

July 31, 2015

**NOTICE OF REGULAR MEETING OF THE  
COLORADO RIVER BOARD**

**NOTICE IS HEREBY GIVEN** pursuant to the call of the Chairperson, Dana B. Fisher, Jr., by the undersigned Executive Director of the Colorado River Board of California that a regular meeting of the Board Members is to be held as follows:

Date: Wednesday, August 12, 2015
Time: 10:00 a.m.
Place: Vineyard Room Holiday Inn Ontario Airport 2155 Convention Center Way Ontario, CA 91764 Tel: (909) 212-8000

The Colorado River Board of California welcomes any comments from members of the public pertaining to items included on this agenda and related topics. Oral comments can be provided at the beginning of each Board meeting; while written comments may be sent to Mr. Dana B. Fisher, Jr., Chairperson, Colorado River Board of California, 770 Fairmont Avenue, Suite 100, Glendale, California, 91203-1068.

An Executive Session may be held in accordance with provisions of Article 9 (commencing with Section 11120) of Chapter 1 of Part 1 of Division 3 of Title 2 of the Government Code and in accordance with Sections 12516 and 12519 of the Water Code to discuss matters concerning interstate claims to the use of Colorado River System waters in judicial proceedings, administrative proceedings, and/or negotiations with representatives from other states or the federal government.

Requests for additional information may be directed to: Ms. Tanya M. Trujillo, Executive Director, Colorado River Board of California, 770 Fairmont Avenue, Suite 100, Glendale, CA 91203-1068, or 818-500-1625. A copy of this Notice and Agenda may be found on the Colorado River Board's web page at [www.crb.ca.gov](http://www.crb.ca.gov).

A copy of the meeting agenda, showing the matters to be considered and transacted, is attached.

Tanya M. Trujillo  
Executive Director

attachment: Agenda

Regular Meeting  
COLORADO RIVER BOARD OF CALIFORNIA  
Wednesday, August 12, 2015  
10:00 a.m.

Vineyard Room  
Holiday Inn Ontario Airport  
2155 Convention Center Way  
Ontario, CA 91764

At the discretion of the Board, all items appearing on this agenda, whether or not expressly listed for action, may be deliberated upon and may be subject to action by the Board. Items may not necessarily be taken up in the order shown.

1. Call to order
2. Opportunity for the Public to Address the Board as required by Government Code, Section 54954.3(a) (limited to 5 minutes)
3. Administration
  - a. Review and approval of Minutes from the June 10, 2015 meeting (**Action**)
  - b. Consideration of application for an allocation of water from the Lower Colorado Water Supply Project (**Action**)
4. Presentation from the Bureau of Reclamation regarding hydropower issues
5. Colorado River Basin Water Reports
  - a. Reports on current reservoir storage, reservoir releases, projected water use, and forecasted river flows
  - b. State and Local Water Reports
6. Update regarding the California Drought
7. Staff Reports regarding the Colorado River Basin Programs
  - a. Review status of the Basin States Drought Contingency Programs
  - b. Review status of the Colorado River Basin Water Supply and Demand Study
  - c. Review status of the implementation of Minute 319
  - d. Review status of the Salinity Control Forum, Workgroup, and Advisory Council
  - e. Review status of the Glen Canyon Dam Adaptive Management Work Group and Long-Term Experimental and Management Plan EIS
  - f. Review Status of the Lower Colorado River Multi-Species Conservation Program
8. Announcements/Notices
9. Executive Session

An Executive Session may be held by the Board pursuant to provisions of Article 9 (commencing with Section 11120) of Chapter 1 of Part 1 of Division 3 of Title 2 of the Government Code and Sections 12516 and 12519 of the Water Code to discuss matters concerning interstate claims to the use of Colorado River system waters in judicial proceedings, administrative proceedings, and/or negotiations with representatives from other states or the federal government.

10. Other Business

- a. Next Board Meeting: Regular Meeting  
September 9, 2015  
10:00 a.m.  
Vineyard Room  
Holiday Inn Ontario Airport  
2155 East Convention Center Way  
Ontario, CA 91764-4452  
Tel: (909) 212-8000, Fax: (909) 418-6703

Minutes of Meeting  
COLORADO RIVER BOARD OF CALIFORNIA  
Wednesday, June 10, 2015

A meeting of the Colorado River Board of California was held on Wednesday, June 10, 2015.

Board Members and Alternates Present

Brian Brady	Jack Seiler
Dana Bart Fisher, Jr., Chairman	Michael Touhey
James Hanks	David Vigil
Peter Nelson	Doug Wilson
Glen Peterson	Jeanine Jones
David Pettijohn	

Board Members and Alternates Absent

Stephen Benson	Chris Hayes
John Powell Jr.	
Henry Kuiper	

Others Present

Steve Abbott	Jan Matusak
Tim Blair	Jessica Neuwerth
Robert Cheng	Autumn Plourd
Dan Denham	Angela Rashid
Karen Donovan	Tom Ryan
Bill Hasencamp	Tina Shields
Tom Havens	Philip Southard
Michael Hughes	Mark Stuart
Ned Hyduke	Tanya Trujillo
Lisa Johansen	Mark Van Vlack
Lori Jones	Suzanna Webb
Tom Levy	Jerry Zimmerman
Kara Mathews	

## **CALL TO ORDER**

Chairman Fisher announced the presence of a quorum and called the meeting to order at 10:06 A.M.

## **OPPORTUNITY FOR THE PUBLIC TO ADDRESS THE BOARD**

Chairman Fisher asked if there was anyone in the audience who wished to address the Board on items on the agenda or matters related to the Board. Hearing none, Chairman Fisher moved to the next agenda item.

## **ADMINISTRATION**

### **Consideration and Approval of the Minutes**

Chairman Fisher asked for a motion to approve the May 13 minutes. Mr. Wilson moved that the minutes be approved, seconded by Ms. Jones. Chairman Fisher asked if there were any additions or corrections. Hearing none and by unanimous support, the May 13 meeting minutes were approved.

### **Approval of Fiscal Year 2015-2016 Colorado River Board Budget and Standard Agreement for Reimbursement of Expenses**

Ms. Trujillo presented to the Board a resolution to approve the Colorado River Board budget and to request approval for Ms. Trujillo, the Executive Director, to execute the standard agreement for reimbursement with the Six Agency Committee for funding of the Board. Ms. Trujillo explained the details of the budget and indicated the total amount of the budget is \$1,892,000.00, as approved by the Governor's May revised budget for the Board.

Chairman Fisher asked for a motion to approve the resolution. Mr. Peterson moved that the resolution be approved, seconded by Mr. Nelson. Mr. Fisher asked if there were any questions or comments. Hearing none and by unanimous support, the resolution was approved.

Ms. Trujillo announced that no item would be presented to the Board relating to the Lower Colorado Water Supply Project during the June meeting.

## **COLORADO RIVER BASIN WATER REPORTS**

Ms. Trujillo reported that there was significant precipitation in the Colorado River Basin in May, but drought conditions still persist and drought planning is ongoing. As of June 1, the water level at Lake Powell was 3,597 feet with 11.49 million acre-feet of storage, or 47% of capacity, while the water level at Lake Mead was at 1,077 feet with 9.72 million acre-feet of storage, or 37% of capacity. The total system storage was 29.06

MAF, or 49 percent of capacity. Ms. Trujillo noted that precipitation since October 1 is about 89 percent of average. The significant precipitation received in May brought the monthly snowpack to 144% of average, but the forecasted April through July 2015 runoff is still about 3.75 million acre-feet, or 52 percent of average.

Ms. Trujillo reviewed the precipitation maps for May 2015 that indicated that nearly the entire Basin was above 150% of average except for the Little Gila River Basin in New Mexico which was in the 50% range. Ms. Trujillo noted that on a map utilizing a scale that exceeds 150% of average, such as the map produced by the National Oceanic and Atmospheric Administration of precipitation in the Southwest, parts of the Upper Basin had up to 400 percent of average precipitation for the month of May. The Upper Basin reservoirs have benefited from the increased precipitation and some of them have filled and spilled.

Chairman Fisher asked if there was an estimate of accumulation in acre-feet of runoff to Lake Powell. The June forecast projected an increase in storage by as much as 2 million acre-feet as a result of late season precipitation compared to the May forecast.

Board Member Peterson asked about plans for flexibility in operations of the Flaming Gorge. Ms. Trujillo explained evaluating flexibility in system operations is one component of the Upper Basin drought contingency planning process. Ms. Trujillo reported that she will attend a meeting with the Upper Colorado River Commission next week and will receive an update on the status of their efforts.

The U.S. drought monitor map indicates some easing of drought conditions in the Colorado, Utah, and Arizona areas. Nevada and California are still experiencing extreme drought, with 47% of California in the Exceptional Drought category.

#### State and Local Water Reports

Mr. Mark Stuart reported that Los Angeles Civic Center cumulative precipitation is considerably below average for the Water Year at 8.5 inches. The precipitation to date in the Los Angeles area is 8.46 inches, or 56% of average, while it is 2.57 inches in Blythe, or 109% of average. As of June 1, we are at: 74% of average for the Northern Sierra; 45% of average for the Central Sierra; and 43% of average for the Southern Sierra. Reservoir inflows are expected to be considerably less than normal.

For the State Water Project storage, Lake Oroville is at 1.57 million acre-feet, or 44% of capacity, and San Luis is at about 786,000 acre-feet, or 74% of capacity. The total storage in the State Water Project was 2.9 million acre-feet, or 52 % of capacity.

Mr. Peterson briefly noted that the MWD's combined reservoir storage is at 48% of capacity.

## UPDATE REGARDING THE CALIFORNIA DROUGHT

The State Water Resources Control Board (SWRCB) continues to implement the Governor's April 1 Executive Order requiring mandatory water conservation. Ms. Trujillo reported that the Association of California Water Agencies developed a series of webinars to provide assistance regarding implementing the required reductions. As of June 2, the SWRCB reported that water conservation for April 2015 vs. April 2013 shows a 13.5 percent level of conservation. The SWRCB released revised reduction tiers on June 5 and it is up to the individual communities and water service providers to comply with those orders.

Ms. Trujillo reported that U.C. Davis researchers released a report on the economic impacts on agricultural production due to the drought in 2015 showing an estimated direct agricultural impact of about \$1.8 billion, with statewide economic costs of about \$2.7 billion and reporting that 563,800 acres would not be irrigated in 2015. Ms. Trujillo added that Governor Brown was in Southern California this week attending the MWD Board meeting and appearing on a public T.V. broadcast associated with water conservation.

Ms. Jones reported that she recently attended a workshop in San Diego on improving precipitation forecasting, which is one of the actions required by the drought emergency proclamations. Seasonal precipitation forecasting is scientifically difficult. The goal of the workshop was to identify actions that could be included in NOAA's programs and prioritize funding for improving forecasting in the federal budget. The next steps include setting up a series of workshops on this subject, with one of them planned for the Colorado River Water Users Association in December 2015.

Ms. Jones mentioned that NOAA recently came out with its assessment for the California drought in 2014, which highlighted seasonal forecasting. The current drought may provide an opportunity to take action on this subject. Seasonal forecasting is also linked to long-term climate change adaptation with respect to improving short-term reservoir operations. Ms. Jones noted that NOAA's drought assessment report is available on its website.

Ms. Jones reported that DWR held workshops to focus on subjects like improving statistical modeling. Ms. Jones reported that DWR is currently funding research on a number of research projects such as atmospheric rivers and short-term forecasting. Ms. Jones noted that more than \$1 million is being spent courtesy of drought emergency funding.

Ms. Jones added that the emergency salinity barrier has been installed in the Delta in **West False River** to better manage salinity without requiring release of flows from upstream reservoirs. The emergency salinity barrier is scheduled to be removed in November 2015.

## **COLORADO RIVER BASIN WATER REPORTS**

### **Review status of the Basin States Drought Contingency Programs**

Ms. Trujillo reported that Central Arizona Project (CAP) is in the process of finalizing approvals from parties to the forbearance agreement for their Extraordinary ICS creation plan, and has requested approval of the plan as quickly as possible. CAP's proposal is to generate up to 95,000 acre-feet of conserved water in 2015 and a similar quantity in 2016. Southern Nevada Water Authority (SNWA) and the Colorado River Commission of Nevada approved the proposal in May. Ms. Trujillo reported that Reclamation awarded a Pilot System Conservation contract to SNWA to create 15,000 acre-feet of water through fallowing in the Virgin River Basins over the next 2 years. Ms. Trujillo also noted that the Upper Colorado River Commission is meeting with funders to implement a similar program in the Upper Basin.

Chairman Fisher noted that delaying approvals of CAP's ICS plan may complicate Reclamation's ability to prepare accurate modeling results. Bill Hasencamp reported that Metropolitan Water District expects to provide approval to the proposal in August. Chairman Fisher added that Palo Verde Irrigation District would also provide approval of the plan by August and reiterated the importance of approving the plan in a timely matter to ensure accurate modeling results.

### **Review status of the Colorado River Basin Water Supply and Demand Study**

Ms. Trujillo reported that the Phase 1 report was published via the internet on May 12, 2015 and is open for public comment. The report identifies 25 opportunities for additional conservation in both the municipal and agricultural sectors. Ms. Trujillo explained that the next steps of the Phase II process have not been determined yet, but will likely involve implementation of pilot projects.

### **Review status of the implementation of Minute 319**

Ms. Trujillo gave an update on the May 14 meeting with the Mexican delegation in San Diego. The Mexican delegation included representatives from both the federal and state levels, the IBWC's counterparts at CILA, as well as some of the local Mexican water users. Regarding the implementation status of Minute 319, a more detailed proposal on one of the canal lining projects is to be expected within the next several weeks. We are halfway through the 5-year term of Minute 319 so there is a need to keep an eye on completion of the obligations in that agreement. There is interest from the Mexican delegation to continue and expand upon Minute 319 and develop a longer-term agreement, and a negotiation process to brainstorm the components of the next Minute has started. Ms. Trujillo will be attending a small team meeting scheduled for June 22 in Juarez. The meeting will most likely focus on technical details of how to structure the negotiation process. Ms. Trujillo passed along appreciation from the Mexican delegation and from our sister states for the reception that was funded by the Colorado River Authority. Ms. Trujillo added that it was an excellent opportunity to meet informally

with our counterparts. Chairman Fisher concurred and thanked Board staff Suzanna Webb for planning the dinner.

#### Review status of the Salinity Control Forum, Workgroup, and Advisory Council Revised Agenda

Ms. Trujillo gave an update on last month's Salinity Control Forum, Advisory Council, and Work Group meetings in Salt Lake City, Utah. One of the highlights of the meetings was a visit to a 25,000-acre salt mine evaporation pond facility run by Compass Minerals. Ms. Trujillo reported that it was a great opportunity to see the interaction between wildlife in the natural setting and evaporation ponds. The 80,000-acre refuge is adjacent to the 25,000-acre salt mining production, which has a viable operation and is one of the world's leading producers of the salt-based components. The Migratory Bird Refuge is one of the crown jewels of the National Park Service's Refuge system that provides an incredible amount of migratory bird habitat in the area. The operators do not have concern about the evaporation ponds attracting the birds or any potential detrimental impacts on birds. It was a beneficial experience for those working on the Paradox well project issue to be able to see a system where two kinds of habitats are coexisting well.

Ms. Trujillo also reported that Reclamation has reduced operations at the Paradox well and has eliminated the seismic activities they were previously concerned about, but at the expense of having reduced the amount of salt being contained at that facility. Reclamation plans to maintain the operation into the future while continuing the draft EIS process, evaluating the evaporation ponds alternative and a replacement well alternative. Chairman of the Salinity Control Forum, David Robbins, who is from Colorado, proposes to participate with Reclamation in their outreach meetings in the Paradox Valley area to review the pros and cons of a surface disposal facility as opposed to a new injection well. There is seismic potential associated with a new well versus potentially unsightliness associated with the disposal ponds. This next step is working through with the public and local entities about the various options. In the meantime, Reclamation continues working on the contingency plan, which would be used if there was an emergency shutdown of the well that ceases disposal prior to the completion of the EIS. One of the key focuses of the meeting was to encourage Reclamation to continue to complete the EIS process within the budget and timeframe predicted while working on an emergency backup plan.

Ms. Trujillo reported that the Forum continues to work on solutions for the potential shortfall of the cost-sharing for the Salinity Control Program (Program), which is in part a result of constraints in the existing legislation to allow flexibility for additional contributions into the cost-sharing components in order to meet cost-share requirements and to continue operating the projects of the Program. The Lower Basin funding is comprised of portions of the power revenues for the Lower Basin power contractors from California and Nevada to pay towards the Program. By statute, the revenues from Arizona contractors go toward repayment of the Central Arizona Project and other processes dealing with Arizona settlement issues. One of the goals is to try to modify the situation so that Arizona can be contributing towards the salinity program cost-share. Another goal is to try to adjust the Upper Basin/Lower Basin parameters so

that the Upper Basin can meet more of their share of the cost-share requirements. The Program is very heavily tilted towards federal contributions, with state contribution at 30 percent and federal contribution at 70 percent. Ms. Trujillo reported that the Forum is currently working on both short-term and long-term solutions for the cost-share issue. One of the short-term solutions the Forum recommended to Reclamation was for Reclamation to withhold some of the funding used to repay some of the Treasury obligations and spend that on projects instead of repaying interest to the federal government. Reclamation implemented the recommendation last year and will again this year to keep the projects moving forward.

Ms. Trujillo reported that the salinity standards for Colorado River Basin in California were adopted by our State Water Resources Control Board in May through the adoption of the 2014 Triennial Review. The process for the new Triennial Review will kick off this summer and fall. At this meeting, the 2016 Forum budget was approved and state assessments were the same as prior years with about \$40,000 coming from California towards the Program. This contribution is separate from the contributions made directly from the power contractors through the Lower Basin fund.

The next meetings of the Work Group are scheduled for July in Salt Lake City, Utah. The Forum meetings will be in late October in Tucson, Arizona.

#### Glen Canyon Dam Adaptive Management Work Group and Long-Term Experimental and Management Plan EIS

Ms. Trujillo reported that the Adaptive Management Work Group (AMWG) met via webinar in late May, with the primary business being the approval of a new charter which authorizes the program to continue through 2017. The AMWG was provided updates on the humpback chub and razorback sucker, which appear to be doing well and are expanding their populations. In contrast, the trout fishery at Lee's Ferry is in decline.

Ms. Trujillo noted that the Long-Term Experimental and Management Plan EIS process is still underway and that the Colorado River Board had requested cooperating agency status in order to review the EIS as soon as it is released. After review by the cooperating agencies, the draft EIS will be released to the public.

Ms. Trujillo reported that the next AMWG meeting would be held on August 26-27 in Tempe, Arizona.

#### Lower Colorado River Multi-Species Conservation Program

Ms. Trujillo reported that the Lower Colorado River Multi-Species Conservation Program (MSCP) was in the process of finalizing its annual Final Implementation Report, which is expected in July. Ms. Trujillo noted that the next Steering Committee meeting would be held on June 24 to approve the Program's 2016 budget and work plan. Additionally, on June 22, the California MSCP partners planned to meet informally to discuss upcoming issues.

