



• **Water Surplus and Drought Management Plan**

Summary

Hydrologic conditions in both northern California and the Upper Colorado River Basin continued to improve in WY 2016/17. Record conditions in California supported an 85 percent SWP allocation, the highest since CY 2006. Above normal conditions in the Upper Colorado River Basin combined with demand management actions implemented by the Lower Basin States (California, Nevada and Arizona), resulted in storage gains in both Lake Powell and Lake Mead over last year. Continued water use efficiency in the region has kept demands low resulting in available water supplies that exceed demands in CY 2017. Metropolitan began implementing storage actions early in the year to manage the available supplies and continue rebuilding its dry-year storage reserves that were drawn down during drought period. Metropolitan is on track to store roughly 1.0 million acre-feet (MAF) of water this year, the largest annual storage increase in its history. This report includes a description of Metropolitan's storage programs, including the projected storage puts and considerations for each program.

Purpose

Informational

Attachments

[Attachment 1: Projected 2017 Water Supply and Demand Balance](#)

[Attachment 2: Projected 2017 WSDM Storage Detail](#)

Detailed Report

This Water Surplus and Drought Management (WSDM) report provides a recap of water year (WY) 2016/17 hydrologic conditions, an update of calendar year (CY) 2017 water supply and demand balances and a preliminary accounting of storage programs and end of year storage balance projections.

Water Year 2016/17 Hydrologic Conditions

Following five consecutive years of below average hydrologic conditions, the northern Sierra watershed achieved above normal river flows in WY 2016/17. In fact, record breaking rainfall, as measured at the 8-Station Index and near record rainfall at the 5-Station Index combined with snowmelt from the above normal snowpack in the northern and central Sierra Nevada resulted in record breaking runoff in many California rivers. These hydrologic conditions supported an 85 percent SWP allocation, the highest allocation since 2006.

Hydrologic conditions in the Upper Colorado River Basin also resulted in above normal runoff flows into Lake Powell in WY 2016/17, the first above normal year for that system since 2011. A net storage gain of 2.6 MAF is forecasted for Lake Powell this year, continuing a trend of year over year storage increases since 2014. The Bureau of Reclamation is also forecasting a net storage increase in Lake Mead, the first annual storage increase since 2011. These improved storage conditions help alleviate drought conditions on the Colorado River system.

Calendar Year 2017 Water Supply and Demand Balance Projection

Metropolitan's water supply conditions improved in CY 2017 as a result of the record breaking hydrologic conditions in northern California and no shortage conditions declared on the Colorado River system. Consequently, available supplies exceed demands in CY 2017. An estimated 2.75 MAF of supplies are available between Metropolitan's imported water supply sources and additional water management actions. The continued successes in water use efficiency throughout Metropolitan's service area have kept demands low and at levels not

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seen since the mid 1980's. The current year demand projection of 1.45 MAF includes member agency consumptive demands, replenishment deliveries, agreements and system losses. The resulting supply and demand balance indicates approximately 1.30 MAF that exceed demands. This represents an opportunity for a record breaking annual increase to Metropolitan's dry-year storage. Metropolitan is expanding put capacities of existing storage programs and implementing new programs to maximize storage puts this year. Metropolitan is currently estimating a storage increase of approximately 1.0 MAF. Attachment 1 provides details of the estimated supply and demand balances for CY 2017.

Calendar Year 2017 Storage Strategy and Implementation

The Water Surplus and Drought Management Plan (WSDM Plan) guides Metropolitan's resource operations to maximize future reliability. The WSDM Plan provides guidelines to prioritize the use of storage in shortage conditions and the replenishment of storage in surplus conditions. The WSDM Plan generally favors in-region storage because it is easily accessible and favors surface storage because it generally has higher fill and withdrawal capacities. The WSDM Plan, however, allows for flexible implementation as other factors must be considered when making storage decisions to maximize future reliability. These factors include starting storage balances, program terms, costs and the timing, volumes and location of supplies that can be unique to each year.

For example, in February 2017, SWP Article 21 water or surplus supplies that typically appear in high volumes and in short durations, were made available. Contractors who have the ability to consume or store these supplies outside of SWP facilities can take delivery. Metropolitan demonstrated its ability to take delivery of Article 21 supplies by utilizing all of its in-region and out-of-region storage programs in combination throughout the year even though out-of-region groundwater programs are generally a lower priority. Continued implementation of the WSDM Plan guidelines including the flexibility it allows will be necessary in order to take advantage of storage opportunities this year.

