing and calibration of these devices were completed at San Dimas, Foothill, Coyote Creek, Red Mountain, Corona, Temescal, Lake Mathews, Etiwanda, and Sepulveda hydroelectric power plants. Five-year high voltage electrical testing and maintenance work were

completed on the main switchgear at the Skinner, Diemer and Mills plants as well as the Wadsworth pumping plant switchyard at Diamond Valley Lake.

Staff continued to implement improvements in the infrastructure reliability of district facilities. This year maintenance staff completed the initial roll-out of condition-based maintenance practices at all treatment plants. These practices allow Metropolitan staff to diagnose impending equipment problems using diagnostic equipment and tools. Initially staff focused on vertical and horizontal pumps at the treatment plants. The effort will continue in the conveyance and distribution system. This is a multi-year effort that will incorporate other types of equipment over time, such as emergency generators and motors.

Fleet Services

WSO's fleet personnel assess, procure, and maintain more than 1,400 mobile assets, as well as approximately 570 facility assets. In FY 2016/17, staff completed some 5,900 preventive maintenance work orders and 2,900 corrective work orders on district equipment and strategically replaced aging vehicles and equipment while meeting air quality regulations.

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.

Security has been implementing the Security Action Plan developed in 2016. A number of immediate security enhancements have been developed and implemented as a result, including personal security awareness training to over 1,600 employees and the Board of Directors, in an effort to increase employee safety and awareness in response to an increase in workplace violence events nationwide.

Security has reduced metal theft incidents districtwide from over 15 occurrences in 2015 to zero over the past year. This achievement was made possible by hardening the security of prospective targets for metal theft and closely working with an alliance of utilities, law enforcement and vigilant employees.

Metropolitan has renewed a five-year maintenance agreement for the physical security system and initiated an upgrade project for electronic security surveillance and access control. This upgrade project features encrypted card readers and badges, new computer servers, network controllers, and video management system software.

Security has been working with local, state and federal law enforcement partners to meet its objectives. A partnership has been developed with the California Highway Patrol to assist with security emergencies at any of the pumping plants in the desert. Security has facilitated local law enforcement and emergency response exercises at multiple facilities and has performed threat and vulnerability assessments with the assistance of the Department of Homeland Security. This collaboration provides useful feedback and information that is used to enhance Metropolitan's safety and security.

Metropolitan continues to participate on the Board of Directors for the California Utilities Emergency Association and is a founding member of CUEA, since the start of the organization in 1952. CUEA focuses on improving collaboration among member utilities and ensuring clear lines of communication between those agencies and California's Office of Emergency Services. CUEA brings together utilities throughout the state from the water, wastewater, electric, gas, petroleum pipeline and telecommunication industries.

Staff conducted several meetings with member agencies and other utilities to develop two large emergency exercises in fiscal year 2016/17. Both exercises concentrated on realistic emergency scenarios in the Southern California region. The first simulation focused on responding to credible terrorist threats with an emphasis on interagency coordination. Metropolitan and member agency staff, as well as representatives from local and state emergency management agencies, participated in an advanced tabletop exercise where participants discussed how they would jointly respond to terrorist acts at multiple locations.

The second exercise concentrated on assessing Metropolitan's emergency communication systems, including high-volume message testing of Metropolitan's new two-way radio system, and expanded use of an online emergency information sharing system. All Metropolitan emergency response command centers, and most member agencies, participated in this full-scale exercise. These communications systems allow key Metropolitan facilities and the member agencies to receive information through multiple communication platforms across the service area and share the information quickly during an emergency.

These exercises mark the fourth year of a five-year plan to invite all of Metropolitan's member agencies to collaborate and participate in at least one Metropolitan exercise.

Energy Management

Hydroelectric Power Recovery Plant Operations

Metropolitan has 16 small-conduit hydroelectric power recovery plants that generated a total of 242 million kilowatt-hours for fiscal year 2016/17 (Table 4-9), and earned revenues of $15.2 million. This was about 105 million kilowatt-hours more generation and $7.7 million more revenue compared to FY 2015/16. The boost in energy production was the result of increased State Water Project resources that allowed the Greg Avenue, Sepulveda Canyon, and Etiwanda hydroelectric generators to come back on-line or significantly increase generation. Generation from all 16 power plants was sold under contractual agreements with Pacific Gas & Electric, Southern California Public Power Authority, Los Angeles Department of Water and Power, and two separate agreements with the Department of Water Resources. The overall contracted price for the energy from Metropolitan's 16 hydroelectric generators averaged approximately $63/megawatt-hour, which is comparable with the value of California certified renewable energy. Metropolitan and the SCPPA negotiated a pricing change in the agreement to sell energy from Metropolitan's Rio Hondo, Coyote Creek, Valley View, and Perris hydroelectric generators. The pricing change was in lieu of SCPPA's request for an early termination of the agreement in 2018 rather than the normal termination date of December 31, 2023, due to the contracted price being significantly higher than what was available

in the renewable energy marketplace. Both parties were provided the option of an early termination under the provisions of the agreement. Metropolitan and SCPPA agreed to modify the price rather than terminate the agreement, effective July 1, 2017 through the end of the contracted term with no further provision for an early termination.

Solar Power Energy Production

Metropolitan has three solar photovoltaic energy facilities. The facility at the Skinner plant is rated at one megawatt, the Diamond Valley Lake Visitor Center facility is rated at 0.52 megawatts, and the newest facility, which came online at the end of June 2016 at the Weymouth plant, has a rating of three megawatts. During fiscal year 2016/17, the Skinner plant produced 2,198 megawatt-hours (MWh) of energy and the visitor center produced an estimated 650 MWh, all of which offsets retail energy purchases at the two locations from Southern California Edison.

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 the California Air Resources Board to cover the amount of gas emitted. In November 2016, Metropolitan submitted allowances to cover its obligation for energy imported into California to serve the CRA pumping load in calendar year 2015. This was the second year Metropolitan had to make such a submittal. The value of the allowances was approximately $210,000.

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

Power Plant[2]	Nameplate Capacity (Megawatts)	2016/17 Production (kWh)	2015/16 Production (kWh)
Greg Ave.	1	1,968,000	0
Lake Mathews	5	18,706,183	32,835,903
Foothill Feeder	9	42,852,309	4,618,409
San Dimas	10	64,728,518	14,470,905
Yorba Linda	5	8,289,209	2,308,480
Sepulveda Canyon	9	13,457,422	0
Venice	10	0	0
Temescal	3	8,582,271	18,427,367
Corona	3	11,809,510	19,103,374
Perris	8	19,322,860	712,036
Rio Hondo	2	1,735,277	170,378
Coyote Creek	3	3,649,966	6,651,452
Red Mountain	6	29,887,522	22,770,534
Valley View	4	5,844,349	12,456,991
Etiwanda	24	4,623,000	27,944
Wadsworth (DVL)	30	6,939,451	2,090,548
TOTAL[3]	**131**	**242,395,847**	**136,644,321**

[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

Colorado River Aqueduct Power

In FY 2016/17, Metropolitan pumped nearly 766,000 AF through the Colorado River Aqueduct, 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 2016/17, the increase in SWP allocation meant less reliance on CRA water, which lowered the need for energy resources for CRA pumping operations. This was a big change from FY 2015/16, when the CRA pumping had operated at near capacity for most of the year. Metropolitan's FY 2016/17 net energy purchases declined significantly to 32 million kWh. This 657 million kWh decline reduced the purchased energy cost by $15.4 million as compared to FY 2015/16. Metropolitan also maximized the Benefit Energy available from Southern California Edison through the 1987 Service and Interchange Agreement to support CRA pumping.

TABLE 4-10
ENERGY COST FOR PUMPING
COLORADO RIVER WATER
Fiscal Year 2016/17

Energy Source	Cost ($)
Hoover Power Plant	16,775,002
Parker Power Plant	3,251,294
Energy Purchases/Sales [1]	1,245,424
Exchange (Edison & DWR) [2]	1,194
Colorado River Water Pumping Revenue [3]	(870,554)
Benefit Energy and Exchange Surcharge [4]	138,129
Reduction in Energy Surcharge [5]	87,423
TOTAL	**20,453,066**

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

Notes:

* Includes June 1987 data

[1] Energy provided by Southern California Edison (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.

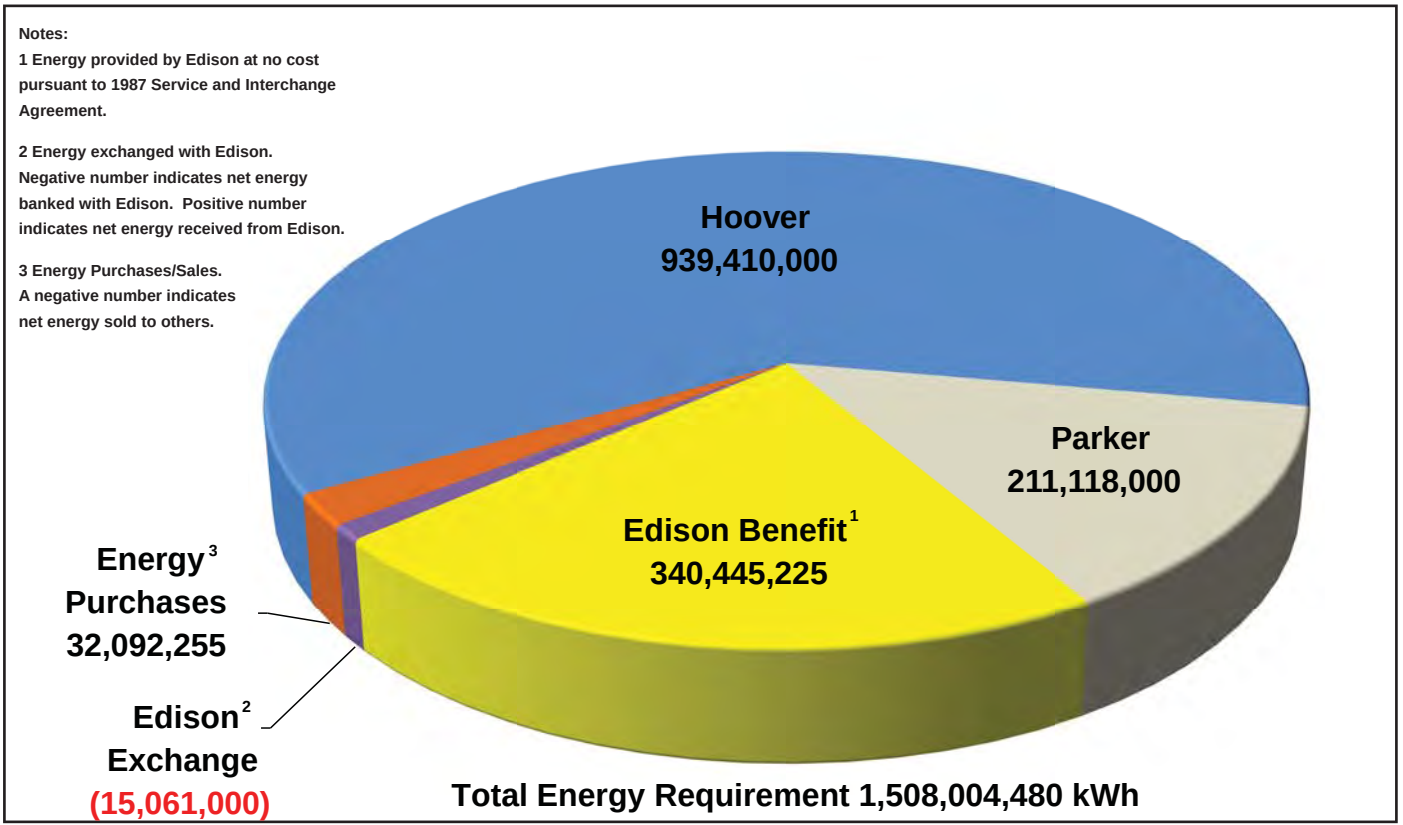


Figure 4-11 Metropolitan's CRA Electric Energy Use (kWh) Fiscal Year 2016/2017

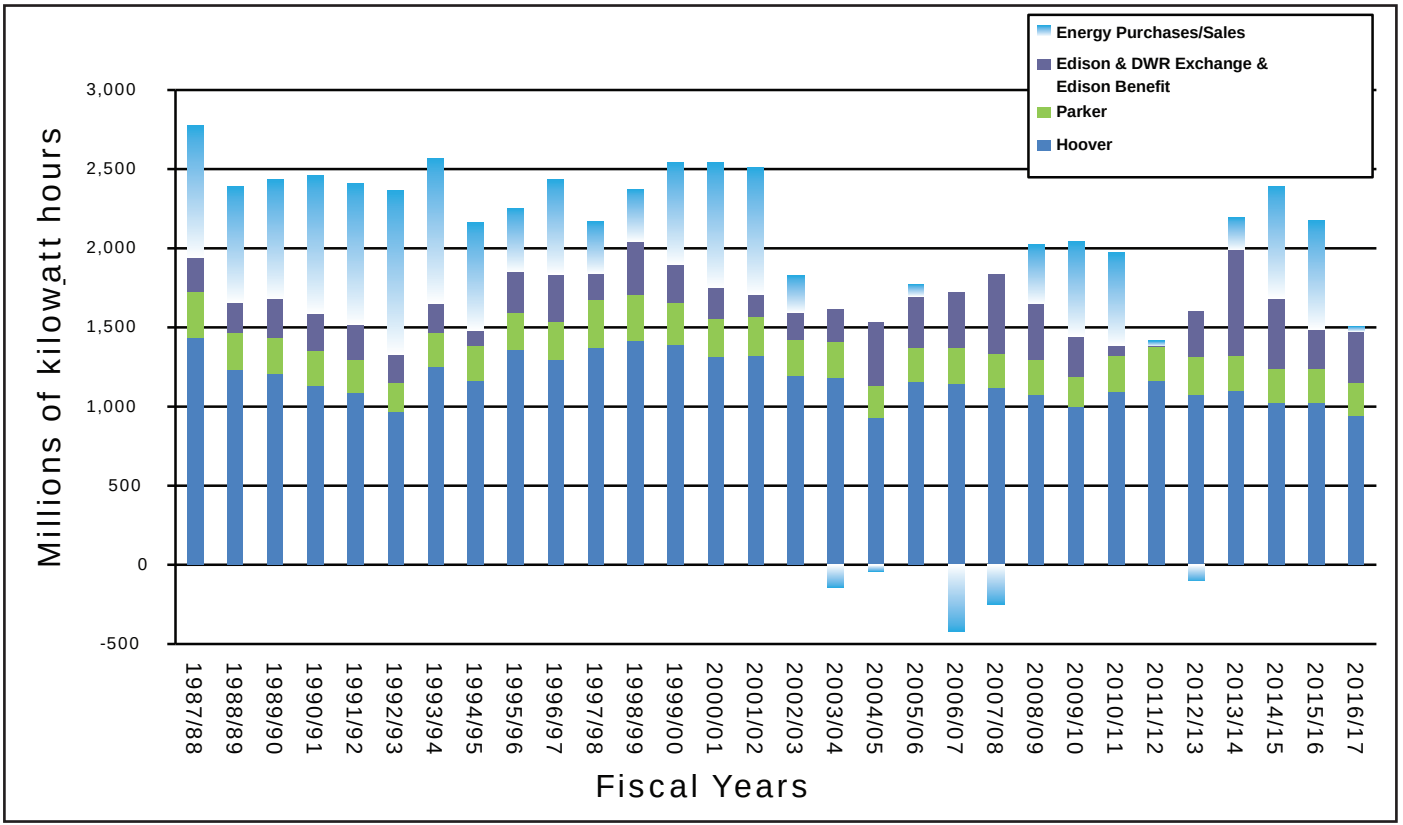


Figure 4-12 CRA Energy Mix 1987 to 2017

Power Transactions with Southern California Edison

The Service and Interchange Agreement establishes the operating practices between Southern California Edison and Metropolitan in regards to the integrated electrical systems of the CRA and Edison. A key provision of the agreement is the ability of Metropolitan to engage in energy sales and purchases with Edison. During the first part of fiscal year 2016/17, from July 2016 to January 2017, Metropolitan purchased approximately 314 million kilowatt-hours of energy for CRA pumping from Edison for approximately $7.8 million. This was a savings of approximately $1.5 million over purchasing the energy from out-of-state sources. This value includes the savings from avoiding the acquisition of allowances to offset the greenhouse gases associated with energy imported into California. During the second part of FY 2016/17, when CRA pumping was significantly reduced due to the dramatic improvement in the availability of water from the SWP, Metropolitan sold approximately 282 million kilowatt-hours of excess energy to Edison for approximately $6.5 million. The result was a net purchase of 32 million kWh of energy at $1.25 million to support CRA operations.