## **ANNOUNCEMENTS/ NOTICES**

Ms. Trujillo announced that a handout of the press release from the Department of the Interior's Water SMART funding announcements was included in the packet. Also of note was that the Secretary was in the Los Angeles area with Commissioner Lopez on May 20<sup>th</sup> and announced \$50 million in drought funding that was awarded.

Ms. Trujillo also announced that Reclamation has announced an additional funding opportunity for drought relief programs. A webinar for that purpose was scheduled for June 11, 2015 at 1:00pm and the application for that type of funding is due June 25<sup>th</sup>.

Ms. Trujillo lastly announced that the Senate Energy National Resources Committee held an oversight hearing on the status of the drought conditions in the Western U.S. on June the 2<sup>nd</sup>. A live webcast is available to view. Ms. Trujillo is working on a draft of testimony to be submitted to the Committee as an opportunity for the Committee to hear perspectives on the western drought from water users. The California witness at the hearing was a representative of the Family Farm Alliance. He presented testimony of the drought impacts associated with his family farming operations in the Central Valley. The State of Arizona was represented by Tom Buschatzke, and his remarks are in the record.

Ms. Trujillo mentioned that she does not anticipate having lengthy reports for the July meeting. Chairman Fisher agreed that July looked like a good month to cancel.

## **ADJOURNMENT**

With no further items to be brought before the Board, Chairman Fisher asked for a motion to adjourn the meeting. Upon the motion of Mr. Pettijohn, seconded Mr. Wilson, and unanimously carried, the meeting was adjourned at 11:13 AM.

RESOLUTION  
of the  
COLORADO RIVER BOARD OF CALIFORNIA  
Regarding  
Potential Applicant to Receive  
Lower Colorado Water Supply Project Water  
2015-2

**WHEREAS**, the United States Congress, on November 14, 1986, enacted the Lower Colorado Water Supply Act (P.L. 99-655) (amended through P.L. 109-103), to authorize the construction and operation of the Lower Colorado Water Supply Project (Project) to provide a limited amount of Colorado River water to be made available on an exchange basis to entities in California, whose lands are located adjacent to the Colorado River, and who either do not have any, or do not have a sufficient, contractual entitlement to use Colorado River water; and

**WHEREAS**, the City of Needles has agreed to assume the administrative responsibility for Project beneficiaries in San Bernardino, Riverside, and Imperial Counties; and

**WHEREAS**, the Colorado River Board provides recommendations to the U.S. Bureau of Reclamation (Reclamation) regarding the eligibility of non-federal applicants to receive Project water; and

**WHEREAS**, the Colorado River Board on September 14, 2001, notified owners of property within the Colorado River flood plain and/or the accounting surface as delineated by the U.S. Geological Survey in California of the availability of Project water; and

**WHEREAS**, the staff of the Colorado River Board on August 12, 2015, submitted the eligible applicant to the Board for its recommendation;

**NOW, THEREFORE, BE IT RESOLVED THAT** the Colorado River Board hereby recommends a subcontract for Project water be offered to the applicant listed on the attachment and directs the Executive Director to forward the application to Reclamation with its recommendation with the following provisos:

- (1) The applicant appears to be eligible to receive Project water, as shown in the attached table and summarized below:

County	Numbers of Parcels	Current Use (AF/YR)	Future Use (AF/YR)	Total Use (AF/YR)
San Bernardino	1	1	1	2

- (2) At the time a subcontract is prepared, the annual quantity of water to be diverted, consumptively used, and returned will be refined to specify quantities of water to be reported in accordance with Article V in the Consolidated Decree in *Arizona v. California, et al.* entered March 27, 2006, (547 U.S. 150 (2006));

- (3) Reclamation should include provisions in the subcontract that the water to be put to reasonable beneficial use within a ten-year period of time, subject to renewal for another ten-year period.

**THE FOREGOING RESOLUTION** is approved and adopted by the Colorado River Board, this 12<sup>th</sup> day of August 2015.

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Dana B. Fisher, Jr., Chairman



# Hoover Powerplant

<b>Region</b>	<a href="#">Facilities in Lower Colorado</a>   <a href="#">Lower Colorado Home Page</a>
<b>State</b>	<a href="#">Arizona</a> and <a href="#">Nevada</a>
<b>River</b>	Colorado River
<b>Purpose</b>	The primary purpose of the electrical powerplant as a project feature is to generate revenue sufficient to repay the project construction monies advanced by the United States Treasury and to annually fund ongoing operation maintenance and replacement expenses.
<b>Purpose</b>	The capacity and operational flexibility of the plant also significantly contribute to the stability and reliability of the California, Arizona, Nevada, Utah, and New Mexico electrical grid. The massive rotating inertia of the generation plant at Hoover provides an unusually high ability to sustain system integrity during moderate to severe system disturbances.
<b>Purpose</b>	The plant contains the unique ability to black start a main 130 MW unit without the benefit of an external system feed. This means the plant can act as a synchronizing source for the rest of the system in the event of a system separation.
<b>Purpose</b>	The plant acts as a primary source of spinning and non-spinning reserves for the service area. The electrical integration and interconnection of Davis, Hoover, and Parker Powerplants provide maximum generation of power with efficient use of water resources.
<b>Purpose</b>	The highly developed agricultural base and the complex industrialization of the Pacific southwest benefit greatly from Colorado River hydroelectric energy.
<b>Facts</b>	The powerplant consists of 17 main Francis turbine generators and two Pelton Waterwheel station service units (one for each plant wing). The total plant capacity is 2,079 MW.
<b>Facts</b>	Hoover Dam is a concrete thick-arch structure, 726.4 feet high and 1,244 feet long at the crest. The dam and appurtenant structures contain 4.4 million cubic yards of concrete. Hoover Dam and Powerplant was the first major concrete thick-arch dam constructed by Reclamation. Water for generation is conveyed through four penstocks from four intake structures immediately upstream and contiguous to the dam. Spillway structures use eight 16 foot by 100 foot drum gates which provide for an additional 16 vertical feet of storage capacity in Lake Mead, the reservoir impounded upstream of the dam. Lake Mead is the largest Reservoir in the United States with a total storage capacity of 29.8 million acre-feet.
<b>History</b>	The plant was authorized as a Boulder Canyon Project feature (the Act also provided for All American Canal construction) and was a requisite requirement for the Seven State Compact ratification. The first unit to be placed in serve was A0 on August 31, 1936. The last unit to be commercially commissioned was N8 on December 1, 1961. There were eleven commercially available units by 1939. The plant was operated by Southern California Edison and Los Angeles Department of Water and Power under the supervision of the Bureau of Reclamation until 1987. That was the termination of the original 50-year electric service contracts. Reclamation assumed control of operation and maintenance in 1987.
<b>History</b>	The Boulder Canyon Project Adjustment Act of 1940 authorized the Secretary of the Interior to promulgate and implement charges for electrical energy generated at Hoover Powerplant. This Act further specified how the revenues resulting from Hoover energy sales were to be applied. The Hoover Powerplant Act of 1984 authorized the uprating of the 17 main generating units and the construction of additional visitor facilities and parking structures and the Hoover Dam bypass bridge. It also changed the funding source from Congressional Appropriations to an Available Receipts Fund (a quasi-revolving fund). The uprating of the units was accomplished through non-Federal funds advanced by 11 power customers.
<b>History</b>	The dam was originally designated as Hoover Dam by instructions of the Secretary of the Interior dated September 17, 1930. The dam was redesignated Boulder Dam by order of the Secretary dated May 8, 1933. The name Hoover Dam was restored by the Act of April 30, 1947, 61 Stat. 56.
<b>Special Issues</b>	Hoover Powerplant generators are primarily used for providing a low-cost peaking resource and regulation. Hoover is not a sole source supplier. Contractual arrangements with the power customers provide for Hoover power to be

	used for ramping, regulating, and reserves.
<b>Special Issues</b>	The demand for Hoover power generation is seasonal, with the winter months as the low-demand period. Hoover's maintenance period is from October through May. Normally Hoover has one unit down for a major overhaul during this time with several weekly outages on other units. Since the penstocks are on a five year maintenance schedule quite often one or more penstocks are taken out per maintenance period. Because four generators are normally supplied from each penstock, when the penstock is out of service, so are four generators.
<b>Special Issues</b>	When not releasing for flood control purposes, Hoover generation is a direct function of downstream water demands. Power production is ancillary to flood control, navigation, and irrigation water delivery.
<b>Special Issues</b>	Hoover dam electrical capacity has been reduced due to the on-going drought and decreased lake elevations.
<b>NERC Region</b>	Western Electricity Coordinating Council
<b>PMA Service Area</b>	Western Area Power Administration, Desert Southwest Region
<b>Plant Type</b>	Conventional
<b>Powerhouse Type</b>	Above Ground
<b>Turbine Type</b>	Francis
<b>Original Nameplate Capacity</b>	1,344,800 kW
<b>Installed Capacity</b>	2,078,800 kW
<b>Year of Initial Operation</b>	1936
<b>Age</b>	71 years
<b>Net Generation</b>	3,806,934,845kWh
<b>(Fiscal Year)</b>	2007
<b>Rated Head</b>	576 ft
<b>Plant Factor</b>	21 percent
<b>(Fiscal Year)</b>	2007
<b>Production Mode</b>	Intermediate
<b>Remotely Operated</b>	No
<b>Project Authorization</b>	The project was authorized by the Boulder Canyon Project Act of December 21, 1928 (45 Stat. 1057), subject to the terms of the Colorado River Compact. The Boulder Canyon Project Adjustment Act (54 Stat. 774), dated July 19, 1940, provided for certain changes to the original plan. The Hoover Powerplant Act of 1984 (98 Stat. 1333) provided for the uprating of the generators and the construction of new visitor facilities.
<b>Project Purpose</b>	Hoover Dam and powerplant was constructed for the purposes of controlling Colorado River floods, improving navigation and regulating the flow of the Colorado River, providing for storage and for the delivery of the stored waters thereof for reclamation of public lands and other beneficial uses exclusively within the United States, and generation of electrical energy as a means of making the project authorized a self-supporting and financially solvent undertaking.
<b>Project Purpose</b>	Floodwaters of the Colorado River are impounded by Hoover Dam and released in response to downstream water orders. The quantity of water available for release through the powerplant is, in part, based upon the water orders. In a hydrologically normal year, 7.5 million acre feet are allotted among the lower basin States (.3 to Nevada, 2.8 to Arizona, and 4.4 to California) with an additional 1.5 million acre feet allotted to Mexico and system losses

Last updated: Nov 19, 2009

# Climate Change Impacts on Hydropower in the Colorado River Basin

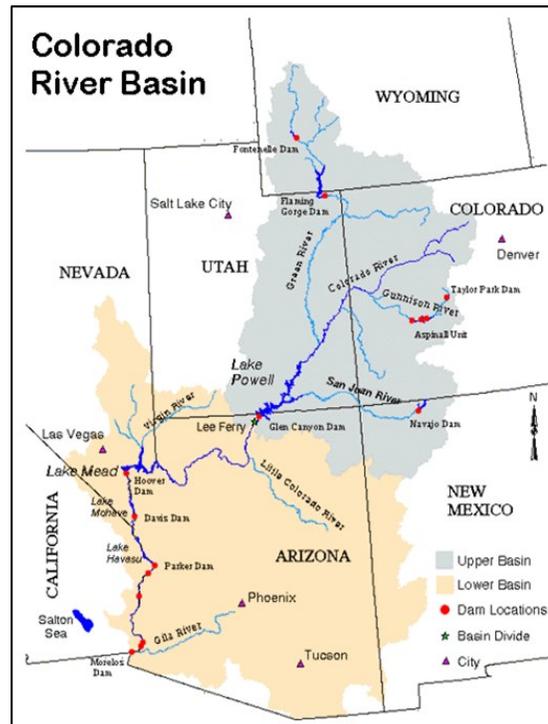
**KEY MESSAGE:** *Hydropower dams along the Colorado River and its tributaries are a significant source of electricity in the southwestern U.S. and Mexico, producing enough energy to power over 780,000 households per year. Climate change is predicted to decrease streamflows and reservoir storage along the Colorado, dramatically decreasing hydropower capacity at a time when electricity demand is increasing due to regional population growth. To address this growing energy deficit, policymakers must adopt regulations and incentives that restore hydropower capacity, promote sustainable energy alternatives, and reduce energy demand throughout the region.*

The Colorado River is a vital freshwater resource for the inhabitants of the southwestern U.S. and Mexico. Approximately 30 million people rely at least partially on the river and its tributaries for fresh water (USBR 2012). The Colorado flows approximately 1,450 mi (2,330 km) from the Rocky Mountains to the Gulf of California, gathering water from a 243,100 mi<sup>2</sup> (629,600 km<sup>2</sup>) drainage basin. Nearly 90 percent of the river's flow is snowmelt from headwaters in Colorado, Utah, Wyoming, and New Mexico. From there, the river travels through Arizona, Nevada, and California before flowing between the Mexican states of Baja California and Sonora into the Gulf of California.

## Hydropower in the Colorado River Basin

The Colorado River Basin has an immense capacity to generate hydropower. Hundreds of hydroelectric dams along the river's main stem and tributaries (Figure 1) have a combined generating capacity of approximately 4,178 megawatts (MW) (Tweed 2013). In the period from 1950-1999, these dams produced an annual average of 8,478 gigawatt hours (GWh) of electricity, enough to support approximately 782,000 U.S. households (Christensen & Lettenmaier 2007, USEIA 2014).

Over 81 percent of the river's hydropower capacity comes from the Hoover and Glen Canyon Dams (Tweed 2013). Constructed between 1931 and 1935, the Hoover Dam spans the Colorado River between Arizona and Nevada, approximately 30 miles southeast of Las Vegas (Figure 2). Lake Mead, the 248 mi<sup>2</sup> (642km<sup>2</sup>) reservoir created by the Hoover Dam, has a storage capacity of approximately 28.9 million acre-feet (35.6 km<sup>3</sup>), the rough equivalent of two years of Colorado River streamflow (USBR 2012a). This reservoir drives the Hoover Dam's power plant, which is comprised of 17 main turbines, nine on the Arizona side



**Figure 1. Major dam locations within the Colorado River Basin. Source: CRCN 2007.**

and eight on the Nevada side, and has a maximum generation capacity of approximately 2,080 MW (USBR 2009). In an average year, Hoover Dam generates about 4,000 GWh of electricity for customers in Nevada, Arizona, and California (USBR 2009). The largest portion of this electricity goes to the Metropolitan Water District of Southern California (28.5 percent), with Nevada (23.4 percent), Arizona (19.0 percent), and Los Angeles (15.4 percent) being the next largest consumers (USBR 2009).

The Glen Canyon Dam, located roughly 350 mi (560 km) northeast of the Hoover Dam in Arizona, is the largest hydropower dam in the Colorado River Storage Project, a series of reservoirs that provides hydroelectric power, flood control, and water storage in the upper Colorado River Basin. The dam's reservoir, Lake Powell, covers 252 mi<sup>2</sup> (653 km<sup>2</sup>) and has a storage capacity of approximately 27 million acre-feet (33 km<sup>3</sup>). These waters drive the Glen Canyon Dam's power plant, which contains eight turbines and has an installed capacity of 1,320 MW. For the period 1965-2010, the Glen Canyon Dam generated an average of 4,610 GWh per year (USBR 2011). The Western Area Power Administration sells this electricity to municipalities, rural electric cooperatives, Native American tribes, and government agencies in Wyoming, Utah, Colorado, New

Mexico, Arizona, Nevada, and Nebraska (USBR 2008).

Hydropower generation in the Colorado River Basin is largely dependent on reservoir storage and streamflow. Hydropower generation is a function of hydraulic head (the falling height of water) and discharge (volume of water per unit time) passing through a turbine (Christensen & Lettenmaier 2007). While discharge can be controlled at the intake gates on the inside of the dam, hydraulic head is determined by the height of water in the reservoir above the natural height of flowing water in the river, which, in turn, is determined by the volume of water stored in the reservoir (Khemnani 2013). The Colorado River Basin has approximately 60 million acre-feet (74 km<sup>3</sup>) of reservoir capacity on its main stem, and nearly 92 percent of this resides in Lakes Mead and Powell, making hydropower generation very sensitive to the storage volumes of these two reservoirs (Christensen & Lettenmaier 2007).

### *Impacts of Climate Change on Hydropower*

Electricity generation at the Hoover and Glen Canyon Dams is already being affected by higher temperatures and reduced streamflow resulting from climate change. In 2014, water levels in Lake Mead are expected to decrease by nearly 8 feet (2.4 meters) due to a 10 percent reduction in upstream releases from Lake Powell, which has seen more than a decade of reduced inflow from major tributaries (Tweed 2013). In August 2013, Lake Mead water levels were 70 feet (21 meters) below their historical average of 1,175 feet, resulting in more than a 16 percent decrease in generation capacity (Tweed 2013). Lower reservoir levels are also expected to reduce Glen Canyon generation capacity by 8 percent in 2014, relative to the previous year (Tweed 2013). Should Lake Powell water levels fall beneath 3,487 feet (1,063 meters), just 98 feet (30 meters) below their August 2013 level, the threat of vortex action from excessive air intake could damage turbines and halt power generation at Glen Canyon Dam altogether (Tweed 2013).



**Figure 2. The Hoover Dam. Source: USBR 2013..**

While the current drought cycle is one of the worst on record, it may be indicative of future trends. Climate studies using an array of general circulation models (GCMs) and future atmospheric carbon dioxide scenarios estimate that by 2075 basin-wide average temperatures will increase 4.9 to 7.9° F (2.7 -4.4° C) relative to recent historical averages (Christensen & Lettenmaier 2007). This may accompany modest increases in winter precipitation and decreases in

summer precipitation, along with a reduction in average annual snowpack of up to 38 percent (Christensen & Lettenmaier 2007, USBR 2012b).

Higher temperatures and altered precipitation patterns are expected to decrease average runoff by 8-10 percent in the basin by 2075, which could lead to streamflow reductions of 8-11 percent (Christensen & Lettenmaier 2007). These factors, combined with increased summer evaporation rates, could reduce reservoir storage by as much 10-13 percent, and ultimately reduce electricity generation by 16-19 percent in the Colorado River Basin (Christensen & Lettenmaier 2007, Figure 3).

Such reductions in hydroelectricity production may have fiscal and ecological impacts. Utilities will have to buy power from other utilities or build new power plants to meet their delivery obligations – both of which are far more expensive than continued use of hydroelectricity. In 2014, the Western Area Power Administration may have to spend up to \$10 million in electricity purchases to meet its delivery commitments due to decreased generation at the Glen Canyon Dam (Tweed 2013). Furthermore, the electricity generated to compensate for the hydropower energy deficit will likely come from fossil fuels, leading to an increase in greenhouse gas emissions. This increase will play into a positive feedback loop in which the effects of climate change are intensified, hydroelectric power capacity is further reduced, and more fossil fuel-based energy sources are needed.

