COLORADO RIVER BOARD OF CALIFORNIA
770 FAIRMONT AVENUE, SUITE 100
GLENDALE, CA 91203-1068
(818) 500-1625
(818) 543-4685 FAX

February 27, 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, March 11, 2015
Time:	1:00 p.m.
Place:	Diamond Valley Lake Training Center East Newport Road (1/2 mile west of the intersection with State Street) Hemet, CA 92543

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 and 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.

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, March 11, 2015
1:00 p.m.

Diamond Valley Training Center
East Newport Road
Hemet, CA 92543

AGENDA

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 (Limited to 5 minutes)
   As required by Government Code, Section 54954.3(a)

3. Welcome by Randy Record, Chairman of the Board of Directors, the Metropolitan Water District of Southern California

4. Administration
   a. Consideration and Approval of the Minutes of the Meeting held February 11, 2015 **(Action)**

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. Status update regarding the California drought

7. Staff Reports regarding 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 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: April 15, 2015
10 a.m.
Vineyard Room
Holiday Inn Ontario Airport
2155 East Convention Center Way
Ontario, CA 91764-4452

Minutes of Meeting
COLORADO RIVER BOARD OF CALIFORNIA
Wednesday, February 11, 2015

A meeting of the Colorado River Board of California was held on Wednesday, February 11, 2015.

Board Members and Alternates Present

Dana Bart Fisher, Jr., Chairman
Henry Kuiper
Glen Peterson
David Pettijohn
John Powell Jr.
Jack Seiler
Doug Wilson
Jeanine Jones, Designee
Department of Water Resources

Board Members and Alternates Absent

Stephen Benson
James Hanks
Michael Touhey
David Vigil, Designee
Department of Fish and Wildlife
Chris Hayes, Designee
Department of Fish and Wildlife

Others Present

Brenda Burman
Brian Brady
Robert Cheng
Christopher Harris
Bill Hasencamp
Michael Hughes
Ned Hyduke
Lisa Johansen
Lori Jones
Kathy Kunysz
Tom Levy
Lindia Liu
Kara Mathews
Jan Matusak
Peter Nelson
Jessica Neuwerth
Thang (Vic) Nguyen
Don Ostler
Autumn Plourd
Angela Rashid
Eric Ruckdaschel
Joanna Smith Hoff
Mark Stuart
Gary Tavetian
Tanya Trujillo
Mark Van Vlack
Suzanna Webb
Jerry Zimmerman

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

Approval of Minutes of the January 14, 2015 Colorado River Board Meeting

Chairman Fisher asked if there was a motion to approve the January 14, 2015 minutes. Mr. Pettijohn moved that the minutes be approved, seconded by Mr. Powell, Jr. By unanimous support, the January 14, 2015 meeting minutes were approved.

Ms. Trujillo introduced Colorado River Board's new staff member, Ms. Suzanna Webb.

Consideration of Application for Allocation from the Colorado Water Supply Project

Ms. Trujillo described one Lower Colorado Water Supply Project application located near City of Needles. The applicant is seeking to utilize up to four acre-feet per year on four parcels. Ms. Trujillo reported that CRB staff had reviewed the application, conferred with the City of Needles, and recommended this application to the Board for approval.

MOTION: Upon the motion of Mr. Pettijohn, seconded by Mr. Wilson, and unanimously carried, the Board adopted the resolution to approve the application.

PRESENTATION BY DON OSTER, EXECUTIVE DIRECTOR OF THE UPPER COLORADO RIVER COMMISSION

Mr. Don Ostler provided an overview of the Upper Colorado River Basin drought contingency plan that is being developed to protect Lake Powell elevations. The first of three pillars of the plan is to develop extended river operations for the upper Colorado River reservoirs. The second element is demand management, and weather modification is the third component of the plan. Mr. Ostler also reported on work on consumptive use estimates in the Upper Basin and how water management in the Upper and Lower Basins impact one another.

Mr. Ostler explained that river management in the Upper and Lower Basins is linked due to the 2007 Interim Guidelines and coordinated reservoir operations. He explained the impacts of losing power at Glen Canyon Dam, which provides more than 75% of the Colorado River Storage Project (CRSP) power generation.

Mr. Ostler updated the Board on the status of the drought contingency planning in the Upper Basin. He noted that modeling efforts are underway to examine potential release scenarios for the Upper Basin reservoirs that would be designed to protect power production and decrease the likelihood of a compact call. The power revenues generated are used for critical functions such as operations, maintenance, and replacement of federal facilities in the entire Upper Basin. The revenues also provide funding for Endangered Species Recovery Program in the San Juan and Upper Colorado River Basin and Salinity Control Forum programs. In addition, low-cost power is provided to tribes, small communities, and irrigation districts.

Lake Powell's elevation was evaluated to determine the risk of losing power at Glen Canyon Dam. The results indicated there was an 18% probability that the elevation would fall below the power pool elevation of 3490 feet in the next 20 years if no reservoir protection actions were taken. If the Upper Basin instituted extended operations of the upper reservoirs and reduced demands by 200,000 acre-feet, the probability of reaching the power pool elevation would be reduced to about 6%. He noted that under the Upper Basin modeling, if both basins are doing contingency planning, the probability of going below the power pool becomes almost zero.

Mr. Ostler stated that the Upper Basin contingency plan was intended to protect critical elevations at Lake Powell but it is uncertain whether the turbines can be operated at the power pool elevation (where cavitation may occur) because the elevation had never reached down to that level. Therefore for planning purposes, an elevation at 3525 feet was selected to provide a factor of safety against cavitation. The Upper Basin plan is designed to be a phased approach to be able to respond to potential hydrologic conditions within the framework and term of the 2007 Interim Guidelines. The effectiveness of the Upper Basin drought contingency plan will depend on the flexibility within existing Records of Decision and Biological Opinions for the existing reservoirs.

The Upper Basin is also evaluating the potential for demand management as a drought contingency tool. One major concern is that Lake Powell is downstream of existing users within the Upper Basin who could not benefit directly from the conserved water. The agricultural community does not want to see agriculture reduced and if the hydrology changes after fallowing or conservation has already been paid for, there is no way to get the water back. There are also concerns about whether the conserved water actually would make it to Lake Powell. For example, if an upstream user conserves water, which may go into a tributary stream, there is no legal mechanism to prevent a downstream user who has a right to that water from diverting it. It is also difficult to document the effects of deficit irrigation versus fallowing on certain crops in the Upper Basin such as alfafa that are not planted annually.

The third component of the Upper Basin drought contingency plan is weather modification, which has the purpose of generating additional snowfall to increase water supply. Cloud seeding has been occurring in the Upper Basin states such as Utah and Colorado for many decades. Mr. Ostler said that the Upper Basin is committed to funding and expanding cloud seeding operations. In 2006, the Upper Colorado River Commission hired North American Weather Consultants to perform a weather modification study. The contractor estimated that an increase between 5 and 15% in precipitation could be obtained from cloud seeding in the winter, with a corresponding estimated runoff of 575,000 acre-feet. The study estimated that as much as 1.2 million acre-feet of additional runoff could be generated on an average year if operations were expanded in certain areas. Mr. Ostler thanked the Lower Basin states that have contributed funding to the weather modification programs.

Mr. Ostler concluded with an update regarding the Upper Basin consumptive use estimate procedures relating to evapotranspiration for agriculture, which is the major component of Upper Basin water use. The Upper Basin is in the process of installing $565,000 worth of additional extended climate stations, which would collect solar radiation and wind speed data, as well as the standard weather information. These stations would allow the Upper Basin to use more precise methods to estimate evapotranspiration, whether by remote sensing or other methods. The Upper Basin also has plans to install eddy-covariance towers to assist with improved calibration. Mr. Ostler noted that the Upper Basin plans to complete a detailed study on the feasibility of remote sensing for the entire Upper Basin by the end of 2015.

Board Member Wilson commented that the Lower Basin states are helping to fund the weather modification programs even though it is uncertain whether the water generated would ever flow downstream to the Lower Basin states. Mr. Ostler acknowledged the benefit to the Upper Basin from the weather modification programs and noted the uncertainty in quantifying how much water actually augments storage in Lake Powell.

Board Member Jones asked for more details regarding the proposed extended reservoir operations. Mr. Ostler explained that the Upper Basin reservoirs are operated primarily to try to fill the smaller reservoirs to meet irrigation needs taking into account environmental restrictions that require increases in flows at certain periods to benefit fish. The current efforts are to look for flexibility within the existing Records of Decision to modify releases from the reservoirs in order to reduce the risk of losing power generation at Lake Powell. Mr. Ostler stated that the goal is to work within the existing NEPA compliance.

Board Member Peterson asked about impacts to the power generated at Flaming Gorge Dam. Mr. Oster said that the Upper Basin has considered a scenario of losing power at Flaming Gorge in order to protect Lake Powell's power generation and also noted there were local concerns about impacts to recreation and users. Mr. Ostler said that it appeared the Flaming Gorge power customers would be able to obtain power elsewhere if Flaming Gorge Dam was not operating at maximum efficiency.

Board Member Pettijohn asked what the priority action would be that both basins could work on now. Mr. Ostler said that the first step would be to work on the drought contingency plan to try to get the overall conservation in the Lower Basin up to 300,000 to 600,000 acre-feet, in addition to the shortages contemplated by the 2007 Guidelines. There is a concern that the long-term modeling shows a significant risk of shortage not just for the next 5 years, but the next 20 years and that a shortage in the Lower Basin would have a direct impact on the Upper Basin because of coordinated reservoir operations. The Upper Basin will continue to work on its goal of undertaking demand management to reduce demands by 200,000 acre-feet to demonstrate a similar level of effort that yields a similar system benefit.

Board Member Jones commented that legislation in California during the drought period of 1987 through 1992 attempted to address the issue of being able protect conserved water generated upstream as it makes its way downstream. Ms. Jones also observed there could be synergies between Upper and Lower Basins with respect to the Salinity Control Program and other federal program appropriations. Mr. Ostler noted that managing the thousands of diverters in the Upper Basin would be challenging. Mr. Ostler mentioned that both basins are engaged with the Salinity Control Forum to develop projects that could serve the same purpose as the Pilot System Conservation Program. He noted that he Upper Basin had recently executed a Memorandum of Agreement to use funds provided by Reclamation to fund projects such as canal lining that are in line with Reclamation's conservation goals.

Mr. Hasencamp noted that both California and the Upper Basin have many things in common and that both entities would be at risk under the worst case hydrologic scenario that is unlikely to occur. Mr. Hasencamp noted that California might want to take the same position as the Upper Basin in developing a drought contingency plan to implement in case the hydrology turns bad but recognizing that we might not need to use it. Mr. Ostler replied that one main difference is where the plan is implemented. Conserving water in Lake Mead provides water that can go into an account. There is not much value to sending water to Lake Powell except in meeting compact deliveries, which does not appear to be a measurable risk over the next 20 years.

Ms. Trujillo asked if there are plans for additional storage, or diversions in the Upper Basin. Mr. Ostler said there are plans for additional diversions and uses, and a small amount of additional storage. There is the Lake Powell pipeline project which could start its EIS process this summer. There have also been discussions in Colorado about how to move additional water to the Front Range. Mr. Ostler stated that the Upper Basin plans to continue to develop additional water but at some level less than 7.5 million acre-feet of water. If the Upper Basin had a better way to manage the risk of shortage or augment the system, the Upper Basin could develop to a higher level. Opportunities may exist with Mexico, perhaps through contributions to the costs of ocean desalination that can be exchanged to get benefits back to the Colorado.

Mr. Zimmerman asked whether potential future exchanges and transfers in the Upper Basin would use similar mechanisms such as ICS in the Lower Basin. Mr. Ostler said that the intent is to create conserve water in the Upper Basin and be able to account for and retrieve it. Chairman Fisher commented that the Upper Basin has innovative leaders who can come up with creative solutions and thanked Mr. Ostler for the presentation.

PRESENTATION REGARDING THE WYOMING WEATHER MODIFICATION PILOT PROGRAM

Mr. Nguyen gave a brief presentation on the Wyoming Weather Modification Pilot Program (WWPPP). In the spirit of cooperation and building goodwill, the Six Agency Committee, SNWA and CAP have been funding weather modification programs in the Upper Basin states of Colorado, Utah, and Wyoming since 2007. The WWMPP has just been completed and a Draft Executive Summary is available. The WWMPP started in 2005 and is sponsored by the Wyoming Water Development Commission. The purpose of the WWMPP is to determine whether cloud seeding in Wyoming is a viable technology in the winter, and if so, at what cost. This Program is unique because it is very rigorous, spanning six winter seasons of data collection. The WWMPP also has an evaluation component performed by a third party, and some preliminary results from the Executive Summary are presented.

Mr. Nguyen explained that cloud seeding is a form of weather modification where the purpose is to create snowfall. Several conditions must exist for cloud seeding to work: suitable temperature, wind direction, and the presence of supercooled liquid water. When the conditions are ripe for cloud seeding, generators placed on the upwind side of the mountain are turned on so that winds can carry silver iodide into the target cloud areas. Ice crystals are formed and eventually fall to the ground as snow.

Mr. Nguyen said that the Six Agency Committee has funded about $960,000 to date for Upper Basin weather modification programs. The main component of the WWMPP, also known as the Randomized Statistical Experiment, is done at the Sierra Madre and Medicine Bow Ranges. Following guidance from the National Research Council in 2003, the success of the WWMPP is determined by considering the combined results of statistical, physical, and modeling studies. Cloud seeding operations were conducted between November 15th and April 15th for the winter seasons between 2008 and 2014. The combined results of the three approaches suggest that weather modification could increase snowfall by about 5 to 15%. The cost of the program varies between $30 to $430 per acre-feet, depending on factors such as start-up costs, whether there is an independent evaluation as part of the program, and whether the equipment is owned or leased.

Board Member Wilson again noted the connection between the Upper and Lower Basin states on these projects. Deputy Director Harris said that any programs that could potentially increase annual yield would be a benefit to both basins.