Expiration and Replacement of Edison Agreement

The Service and Interchange Agreement with Edison will terminate on September 30, 2017. Edison has stated that it is not interested in continuing to provide transmission-related services under a new agreement. In anticipation of the termination of the agreement, Metropolitan evaluated options for replacing the services previously provided by Edison with a series of new agreements that would provide the most cost-effective and operationally desirable outcome for Metropolitan.

Metropolitan has been in discussions with the Arizona Electric Power Cooperative, a non-profit, membership-based generation and transmission cooperative that can provide transmission services to Metropolitan. AEPCO's services would cost less than if Metropolitan provided the services itself. Negotiations with AEPCO are nearly complete with the goal of having agreements in place before the Edison agreement expires on September 30, 2017. AEPCO would provide services to Metropolitan under the terms of two agreements, both running from October 1, 2017 through December 31, 2035. One

agreement covers transmission system operation services that ensure Metropolitan's facilities comply with national electric reliability standards. Under the other agreement, AEPCO would schedule Metropolitan's energy resources from Hoover and Parker dams, and procure supplemental energy for CRA operations when the available energy from Hoover and Parker is insufficient.

In June 2017, the Metropolitan board authorized approval of an operating agreement with CAISO (California Independent System Operator). The operating agreement will govern the operation of Metropolitan's CRA power system within CAISO's balancing area and allow CAISO to accept Metropolitan's imports and exports of capacity, energy, and ancillary services.

The board also adopted a Resource Adequacy Resolution that will satisfy requirements for the CRA power system to provide sufficient resources to reliably meet its power needs.

Although Edison has indicated that it does not plan to extend the term of the Service and Interchange Agreement, it has requested retention of all the existing points of interconnection at four of Metropolitan's pumping plants and one switching station along the CRA transmission system. This will allow Edison to serve its remote desert retail loads and maintain interconnections with other entities. Interconnection agreements are being negotiated for the Camino Switching Station and the Gene, Iron Mountain, Eagle Mountain and Hinds pumping plants.

Hoover Electric Service Contract

The current Hoover Electric Service Contract will terminate on September 30, 2017. Metropolitan and the other Hoover power contractors have been negotiating for several years with the Western Area Power Administration and Bureau of Reclamation on successor contracts. These negotiations were successfully concluded in May 2016 and Metropolitan executed the contracts in March 2017 with an effective date of October 1, 2017. The new Energy Service Contract and Implementation Agreement will provide Metropolitan with 95 percent of its current share of the Hoover project, energy and capacity, for a period of 50 years (2017–2067). This will ensure a

continuing source of reliable and economic energy to power the CRA pumps for another 50 years.

Mead Substation Interconnection Contract

The original Mead Substation Interconnection Agreement commenced in 1968 and terminated on May 31, 2017. Metropolitan and the Western Area Power Administration have successfully negotiated the terms of a new 50-year Operation, Maintenance, and Replacement Agreement, which establishes points of ownership and interconnection rights for Metropolitan to continue its existing transmission interconnections to WAPA's Mead Substation. The new agreement will allow Metropolitan to maintain interconnections of its two transmission lines from Metropolitan's Camino Switching Station to the Mead Substation, and to continue to receive power from Hoover and other power resources to serve Metropolitan's CRA pumps. The agreement was executed in March 2017, with an effective date of June 1, 2017.

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 82 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 more than 92 wastewater, storm water 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 nearly 38 annual disclosures and business plans dealing with hazardous materials for required Metropolitan sites.

Despite its public health benefit, cost-effectiveness and superior disinfection properties, chlorine is a highly regulated chemical. Staff took the lead in several important regulatory compliance-related activities involving Metropolitan's chlorine systems, including two very successful regulatory inspections and revalidations for the chlorine systems at two treatment plants. In addition, comprehensive internal audits were conducted at all six chlorine facilities. Regulatory authorities found that Metropolitan was 100 percent compliant with the federal Risk Management Program and California Accidental Release Program regulations. The regulators praised the treatment plants' operations, appearance, housekeeping, and high degree of compliance.

Health & Safety

Staff provided safety coverage during the FY 2016/17 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 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. These meetings heighten safety awareness by discussing project plans and reviewing job hazard assessment and requirements. Table 4-12 shows the injuries, illnesses and incidents that required time off from work during FY 2016/17 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 Total Incident 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. Approximately 660 classes covering more than 90 individual topics were presented. Online courses continued to provide flexibility for diverse work schedules and accounted for over one-third 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. Over 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 91 journey and electrical craft persons which comprises over 40 percent of the current apprenticeable trades workforce. A recruitment to establish a new two-year hiring eligibility list was conducted in FY 2016/17.

TABLE 4-12
ACCIDENT INCIDENTS
Fiscal Year 2016/17

Location	Total* Incident Rate	DART** Incident Rate
Diemer	12.3	3.1
Diamond Valley Lake	14.3	5.7
Eagle Mountain	40.7	20.3
Eagle Rock	5.9	5.9
Gene Camp	3.9	2.9
Hinds	22.4	11.2
Iron Mountain	4.7	0
Jensen Plant	7.9	4.7
La Verne	4.0	3.3
Lake Mathews	13.1	7.3
Lake Skinner	3.0	1.5
Mills Plant	2.2	0
Sacramento	6.6	0
San Diego	0	0
Soto Street	11.6	3.9
Sunset	0	0
Union Station	0.6	0.4
Washington, D.C.	0	0
AVERAGE RATE	**3.0**	2.2
Federal Utility Average	**5.5**	3.0
State Utility Average	**6.9**	3.0

*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.

Side view of a 120-inch butterfly valve on the Rialto Feeder.

Weymouth Oxidation Retrofit Program –
Ozone Generation Building.

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 MWD's commitment to construct and rehabilitate facilities that enable long-term, reliable water deliveries.

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 2016/17, expenditures totaled approximately $372 million for all capital programs. This amount includes $174.3 million for the Delta Islands purchase. All other 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, 17 construction contracts were completed with a total value of $222 million, while 23 construction contracts (as shown in

Table 5-2) and seven procurement contracts remained underway with a total value of approximately $174 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 2016/17.

Water Quality/Oxidation Retrofit Program

Metropolitan initiated the Oxidation Retrofit Program in 1990 to enable ozone to serve as primary disinfectant, reduce the level of disinfection byproducts, and improve the water quality at Metropolitan's five treatment plants. Construction of the main ozonation facilities at the F. E. Weymouth Water Treatment Plant was completed in FY 2016/17. Start-up of the Weymouth system, which represents the final step for the Oxidation Retrofit Program, will be completed within the first half of FY 2017/18. Ozone has been employed as the primary disinfectant at the Joseph Jensen, Henry J. Mills, Robert A. Skinner and Robert B. Diemer water treatment plants for several years.

Treatment Plant Reliability Program

Projects under this program maintain reliability and improve the operating efficiency of Metropolitan's water treatment plants. Specific accomplishments included: completion of electrical upgrades at the Diemer plant; completion of upgrades to replace deteriorated filter valves at the Jensen plant; completion of industrial wastewater handling improvements at the Mills plant; continued seismic upgrades to the Administration Building at the Diemer plant; and continued filter and basin structural and equipment upgrades at the Weymouth and Diemer plants.

Distribution System Reliability Program

Projects within this program maintain delivery reliability to Metropolitan's member agencies. Specific accomplishments included: completion of the second stage of lining repairs on the Etiwanda Pipeline; completion of a pilot construction project to replace the deteriorated lining on the Orange County Feeder; completion of the

installation of cathodic protection along the Allen-McColloch Pipeline; 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. Specific accomplishments included: initiating repairs to the delivery line expansion joints at all five CRA pumping plants; initiating construction of erosion protection for the Whitewater Siphons; continued construction to replace the original sand trap equipment at the Iron Mountain, Eagle Mountain and Hinds pumping plants; and continued seismic 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 2016/17, four miles of PCCP have been rehabilitated, leaving 96 miles that remain to be lined or replaced. Specific accomplishments included: completion of electromagnetic inspections along portions of the Rialto Pipeline, Second Lower Feeder, Sepulveda Feeder, Calabasas Feeder and West Valley Feeder No. 2; completion of urgent repairs on the Sepulveda Feeder; board certification of the programmatic Environmental Impact Report for five priority PCCP feeders; and completion of design of the program's initial construction contract to line Reach 1 of the Second Lower Feeder.

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 feeders throughout the distribution system. This effort will enable 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 the initial phase of the program, including design of improvements, preparation of programmatic environmental impact reports, and identification and resolution of right-of-way issues throughout the distribution system.

System Flexibility/Supply Reliability Program

In response to the recent drought and resulting low allocation of State Water Project supplies to Metropolitan, staff continues to execute projects to expand the reach of CRA water throughout Metropolitan's distribution system. During FY 2016/17, 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 will improve or modify facilities located throughout Metropolitan's service area in order to utilize new processes and/or technologies, and improve facility and overall reliability. Specific accomplishments included: completion of preliminary design of building improvements at the Headquarters Building in Los Angeles; and initiation of full-scale upgrades to the control and electrical protection systems for the pump/turbine units at Wadsworth Pumping Plant.

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. FY 2016/17 marked the completion of construction upgrades to Metropolitan's Chemical Unloading Facility. This project represents the final stage of a long-term effort to upgrade containment facilities to enhance safety and security.

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 is underway and is expected to be completed in the first half of FY 2017/18. This project will provide a long-term hedge against utility power cost increases at the plant.

Minor Capital Projects Program

This program executes refurbishments, replacements, or upgrades at Metropolitan facilities that cost less than $250,000. During FY 2016/17, 24 projects were authorized under this program.

Potential 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. During FY 2016/17, design of the 500,000 gallon-per-day demonstration plant was completed. This work is being undertaken in collaboration with the Sanitation Districts of Los Angeles County.