### *Current Policy Situation*

The over-allocation of the Colorado River's waters will

likely act in conjunction with climate change to further reduce hydropower capacity in the basin. Hydropower consumes minimal water, yet hydropower capacity relies on consistent streamflows and reservoir storage, both of which are threatened by a disparity between supply and demand enshrined in current basin water policy. Allocation of the Colorado River is governed by a series of 12 major and a series of minor federal and state laws, treaties, court decisions, and compacts collectively known as the

Law of the River. The Colorado Compact of 1922, the cornerstone of the Law of the River, split the basin's water between the Upper Basin states (Wyoming, Utah, Colorado, and New Mexico) and Lower Basin states (Arizona, Nevada, California), apportioning 7.5 million acre-feet (9.3 km<sup>3</sup>) of water per year to each. The subsequent adoption of the U.S.-Mexico Treaty of 1944 allocated another 1.5 million acre-feet (1.9 km<sup>3</sup>) of water per year to Mexico, bringing total Colorado River allocations to 16.5 million acre-feet (20.4 km<sup>3</sup>) per year (USBR 2012b). These treaties were created in an especially wet period, so short-term stream flow data overestimated how much water would be available in the future (Christensen & Lettenmaier 2007). The Colorado River's current historical annual stream flow average (1906-2011) is approximately 16.4 million acre-feet (20.2 km<sup>3</sup>), with current averages being even lower (USBR 2012b). In effect, the Colorado River is over-allocated. The Law of the River has functioned in recent years only because the Upper Basin states have not fully developed their portion of the Colorado (USBR 2012b), yet as existing policy allows water demand to exceed supply, the resulting reduction in streamflow and reservoir storage will adversely affect hydropower generation.

## Ways Forward

To maintain hydroelectric capacity in the Colorado River Basin, policymakers must support regulations and programs that protect streamflow and restore reservoir stor-



**Figure 3. Lake Powell water line. The white “bathtub ring” lining the canyon wall shows the former high water mark of the reservoir. Source: NPR 2005.**

age to historical averages. Efficiency and conservation efforts aimed at agricultural and municipal water use will be important tools in achieving these goals. Agriculture, which account for roughly 57 percent of water demand in the basin, holds the greatest potential for water savings (USBR 2012b). Programs that promote efficient irrigation technology, deficit irrigation, and water-efficient crops are just some of the ways in which policymakers can help farmers decrease their water use. In addition, water-sharing pro-

grams, in which farmers lease or sell water rights to municipalities, would provide a means to decrease irrigated acreage in the most arid regions of the basin, where evaporative losses are excessive and crop production is water inefficient. Municipalities throughout the basin have already been active in reducing per capita water use through various conservation and efficiency programs over the past several decades, yet explosive population growth has counteracted this decrease, resulting in an overall increase in water deliveries (Cohen 2011). More aggressive conservation and efficiency efforts will be necessary to reverse this trend.

Policymakers can also address threats to hydropower capacity by funding adaptive upgrades to power plants. The Hoover Dam, for example, is having five new wide-head turbines installed to allow hydropower to be generated under low water levels in Lake Mead (Tweed 2013). Such investments expand the lifespan of existing major infrastructure investments under increasingly water-scarce conditions.

Given the predicted trajectory of climate change in the Colorado River Basin, sustaining hydropower at its current level may prove untenable. Policymakers must prepare for this possibility and address the resulting energy deficit responsibly. One option is to promote the development of renewable energy sources throughout the basin. Subsidies and incentives for wind, solar, and thermal energy projects would increase the likelihood of their adoption over fossil fuel power plants, preventing further contributions to cli-

mate change. Another option is to reduce demand by promoting energy efficiency and conservation programs. If energy demands are reduced, especially in water transportation networks and urban centers, the basin's power grid may be able to absorb the loss of hydropower without having to turn to additional fossil fuel-based generation.

Overall, hydropower in the Colorado River Basin faces an uncertain future due to climate change, and dealing with that uncertainty will be a major challenge for policymakers in the coming decades. While this is a daunting task, there

are many options available to maintain hydropower generation in the basin or compensate for its decrease with sustainable energy alternatives. The one certainty is that business as usual will no longer meet the needs of the basin's inhabitants, requiring decisive action from its managers and leaders.

- Authored by Aaron Thiel; Edited by Will Kort & Victoria Lubner; Supervised by Dr. Jenny Kehl

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Aug 04, 2015

## LOWER COLORADO WATER SUPPLY REPORT

River Operations  
Bureau of Reclamation

Questions: [BCOOWaterops@usbr.gov](mailto:BCOOWaterops@usbr.gov)

(702)293-8373

<http://www.usbr.gov/lc/region/g4000/weekly.pdf>

	PERCENT	Content 1000 ac-ft (kaf)	Elev. (Feet above mean sea level)	7-Day Release (CFS)
CURRENT STORAGE	FULL			
LAKE POWELL	53%	12,982	3612.48	15,300
* LAKE MEAD	38%	9,893	1078.57	9,400
LAKE MOHAVE	92%	1,669	641.91	12,400
LAKE HAVASU	94%	583	448.17	9,500
TOTAL SYSTEM CONTENTS **	53%	31,355		
As of 08/03/2015				
SYSTEM CONTENT LAST YEAR	51%	30,441		
* Percent based on capacity of 26,120 kaf or elevation 1219.6 feet.				
** TOTAL SYSTEM CONTENTS includes Upper & Lower Colorado River Reservoirs, less Lake Mead exclusive flood control space.				
Salt/Verde System	52%	1,191		
Painted Rock Dam	0%	0	535.13	0
Alamo Dam	6%	57	1,090.29	25
Forecasted Water Use for Calendar Year 2015 (as of 08/04/2015) (values in kaf)				
NEVADA			245	
SOUTHERN NEVADA WATER SYSTEM				215
OTHERS				30
CALIFORNIA			4,251	
METROPOLITAN WATER DISTRICT OF CALIFORNIA				888
IRRIGATION DISTRICTS				3,225
OTHERS				138
ARIZONA			2,611	
CENTRAL ARIZONA PROJECT				1,497
OTHERS				1,114
TOTAL LOWER BASIN USE				7,107
DELIVERY TO MEXICO - 2015 (Mexico Scheduled Delivery + Preliminary Yearly Excess <sup>1</sup> )				1,524
OTHER SIGNIFICANT INFORMATION				
UNREGULATED INFLOW INTO LAKE POWELL - AUGUST FINAL FORECAST DATED 08/03/2015				
		MILLION ACRE-FEET	% of Normal	
FORECASTED WATER YEAR 2015		10.335	95%	
PRELIMINARY OBSERVED APRIL-JULY 2015		6.713	94%	
JULY OBSERVED INFLOW		1.072	98%	
AUGUST INFLOW FORECAST		0.400	80%	
		Upper Colorado Basin	Salt/Verde Basin	
WATER YEAR 2015 PRECIP TO DATE		94% (25.4")	94% (21.7")	
CURRENT BASIN SNOWPACK		NA% (NA)	NA% (NA)	

<sup>1</sup> Delivery to Mexico forecasted yearly excess calculated using year-to-date observed and projected excess.

**U.S. BUREAU OF RECLAMATION  
LOWER COLORADO REGION  
CY 2015**

ARIZONA, CALIFORNIA, NEVADA, MEXICO  
FORECAST OF END OF YEAR CONSUMPTIVE USE  
FORECAST BASED ON USE TO DATE AND APPROVED ANNUAL WATER ORDERS<sup>1</sup>  
(ACRE-FEET)

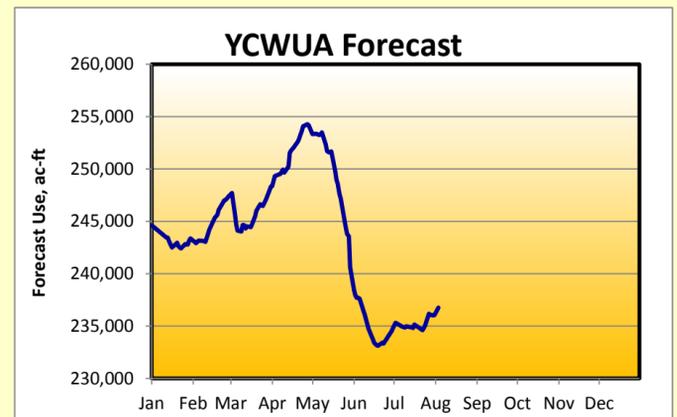
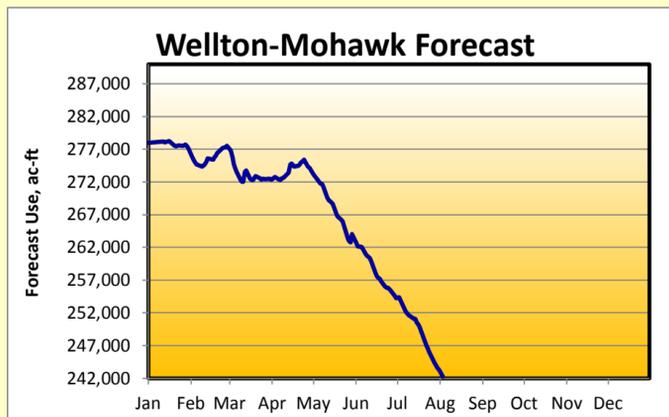
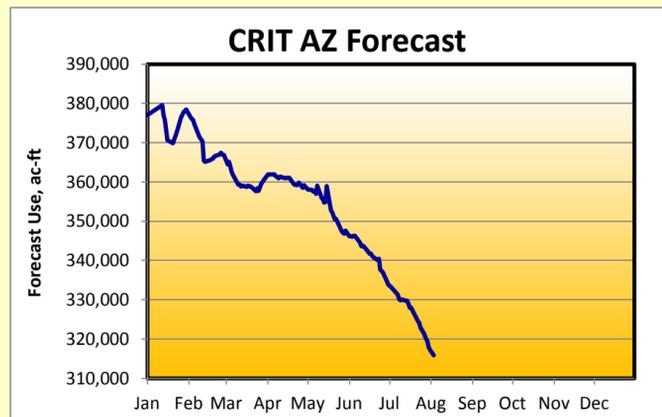
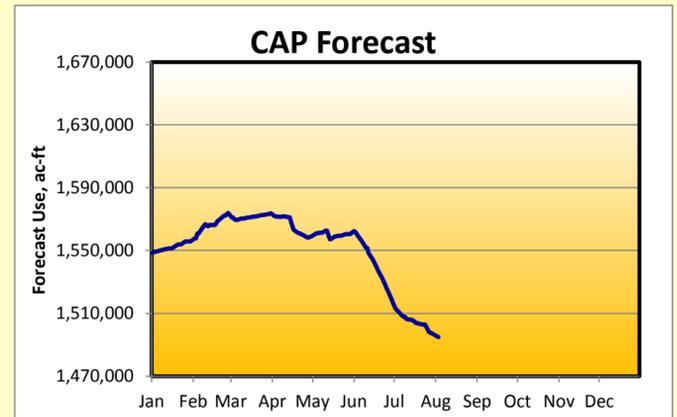
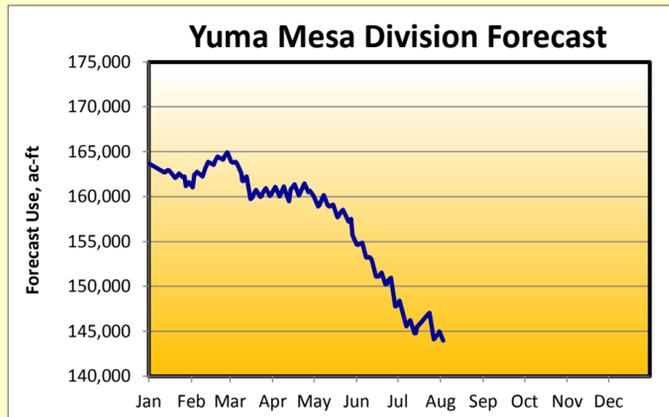
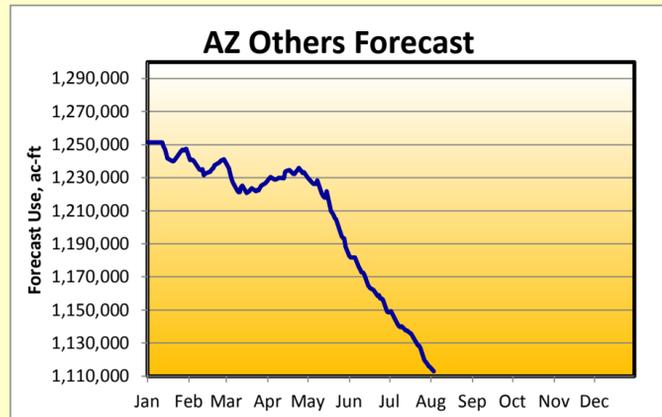
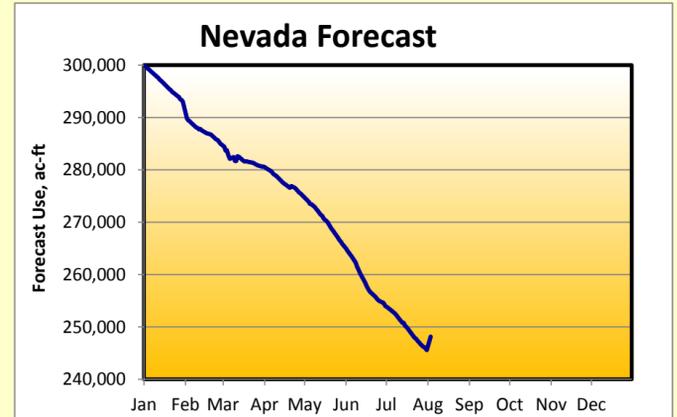
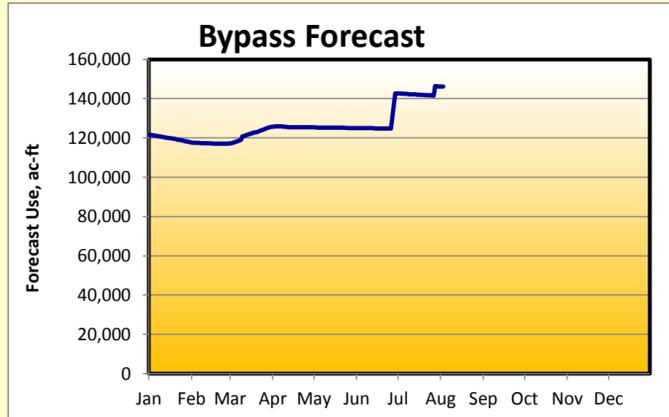
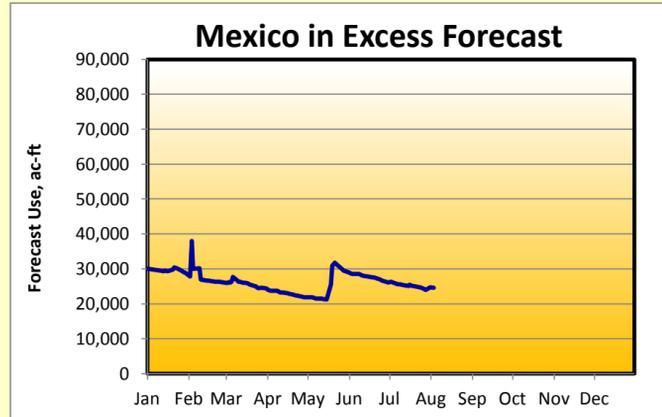
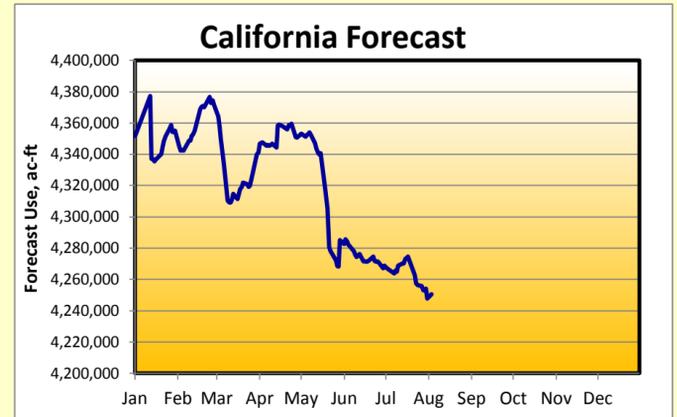
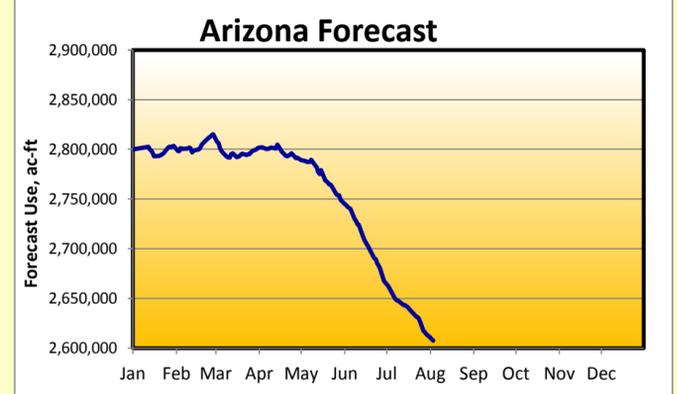
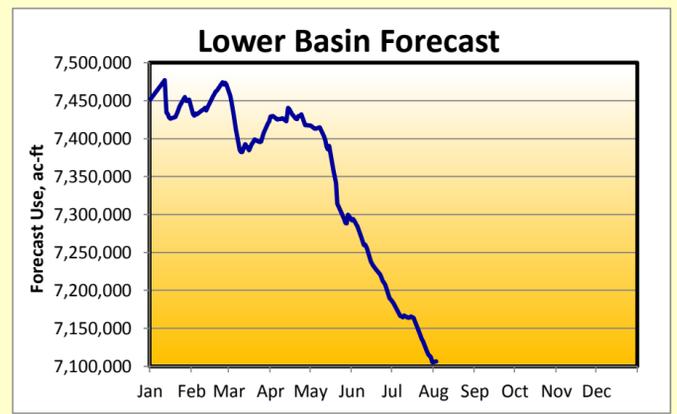
<b>WATER USE SUMMARY</b>	<b>Use To Date CY2015</b>	<b>Forecast Use CY2015</b>	<b>Approved Use<sup>2</sup> CY2015</b>	<b>Excess to Approval CY2015</b>
ARIZONA	1,620,397	2,607,676	2,799,878	-192,202
CALIFORNIA	2,773,607	4,250,475	4,351,727	-101,252
NEVADA	132,410	248,107	300,000	-51,893
<b>STATES TOTAL<sup>3</sup></b>	<b>4,526,414</b>	<b>7,106,258</b>	<b>7,451,605</b>	<b>-345,347</b>
MEXICO IN SATISFACTION OF TREATY (Including downward delivery) TO MEXICO AS SCHEDULED	1,081,395 1,069,204	1,524,530 1,500,000	1,500,000	<b>24,530</b>
MEXICO IN EXCESS OF TREATY BYPASS PURSUANT TO MINUTE 242	12,191 87,766	24,530 146,190		
<b>TOTAL LOWER BASIN &amp; MEXICO</b>	<b>5,695,575</b>	<b>8,776,978</b>		

1/ Incorporates Jan-Jun USGS monthly data and 80 daily reporting stations which may be revised after provisional data reports are distributed by the USGS. Use to date estimated for users reporting monthly and annually.

2/ These values reflect adjusted apportionments. See Adjusted Apportionment calculation on each state page.

3/ Includes unmeasured returns based on estimated consumptive use/diversion ratios by user from studies provided by Arizona Department of Water Resources, Colorado River Board of California, and Reclamation.