With the high SWP allocation, maximizing storage opportunities requires an operation that expands SWP water deliveries while minimizing Colorado River water deliveries to the service area, a complete reversal from the mode of operation implemented during the drought period in CY 2014 and CY 2015. This storage operation allows Metropolitan to back-up supplies on the Colorado River Aqueduct system and maximize storage opportunities in both the Desert Water Agency and Coachella Valley Water District's (DWCV) groundwater banking and Lake Mead ICS storage programs. This operation also allows for ample deliveries through the SWP system to continue recovery of Diamond Valley Lake (DVL) and SWP groundwater banking storage programs in the San Joaquin Valley and Mojave Desert and to refill SWP flexible storage and San Luis Reservoir carryover storage.

This storage operation is affected by other considerations including capacity constraints along the East Branch of the California Aqueduct that limit SWP deliveries and water quality objectives that have required some Colorado River water deliveries into the service area. Metropolitan is working within these operational constraints to maximize storage. Below is a discussion of the current year storage strategy and considerations for Metropolitan's key storage programs. A complete listing of Metropolitan's storage programs and projected puts and takes is shown in Attachment 2.

SWP Carryover

State Water Project contractors (SWP Contractors) have the flexibility to store water in San Luis Reservoir and carry over (SWP Carryover) those supplies from one year to the next. The annual amount that can be stored is dependent on the SWP allocation. Under an 85 percent SWP allocation, Metropolitan's contract allows for carryover of up to 200 TAF of Table A supplies. There is a risk, however, of losing some of these stored supplies should the San Luis Reservoir fill. Once San Luis Reservoir fills, carryover water is considered by the Department of Water Resources (DWR) to be water available for allocation in 2018. Metropolitan receives almost half of the allocated supplies. Positioning water in San Luis Reservoir provides Metropolitan with additional operational flexibility. SWP Carryover can help supplement low SWP allocations to meet demands in portions of its service area that can only receive deliveries from the SWP system.

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Metropolitan carried over 168 TAF from CY 2016 into CY 2017. With the impending fill of the San Luis Reservoir earlier this year, Metropolitan utilized its storage and conveyance system to evacuate its carryover and prevent losing the supply. To help manage the available supplies this year and prepare for potential dry conditions next year, Metropolitan plans to carry over its maximum amount of 200 TAF. Metropolitan can also choose to carry over up to 97 TAF of DWCV's Table A supplies, under an 85 percent SWP allocation, into next year. Preliminary forecasts of San Luis Reservoir levels, however, suggests the reservoir may fill early next year, requiring SWP contractors to evacuate their SWP Carryover supplies quickly similar to the beginning of this year. Metropolitan will continue to evaluate conditions and manage its storage programs, including the decision to utilize DWCV carryover capacity, accordingly to help mitigate that risk.

SWP Groundwater Banking Programs

Metropolitan has developed long-term storage agreements to utilize storage capacity in various groundwater storage basins in the San Joaquin Valley and Mojave Desert, collectively referred to as the SWP Groundwater Banking programs (Banking Programs). The put and take capacities are subject to percolation and pumping rates and in some cases tied to the SWP allocation. Metropolitan can expedite takes from many of these programs through Table A exchanges when those stored supplies are called upon in dry years. Positioning water in the Banking Programs also provides Metropolitan operational flexibility for meeting demands in portions of its service area that can only receive deliveries through the SWP system.

Metropolitan exercised Banking Programs throughout the drought years and drafted nearly half of the previously stored supply in those accounts. Metropolitan and its banking partners are on track to exceed the contractual storage put obligations of these programs. Staff is coordinating closely to find opportunities to store even more water into these Banking Programs before the end of the year. These operations are challenging in a year as wet as 2017 because many other entities are trying to store water at the same time. Metropolitan is currently estimating a storage put of approximately 157 TAF this year bringing storage in these programs to roughly 70 percent of pre-drought levels.

SWP Flexible Storage Programs

Metropolitan has access to up to 219 TAF of combined storage in Castaic Lake and Lake Perris, known as the SWP Flexible Storage account. Any water withdrawn from this account must be replaced within five years. These storage programs provide Metropolitan with easy access to supplies within the Southern California region. Metropolitan emptied its SWP Flexible storage program to help meet demands during the record low 5 percent allocation in 2014. Metropolitan began refilling the account in 2015 and has returned the balance of its obligation earlier this year bringing this storage program back to pre-drought levels. The total supply of 219 TAF is ready for use if needed in future dry years.

