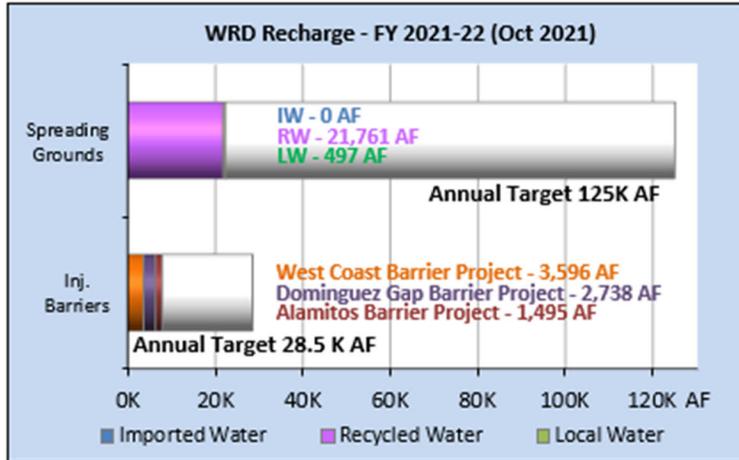
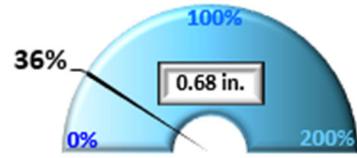


GROUNDWATER BASIN UPDATE FOR DECEMBER 2021

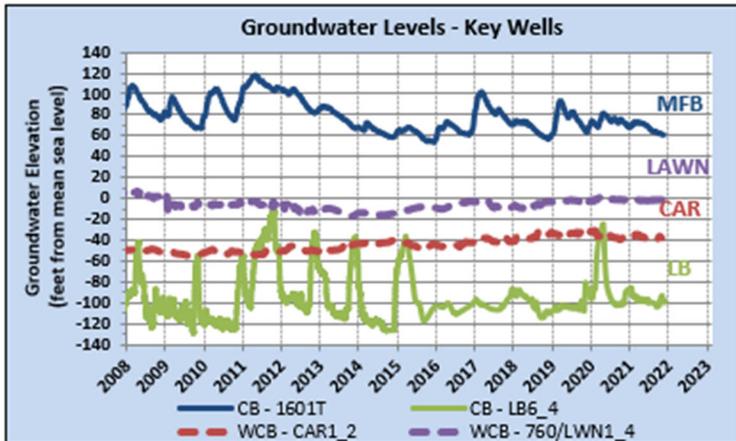
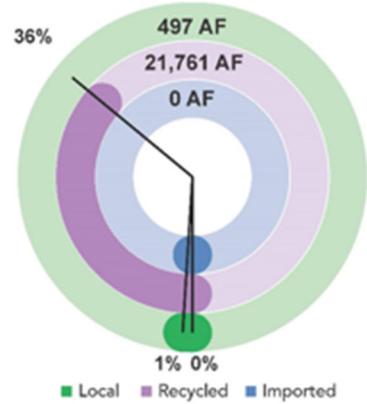
GROUNDWATER BASINS AT A GLANCE*



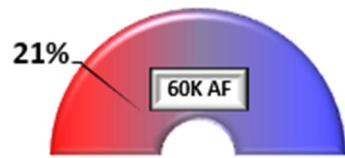
Precipitation % of Normal to Date
Oct. 1 - Dec. 3



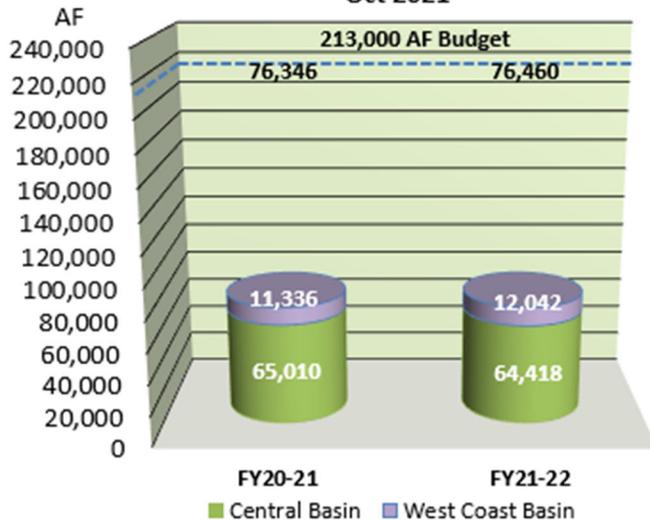
Spreading Grounds Recharge
Fiscal Year to Date



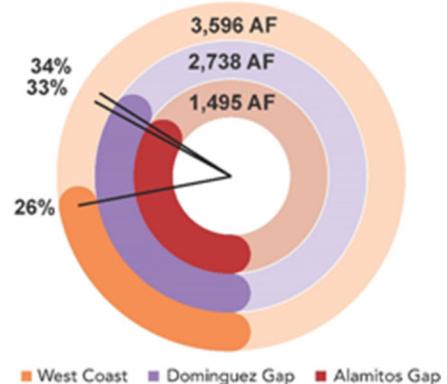
GW Basin Operating Range



Basin Pumping (Q)
Oct 2021



Seawater Barrier Recharge
Fiscal Year to Date



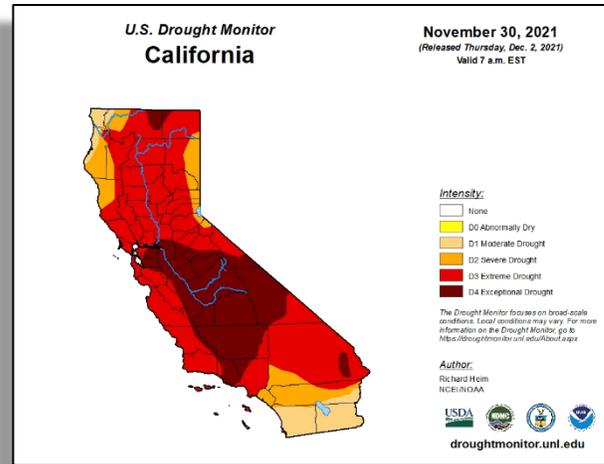
* - Preliminary numbers, subject to change.

SUMMARY

Staff monitors groundwater conditions in the District's service area throughout the year. A summary of the latest information is presented below.

Precipitation (Oct. 1, 2021 – Dec. 3, 2021)

The WRD precipitation index reports that for the 2021-22 Water Year, there has been slightly above average rainfall (0.68 inches) through December 3, 2021. The normal rainfall for this time period is 1.91 inches, so the District is 36% of normal. As of November 30, 2021, the U.S. Drought Monitor is reporting 100% of the State is under moderate, 92% under severe (-2%), 80% under extreme (-3%), and 28% exceptional (-11%) drought conditions.