COLORADO RIVER BASIN WATER REPORTS

Colorado River Basin Water Report

Ms. Trujillo reported that as of February 2 total system storage was 29.40 million acre-feet, or 49 percent of capacity. Last year (February 2nd) the total system storage was 29.03 million acre-feet, also 49 percent of capacity. Lake Powell was reported at 46 percent of capacity and Lake Mead at 41 percent of capacity. Total system storage is almost 400,000 acre feet greater than last year, despite a record low release from Lake Powell to the Lower Basin. Precipitation as of February 2 is about 80 percent of average, and the Upper Basin snowpack is about 86 percent of average. Unregulated inflow into Lake Powell, as of January 16, is forecasted to be 9.758 million acre-feet, or 90 percent of average, for the Water Year. The snow water equivalent is at about 79% to date for 2015. January 2015 turned out to be a dry month with the majority of the Upper Basin at 50% or less in precipitation.

The U.S. Drought Monitor map indicates that California is still experiencing widespread drought. 40% of the state is in the Exceptional Drought category while almost 80% of the state is in the Extreme Drought category. Ms. Trujillo referred to a figure that indicated the percent of precipitation required by September 30 to bring California out of the bottom 20 percentile of a 4-year accumulated precipitation level and out of the bottom 50 percentile of a 4-year accumulated precipitation level. Ms. Jones commented that the figure was developed by NOAA to respond to reporters asking how much precipitation was needed to end the drought in California

State Water Report

Board Member Stuart reported that the LA Civic Center precipitation is at 5.7 inches to date. The precipitation at the six major stations in Southern California was below normal to date for the Water Year, particularly in the Central Coast and Imperial areas. The majority of the state, especially in the Southern Sierras, is in the range between 25 to 75% of normal, for precipitation.

Mr. Stuart reported that the daily cumulative precipitation of 23.1 inches for the Northern Sierra is near the historical average. By contrast, the Southern Sierras is only about 50% of normal and the snow water equivalent is only at a meager 14% of the April 1 average.

Mr. Stuart reported that with respect to the State Water Project (SWP) water storage, Lake Oroville is at about 1.45 million acre-feet as of February 1, 2015, or almost 200,000 acre-feet more than this time last year. San Luis Reservoir is at about 759,000 acre-feet, or an increase of almost 600,000 acre-feet from last year, due to a significant amount of water being moved south via the aqueduct. Mr. Stuart then pointed to a graph of Oroville storage, which showed the reservoir at about 3.5 million acre-feet when full in recent years to low of about 900,000 acre-feet in October 2014.

Local Reports

MWD's total reservoir storage as of February 1, 2015 is at 51% of capacity. Board Member Peterson stated that the Colorado River Aqueduct would be shut down for 17 days beginning on February 17 for operations and maintenance procedures.

Mr. Pettijohn reported that the water supply conditions for the eastern Sierra have not changed much from the previous month and the outlook is still bleak. This situation is similar to last year when the lowest water delivery on record was recorded. If conditions don't change, there may not be much water delivered from the L.A. Aqueduct.

2015 CALIFORNIA DROUGHT UPDATE

Ms. Trujillo commented that the January survey indicated the snowpack was at 12% of normal. The good news was that urban water conservation rate was at 22% for December. Board Member Jones reported that in response to the drought, a Drought Contingency Plan was developed to coordinate operations of the State and Federal Water Projects. The plan was submitted to the State Water Resources Control Board on January 15, 2015. The Drought Contingency Plan is an effort among five agencies: the Department of Water Resources and the Bureau of Reclamation, and three fish and wildlife agencies. These agencies form the Real Time Drought Operations Team (RTDOT) comprised of high-level executives representing the agencies.

Ms. Jones added that within the SWP service area, Alameda County (SWP contractor in the Bay Area) relies almost entirely on imported water to meet its urban needs, and within the CVP service area the city of Huron (in the San Joaquin Valley) also is essentially dependent on project water to meet its water needs. The number currently being considered to meet human health and safety is about 55 gallons per day per capita; outside uses such as landscape irrigation are not considered essential and are not included.

Managing salinity in the Delta could be achieved by construction of emergency temporary rock barriers to obviate the need to release upstream water. The project cost is on the order of $30-40 million and the permit process is moving forward with the Corps of Engineers, even though it is unlikely to get constructed because of improving hydrology. Implementing the required fishery protection measures is part of the plan including the need to conserve cold water for migrating salmon and protecting smelt as they move through the Delta.

STAFF REPORTS REGARDING COLORADO RIVER BASIN PROGRAMS

Basin States Drought Contingency Program

Ms. Trujillo reported that the Basin States are continuing their drought contingency efforts. The status of these efforts will be discussed in an upcoming Basin States Principal's meeting scheduled for mid-February. Ms. Trujillo reminded the Board that the Lower Basin States have entered into a Memorandum of Understanding for the contingency planning process and will be working through the details for implementation of the plan over the next few months.

Colorado River Basin Water Supply and Demand Study

Ms. Trujillo reported that the Phase 1 report is anticipated to be released in March 2015. In addition, Ms. Trujillo stated that Reclamation is evaluating what the next phases of the project may be and whether it would include some pilot projects.

Review of implementation of Minute 319

Ms. Trujillo reported that the workgroup met in Salt Lake City in January to discuss the current status of the Minute 319 implementation, as well as the development of the next Minute. A Commissioner-level bi-national meeting is scheduled for May 2015. Ms. Trujillo reminded the Board that the implementation of Minute 319 is in its fifth year and has several interconnected components that are at varying stages of completion or execution.

Salinity Control Forum, Workgroup, and Advisory Council

Ms. Trujillo reported that California will host the next Salinity Control Work Group meeting on February 17 through 19 at MWD's Diamond Valley Lake facilities. The meeting will include tours of the Diamond Valley Lake Reservoir and the Eastern Municipal Water District facilities. Discussions at the Work Group meeting will include evaluation of updating the economic damage model to make sure the risks of additional salinity for each state can be correctly calculated. Ms. Trujillo reported that an update from Reclamation on the Contingency Plan for the Paradox Valley Injection Well Unit is expected at this meeting. Ms. Trujillo will report back on the Work Group meetings at the next Board meeting.

Ms. Trujillo reported that the next Salinity Control Forum meeting is scheduled for May 20-21 in Salt Lake City. An Advisory Council report to the federal agencies was recently released which compiles comments from Forum members and summarizes the status of the Forum's perspective on the Salinity Control Program.

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

Deputy Director Harris reported that the Technical Workgroup of the Glen Canyon Dam Adaptive Management Workgroup (AMWG) held its Annual Reporting meeting in Phoenix on January 20-21. An update on the High Flow Experiments (HFEs) in the Grand Canyon was provided which showed that during the 2014 HFE, 22 sandbars increased in size, although over time these newly enlarged sandbars degraded. Researchers reported that the humpback chub population around the Lower Colorado River confluence seems to be stable to increasing. In contrast, the population of rainbow trout at the Lee's Ferry fishery is undergoing a dramatic decline, possibly because of limited food supply in the reach. In addition, quagga mussels which were recently detected in Lake Powell and downstream of the dam are not expected to have a large impact on the Grand Canyon reach. It is not currently anticipated that the quagga mussels will establish in large numbers due to turbidity and turbulent flows in this reach of the Colorado River.

Mr. Harris also reported that the AMWG will be having its biannual meeting in Salt Lake City on February 25-26, followed by an HFE workshop on February 27 to evaluate the effectiveness of the last three HFEs. In addition, the LTEMP EIS process is still ongoing. Hydropower modeling is underway, with a draft EIS expected to reach the cooperating agencies within the next few months and a public review draft due 30 days after that.

Lower Colorado River Multi-Species Conservation Program

Staff member Neuwerth reported that the Lower Colorado River Multi-Species Conservation Program (MSCP) held its annual Colorado River Terrestrial and Riparian meeting on January 27-29 to provide an update on the past year's monitoring and research. Avian monitoring in 2014 found 201 bird species, 97 of which were breeding along the Lower Colorado River. Targeted monitoring of our endangered and threatened bird species, the southwestern willow flycatcher (SWFL) and the yellow-billed cuckoo (YBC), showed that while the YBC is using MSCP conservation areas, the SWFL is not.

Ms. Neuwerth noted that meeting attendees also received an update on amphibians and reptiles, including the northern Mexican gartersnake, which was recently listed as threatened and has been detected along the Bill Williams River and at the Planet Ranch property. A critical habitat designation for the gartersnake is expected in the next few months. In addition, 2014 bat monitoring showed that MSCP conservation areas are being used by bats, with the Palo Verdo Ecological Reserve seeing particularly high numbers of many bat species.

Ms. Neuwerth reported that the MSCP will be holding a financial workgroup call on February 25 and that the tour celebrating the tenth anniversary of the program is scheduled for April 7-9, coinciding with the dedication of the Laguna Division Conservation Area.

ANNOUNCEMENTS

Ms. Trujillo reported that the Governor of Arizona has appointed Tom Buschatzke, as the Director of the Arizona Department of Resources. Mr. Buschatzke will serve as Arizona's principal for Colorado River Basin matters.

Ms. Trujillo reported that on February 6, Governor Brown and the Secretary of the Interior, Sally Jewel announced the availability of $50 million for drought relief funding, which Congress had previously appropriated to Reclamation. Ms. Trujillo noted that a majority of the funding was designated for entities and projects within California. Within the Colorado River Basin, $8.6 million is allocated to the Lower Basin, with $6 million allocated for rehabilitation of the Minute 242 well fields. Two million dollars will be spent on the Yuma desalting plant and $600,000 will be spent for repairs and monitoring equipment at the California Wasteway Project. Ms. Trujillo noted that work done on these facilities is consistent with the operational efficiencies and improvements called out in the Lower Basin Drought Contingency Planning MOU. Ms. Trujillo added that Reclamation has issued the draft funding criteria for additional drought funding, which is open for comment.

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. Kuiper, seconded Mr. Pettijohn, and unanimously carried, the meeting was adjourned at 11:58 AM.

Mar 02, 2015

LOWER COLORADO WATER SUPPLY REPORT

River Operations

Bureau of Reclamation

Questions: BCOOWaterops@usbr.gov
(702)293-8373
http://www.usbr.gov/lc/region/g4000/weekly.pdf

CURRENT STORAGE	PERCENT FULL	Content 1000 ac-ft (kaf)	Elev. (Feet above mean sea level)	7-Day Release (CFS)
LAKE POWELL	45%	11,030	3592.30	10,900
* LAKE MEAD	41%	10,768	1088.97	11,000
LAKE MOHAVE	92%	1,658	641.51	11,900
LAKE HAVASU	93%	578	447.89	8,300
TOTAL SYSTEM CONTENTS **	49%	29,218		
As of 03/01/2015				
SYSTEM CONTENT LAST YEAR	48%	28,764		

* 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	54%	1,234		
Painted Rock Dam	0%	0	535.00	0
Alamo Dam	5%	53	1088.45	25

Forecasted Water Use for Calendar Year 2015 (as of 03/02/2015) (values in kaf)

NEVADA	284	
SOUTHERN NEVADA WATER SYSTEM		253
OTHERS		32
CALIFORNIA	4,364	
METROPOLITAN WATER DISTRICT OF CALIFORNIA		791
IRRIGATION DISTRICTS		3,434
OTHERS		139
ARIZONA	2,808	
CENTRAL ARIZONA PROJECT		1,571
OTHERS		1,237
TOTAL LOWER BASIN USE		7,456
DELIVERY TO MEXICO - 2015 (Mexico Scheduled Delivery + Preliminary Yearly Excess[1])		1,526

OTHER SIGNIFICANT INFORMATION

UNREGULATED INFLOW INTO LAKE POWELL - FEBRUARY MID MONTH FORECAST DATED 02/17/2015

	MILLION ACRE-FEET	% of Normal
FORECASTED WATER YEAR 2015	8.416	78%
FORECASTED APRIL-JULY 2015	4.900	68%
JANUARY OBSERVED INFLOW	0.348	96%
FEBRUARY INFLOW FORECAST	0.430	109%

	Upper Colorado Basin	Salt/Verde Basin
WATER YEAR 2015 PRECIPITATION TO DATE	81% (11.8")	75% (10.4")
CURRENT BASIN SNOWPACK	84% (10.7")	33% (1.9")

[1] Delivery to Mexico forecasted yearly excess calculated using year-to-date observed and projected excess.