Diamond Valley Lake (DVL)

Diamond Valley Lake (DVL) is Metropolitan's largest surface storage reservoir and is located within Metropolitan's service area. DVL provides great operational flexibility both in terms of a readily accessible water supply and the ability to store water quickly. Metropolitan relied on DVL to help meet demands during the drought. By the end of CY 2015 it had drafted DVL to its lowest level since it began filling in 1999. Metropolitan began refilling DVL in CY 2016 as water supply conditions showed signs of improvement. Metropolitan will continue to refill DVL in CY 2017 and is estimating a storage put of approximately 185 TAF bringing storage to near full before the end of the year. –Should wet conditions persist into next year, and San Luis Reservoir fills, Metropolitan can use any available storage space in DVL to reposition its SWP Carryover supplies to mitigate losses or prevent losing all of these supplies similar to what was done at the beginning of this year.

Desert Water Agency / Coachella Valley Water District Advanced Delivery Account

The Desert Water Agency and Coachella Valley Water District (DWCV) are both SWP Contractors with no physical connection to SWP facilities. Both agencies are, however, adjacent to the Colorado River Aqueduct (CRA) and are connected via the Whitewater River and the Mission Springs drainage basin (DWCV connections). To enable DWCV to obtain their SWP supplies, Metropolitan entered into a long-term exchange contract in 1967,

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agreeing to take delivery of their SWP supplies and exchange an equal quantity of Colorado River water at the DWCV connections. In 1983, Metropolitan executed an Advance Delivery Account agreement with DWCV, allowing Metropolitan to supply them with Colorado River water in advance of DWCV developing their SWP supplies. Metropolitan can recover this water or satisfy their annual exchange contract obligation by reducing its CRA deliveries to DWCV and deducting from the Advanced Delivery Account in any given year.

This program proved beneficial to Metropolitan as it boosted water deliveries on the SWP during the drought years. Metropolitan is working to maximize deliveries of SWP supplies into the region which allows Colorado River water to be stored in the Advanced Delivery Account and Lake Mead ICS. As with any year, the water used by the higher priority users on the Colorado River may affect the supplies available for the Advance Delivery Account. In addition, Metropolitan may choose to carry over a portion of DWCV's Table A supply on the SWP, which would impact the end of year storage balance in this account. Currently, Metropolitan is estimating a net storage increase of approximately 158 TAF after meeting the annual exchange contract obligation, which would bring storage in this program to roughly 50 percent of pre-drought levels.

Lake Mead ICS

The "Colorado River Interim Guidelines for Lower Basin Shortages and the Coordinated Operations for Lake Powell and Lake Mead" (Interim Guidelines) created the Intentionally Created Surplus (ICS) program in 2007. This program allows Lower Basin Colorado River states to store water in Lake Mead if they create a like amount of water within their state that could be used instead. The program also helps control the potential of a shortage declaration by holding more water in Lake Mead. Metropolitan's annual put limit is typically 200 TAF, however it is seeking approval to double its storage put amount to increase flexibility with managing all of the available supplies this year.

Metropolitan participated in the Lake Mead ICS program since its inception and built its storage reserves in Lake Mead up to 580 TAF prior to the drought. Metropolitan drew down this account through the drought and is now working to maximize storage puts to be able to have adequate supplies to fill the CRA in future dry years. As with any year, the water used by the higher priority users on the Colorado River may affect the supplies available for Lake Mead ICS. Metropolitan is currently estimating a storage put of approximately 356 TAF this year, bringing storage in this program to roughly 60 percent of pre-drought levels.

Conjunctive Use Cyclic Storage Programs

Metropolitan has worked with local agencies to develop programs to increase local groundwater storage in the region. The Conjunctive Use and Cyclic Storage programs involve specific agreements for the storage of imported water with member agencies. Through these programs, Metropolitan can deliver water into groundwater basins in advance of agency demands and enhance groundwater recharge. In the case of the Conjunctive Use program, Metropolitan can call on these supplies when needed. In the case of the Cyclic Storage programs, the water is pre-delivered and paid for over time, based on an agreed upon schedule.

These accounts were drawn down during the drought and Metropolitan and its member agencies are seeking to rebuild storage in 2017. Metropolitan is currently estimating a storage put of approximately 26 TAF for the Conjunctive Use Program and approximately 140 TAF for the Cyclic Storage Program this year, more than doubling storage in these accounts as compared to pre-drought levels. This storage activity is happening through seven different accounts, all shown in Attachment 2.

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 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

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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 2016 and does not plan to store any SNWA water in 2017.