Snowpack (Snow Water Content [SWE] as of December 3, 2021)

In 1929, the State established the California Cooperative Snow Surveys Program with the California Department of Water Resources as the coordinator. Today, over 50 state, national, and private agencies collaborate in collecting snow data from over 300 snow courses with more than 60 of the courses being the original courses established in the early 1900's. The average snow course is 1,000 feet long and consist of about 10 sample points. Anywhere from two to six courses are measured per day depending on weather and access method.

The snow survey is completed using a snow sampling tube equipped with a cutter on the end that is driven through the snow measuring the depth and obtaining a snow core. The snow core is then weighed and the snow water content (or snow water equivalent) calculated. The surveys are completed throughout the winter by returning to the same sample points throughout the season to observe the changing conditions. From February through May the data is used by the State to forecast snow melt runoff. Many snow courses are only measured on or around April 1st, and since it is presumed that the snow accumulates up to April 1st and melts thereafter, April 1st is the benchmark for historic data comparisons.

NORTH	
Data For: 03-Dec-2021	
Number of Stations Reporting	29
Average snow water equivalent	0.6"
Percent of April 1 Average	2%
Percent of normal for this date	11%

CENTRAL	
Data For: 03-Dec-2021	
Number of Stations Reporting	45
Average snow water equivalent	0.9"
Percent of April 1 Average	3%
Percent of normal for this date	16%

SOUTH	
Data For: 03-Dec-2021	
Number of Stations Reporting	31
Average snow water equivalent	1.4"
Percent of April 1 Average	5%
Percent of normal for this date	33%

STATEWIDE SUMMARY	
Data For: 03-Dec-2021	
Number of Stations Reporting	105
Average snow water equivalent	0.9"
Percent of April 1 Average	3%
Percent of normal for this date	17%

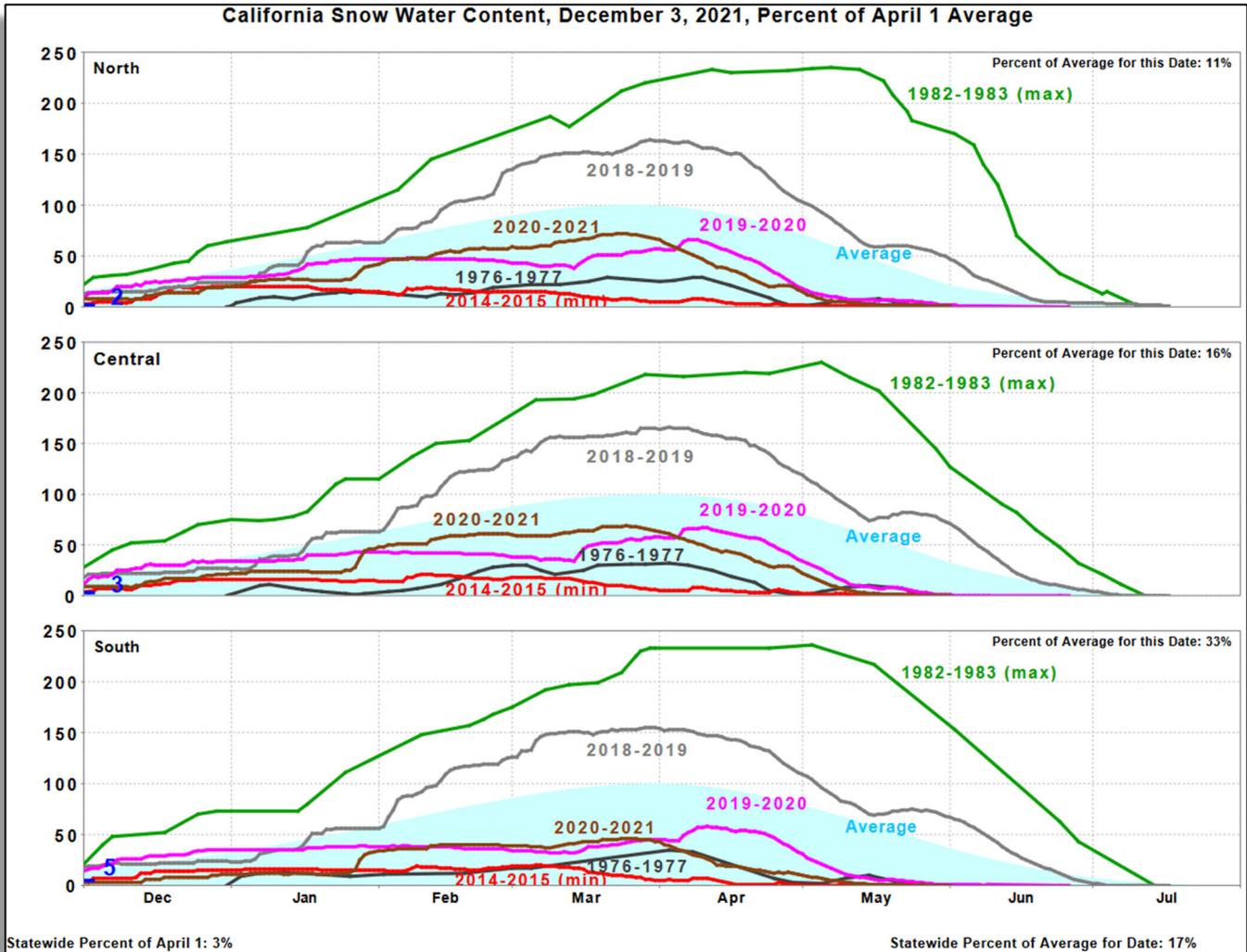
Snow Water Equivalent (SWE):

Northern Sierra Nevada – 0.6 in., 11% of normal to date and 2% of April 1st average

Central Sierra Nevada – 0.9 in., 16% of normal to date and 3% of April 1st average

Southern Sierra Nevada – 1.4 in., 33% of normal to date and 5% of April 1st average

Statewide Summary – 0.9 in., 17% of normal to date and 3% of April 1st average



A La Nina has developed and will extend through the second winter in a row. La Nina is a natural ocean-atmospheric phenomenon marked by cooler-than-average sea surface temperatures across the central and eastern Pacific Ocean near the equator.

Consecutive La Ninas following are not uncommon and can be referred to as a “double-dip.” In 2020, La Nina developed during the month of August and then dissipated in April 2021 as neutral conditions returned.