NOTE: Use to date values have been updated with June USGS Provisional data as well as monthly reported data. [7-27-2015]



Graph notes: Jan 1 forecast use is scheduled use in accordance with the Annual Operating Plan's state entitlements, available unused entitlements, and over-run paybacks. A downward sloping line indicates use at a lower rate than scheduled, upward sloping is above schedule, and a flat line indicates a use rate equal to schedule. Lower priority users such as CAP, MWD, and Robt.B.Griffith may adjust use rates to meet state entitlements as higher priority use deviates from schedule. Abrupt changes in the forecast use line may be due to a diversion schedule change or monthly updating of provisional realtime diversions.

**U.S. BUREAU OF RECLAMATION  
LOWER COLORADO REGION  
CY 2015**

**NOTE:**  
 • Diversions and uses that are pending approval are noted in *red italics*.  
 • Water users with a consumptive use entitlement - **Excess to Estimated Use** column indicates overrun/underrun of entitlement. Dash in this column indicates water user has a diversion entitlement.  
 • Water user with a diversion entitlement - **Excess to Approved Diversion** column indicates overrun/underrun of entitlement. Dash in this column indicates water user has a consumptive use entitlement.

**CALIFORNIA WATER USERS  
FORECAST OF END OF YEAR CONSUMPTIVE USE  
FORECAST BASED ON USE TO DATE AND APPROVED ANNUAL WATER ORDERS**

[California Schedules and Approvals](#)  
[Historic Use Records \(Water Accounting Reports\)](#)

WATER USER	Use	Forecast	Estimated	Excess to	Diversion	Forecast	Approved	Excess to
	To Date	Use	Use	Estimated	To Date	Diversion	Diversion	Approved
	CY2015	CY2015	CY2015	CY2015	CY2015	CY2015	CY2015	CY2015
CALIFORNIA PUMPERS	1,111	1,680	1,680	---	2,015	3,047	3,047	0
FORT MOJAVE INDIAN RESERVATION, CA	5,425	7,553	8,996	---	10,083	14,038	16,720	-2,682
CITY OF NEEDLES (includes LCWSP use)	1,277	1,931	1,931	0	1,799	2,720	2,720	0
METROPOLITAN WATER DISTRICT	675,776	888,301	768,208	---	677,402	891,184	771,299	---
COLORADO RIVER INDIAN RESERVATION, CA	2,146	3,246	3,246	---	3,556	5,378	5,378	0
PALO VERDE IRRIGATION DISTRICT	266,835	401,177	431,782	---	542,183	881,151	946,750	-65,599
YUMA PROJECT RESERVATION DIVISION	30,443	44,833	48,586	---	57,842	96,274	104,200	-7,926
YUMA PROJECT RESERVATION DIVISION - INDIAN UNIT	---	---	---	---	28,958	47,474	50,200	-2,726
YUMA PROJECT RESERVATION DIVISION - BARD UNIT	---	---	---	---	28,884	48,800	54,000	-5,200
YUMA ISLAND PUMPERS	3,085	4,665	4,665	---	5,589	8,452	8,452	0
FORT YUMA INDIAN RESERVATION - RANCH 5	446	675	675	---	807	1,221	1,221	0
IMPERIAL IRRIGATION DISTRICT	1,538,864	2,428,770	2,602,481	-173,711	1,513,539	2,448,026	2,706,070	---
SALTON SEA SALINITY MANAGEMENT	47,153	121,636	121,636	0	49,125	126,826	126,826	---
COACHELLA VALLEY WATER DISTRICT	200,490	345,167	357,000	-11,833	207,447	359,388	371,671	---
OTHER LCWSP CONTRACTORS	444	671	671	---	705	1,066	1,066	0
CITY OF WINTERHAVEN	45	68	68	---	68	103	103	0
CHEMEHUEVI INDIAN RESERVATION	67	102	102	---	7,498	11,340	11,340	0
<b>TOTAL CALIFORNIA</b>	<b>2,773,607</b>	<b>4,250,475</b>			<b>3,079,658</b>	<b>4,850,214</b>	<b>5,076,863</b>	

**CALIFORNIA ADJUSTED APPORTIONMENT CALCULATION**

California Basic Apportionment	4,400,000
Conservation for Salton Sea Restoration - 2010 <sup>1</sup>	-23,273
Creation of Extraordinary Conservation ICS (IID)	-25,000
Creation of Extraordinary Conservation ICS (MWD)	
Total State Adjusted Apportionment	4,351,727
Excess to Total State Adjusted Apportionment	-101,252

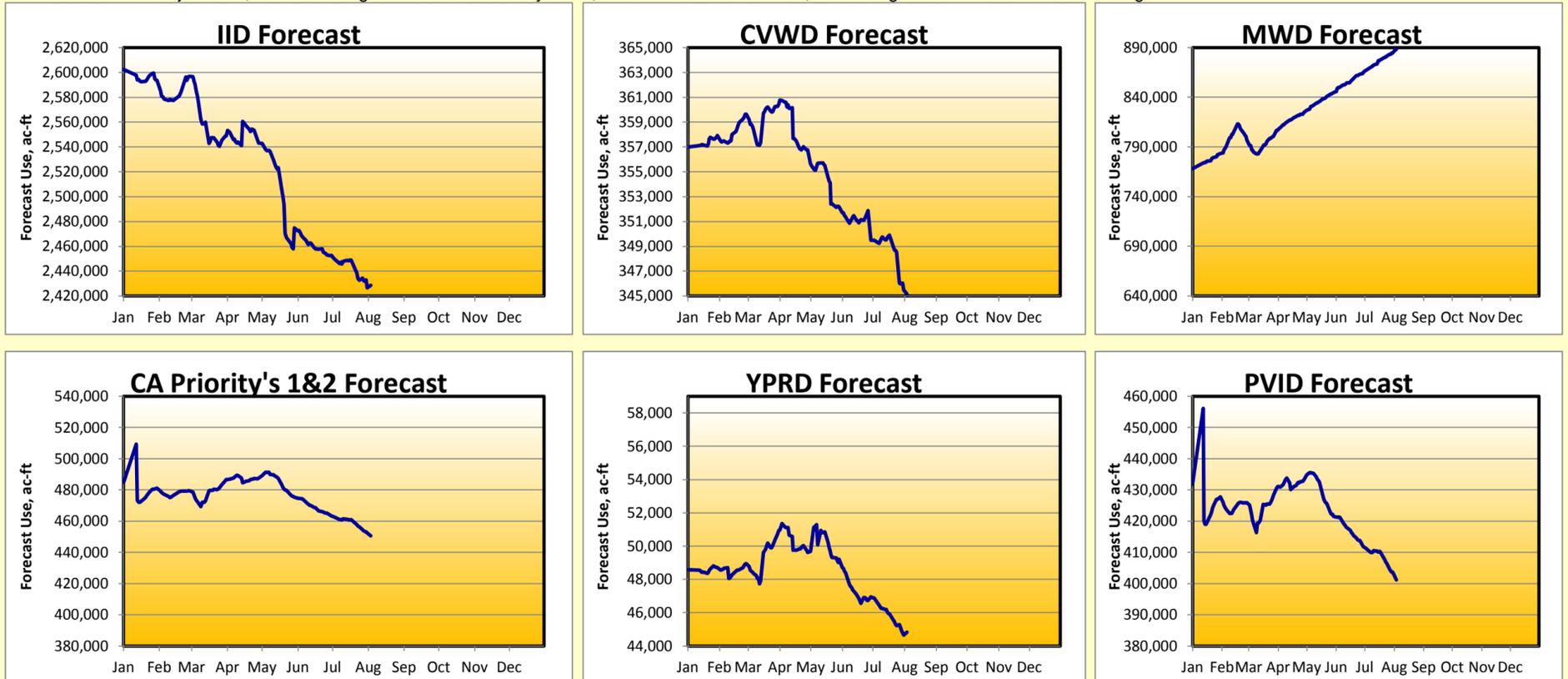
**ISG ANNUAL TARGET COMPARISON CALCULATION**

Priorities 1, 2, 3b Use (PVID+YPRD+Island+PVID Mesa)	450,675
MWD Adjustment	-30,675
Total California Agricultural Use (PVID+YPRD+Island+IID+CVWD)	3,224,612
California Agricultural Paybacks	23,273
Misc. PPRs Covered by IID and CVWD	14,500
California ICS Creation (IID ICS)	25,000
Total Use for Target Comparison <sup>2</sup>	3,256,710
ISG Annual Target (Exhibit B)	3,448,000
Amount over/(under) ISG Annual Target	-191,290

NOTES: Click on California Schedules and Approvals above for incoming diversion schedules and approvals.

1/ Pending approval by Imperial Irrigation District's Board of Directors.

2/ Includes MWD Adjustment, California Agricultural Use and Paybacks, IID-CVWD covered PPRs, and taking out the MWD-CVWD Exchange



**U.S. BUREAU OF RECLAMATION  
LOWER COLORADO REGION  
CY 2015**

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 ● Water user with a diversion entitlement - **Excess to Approved Diversion** column indicates overrun/underrun of entitlement. Dash in this column indicates water user has a consumptive use entitlement.

ARIZONA WATER USERS  
 FORECAST OF END OF YEAR CONSUMPTIVE USE  
 FORECAST BASED ON USE TO DATE AND APPROVED ANNUAL WATER ORDERS  
[Arizona Schedules and Approvals](#)  
[Historic Use Records \(Water Accounting Reports\)](#)

<u>WATER USER</u>	<u>Use To Date CY2015</u>	<u>Forecast Use CY2015</u>	<u>Estimated Use CY2015</u>	<u>Excess to Estimated Use CY2015</u>	<u>Diversion To Date CY2015</u>	<u>Forecast Diversion CY2015</u>	<u>Approved Diversion CY2015</u>	<u>Excess to Approved Diversion CY2015</u>
ARIZONA PUMPERS	11,612	17,561	17,561	---	17,973	27,181	27,181	0
LAKE MEAD NRA, AZ - Diversions from Lake Mead	90	155	155	---	90	155	155	0
LAKE MEAD NRA, AZ - Diversions from Lake Mohave	114	191	191	---	114	191	191	0
DAVIS DAM PROJECT	1	2	2	---	50	75	75	0
BULLHEAD CITY	3,971	7,603	8,523	---	5,927	11,346	12,720	-1,374
MOHAVE WATER CONSERVATION	368	556	556	---	549	831	831	0
BROOKE WATER LLC	137	207	207	---	206	311	311	0
MOHAVE VALLEY IDD	10,734	19,727	22,260	---	19,878	36,529	41,220	-4,691
FORT MOJAVE INDIAN RESERVATION, AZ	25,322	38,474	42,390	---	46,893	71,248	78,500	-7,252
GOLDEN SHORES WATER CONSERVATION DISTRICT	209	316	316	---	313	473	473	0
HAVASU NATIONAL WILDLIFE REFUGE	2,388	3,347	3,563	---	19,911	31,152	41,820	-10,668
LAKE HAVASU CITY	4,324	8,046	8,928	---	6,977	12,980	14,400	-1,420
CENTRAL ARIZONA PROJECT	920,018	1,494,754	1,541,550	---	920,018	1,494,754	1,541,550	---
TOWN OF PARKER	92	1,157	352	---	226	2,103	920	1,183
COLORADO RIVER INDIAN RESERVATION, AZ	197,298	315,825	376,964	---	383,194	620,830	662,402	-41,572
EHRENBURG IMPROVEMENT ASSOCIATION	169	256	256	---	239	361	361	0
CIBOLA VALLEY IRRIGATION DISTRICT	11,209	16,951	16,951	---	15,676	23,707	23,707	0
CIBOLA NATIONAL WILDLIFE REFUGE	8,425	12,741	12,741	0	13,588	20,550	20,550	0
IMPERIAL NATIONAL WILDLIFE REFUGE	1,730	2,616	2,616	0	2,793	4,224	4,224	0
YUMA PROVING GROUND	307	510	550	---	307	510	550	-40
GILA MONSTER FARMS	2,144	3,459	5,244	---	3,744	6,275	9,156	-2,881
WELLTON-MOHAWK IDD	149,707	242,305	278,000	-35,695	226,745	383,397	424,350	---
CITY OF YUMA	8,193	15,196	17,051	-1,855	14,197	25,552	27,318	-1,766
MARINE CORPS AIR STATION YUMA	851	1,411	1,305	---	851	1,411	1,305	106
UNION PACIFIC RAILROAD	14	24	24	---	28	48	48	0
UNIVERSITY OF ARIZONA	379	673	764	---	379	673	764	-91
YUMA UNION HIGH SCHOOL DISTRICT	76	157	193	---	102	208	253	-45
DESERT LAWN MEMORIAL	60	91	91	---	85	129	129	0
NORTH GILA VALLEY IDD	8,295	10,534	10,099	---	28,182	42,534	41,000	1,534
YUMA IRRIGATION DISTRICT	24,636	38,408	42,581	---	44,041	70,841	75,900	-5,059
YUMA MESA IDD	59,471	95,035	111,022	---	110,180	181,548	204,904	-23,356
UNIT "B" IRRIGATION DISTRICT	11,467	17,493	17,330	---	17,149	27,455	28,050	-595
FORT YUMA INDIAN RESERVATION	923	1,396	1,396	---	1,421	2,149	2,149	0
YUMA COUNTY WATER USERS' ASSOCIATION	154,692	236,759	244,599	---	229,665	370,117	388,000	-17,883
COCOPA INDIAN RESERVATION	894	3,624	6,457	---	1,367	5,543	9,840	-4,297
RECLAMATION-YUMA AREA OFFICE	77	116	116	---	77	116	116	0
RETURN FROM SOUTH GILA WELLS								
<b>TOTAL ARIZONA</b>	<b>1,620,397</b>	<b>2,607,676</b>	<b>2,792,904</b>		<b>2,133,135</b>	<b>3,477,507</b>	<b>3,685,423</b>	
CAP	920,018	1,494,754				1,494,754		
ALL OTHERS	700,379	1,112,922	1,251,354			1,982,753	2,143,873	
YUMA MESA DIVISION, GILA PROJECT	92,402	143,977	350,000	-206,023		294,923		

**ARIZONA ADJUSTED APPORTIONMENT CALCULATION**

Arizona Basic Apportionment	2,800,000
Payback of IOPP overruns - (Cocopah and Beattie)	-122
CAGR/YMIDD Pilot Conservation Program <sup>1</sup>	
Total State Adjusted Apportionment	2,799,878
Excess to Total State Adjusted Apportionment	-192,202
Estimated Allowable Use for CAP	1,688,465

1/ CAWCD has agreed to forebear 9,000 acre-feet during phase one of the study, during which time CAGR/D will refine the estimate of the actual conservation yield of the program.  
 NOTES: Click on Arizona Schedules and Approvals above for incoming diversion schedules and approvals.

**U.S. BUREAU OF RECLAMATION  
LOWER COLORADO REGION  
CY 2015**

**NOTE:**

- Diversions and uses that are pending approval are noted in *red italics*.
- Water users with a consumptive use entitlement - **Excess to Estimated Use** column indicates overrun/underrun of entitlement. Dash in this column indicates water user has a diversion entitlement.
- Water user with a diversion entitlement - **Excess to Approved Diversion** column indicates overrun/underrun of entitlement. Dash in this column indicates water user has a consumptive use entitlement.

**NEVADA WATER USERS  
FORECAST OF END OF YEAR CONSUMPTIVE USE  
FORECAST BASED ON USE TO DATE AND APPROVED ANNUAL WATER ORDERS**

[Nevada Schedules and Approvals](#)  
[Historic Use Records \(Water Accounting Reports\)](#)

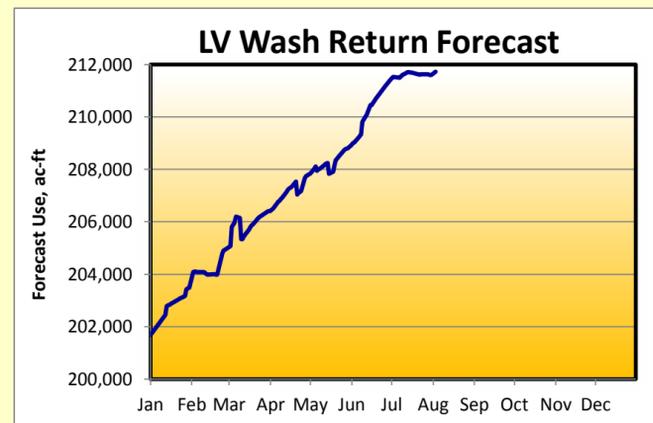
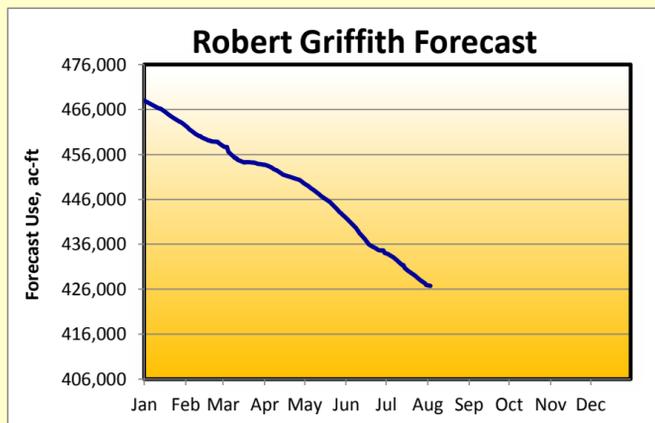
<b>WATER USER</b>	<b>Use To Date CY2015</b>	<b>Forecast Use CY2015</b>	<b>Estimated Use CY2015</b>	<b>Excess to Estimated Use CY2015</b>	<b>Diversion To Date CY2015</b>	<b>Forecast Diversion CY2015</b>	<b>Approved Diversion CY2015</b>	<b>Excess to Approved Diversion CY2015</b>
ROBERT B. GRIFFITH WATER PROJECT (SNWS)	243,373	426,714	467,935	-41,221	243,373	426,714	467,935	-41,221
LAKE MEAD NRA, NV - Diversions from Lake Mead	231	406	422	---	231	406	422	-16
LAKE MEAD NRA, NV - Diversions from Lake Mohave	107	174	166	---	107	174	166	<b>8</b>
BASIC MANAGEMENT INC.	3,572	7,542	8,211	---	3,572	7,542	8,211	-669
CITY OF HENDERSON (BMI DELIVERY)	8,732	14,864	15,878	---	8,732	14,864	15,878	-1,014
NEVADA STATE DEPT. OF FISH & GAME	3	2,904	12	<b>2,892</b>	158	3,208	363	---
PACIFIC COAST BUILDING PRODUCTS INC.	570	962	923	---	570	962	923	<b>39</b>
BOULDER CANYON PROJECT	115	174	174	---	200	302	302	0
BIG BEND WATER DISTRICT	1,145	3,074	4,061	---	2,934	6,957	10,000	-3,043
FORT MOJAVE INDIAN TRIBE	1,841	3,017	3,886	---	2,749	4,504	5,800	-1,296
LAS VEGAS WASH RETURN FLOWS	-127,279	-211,724	-201,668	---				
<b>TOTAL NEVADA</b>	<b>132,410</b>	<b>248,107</b>	<b>300,000</b>	<b>-38,329</b>	<b>262,626</b>	<b>465,633</b>	<b>510,000</b>	<b>-47,212</b>
SOUTHERN NEVADA WATER SYSTEM (SNWS)	116,094	214,990				426,714		
ALL OTHERS	16,316	33,117				38,919		
NEVADA USES ABOVE HOOVER	129,424	242,016				454,172		
NEVADA USES BELOW HOOVER	2,986	6,091				11,461		

