



## ● **Water Surplus and Drought Management Plan**

### **Summary**

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Dry hydrologic conditions returned to Metropolitan's imported supply watersheds in northern California and the Upper Colorado River Basin in water year 2017/18 (WY 2018). The below normal conditions in California supported a 35 percent State Water Project (SWP) allocation for calendar year (CY) 2018. The below normal conditions in the Upper Colorado River Basin, although not impacting current year water supplies, will result in storage losses in both Lake Powell and Lake Mead over last year. The storage losses increase the possibility of water shortages in the coming years.

Water use efficiency practices continue within Metropolitan's service area keeping demands on Metropolitan low. As a result, Metropolitan anticipates needing minimal dry-year storage reserves in CY 2018 to balance the imported supplies with demands.

### **Purpose**

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Informational

### **Attachments**

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#### **Attachment 1: Projected 2018 WSDM Storage Detail**

### **Detailed Report**

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This Water Surplus and Drought Management (WSDM) report provides a recap of WY 2018 hydrologic conditions, an update of CY 2018 water supply and demand balances, and a summary of Metropolitan's storage programs including an estimate of end of CY 2018 storage balances.

#### **Water Year 2017/18 Hydrologic Conditions**

Below normal hydrologic conditions returned to the northern Sierra watershed in WY 2018 leading to a 35 percent SWP allocation in CY 2018. The northern Sierra snowpack peaked in late March at 50 percent of the April 1 average. The resulting runoff was only 71 percent of normal. This followed a water year of record-high precipitation and above-average snowpack that allowed for an 85 percent SWP allocation in CY 2017.

The Upper Colorado River Basin also experienced below normal hydrologic conditions. The basin snowpack peaked in early April at 74 percent of the April 1 average. The hot conditions and timing of the snowmelt resulted in a runoff into Lake Powell that was only 43 percent of normal. A net storage loss of roughly 4 MAF is forecasted for Lake Powell this year, reversing a trend of year over year storage increases in that reservoir since 2014. The Bureau of Reclamation is also forecasting a net storage decrease in Lake Mead. These decreasing storage conditions increase the likelihood of shortage conditions on the Colorado River system.

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### Calendar Year 2018 Water Supply and Demand Balance Projection

An estimated 1.62 MAF of supplies are available in CY 2018 between Metropolitan’s imported water supply sources. This estimate includes an adjustment of minus 27 TAF to account for the agricultural water users in California that have higher priority water rights to Colorado River supplies. Details of CY 2018 water supply estimate are shown in the table below:

<b>2018 Supply Estimate (Acre-Feet)</b>	
<i>Colorado River Aqueduct Base Supply Estimate</i>	
Basic Apportionment	550,000
IID/MWD Conservation Program	105,000
PVID/Bard Following Programs	76,000
Exchange with SDCWA (IID Transfer and Canal Lining)	208,000
Canal Lining Water to MWD	16,000
Lower Colorado Water Supply Project	9,000
Agricultural Adjustment	-27,000
	<b>Total CRA Base Supply</b>
	<b>937,000</b>
<i>State Water Project Supply Estimate (Acre-Feet)</i>	
Table A Supply (35% SWP allocation)	669,000
Yuba Transfer Supplies	14,000
Port Hueneme Agreement	1,000
	<b>Total SWP Supply</b>
	<b>684,000</b>
<b>Total Estimated Supply</b>	<b>1,621,000</b>

The CY 2018 demand projection is 1.69 MAF and includes member agency consumptive demands, replenishment deliveries, agreements and system losses. Details of the CY 2018 demand estimate are shown in the table below:

<b>2018 Estimated Demands, Losses and Obligations (Acre-Feet)</b>	
Member Agency Consumptive Demands	1,447,000
Member Agency Replenishment Demands	122,000
Coachella Valley Water District Agreement	35,000
System and Storage Losses	90,000
<b>Total Estimated Demands and Losses</b>	<b>1,694,000</b>

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The resulting supply and demand balance indicates approximately 73 TAF of demand that exceed supplies as shown in the table below. Metropolitan is currently estimating a net withdrawal of this amount from dry year storage reserves to meet demands.

