

# Supporting Analysis & Calculations

## Introduction

On May 18, 2016, the State Water Resources Control Board (SWRCB) amended its emergency water conservation regulation. The amended regulation now includes a supply-based approach that recognizes the unique water supply conditions of each water supplier. The new supply-based approach considers the necessity for a conservation standard for the period of June 2016 through January 2017, based on each water supplier's specific circumstances and water supplies. The new regulation requires individual urban water suppliers – or a region as a whole, if all of that region's water suppliers agree – to self-certify the sufficiency of available water supplies using a calculation methodology prescribed in the amended emergency water conservation regulation.

In support of the region as a whole self-certifying supply sufficiency, on June 9, 2016, the Water Authority Board of Directors adopted Resolution No. 2016-07, instructing the Water Authority General Manager, under Article 22.5 of the SWRCB's Emergency Regulation, to submit to the SWRCB an aggregated conservation standard. The member agencies of the Water Authority all consented to the regional self-certification approach.

The SWRCB's supply sufficiency calculation is based on a series of conservative assumptions including projecting, for the purpose of the calculation, available supplies based on three additional years of drought, with the third year, 2019, serving as the evaluation year that determines the conservation standard for the period of June 2016 through January 2017. The calculation specifies the use of hydrology from 2013, 2014, and 2015, to project water supplies for 2017, 2018, and 2019. Very conservative demand projections for the three-year period are based on a water supplier's average potable water use in 2013 and 2014 – a period where water use was significantly higher than current water demand trends. Projected water supplies and demands for 2019 are compared to determine whether a surplus or deficit exists. If the projected water supplies meet or exceed the demand, the water conservation standard is set at zero for the period of June 2016 through January 2017. If demand exceeds available water supplies, the conservation standard is equivalent to the percentage of the water supply deficit.

The SWRCB's supply sufficiency calculation for the Water Authority service area is shown in the formula below:

$$\text{Member Agency Potable Water Use} - \left( \text{Water Authority Available Supplies} + \text{Member Agency Local Supplies} + \text{Water Authority Stored Water} \right) = \text{Supply Adequacy}$$

The calculation is used to show that Water Authority supplies, when combined with member agency local supplies and supplemented by Water Authority stored water supplies, are sufficient to meet demand.

## **Supporting Analysis and Calculation Requirement**

The SWRCB Water Supply Reliability Certification and Data Submission Form requires, as part of Step 5, supporting documentation that validates all analyses and calculations used to project supplies and demands for the supply sufficiency calculation. This section provides documentation and an explanation of the information and methodology used in the submission form and accompanying worksheets, including references to source documents.

## **Supply**

The Water Authority's water sources include the Quantification Settlement Agreement (QSA) supplies made up of Imperial Irrigation District (IID) transfers and the All American Canal (ACC) and Coachella Canal (CC) lining projects; supplies from the Claude "Bud" Lewis Carlsbad Desalination Plant and supplies purchased from the Metropolitan Water District of Southern California (MWD). In addition, when needed, the Water Authority can supplement its supplies with water from its surface and groundwater storage accounts. Furthermore, member agencies have developed their own local water supplies in an effort to be more self-reliant and mitigate the impacts of dry years.

**Quantification Settlement Agreement** - On April 29, 1998, the Water Authority signed a historic agreement with IID for the long-term transfer of conserved Colorado River water to San Diego County. The Water Authority-IID Water Conservation and Transfer Agreement is the largest agriculture-to-urban water transfer in U.S. history. Colorado River water is conserved by Imperial Valley farmers who voluntarily participate in the program by fallowing and implementing on-farm conservation projects that conserve water, which is then transferred to the Water Authority for use in San Diego County. Additionally, the IID is developing distribution system efficiency improvements to conserve water, which are planned to increase over time as the transfer volume ramps up. Through this transfer agreement, the Water Authority is entitled to Priority 3(a) water, which is a higher priority water right than Metropolitan's Priority 4 apportionment.

Deliveries into San Diego County from the transfer began in 2003. The Water Authority receives transfer water each year according to a water delivery schedule contained in the transfer agreement. In 2015, the Water Authority received 100,000 AF. The quantities are scheduled to ramp up to 200,000 AF by 2021 and then remain fixed for the duration of the transfer agreement. The initial term of the transfer agreement is 45 years, with a provision that either agency may extend the agreement for an additional 30-year term. The conserved water is transferred under IID's Colorado River rights, which are among the most senior in the Lower Colorado River Basin.