**Tributary Conservation & Imported Intentionally Created Surplus**

Total Requested Tributary Conservation Intentionally Created Surplus	37,000
Total Requested Imported Conservation Intentionally Created Surplus	9,000
5% System Cut for Creation of Intentionally Created Surplus	-2,300
<b>Total Intentionally Created Surplus Left in Lake Mead</b>	<b>43,700</b>

**NEVADA ADJUSTED APPORTIONMENT CALCULATION**

Nevada Basic Apportionment	300,000
Excess to Total State Adjusted Apportionment	-51,893



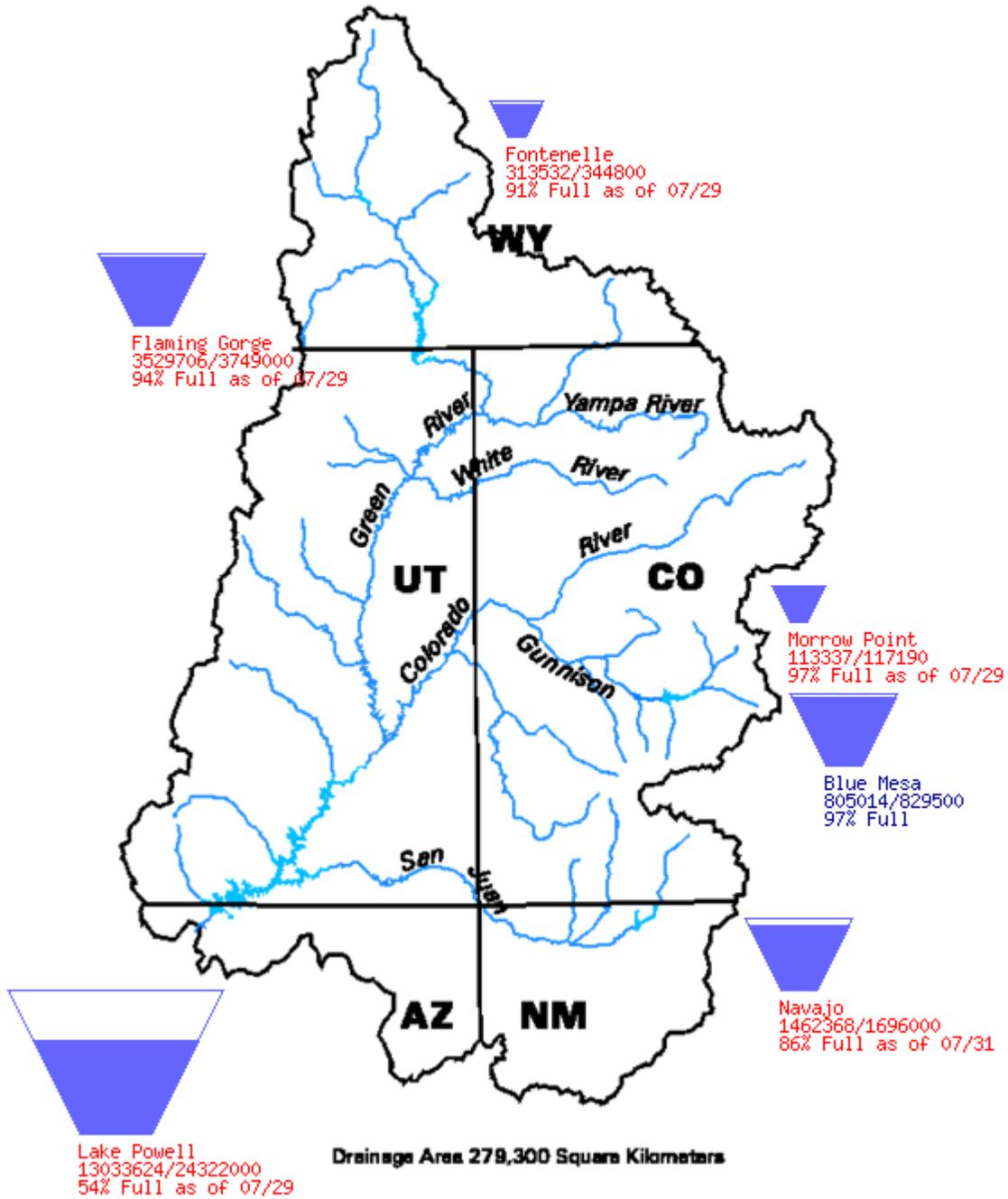
NOTES: Click on Nevada Schedules and Approvals above for incoming diversion schedules and approvals.

# Upper Colorado Region Water Resources Group

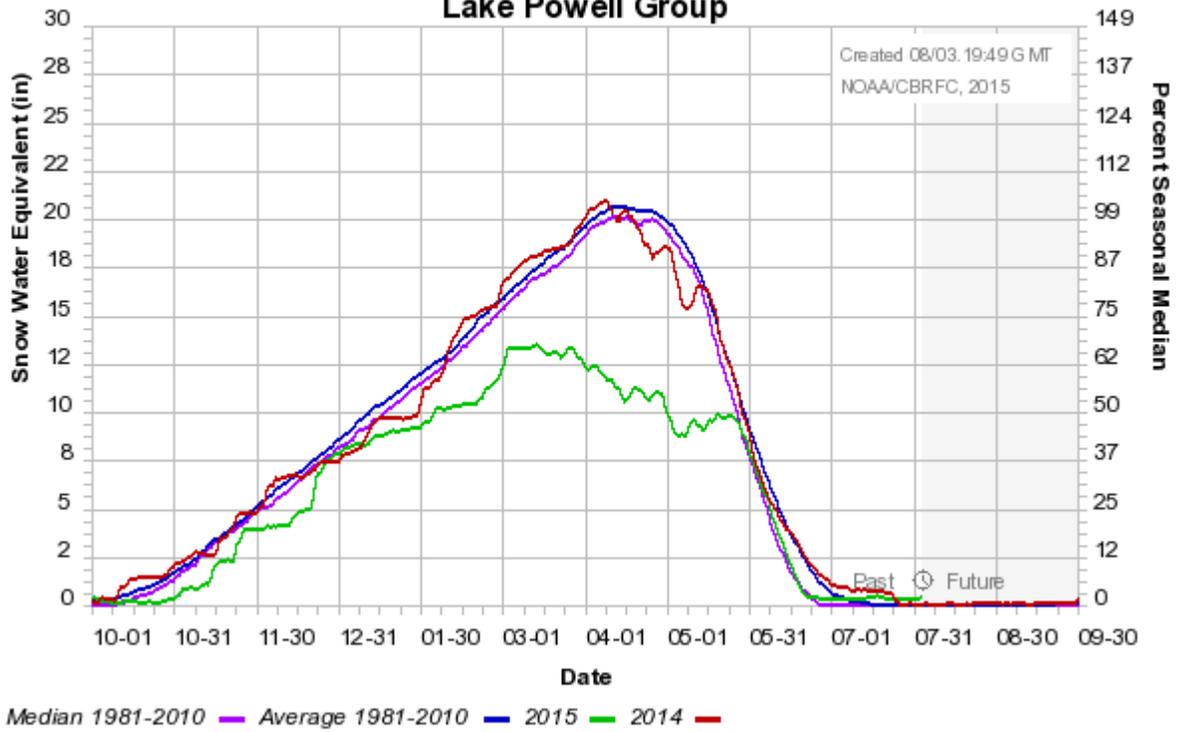
## River Basin Tea-Cup Diagrams

Data Current as of:  
08/02/2015

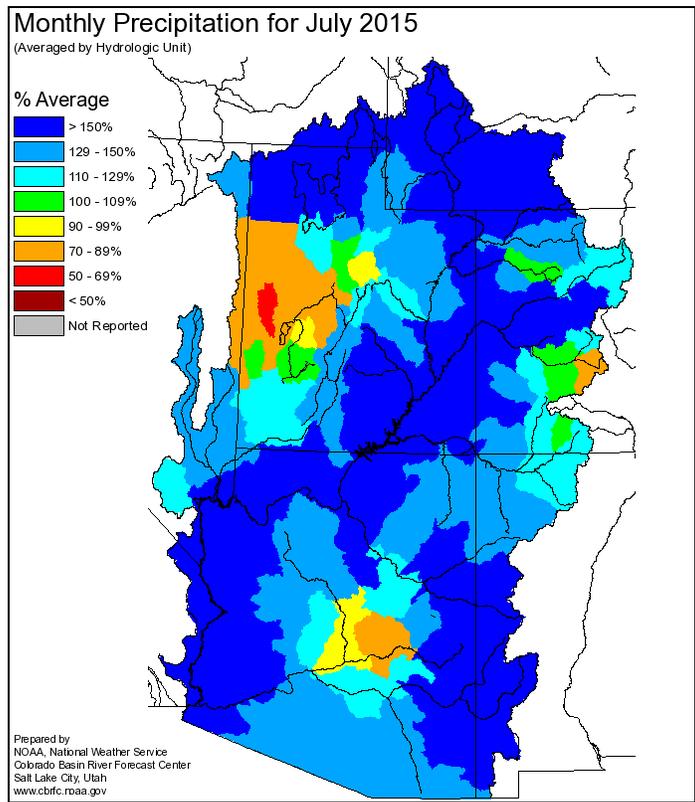
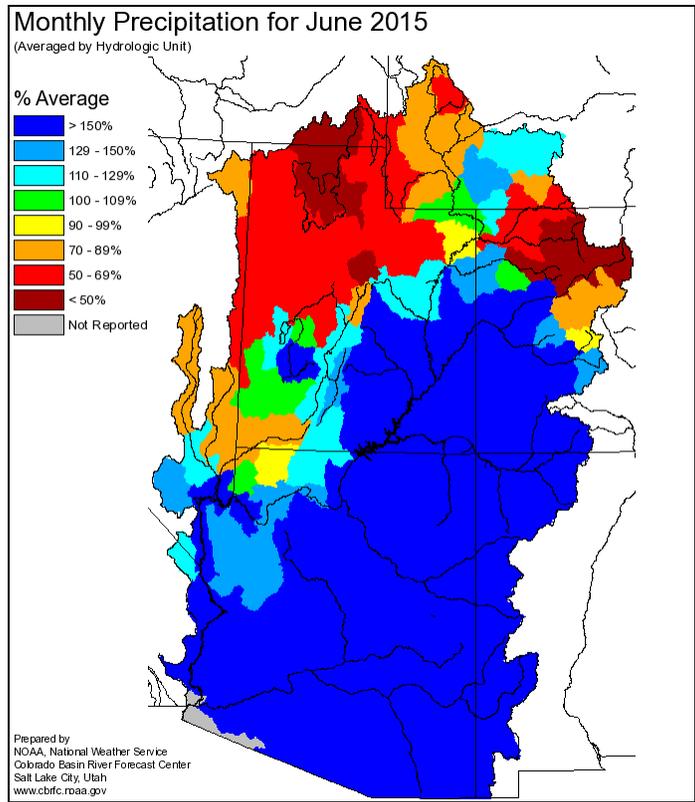
### Upper Colorado River Drainage Basin



# Colorado Basin River Forecast Center Lake Powell Group



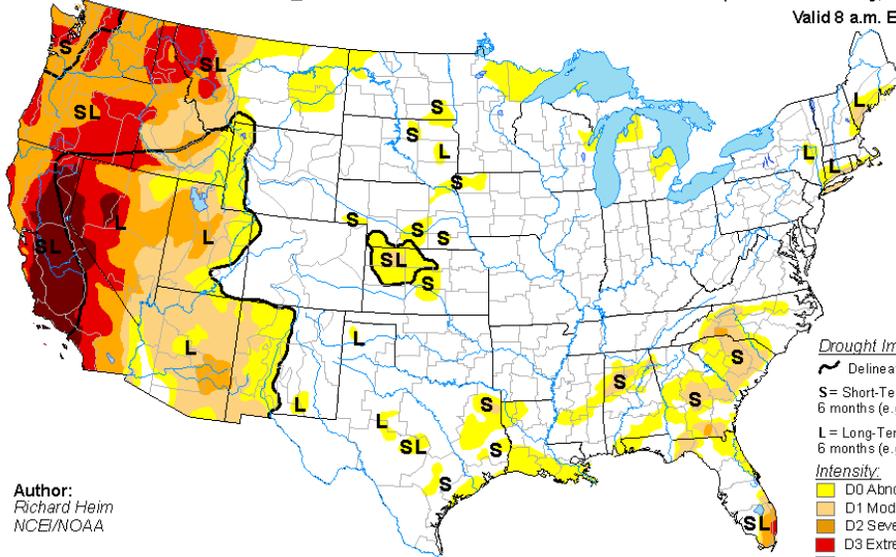
NOAA National Weather Service Monthly Precipitation Maps for June and July 2015



USDA United States Drought Monitor Map

# U.S. Drought Monitor

**July 28, 2015**  
 (Released Thursday, Jul. 30, 2015)  
 Valid 8 a.m. EDT



Author:  
 Richard Heim  
 NCEI/NOAA

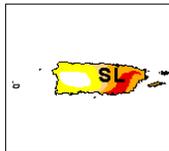
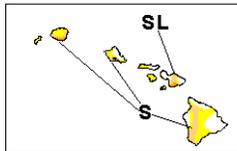
**Drought Impact Types:**

- Delineates dominant impacts
- S** = Short-Term, typically less than 6 months (e.g. agriculture, grasslands)
- L** = Long-Term, typically greater than 6 months (e.g. hydrology, ecology)

**Intensity:**

- D0 Abnormally Dry
- D1 Moderate Drought
- D2 Severe Drought
- D3 Extreme Drought
- D4 Exceptional Drought

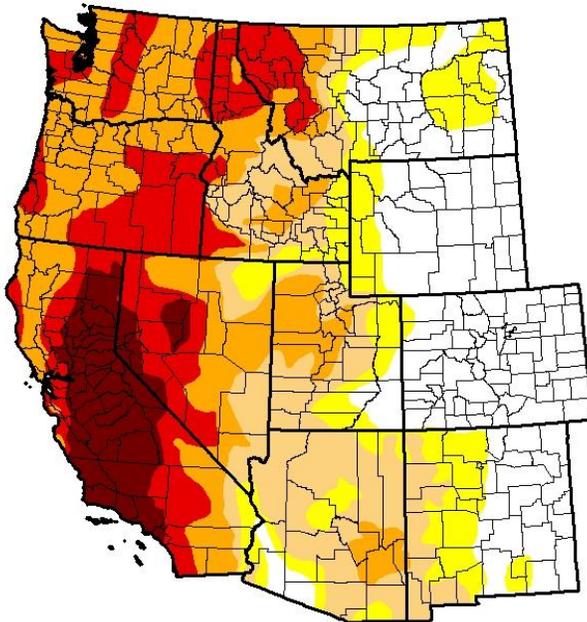
*The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. See accompanying text summary for forecast statements.*



<http://droughtmonitor.unl.edu/>

## U.S. Drought Monitor West

**July 28, 2015**  
 (Released Thursday, Jul. 30, 2015)  
 Valid 8 a.m. EDT



**Drought Conditions (Percent Area)**

	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
<b>Current</b>	26.53	73.47	60.09	42.99	22.24	7.17
<b>Last Week</b> <i>7/21/2015</i>	25.49	74.51	61.04	41.92	18.87	7.17
<b>3 Months Ago</b> <i>4/28/2015</i>	26.14	73.86	62.12	39.33	17.64	7.95
<b>Start of Calendar Year</b> <i>1/20/2014</i>	34.76	65.24	54.48	33.50	18.68	5.40
<b>Start of Water Year</b> <i>9/30/2014</i>	31.48	68.52	55.57	35.65	19.95	8.90
<b>One Year Ago</b> <i>7/28/2014</i>	27.73	72.27	60.93	44.49	21.68	8.98

**Intensity:**

- D0 Abnormally Dry
- D1 Moderate Drought
- D2 Severe Drought
- D3 Extreme Drought
- D4 Exceptional Drought

*The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. See accompanying text summary for forecast statements.*

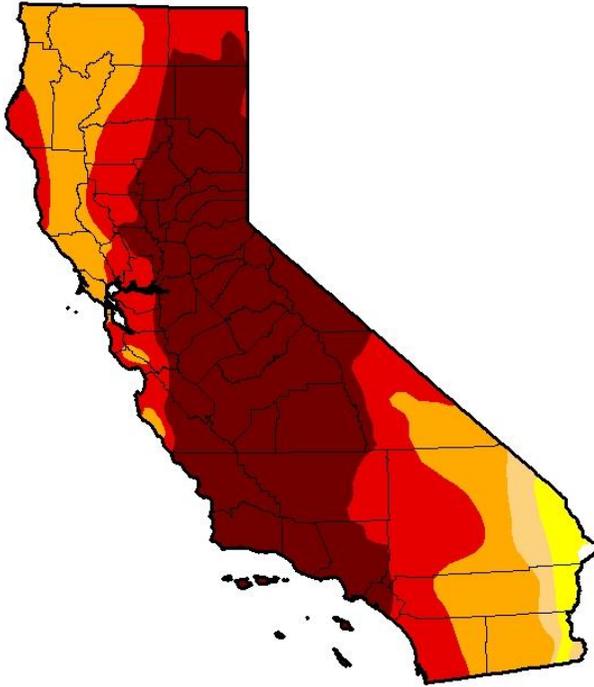
Author:  
 Richard Heim  
 NCEI/NOAA



<http://droughtmonitor.unl.edu/>

# U.S. Drought Monitor California

**July 28, 2015**  
(Released Thursday, Jul. 30, 2015)  
Valid 8 a.m. EDT



Drought Conditions (Percent Area)

	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
<b>Current</b>	0.14	99.86	97.35	94.59	71.08	46.00
<b>Last Week</b> 7/21/2015	0.14	99.86	97.35	94.59	71.08	46.00
<b>3 Months Ago</b> 4/28/2015	0.14	99.86	98.11	93.44	66.60	46.77
<b>Start of Calendar Year</b> 1/20/2014	0.00	100.00	98.12	94.34	77.94	32.21
<b>Start of Water Year</b> 9/30/2014	0.00	100.00	100.00	95.04	81.92	58.41
<b>One Year Ago</b> 7/29/2014	0.00	100.00	100.00	100.00	81.89	58.41

Intensity:

- D0 Abnormally Dry
- D1 Moderate Drought
- D2 Severe Drought
- D3 Extreme Drought
- D4 Exceptional Drought