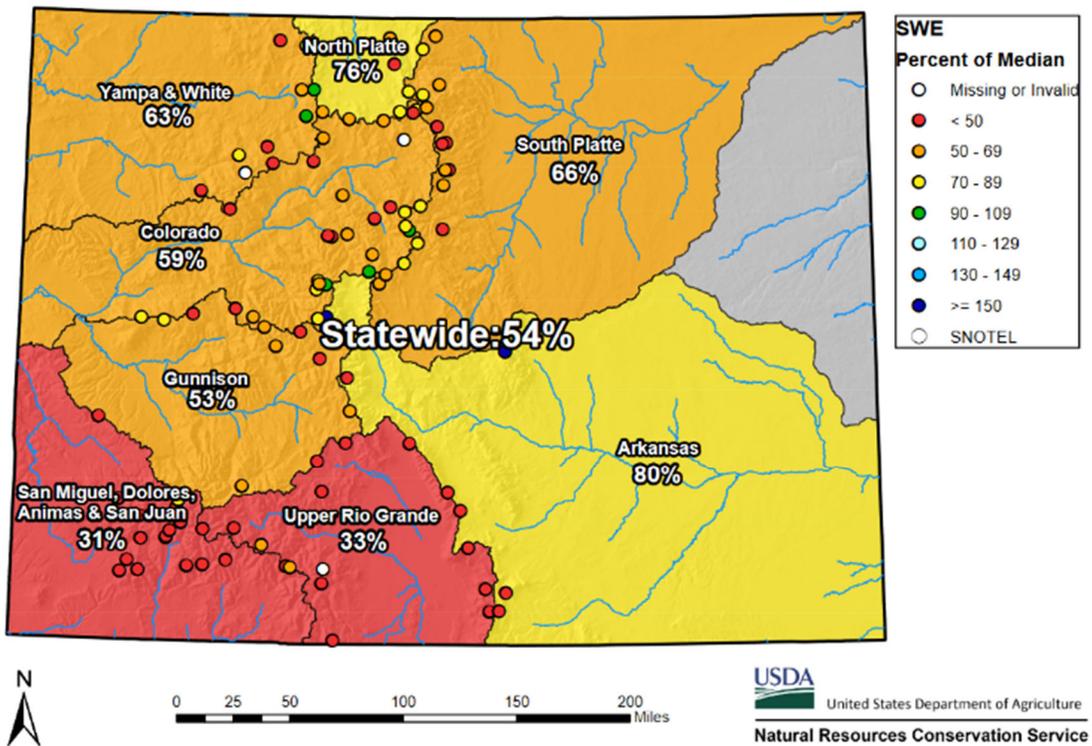
Scientists have been tracking the potential development of a La Nina since this summer, and it was a factor in the above-normal hurricane season forecast. La Nina also influences weather across the country during the winter, and it will influence our upcoming temperature and precipitation outlooks.

This La Nina is expected to last through the early spring 2022. For the upcoming winter season, which extends from December 2021 through February 2022, there is an 87% chance of La Nina.

Previous La Ninas occurred during the winter of 2020-2021 and 2017-18, and an El Nino developed in 2018-19.

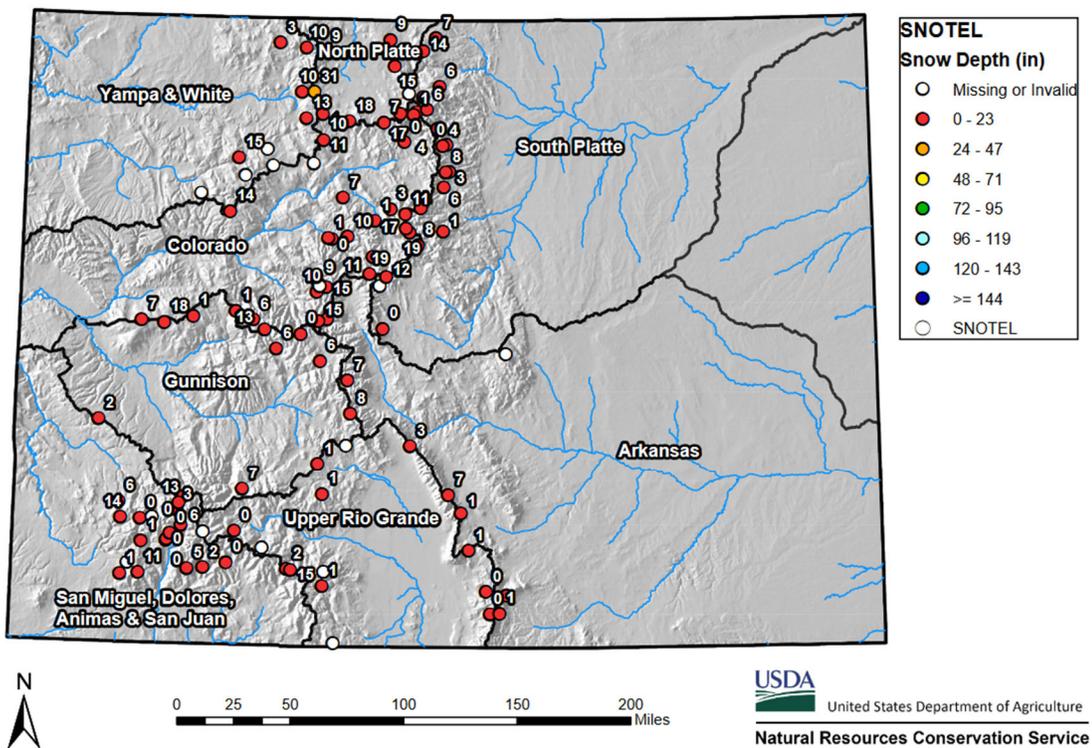
Colorado SNOTEL Snow Water Equivalent (SWE) Update Map with Site Data

Current as of Dec 03, 2021



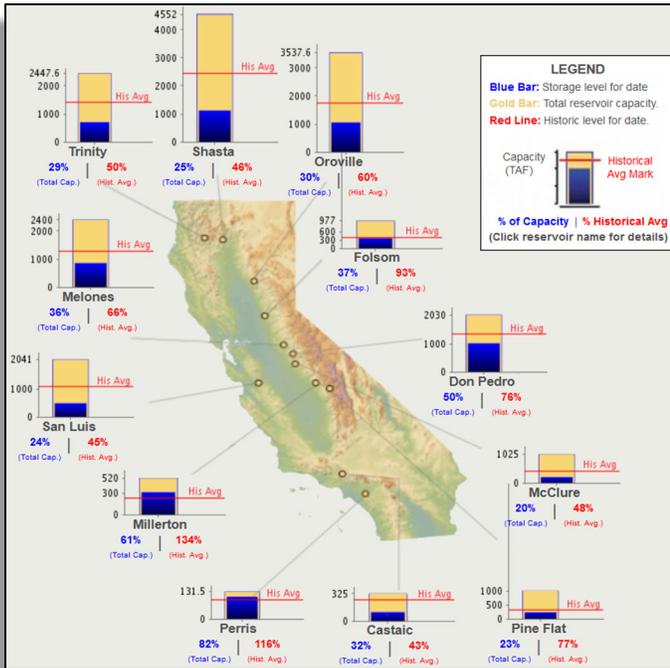
Colorado SNOTEL Snow Depth

Current as of Dec 03, 2021



Reservoirs (as of December 2, 2021)

For the 16 reservoirs reported monthly to the committee, water levels have increased in 11 of 16 reservoirs. The largest increase occurred at San Luis Reservoir (0.16 million acre feet, MAF) and the smallest increases occurred at Lakes Castaic and McClure (0.01 MAF). The largest decrease (-0.14 MAF) occurred at Lake Powell. The smallest decrease (<-0.0 MAF) occurred at Lakes Perris and Silverwood.



