THE METROPOLITAN WATER DISTRICT OF SOUTHERN CALIFORNIA

Report

Water Resource Management

• Water Surplus and Drought Management Report

Summary

This Water Surplus Drought Management (WSDM) report provides a detailed accounting of water supply, demand, and storage conditions for calendar year (CY) 2017, and an overview of developing conditions for CY 2018.

Record hydrologic conditions in northern California supported an 85 percent State Water Project (SWP) allocation in CY 2017, the highest since CY 2006. The 8-Station reached 94.7 inches in April 2017, breaking its previous record set in 1983 and the northern California snowpack reached 148 percent on April 1, 2017. Record runoff helped fill Oroville to its highest levels in its history and allowed for the longest duration of maximum permitted exports at Banks Pumping Plant helping maintain San Luis Reservoir full for most of CY 2017. Overall, the improved hydrologic conditions reduced the percentage of the state remaining in drought. By the end of the calendar year roughly 60 percent of the state was drought free. The extreme wet conditions, however, tested the resiliency of key SWP facilities resulting in failures at the Oroville main spillway and Clifton Court Forebay structures. Despite these infrastructure issues, water supply reliability was not impacted in CY 2017. The Department of Water Resources (DWR) maintained the SWP allocation at 85 percent and offered Article 21 supplies, additional supplies beyond the SWP allocation, for the first time since CY 2011.

Conditions in the Upper Colorado River Basin also resulted in improvements over previous years. The snowpack on April 1 was above average at 122 percent. The resulting runoff into Lake Powell for water year (WY) 2016/17 was 110 percent of normal, the first above normal year since WY 2010/11. At the end of CY 2017, these above normal conditions combined with ongoing demand management actions implemented by the Lower Basin States (California, Nevada and Arizona) resulted in continued year over year storage gains in Lake Powell and the first annual storage gain for Lake Mead since 2011.

Continued water use efficiency in the region kept demands low in CY 2017 resulting in available water supplies that far exceeded demands. Metropolitan began implementing storage actions early last year to manage the available supplies. Metropolitan stored roughly 1.2 MAF achieving its largest annual storage increase in history. Metropolitan began CY 2018 with roughly 2.5 million acre-feet (MAF) of water in its dry-year storage portfolio. Thus far in water year 2018, below normal conditions have returned for both watersheds associated with Metropolitan's imported water supply sources. On November 30, 2017, DWR announced an initial CY 2018 SWP allocation of 15 percent.

Purpose

Informational

Attachments

Attachment 1: Estimated 2017 Water Supply Demand Balance Summary

Attachment 2: Estimated 2017 WSDM Storage Detail

Attachment 3: Projected 2018 WSDM Storage Capacities (15 percent SWP allocation)

Detailed Report

This report provides the Board with a detailed accounting of WSDM conditions for CY 2017 and an overview of developing conditions for CY 2018. Unless otherwise indicated, hydrologic conditions, demand, supply and storage information contained in this report is current as of December 14, 2017.

The following table summarizes the 2017 estimated total supplies from Metropolitan's two imported water supply sources. The Colorado River Aqueduct (CRA) supply of 1.04 MAF includes the base supply of 966 thousand acre-feet (TAF) and water management actions of 74 TAF. The SWP supply of 1.77 MAF includes the

85 percent Table A Allocation of 1,625 TAF, Article 21 supplies of 124 TAF, water management actions of 19 TAF and delivery of 2 TAF of water per the Port Hueneme Agreement.

2017 Water Supplies by Source (Acre-Feet)	
Colorado River Water	1,040,000
State Water Project	1,770,000
Total 2017 Water Deliveries	**2,810,000**

2017 Colorado River Aqueduct Supplies

The table below shows staff's estimate of CRA water supply from the Colorado River for CY 2017 prior to water management actions. The total of 966 TAF is referred to as the CRA base supply and is comprised of Metropolitan's Basic Apportionment (550 TAF), the established Colorado River supply programs developed to date and an agricultural use adjustment of minus 15 TAF. The numbers shown in this table are subject to final decree accounting by the U.S. Bureau of Reclamation; any changes would be reflected as an adjustment to the CY 2017 ending balance in Metropolitan's Lake Mead Intentionally Created Surplus (ICS) account and/or the agricultural use adjustment.