<b>2018 Water Supply and Demand Balance Estimate (Acre-Feet)</b>	
Total Supplies	1,621,000
Total Demands and Losses	1,694,000
<b>Net Water Supply and Demand Balance</b>	<b>-73,000</b>

### Calendar Year 2018 Storage Activities

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.

In addition to changes in storage balances due to day-to-day operations, other adjustments to the storage balances are made throughout the year to capture accounting and contractual reconciliations. For example, Metropolitan's total storage levels at the beginning of CY 2018 were increased in July to include 28 TAF of Table A supplies that were requested in CY 2017 to be stored by Metropolitan but never delivered. DWR was unable to deliver this water due to SWP system outages. Per Article 14(b) of the long-term water supply contract with the State, DWR was required to deliver in 208. A listing of Metropolitan's storage programs, adjusted starting balances, projected puts/takes and end of year balances is shown in **Attachment 1**. Below is a discussion of the CY 2018 storage activity.

#### 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 a 35 percent SWP allocation, Metropolitan's contract allows for carryover of up to 100 TAF of current year Table A supplies. There is a risk, however, of losing a portion or all of these stored supplies should the San Luis Reservoir fill. If San Luis Reservoir filled, carryover water is considered by the Department of Water Resources (DWR) to be water available for allocation. 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.

Metropolitan carried over 200 TAF from CY 2017 into CY 2018. The low CY 2018 SWP allocation, prompted Metropolitan to deliver approximately 34 TAF of this water to satisfy obligations and demands earlier in the year. To help manage the available supplies this year and prepare for continued dry conditions next year, Metropolitan plans to carry over the remaining balance of 166 TAF, referred as prior year carryover, into CY 2019. In addition, approximately 83 TAF of Metropolitan's current year Table A supply will also be carried into CY 2019 for a total SWP Carryover of 249 TAF. Preliminary forecasts of San Luis Reservoir levels do not suggest the reservoir will fill early next year, providing Metropolitan ample flexibility to manage these supplies and minimizing the risk of spill. Metropolitan will continue to evaluate conditions and make appropriate adjustments to mitigate the risk of spill.

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### 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 did not rely heavily on the Banking Programs in CY 2018 despite the low SWP allocation. Metropolitan is estimating a minimal net withdrawal of roughly 4 TAF in CY 2018 keeping the total Banking Program storage balance relatively unchanged at approximately 497 TAF.

### 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. These supplies were not required in CY 2018 and 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 is estimating a decrease of roughly 40 TAF in DVL storage this year. This decrease is primarily due to the repositioning of Metropolitan's in-region dry-year storage reserves. Should conditions turn wet on the SWP system and San Luis Reservoir fills in CY 2019, Metropolitan can utilize the space made available in DVL to evacuate its SWP Carryover supplies and mitigate potential losses.

### 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, 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.

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 7 TAF after meeting the annual exchange contract obligation, which would bring storage in this program to roughly 235 TAF.

### 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.

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Metropolitan participated in the Lake Mead ICS program since its inception. Metropolitan draws on Lake Mead ICS to help fill the Colorado River Aqueduct in low SWP allocation 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 63 TAF this year, bringing storage in this program to roughly 542 TAF.

### 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.

Metropolitan is currently estimating a storage put of approximately 6 TAF for the Conjunctive Use Program and approximately 4 TAF for the Cyclic Storage Program this year. Despite the low SWP allocation the region continues to rebuild groundwater storage through these accounts. This storage activity is happening through four different accounts, all shown in **Attachment 1**.

### **2019 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, 2018, DWR announced an initial SWP allocation of 10 percent for CY 2019. 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. In CY 2018 this operating criteria expanded the storage space in Oroville reserved to capture flood flows while replacement of the main spillway structure was completed. This ensured the safe management of a runoff from a theoretically possible extreme flood event. Although the new criteria had the potential to reduce opportunities to develop supplies, the below normal runoff conditions in WY 2018 did not trigger significant flood control releases to negatively impact the SWP allocation. DWR released a new Oroville operating criteria for 2019 operations. This plan is not as stringent as the CY 2018 criteria and DWR does not anticipate any water supply impacts even under wet hydrologic conditions.