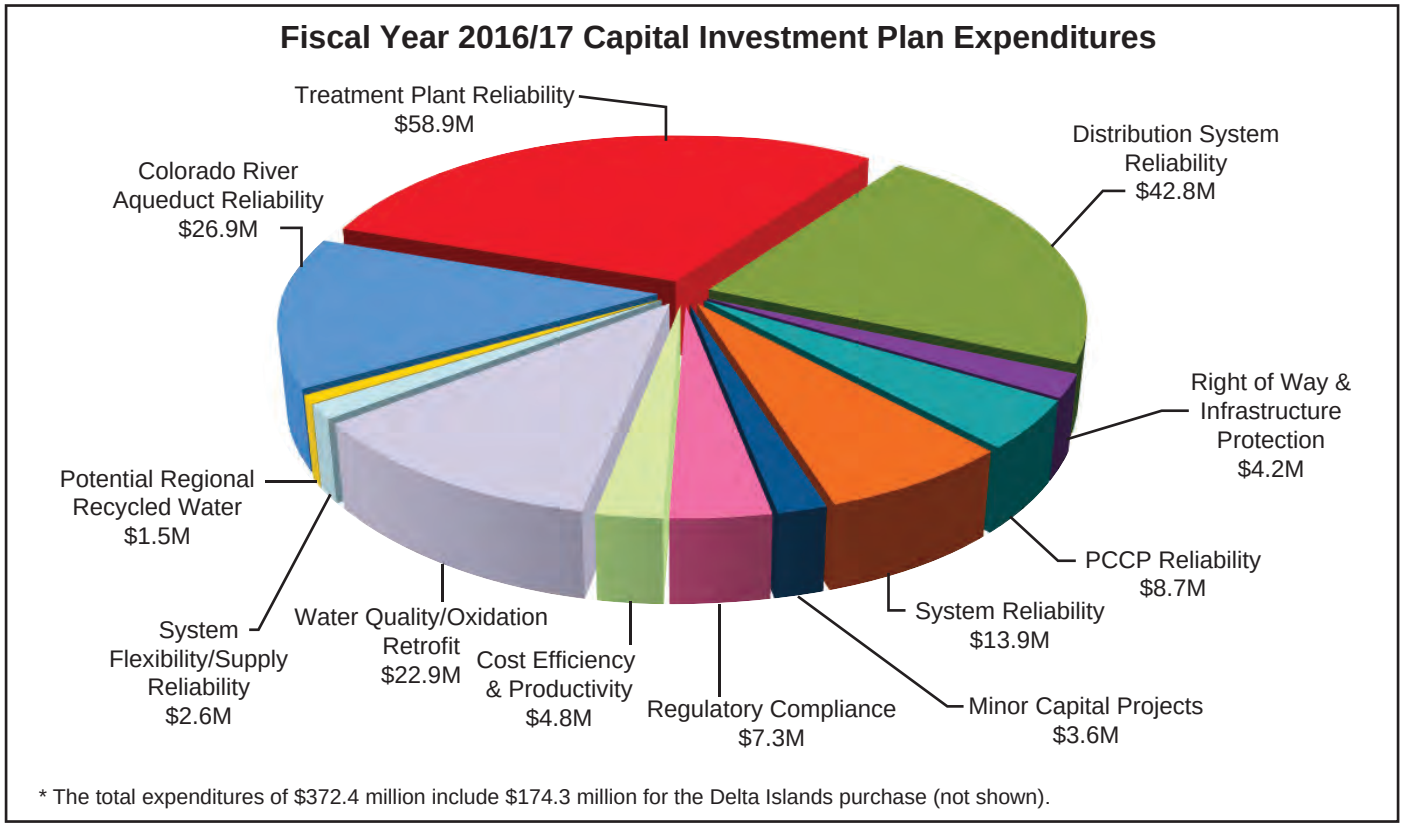


Figure 5-1. Fiscal Year 2016/17 Capital Investment Plan Expenditures

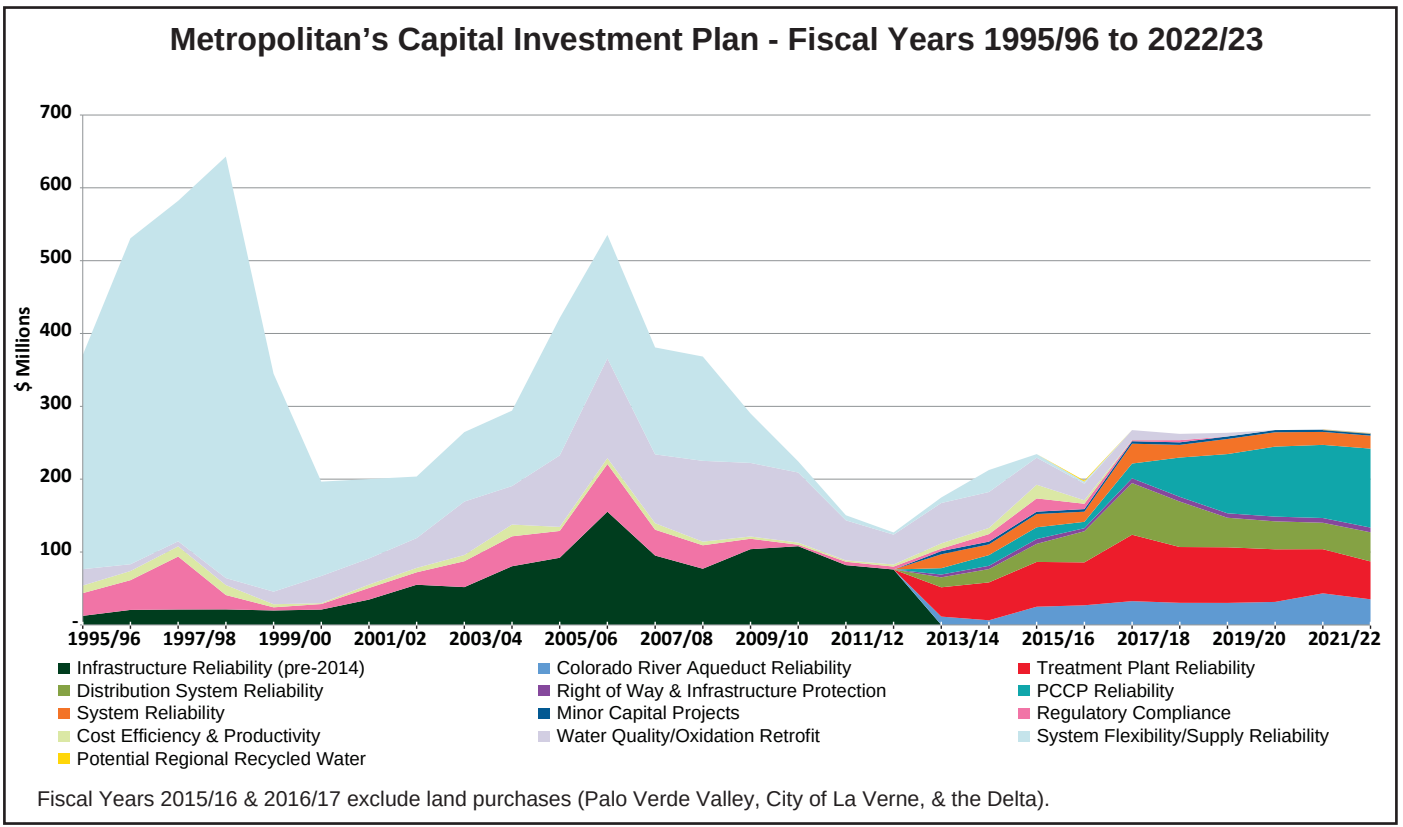


Figure 5-2. Metropolitan's Capital Investment Plan – Fiscal Years 1995/96 to 2022/23

TABLE 5-1
CONSTRUCTION CONTRACTS COMPLETED AS OF JUNE 30, 2017 (Unaudited)

Completion Date	Contract / Spec. No.	Project	Base Bid Amount ($)	Final Amount ($)
7/18/16	1817/1749	Weymouth Plant Scrubber Platform	371,800	388,600
8/26/16	1832/1871	Sepulveda Feeder Urgent PCCP Repairs	9,150,000	10,625,967
10/5/16	1823/1796	Colorado River Aqueduct Erosion Protection Curbing	16,640,000	16,674,000
10/20/16	1811/1780	Water Quality Lab HVAC Chiller Replacement	989,215	989,215
10/31/16	1808/1782	Diemer Plant South Slope Revegetation	996,600	1,018,600
11/1/16	1829/1776A	Diamond Valley Lake Visitors Center Building Improvements	161,525	177,028
11/1/16	1826/1813	Diamond Valley Lake Fuel Tank Monitoring and Inventory System Upgrades	195,771	230,238
11/10/16	1838/1841	Middle Feeder South Blowoff Valve Replacement at Sta. 782+53	343,625	343,625
11/28/16	1812/1825	La Verne Solar Power Plant	10,065,865	10,022,256
12/5/16	1828/1808	Weymouth Plant Filter Building No. 1 Window Replacement	130,000	130,000
12/16/16	1773/1705	Diemer Plant Electrical Upgrades, Stage 2	11,110,000	11,352,044
2/27/17	1802/1744A	Jensen Plant Module No. 1 Filter Valve Replacement	3,637,083	3,887,082
3/23/17	1830/1832	Etiwanda Pipeline Lining Repairs, Stage 2	11,555,000	11,735,900
5/10/17	1804/1753	Diemer Plant East Filter Upgrades	9,310,000	9,748,678
5/19/17	1741/1600	Weymouth Oxidation Retrofit Program - Main Ozonation Facilities	95,497,513	118,432,136
6/1/17	1800/1707A	Mills Plant Industrial Wastewater Handling Facility	2,565,063	2,565,063
6/30/17	1785/1709	Chemical Unloading Facility Containment and Handling Facilities	22,888,888	23,659,678

TABLE 5-2
MAJOR CONSTRUCTION CONTRACTS IN PROGRESS
AS OF JUNE 30, 2017 (UNAUDITED)
Accrual Basis

Contract No.	Project	Percent Contract Complete through 6/30/2017	Estimated Contract Completion Date	Contract Earnings ($) through 6/30/2017 [1]	Base Bid Amount ($)
1803	Jensen Plant - LADWP Lagoon Refurbishment	92%	Aug. 2017	3,102,497	3,067,900
1809	Weymouth Plant Filter Rehabilitation	99%	Dec. 2017	32,310,254	31,762,914
1814	Diemer Plant East Basin Rehabilitation	96%	Aug. 2017	20,962,494	21,524,084
1818	Weymouth Plant Chemical Upgrades	89%	Jun. 2018	9,092,261	10,267,000
1822	CRA Sand Trap Rehabilitation	71%	Sep. 2017	6,964,620	9,777,000
1825	Palos Verdes Reservoir Cover and Liner Replacement	35%	Aug. 2018	10,443,684	29,560,000
1827	Jensen Plant Electrical Upgrades, Stage 1	76%	Feb. 2019	12,009,047	15,800,000
1834	Diamond Valley Lake East Dam Electrical Upgrades	79%	Aug. 2017	562,658	708,000
1835	La Verne Shops Fire Sprinkler System	84%	Jul. 2017	226,100	268,000
1836	Diamond Valley Lake East Marina Restroom	10%	Oct. 2017	20,790	204,000
1837	Diamond Valley Lake Inlet/Outlet Tower Fish Screen Replacement	8%	Jan. 2018	156,124	1,885,150
1839	Palos Verdes Feeder Collis Avenue Structure Valve Replacement	99%	Jul. 2017	1,651,962	1,422,082
1841	Jensen Solar Power Plant	53%	Sep. 2017	2,402,121	4,878,635
1842	Allen-McColloch Pipeline Cathodic Protection	98%	Jul. 2017	1,149,789	1,171,293

TABLE 5-2 (Continued)
MAJOR CONSTRUCTION CONTRACTS IN PROGRESS
AS OF JUNE 30, 2017 (UNAUDITED)
Accrual Basis

Contract No.	Project	Percent Contract Complete through 6/30/2017	Estimated Contract Completion Date	Contract Earnings ($) through 6/30/2017 [1]	Base Bid Amount ($)
1843	Diemer Plant Administration Building Seismic Upgrades	20%	Apr. 2018	890,500	4,426,000
1844	CRA Pumping Plants - Seismic Retrofit of 6.9 kV Switch Houses	42%	Sep. 2018	4,019,713	9,595,000
1845	Orange County Feeder Lining Repairs, Stage 1	82%	Jul. 2017	3,772,068	4,580,000
1847	Allen-McColloch Pipeline Flow Control Structure Seismic Upgrades	46%	Oct. 2017	497,250	1,092,092
1848	CRA Pumping Plants Delivery Line Expansion Joint Repairs, Stage 2	4%	Oct. 2017	43,000	1,109,254
1849	Lake Mathews Power Plant Concrete Repairs	3%	Apr. 2018	5,250	207,800
1850	CRA Whitewater Siphons Erosion Protection	0%	Dec. 2018	-	5,285,000
1853	Employee Housing Rehabilitation at Julian Hinds and Eagle Mountain Pumping Plants	0%	Feb. 2018	-	1,219,809
1854	Employee Housing Rehabilitation at Iron Mountain and Gene Pumping Plants	0%	Feb. 2018	-	1,219,809

[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

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	September 2019
Colorado River Aqueduct Reliability Program				
15341	Whitewater Siphon Protection	$15,300,000	CRA Whitewater Siphon Protection	October 2016
15373	CRA Conveyance Reliability	$186,000,000	CRA Discharge Line Isolation Gates	April 2019
			Copper Basin & Gene Wash Dam Discharge Valve Replacement	January 2018
15374	CRA Pumping Plant Reliability	$25,500,000	CRA Main Pump Expansion Joint Repairs	June 2017
15384	CRA Electrical/Power Systems Reliability	$48,600,000	CRA UPS Replacement	October 2017
			CRA Power Cable Replacement	October 2017
			CRA Auxiliary Power Systems	August 2017
15438	CRA Reliability - FY2006/07 Through FY2011/12	$110,200,000	CRA Pump Plant Sump System Rehabilitation	December 2017
			CRA Seismic Retrofit of 6.9 kV Switch Houses	July 2016
			CRA Radial Gates Rehabilitation	August 2018
			Intake Pumping Plant Standby Generator Replacement	November 2018
			Intake Power and Communication Line Relocation	November 2018
			CRA Mile 12 Flow Monitoring Station Upgrades	December 2016
15481	CRA Main Pump Reliability	$177,200,000	CRA Overhead Crane Replacement	June 2018
			CRA Discharge Line Isolation Couplings	June 2018
15483	CRA Reliability - FY2012/13 Through FY2017/18	$67,600,000	CRA and Iron Mountain Reservoir Panel Repairs	August 2017
			CRA Delivery Line Expansion Joints Rehabilitation	January 2017
			CRA Water Distribution System Replacement	August 2018
			CRA Conduit Structural Protection	January 2018
			CRA Domestic Water Treatment System Replacement	April 2019
			CRA Storage Buildings at Hinds, Eagle Mountain and Iron Mountain	November 2018

TABLE 5-3 (Continued)
MAJOR PROJECTS UNDER DESIGN

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	$119,500,000	Orange County Feeder Lining Repairs	May 2018
			Upper Newport Bay Blow-Off Structure Rehabilitation	November 2017
			Coyote Creek Hydroelectric Plant Rehabilitation	February 2018
			West Valley Feeder No. 1 Valve Structure Rehabilitation, Stage 3	September 2018
15417	Reservoir Cover and Replacement	$41,500,000	Mills Finished Water Reservoirs Rehabilitation	August 2020
15419	Dam Rehabilitation & Safety Improvements	$8,900,000	DVL Dam Monitoring System Upgrade	December 2017
15441	Conveyance and Distribution System Rehabilitation - FY2006/07 Through FY2011/12	$182,700,000	Lake Mathews Forebay Repairs	December 2018
			OC-88 Pump Plant Surge Tank Upgrade	December 2018
			Sepulveda Canyon Control Facility Seismic Upgrades	July 2019
			Santa Ana River Bridge Seismic Upgrades	May 2017
			Santiago Lateral Sectionalizing Valve Replacement	January 2019
			Lake Mathews Forebay Upgrades	December 2017
			Orange County Feeder Cathodic Protection	October 2017
			Lake Mathews Hydroelectric Plant Repairs	December 2017
			Seismic Upgrade of 10 Facilities on the Allen-McColloch Pipeline	December 2017
			Etiwanda Pipeline Lining Repairs, Stage 3	October 2017
			Palos Verdes Reservoir Sodium Hypochlorite Feed System Upgrade	September 2016
15458	Hydroelectric Power Plant Improvements	$39,300,000	Foothill Hydroelectric Plant Rehabilitation	July 2018
			Carbon Creek Pressure Control Structure Seismic Upgrades	December 2018
			Foothill Hydroelectric Plant Seismic Upgrades	January 2019
			San Dimas Hydroelectric Plant Rehabilitation	February 2020
			Sepulveda Canyon Hydroelectric Plant Rehabilitation	February 2020
			Venice Hydroelectric Plant Rehabilitation	January 2019

TABLE 5-3 (Continued)
MAJOR PROJECTS UNDER DESIGN

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	Allen-McColloch Pipeline Service Connection OC-76 Turnout	September 2017
			East Orange County Feeder No. 2 Service Connection A-6 Venturi Meter Replacement	December 2017
			Rialto Pipeline Service Connections CB-12 and CB-16 Valve Replacement & Electrical Improvements	January 2018
			Sepulveda Canyon Control Facility Bypass	January 2019
			Electrical Upgrade of 14 Structures within Orange County	June 2018
			Garvey Reservoir Drainage and Erosion Improvements	December 2016
			Lakeview Pipeline Rehabilitation	June 2018
			West Orange County Feeder Valve Replacement	September 2018
			San Dimas and Red Mountain Power Plants Standby Generator Replacement	July 2017
			Lake Mathews Electrical Upgrades	December 2017
			Orange County Region Service Center	April 2017
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 Shops - Building Completion & Equipment Installation	March 2018
			La Verne Shops - Equipment Design and Procurement	March 2018
15473	Headquarters Building Improvements	$42,200,000	Headquarters Building Improvements	May 2018

TABLE 5-3 (Continued)
MAJOR PROJECTS UNDER DESIGN

Appropriation Number	Appropriation Title	Appropriation Estimate	Project Description	Estimated or Actual Completion Date for Final Design
PCCP Reliability Program				
15497	Second Lower Feeder PCCP Rehabilitation	$625,000,000	Second Lower Feeder PCCP Rehabilitation - Preliminary Design	December 2018
			Second Lower Feeder PCCP Rehabilitation - Reach 1	June 2017
			Second Lower Feeder PCCP Rehabilitation - Reach 2	March 2018
			Second Lower Feeder PCCP Rehabilitation - Reach 3	October 2018
			Second Lower Feeder Pipe Procurement - Reaches 2/3	February 2019
			Second Lower Feeder Valve Procurement	December 2018
Potential Regional Recycled Water Program				
15493	Advanced Water Treatment Demonstration Plant	$15,000,000	Demonstration-Scale Recycled Water Treatment Plant	March 2017
Regulatory Compliance Program				
15385	CRA Discharge Containment	$19,800,000	CRA Wastewater System Replacement - Gene & Iron Mountain	August 2018
			CRA Wastewater System Replacement - Intake	August 2018
Right of Way & Infrastructure Protection Program				
15474	Right of Way and Infrastructure Protection	$71,200,000	Infrastructure Improvements for Los Angeles County Region	November 2021
			Infrastructure Improvements for Riverside/San Diego County Region	November 2019
			Infrastructure Improvements for Orange County Region	September 2017
			Infrastructure Improvements for Western San Bernardino County Region	March 2019
System Flexibility/Supply Reliability Program				
15402	Hayfield Groundwater Storage	$40,500,000	Lake Perris Seepage Water Conveyance Pipeline	June 2018
15488	Water Delivery System Improvements	$40,500,000	Greg Avenue Pump Station Rehabilitation	November 2017
Treatment Plant Reliability Program				
15369	Weymouth Improvements - FY2000/01 Through FY2005/06	$240,700,000	Weymouth Filter Valve Replacement	Phase I - August 2017 Phase II - May 2018
			Weymouth West Washwater Tank Seismic Upgrades	November 2017
			Basin Drop Gate Replacement	N/A
			Weymouth Structural Upgrades	December 2017
			Weymouth Administrative Building Seismic Retrofit	December 2017