MWD Reservoirs (SWP) Storage in Million Acre Feet

Reservoir	Capacity	Storage	% Full	Change
Trinity Lake	2.45	0.71	29%	0.02
Lake Shasta	4.55	1.12	25%	0.10
Lake Oroville	3.54	1.06	30%	0.07
Folsom Lake	0.98	0.36	37%	0.04
New Melones L.	2.40	0.86	36%	0.03
Don Pedro Res	2.03	1.02	50%	0.02
Lake McClure	1.02	0.21	20%	0.01
San Luis Res	2.04	0.48	24%	0.16
Millerton Lake	0.52	0.32	61%	0.02
Pine Flat	1.00	0.23	23%	0.02
Castaic Lake	0.33	0.11	32%	0.01
Lake Perris	0.13	0.11	82%	0.00
L. Silverwood	0.08	0.07	86%	0.00

MWD Reservoirs (CRA) Storage in Million Acre Feet

Reservoir	Capacity	Storage	% Full	Change
Powell	24.32	7.03	29%	-0.14
Mead	26.12	8.82	34%	-0.08
DVL	0.81	0.60	75%	-0.01

Black Text - Decrease or no change in storage since the last report.
Green Text - Increase in storage since the last report.

These 16 reservoirs are at 32% capacity (23.1MAF) which is up 0.26 MAF from the prior month (0.49 MAF State Water Project [SWP] and -0.23 MAF Colorado River Aqueduct [CRA]).

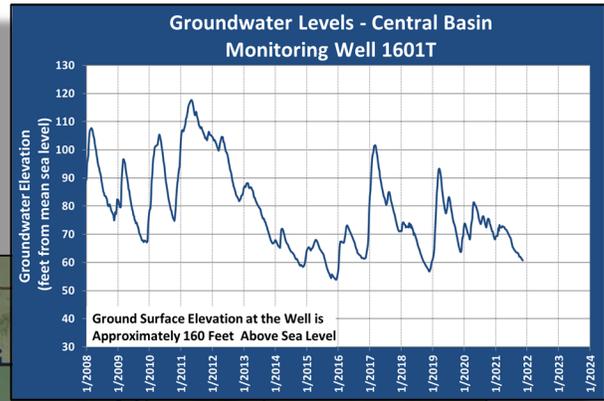
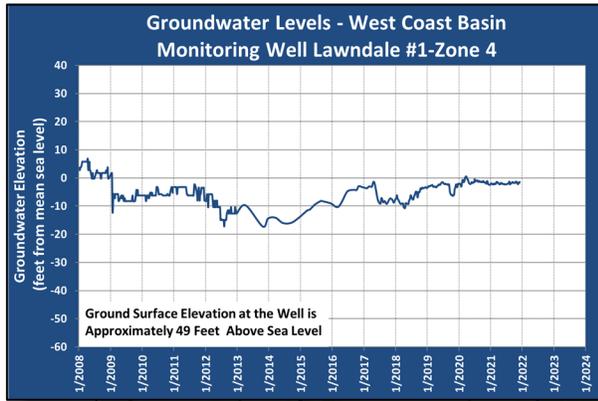


Did you know?

Groundwater's age (or time since recharge) in shallow, local systems can vary from less than a day to a few hundred years. In deep, regional systems with long flow paths (tens of miles), the age of groundwater may reach thousands or tens of thousands of years.

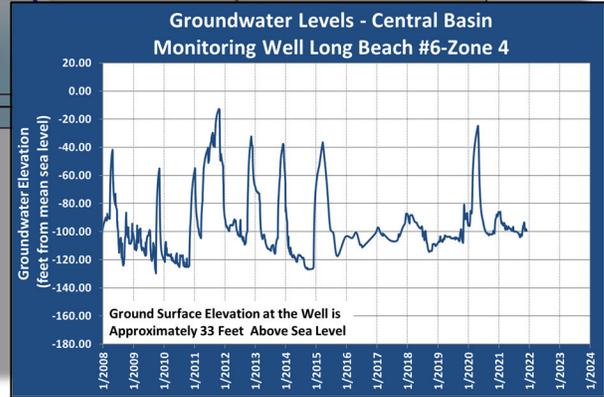
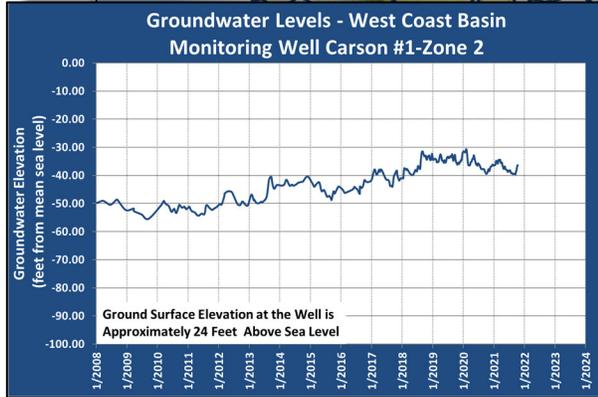
Groundwater Levels (through December 3, 2021)

Groundwater levels in key monitoring wells are shown in the hydrographs below.



Central Basin Key Well Long Beach #6 and West Coast Basin Key Wells Lawndale #1 & Carson #1 are in a confined aquifer and do not respond readily to rainfall but instead to changes in pumping patterns and barrier recharge.

Central Basin Key Well 1601T is between the two spreading grounds and rises rapidly with rainfall and replenishment but falls sharply during dry spells and lack of replenishment.



Groundwater Level Changes in Key Wells

Well Name	Since Last Report	Since Same Time the Previous Year
Central Basin Key Well 1601T	Decreased 1.0 foot	Decreased 10.4 feet
Central Basin Key Well Long Beach #6_4	Decreased 4.6 feet	Decreased 9.4 feet
West Coast Basin Key Well Lawndale #1_4	Increased 0.3 foot	Increased 0.8 foot
West Coast Basin Key Well Carson #1_2	Decreased 0.7 foot	Decreased 0.3 foot

Bold indicates a change in direction (decreasing or increasing) since the last report.

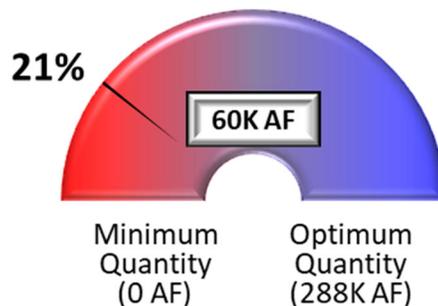
Optimum and Minimum Groundwater Quantity

In response to a 2002 State audit of the District's activities, the Board of Directors adopted an Optimum and Minimum Quantity for groundwater in the District to define an appropriate operating range that would sustain adjudicated pumping rights, leave room for future storage projects, and identify a lower limit. The amounts are based on the accumulated overdraft concept, which the District tracks year by year based on changes in groundwater storage.