Northern California hydrologic conditions started the year well below normal. Prior to the storm systems in mid-November, precipitation at the 8-Station Index, a collection of gauges that provide a metric for supply conditions, recorded the fifth lowest levels in history with little to no snowpack. Following the first major storm systems to hit the area, the 8-Station Index jumped to 86 percent of normal as of December 1, 2018. The snowpack in the Upper Colorado River Basin, in contrast, is tracking slightly above average for this time of year, measuring 112 percent of normal as of December 1, 2018. Given this system by most measures is in its 19<sup>th</sup> year of drought, a series of above normal years in addition to demand management actions would be needed to bolster total system storage and reduce the risk of triggering a shortage condition. Metropolitan will continue to monitor the development of the hydrologic conditions and water supply impacts.

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### 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. 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 CY 2018.

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.

The table below shows all outstanding Dry-year Exchange payback amounts.

<b>Dry-year Exchange/Program</b>	<b>Payback Amount</b>	<b>Payback Term</b>
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	132,000	Any year, conditional on whether or not Metropolitan is implementing a WSAP
<b>Total</b>	<b>462,000</b>	

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 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.

<b>Operational Exchange/Program</b>	<b>Payback Amount</b>	<b>Payback Term</b>
Strand Ranch - Irvine Ranch	4,000	No later than 2024
Dudley Ridge WD – Irvine Ranch	7,000	No later than 2022
<b>Total</b>	<b>11,000</b>	

## 2018 Projected WSDM Storage Detail

(Operations and final accounting will affect storage balances)

WSDM Storage	1/1/2018 Storage Levels	Estimated Change in Storage	1/1/2019 Storage Levels
<b>Colorado River Aqueduct System</b>	<b>479,000</b>	<b>63,000</b>	<b>542,000</b>
Lake Mead ICS	479,000	63,000	542,000
<b>State Water Project System</b>	<b>1,054,000</b>	<b>-79,000</b>	<b>975,000</b>
MWD SWP Carryover	200,000	50,000	250,000
DWCV SWP Carryover	97,000	-97,000	0
MWD Article 14(b)	28,000	-28,000	0
Castaic Lake (DWR Flex Storage)	154,000	0	154,000
Lake Perris (DWR Flex Storage)	65,000	0	65,000
Arvin Edison Storage Program	149,000	5,000	154,000
Semitropic Storage Program	187,000	0	187,000
Kern Delta Storage Program	138,000	0	138,000
Mojave Storage Program	27,000	-9,000	18,000
AVEK Storage Program	9,000	0	9,000
<b>In-Region Supplies and WSDM Actions</b>	<b>1,012,000</b>	<b>-64,000</b>	<b>948,000</b>
Diamond Valley Lake	747,000	-46,000	701,000
Lake Mathews	139,000	-26,000	113,000
Lake Skinner	38,000	-2,000	36,000
IEUA/TVMWD (Chino Basin)	36,000	5,000	41,000
Long Beach (Central 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)	0	0	0
Three Valleys (Upper Claremont)	1,000	0	1,000
Western	3,000	1,000	4,000
Cyclic - Upper San Gabriel	32,000	11,000	43,000
Cyclic - Three Valleys	0	0	0
Cyclic - Burbank	6,000	0	6,000
Cyclic - Calleguas	0	0	0
Cyclic - Eastern	1,000	0	1,000
Cyclic - MWDOC	9,000	-7,000	2,000
<b>Other Programs</b>	<b>556,000</b>	<b>7,000</b>	<b>563,000</b>
Other Emergency Storage	328,000	0	328,000
DWCV Advance Delivery Account	228,000	7,000	235,000
<b>Total</b>	<b>3,101,000</b>	<b>-73,000</b>	<b>3,028,000</b>
Emergency	626,000	0	626,000
<b>Total WSDM Storage <sup>1</sup></b>	<b>2,475,000</b>	<b>-73,000</b>	<b>2,402,000</b>

<sup>1</sup> Total WSDM Storage level is subject to change based on accounting adjustments.