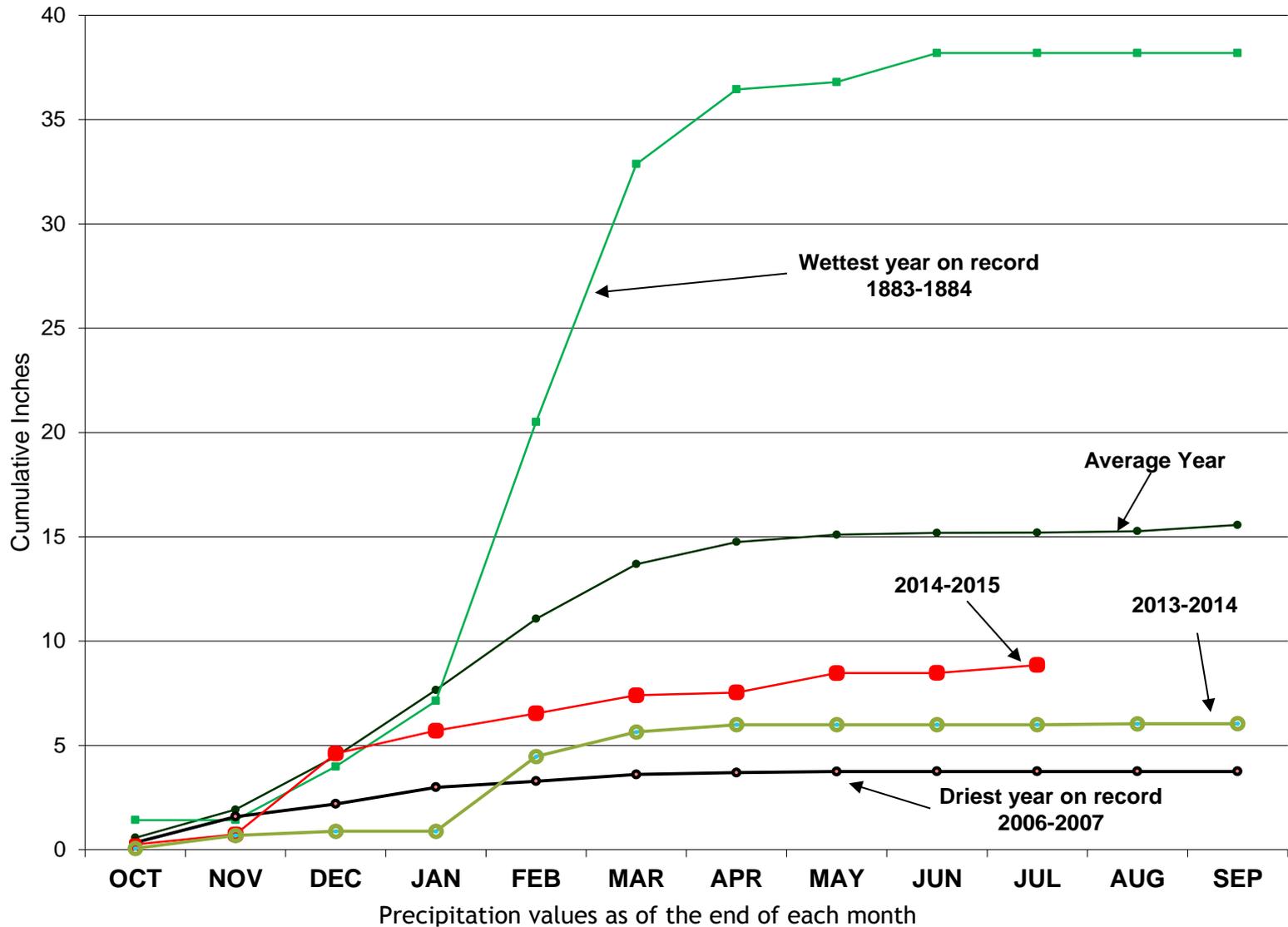
The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. See accompanying text summary for forecast statements.

**Author:**  
Richard Heim  
NCEI/NOAA



<http://droughtmonitor.unl.edu/>

# Los Angeles Civic Center Precipitation

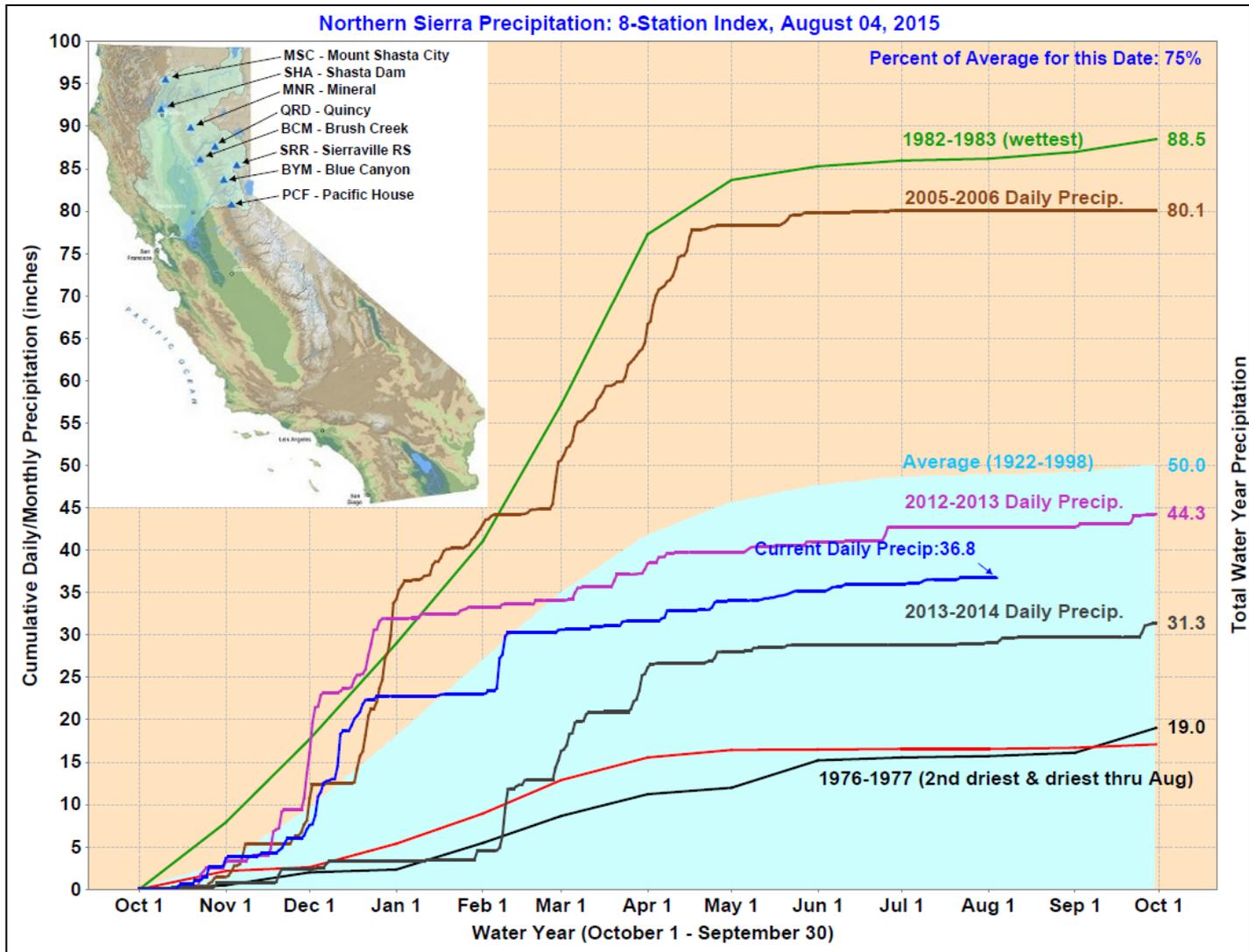


# Precipitation at Six Major Stations in Southern California

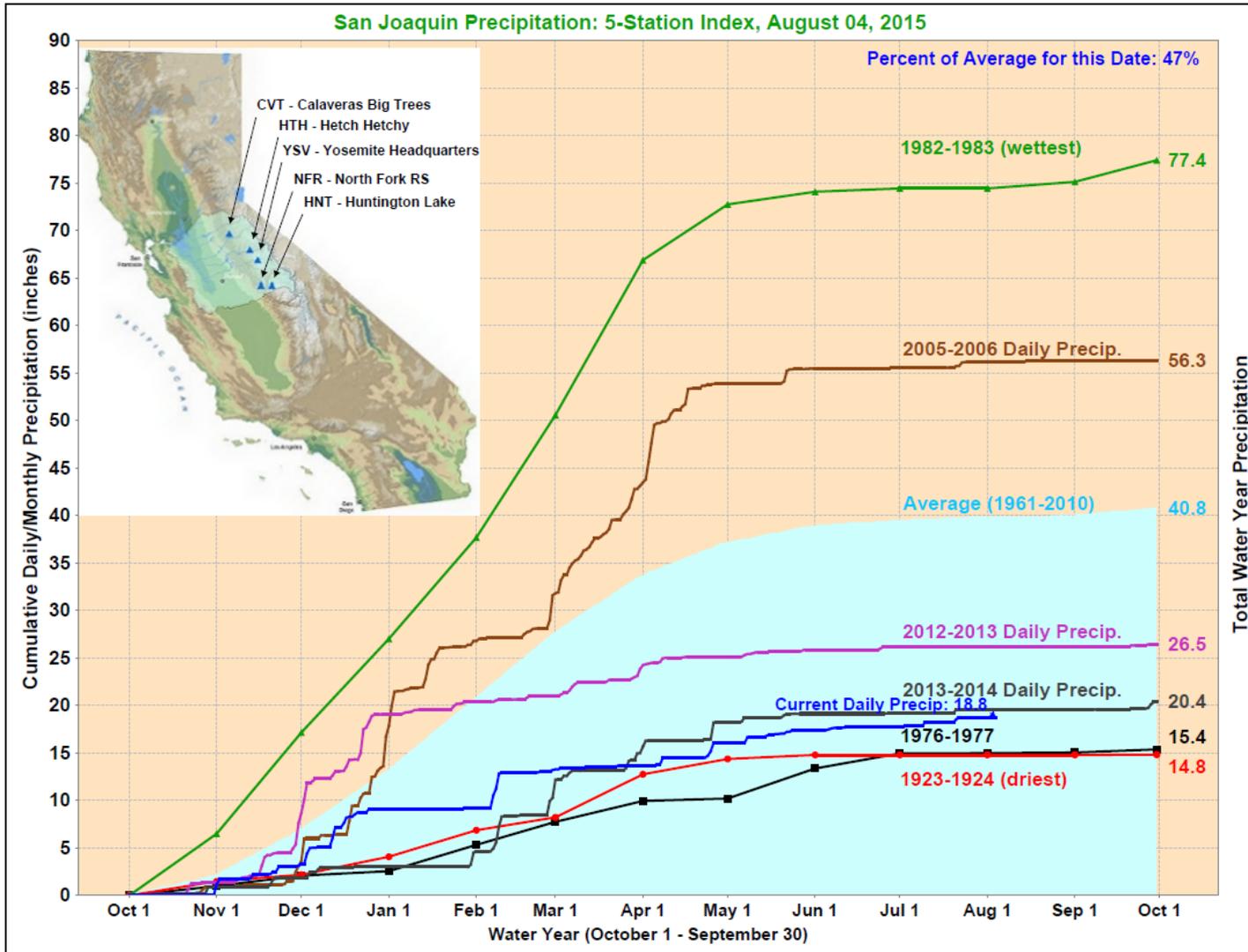
From October 1, 2014 to July 31, 2015

Station	Precipitation in inches		Average to Date	Percent of Average
	Jul	Oct 1 to Jul 31		
San Luis Obispo	1.32	8.82	22.14	40%
Santa Barbara	0.01	9.63	17.54	55%
Los Angeles	0.38	8.85	15.20	58%
San Diego	1.50	7.94	9.92	80%
Blythe	0.23	3.06	2.81	109%
Imperial	0.26	1.95	2.28	86%

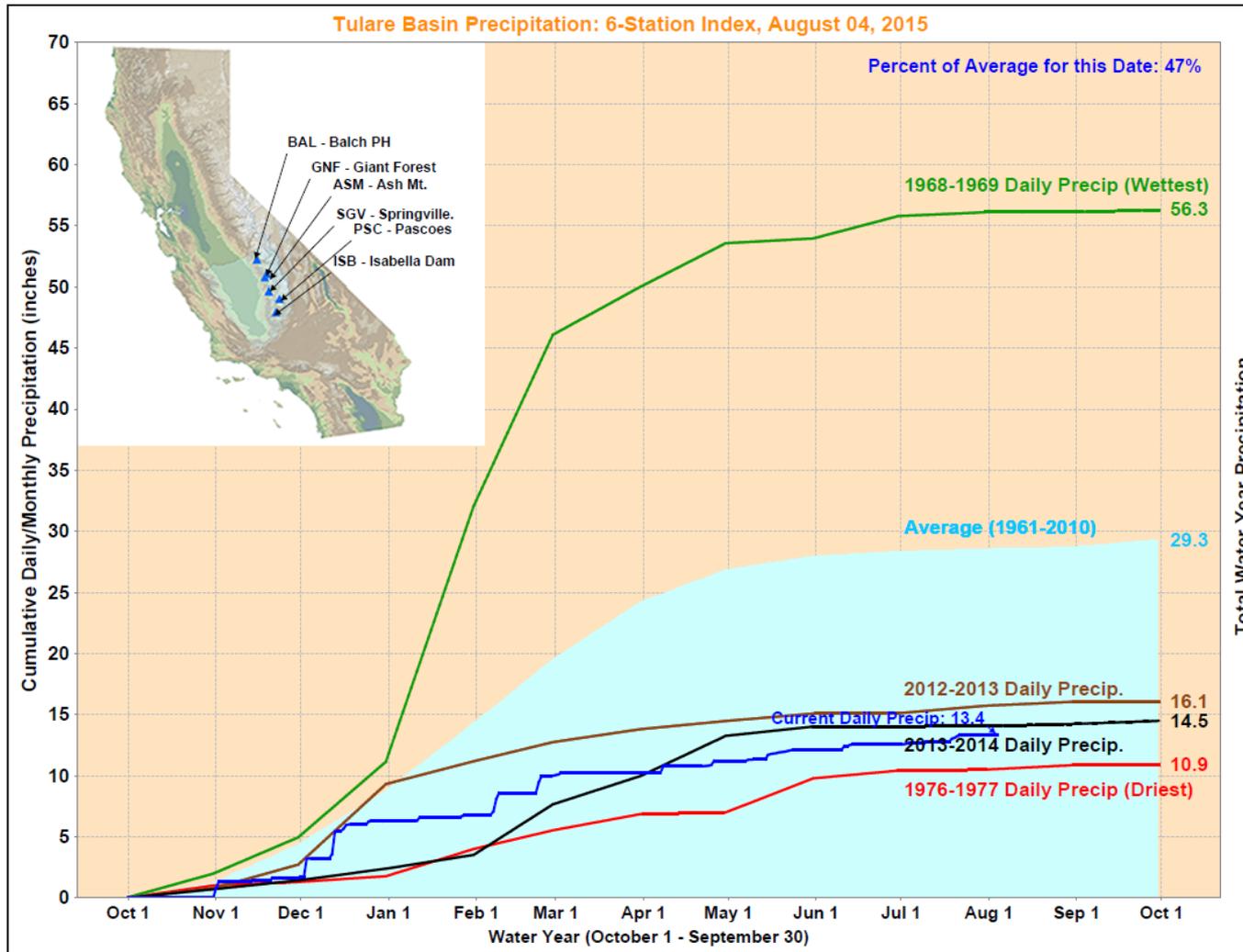
# Northern Sierra Precipitation-8 Station Index



# San Joaquin Precipitation-5 Station Index



# Tulare Basin Precipitation-6 Station Index



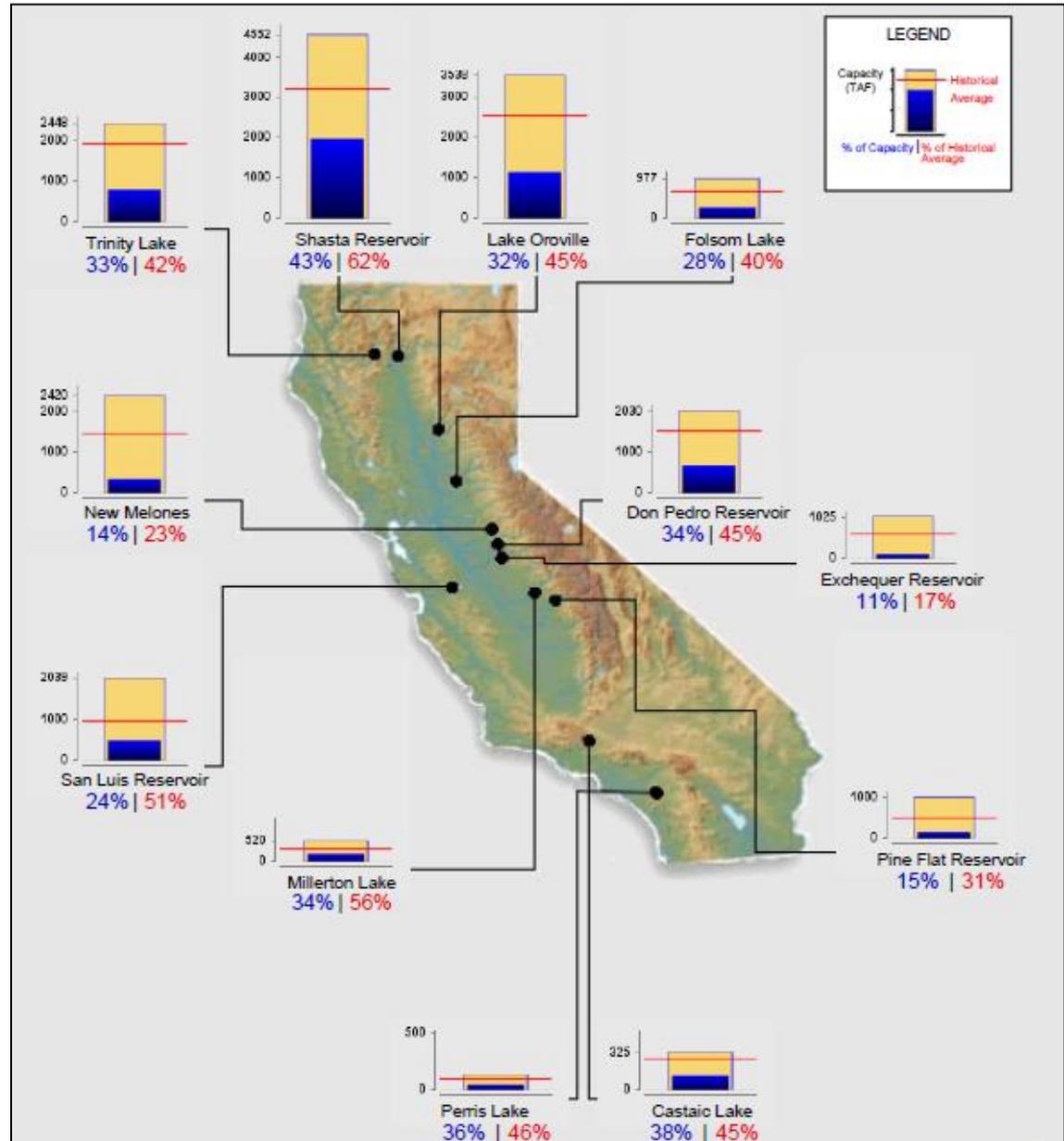
# Comparison of SWP Water Storage

Reservoir	Capacity	2014 Storage (acre-feet)		2015 Storage (acre-feet)	
		As of Aug 1	% of Cap.	As of Aug 1	% of Cap.
Frenchman	55,475	21,906	39%	15,854	29%
Lake Davis	84,371	48,988	58%	41,908	50%
Antelope	22,564	19,455	86%	19,998	89%
Oroville	3,553,405	1,247,245	35%	1,155,247	33%
<b>TOTAL North</b>	<b>3,715,815</b>	<b>1,337,594</b>	<b>36%</b>	<b>1,233,007</b>	<b>33%</b>
Del Valle	39,914	40,134	101%	37,732	95%
San Luis (DWR)	1,062,180	166,035	16%	455,660	43%
Pyramid	169,901	165,080	97%	167,025	98%
Castaic	319,247	155,212	49%	126,238	40%
Silverwood	74,970	69,744	93%	71,121	95%
Perris	126,841	61,838	49%	47,004	37%
<b>TOTAL South</b>	<b>1,793,053</b>	<b>658,043</b>	<b>37%</b>	<b>904,780</b>	<b>50%</b>
<b>TOTAL SWP</b>	<b>5,508,868</b>	<b>1,995,637</b>	<b>36%</b>	<b>2,137,787</b>	<b>39%</b>