After an extensive review of over 70 years of water level fluctuations and discussions with the Board and pumping community, Water Year 1999/2000 was recognized as a representative year for the Optimum Quantity, which equated to an accumulated overdraft of approximately 612,000 acre feet. The Minimum Quantity was defined as an accumulated overdraft of 900,000 acre feet, which allowed an operating range from 0 acre feet (minimum) to 288,000 acre feet (optimum). The Board also adopted a policy to make-up the groundwater deficit should the accumulated overdraft fall too far below the Optimum Quantity.

The Accumulated Overdraft as of December 3, 2021, has been estimated at 839,834 acre feet (subject to change), which is 60,166 acre feet above the Minimum Quantity and 227,834 acre feet below the Optimum Quantity. The Basin is at 21% of Optimum Quantity which is 8% lower than what was reported last month (~24,000 AF lower).

GW Basin Operating Range



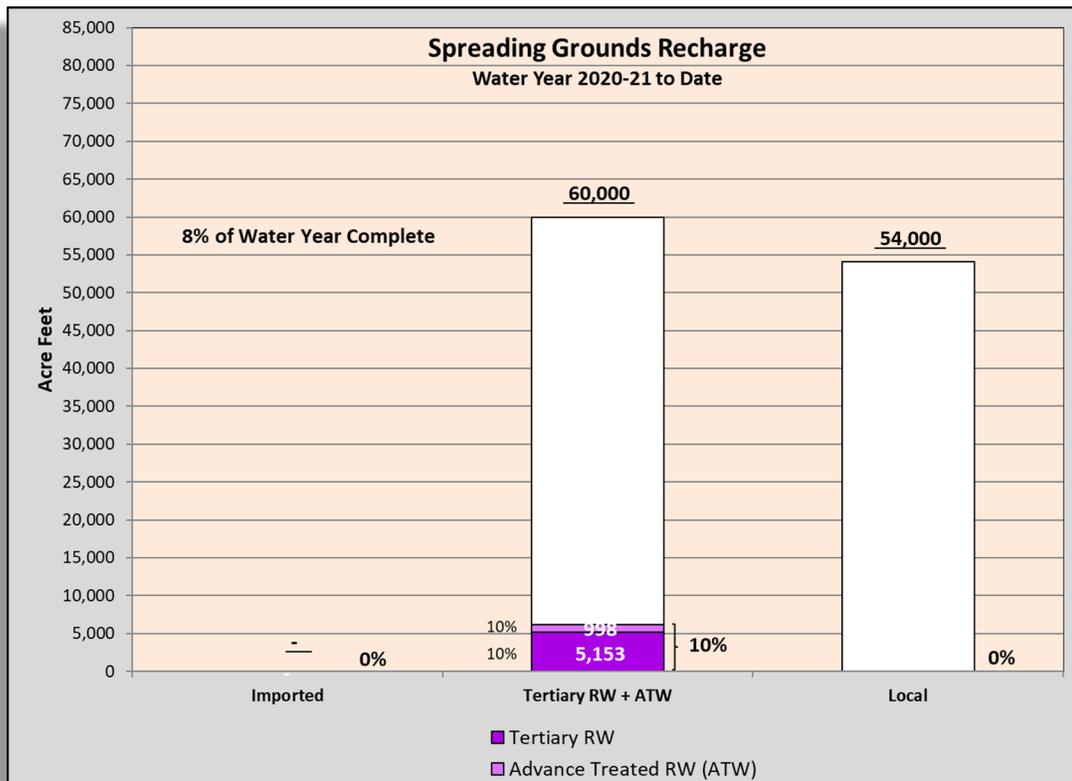
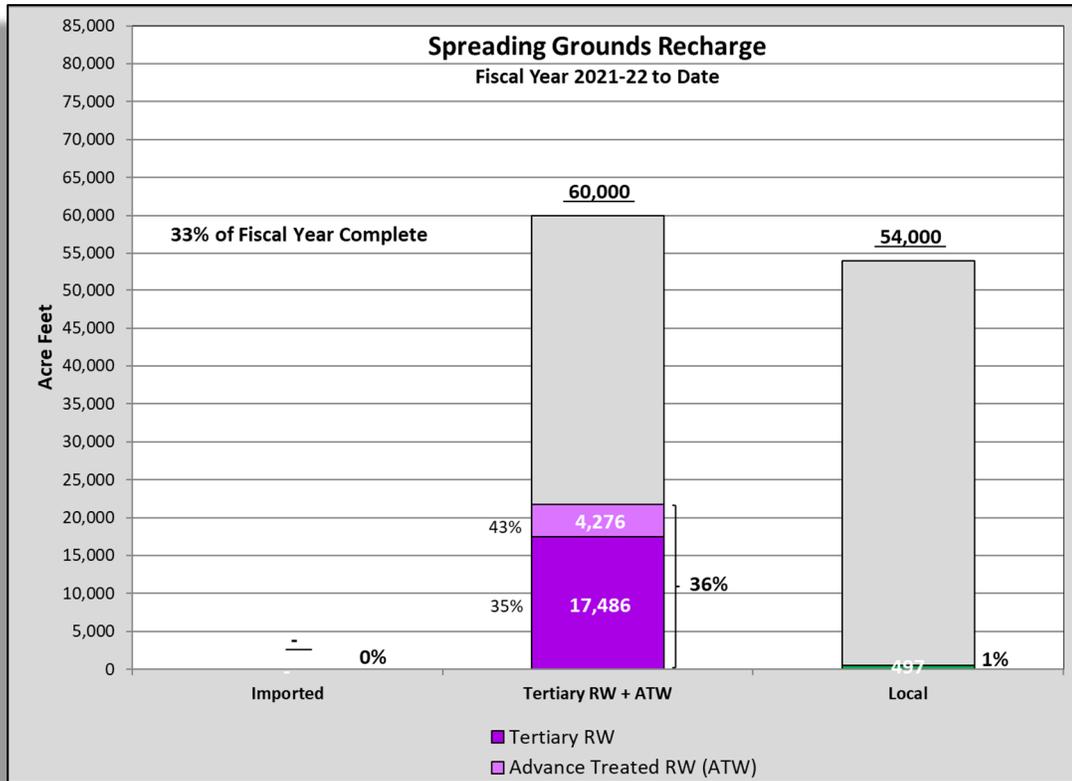
FACT:

The U.S. uses 79.6 billion gallons per day of fresh groundwater for public supply, irrigation, livestock, manufacturing, mining, thermoelectric power, and other purposes.