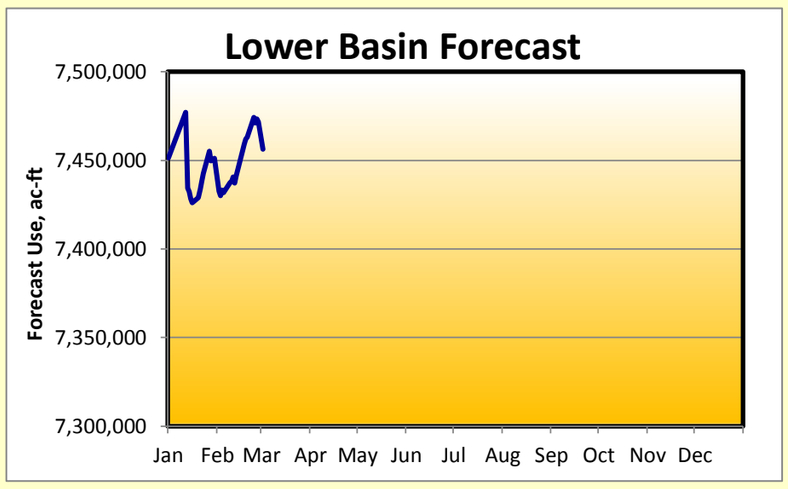
Mar 02, 2015 09:41:23 AM

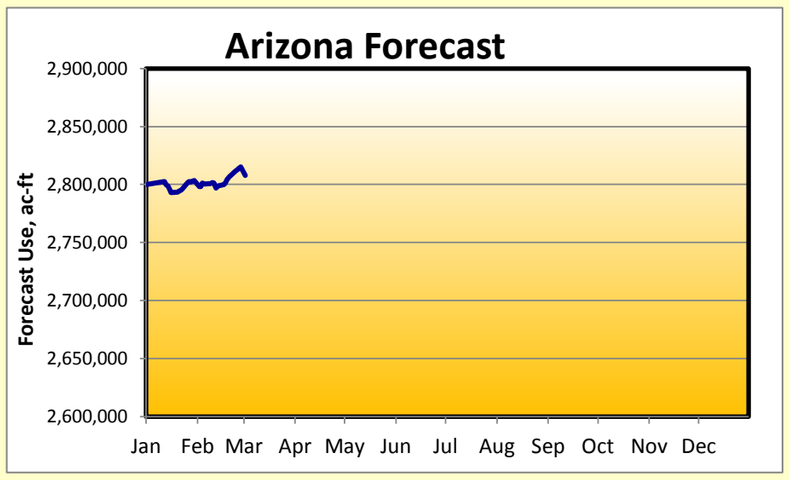
U.S. BUREAU OF RECLAMATION
LOWER COLORADO REGION
CY 2015

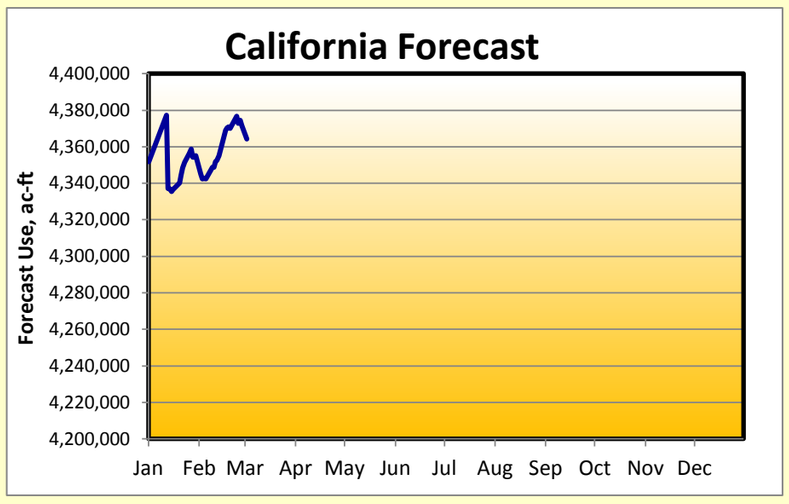
ARIZONA, CALIFORNIA, NEVADA, MEXICO
FORECAST OF END OF YEAR CONSUMPTIVE USE
FORECAST BASED ON USE TO DATE AND APPROVED ANNUAL WATER ORDERS [1]
(ACRE-FEET)

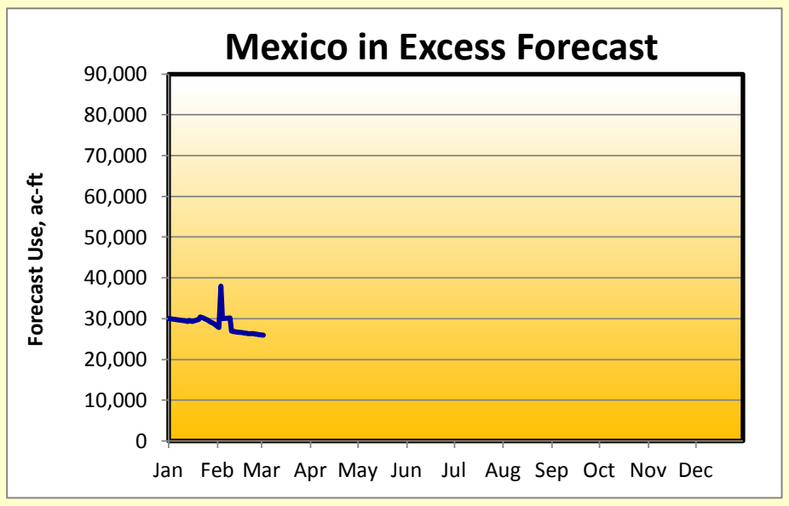
WATER USE SUMMARY	Use To Date CY2015	Forecast Use CY2015	Approved Use [2] CY2015	Excess to Approval CY2015
ARIZONA	393,012	2,807,702	2,799,878	**7,824**
CALIFORNIA	520,485	4,364,371	4,351,727	**12,644**
NEVADA	13,773	284,389	300,000	-15,611
STATES TOTAL [3]	927,270	7,456,462	7,451,605	**4,857**
MEXICO IN SATISFACTION OF TREATY (Including downward delivery)	324,909	1,525,975	1,500,000	**25,975**
TO MEXICO AS SCHEDULED	323,853	1,500,000		
MEXICO IN EXCESS OF TREATY	1,056	25,975		
BYPASS PURSUANT TO MINUTE 242	18,600	117,226		
TOTAL LOWER BASIN & MEXICO	1,270,779	9,099,663		

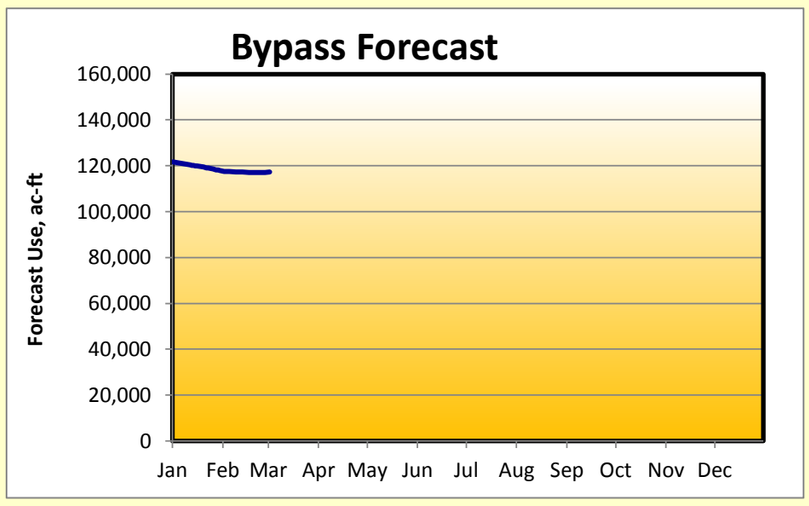
1/ Incorporates Jan-Jan USGS monthly data and 80 daily reporting stations which may be revised after provisional data reports are distributed by the USGS. Use to date estimated for users reporting monthly and annually.
2/ These values reflect adjusted apportionments. See Adjusted Apportionment calculation 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.

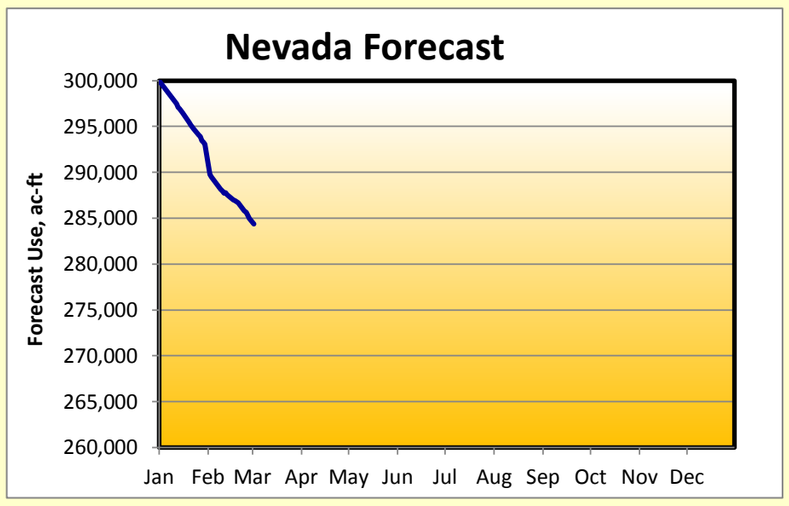


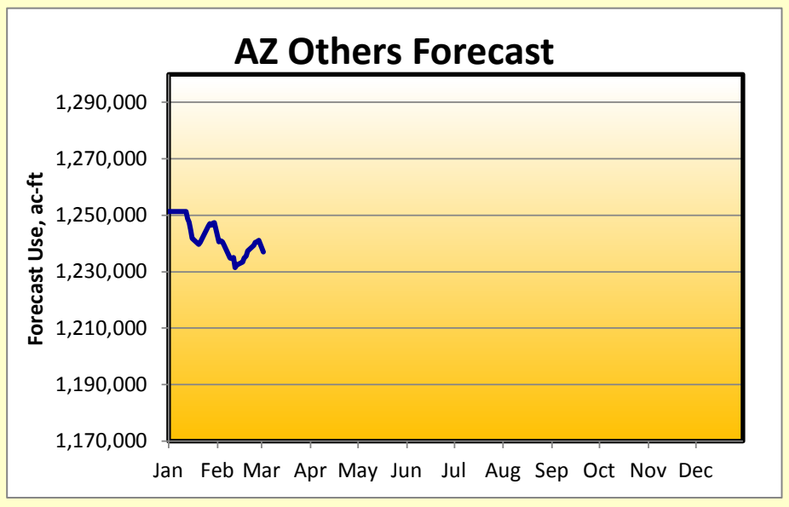


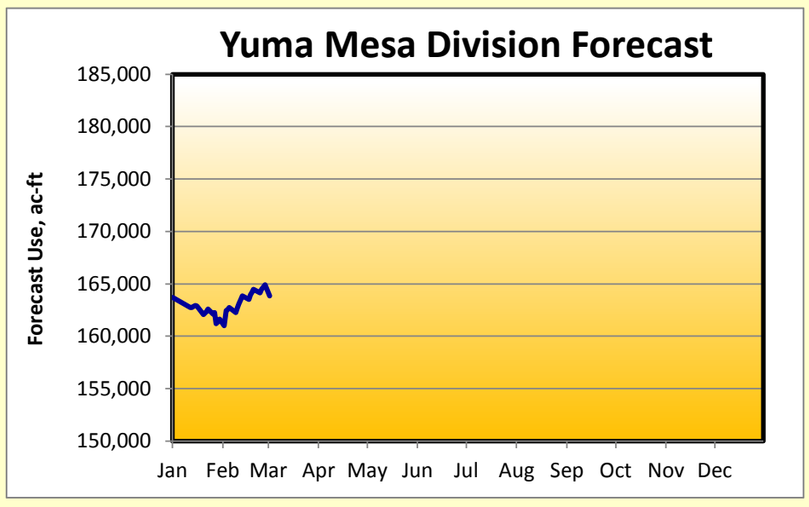


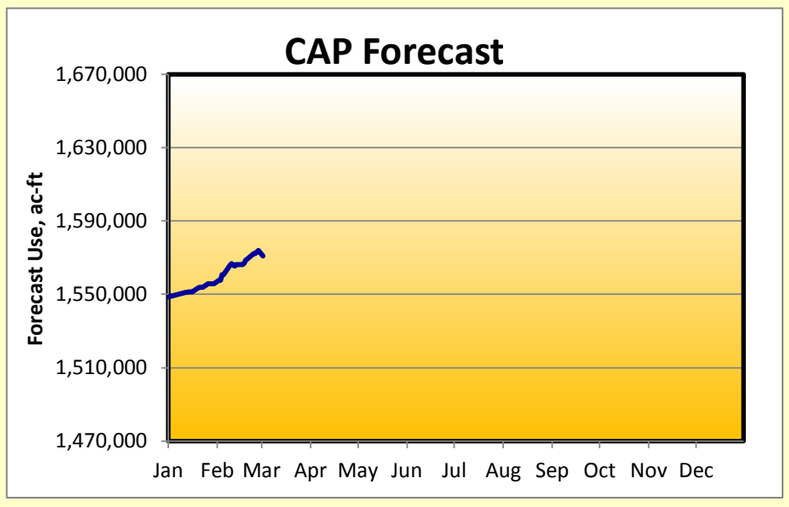


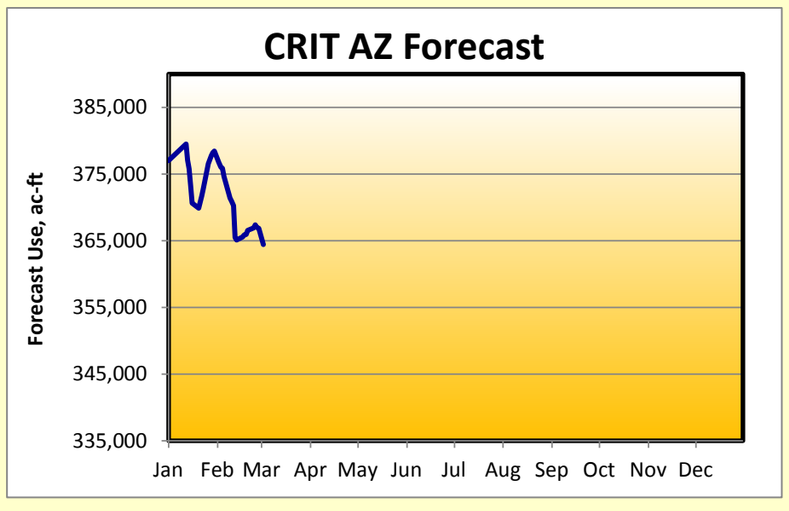


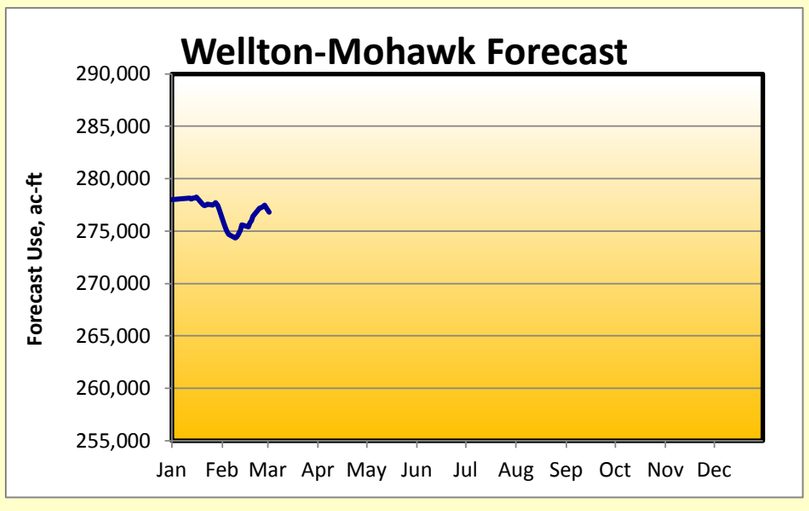


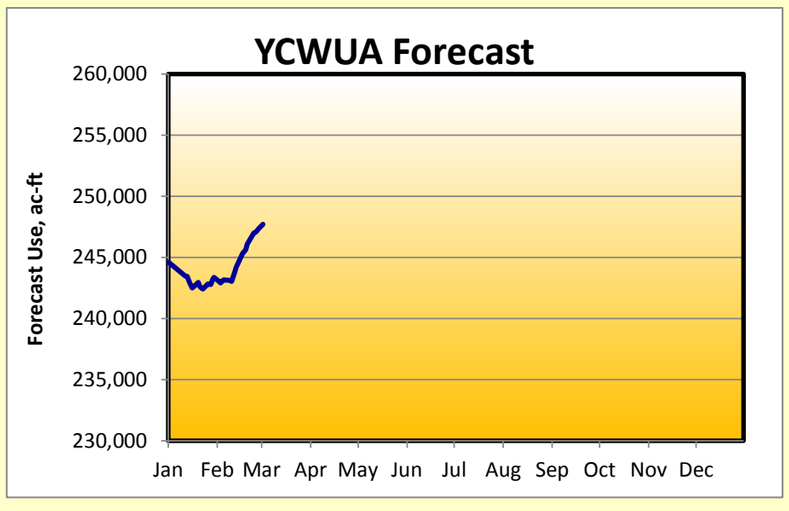












Graph notes: Jan 1 forecast use is scheduled use in accordance with the Annual Operating Plan's state entitlements, available unused entitlements, and over-run paybacks. A downward sloping line indicates use at a lower rate than scheduled, upward sloping is above schedule, and a flat line indicates a 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.