2017 Colorado River Aqueduct Base Supply (Acre-Feet)	
Basic Apportionment	550,000
IID/MWD Conservation Program	105,000
PVID Land Fallowing	125,000
Transfer to SDCWA (IID Transfer and Canal Lining)	179,000
Canal Lining Water to MWD	16,000
Lower Colorado Water Supply Project	6,000
Agricultural Adjustments	-15,000
CRA Supply Before Water Management and Storage Actions	**966,000**

2017 State Water Project Supplies

The table below shows the CY 2017 SWP supplies prior to water management actions.

2017 State Water Project Supply (Acre-Feet)	
Table A Allocation @ 85%	1,625,000
Article 21	124,000
Port Hueneme Agreement	2,000
SWP Supply Before Water Management and Storage Actions	**1,751,000**

2017 WSDM Non-Storage Water Management Actions

The table below shows the non-storage withdrawal water management actions implemented in CY 2017 and associated supply estimates developed on both the SWP and CRA systems.

2017 Non-Storage Withdrawal Water Management Actions (Acre-Feet)	
CRA Actions	
California ICS Agreement – IID[1]	50,000
Bi-National ICS	24,000
Total CRA Water Management Supplies	**74,000**
SWP Actions	
Unbalanced Exchanges with SWP Contractors	18,000
Los Angeles Aqueduct Supply Emergency Storage	1,000
Total SWP Water Management Supplies	**19,000**
Total CRA and SWP Water Management Supplies	**93,000**

[1] Preliminary estimate.

In October 2017, the Imperial Irrigation District (IID) requested that Metropolitan store Excess Extraordinary Conservation Intentially Created Surplus generated by IID within Metropolitan's system. The amount of water IID will have available to store is not yet known but could range between 38 TAF to 69 TAF. For the purposes of this report, Metropolitan is using a preliminary estimate of 50 TAF. The water would be stored pursuant to the terms of the 2007 California Agreement for the Creation and Delivery of Extraordinary Conservation Intentionally Created Surplus as amended in 2015. Metropolitan will make every effort to meet IID's storage request provided it does not result in Metropolitan exceeding its Intentionally Created Surplus limitation in 2017.

2017 Demands, Obligations and Losses

The table below summarizes the estimated demands, obligations and losses for CY 2017. Demands on Metropolitan include Member Agency consumptive use which includes water exchanged with San Diego County Water Authority and sea water barrier requirements. Member Agency replenishment demands include water for groundwater basins and surface reservoir recharge. CY 2017 demands also include obligations to deliver water to the Coachella Valley Water District under a long-term delivery and exchange agreement. Losses for CY 2017 are an estimate of Metropolitan distribution system losses, and evaporative and contractual losses from storage.

2017 Estimated Demands, Losses and Obligations (Acre-Feet)	
Member Agency Consumptive Demands	1,279,000
Member Agency Replenishment Demands	88,000
Coachella Valley Water District Agreement	35,000
System and Storage Losses	89,000
Total Estimated Demands and Losses	**1,491,000**

2017 Water Supply and Demand Balance

The following table shows the estimated net balance between total water supplies and demands for CY 2017.

2017 Water Supply and Demand Balance (Acre-Feet)	
Supply	
Total CRA Base Supplies	966,000
Total SWP Allocated Supplies	1,751,000
Total CRA and SWP Water Management Actions	93,000
	2,810,000
Demand	
Total Demands, Losses and Obligations	1,491,000
	1,491,000
Estimated Net Water Supply and Demand Balance	**1,319,000**

A summary of Metropolitan's estimated 2017 supplies and demands and supply demand balances is provided as **Attachment 1**.

2017 WSDM Storage

Metropolitan's dry-year WSDM storage balance at the beginning of CY 2017 was estimated to be 1.29 MAF. Metropolitan implemented new and modified existing storage programs to manage as much of the water supply and demand balance surplus of 1.32 MAF in CY 2017. As a result, a record breaking annual increase of roughly 1.2 MAF to Metropolitan's dry-year storage was realized. Metropolitan's dry-year storage ended the year at 2.46 MAF, the second highest end of year dry-year storage balance in Metropolitan's history. **Attachment 2** shows the CY 2017 starting balance, net change in storage, and estimated CY 2017 ending storage balance for each of Metropolitan's storage programs. **Attachment 3** shows the starting balance, estimated take capacities for CY 2018 and total storage capacity for each of Metropolitan's storage programs at the current 15 percent SWP allocation.