TABLE 5-3 (Continued)
MAJOR PROJECTS UNDER DESIGN

Appropriation Number	Appropriation Title	Appropriation Estimate	Project Description	Estimated or Actual Completion Date for Final Design
15371	Jensen Improvements - FY2000/01 Through FY2005/06	$75,100,000	Jensen Tank Farm Chemical Containment	June 2018
			Jensen Modules Nos. 2 & 3 Traveling Bridge Repairs	February 2018
			Jensen Washwater Return Pump Modifications, Stage 2	December 2018
15380	Diemer Improvements	$238,000,000	Diemer East Basin Rehabilitation	September 2017
			Diemer Main Washwater Reclamation Plant	June 2019
			Diemer Filter Outlet Conduit Seismic Upgrades	August 2017
15381	Mills Improvements	$8,200,000	Mills Solids Removal Automation	December 2018
15436	Diemer Improvements - FY2006/07 Through FY2011/12	$79,500,000	Diemer Administration Building Seismic Upgrades	April 2018
			Diemer West Filter Valve Refurbishment	February 2018
			Diemer West Filter Building Seismic Upgrades	February 2018
			Diemer Water Sampling System Improvements	December 2020
			Diemer Chemical Feed System Improvements	June 2020
15440	Weymouth Improvements - FY2006/07 Through FY2011/12	$57,000,000	Weymouth Dry Polymer System Replacement	July 2019
			Weymouth Basins Nos. 5-8 Refurbishment	January 2019
15442	Jensen Improvements - FY2006/07 Through FY2011/12	$146,000,000	Jensen Modules Nos. 2 & 3 Flocculator Refurbishment	August 2018
			Jensen Electrical Upgrades, Stage 2	December 2018

TABLE 5-3 (Continued)
MAJOR PROJECTS UNDER DESIGN

Appropriation Number	Appropriation Title	Appropriation Estimate	Project Description	Estimated or Actual Completion Date for Final Design
15452	Mills Improvements - FY2006/07 Through FY2011/12	$27,500,000	Mills Electrical Improvements	August 2017
			Mills Inlet Flash Mix Chemical Containment	December 2017
			Mills Solid Removal Automation	December 2018
15477	Weymouth Improvements - FY2012/13 Through FY2017/18	$81,000,000	Weymouth Domestic Fire and Water System Improvements	October 2017
			Weymouth Chlorine System Upgrades	May 2019
			Weymouth Basin Inlet Gate Improvements	May 2022
			ODP Rehabilitation	February 2021
			East Washwater Tank Pump Replacement	December 2017
			Water Quality Instrumentation Improvements	April 2018
			Seismic Assessment for Buildings Nos. 30, 40, and 50	January 2019
			Weymouth Washwater Pump Station Improvements	July 2020
15478	Diemer Improvements - FY2012/13 Through FY2017/18	$10,400,000	Diemer Chemical Tank Farm Improvements	July 2020
15479	Mills Improvements - FY2012/13 Through FY2017/18	$36,500,000	Mills Finished Water Reservoir Improvements	June 2019
15486	Jensen Improvements - FY2012/13 Through FY2017/18	$16,300,000	Jensen Chemical Unloading Containment Upgrades	October 2016
			Jensen Finished Water Reservoir No. 1 Roof Refurbishment	April 2019
			Jensen Inlet Water Quality Instrumentation Enclosure	June 2019
			Jensen Filter Backwash Biological Control System	June 2018
			Jensen Fluoride Tank Replacement	November 2018
Water Quality/Oxidation Retrofit Program				
15472	Enhanced Bromate Control	$13,300,000	Mills Enhanced Bromate Control	June 2019

Following are highlights of Engineering Services' operation and maintenance activities during fiscal year 2016/17:

California WaterFix

Engineering Services provided direct support for the California WaterFix in collaboration with Metropolitan's Bay-Delta Initiatives office. Key activities during the fiscal year included: appearing before the State Water Resources Control Board to deliver testimony related to the California WaterFix program's Change of Point of Diversion hearings; continued participation in the Design and Construction Enterprise to provide program management leadership, including preparation of potential program budgets and schedules, while also conducting studies for the Department of Water Resources to answer questions related to comments on the program's Final Environmental Impact Report/Statement. Staff also met with state and federal resource agencies on the Biological Assessment and Final Biological Opinions as they relate to eventual design and construction of the program facilities, and met with stakeholders on the design and construction aspects of the program.

Infrastructure Protection

Engineering Services regularly monitors critical facilities including dams, reservoirs, pipelines and chemical 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 of over 100 miles of pipelines for corrosion by stray current interference; and maintaining cathodic protection systems throughout the distribution system.

Dam Safety

Engineering Services regularly performs inspection 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 23 dams permitted by the California Division of Safety of Dams; performed detailed field inspections of all dams, and submitted surveillance reports to DSOD; continued preparation of Emergency Action Plans, in anticipation of new legislation that will require specific features to be included in those plans; completed updating inundation maps for seven dams, and initiated updates for 16 other dams.

Seismic Resilience

Engineering Services has developed a proactive seismic resilience strategy with the goal of ensuring that Metropolitan continues water deliveries after a major seismic event. This approach involves regularly assessing the structural capacity of specific facilities and upgrading them as needed; evaluating the 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. Metropolitan also collaborated with the Los Angeles Department of Water and Power and the California Department of Water Resources to create a task force that addresses the unique vulnerabilities of the major imported water aqueducts crossing the San Andreas Fault, in order to improve the overall seismic resilience of imported water supplies to Southern California.

Cooperative Education Program

Engineering Services continued to offer summer and year-round student intern positions for the 15th 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. Seventeen students participated during FY 2016/17.

Technical Leadership

Engineering Services' staff continued participating in technical and professional organizations, including the publication of three technical papers and presentations at nine conferences. Staff continued active participation on committees of professional organizations including the American Water Works Association, American Society of Civil Engineers, American Public Works Association, American Concrete Institute, Greenbook Committee of Public Works Standards, Inc., International Society of Automation, Society for Mining, Metallurgy and Exploration, and Society of American Value Engineers.

Metropolitan acquired more than 20,000 acres in the Bay-Delta.

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

Bay-Delta

California WaterFix

Metropolitan supported efforts by the state Department of Water Resources in proceedings before the SWRCB (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.

Delta Wetlands Land Acquisition and Litigation

Legal Department attorneys assisted in negotiating and drafting the purchase and sale agreement for acquiring over 20,000 acres in the Sacramento-San Joaquin Delta. They also assisted in conducting pre-acquisition due diligence before escrow closed in July 2016.

Legal Department attorneys also have defended Metropolitan in four lawsuits over the purchase: three CEQA (California Environmental Quality Act) cases; and, one interference with contract case filed in three different courts. They successfully defeated requests for temporary restraining orders and a motion for preliminary injunction in the CEQA and interference with contract actions.

Metropolitan settled two of the CEQA cases on favorable terms. The remaining CEQA case is pending in San Joaquin County, where petitioners are preparing the record and have moved for permission to conduct discovery. In the interference with contract case, Metropolitan successfully moved to dismiss some claims in December 2016. In May 2017, the court tentatively granted MWD's motion to dismiss the remaining claims, with a final ruling expected in August.

State Water Project

SWP Contract Extension

Staff attorneys provided legal advice and support in connection with proposed amendments of Metropolitan's long-term SWP contract with DWR that would extend the duration of the contract and separately implement the California WaterFix and ancillary Delta projects.

Diversions

Working on behalf of Metropolitan and the State Water Contractors, Legal staff participated in SWRCB curtailment enforcement proceedings against Byron-Bethany Irrigation District and Westside Irrigation District and intervened along with SWC and other SWC member agencies in the subsequent cases in Contra Costa County Superior Court to protect Metropolitan interests in State Water Project stored water supplies. Staff participated in studies promoted by the Delta Watermaster to test water monitoring technology and studies to further scientific understanding of in-Delta water use. Legal staff also participated with General Manager staff in developing a Metropolitan study plan to investigate the water balance on Metropolitan's Delta islands properties.

Colorado River

Additional Conservation Agreements

Working with Reclamation, the Central Arizona Water Conservation District, Denver Water, the Southern Nevada Water Authority, the Upper Colorado River Commission, staff helped negotiate and draft 16 agreements with various water users throughout the Colorado River basin. These agreements 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.

Colorado River Drought Contingency Planning

Staff attorneys participated in negotiations with other Colorado River water users in California and the seven Colorado River Basin States regarding drought contingency plans, including negotiation of projects to increase Lake Mead and Lake Powell reservoir levels.

Legislation

Legal staff reviews and provides advice on a broad range of proposed legislation that may affect Metropolitan. As one example, in-house counsel assisted in drafting legislation introduced as AB 2488, to authorize the California Department of Fish and Wildlife to issue a permit to Metropolitan for incidental take of unarmored threespine stickleback, a fully protected fish species that may be impacted by Metropolitan operations and maintenance activities. AB 2488 was enacted in September 2016 and became effective January 1, 2017.

Drought Legislation

Metropolitan attorneys provided legal analyses of draft language for state and federal drought relief actions, including proposed federal drought relief legislation and state emergency drought regulations.

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. Attorneys provided legal advice to Water Quality staff in connection with an Emerging Constituents Task Force established by Santa Ana Regional Water Quality Control Board to study approaches for potential new regulation of trace chemicals in surface and groundwater supplies. The Legal Department assisted water quality staff in a stakeholder advisory process regarding the proposed remediation plan for chromium 6 groundwater contamination adjacent to the Colorado River at the Pacific Gas & Electric Topock compressor station site. Legal staff continued to monitor remediation of perchlorate and other contaminants at the Tronox site. Staff provided legal assistance to the Environmental Planning Team on analysis and comments on Army Corps of Engineers' Clean Water Act general permit and draft federal and state policies regulating wetlands and other waters subject to Clean Water Act jurisdiction.

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

Finance

In-house counsel, with special counsel, assisted in the closing of Metropolitan financial transactions totaling over $1.2 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. Legal developed and incorporated provisions into contracts for construction, procurement, and professional services, concerning prohibited relationships with sanctioned countries and persons. Legal staff also researched and recommended firms to assist with screening of Metropolitan's vendors against OFAC's list of Specially Designated Nationals and Blocked Persons List.

San Diego County Water Authority v. Metropolitan et al.

Legal staff represented Metropolitan in conjunction with outside counsel in litigation challenging the validity of Metropolitan's rates adopted in 2010, 2012, 2014, and 2016, and its charges adopted in 2016 and 2017. In the 2010 and 2012 cases, the San Diego County Water Authority alleged that Metropolitan's allocation of certain SWP costs and demand management program costs to transportation rates rather than supply rates is unlawful, and that Metropolitan's rates do not account for "dry year peaking." SDCWA also alleged breach of the Exchange Agreement entered into between Metropolitan and SDCWA as part of the QSA (Quantification Settlement Agreement) based on allegedly unlawful rates, miscalculation of member agencies' preferential rights to Metropolitan's water supplies, and that a Rate Structure Integrity clause used in certain contracts is unlawful.

The trial court ruled that 100 percent of the SWP and demand management costs in question could not be allocated to transportation rates and, based on that ruling, found that Metropolitan breached the price term in the Exchange Agreement. The court also ruled in SDCWA's favor

on the preferential rights claim. The court ruled in Metropolitan's favor on the "dry year peaking" and RSI clause claims. The court also limited SDCWA's attorneys' fee award to the amount Metropolitan asserted was proper. The judgments issued in the 2010 and 2012 cases were appealed by Metropolitan and nine member agencies supporting Metropolitan, and by SDCWA. The 2014 and 2016 cases have been stayed pending the outcome of the appeal, and the 2017 case is expected to be similarly stayed. In October 2016, the parties' appellate briefing concluded. Oral argument before the California Court of Appeal took place on May 10, 2017 and an appellate decision was issued on June 21, 2017.

The Court of Appeal ruled in Metropolitan's favor on the key issue of SWP costs. The court held that it is lawful for Metropolitan to recover its SWP transportation costs in the transportation rates charged under the Exchange Agreement with SDCWA and in its wheeling rate. The court held that the rates which include SWP costs—the System Access Rate and System Power Rate—comply with all asserted laws, including Proposition 26. The court further stated that the decision does not preclude inclusion of the Water Stewardship Rate (WSR), which recovers demand management costs, in the full-service rate. The court ruled that, based on the record, Metropolitan cannot include the WSR as a transportation cost in the agreement price or the wheeling rate. The court ruled that because the WSR was included in the agreement price, there was a breach. The court remanded the case to the trial court for a redetermination of damages in light of its WSR ruling. The appellate court held in SDCWA's favor on preferential rights, the RSI clause, prejudgment interest, and interpretation of the agreement's attorneys' fees clause. The court stated that on remand, the trial court is to review attorneys' fees to determine whether one party recovered greater relief than the other.

Litigation

Copper Pitting Cases

Metropolitan and other water agencies prevailed in a "legal issues trial" dealing with allegations that Metropolitan provided "aggressive and/or corrosive" water to its member agencies and the other defendant water agencies delivered "aggressive and/or corrosive" water to consumers which caused pinhole leaks in residential copper plumbing. The court ruled in the water agencies' favor on all key legal issues. Metropolitan was represented by in-house counsel. Some of the plaintiffs

appealed the trial court's decision. The appeal has been fully briefed, and the parties are waiting for the court to schedule oral argument.

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

Shimmick alleges it was damaged by Metropolitan's project changes, delays, disruption, and interference and that Metropolitan improperly withheld $2.5 million in liquidated damages from contract payments. The complaint seeks monetary and equitable relief in excess of $10 million, plus interest. Following unsuccessful settlement discussions, the parties have engaged in extensive discovery.

Metropolitan has produced roughly 100,300 documents and reviewed roughly 455,000 documents produced by Shimmick/Obayashi a joint venture. The trial in the case is scheduled for January 16, 2018. Metropolitan is represented by in-house counsel and special counsel.

Real Estate Matters

Palo Verde Irrigation District Land Holdings

Metropolitan attorneys assisted staff in negotiating renewals of two leases. Following the review of proposals submitted, Legal assisted staff in negotiating new agricultural leases, with provisions to reduce water use by 30 percent and to encourage innovative agricultural practices in the Palo Verde Valley.

In re Holy Hill Community Church (US Bankruptcy Court)

Legal defended Metropolitan real property management interests put at issue in a legal battle between different factions of a bankrupt church. The settlement, approved in 2017, provides for a short term lease of up to five years to a developer entity for the use of the upper floors of the Metropolitan-owned parking structure, with an option to purchase the entire property for $10,000,000. In addition, Metropolitan receives certain protections against any environmental clean-up costs and the dismissal of all litigation involving Metropolitan in this matter.