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

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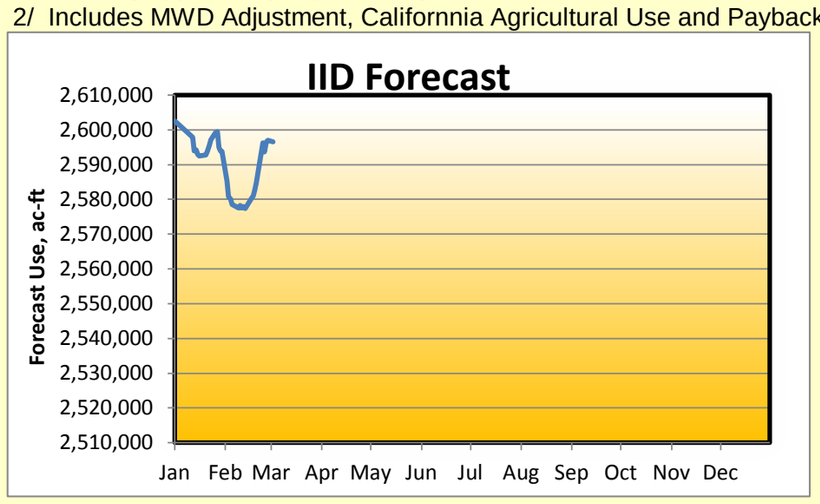
CALIFORNIA WATER USERS
FORECAST OF END OF YEAR CONSUMPTIVE USE
FORECAST BASED ON USE TO DATE AND APPROVED ANNUAL WATER ORDERS
California Schedules and Approvals
Historic Use Records (Water Accounting Reports)

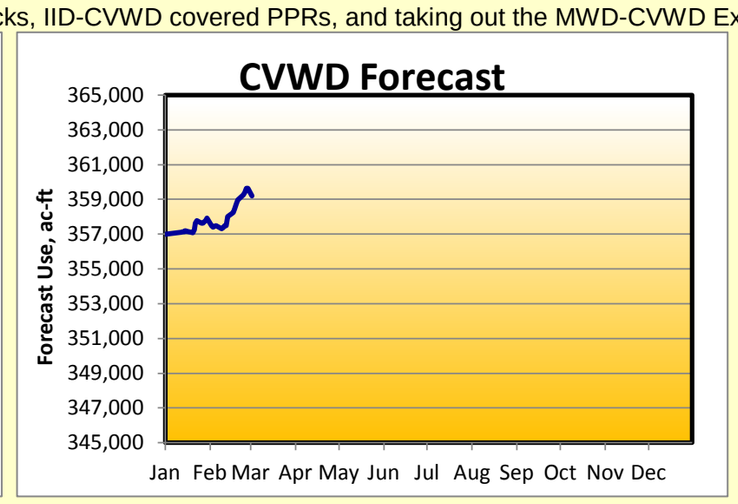
WATER USER	Use To Date CY2015	Forecast Use CY2015	Estimated Use CY2015	Excess to Estimated Use CY2015	Diversion To Date CY2015	Forecast Diversion CY2015	Approved Diversion CY2015	Excess to Approved Diversion CY2015
CALIFORNIA PUMPERS	216	1,680	1,680	---	392	3,047	3,047	0
FORT MOJAVE INDIAN RESERVATION, CA	830	8,607	8,996	---	1,542	15,997	16,720	-723
CITY OF NEEDLES (includes LCWSP use)	249	1,931	1,931	0	350	2,720	2,720	0
METROPOLITAN WATER DISTRICT	158,693	791,456	768,208	---	159,193	794,508	771,299	---
COLORADO RIVER INDIAN RESERVATION, CA	418	3,246	3,246	---	692	5,378	5,378	0
PALO VERDE IRRIGATION DISTRICT	18,044	425,121	431,782	---	83,476	929,760	946,750	-16,990
YUMA PROJECT RESERVATION DIVISION	4,655	48,778	48,586	---	10,235	103,058	104,200	-1,142
YUMA PROJECT RESERVATION DIVISION - INDIAN UNIT	---	---	---	---	4,894	49,804	50,200	-396
YUMA PROJECT RESERVATION DIVISION - BARD UNIT	---	---	---	---	5,341	53,254	54,000	-746
YUMA ISLAND PUMPERS	600	4,665	4,665	---	1,088	8,452	8,452	0
FORT YUMA INDIAN RESERVATION - RANCH 5	87	675	675	---	157	1,221	1,221	0
IMPERIAL IRRIGATION DISTRICT	277,245	2,596,534	2,602,481	-5,947	286,787	2,699,698	2,706,070	---
SALTON SEA SALINITY MANAGEMENT	18,204	121,636	121,636	0	18,795	125,835	126,826	---
COACHELLA VALLEY WATER DISTRICT	41,136	359,201	357,000	**2,201**	42,585	373,943	371,671	---
OTHER LCWSP CONTRACTORS	86	671	671	---	137	1,066	1,066	0
CITY OF WINTERHAVEN	9	68	68	---	13	103	103	0
CHEMEHUEVI INDIAN RESERVATION	13	102	102	---	1,459	11,340	11,340	0
TOTAL CALIFORNIA	520,485	4,364,371			606,901	5,076,126	5,076,863	

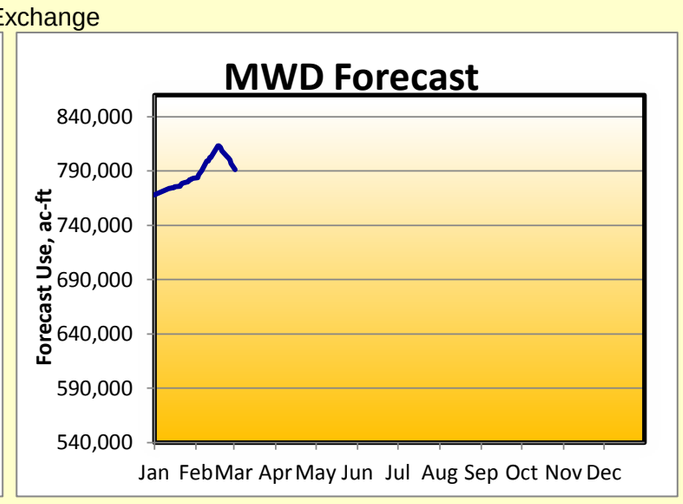
CALIFORNIA ADJUSTED APPORTIONMENT CALCULATION	
California Basic Apportionment	4,400,000
Conservation for Salton Sea Restoration - 2010 [1]	-23,273
Creation of Extraordinary Conservation ICS (IID)	-25,000
Creation of Extraordinary Conservation ICS (MWD)	
Total State Adjusted Apportionment	4,351,727
Excess to Total State Adjusted Apportionment	12,644

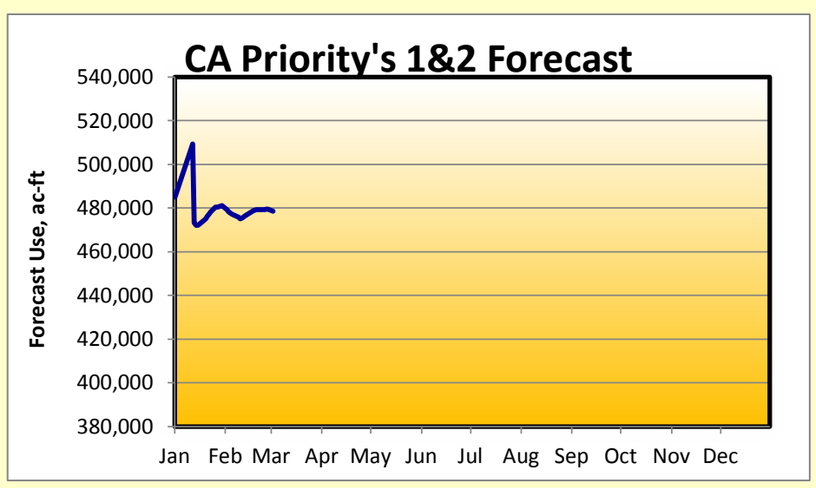
ISG ANNUAL TARGET COMPARISON CALCULATION	
Priorities 1, 2, 3b Use (PVID+YPRD+Island+PVID Mesa)	478,564
MWD Adjustment	-58,564
Total California Agricultural Use (PVID+YPRD+Island+IID+CVWD)	3,434,299
California Agricultural Paybacks	23,273
Misc. PPRs Covered by IID and CVWD	14,500
California ICS Creation (IID ICS)	25,000
Total Use for Target Comparison [2]	3,438,508
ISG Annual Target (Exhibit B)	3,448,000
Amount over/(under) ISG Annual Target	-9,492

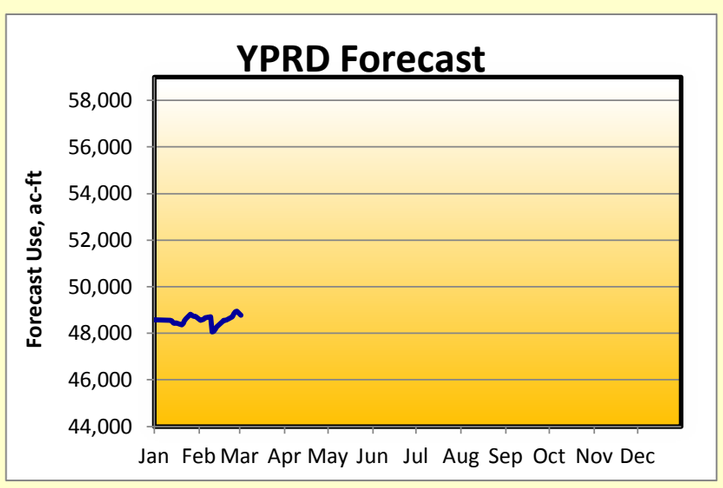
NOTES: Click on California Schedules and Approvals above for incoming diversion schedules and approvals.
1/ Pending approval by Imperial Irrigation District's Board of Directors.
2/ Includes MWD Adjustment, Californnia Agricultural Use and Paybacks, IID-CVWD covered PPRs, and taking out the MWD-CVWD Exchange

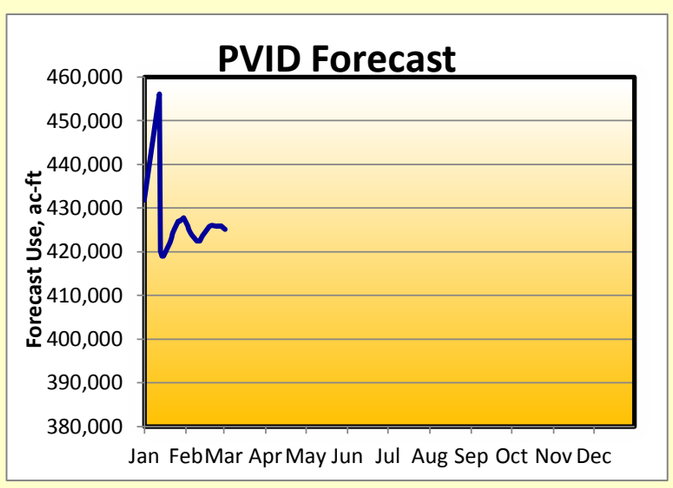












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U.S. BUREAU OF RECLAMATION
LOWER COLORADO REGION
CY 2015

NOTE:
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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)