## State Water Project Projected Deliveries:

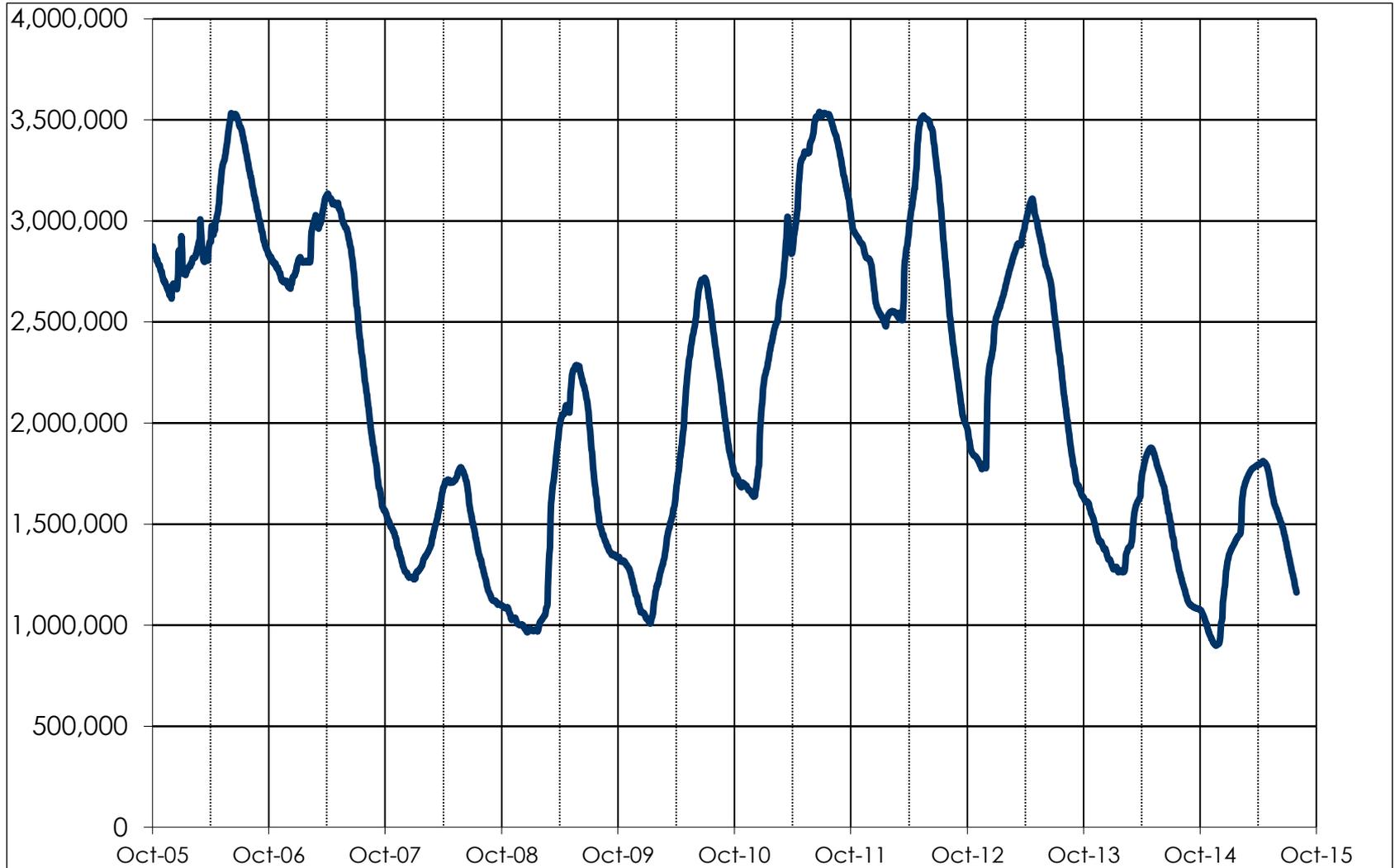
As of March 2, 2015, the Table-A allocations for 2015 is 20%

# Current Reservoir Conditions



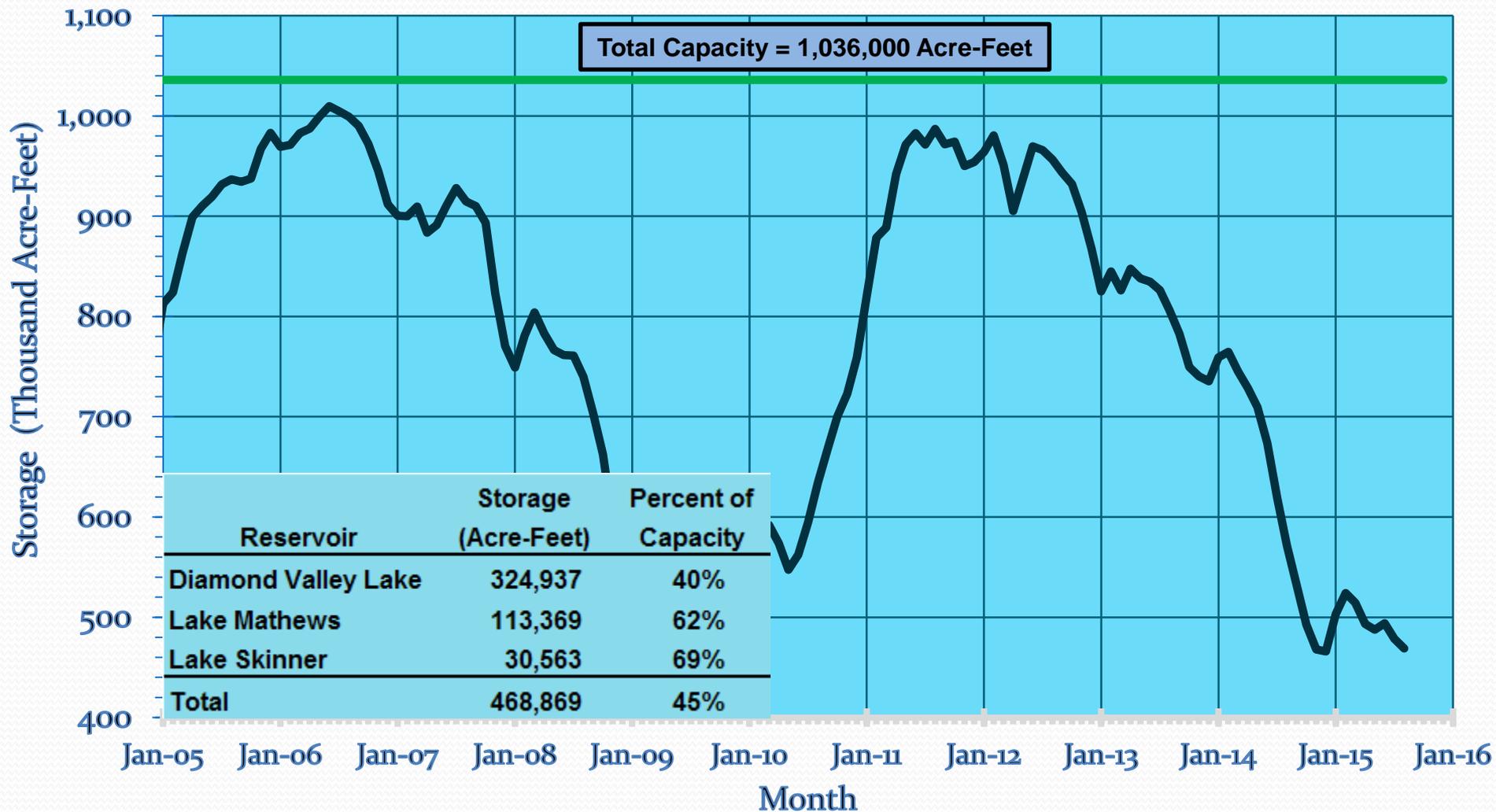
# Oroville Storage (acre-feet)

October 1, 2005 - July 31, 2015



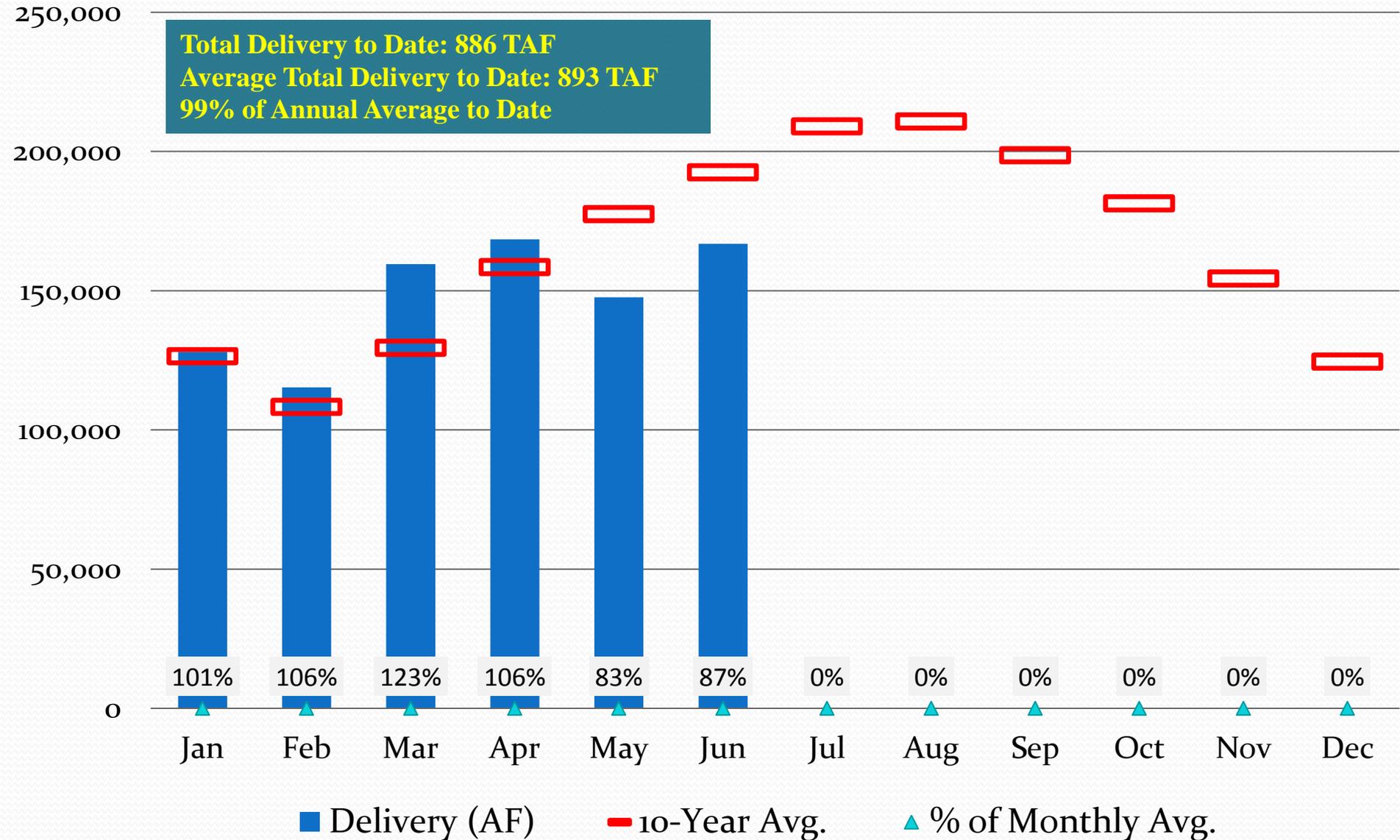
# MWD's Combined Reservoir Storage as of August 1, 2015

Lake Skinner, Lake Mathews, and Diamond Valley Lake



# 2015 Water Deliveries to Member Agencies (AF)

**Total Delivery to Date: 886 TAF**  
**Average Total Delivery to Date: 893 TAF**  
**99% of Annual Average to Date**





## Drought Update

### Tuesday, July 28, 2015

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#### **KEY ACTION ITEMS FROM THIS WEEK**

- **California WaterFix Comment Period Extended to Oct. 30:** On July 22, the Department of Water Resources (DWR) and the U.S. Bureau of Reclamation [announced](#) a 60-day extension on the public comment period for the recirculated environmental documents for California WaterFix, which is the proposed water conveyance improvement plan for the Sacramento-San Joaquin River Delta. For more information on California WaterFix, visit the website [here](#).
- **Draft Regulations Released to Guide Groundwater Basin Boundary Revision:** On July 17, the Department of Water Resources (DWR) opened the public comment period on [proposed draft emergency regulations](#) that will outline the process local agencies must follow when requesting modifications to existing boundaries of groundwater basins and sub-basins. For additional information on the draft regulations, visit DWR's Basin Boundary Revision webpage [here](#).
- **USDA and NASA Expand Innovative Partnership to Better Predict Wildfires, Monitor Drought from Space:** On July 16, the U.S. Department of Agriculture (USDA) and the National Aeronautics and Space Administration (NASA) [announced](#) an expanded partnership designed to better protect America's working lands, predict and prevent natural disasters, and inspire young people to pursue careers in science, technology, engineering, mathematics and agriculture.

Under the new agreement, USDA has expanded access to NASA satellite data, which will help U.S. Forest Service's fire fighters and first responders to better detect wildfires and predict their behavior. Additionally, the satellite data could be used to create soil moisture maps for California to improve weather and water availability forecasting and to provide a drought early-warning system for producers.

- **California's Water Conservation Education Program Campaign:** This past week, Save Our Water, in partnership with the Bay Area Council, released a new [public service announcement](#) featuring Sergio Romo, San Francisco Giants Pitcher, asking residents to keep "saving together" by fixing leaks and limiting outdoor watering. Save Our Water has also partnered with [California ReLeaf](#) to raise awareness of the importance of proper tree care during the drought. In addition, a new section on the Save Our Water website is promoting California Native Plant Society as a key part of Save Our Water's [landscaping tips](#).

Save Our Water's new media campaign asks Californians to share a helping hand by "Saving Together" with a selfie. [Saving Together](#) is about creating a social movement of Californians sharing water-saving tips to encourage and empower others to join the effort. For more tips and tools to help conserve water and keep trees healthy during the drought, please visit Save Our Water's website, which is available in both [English](#) and [Spanish](#), or connect with the program on [Facebook](#), [Twitter](#) or [Instagram](#).

- **Governor's Drought Task Force:** The Task Force continues to take actions that conserve water and coordinate state response to the drought. During the most recent Task Force meeting on July 23, the State Water Board reported that the June water conservation numbers will be announced at the July 29 Board meeting. In addition, the Governor's Office of the Tribal Advisor will hold the next drought webinar tribal consultation meeting on August 19.

## **ONGOING DROUGHT SUPPORT**

- **Emergency Food Aid, Rental and Utility Assistance:** The Department of Social Services (CDSS) Drought Food Assistance Program (DFAP) provides food assistance to affected communities that suffer high levels of unemployment from the drought. To date, over 780,950 boxes have been provided to community food banks in drought-impacted counties, with an average of approximately 13,250 food boxes per week since June 2014. Approximately 692,170 boxes of food have been picked up by 364,066 households.

Food boxes distributions vary by county and occur 1-4 times per month. Over 70% of the food distributions have occurred in the Tulare Basin (Fresno, Kern, Kings and Tulare). There are 8,400 boxes scheduled for delivery for the week ending July 31, to Fresno, Kern, Riverside, San Joaquin and Tulare County.

The Department of Community Services and Development (CSD) allocated an additional \$600,000, under the federally-funded Community Services Block Grant (CSBG), to continue the [Drought Water Assistance Program \(DWAP\)](#) which provides financial assistance to help low-income families pay their water bills. As of July 17, CSD has reported that a total of \$260,258 has been issued to 1,353 households.

CSD is in the process of allocating \$400,000, under CSBG, to continue the Migrant and Seasonal Farmworker (MSFW) drought assistance program, which provides assistance in employment training and placement services to individuals impacted by the drought. This program provides employment training and placement services to migrant and seasonal farmworkers suffering job loss or reduced employment due to the drought. To date, CSD has reported that a total of \$10,000 has been issued to the Center for Employment Training located in Monterey, San Benito and Santa Cruz County.

**Drought Response Funding:** The \$687 million in state drought funding that was appropriated last March through emergency legislation, as well as \$142 million provided in the 2014 Budget Act, continues to advance toward meeting critical needs. To date, \$468 million has been committed, and nearly \$625 million of the emergency funds appropriated in March came from sources dedicated to capital improvements to water systems. Since March, the Department of Water Resources has expedited grant approvals, getting \$21 million immediately allocated to grantees that were pre-approved for certain projects.

As planned in March, the next \$200 million of expedited capital funding was awarded in October, and the remaining \$250 million will be granted by fall 2015. The 2014 Budget Act appropriated an additional \$53.8 million to CAL FIRE over its typical budget to enhance firefighter surge capacity and retain seasonal firefighters beyond the typical fire season.

As a result of continuing drought conditions, emergency legislation was enacted in March 2015 that appropriated over \$1 billion of additional funds for drought-related projects and activities. The Administration's May Revision proposal includes an additional \$2.2 billion for programs that protect and expand local water supplies, improve water conservation, and provide immediate relief to impacted communities.