IID Transfers in 2017 = 100,000 AF  
IID Transfers in 2018 = 130,000 AF  
IID Transfers in 2019 = 160,000 AF

In addition to the IID transfer water, the ACC lining project makes 67,700 AF of Colorado River water per year available for allocation to the Water Authority and San Luis Rey Indian water rights settlement parties. The CC lining project makes 26,000 AF of Colorado River water available each year for allocation. The 2003 Allocation Agreement provides for 16,000 AF/YR of conserved canal lining water to be allocated to the San Luis Rey Indian water rights settlement parties. The remaining amount, 77,700 AF/YR, is to be available to the Water Authority, with up to an additional 4,850 AF/YR available to the Water Authority, depending on environmental requirements from the CC lining project. For planning purposes, the Water Authority assumes that 2,500 AF of the 4,850 AF will be available each year for delivery, for a total of 80,200 AF/YR of that supply.

ACC and CC Lining Projects Transfers in 2017 = 80,200 AF  
ACC and CC Lining Projects Transfers in 2018 = 80,200 AF  
ACC and CC Lining Projects Transfers in 2019 = 80,200 AF

Total available from QSA = IDD Transfers + (ACC + CC Lining)  
Quantity available in 2017 = 100,000 + 80,200 = 180,200 AF  
Quantity available in 2018 = 130,000 + 80,200 = 210,200 AF  
Quantity available in 2019 = 160,000 + 80,200 = 240,200 AF

Source Document Links:

QSA: General Reference - [http://www.sdcwa.org/sites/default/files/files/QSA\\_final.pdf](http://www.sdcwa.org/sites/default/files/files/QSA_final.pdf)  
IID Transfer: Page 4 - [http://www.sdcwa.org/sites/default/files/files/QSA\\_4thAmend.pdf](http://www.sdcwa.org/sites/default/files/files/QSA_4thAmend.pdf)  
AAC and CC Lining Project Transfers: Page 19 - [http://www.sdcwa.org/sites/default/files/files/QSA\\_allocation-agreement.pdf](http://www.sdcwa.org/sites/default/files/files/QSA_allocation-agreement.pdf)

**Claude “Bud” Lewis Carlsbad Desalination Plant** - Development of seawater desalination in San Diego County assists the region in diversifying its water resources; reduces dependence on imported supplies; and provides a new drought-proof, locally produced water supply. The Lewis Carlsbad Desalination Plant is a fully operational seawater desalination plant owned and operated by Poseidon Water, a private investor-owned company that develops water and wastewater infrastructure. The Lewis Carlsbad Desalination Plant, located adjacent to the Encina Power Station in Carlsbad, began commercial operation on December 23, 2015, and provides a highly reliable local supply of up to 56,000 AF/YR to the region. Of the total Lewis Carlsbad Desalination Plant production, 6,000 AF is accounted for as “member agency local supply.”

Quantity available in 2017-2019 = 50,000 AF/year

Source Document Link: Pages 105-106 of the Water Purchase Agreement  
<http://www.sdcwa.org/sites/default/files/files/waterpurchaseagreement.pdf>

**Metropolitan Water District of Southern California** - The Water Authority's imported water sources include purchases from MWD. The extent to which MWD's member agencies rely upon MWD supplies varies by the amount of local supplies available or each agency's own reliability goals. MWD has the ability to provide the following supplies to the Water Authority in 2017 through 2019:

Quantity available in 2017 = 290,798 AF

Quantity available in 2018 = 257,237 AF

Quantity available in 2019 = 233,242 AF

Source Document Link: <http://www.mwdh2o.com/AboutYourWater/Planning/Planning-Documents/Pages/default.aspx>

**Member Agency Local Supplies** - Local resources developed and managed by the Water Authority's member agencies are critical to securing a diverse and reliable water supply for the region. Local projects reduce demands for imported water and some local supplies provide member agencies with a drought-resilient supply. Local supplies include surface water, groundwater, recycled water (offset to potable water demands), and desalinated seawater. Local supply volumes for surface water and groundwater were provided by the Water Authority's member agencies based on hydrology in years 2013 through 2015. Carlsbad Municipal Water District and Vallecitos Water District have secured 2,500 AF/YR and 3,500 AF/YR (6,000 AF/YR Total) of local supplies respectively from the Claude "Bud" Lewis Carlsbad Desalination Plant.

Quantity available in 2017 = 37,511 AF

Quantity available in 2018 = 39,499 AF

Quantity available in 2019 = 38,763 AF

Source: Local supply quantities were provided by member agencies. Each member agency will upload documentation of their supply sources onto the State's database.