The California Extraordinary Conservation ICS agreement with the Imperial Irrigation District (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 may desire to store approximately 50 TAF of conserved water with Metropolitan this year. Metropolitan will make a determination whether to take delivery of this water based on storage capacity and need.

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.

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

Dry-year Exchange/Program	Payback Amount (Acre-Feet)	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	98,000 ¹	Any year, conditional on whether or not Metropolitan is implementing a WSAP
Total	428,000	

¹ Estimated and subject to final U.S. Bureau of Reclamation Colorado River Accounting.

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. 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 7 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 (Acre-Feet)	Payback Term
Strand Ranch - Irvine Ranch	4,000	No later than 2024
Dudley Ridge WD – Irvine Ranch	7,000	No later than 2022
Total	11,000	

2017 Projected Supply and Demand Balances

2017 Supply Estimate (Acre-Feet)	
<i>Colorado River Aqueduct Base Supply Estimate</i>	
Basic Apportionment	550,000
IID/MWD Conservation Program	85,000
PVID/Bard Following Programs	125,000
Exchange with SDCWA (IID Transfer and Canal Lining)	178,000
Canal Lining Water to MWD	16,000
Lower Colorado Water Supply Project	6,000
Total CRA Base Supply	960,000
<i>2017 State Water Project Supply Estimate (Acre-Feet)</i>	
Table A Supply (85% SWP allocation)	1,625,000
Article 21	124,000
Port Hueneme Agreement	2,000
SWP Contractual Supply	1,751,000
<i>Water Management Actions - Transfers/Exchanges</i>	
Bi-National ICS	24,000
Unbalanced Exchanges with SWP Contractors	18,000
Los Angeles Aqueduct Supply Emergency Storage	1,000
Water Management Actions	43,000
Total Estimated Supply	2,754,000

2017 Estimated Demands, Losses and Obligations (Acre-Feet)	
Member Agency Consumptive Demands	1,229,000
Member Agency Replenishment Demands	97,000
Coachella Valley Water District Agreement	35,000
System and Storage Losses	90,000
Total Estimated Demands and Losses	1,451,000

2017 Water Supply and Demand Balance Estimate (Acre-Feet)	
Total Supplies	2,754,000
Total Demands and Losses	1,451,000
Net Water Supply and Demand Balance	1,303,000

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
Colorado River Aqueduct System	85,000	356,000	441,000
Lake Mead Extraordinary Conservation ICS	5,000	332,000	361,000
Bi-National ICS	0	24,000	24,000
System Efficiency ICS	80,000	0	80,000
State Water Project System	723,000	212,000	935,000
MWD SWP Carryover	168,000	32,000	200,000
DWCV SWP Carryover	42,000	-42,000	0
Castaic Lake (DWR Flex Storage)	154,000	0	154,000
Lake Perris (DWR Flex Storage)	0	65,000	65,000
Arvin Edison Storage Program	108,000	45,000	153,000
Semitropic Storage Program	125,000	57,000	182,000
Kern Delta Storage Program	99,000	45,000	144,000
Mojave Storage Program	27,000	0	27,000
AVEK Storage Program	0	10,000	10,000
In-Region Storage	739,000	311,000	1,050,000
Diamond Valley Lake	566,000	185,000	751,000
Lake Mathews	135,000	-40,000	95,000
Lake Skinner	37,000	0	37,000
IEUA/TVMWD (Chino Basin)	0	23,000	23,000
Long Beach (Cent. Basin)	0	0	0
Long Beach (Lakewood)	0	0	0
Foothill (Raymond and Monkhill)	0	0	0
MWDOC (Orange County Basin)	0	0	0
Three Valleys (Live Oak)	1,000	0	1,000
Three Valleys (Upper Claremont)	0	0	0
Compton	0	0	0
Western	0	3,000	3,000
Cyclic - Upper San Gabriel	0	80,000	80,000
Cyclic - Three Valleys	0	1,000	1,000
Cyclic - Burbank	0	6,000	6,000
Cyclic - Eastern	0	3,000	3,000
Cyclic - MWDOC	0	50,000	50,000
Other Programs	366,000	158,000	524,000
Other Emergency Storage	328,000	0	328,000
DWCV Advance Delivery Account	38,000	158,000	196,000
Total	1,913,000	1,037,000	2,950,000
Emergency	626,000	0	626,000
Total WSDM Storage ¹	1,287,000	1,037,000	2,324,000

¹ Total WSDM Storage level is subject to change based on accounting adjustments.