WATER USER	Use To Date CY2015	Forecast Use CY2015	Estimated Use CY2015	Excess to Estimated Use CY2015	Diversion To Date CY2015	Forecast Diversion CY2015	Approved Diversion CY2015	Excess to Approved Diversion CY2015
ARIZONA PUMPERS	2,260	17,561	17,561	---	3,498	27,181	27,181	0
LAKE MEAD NRA, AZ - Diversions from Lake Mead	10	138	138	---	10	138	138	0
LAKE MEAD NRA, AZ - Diversions from Lake Mohave	24	168	168	---	24	168	168	0
DAVIS DAM PROJECT	0	2	2	---	10	75	75	0
BULLHEAD CITY	1,171	7,947	8,523	---	1,748	11,860	12,720	-860
MOHAVE WATER CONSERVATION	72	556	556	---	107	831	831	0
BROOKE WATER LLC	27	207	207	---	40	311	311	0
MOHAVE VALLEY IDD	3,046	20,679	22,260	---	5,642	38,292	41,220	-2,928
FORT MOJAVE INDIAN RESERVATION, AZ	3,943	42,161	42,390	---	7,302	78,076	78,500	-424
GOLDEN SHORES WATER CONSERVATION DISTRICT	41	316	316	---	61	473	473	0
HAVASU NATIONAL WILDLIFE REFUGE	118	3,422	3,563	---	985	39,767	41,820	-2,053
LAKE HAVASU CITY	1,197	8,339	8,928	---	1,931	13,450	14,400	-950
CENTRAL ARIZONA PROJECT	292,388	1,570,756	1,548,550	---	292,388	1,570,756	1,548,550	
TOWN OF PARKER	26	337	352	---	114	866	920	-54
COLORADO RIVER INDIAN RESERVATION, AZ	17,358	364,395	376,964	---	65,474	666,015	662,402	**3,613**
EHRENBURG IMPROVEMENT ASSOCIATION	33	256	256	---	46	361	361	0
CIBOLA VALLEY IRRIGATION DISTRICT	2,181	16,951	16,951	---	3,051	23,707	23,707	0
CIBOLA NATIONAL WILDLIFE REFUGE	1,640	12,741	12,741	0	2,645	20,550	20,550	0
IMPERIAL NATIONAL WILDLIFE REFUGE	337	2,616	2,616	0	544	4,224	4,224	0
YUMA PROVING GROUND	51	527	550	---	51	527	550	-23
GILA MONSTER FARMS	392	4,977	5,244	---	743	8,663	9,156	-493
WELLTON-MOHAWK IDD	19,526	276,795	278,000	-1,205	39,118	418,763	424,350	
CITY OF YUMA	1,090	15,663	17,051	-1,388	2,462	25,368	27,318	-1,950
MARINE CORPS AIR STATION YUMA	186	1,351	1,305	---	186	1,351	1,305	**46**
UNION PACIFIC RAILROAD	4	22	24	---	8	44	48	-4
UNIVERSITY OF ARIZONA	108	725	764	---	108	725	764	-39
YUMA UNION HIGH SCHOOL DISTRICT	10	185	193	---	14	243	253	-10
DESERT LAWN MEMORIAL	12	91	91	---	17	129	129	0
NORTH GILA VALLEY IDD	846	9,924	10,099	---	5,049	41,314	41,000	**314**
YUMA IRRIGATION DISTRICT	4,887	42,676	42,581	---	7,867	74,315	75,900	-1,585
YUMA MESA IDD	9,959	111,255	111,022	---	17,143	196,716	204,904	-8,188
UNIT "B" IRRIGATION DISTRICT	1,733	17,978	17,330	---	2,538	27,680	28,050	-370
FORT YUMA INDIAN RESERVATION	180	1,396	1,396	---	277	2,149	2,149	0
YUMA COUNTY WATER USERS' ASSOCIATION	27,292	247,684	244,599	---	50,634	393,311	388,000	**5,311**
COCOPAH INDIAN RESERVATION	849	6,789	6,457	---	853	9,904	9,840	**64**
RECLAMATION-YUMA AREA OFFICE	15	116	116	---	15	116	116	0
RETURN FROM SOUTH GILA WELLS								
TOTAL ARIZONA	393,012	2,807,702	2,799,864		512,703	3,698,419	3,692,383	
CAP	292,388	1,570,756				1,570,756		
ALL OTHERS	100,624	1,236,946	1,251,314			2,127,663	2,143,833	
YUMA MESA DIVISION, GILA PROJECT	15,692	163,855	350,000	-186,145		312,345		

ARIZONA ADJUSTED APPORTIONMENT CALCULATION	
Arizona Basic Apportionment	2,800,000
Payback of IOPP overruns - (Cocopah and Beattie)	-122
CAGRD/YMIDD Pilot Conservation Program [1]	
Total State Adjusted Apportionment	2,799,878
Excess to Total State Adjusted Apportionment	7,824
Estimated Allowable Use for CAP	1,567,371

1/ CAWCD has agreed to forebear 9,000 acre-feet during phase one of the study, during which time CAGRD 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.

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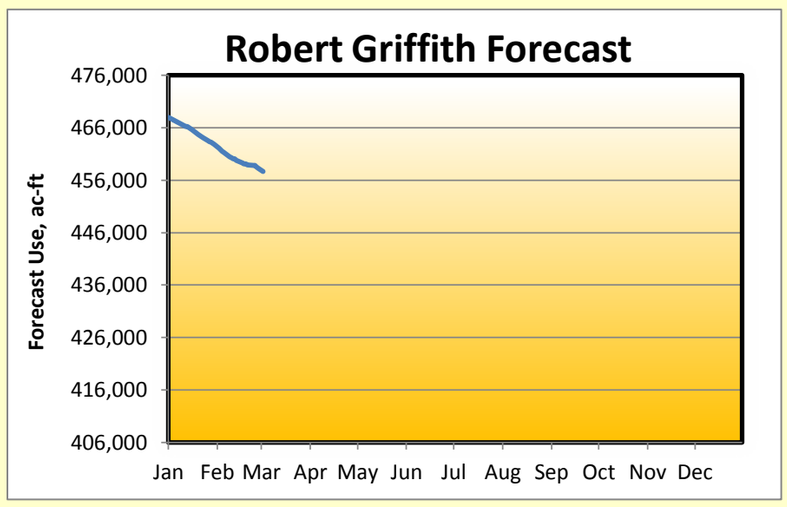
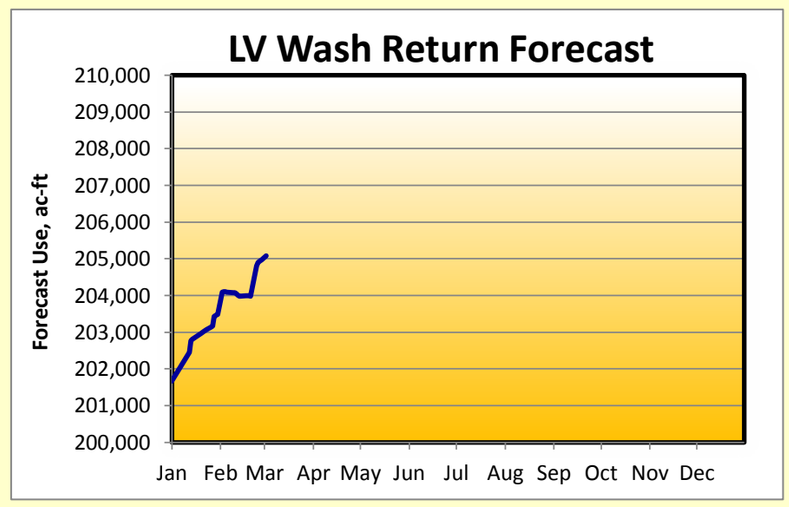
NEVADA WATER USERS
FORECAST OF END OF YEAR CONSUMPTIVE USE
FORECAST BASED ON USE TO DATE AND APPROVED ANNUAL WATER ORDERS
Nevada Schedules and Approvals
Historic Use Records (Water Accounting Reports)

WATER USER	Use To Date CY2015	Forecast Use CY2015	Estimated Use CY2015	Excess to Estimated Use CY2015	Diversion To Date CY2015	Forecast Diversion CY2015	Approved Diversion CY2015	Excess to Approved Diversion CY2015
ROBERT B. GRIFFITH WATER PROJECT (SNWS)	47,682	457,655	467,935	-10,280	47,682	457,655	467,935	-10,280
LAKE MEAD NRA, NV - Diversions from Lake Mead	49	399	422	---	49	399	422	-23
LAKE MEAD NRA, NV - Diversions from Lake Mohave	22	156	166	---	22	156	166	-10
BASIC MANAGEMENT INC.	955	7,778	8,211	---	955	7,778	8,211	-433
CITY OF HENDERSON (BMI DELIVERY)	2,286	14,817	15,878	---	2,286	14,817	15,878	-1,061
NEVADA STATE DEPT. OF FISH & GAME	2	11	12	-1	51	338	363	---
PACIFIC COAST BUILDING PRODUCTS INC.	171	845	923	---	171	845	923	-78
BOULDER CANYON PROJECT	22	174	174	---	39	302	302	0
BIG BEND WATER DISTRICT	354	3,894	4,061	---	1,347	9,364	10,000	-636
FORT MOJAVE INDIAN TRIBE	266	3,739	3,886	---	397	5,581	5,800	-219
LAS VEGAS WASH RETURN FLOWS	-38,036	-205,079	-201,668	---				
TOTAL NEVADA	13,773	284,389	300,000	-10,281	52,999	497,235	510,000	-12,740
SOUTHERN NEVADA WATER SYSTEM (SNWS)	9,646	252,576				457,655		
ALL OTHERS	4,127	31,813				39,580		
NEVADA USES ABOVE HOOVER	13,153	276,756				482,290		
NEVADA USES BELOW HOOVER	620	7,633				14,945		

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
Total Intentionally Created Surplus Left in Lake Mead	43,700

NEVADA ADJUSTED APPORTIONMENT CALCULATION	
Nevada Basic Apportionment	300,000
Excess to Total State Adjusted Apportionment	-15,611





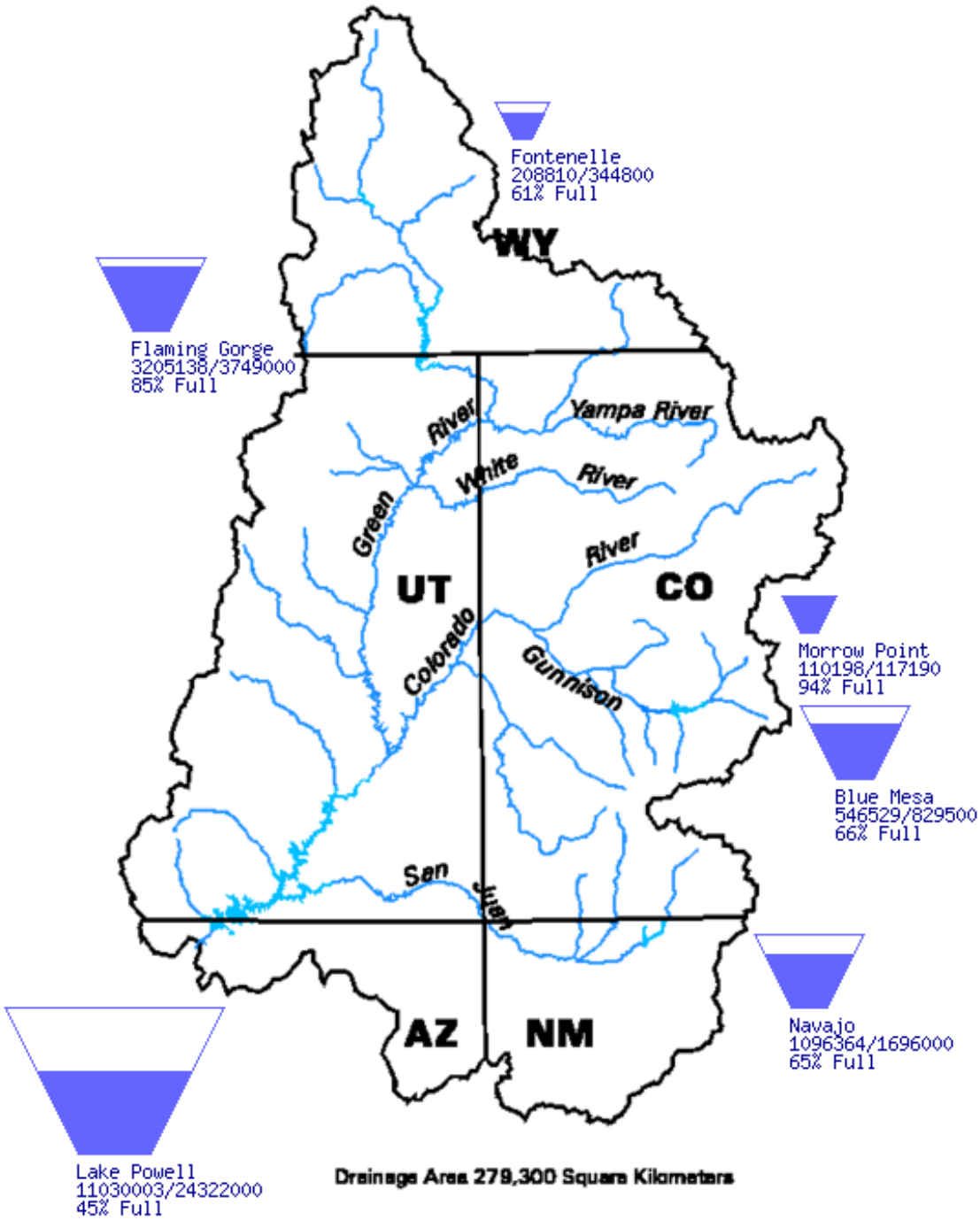
NOTES: Click on Nevada Schedules and Approvals above for incoming diversion schedules and approvals.