Pechanga Tribe Agreement

Metropolitan staff continued to work with Eastern Municipal Water District and Rancho California Water District to finalize modification of Metropolitan's service area boundaries to provide water to portions of the Pechanga Tribal Reservation in Riverside County. Congress approved the settlement agreement in December 2016 which was a precursor to completion of the related water delivery agreements. Staff continues to work with the parties to complete and implement the agreements.

Managing Energy Costs

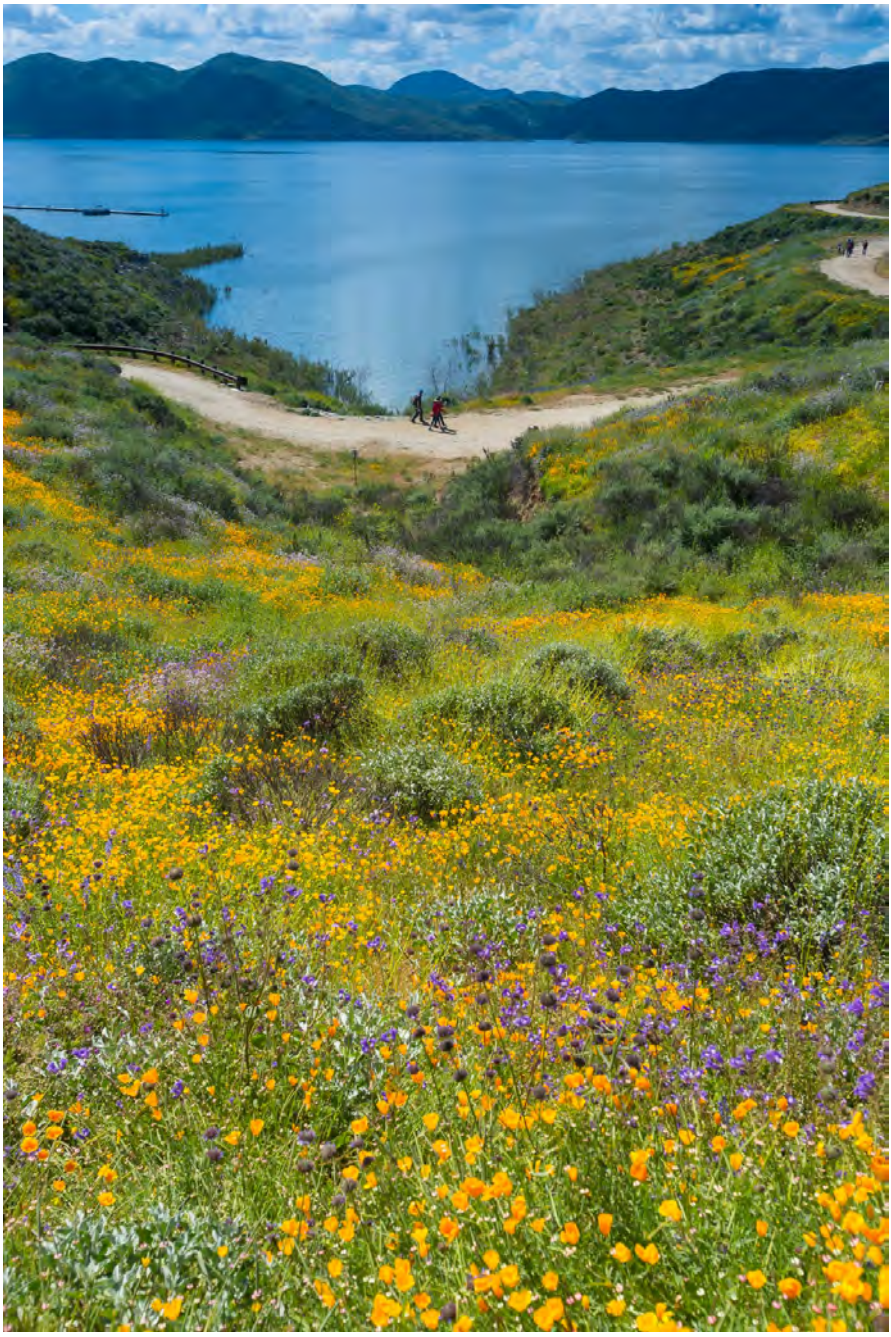
Metropolitan attorneys assisted staff in the negotiation and drafting of a new 50-year agreement with the Western Area Power Administration for Metropolitan's interconnection with WAPA at the Mead Substation. The use of WAPA's transmission facilities is necessary for Metropolitan to obtain its entitlement to energy and capacity from the Hoover Power Plant.

Workforce Matters

Following a jury verdict in Metropolitan's favor, which rejected a $7 million claim for damages based on allegations of religious discrimination and retaliation by a former employee terminated for misconduct, the trial judge on January 30, 2017, awarded Metropolitan $43,430 in costs against the plaintiff. This sum represents the expert fees incurred by Metropolitan after making a settlement offer pursuant to Code of Civil Procedure Section 998. Metropolitan was jointly represented by in-house and special counsel.

Public Records Act Requests

Legal staff coordinated Metropolitan's responses to over 165 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 bids, proposals, contracts and agreements, water quality data, water treatment, conservation-related rebates, data on uncashed checks, water supply, deliveries, sales and transfers, Metropolitan's land purchases and leases, staff compensation, benefits and expenses, history of Metropolitan's facilities, service area, easements and rights-of-way, and the proposed Bay Delta Conservation Plan/California WaterFix.



A replenished Diamond Valley Lake improved Southern California water supplies and provided a colorful landscape for recreational activities.

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's Board of Directors, management and employees; maintaining Metropolitan's strong financial position and high credit ratings; developing water rates and charges that are fair and equitable and generate sufficient revenues; assisting in the efficient management of Metropolitan's financial resources; and ensuring that adequate financial controls are in place to accurately record financial transactions, communicate financial results and protect Metropolitan assets.

Finance Department 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.

- Issuing debt to efficiently fund Metropolitan's Capital Investment Plan 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 2016/17 Major Financial Activities and Accomplishments

Security Sales/Debt Administration

Metropolitan maintained Standard & Poor's highest long-term water revenue bond rating of AAA, and the second highest credit rating for Moody's and Fitch of Aa1 and AA+ on its senior lien debt.

In August 2016 and September 2016 Metropolitan successfully repriced the 2009 Series A-2, the 2011 Series A-1 and A-3, SIFMA Index Notes, and the 2013 Series E Flexible Index Notes. The SIFMA notes were repriced at rates that ranged from the SIFMA index plus 12

to plus 16 basis points. SIFMA stands for Securities Industry and Financial Markets Association.

In September 2016, Metropolitan issued $103.6 million Special Variable Rate Water Revenue Refunding Bonds, 2016 Series A1 and A2 to refund a series of variable rate bonds and notes. The refunding is projected to provide approximately $3.1 million in total debt service savings.

In December 2016, Metropolitan issued $175 million Subordinate Water Revenue Bonds, 2016 Authorization Series A (Taxable), to reimburse the purchase of lands from Delta Wetlands Properties. These were the first series of bonds issued under Metropolitan's new Master Subordinate Resolution, adopted by the board in March 2016.

In March 2017, Metropolitan issued $80 million Water Revenue Bonds, 2017 Authorization Series A, to fund a portion of Metropolitan's capital expenditures.

In April 2017 Metropolitan issued $125 million Taxable Flexible Rate Refunding Note, Series A-1 and $125 million Index Notes (Taxable and Refunding), Subseries B-1, to refund notes issued in April 2016. The proceeds of the original note financings were used to replenish financial reserves, after set-aside funds were transferred to fund the Exchange Agreement Set-aside Fund related to the San Diego County Water Authority litigation.

In June 2017 Metropolitan issued $238 million Subordinate Water Revenue Refunding Bonds, 2017 Series A to refund several series of fixed and variable rate bonds and a State of California Revolving Fund loan. The refunding is projected to provide $21.8 million in debt service savings.

In June 2017 Metropolitan issued $12 million Tax Exempt Flexible Rate Revolving Notes, Series 2017 B-1 to partially refund a series of fixed rate bonds. The notes were anticipated to be refunded by bonds issued in July 2017.

Treasury Operations

- Successfully managed Short Term and Bond Reserve portfolios averaging $869.8 million, complying with the state Government Code and Metropolitan's Statement of Investment Policy.
- Earned total returns of 0.90, -1.91, and -0.13 percent respectively for the Core, Bond Reserve, and Long-Term portfolios.
- Monitored performance by the external managers of the $344.5 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 fiscal year 2016/17.
- Managed debt service, which includes the calculation and coordination of approximately $333.7 million in debt service and swap payments.
- 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 2015/16 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.
- Maintained the 90-day past-due amounts on non-DWR accounts receivable to below $600,000.
- Continued the documentation and testing of internal controls over financial reporting, concluding that the controls were effective for the fiscal year ending June 30, 2016.

- Received the Award of Excellence from the Government Finance Officers Association for FY 2015/16 for financial reporting.

Budget and Financial Planning

- Implemented Metropolitan's biennial budget and water rates and charges for FY 2016/17.
- Prepared financial analyses to evaluate the financial impacts of the Regional Recycled Water Program.
- Coordinated a member agency workgroup and prepared analyses to support and implement a potential Treatment Fixed Charge and policy principles.
- Worked with the Legal Department to maintain Metropolitan's ad valorem property tax assessment at the FY 2014/15 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

- Enhanced the Business Continuity Management software (Fusion) to capture better information during the Business Impact Analysis and align with industry best practices; enhanced the business continuity plan template to be more comprehensive and produce an actionable and easy-to-follow outline of steps to be taken to resume critical operations.
- Created a SharePoint site to serve as a resource for the business continuity coordinators, providing a cloud-based secure environment to serve as a one-stop repository for training resources, collaboration, FAQ's, schedules for various business continuity activities and more.
- Conducted business continuity tabletop exercises for all plans to create awareness and set the foundation for plan updates in cooperation with leadership and other key personnel.

Risk Management

- Completed incident reports involving Metropolitan property damage, liability issues, workplace injuries, regulatory visits, criminal activity and spills; 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 also provided feedback into the claims settlement and litigation process with the Legal Department; 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 water sales, which include all revenues received by Metropolitan from charges for the sale and availability of water, including Metropolitan's water rates, readiness-to-serve charge and capacity charge. Other sources of revenue include property taxes, investment income and power sales. Water rates and charges are established by the board of directors on a biennial basis 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, 2017, 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 $666 per acre-foot for untreated water. Likewise, the full service Tier 2 rate of $760 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 4.0 percent effective January 1, 2017.

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 2016/17 totaled $1.484 billion. Sources of revenues include water sales, readiness-to-serve charges, capacity charges, power sales, property taxes, investment income and other income, such as rents. Total revenues were $27 million lower than the prior fiscal year, primarily due to lower water sales.

TABLE 7-1
WATER SALES RATE STRUCTURE-CURRENT

(Dollars per acre-foot-unless otherwise specified)

	Calendar Year[1]									
	2017	2016	2015	2014	2013	2012	2011	2010	2009	2008
Tier 1 Supply Rate	$ 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	290	290	290	290	290	280	280	250	171
Water Supply Surcharge	--	--	--	--	--	--	--	--	25	--
System Access Rate	289	259	257	243	223	217	204	154	143	143
Water Stewardship Rate	52	41	41	41	41	43	41	41	25	25
System Power Rate	124	138	126	161	189	136	127	119	110	110
Full Service Untreated:										
Tier 1	666	594	582	593	593	560	527	484	412	351
Tier 2	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	313	348	341	297	254	234	217	217	167	157
Full Service Treated:										
Tier 1	979	942	923	890	847	794	744	701	579	508
Tier 2	1,073	1,076	1,055	1,032	997	920	869	811	695	606
Capacity Charge ($ per cubic foot second)	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)	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,		
	2017	**2016**	**Change**
Water sales	$ 1,151	$ 1,166	$ (15)
Capacity Charge [1]	40	45	(5)
Readiness-To-Serve Charge	144	156	(12)
Power Sales [2]	21	7	14
Taxes (Net)	115	108	7
Investment Income (loss)	6	19	(13)
Other	7	10	(3)
Total	**$ 1,484**	**$ 1,511**	$ (27)

[1] Previously reported as part of water sales.

[2] Previously referred to as power recoveries or hydroelectric power sales.

Expenses

Metropolitan continued its efforts to manage finances, control costs, enhance productivity, pay for 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 supplies from the State Water Project.

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 2016/17 and the preceding nine years, while Table 7-7 shows property tax levies and collections. Revenue bond debt service is funded from water sales 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.

Fiscal year expenses totaled $1.410 billion. Expenses include power and water costs, operations and maintenance costs, depreciation and amortization, and interest on debt obligations. Total expenses were $301 million less than the prior year, mainly due to $97 million in lower power and water costs, and $162 million less in operations and maintenance costs associated with funding conservation incentives.

TABLE 7-3
EXPENSES
(Dollars in Millions)

	Year Ended June 30,		
	2017	**2016**	**Change**
Power and Water Costs	$ 455	$ 552	$ (97)
Operations and Maintenance	488	650	(162)
Depreciation and Amortization	302	377	(75)
Bond Interest	135	127	8
Other	30	5	25
Total	**$ 1,410**	**$ 1,711**	**$ (301)**

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 2016/17 and 2017/18 was presented to and discussed by the board during February and March 2016, and approved in April 2016.

The biennial budget process begins in July of odd-numbered years (e.g., July 2015 for the FY 2016/17 and FY 2017/18 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 a 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 of Directors at the midpoint of the two-year period.

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 can also 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 approximately $1.2 billion during fiscal year 2016/17, with cash basis investment earnings of approximately $15.4 million. As of June 30, 2017, the market value of Metropolitan's investment portfolio was approximately $1.4 billion.

TABLE 7-4

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

(Dollars in Millions)

	Fiscal Year Ended June 30,									
	2017	2016	2015 [2] As Adjusted	2014	2013	2012 [3] As Adjusted	2011 [3] As Adjusted	2010	2009 [4] As Adjusted	2008
Water sales	$ 1,150.5	$ 1,166.0	$ 1,382.9	$ 1,484.7	$ 1,282.5	$ 1,123.3	$ 1,001.0	$ 1,010.9	$ 999.5	$ 958.7
Readiness-to-serve charges	144.0	155.5	162.0	154.0	144.0	135.5	119.5	103.0	87.0	82.1
Capacity charge	39.7	44.7	37.5	28.4	28.7	33.0	34.4	33.4	32.6	32.6
Power recoveries	20.9	7.5	8.4	14.6	24.5	31.5	22.9	18.3	17.4	23.1
Operating revenues	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	1,096.5
Taxes, net	115.4	107.9	102.3	94.5	94.8	79.2	79.3	98.1	105.6	98.7
Investment income	6.2	19.4	(3.6)	5.7	(0.4)	4.1	2.0	40.6	27.3	65.9
Other, net	7.3	10.2	5.4	-	6.1	0.6	22.0	6.4	6.0	2.9
Nonoperating revenues	128.9	137.5	104.1	100.2	100.5	83.9	103.3	145.1	138.9	167.5
Total revenues	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	1,264.0
Power and water costs	(455.4)	(552.3)	(473.6)	(510.1)	(371.3)	(384.0)	(364.8)	(433.7)	(402.1)	(350.3)
Operations and maintenance	(487.5)	(650.1)	(543.4)	(439.7)	(419.8)	(433.5)	(394.9)	(395.6)	(440.0)	(405.0)
Depreciation and amortization	(301.7)	(376.5)	(374.8)	(261.5)	(265.4)	(290.1)	(286.4)	(246.4)	(226.1)	(228.9)
Operating expenses	(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)	(984.2)
Bond interest	(134.6)	(126.9)	(132.5)	(146.7)	(150.2)	(135.8)	(135.7)	(133.3)	(103.4)	(120.0)
Interest and adjustments on OAPF [5]	(0.6)	(0.8)	(1.2)	(1.6)	(2.1)	(2.6)	(3.0)	(3.4)	(3.8)	(4.1)
Other, net	(30.3)	(4.6)	-	(23.7)						
Nonoperating expenses	(165.5)	(132.3)	(133.7)	(172.0)	(152.3)	(138.4)	(138.7)	(136.7)	(107.2)	(124.1)
Total expenses	(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)	(1,108.3)
Contributed capital	-	2.1	2.3	2.2	1.7	13.6	17.7	4.6	66.1	15.6
Cumulative effect of change in accounting principle	-		(491.0)				(8.2)		0.5	
Change in net position	$ 73.9	$ (197.9)	$ (319.3)	$ 400.8	$ 373.1	$ 174.8	$ 105.8	$ 102.9	$ 166.6	$ 171.3

[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. 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 2008 through 2014 have not been adjusted.