## **CURRENT DROUGHT CONDITIONS**

- **Fire Activity:** Since the beginning of the year, firefighters from CAL FIRE and the U.S. Forest Service have responded to 4,445 wildfires across the state, burning 74,766 acres. Fire activity across California remains high with over 316 wildfires in just the past week. To date, CAL FIRE has experienced a 52% increase in wildfire activity compared to the 5-year average for the same time period.
- **CAL FIRE Suspends Outdoor Residential Burning:** California's increased fire activity this year, coupled with record-setting drought conditions, require CAL FIRE to take every step possible to prevent new wildfires from starting. To date, CAL FIRE has suspended burn permits in all counties in the State Responsibility Area. This suspension bans all residential outdoor burning of landscape debris including branches and leaves. The department may issue restricted temporary burning permits if there is an essential reason due to public health and safety. For additional information on preparing for and preventing wildfires, please visit [www.ReadyForWildfire.Org](http://www.ReadyForWildfire.Org).
- **Dry Well Reports:** As California enters the fourth consecutive summer of drought, Cal OES continues to monitor and identify communities and local water systems in danger of running out of water. Approximately 2,091 wells statewide have been identified as critical or dry, which affects an estimated 10,455 residents. As of July 22, Cal OES has reported that 1,987 of the 2,091 dry wells are concentrated in the inland regions within the Central Valley.
- **Vulnerable Water Systems:** The State Water Board continues to provide technical and funding assistance to several communities facing drinking water shortages, and is monitoring water systems across the state. Since January 2014, 85 out of the 112 projects approved to receive emergency funding for interim replacement drinking water have been executed. On May 19, the State Water Board adopted Guidelines for administering the latest emergency drought appropriations of \$19 million announced this past March. To date, the State Water Board has received requests for \$3.8 million of those funds.
- **Projected Reservoir Management:** Shasta Reservoir recorded 2,038,000 acre-feet (AF) on July 23 with a 10-day average reduction in storage of 6,500 AF/day. Releases are being held lower than normal to keep cold water in the reservoir for Winter Run Chinook Salmon later in the fall. Shasta Reservoir is projected to reach 1,460,000 AF by the end of September. This is higher than the 1976-77 record low storage of 700,000 AF.

Oroville Reservoir recorded 1,224,000 AF on July 23 with a 10-day average reduction in storage of 6,900 AF/day. Releases are higher than normal to help make up for reduced flows out of Shasta. These higher flows are to keep salt water from coming too far into the Delta and to meet other joint federal-state obligations. Oroville Reservoir is projected to reach 900,000 AF by the end of September. This storage is about the same as the record low 1976-77 storage level.

Folsom Reservoir recorded 316,000 AF on July 23 with a 10-day average reduction in storage of 5,800 AF/day. Releases are higher than normal to help make up for reduced flows out of Shasta. Folsom Reservoir is projected to reach 120,000 AF by the end of September. This is lower than the 1976-77 record low storage of 150,000 AF.

[Reservoir Levels](#) as of July 26 remain low, including: Castaic Lake 38% of capacity (45% of year to date average); Don Pedro 35% of capacity (45% of average); Exchequer 11% of capacity (17% of average); Folsom Lake 31% of capacity (43% of average); Lake Oroville 34% of capacity (45% of average); Lake Perris 36% (45% of average); Millerton Lake 34% of capacity (53% of average); New Melones 15% of capacity (24% of average); Pine Flat 17% of capacity (32% of average); San Luis 27% of capacity (53% of average); Lake Shasta 44% of capacity (61% of average); and Trinity Lake 34% of capacity (43% of average). An update of water levels at other [smaller reservoirs](#) is also available.

- **Weather Outlook:** Dry weather continues this week with temperatures returning to well above average as high pressure strengthens. Increasing monsoon moisture may lead to an increasing chance of mountain thunderstorms by the weekend.

## **Local Government**

- **Local Emergency Proclamations:** A total of 58 local Emergency Proclamations have been received to date from city, county, and tribal governments, as well as special districts:
  - **25 Counties:** El Dorado, Fresno, Glenn, Humboldt, Inyo, Kern, Kings, Lake, Madera, Mariposa, Merced, Modoc, Plumas, San Bernardino, San Joaquin, San Luis Obispo, Santa Barbara, Shasta, Siskiyou, Sonoma, Sutter, Trinity, Tulare, Tuolumne and Yuba.
  - **12 Cities:** City of Live Oak (Sutter County), City of Lodi (San Joaquin County), City of Manteca (San Joaquin County), City of Montague (Siskiyou County), City of Porterville (Tulare County), City of Portola (Plumas County), City of Ripon (San Joaquin County), City of San Juan Bautista (San Benito County), City of Santa Barbara (Santa Barbara County), City of Rancho Cucamonga (San Bernardino County) and City of West Sacramento (Yolo County) and City of Willits (Mendocino County).
  - **9 Tribes:** Cortina Indian Rancheria (Colusa County), Hoopa Valley Tribe (Humboldt County), Karuk Tribe (Siskiyou/Humboldt Counties), Kashia Band of Pomo Indians of the Stewarts Point Rancheria (Sonoma County), Picayune Rancheria of Chukchansi Indians (Madera County) Sherwood Valley Pomo Indian Tribe (Mendocino County), Tule River Indian Tribe (Tulare County), Yocha Dehe Wintun Nation (Yolo County) and Yurok Tribe (Humboldt County).
  - **12 Special Districts:** Carpinteria Valley Water District (Santa Barbara County), Goleta Water District (Santa Barbara County), Groveland Community Services District (Tuolumne County), Lake Don Pedro Community Services District (Mariposa Stanislaus County), Mariposa Public Utility District (Mariposa County), Meiners Oaks Water District (Ventura County), Montecito Water District (Santa Barbara County), Mountain House Community Service District (San Joaquin County), Nevada Irrigation District (Nevada County), Placer County Water Agency (Placer County), Tuolumne Utilities District (Tuolumne County) and Twain Harte Community Services District (Tuolumne County).

- **Water Agency Conservation Efforts:** The Association of California Water Agencies (AWCA) [has identified](#) several hundred local water agencies that have implemented water conservation actions. These water agencies [are responding to the drought](#) by implementing conservation programs, which include voluntary calls for reduced water usage and mandatory restrictions where water shortages are worst.

ACWA [released](#) a Drought Response Toolkit to assist water agencies as they take action to meet state-mandated water conservation target and communicate information about water use restrictions, enforcement and other issues with their customers, media and other audiences.

- **County Drought Taskforces:** A total of 33 counties have established drought task forces to coordinate local drought response. These counties include: Butte, Colusa, Glenn, Humboldt, Kern, Kings, Lake, Madera, Mendocino, Merced, Modoc, Monterey, Napa, Nevada, Orange, Placer, Plumas, Sacramento, San Francisco, San Joaquin, San Luis Obispo, San Mateo, Santa Barbara, Santa Clara, Siskiyou, Stanislaus, Solano, Sutter, Tehama, Trinity, Tulare, Tuolumne, and Yolo.
- **Tribal Taskforce:** A total of 7 tribes have established drought task forces to coordinate tribal drought response. These tribes include: Hoopa Valley Tribe (Humboldt County), Hopland Tribe (Mendocino County), Karuk Tribe (Siskiyou County), La Jolla Band of Luiseno Indians (San Diego County), Sherwood Valley Tribe (Mendocino County), Trinidad Tribe (Humboldt County), and Yurok Tribe (Humboldt and Del Norte County).

#### DROUGHT RELATED WEBSITES FOR MORE INFORMATION

##### [Drought.CA.Gov](#): California's Drought Information Clearinghouse

State's Water Conservation Campaign, [Save Our Water](#)  
Local Government, [Drought Clearinghouse and Toolkit](#)

California Department of Food and Agriculture, [Drought information](#)  
California Department of Water Resources, [Current Water Conditions](#)  
California Data Exchange Center, [Snow Pack/Water Levels](#)

California State Water Resources Control Board, Water Rights, [Drought Info and Actions](#)

California Natural Resources Agency, [Drought Info and Actions](#)

State Water Resources Control Board, Drinking Water, [SWRCB Drinking Water Program](#)

California State Water Project, [Information](#)

[U.S. Drought Monitor](#) for Current Conditions throughout the Region

[U.S. Drought Portal](#), National Integrated Drought Information System (NIDIS)

National Weather Service [Climate Predictor Center](#)

USDA Drought Designations by County [CA County Designations](#)

USDA Disaster and Drought Assistance Information [USDA Programs](#)

U.S. Small Business Administration Disaster Assistance Office: [www.sba.gov/disaster](http://www.sba.gov/disaster)



# Will El Niño Make a Difference? Maybe Not

July 2015

💧 Making seasonal climate forecasts of precipitation—the ability to predict now if water year 2016 will be wet or dry (and how wet or dry)—is scientifically difficult, and the accuracy of such predictions is very low, much less accurate than that of a seven-day weather forecast.

Scientists consider teleconnections (recurring and persistent, large-scale patterns of pressure and circulation anomalies over important regions of the globe that correlate with climate at a site of interest) when attempting to make seasonal climate forecasts.

💧 The El Niño-Southern Oscillation (ENSO) is one of the most studied climate phenomena, and one that can provide some predictive guidance in parts of the United States under certain conditions. ENSO is characterized by year-to-year fluctuations in sea surface temperatures along the

equator in the Pacific Ocean between Peru and the International Date Line, and concomitant fluctuations in sea level air pressures between Tahiti and Darwin, Australia. The ENSO cycle is expressed as three states: neutral conditions, El Niño (warm ocean phase), and La Niña (cold ocean phase).

💧 The National Oceanic and Atmospheric Administration's Climate Prediction Center ENSO diagnostic discussion presently calls for a 90 percent chance of El Niño conditions in the fall and early winter. Forecaster consensus is for an event with a sea-surface temperature anomaly greater than 1.5 degrees Celsius which is the threshold for a strong event.

💧 The graphics on the reverse show the relationship over an 80-year period between measured precipitation in each of California's climate divisions (see map key) and ENSO conditions, which are expressed as the Southern Oscillation Index, a measure of air pressure fluctuations between Tahiti and Darwin.

“  
... a strong El Niño can result in a continuing drought year ...  
”

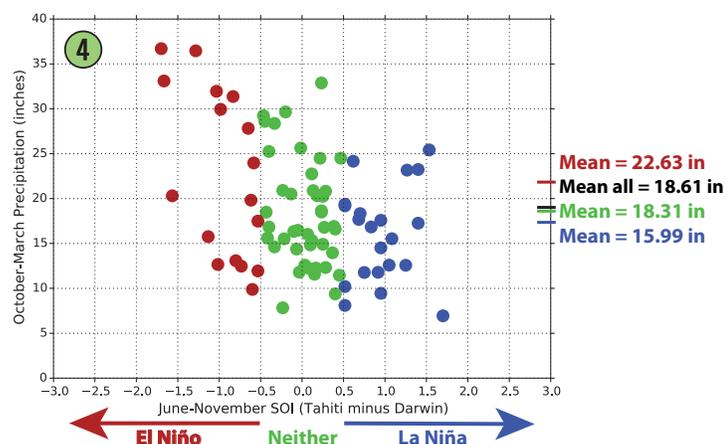
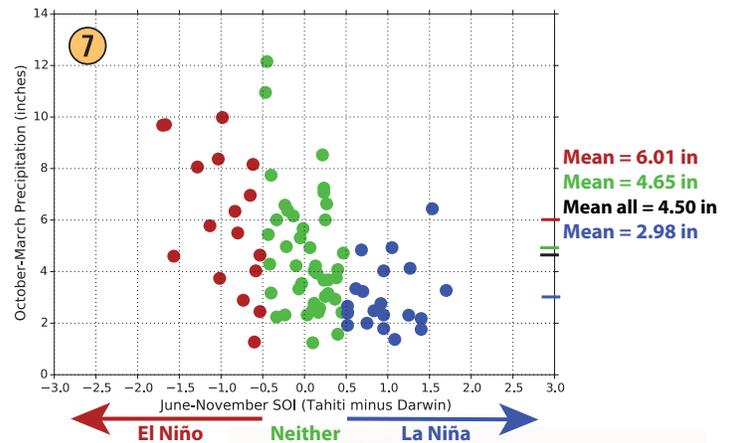
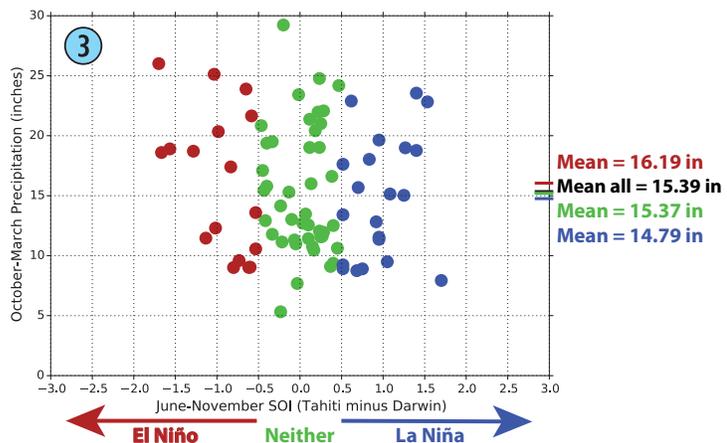
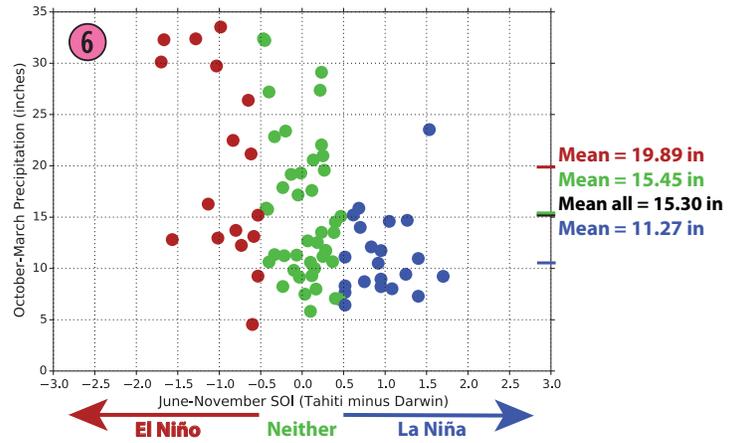
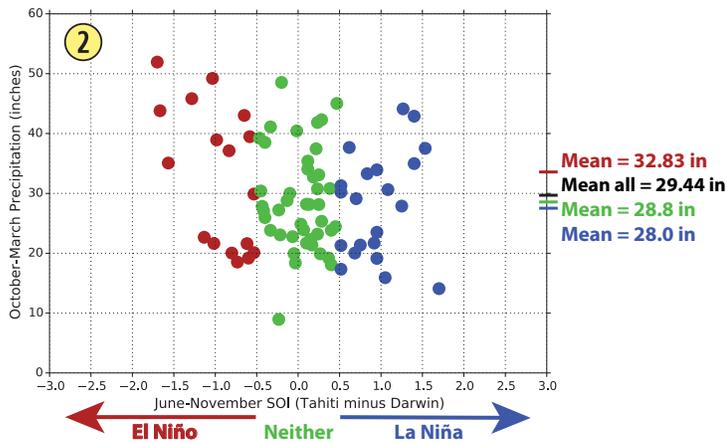
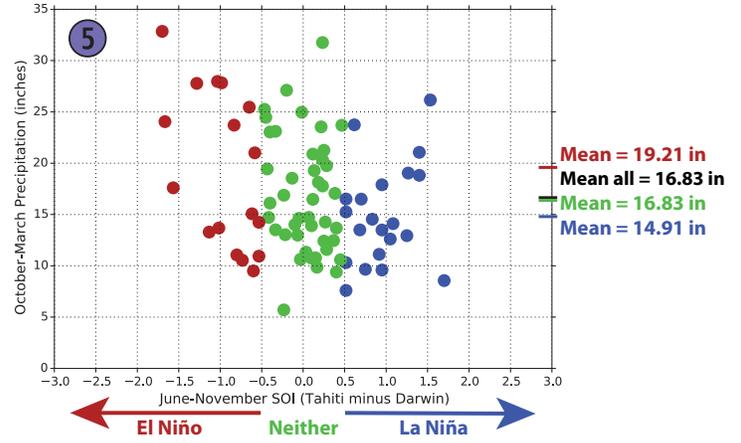
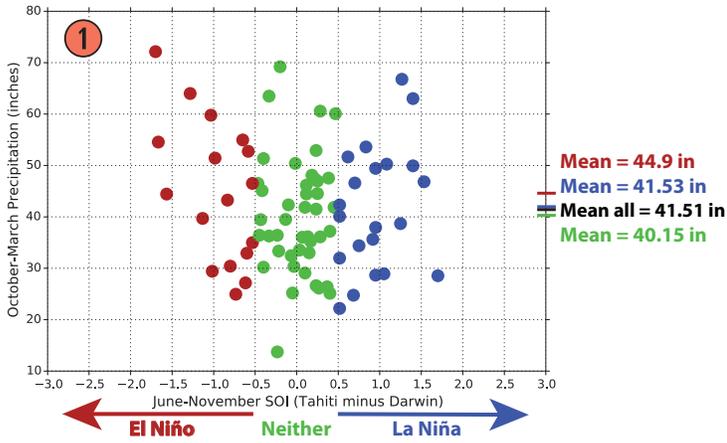
The strongest El Niño and La Niña events plot on the far left and far right sides of the graphics, respectively.

💧 As illustrated on the reverse, there is almost no correlation between precipitation and El Niño conditions in Northern and Central California. ENSO's strongest signal in California is for Southern California to be drier than average in La Niña years.

💧 Since 1950 there have only been five events with an Ocean Niño Index value greater than 1.5 for the winter months of

December through February (ONI value greater than 1.5 signals a strong El Niño). Those events occurred during the 1958, 1973, 1983, 1992, and 1998 water years. Looking at the Northern Sierra 8-station index (a precipitation index for the mountainous regions extending from east of Sacramento to above Shasta Dam) water year precipitation totals range from 36 inches (72% of average) in 1992 to 88.5 inches (177% of average) in 1983 while 1973's total was 51.6 inches (103% of average). Thus a strong El Niño can result in a continuing drought year like water year 1992, an average year like 1973, or a wet year like 1983.

Years 1933/34 through 2013/14 • October - March (winter) precipitation by Climate Division versus Southern Oscillation Index for immediately preceding June - November



Key: climate divisions





CALIFORNIA DEPARTMENT OF WATER RESOURCES

## NEWS FOR IMMEDIATE RELEASE

**August 3, 2015**

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### **Agricultural Water Management Plan Guidebook Released by DWR for Water Suppliers' Use**

SACRAMENTO -- To help mid-sized farm water districts comply with Governor Edmund G. Brown Jr.'s directive to prepare water management plans, the Department of Water Resources (DWR) has updated its guidebook on preparation of such plans.

DWR today released its final 2015 Agricultural Water Management Plan Guidebook, which farm water districts can use in preparing and submitting their required plans to DWR. First required by 2009 legislation, such plans include a detailed account of water supplies, demands and deliveries to farm customers, as well as a report on the efficient water management practices that have been adopted by the irrigation or water district.

Under the 2009 legislation, agricultural water suppliers that served more than 25,000 acres were required to submit such plans to DWR. Fifty-four districts met that threshold. The first agricultural water management plan was due at the end of 2012, and the next plan is due at the end of 2015. (The plans are available here: <http://www.water.ca.gov/wateruseefficiency/>.)

On April 15, Governor Brown broadened the reporting requirement by directing agricultural water suppliers that provide water to 10,000 acres to 25,000 acres to also submit an agricultural water management plan to DWR. The submission deadline for these suppliers is July 1, 2016. An estimated 56 agricultural water agencies fall within this category.

DWR Director Mark Cowin said use of the [Guidebook](#) is optional, but it may help agricultural suppliers address existing requirements, as well as new requirements imposed under the Governor's April 15 Executive Order B-29-15.

Agricultural water suppliers that fail to submit water management plans to DWR are not eligible for state loans or grants.

California has been dealing with the effects of drought for four years. To learn about all the actions the state has taken to manage our water system and cope with the impacts of the drought, visit [Drought.CA.Gov](http://Drought.CA.Gov). Every Californian should take steps to conserve water. Find out how at [SaveOurWater.com](http://SaveOurWater.com).