2018 Outlook

There are a number of factors that impact Metropolitan's demands and imported supplies conveyed through the Colorado River Aqueduct and the State Water Project (Projects) each year. The primary drivers are the hydrologic conditions and operation of reservoirs and conveyance facilities associated with both Projects. Key indicators such as precipitation and snowpack developed in the Projects' watersheds and the resulting runoff measured on a water year basis provide insight to the overall health of the imported water supplies and impacts to Metropolitan's supply and demand balances. On November 30, 2017, DWR announced an initial SWP allocation of 15 percent for CY 2018. This allocation assumes a dry hydrologic condition for the remainder of the current water year. Increases to the allocation depend on improvements to the hydrologic conditions in northern California.

Following the February 2017 Oroville spillway incident, DWR developed new Oroville operating criteria to be implemented in CY 2018. DWR expanded the storage space in Oroville reserved to capture flood flows while replacement of the main spillway structure is completed, currently scheduled for the end of CY 2018. This was done to safely manage the project under a theoretically possible extreme flood event. This reduces opportunities to conserve supplies as the year progresses and may have impacts to the final allocation, the extent of which will depend on how the hydrologic conditions develop.

For example, should northern California experience warmer storms producing heavy rain events early in the year, under the new Oroville operating criteria, DWR would be required to release more water than normal. This

additional release would occur during the year when the export pumping constraints are the highest, increasing the chances of losing those supplies to the ocean. If, however, northern California experiences colder storms with a larger snowpack that melts slowly through the spring, DWR may be able to reduce the impacts of the new Oroville operating criteria by delaying those releases to when the export pumping constraints are less restrictive. It has not yet been decided if the original Oroville flood operations will be reinstituted after the main spillway is completely rebuilt or if the new Oroville operating criteria or a modified version will remain in place beyond the current wet season. Metropolitan staff will monitor the hydrologic conditions and SWP operations and provide periodic updates.

The hydrologic conditions for the watersheds associated with Metropolitan's imported water supplies are off to a slower start as compared to last year. As of December 14, 2017, the Upper Colorado River Basin snowpack measured below normal at 56 percent. Although precipitation at the 8-Station Index is near normal at 12.3 inches or 96 percent of normal for this time of year, the northern Sierra snowpack measured a mere 26 percent of normal indicating the warmer nature of the storm systems observed thus far.

Future Payback Agreements

Metropolitan has two types of payback agreements; Dry-year Exchanges and Operational Exchanges. The following table shows a list of the future dry-year exchange payback amounts from programs in which Metropolitan participates. Dry-year exchanges are those with payback provisions that are beyond one year from the exchange date.

The exchange agreement with the Southern Nevada Water Authority (SNWA) was executed in 2004 and later amended to address changing conditions. The agreement allows Metropolitan to store unused Nevada apportionment of Colorado River water in California. SNWA may request recovery of this stored water in the future. Return may commence as early as 2022, however, SNWA has other supplies available that would likely delay the need for returns until after this date. Metropolitan did not store any SNWA water in 2017 and does not plan to store any SNWA water in 2018.

The California Extraordinary Conservation ICS agreement with the IID and other agencies executed in 2007, and later amended in 2015 to expand volumes, allows Metropolitan to store conserved IID water in excess of its Quantification Settlement Agreement (QSA) conservation commitments. The water may be returned at IID's request. IID has requested to store up to 69 TAF of conserved water with Metropolitan this year. Metropolitan will make every effort to meet IID's storage request provided it does not result in Metropolitan exceeding its Intentionally Created Surplus limitation in 2017.

In 2014, Metropolitan exercised Article 54 of its long-term water supply contract with the State of California and took delivery of 219 TAF from the SWP system. Repayment is required by 2020. Metropolitan paid 30 TAF of this obligation back in 2015, an additional 124 TAF repayment in 2016 through storage management actions, and the remaining balance of 65 TAF was repaid in January and February 2017. As such , thoese payback requirements are no longer shown in the table.

Repayments are subject to final DWR accounting. The table below shows all outstanding Dry-year Exchange payback amounts.