Montebello Forebay Spreading Grounds (July - October 2021)

The following Charts shows the preliminary spreading grounds replenishment water for the current Fiscal Year (2021-22; 4 months) and Water Year (2020-21; 1 month):

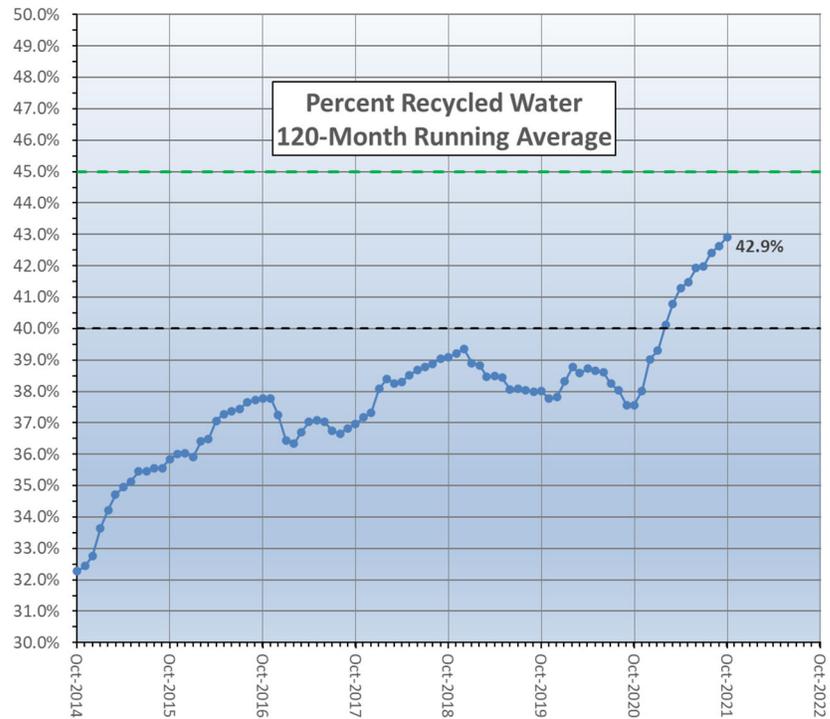
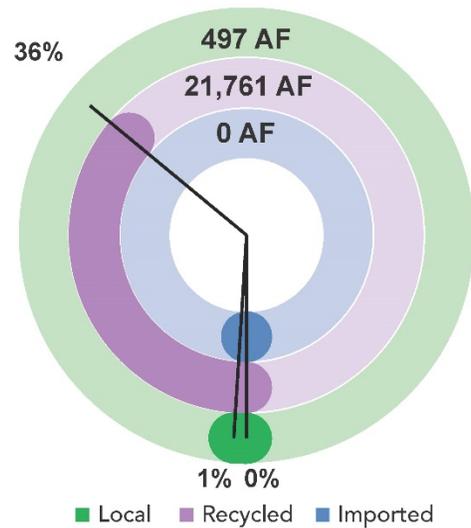


No imported water purchases are planned for Fiscal Year 2021-22.

Local water (stormwater plus dry weather urban runoff) is captured by the Los Angeles County Department of Public Works (LACDPW) at the spreading grounds for recharge. Local water amounts are determined as the sum of the total waters conserved at the spreading grounds less the imported and recycled water deliveries. For the 2021-22 Fiscal Year, approximately 497 acre feet of local water capture has been reported by the LACDPW.

Preliminary numbers for the 2021-22 Fiscal Year show that approximately 21,761 acre feet of recycled water has been recharged with 4,276 acre feet consisting of advanced treat water from the ARC AWTF and 17,485 acre feet of tertiary recycled water. Presuming the advanced treated water as “Null Water”, the 120-month running average of the recycled water contribution in the Montebello Forebay is 42.9% and the regulatory maximum is 45%, with additional monitoring being required once 40% is reached. WRD and LACSD submitted the additional monitoring plan on May 26, 2021. Implementation of the plan will commence upon acceptance by the RWQCB.