[3] 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 2008 through 2010 have not been adjusted.

[4] 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.

[5] Off-Aqueduct Power Facilities.

TABLE 7-5
TEN MEMBER AGENCIES WITH LARGEST ASSESSED VALUATIONS
YEAR ENDED JUNE 30, 2017
(Dollars in Billions)

Member Agency	Assessed Valuation	*Percent of Total
Los Angeles	$ 523.4	20.26
San Diego County Water Authority	451.9	17.49
MWD of Orange County	441.4	17.09
West Basin MWD	176.2	6.82
Central Basin MWD	133.0	5.15
Inland Empire Utilities Agency	97.8	3.79
Calleguas MWD	94.7	3.67
Upper San Gabriel Valley MWD	93.8	3.63
Western MWD	93.5	3.62
Eastern MWD	69.6	2.69
	$2,175.3	**84.20**
Total Gross Assessed Valuation (All 26 Member Agencies)	**$2,583.4**	

* 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
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
2008	2,015.4	17.1	1,998.3	0.0045

[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]				
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 [3]	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
2008	107,059	87,670	11,224	98,894	12,951	81.9	92.4	12.1

[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,									
	2017	2016	2015	2014	2013	2012	2011	2010	2009	2008
Water Sales [2]	$ 1,151	$ 1,166	$ 1,383	$ 1,485	$ 1,283	$ 1,062	$ 996	$ 1,011	$ 988	$ 968
Additional Revenues [2]	184	200	199	182	173	168	153	135	120	114
Total Revenues	1,335	1,366	1,582	1,667	1,456	1,230	1,149	1,146	1,108	1,082
Operating Expenses	(927)	(1,201)	(1,005)	(854)	(793)	(792)	(853)	(825)	(782)	(792)
Net Operating Revenues	408	165	577	813	663	438	296	321	326	290
Hydroelectric Power Revenue & Other	39	30	29	34	48	87	96	52	43	48
Transfer from Reserve Funds	33	222	142	-	-	-	-	-	-	-
Interest on Investments [3]	4	18	13	19	(2)	11	17	19	32	46
Adjusted Net Operating Revenues	484	435	761	866	709	536	409	392	401	384
Bonds and Additional Bonds Debt Service	(306)	(309)	(280)	(343)	(298)	(297)	(277)	(244)	(223)	(219)
Subordinate Revenue Obligations	(2)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)
Funds Available from Operations	$ 176	$ 125	$ 480	$ 522	$ 410	$ 238	$ 131	$ 147	$ 177	$ 164
Ratios										
Bonds and Additional Bonds Debt Service Coverage	1.58	1.41	2.72	2.52	2.38	1.81	1.48	1.61	1.80	1.76
Debt Service Coverage on all Obligations	1.57	1.41	2.71	2.51	2.37	1.80	1.47	1.60	1.79	1.75

[1] Prepared on a modified accrual basis for fiscal years 2013-2017 and on a cash basis for fiscal years 2008-2012.

[2] Fiscal years 2008-2011 restated to include exchange sales in Water Sales. 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.

Minor differences are due to rounding.

TABLE 7-9
TEN LARGEST WATER CUSTOMERS
Year Ended June 30, 2017
Accrual Basis (Dollars In Millions)

Agency		Water Sales and Exchanges	* Percent of Total	Water Sales and Exchanges in Acre-Feet	* Percent of Total
San Diego CWA	$	223.9	19.5%	377,327	24.5%
City of Los Angeles		159.5	13.9%	216,319	14.0%
MWD of Orange County		148.8	12.9%	181,428	11.8%
West Basin MWD		105.5	9.2%	109,896	7.1%
Calleguas MWD		83.6	7.3%	87,293	5.7%
Eastern MWD		79.1	6.9%	101,284	6.6%
Western MWD of Riverside		54.6	4.7%	65,054	4.2%
Three Valleys MWD Central		52.3	4.5%	66,235	4.3%
Basin MWD		37.2	3.2%	51,196	3.3%
Inland Empire Utilities Agency		29.9	2.6%	47,848	3.1%
Total	**$**	**974.4**	**84.7%**	**1,303,880**	**84.6%**
Total Revenue	**$**	**1,150.5**	**Total Acre-Feet**	**1,540,915**	

* Total may not foot due to rounding.

IT introduced the idea of supporting Metropolitan operations via unmanned aerial vehicles, such as the drone seen in this simulated montage.

CHAPTER 8

Information Technology-Administration

This fiscal year, the former Business Technology Group was reorganized into the Information Technology Group, with administrative services and annexation administration reporting directly to the Chief Administrative Officer, along with environmental planning, which was formerly part of Engineering Services.

Information Technology

The IT Group delivers technology options, services and solutions for enterprise and business applications, mobile/wireless computing, control systems, telecommunications, network services and cyber/information security.

IT Strategic Plan Update

Staff continued implementing initiatives outlined in the IT Strategic Plan optimizing water system operations, improving asset management, streamlining business operations and managing costs.

Highlights for Fiscal Year 2016/17

- Completed the Emergency Response Two-Way Radio Project.
- Initiated deployment of a new phone system.
- Completed 95 percent of the design phase to replace and upgrade the control and electrical protection systems at the Wadsworth Pumping Plant.
- Completed a systemwide hydraulic model to assist with rehabilitation of the pre-stressed concrete cylinder pipe portions of the Second Lower Feeder.

- Obtained board authorization and appropriated $1.54 million to upgrade Metropolitan's cybersecurity capabilities.
- Introduced the use of unmanned aerial vehicles (drones) to support Metropolitan operations, such as the 2017 Solar Cup.
- Implemented Skype for Business for online meetings and conferences.
- Remediated business and security risks associated with 350 computers that were running on older, less-secure operating systems.
- Redesigned bewaterwise.com to be mobile-friendly.
- Implemented a project management enhancement program, which included an extensive training component.

Administrative Services

The Administrative Services Section focuses on business process sustainability and achieving cost reductions and efficiencies. These include contracting services, warehousing, procurement of goods and nonprofessional services, inventory management, Rideshare Program and Spring Green Expo events.

Spring Green Expo

Metropolitan hosted the 10th Annual Spring Green Expo and ECO Innovators Showcase college competition for staff, member agencies and the surrounding community. This year's event showcased over 30 sustainability concept projects designed by nearly 100 students, representing 15 Southern California universities and colleges in Riverside, San Bernardino, San Luis Obispo, San Diego, Orange and Los Angeles counties.

Highlights for Fiscal Year 2016/17

- Enhanced the leave request electronic form, enabling approvals via mobile devices and expanding use of mobile technology to increase productivity.
- Initiated an information enterprise content management system, with information policies and procedures to be

developed in partnership with Information Technology and other Metropolitan business groups.

- Improved online access to warehouse inventory utilizing web-based shopping, with “MyWarehouse” providing an overview of available items throughout Metropolitan’s warehouses.

Annexations

Metropolitan processes member agency requests involving annexation into its service area. One annexation totaling approximately 8.3 acres was completed this year, while four annexation requests are pending completion. One pending annexation has the potential to increase Metropolitan’s service area by approximately 460 acres.

Environmental Planning

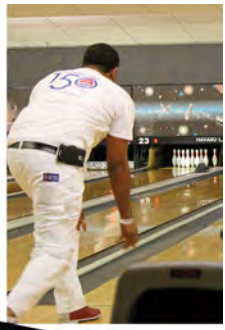
The Environmental Planning Section provides specialized services for Water System Operations, Water Resources Management, Engineering Services, Real Property, and External Affairs. These services include CEQA (California Environmental Quality Act) compliance, regulatory clearance, construction monitoring, environmental training, reserve management, sustainability planning, and environmental technical support to Metropolitan, members, and outside agencies.

Highlights for Fiscal Year 2016/17

- Completed CEQA documentation, including two Programmatic Environmental Impact Reports; prepared multiple addenda to previously-certified EIRs; and filed 45 Notices of Exemption.
- Provided planning support, CEQA and/or regulatory compliance for 143 engineering projects and 106 operations and maintenance projects.
- Provided CEQA clearance for 204 board letters.
- Reviewed and submitted comment letters on 236 external projects with the potential to impact Metropolitan facilities or water supply.

- Procured Clean Water Act, state and federal endangered species acts, and Fish and Game Code permits for two capital and five O&M projects.
- Obtained emergency permits to repair roads damaged by heavy winter rains.
- Participated in 30 legislative actions impacting Metropolitan's interests in environmental regulatory proposals on climate change, endangered species, wetlands, and CEQA.
- Advocated and provided technical expertise on a legislative solution that allows the issuance of a permit to handle and rescue the endangered unarmored threespine stickleback during shutdown, inspection, and maintenance of the Foothill Feeder, culminating in the successful passage of Assembly Bill 2488.
- Participated in print and radio interviews, and collaborated with External Affairs on the award-winning brochure "Leaders in Environmental Stewardship."

During 2016/17, a blue grosbeak made a rare visit to DVL East Recreation Basin (top) while endangered bighorn sheep were spotted at Hinds Pumping Plant.



Employee Appreciation 2016

Employee Appreciation events were held throughout Metropolitan during fiscal year 2016/17.

CHAPTER 9

Human Resources

The Human Resources Group maintained its focus on effective people management, while building strong partnerships with management on selecting, engaging, motivating, developing and valuing staff accomplishments. Employee development, a strategic priority of the General Manager, focused on preparing the workforce to meet current and future business needs. Work continued on updating HR systems, policies and processes to meet changing compliance requirements, and to further improve the delivery of Human Resources services.

Major Activities and Accomplishments

HR continued to emphasize the importance of effective leadership in engaging and motivating the workforce, complying with laws and regulations and consistently delivering cost-effective HR services. It expanded recruitment outreach to fill job openings with diverse and capable talent, and increased talent development opportunities throughout the organization. HR met monthly with group managers to identify areas of needed support, and worked closely with management on the effective deployment of initiatives and early resolution of issues.

The General Manager launched an annual Employee Appreciation Day event during fall 2016. These events were designed and organized by employee committees at each of Metropolitan's facilities, supported by HR. The events successfully recognized the contributions of employees and their commitment to Metropolitan, and provided an opportunity for employees to interact with each other and have fun.

Strategic Priority: Employee Development

HR implemented several initiatives to support the General Manager's strategic priority of Employee Development and ensure that Metropolitan is prepared for continuing retirements, which this year reached a record total of 108.

HR staff provided the board and management with workforce analytics to facilitate planning for pending workforce retirements and expanded diversity outreach efforts. This year, minority representation in the workforce grew to 51 percent. Staff also participated in regional workforce development committees and met with universities and colleges to help align the educational curriculum with Metropolitan business needs.

All groups are addressing the loss of talent – primarily due to retirements. HR staff continued efforts with management to ensure talent is available to fill critical positions. HR expanded internal staff development and training opportunities and worked with local management to identify and assess skill gaps, and facilitated various leadership and management development workshops and succession planning. Staff also supported internship and mentoring programs, and expanded use of job rotations and cross-functional training opportunities throughout Metropolitan.

Organizational Development and Training

Management development programs were expanded to address the needs of different levels of management. For employees aspiring to become managers, Management Academies have been established to introduce them to managerial roles and responsibilities. Metropolitan Management University, a new six-day management development program, is mandatory for all new managers and strongly encouraged for existing managers. Instruction is provided by staff, in-house experts and expert consultants on effectively leading, engaging and motivating employees. To date, 60 percent of team managers have completed MMU, while 15 unit managers have completed a more advanced version of the program.

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 Group's Development Camp for its Chemistry Unit; and a Leading Technical People program for managers in various groups.

Training curriculum focused on subjects such as: improved teamwork and collaboration, communication and business writing, effective performance conversations, conflict resolution, project management, problem-solving, plus basic and advanced Microsoft Office skills. Staff expanded online and mobile learning offerings to provide all employees and managers 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 60 new employees.

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.

Eighty-four percent of managers completed mandatory drug and alcohol reasonable-suspicion training, 93 percent of Metropolitan's non-management employees completed drug and alcohol awareness training and 93 percent of employees completed personal security awareness training.

Metropolitan's tuition reimbursement program had 116 participants and 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 Water Leadership and Management by partnering with the California State University campuses at Los Angeles and San Luis Obispo, and the Augmented Leader programs from Rady School of Management at the University of California, San Diego.

Sixty 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, HR provided more than 240 managers opportunities to attend presentations on management topics including leadership development, persuasive communication, executive decision-making, business-case writing, collaborative management, and overseeing technical staff. HR also arranged for workshops on legal aspects of managing people and performance and partnered with the Ethics Office to provide ethics training to the Board of Directors. Eight external coaches provided internal coaching and consultations for managers on issues ranging from transition management and personal development to succession planning.

Performance Management

The MyPerformance Evaluation process completed its sixth year of providing a year-round performance planning process that sets clear expectations for work products, goals and performance factors for both employees and managers. It is aligned with Metropolitan business

planning cycles and fosters continuing performance conversations and progress checks throughout the year.

HR also facilitated the Department Head Performance Evaluations of executive staff who report directly to the board. In July 2016, 83 percent of the board participated by providing direct feedback about strategic and operational leadership, board relationships and business results during the previous fiscal year. The Home Committees for each department head conducted progress checks on follow-up actions.

Recruitment and Classification/Compensation

More than 24,000 people submitted resumes for job openings during fiscal 2016/2017 and 194 regular and part-time positions were filled – almost three times the number filled in the previous year. HR processed 850 applicants and placed 34 new Pre-Apprentices into Metropolitan's Apprenticeship Program, while supporting student intern recruiting for the Real Property, Business Technology, and Water Resource Management and Water System Operations groups. Equal Employment Opportunity staff participated in several job fairs and outreach efforts to promote the hiring of military veterans and individuals with disabilities.

Staff continued to optimize technologies such as Skype for remote interviews, and eSkill online pre-employment skills-testing for some entry-level positions. Staff completed contracting for a new automated recruitment tracking system providing for improved communication and coordination between job candidates and hiring managers. At the start of each recruitment, HR held strategic partnership meetings with hiring managers to speed the recruitment of each position.