Dry-year Exchange/Program	Payback Amount	Payback Term

Storage and Interstate Release Agreement with Southern Nevada Water Authority	330,000	Up to 30,000 AFY (no earlier than 2022)
California ICS Agreement - IID	145,500[1]	Any year, conditional on whether or not Metropolitan is implementing a WSAP
Total	**475,500**	

[1] Initial Estimate.

The following table shows the future operational exchange payback amounts from the programs in which Metropolitan participates. Operational exchanges are those with payback provisions that may be within one year of the exchange date and provide Metropolitan increased flexibility in the timing and conveyance of deliveries. In 2014, Metropolitan took possession of 5 TAF of water from Irvine Ranch Water District (Irvine Ranch). Metropolitan returned 1 TAF in 2015 and the remaining 4 TAF is to be returned no later than 2024 at Irvine Ranch's request. Metropolitan has also taken possession of 8 TAF of water from Dudley Ridge Water District in coordination with Irvine Ranch. Half of this supply must be returned to Dudley Ridge and the other half to Irvine Ranch no later than 2022.

Operational Exchange/Program	**Payback Amount**	**Payback Term**
Strand Ranch - Irvine Ranch	4,000	No later than 2024
Dudley Ridge WD – Irvine Ranch	8,000	No later than 2022
Total	**12,000**	

2017 Projected Supply and Demand Balances

2017 Supply Estimate (Acre-Feet)	
Colorado River Aqueduct Base Supply Estimate	
Basic Apportionment	550,000
IID/MWD Conservation Program	105,000
PVID/Bard Fallowing Programs	125,000
Exchange with SDCWA (IID Transfer and Canal Lining)	179,000
Canal Lining Water to MWD	16,000
Lower Colorado Water Supply Project	6,000
Agricultural Adjustment	-15,000
Total CRA Base Supply	***966,000***
2017 State Water Project Supply Estimate (Acre-Feet)	
Table A Supply (85% SWP allocation)	1,625,000
Article 21	124,000
Port Hueneme Agreement	2,000
SWP Contractual Supply	***1,751,000***
Water Management Actions - Transfers/Exchanges	
California ICS Agreement - IID	50,000
Bi-National ICS	24,000
Unbalanced Exchanges with SWP Contractors	18,000
Los Angeles Aqueduct Supply Emergency Storage	1,000
Water Management Actions	***93,000***
Total Estimated Supply	**2,810,000**

2017 Estimated Demands, Losses and Obligations (Acre-Feet)	
Member Agency Consumptive Demands	1,279,000
Member Agency Replenishment Demands	88,000
Coachella Valley Water District Agreement	35,000
System and Storage Losses	89,000
Total Estimated Demands and Losses	**1,491,000**

2017 Water Supply and Demand Balance Estimate (Acre-Feet)	
Total Supplies	2,810,000
Total Demands and Losses	1,491,000
Net Water Supply and Demand Balance	**1,319,000**

2017 Projected WSDM Storage Detail

(Operations and final accounting will affect storage balances)

WSDM Storage	1/1/2017 Storage Levels	Estimated Change in Storage	1/1/2018 Storage Levels	2017 Total Storage Capacity
Colorado River Aqueduct System	**85,000**	**349,000**	**434,000**	**1,554,000**
Lake Mead Extraordinary Conservation ICS	5,000	325,000	330,000	1,450,000
Bi-National ICS	0	24,000	24,000	24,000
System Efficiency ICS	80,000	0	80,000	80,000
State Water Project System	**723,000**	**304,000**	**1,027,000**	**1,796,000**
MWD SWP Carryover [1]	168,000	32,000	200,000	200,000
DWCV SWP Carryover [1]	42,000	55,000	97,000	97,000
Castaic Lake (DWR Flex Storage)	154,000	0	154,000	154,000
Lake Perris (DWR Flex Storage)	0	65,000	65,000	65,000
Arvin Edison Storage Program	108,000	42,000	150,000	350,000
Semitropic Storage Program	125,000	61,000	186,000	350,000
Kern Delta Storage Program	99,000	39,000	138,000	250,000
Mojave Storage Program	27,000	0	27,000	330,000
AVEK Storage Program	0	10,000	10,000	0
In-Region Storage	**739,000**	**336,000**	**1,075,000**	**1,449,000**
Diamond Valley Lake	566,000	182,000	748,000	810,000
Lake Mathews	135,000	8,000	143,000	182,000
Lake Skinner	37,000	0	37,000	44,000
IEUA/TVMWD (Chino Basin)	0	38,000	38,000	100,000
Long Beach (Central Basin)	0	0	0	13,000
Long Beach (Lakewood)	0	0	0	4,000
Foothill (Raymond and Monkhill)	0	0	0	9,000
MWDOC (Orange County Basin)	0	0	0	66,000
Three Valleys (Live Oak)	1,000	0	1,000	6,000
Three Valleys (Upper Claremont)	0	0	0	3,000
Western	0	3,000	3,000	12,000
Cyclic - Upper San Gabriel	0	47,000	47,000	100,000
Cyclic - Three Valleys	0	1,000	1,000	40,000
Cyclic - Burbank	0	5,000	5,000	7,000
Cyclic - Eastern	0	3,000	3,000	3,000
Cyclic - MWDOC	0	49,000	49,000	50,000
Other Programs	**366,000**	**183,000**	**549,000**	**1,128,000**
Other Emergency Storage	328,000	0	328,000	328,000
DWCV Advance Delivery Account	38,000	183,000	221,000	800,000
Total	**1,913,000**	**1,172,000**	**3,085,000**	**5,927,000**
Emergency	626,000	0	626,000	626,000
Total WSDM Storage [1]	**1,287,000**	**1,172,000**	**2,459,000**	**5,301,000**