Spreading Grounds Recharge
Fiscal Year to Date

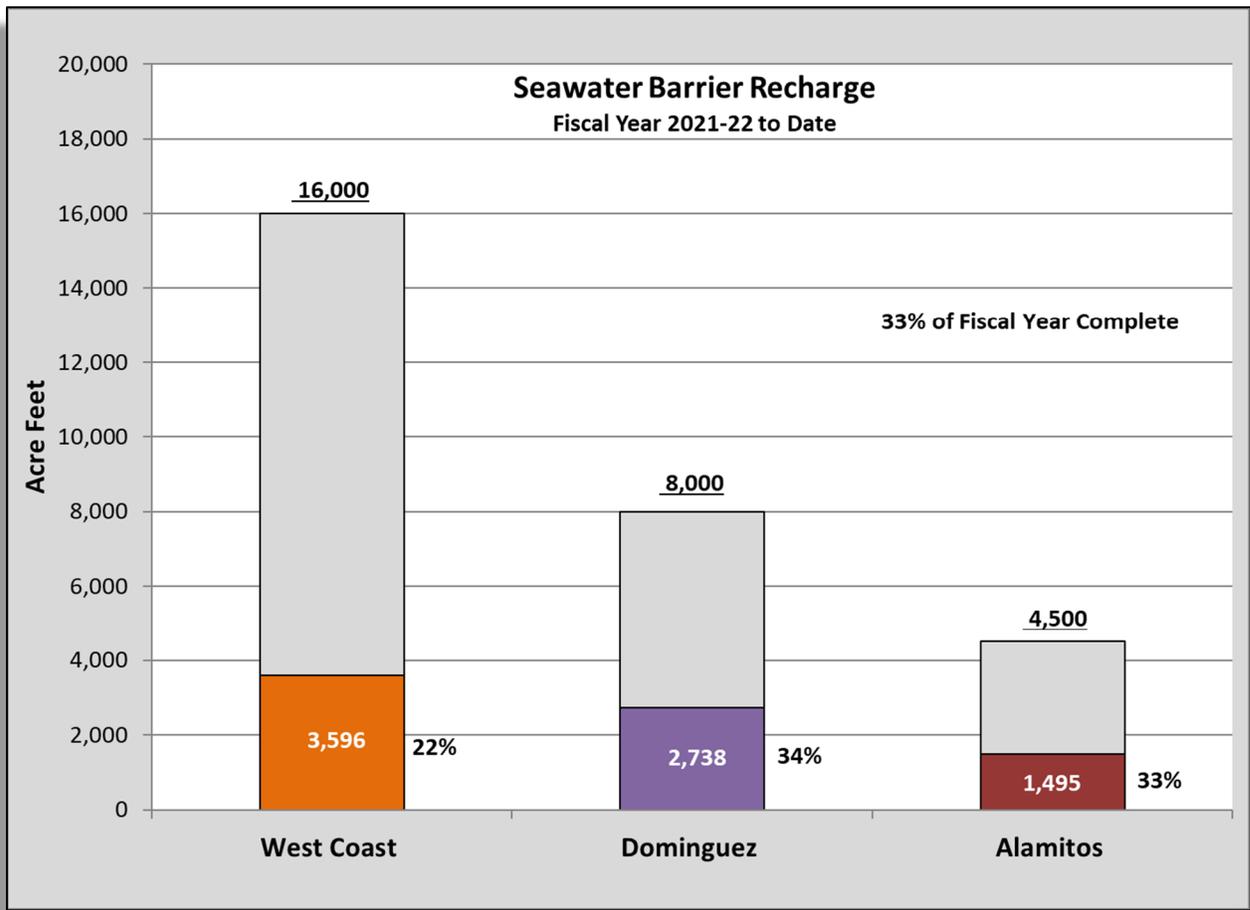


Tertiary Recycle Water Permit Update

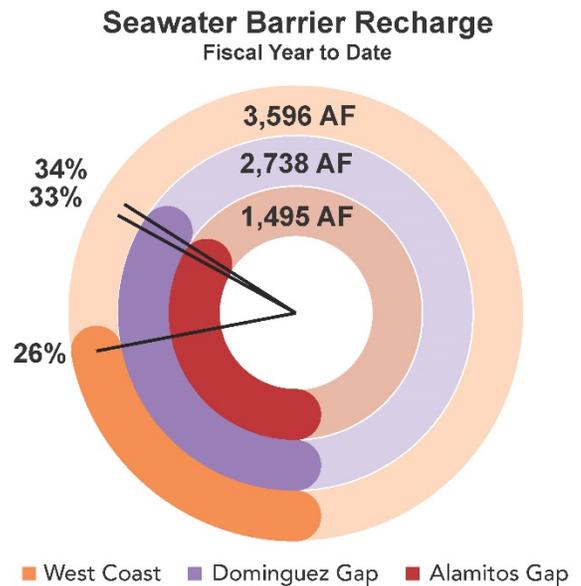
The permit is progressing with LACSD and WRD staff working with both LARWQCB and CA-DDW regulators to respond the questions and update pertinent sections of the new Title 22 Engineering Report. LACSD continues to work on two major studies needed for the new Title 22 Engineering Report – Biodegradable Dissolve Organic Carbon (BDOC) Study and Virus Logarithmic Reduction Value (LRV) Study.

Seawater Barrier Well Injection and Replenishment (July - October 2021)

The following Chart shows the barrier water injection:

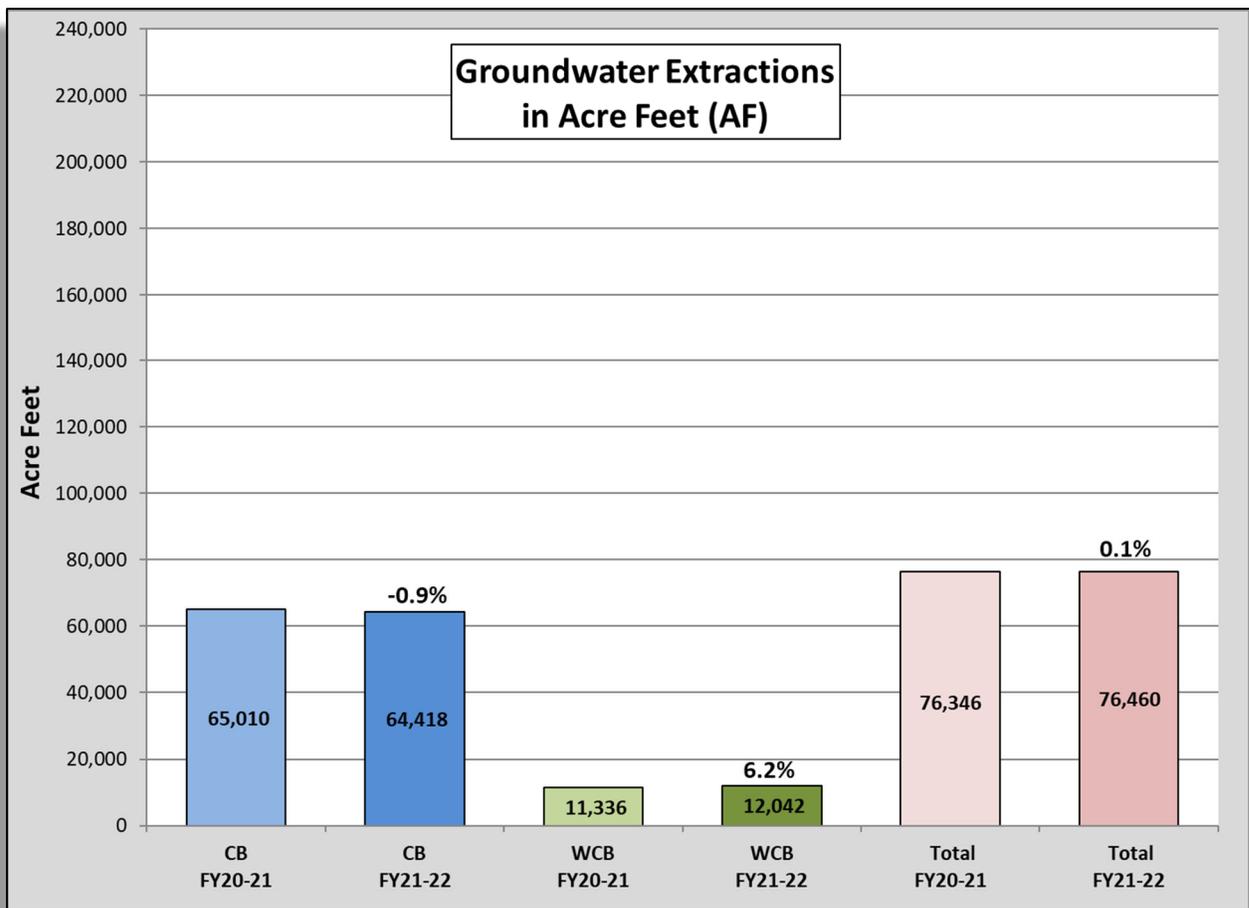


Preliminary numbers for the 2021-22 Fiscal Year show that the West Coast Barrier has used 3,596 acre feet of the total 16,000 acre feet planned for injection, 22% of total for the Fiscal Year. The Dominguez Gap Barrier used 2,738 acre feet of the total 8,000 acre feet planned for injection, 34% of the total for the Fiscal Year. The Alamitos Barrier, on the WRD side, used 1,495 acre feet of the total 4,500 acre feet planned for injection, 33% of the total for the Fiscal Year.



Assessable Pumping (Fiscal Year 2021-2022)