Classification staff validated the merits of more than 100 job promotional 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 a market salary survey on department heads and other positions based on various salary surveys.

Benefits

Staff updated PeopleSoft to maintain compliance of benefits programs and coordinated with Metropolitan's deferred compensation third-party record-keeper, TIAA Financial Services. To assess participant satisfaction with the services provided by TIAA 401(k) / 457(b) support, focus groups

and a satisfaction feedback survey was sent to all 2,700 employee and retiree plan active participants, with 43 percent submitting their feedback. Staff worked with TIAA to enhance the Self-Directed Brokerage platform and TIAA website user-friendliness and key features.

Benefits staff conducted open enrollment for all employees and met in one-on-one sessions with 685 employees. Staff sent benefits confirmation letters and provided data to CalPERS for an audit of member earnings and enrollments. A Patient Care Advocacy program assisted employees with medical referrals, pre-authorizations and claim issues. Benefits also sent every employee a 2016 Total Compensation Statement to convey the value of benefits and salary provided by Metropolitan. Staff partnered with in-house technical staff to provide 2016 IRS-mandated 1095-C forms to all employees and complete the new 1094-C employer report, both in connection with the Affordable Care Act.

To meet fiduciary responsibilities, Benefits hosted instructor-led workshops and webcasts available to all employees on financial planning, budgeting, the new fund lineup, investment basics, pre-retirement and retirement issues at various Metropolitan locations. More than 350 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. In addition, a new class, "Your Survivor Benefits and Beneficiary Designation" was launched at the Gene desert facility to address issues for which surviving family members may need to plan ahead.

Staff coordinated with Payroll and Information Technology to respond and close a CalPERS Audit. Two semi-annual Service Awards Program luncheons with executive management and board members recognized more than 123 employees with 20 to 35 years of service.

A new Wellness program has been developed, with implementation set to begin in 2018.

Employee Relations/Equal Employment Opportunity Program

The Employee Relations Section successfully negotiated two five-year memoranda of understanding with the Management and Professional Employees Association and the Association of Confidential Employees. Negotiations continued on a successor MOU with the remaining two bargaining units. Staff responded to all grievances within the prescribed timeframes and worked collaboratively with the bargaining units,

whenever possible, to resolve grievances. Staff was also involved in a number of single-item negotiations, primarily over new or revised job descriptions. The Employee Relations Section also continued to partner with Legal on unfair labor practice charges, hearing officer appeals and employment litigation.

Equal Employment Opportunity staff conducted 10 investigations and 21 informal investigations of unlawful discrimination allegations within the timeframes prescribed by Metropolitan procedures. EEO Investigations staff also worked successfully with outside agencies, such as the State Department of Fair Employment and Housing, to resolve complaints filed against Metropolitan with those offices.

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

Metropolitan's Affirmative Action program for protected veterans and individuals with disabilities was updated along with the Nondiscrimination Program for women and minorities. Staff also conducted a workforce self-identification survey on the revised race/ethnicity categories to comply with reporting requirements. Staff partnered with internal volunteer-led employee resource groups to plan expanded outreach opportunities.

Outreach and inclusion efforts included the launching of a new employee resource group, Women at Metropolitan, and continued partnership with Women in Non Traditional Roles, Inc. to provide opportunities for women in the skilled trades. New outreach partnerships and events included a successful veterans job fair at Union Station Headquarters, where Metropolitan also participated in a Veterans Breakfast and Apprenticeship event. Discussions with management groups addressed their responsibilities to provide reasonable accommodations for disabilities.

Staff presented semi-annual reports on EEO and Affirmative Action to the Organization, Personnel and Technology Committee, including an assessment of organizational diversity. A 98 percent completion rate was achieved on mandatory EEO workforce training.

Staff attended the annual CALPELRA (California Public Employees Labor Relations Association) conference which provides legal and legislative updates, as well as topical discussions on various employee relations issues. The Human Resources group manager participated in the

ACWA (Association of California Water Agencies) conference on Defining the Modern Workplace: When Generational Diversity Takes Shape.

Workers' Compensation and Medical Screening

Staff reduced outstanding funding reserves (based on outstanding reserves-per-claim) by 11.7 percent and total workers' compensation payments by 4.6 percent during fiscal year 2016/17. 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

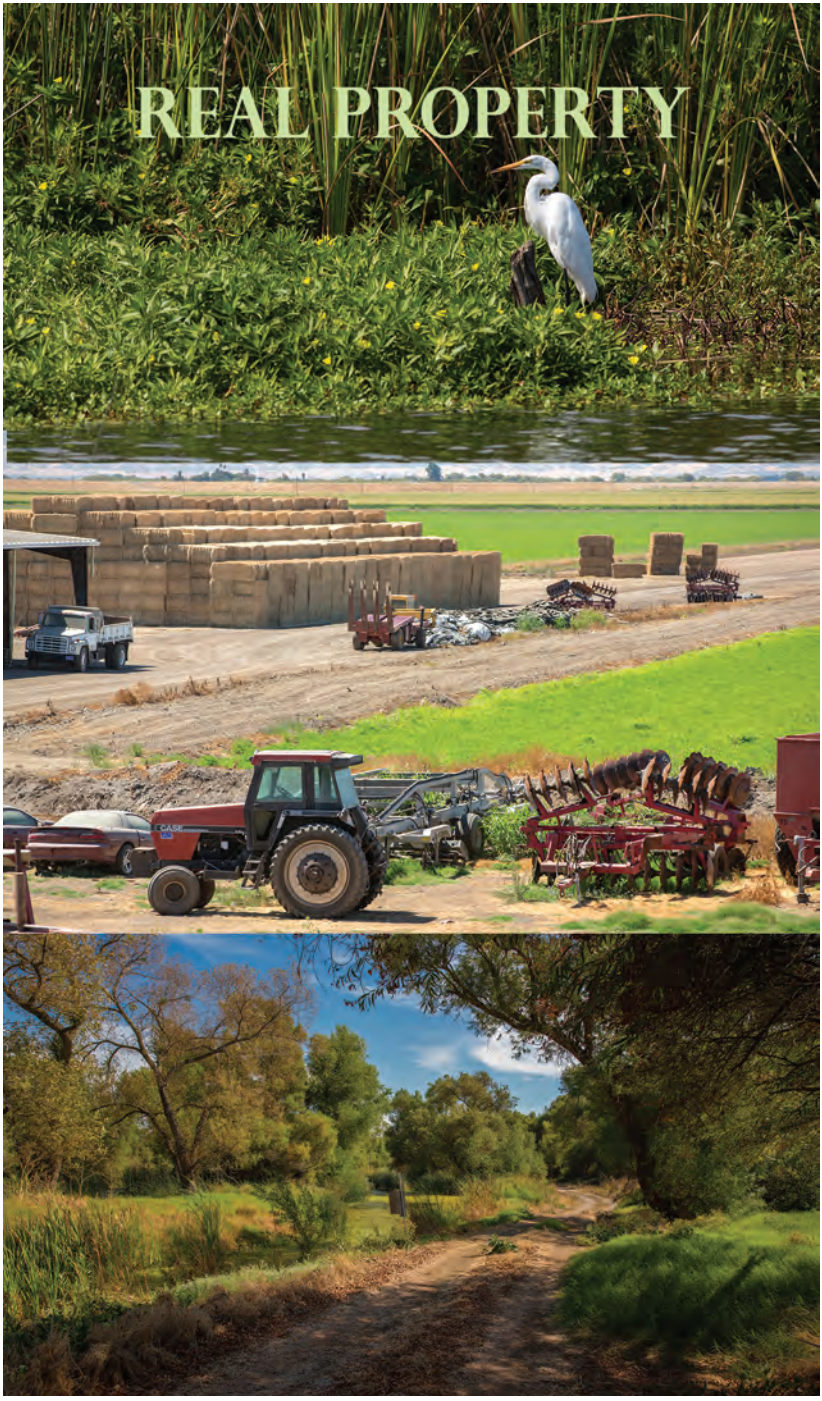
Staff updated HR systems to comply with changes required by new tax laws, MOU agreements, the Affordable Care Act and other technical and security requirements. This entailed creating new benefits structures, leave plans, and records to ensure compliance. Staff also implemented a classification/compensation database to streamline the process and new database to assist with COBRA compliance and administration.

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.

Staff worked to transition Metropolitan's "Reverse 9-1-1" communication system to the Office of the CFO. This is a critical system that can be used to communicate with the workforce during emergencies.

Going Forward

Organizations are continuing to face the challenges fostering an engaged and motivated workforce, competing for talent, adapting to a multi-generational workforce, integrating changing technologies and maintaining compliance with changing requirements. Human Resources continues spearheading efforts to ensure that Metropolitan is prepared to meet future business challenges.


REAL PROPERTY

CHAPTER 10

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 operates under the leadership of 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 2016/17, the group worked to achieve 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, appraisals and acquisition 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; conducting complex and detailed property negotiations; and providing relocation assistance services when necessary.

Accomplishments for Fiscal Year 2016/17

- Completed the strategic purchase of four islands in the Sacramento-San Joaquin Delta and a portion of Chipps Island in the Suisun Marsh region, a 20,400-acre investment with

multiple potential values consistent with California's goals of ecosystem restoration and water supply reliability.

- Executed 26 permanent and temporary easements, fallowing easements, entry permits, licenses, consent letters, settlement and release of claims agreements, and leases in pipeline repair and rehabilitation projects including Santa Monica Feeder Pipeline Repair, Rialto Pipeline, San Diego Pipeline No. 3, the Orange County Feeder Relining Project, Calabasas Feeder, Allen-McColloch Pipeline, and the Santa Ana River Bridge Bellows Expansion Joint Replacement.
- Completed review of four independent appraisals for the lease of temporary construction staging areas for the Etiwanda Pipeline North Liner Repair Project; reviewed two easement appraisals for access for the Allen-McColloch Pipeline in Orange County.
- Evaluated proposed alternative alignment options and prepared a study recommending the Preferred Alternative Alignment for the Regional Recycled Water Supply Program.

Property Management

The Property Management Unit ensures that Metropolitan's real property assets and rights are protected, working in conjunction with internal stakeholders and external law enforcement as required. In addition, via secondary land uses, 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 2016/17, Metropolitan generated over $7.2 million in related revenue.

Property Management Accomplishments

- Executed 63 transactions, including secondary use requests; access permits, letters of consent, telecommunication uses, filming permits and infrastructure permits and easements.
- Executed six farm-lease agreements for approximately 22,000 acres within Palo Verde Irrigation District to support Metropolitan's fallowing program and promote agricultural

water use efficiency and innovation, generating approximately $3.5 million per year.

- Executed a lease with Semitropic Water Storage District on Metropolitan-owned islands with anticipated annual revenue of $1 million.
- Collected $1.6 million in revenue from the leases at the Headquarters building.
- Sold 2.75 acres of surplus property near the Inland Feeder Pipeline for $130,000.
- Successfully amended the Sacramento office lease to include two 5-year options, four new offices and six cubicle spaces, four months free rent, and $118,000 of tenant improvements.
- Negotiated a settlement agreement for the Metropolitan-owned parking structure at the Sunset Garage, which provided for a lease with an option to purchase through July 5, 2022 and a release from certain litigation.

Facility Management

The Facility Management Unit is responsible for maintaining and operating the Headquarters building and the Diamond Valley Lake Visitors Center in an energy efficient and sustainable manner. Staff responsibilities include testing and maintenance of all mechanical, electrical and life safety systems.

Headquarters

- Performed annual Energy Star audit resulting in an overall rating of 97 out of 100 possible points.
- Completed over 2,000 preventive maintenance tasks to building equipment including the central air-conditioning system, certification and testing of the fire life safety system, and emergency power system.
- Upgraded the building, courtyard fountain, and landscape lighting systems to energy efficient LED fixtures resulting in increased lighting performance and lower maintenance costs.

- Coordinated and completed over 200 employee moves and office reconfigurations creating employee collaboration areas.
- Partnered with Contracting Services to select a vendor for janitorial services.
- Installed hands-free paper towel dispensers and eliminated counter top dispensers, resulting in a projected savings of $20,000 and 1,560 cases of paper towels.
- Certified staging equipment, procured service provider and scheduled window washing services which ceased in 2011 to support water conservation efforts.
- Conducted the biennial food services survey at the Headquarters' building resulting in a satisfaction rating of 3.18 based on a 1.0-4.0 scale, and began working with the vendor to identify areas of improvement.
- Coordinated the hydro-jetting efforts of the entire headquarters sewage system which removed excessive build-up, addressed building plumbing concerns, and reduced plumbing related services by 90 percent.

Diamond Valley Lake Visitors Center

- Completed over 500 preventive maintenance tasks to building equipment including the central air-conditioning system, certification and testing of the fire life safety system, and emergency power system.
- Replaced 15 failed solar power inverters, and power washed solar panels to ensure maximum generation and performance of the solar power system.

Diamond Valley Lake Recreation Area

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

It also contains a Multi-Species Reserve with a seasonal flower trail that opened to the public on February 24 and drew a record

number of visitors to see the rare abundance of color called the "super bloom." Since its 2003 public opening, DVL has hosted approximately 730,000 visitors at its marina facilities and about 160,000 private boats have launched.

The DVL Visitor Center houses key functions of the External Affairs Education program, and is also partially leased to the Western Science Center for the Western Center Academy administrative offices. The DVL Visitor Center and Western Science Center continue to attract year-round visitors for a variety of educational/community events and uses.

Highlights for Fiscal Year 2016/17

- Entered into a non-binding Memorandum of Intent with Valley-Wide Park and Recreation District, Eastern Municipal Water District, the city of Hemet, and Riverside Regional Park and Open Space District that will help guide the development of DVL recreation.
- Completed improvements to the DVL Visitor Center Building #4 and then leased the building to the Western Science Center to be used by the Western Center Academy.
- Hosted the 10th annual Bass Fishing Tournament held by the Lake Elsinore Bass Club and National Bass West to honor soldiers who served in Iraq.

Staff Training and Development

Staff attended numerous Metropolitan-sponsored training classes and seminars, webinars and courses offered by the International Right of Way Association and Southern California Chapter of the Appraisal Institute.

Staff has achieved the following state of California professional designations or licenses: Senior Right of Way Professional, Real Estate Salespersons, Broker, Certified General Appraisers, Notary and Facility Management Administrator designation.


H2
Loving water means saving water.
bewaterwise.com
SOLAR SUB
H2O
MWD INNOVATION & TECHNOLOGY
DISCOVER • CONNECT • IGNITE
Why a California Water "Fix"?
Five Reasons:
1. The Big One
2. Drought
3. Groundwater
4. Big Storms
5. The Highest Quality – More Local Supplies
H2
California WaterFix
Securing Reliable Water Supplies for Future Generations
METROPOLITAN: A TRADITION OF SOUND SPENDING
INVESTMENTS TODAY FOR WATER TOMORROW

CHAPTER 11

External Affairs

The External Affairs Group is responsible for Metropolitan's communication, public outreach, education, legislative and innovation activities. With the emergence of a "new normal" directly impacting California water conditions, 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 award-winning advertising and public outreach efforts continued to evolve in FY 2016/17. Metropolitan's H2Love conservation campaign, which was initiated as a call to action in response to the drought emergency, adapted to California's improved water supply conditions and the end of the drought by encouraging consumers and businesses to make conservation a lifelong habit. Over the course of the fiscal year, the campaign delivered more than 734 million media impressions in five languages. In addition, the district's H2Love branding and marketing was shared with other utilities that incorporated it into their own advertising, broadening the reach of the conservation messaging. Metropolitan's social media growth rates accelerated and a partnership with Major League Soccer's L.A. Galaxy also contributed to the success of the multimedia, multilingual advertising and outreach campaign valued at approximately $4.8 million, including $1.4 million in bonus advertising.