Upper Colorado Region Water Resources Group

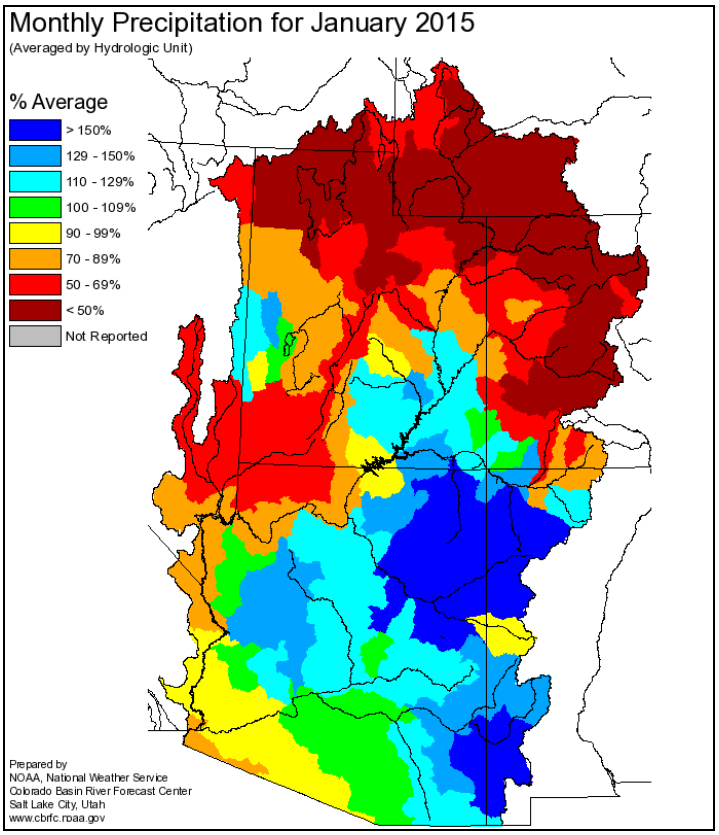
River Basin Tea-Cup Diagrams

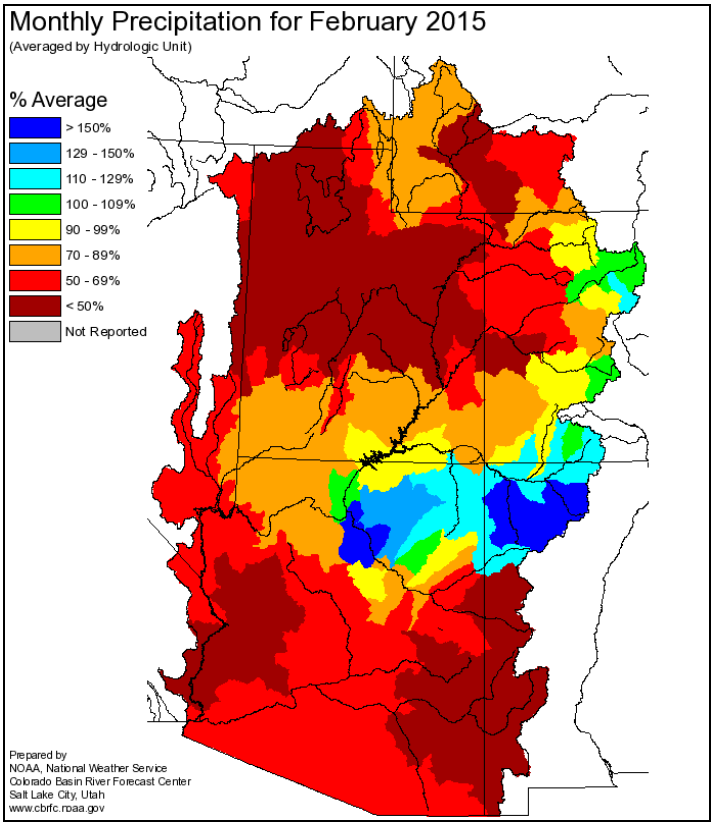
Data Current as of:
03/01/2015

Upper Colorado River Drainage Basin

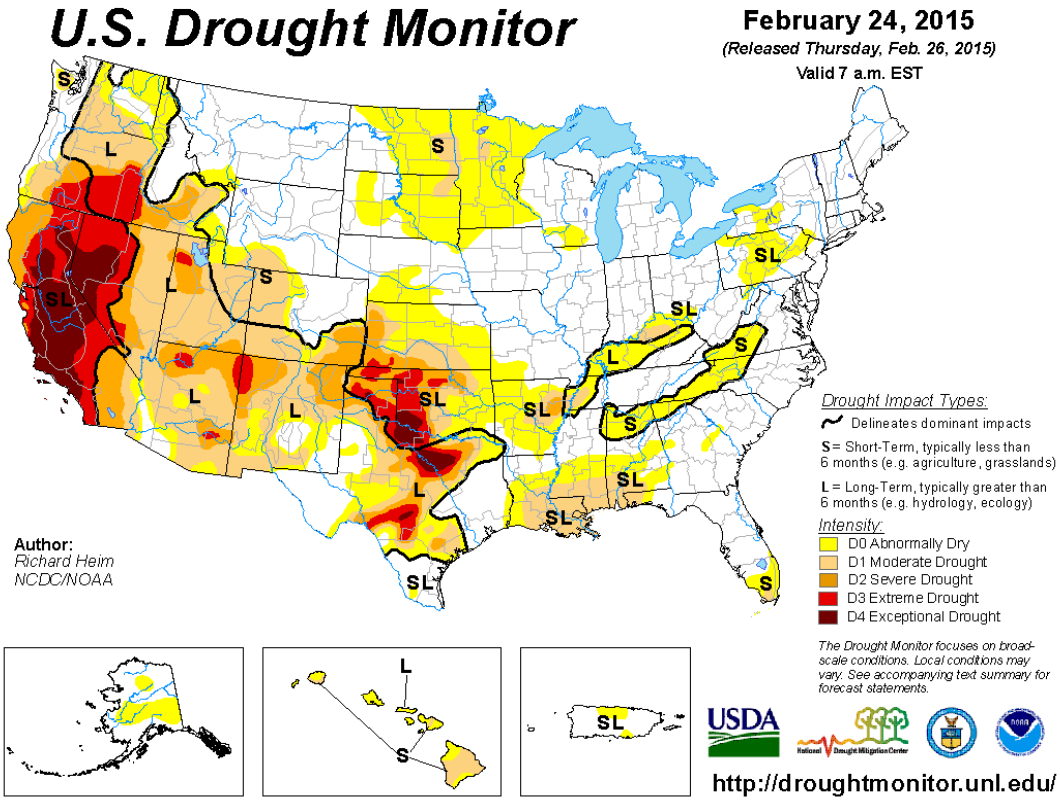


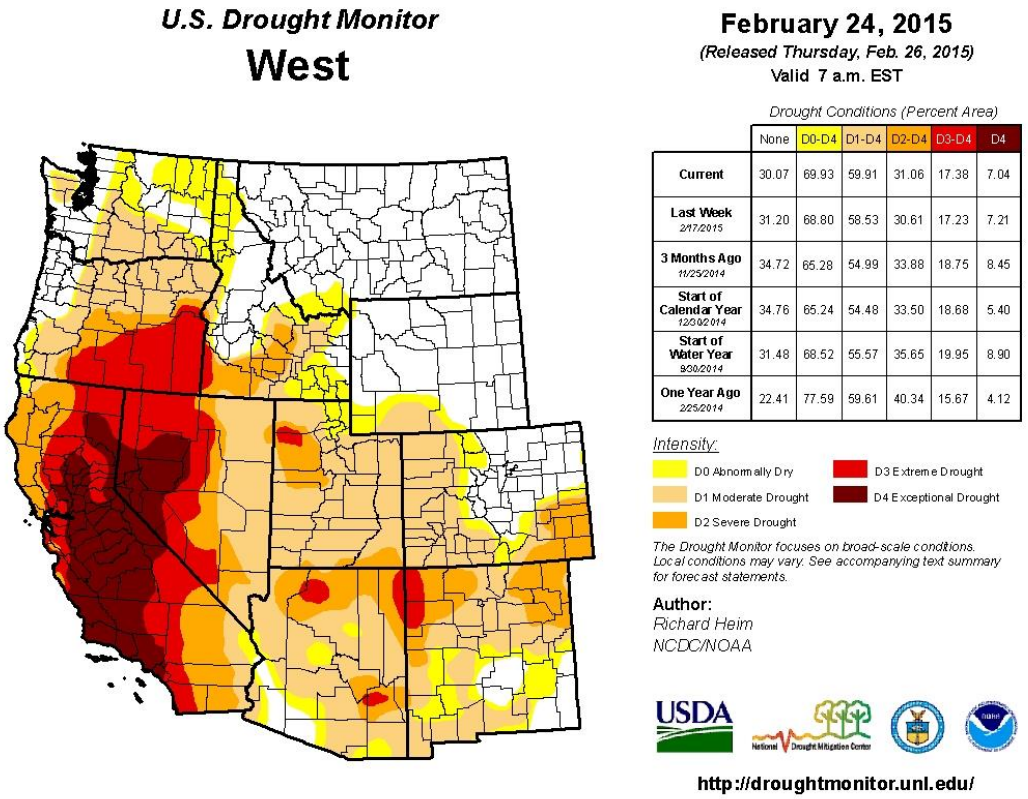
NOAA National Weather Service Monthly Precipitation Maps for January and February 2015





USDA United States Drought Monitor Map



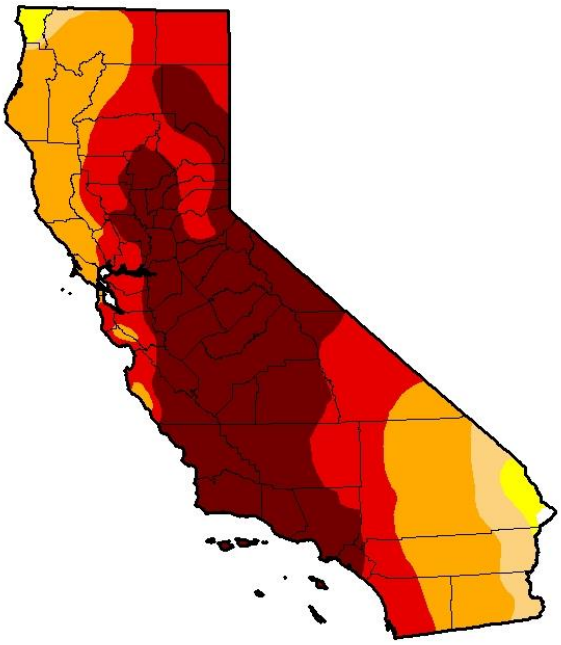


Drought Conditions (Percent Area)

	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	30.07	69.93	59.91	31.06	17.38	7.04
Last Week 2/17/2015	31.20	68.80	58.53	30.61	17.23	7.21
3 Months Ago 11/25/2014	34.72	65.28	54.99	33.88	18.75	8.45
Start of Calendar Year 12/30/2014	34.76	65.24	54.48	33.50	18.68	5.40
Start of Water Year 9/30/2014	31.48	68.52	55.57	35.65	19.95	8.90
One Year Ago 2/25/2014	22.41	77.59	59.61	40.34	15.67	4.12

U.S. Drought Monitor

California



February 24, 2015

(Released Thursday, Feb. 26, 2015)

Valid 7 a.m. EST

Drought Conditions (Percent Area)

	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	0.16	99.84	98.10	93.44	67.46	39.92
Last Week *2/17/2015*	0.16	99.84	98.10	93.44	67.46	41.20
3 Months Ago *11/25/2014*	0.00	100.00	99.72	94.42	79.69	55.08
Start of Calendar Year *12/30/2014*	0.00	100.00	98.12	94.34	77.94	32.21
Start of Water Year *9/30/2014*	0.00	100.00	100.00	95.04	81.92	58.41
One Year Ago *2/25/2014*	0.00	100.00	94.56	90.82	73.83	26.21

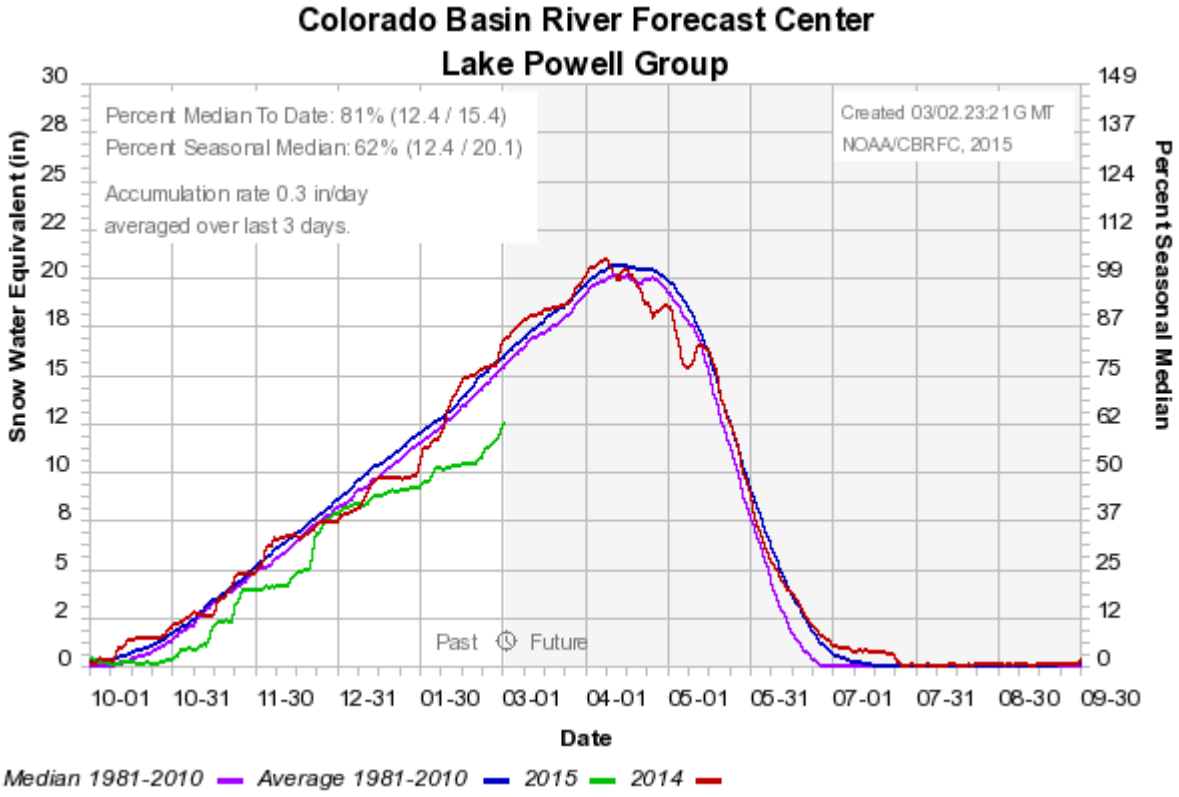
Intensity:

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

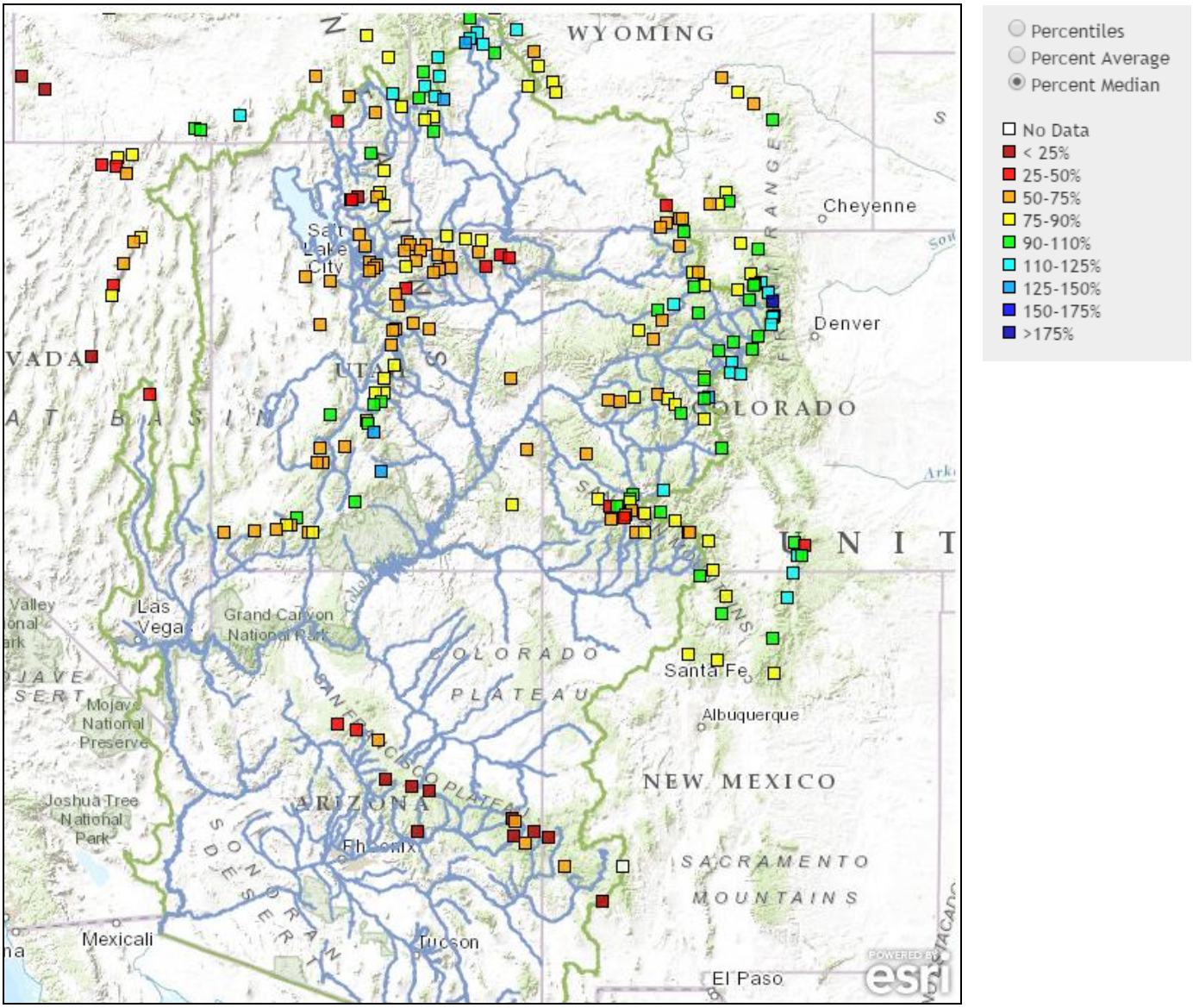
The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. See accompanying text summary for forecast statements.

Author:
Richard Heim
NCDC/NOAA

http://droughtmonitor.unl.edu/

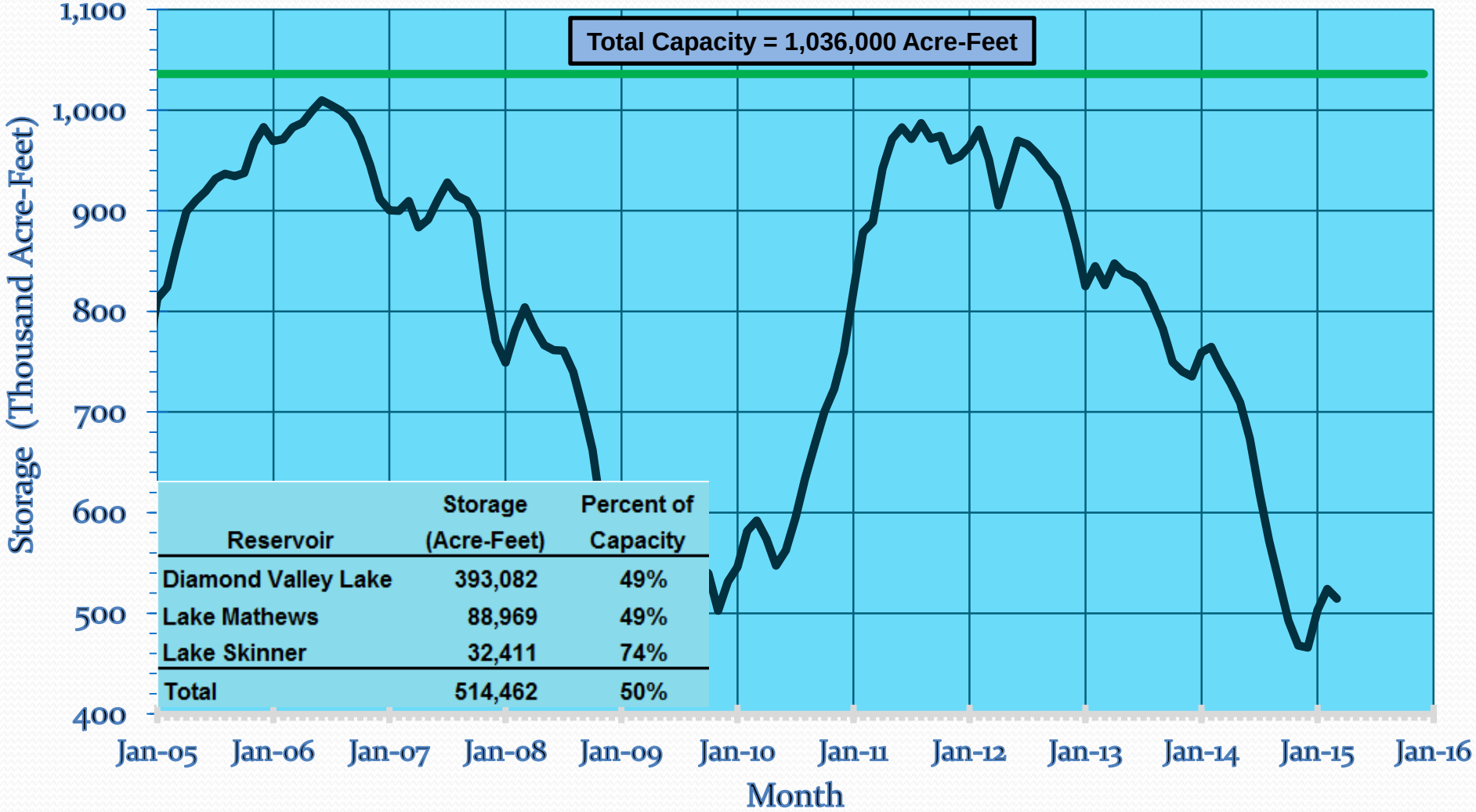

Colorado Basin River Forecast Center
Lake Powell Group
Percent Median To Date: 81% (12.4 / 15.4)
Percent Seasonal Median: 62% (12.4 / 20.1)
Accumulation rate 0.3 in/day
averaged over last 3 days.
Created 03/02.23:21 GMT
NOAA/CBRFC, 2015
Past
Future
Snow Water Equivalent (in)
Percent Seasonal Median
Date
10-01
10-31
11-30
12-31
01-30
03-01
04-01
05-01
05-31
07-01
07-31
08-30
09-30
Median 1981-2010
Average 1981-2010
2015
2014

CBRFC Basin Snow Conditions as of March 2, 2015



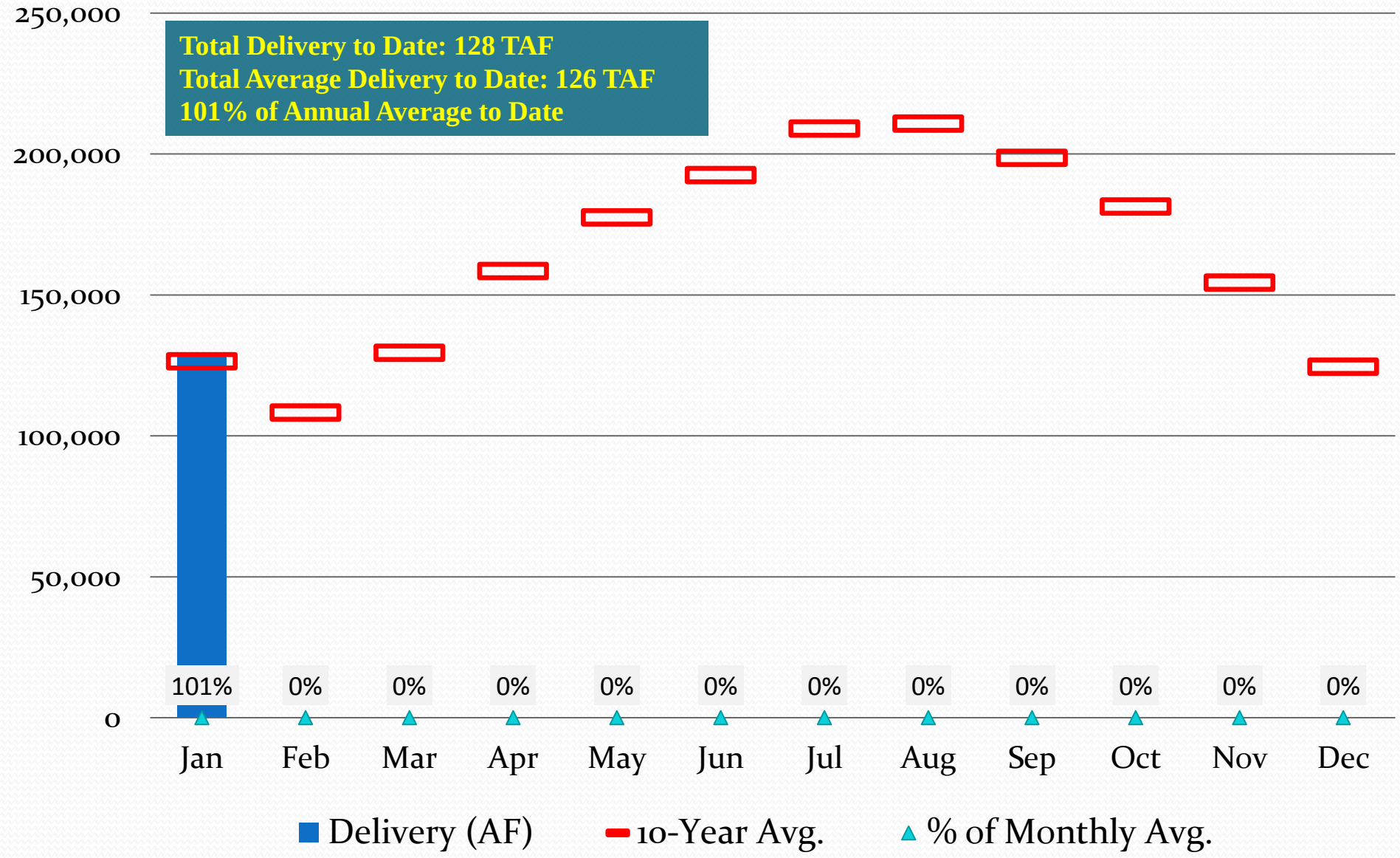
MWD's Combined Reservoir Storage as of March 1, 2015

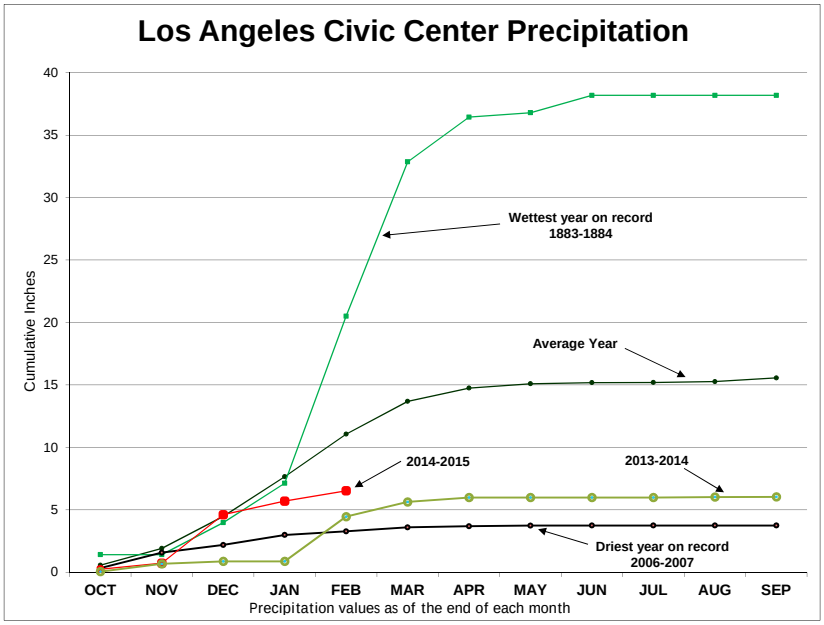
Lake Skinner, Lake Mathews, and Diamond Valley Lake



Reservoir	Storage (Acre-Feet)	Percent of Capacity
Diamond Valley Lake	393,082	49%
Lake Mathews	88,969	49%
Lake Skinner	32,411	74%
Total	514,462	50%