[1] Total Storage Capacity varies year to year based on prior year remaining balance added to current year contractual limits.

[2] Total WSDM Storage level is subject to change based on accounting adjustments

2018 WSDM Storage Detail

WSDM Storage	1/1/2018 Storage Levels	CY 2018 Take Capacity [1]	2018 Total Storage Capacity
Colorado River Aqueduct Delivery System	**434,000**	**305,000**	**1,554,000**
Lake Mead Extraordinary Conservation ICS	330,000	305,000 [2]	1,450,000
Bi National ICS	24,000		24,000
System Efficiency ICS	80,000		80,000
State Water Project System	**1,027,000**	**642,000**	**1,945,000**
MWD SWP Carryover [3]	200,000	200,000	300,000
DWCV SWP Carryover [3]	97,000	97,000	146,000
Castaic Lake (DWR Flex Storage)	154,000	154,000	154,000
Lake Perris (DWR Flex Storage)	65,000	65,000	65,000
Arvin Edison Storage Program	150,000	40,000	350,000
Semitropic Storage Program	186,000	46,000	350,000
Kern Delta Storage Program	138,000	40,000	250,000
Mojave Storage Program	27,000	0	330,000
AVEK Storage Program	10,000	0	0
In-Region Supplies and WSDM Actions	**1,075,000**	**720,000**	**1,449,000**
Diamond Valley Lake	748,000	558,000	810,000
Lake Mathews	143,000	65,000	182,000
Lake Skinner	37,000	7,000	44,000
IEUA/TVMWD (Chino Basin)	38,000	20,000	100,000
Long Beach (Central Basin)	0	0	13,000
Long Beach (Lakewood)	0	0	4,000
Foothill (Raymond and Monkhill)	0	0	9,000
MWDOC (Orange County Basin)	0	0	66,000
Three Valleys (Live Oak)	1,000	1,000	6,000
Three Valleys (Upper Claremont)	0	0	3,000
Western	3,000	3,000	12,000
Cyclic - Upper San Gabriel	47,000	16,000	100,000
Cyclic - Three Valleys	1,000	0	40,000
Cyclic - Burbank	5,000	0	7,000
Cyclic - Eastern	3,000	1,000	3,000
Cyclic - MWDOC	49,000	49,000	50,000
Other Programs	**549,000**	**64,000**	**1,128,000**
Other Emergency Storage	328,000	0	328,000
DWCV Advanced Delivery Account	221,000	64,000	800,000
Total	**3,085,000**	**1,731,000**	**6,076,000**
Emergency	626,000	0	626,000
Total WSDM Storage [4]	**2,459,000**	**1,731,000**	**5,450,000**

[1] Take capacity assumed under a 15% SWP Table A Allocation.

[2] Amount needed to fill Colorado River Aqueduct assuming 945,000 AF of base supplies (no agricultural adjustment).

[3] Total Storage Capacity varies year to year based on prior year remaining balance added to current year contractual limits.

[4] Total WSDM Storage level is subject to change based on accounting adjustments