Media Activities

Over the past fiscal year, Metropolitan conducted editorial board meetings, press conferences and briefings, while issuing nearly three dozen press releases, including several statements from the general manager and 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 drought conditions, along with queries about the state's record water year, California WaterFix, the damage to the Oroville Dam spillway, the region's water conservation efforts, San Diego vs. Metropolitan rate litigation, drought contingency planning in the Lower Colorado River Basin, finance, Metropolitan's purchase of land on five Delta islands, a proposed regional water recycling program, conservation rebates, planning for the proposed Sites Reservoir, and other key issues.

Web and Social Media Activities

Microsites were created to provide informational resources for many of Metropolitan's key initiatives including Water Tomorrow, providing a gateway to existing and new webpages for California WaterFix, the Colorado River, the proposed Regional Recycled Water Project, the Integrated Water Resources Plan, and the innovation and water conservation outreach programs. Metropolitan's California WaterFix site included an online toolkit containing key documents, fact sheets, presentation materials, videos, photos and maps.

MWDinnovates.com was created to highlight Metropolitan's growing portfolio of programs and activities that support innovation, new technologies and entrepreneurs.

Metropolitan's online conservation portal, bewaterwise.com®, was redesigned with a fresh, mobile-friendly navigation and layout, and translated into Chinese and Spanish.

Metropolitan's Facebook page received more than 10 million impressions, with the number of followers increasing 12 percent. A conservation tip posted in June 2017 received 1 million impressions alone. The district's Twitter followers increased by 20 percent, with

engagement increasing nearly 450 percent. Metropolitan used Facebook Live and Snapchat geofilters to reach a broader audience during its conservation campaign.

In 2017, Metropolitan expanded its use of several e-newsletters, raising the number of subscribers to nearly 30,000 and covering a variety of topics including California WaterFix, water education, and key Metropolitan projects and initiatives.

Legislative and Policy Activities

Metropolitan sponsored Assembly Bill 2488, which was signed into law by Governor Brown in September 2016. The legislation will allow Metropolitan to perform important work on the Foothill Feeder by authorizing the state to issue incidental take permits for the unarmored threespine stickleback, a fully protected species under the state Endangered Species Act.

Metropolitan worked with U.S. Senator Feinstein, along with congressional members throughout the West to pursue administrative and legislative remedies to would clarify that water conservation rebates should not be taxed. Metropolitan also supported S. 612, the WIIN (Water Infrastructure Improvements for the Nation) Act signed by President Obama in December 2016. The bill provided funding for water infrastructure as well as flexibility in water delivery operations while protecting existing environmental laws.

Community Partnerships

More than 50 Community Partnering Program sponsored projects included 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 maintained a strong speakers bureau, providing presentation materials and arranging speakers, for more than 100 presentations to service organizations and various community groups in all six Southland counties. The most requested topics included water supply updates, Metropolitan's history and regional benefits, conservation programs and water-saving rebates.

Water Stewardship Education

Education staff worked with member agencies to hold more than 400 events and engage nearly 300,000 students, teachers, parents and participants through activities, social media and curriculum materials during the fiscal year. Metropolitan continues to develop K-12 water education curriculum in support of California's Education and Environment Initiative. These educational resources align to modern education standards and support early bilingual education (Spanish and Mandarin). During FY 2016/17, more than 18,000 public visitors and students toured the Diamond Valley Lake Visitor Center to learn more about Metropolitan's water systems and operations, programs and water stewardship.

The World Water Forum College Grant Program concluded during Metropolitan's Spring Green event at Union Station, showcasing water conservation and treatment projects. Solar Cup, the nation's largest high school solar boat race, engaged 43 teams and more than 800 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 14,000 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 Bay-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, nearly 2,100 participants visited these facilities on 70 inspection trips.

Publications, Video

External Affairs designed, wrote, distributed and posted roughly 50 new publications. The materials covered a wide range of topics including California WaterFix, the Colorado River and programs to strengthen urban-agriculture partnerships, innovation and climate change, the annual Water Quality Report, the SB 60 annual progress report to the state legislature on conservation, recycling and reuse. Other materials included multi-faceted explanations of conservation program and cutting edge local-supply projects, and environmental

and financial stewardship. Metropolitan also produced the 2016 Annual Report and two California Water maps. Staff 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, solar technology and the district's purchase of Delta islands, along with the general manager's H20Talk video blog. Metropolitan's "Wings Over the Colorado River Aqueduct" video received nearly 350,000 views.

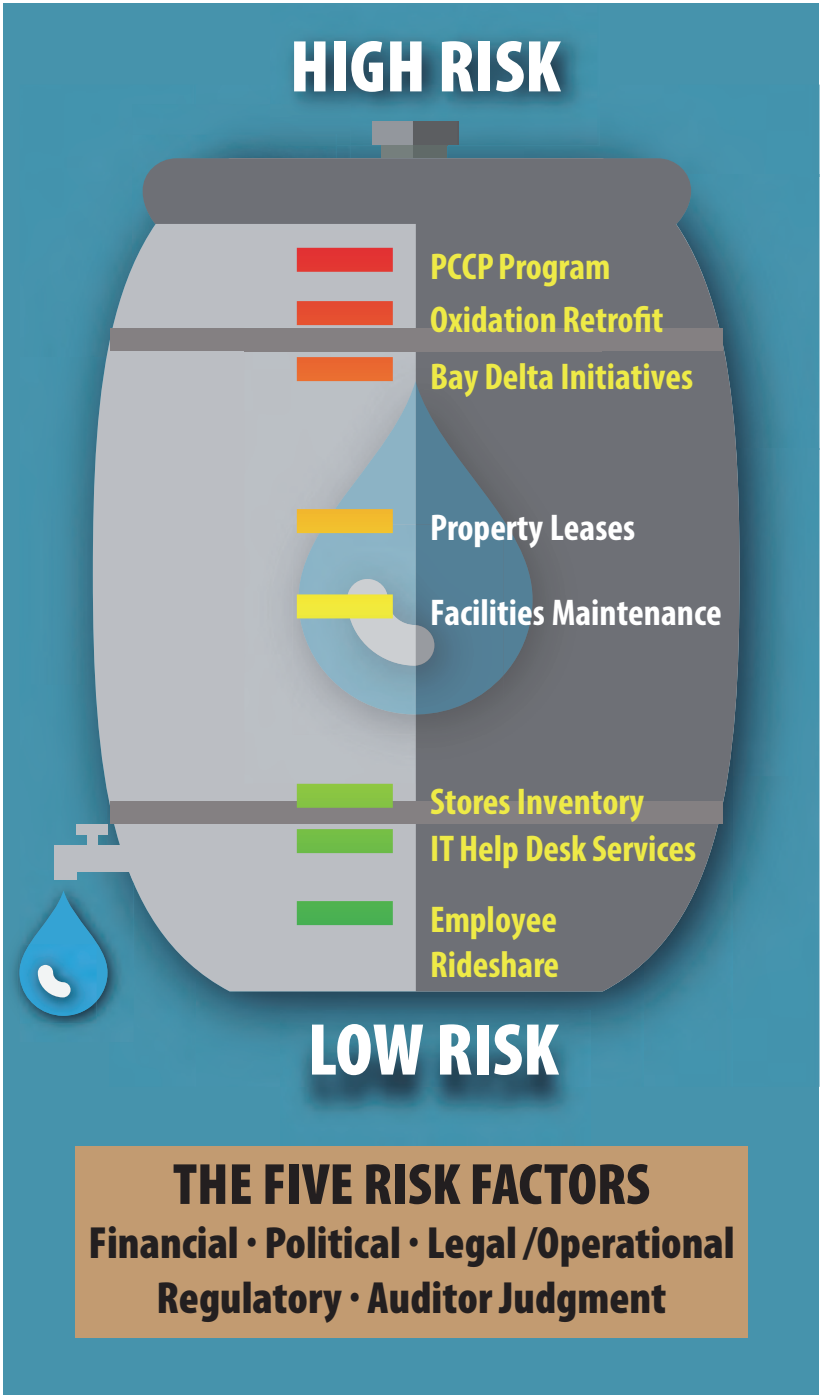
Outreach for Infrastructure Projects

External Affairs provided community outreach for major capital and system maintenance projects including pipeline relining, valve replacements, cathodic protection, and maintenance shutdowns. Nearly 6,400 notices were provided, along with community meetings and briefings for city officials.

Business Outreach, Innovation

Metropolitan increased its profile as a leader in business outreach and innovation activities including co-hosting the Annual California Construction Expo, which generated more than 1,200 attendees and represented over $150 billion in construction projects. The district's Connect 2 Vet event promoted contracting opportunities to disabled veteran businesses. More than 110 veterans and several member agency representatives attended.

Metropolitan also hosted the Canadian Water Roadshow, at which water technology companies made presentations to Metropolitan 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.



Audit considers five risk factors when assessing the risks associated with various programs.

CHAPTER 12

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 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 2016/17 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 2016/17, Internal Audit contributed to governance activities through the following major actions:

- Successfully carried out the FY 2016/17 Audit Plan, including an audit of the Turf Removal Program that required extensive audit resources and careful coordination with Metropolitan management and contractors.

- 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 20 audits and three special projects; monitored five higher risk areas, including board and management requests; issued seven bond comfort letters.

	Number of Reports
Audits:	**20**
Accounts Payable Automation	
AECOM, HDR and MWH Americas	
Assist External Auditors (2)	
AST, Advanced Electronics & Johnson Controls	
CH2M Hill & Kennedy Jenks	
Chlorine Containment & Handling Facilities	
CRA Reliability Program Phase II	
Diemer Water Treatment Plant East Basin Rehabilitation	
Employee & Director Expenses	
Jensen Business Support & Administrative Activities	
Lee & Ro, Richard Brady & Associates, Black & Veatch	
MWD Web Platform Infrastructure	
Oracle Financial Applications	
PCCP Rehabilitation and Replacement Program	
Power Reliability & Energy Conservation	
Safety & Regulatory Services	
Stores Inventory	
Turf Removal Program	
Weymouth Filter Rehabilitation	
Special Projects:	**3**
Purchases Outside Normal Procurement	
Turf Member Agency Program	
Quality Assurance Self-Assessment	
Monitoring:	**5**
Consulting Contracts (3)	
Systems Development Life Cycle 2-Way Radio	
Colorado River Water Users Association	
Bond Comfort Letters:	**7**
Water Revenue Refunding Bonds (7)	

- Evaluated management's response to all significant control issues noted in audit reports; tracked and reviewed management responses on 21 recommendations included in audit reports and ensured timely responses to all reports.
- Assisted the external auditors, Macias Gini & O'Connell, with the performance of the June 30 Annual Financial Audit and Colorado River Joint Powers Authority Reports.
- Completed a reorganization of internal audit staff to enhance communication and promote consistency.
- Conducted department-wide training on group dynamics and team building employing the Myers-Briggs Type Indicator personality tool.

Quality Assurance Activities

Professional auditing standards require internal auditors to maintain a quality enhancement and continuous improvement program. Accordingly, Internal Audit conducts a comprehensive Quality Assurance and Improvement Program annually. For FY 2016/17, the department contracted with the IIA to perform an external review. 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's report, issued May 30, 2017, judged the department to be in "general conformance" with IIA standards, the highest possible rating.

Office of ETHiCS

Integrity, Transparency and Compliance

The Metropolitan Water District of Southern California

CHAPTER 13

Ethics

Created by state legislation in 1999, Metropolitan's Ethics Office promotes and maximizes Metropolitan's transparency, integrity and good government practices. At a time when ethical principles and standards are being analyzed at the highest levels of government, the Ethics Office is committed to safeguarding one of Metropolitan's most valuable assets—its integrity.

The Ethics Officer's core responsibilities are to provide education and advice; investigate potential violations of Metropolitan's internal ethics rules; develop policy; and promote compliance with state ethics laws. Preventing ethical missteps in the first instance is the cornerstone of the ethics program. However, Ethics also has a robust investigation process intended to fairly and objectively address potential violations and encourage accountability.

Advice and Education

To assist Metropolitan directors, employees and others in addressing ethics requirements, the Ethics Office offers advice and provides training tailored to meet the specific needs of the targeted audience. One example was the November 2016 district-wide training designed to fulfill state-mandated ethics training for officials. In addition, a monthly conflicts bulletin provides Metropolitan's governing body with detailed information about agendized items, including the sources of potential conflicts of interest affected by the decisions before them and corresponding conflict of interest regulations, to help determine whether their recusal from certain matters is required.

The office also developed an online training program to assist the hundreds of Metropolitan employees who will be required to disclose personal financial interests for the first time in calendar year 2017. The training introduces employees to the concept of financial disclosure and informs employees of their obligations under state law.

Policies and Procedures

The Ethics Office is responsible for continuously evaluating its policies and procedures to ensure that they meet the highest standards for effectively implementing Metropolitan's governmental ethics program, while ensuring fairness for all stakeholders involved. This year, the Ethics Office began a review of multiple ethics-related provisions in the Administrative Code to improve Ethics Office processes and procedures and to strengthen the ability to meet mandates.

Compliance

Monitoring for compliance with various state-mandated ethics requirements is one of the office's core duties. This year, the Assistant Ethics Officer ushered in a comprehensive overhaul of Metropolitan's conflict of interest code in compliance with applicable state regulations. The new conflict of interest code has been approved by the board and the Fair Political Practices Commission and will take effect in the coming year.

The Ethics Office continues to perform all filing officer duties for Metropolitan to comply with mandatory disclosures of financial interests of designated officials to the Fair Political Practices Commission. In fiscal year 2016/17, the office handled over 400 financial disclosure reports.

Investigations

An essential part of the Ethics Office's mandate is to independently investigate and report on alleged violations of Metropolitan's ethics rules. Investigations promote accountability and identify systemic changes for avoiding future missteps.

The past fiscal year has been notable in requiring more attention and resources for investigations. Ethics began the year with a request from the General Manager to investigate alleged conflicts of interest between a manager's personal investments and official Metropolitan duties. The process, which resulted in minor findings that were readily corrected, was more notable for demonstrating Metropolitan's

commitment to accountability, internal monitoring, and self-correction.

Also this year, the Ethics Office undertook investigations involving core issues of governance. While such investigations often face controversy, the ability to work through the issues, find their root causes, and work toward better solutions is a key part of any ethics program.

Staffing and Professional Resources

The Ethics Office is responsible for continuously evaluating whether professional staffing levels are sufficient for compliance with its statutory mandate.

This marked the first fiscal year in which the office had two new Deputy Ethics Officer positions. The office experienced a notable increase in the number of matters resolved and a reduction in the amount of time spent to resolve them. The office also established and filled a permanent administrative support position.

In support of the office's ongoing effort to operate in accordance with best practices in the industry, the Deputy Ethics Officers attended the Council on Governmental Ethics Laws conference, where they engaged with experts and colleagues in the fields of governmental ethics, public records legislation, and other areas. The Ethics Officer also attended the California State Bar's conference on the California Public Records Act and Ralph M. Brown Act. The office continues to increase its involvement with professional organizations in the field of governmental ethics and compliance.

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