**Water Authority Storage Programs** – The Water Authority maintains regional storage for both emergency and carryover purposes. Emergency storage was established to serve member agencies during a prolonged regional supply interruption. Carryover storage includes both reservoir and groundwater storage and was developed in order to: 1) enhance reliability during extended dry year periods; 2) increase operational flexibility during peak demands or extended drought; and 3) better manage water supplies by allowing more deliveries during wet years and increasing supply availability during dry years. The Water Authority has approximately 180,841 AF currently stored, of the total 260,100 AF of capacity, in these programs. For the SWRCB supply sufficiency calculation, evaporation rates are estimated by using actual 2015 evaporation data distributed using monthly peaking factors based on California Irrigation Management Information System (CIMIS) evapotranspiration rates for Zone 6.

**SWRCB Supply Sufficiency Calculation  
Projected Storage Utilization (2017 – 2019)**

	2017	2018	2019
Beginning Storage Pool	180,841 AF	147,059 AF	112,649 AF
Withdraw to Meet Demand	(23,306 AF)	(26,079 AF)	(21,256 AF)
Evaporation	(10,476 AF)	(8,331 AF)	(6,197 AF)
Ending Storage Pool	147,059 AF	112,649 AF	85,196 AF

Source: Emergency and carryover storage programs are addressed in the Water Authority’s 2010 Urban Water Management Plan, Pages 150 and 156, respectively - <http://www.sdcwa.org/sites/default/files/files/water-management/2010UWMPfinal.pdf>. Current storage volumes are from the Water Authority’s PRIMA database.

**Demand**

The aggregate demand is a summation of individual member agency demands. Individual member agency demands are based on the average of actual potable water used for calendar year 2013 and 2014 per Section 864.5(b)(3).

Aggregate Potable Water Use in 2019 = 557,736 AF

Source: <http://www.sdcwa.org/water-use>. Actual 2013 and 2014 demands are from the Water Authority’s PRIMA database.

**Calculation Methodology**

The methodology used in determining the aggregate surplus or shortfall is based on the table below:

Member Agency	CY 13 & CY 14 Average Potable Water Use	% of Total	Water Authority Supply	Surplus / (Deficit) Before Local Supplies or Water Authority Storage Draw	Member Agency Local Supply	Surplus / (Deficit) Before Use of Stored Water	Water Authority Storage Draw to Cover Remaining Deficit	Final Surplus / Supply Sufficiency
	(A)	(B)	(C) = 523,442 AF x (B)	(D) = (C) - (A)	(E)	(F) = (C) + (E) - (A)	(G)	(H)

Individual member agencies are listed in the first column.

Column A lists each member agency’s average calendar year 2013 and 2014 potable water use.

Column B lists each member agency’s average calendar year 2013 and 2014 potable water use as a percentage of the total average potable water use from Column A.

Column C lists each member agency's proportional share of available Water Authority supplies. Water Authority supplies are distributed to each member agency by multiplying the available Water Authority supplies by the percentage in Column B.

Column D lists each member agency's water surplus or deficit (before local supplies or Water Authority storage draw) by comparing Water Authority supplies to the average potable water use in Column A. A surplus exists if Column C is greater than Column A. A deficit exists if Column A is greater than Column C.

Column E lists each member agency's local supply. A member agency's local supply is only used to calculate that member agency's supply sufficiency. Surplus supplies are not available to other member agencies.

Column F lists each member agency's water surplus or deficit (before any Water Authority storage draw) by comparing Water Authority and member agency local supplies to the average potable water use in Column A. A surplus exists if Column C plus Column E is greater than Column A. A deficit exists if Column A is greater than Column C plus Column E.

Column G lists the amount of Water Authority storage water added to each member agency's supply calculation to ensure supply sufficiency. Member agencies that have a surplus in Column F do not receive any Water Authority storage water in Column G.

Column H lists each member agency's level of supply sufficiency. The summation of Column H is the aggregate surplus for the region.

## **Conclusion**

The numbers for all three years (2017-2019) show that the Water Authority and its member agencies have adequate supply to meet projected demands under the conditions outlined in Section 864.5, Self-Certification of Supply Reliability for Three Additional Years of Drought.

The supply, demand, and methodology information provided in the sections above will be applied to SWRCB Worksheet 2: Calculation for Aggregate Self-Certification Standard; a requirement of the Water Supply Reliability Certification and Data Submission Form.