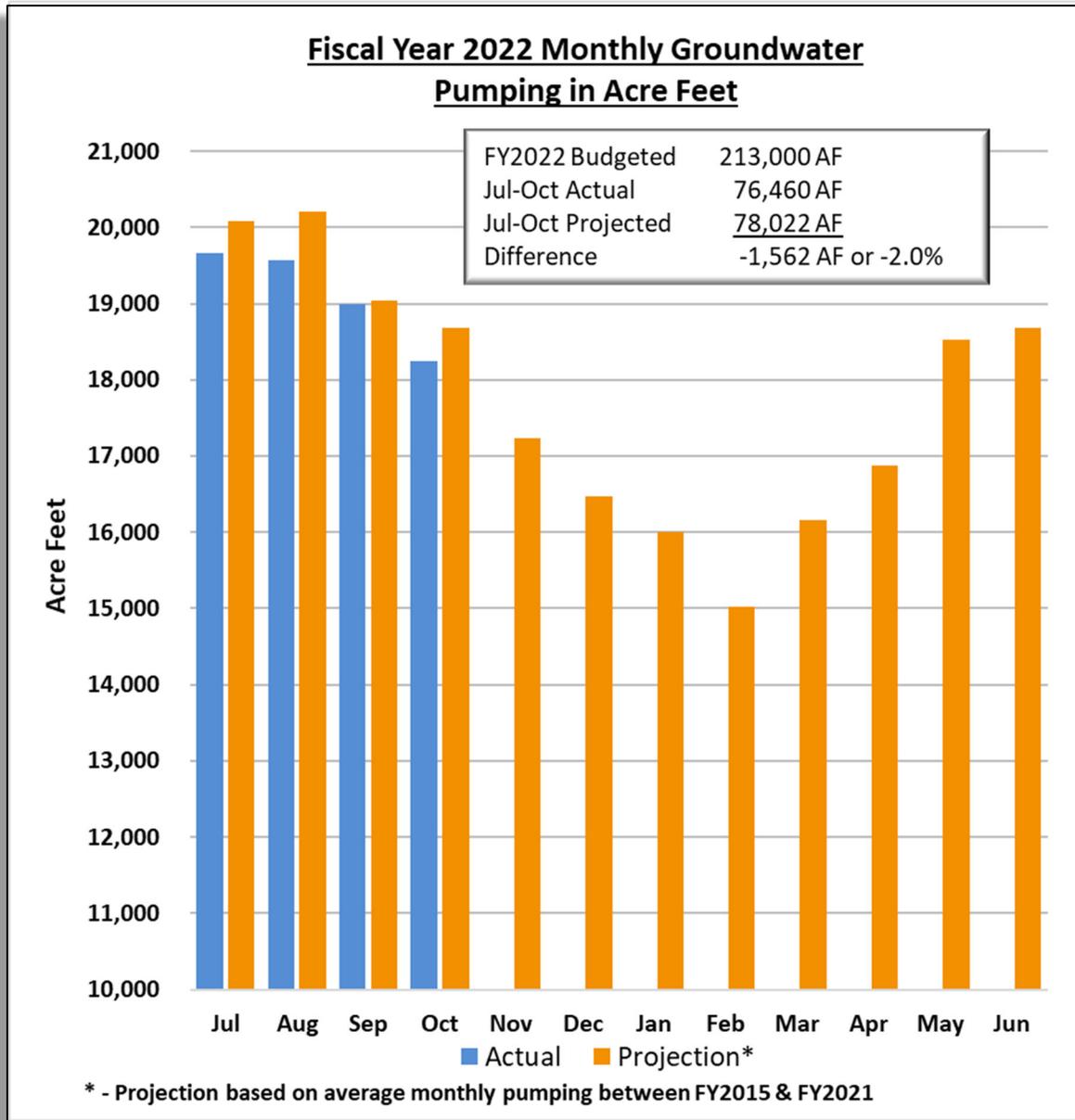
Preliminary numbers for groundwater production in the District for the Fiscal Year 2021-22 (July-October 2021) indicate pumping in the Central Basin was down 592 acre feet from the same time of the previous fiscal year (-0.9%) and the West Coast Basin pumping was 706 acre feet higher than the previous fiscal year (+6.2%). The total pumping is 76,346 acre feet compared to 76,460 acre feet during the same time the previous year for an increase of 114 acre feet, or +0.1%. The current pumping data do not include five (5) Central Basin pumpers and two (2) West Coast Basin pumper who have not yet reported for an estimated 13 additional acre feet.



Interesting...

... California uses the most groundwater at 10.7 billion gallons a day, which is one-third more than the second ranked state, Texas at 8.02 billion gallons a day.

Preliminary numbers indicate 76,460 acre feet have been pumped this fiscal year and is 2.0% below the projected goal of 78,022 acre feet (or -1,562 acre feet). Monthly actual production versus the 7-year average monthly production projections (FY 2015 through 2021) are included in the chart below.



“Nothing is softer or more flexible than water, yet nothing can resist it.” - Lao Tzu



For the Fiscal Year 2021-22 (July-Oct 2021), staff has tracked the production trends of the top five (5) producing pumpers and the bottom five (5) producing pumpers in each basin. These pumpers are identified in the following tables and are based on the change in volume (in acre feet) compared to the same time period for the previous Fiscal Year.

Production Trends - Central Basin				
Top 5 Producing <u>by Volume</u> (AF)	Jul-Oct 2020	Jul-Oct 2021	Difference	% Change
San Gabriel Valley Water Co.	5.51	925.94	920.43	99.40
Los Angeles, City - CB	33.01	895.55	862.54	96.31
Vernon, City	2,021.64	2,366.80	345.16	14.58
Downey, City	5,074.58	5,403.63	329.05	6.09
Santa Fe Springs, City	607.67	825.95	218.28	26.43
Bottom 5 Producing <u>by Volume</u> (AF)	Jul-Oct 2020	Jul-Oct 2021	Difference	% Change
Golden State Water Co. - CB	7,705.97	6,664.18	-1041.79	-15.63
Paramount, City	1,481.52	945.74	-535.78	-56.65
Cal. Water Service Co. (East LA)	3,646.85	3,198.86	-447.99	-14.00
Signal Hill, City	701.21	259.84	-441.37	-169.86
Cerritos, City	3,140.71	2,941.47	-199.24	-6.77

Production Trends – West Coast Basin				
Top 5 Producing <u>by Volume</u> (AF)	Jul-Oct 2020	Jul-Oct 2021	Difference	% Change
Phillips 66 Co. - Alpha 7093	1,728.10	2,112.05	383.95	18.18
Tesoro Refining & Marketing Co., LLC	2,750.20	3,124.07	373.87	11.97
Cal. Water Service Co. Alpha 7050	294.99	637.75	342.76	53.75
Golden State Water Co. - WB	1,359.28	1,606.34	247.06	15.38
Torrance Refining & Marketing Co.	119.06	315.01	195.95	62.20
Bottom 5 Producing <u>by Volume</u> (AF)	Jul-Oct 2020	Jul-Oct 2021	Difference	% Change
Torrance, City	2,117.58	605.22	-1512.36	-249.89
West Basin Brewer Desalter	347.56	0.00	-347.56	-100.00
Inglewood, City	1,081.57	760.52	-321.05	-42.21
Cal. Water Service Co. Dominguez - WB	864.19	644.19	-220.00	-34.15
Rolling Hills Country Club	165.00	119.00	-46.00	-38.66

Water Replenishment District (WRD) publishes the Groundwater Basin Update (GWBU) monthly. All information contained herein is preliminary and is meant to be a snapshot the status of the basins at the time of publication and should not constitute an official WRD report. All the information presented in the GWBU utilizes the best available data at the time of publication. Data provided herein is a compilation of WRD data and publicly available information from several of our partners including, by not limited to, the Los Angeles County Department of Public Works - Stormwater Engineering Division, Metropolitan Water District of Southern California, California Department of Water Resources, US Bureau of Reclamation, University of Nebraska - Lincoln, and the US Department of Agriculture - Natural Resources Conservation Service. The GWBU is prepared by Senior Hydrogeologist, Everett Ferguson, who can be contacted directly with questions at eferguson@wrd.org.