2015 Water Deliveries to Member Agencies (AF)



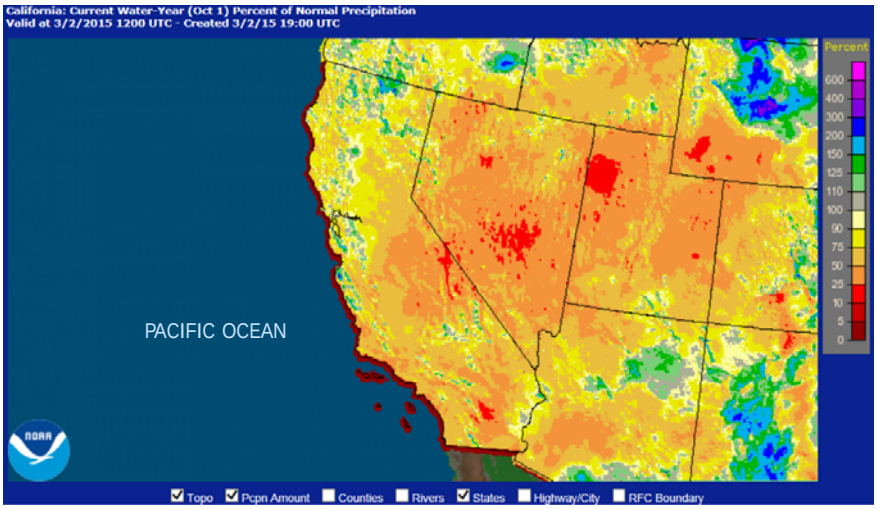


Precipitation at Six Major Stations in Southern California

From October 1, 2014 to February 28, 2015

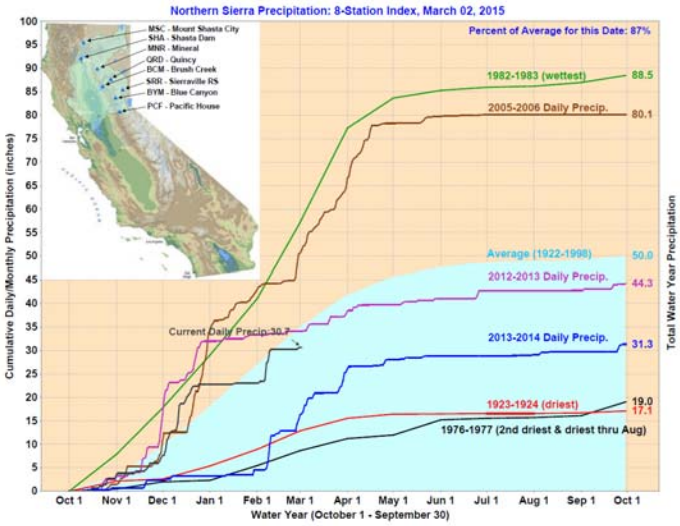
Station	Precipitation in inches Feb	Oct 1 to Feb 28	Average to Date	Percent of Average
San Luis Obispo	2.05	6.28	16.69	38%
Santa Barbara	0.90	8.52	12.91	66%
Los Angeles	0.83	6.53	11.06	59%
San Diego	0.04	4.78	7.24	66%
Blythe	0.04	1.42	2.08	68%
Imperial	0.00	0.55	1.81	30%

Water Year 2014-2015: Percent of Normal Precipitation



National Weather Service –Advance Hydrologic Prediction Center
http://water.weather.gov/precip/

Northern Sierra Precipitation-8 Station Index

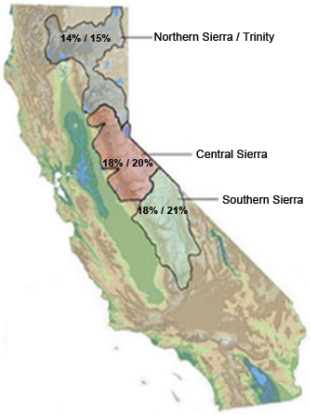


California Data Exchange Center
http://cdec.water.ca.gov/cgi-progs/products/PLOT_ESI.pdf

Snow Water Equivalents (inches)

Current Regional Snowpack from Automated Snow Sensors

% of April 1 Average / % of Normal for This Date



NORTH	
Data as of March 2, 2015	
Number of Stations Reporting	31
Average snow water equivalent (inches)	4.1
Percent of April 1 Average (%)	14
Percent of normal for this date (%)	15

CENTRAL	
Data as of March 2, 2015	
Number of Stations Reporting	43
Average snow water equivalent (inches)	5.4
Percent of April 1 Average (%)	18
Percent of normal for this date (%)	20

SOUTH	
Data as of March 2, 2015	
Number of Stations Reporting	29
Average snow water equivalent (inches)	4.9
Percent of April 1 Average (%)	18
Percent of normal for this date (%)	21

STATE	
Data as of March 2, 2015	
Number of Stations Reporting	103
Average snow water equivalent (inches)	4.9
Percent of April 1 Average (%)	17
Percent of normal for this date (%)	19

Statewide Average: 17% / 19%

Data as of March 2, 2015

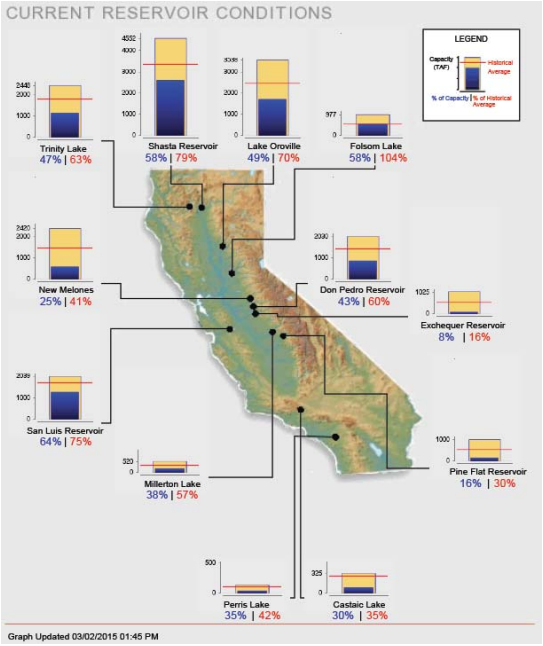
http://cdec.water.ca.gov/cdecapp/snowapp/sweq.action

Comparison of SWP Water Storage

		2014 Storage (acre-feet)		2015 Storage (acre-feet)	
Reservoir	Capacity	As of March 1	% of Cap.	As of March 1	% of Cap.
Frenchman	55,475	27,909	50%	20,127	36%
Lake Davis	84,371	55,521	66%	48,218	57%
Antelope	22,564	18,854	84%	22,667	100%
Oroville	3,553,405	1,416,257	40%	1,735,431	49%
TOTAL North	3,715,815	1,518,541	41%	1,826,443	49%
Del Valle	39,914	33,888	85%	36,434	91%
San Luis (DWR)	1,062,180	307,025	29%	935,859	88%
Pyramid	169,901	169,360	100%	167,972	99%
Castaic	319,247	271,878	85%	98,394	31%
Silverwood	74,970	72,551	97%	70,063	93%
Perris	126,841	73,597	58%	45,181	36%
TOTAL South	1,793,053	928,299	52%	1,353,903	76%
TOTAL SWP	5,508,868	2,446,840	44%	3,180,346	58%

State Water Project Projected Deliveries:
As of March 2, 2015, the Table-A allocations for 2015 is 20%

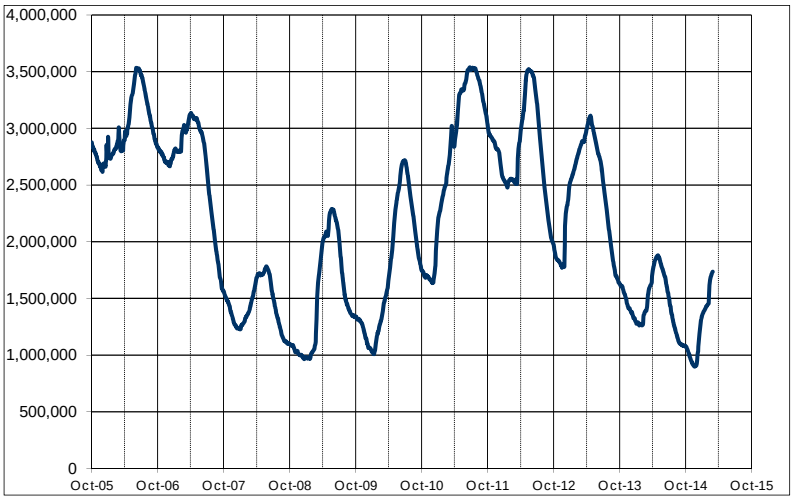
Current Reservoir Conditions



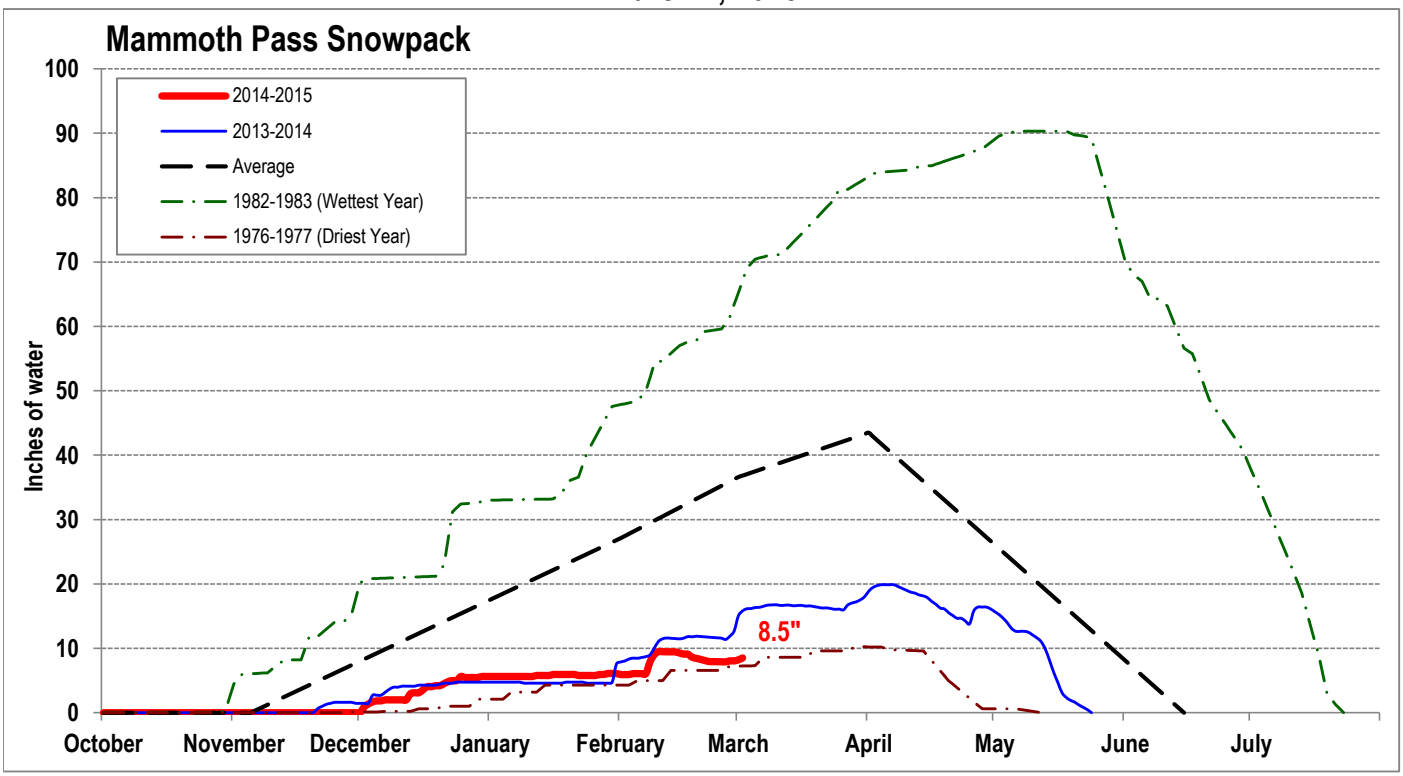
http://cdec.water.ca.gov/cdecapp/resapp/getResGraphsMain.action

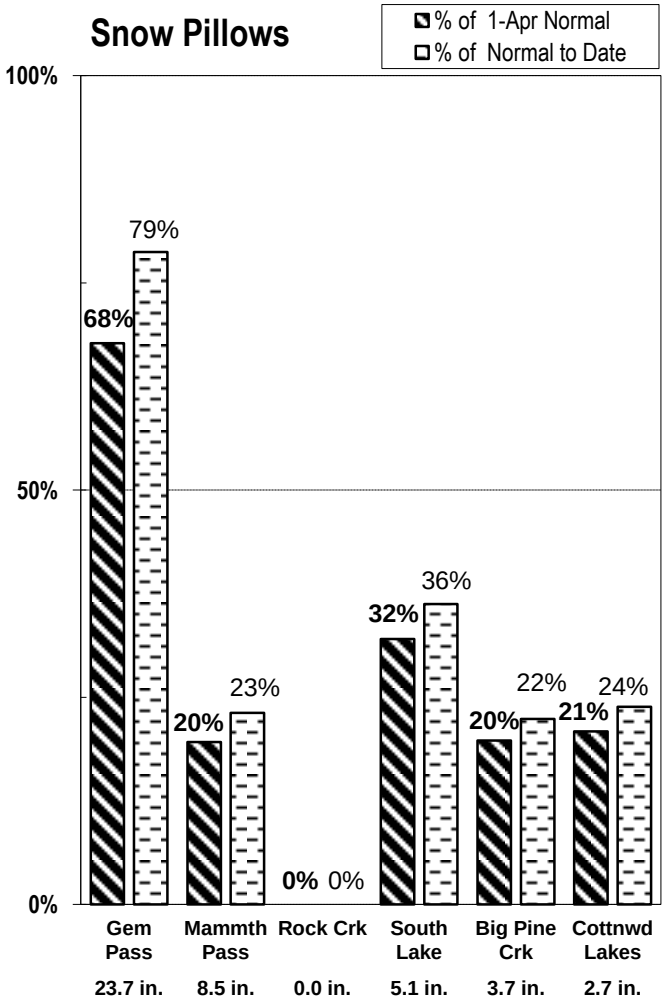
Oroville Storage (acre-feet)

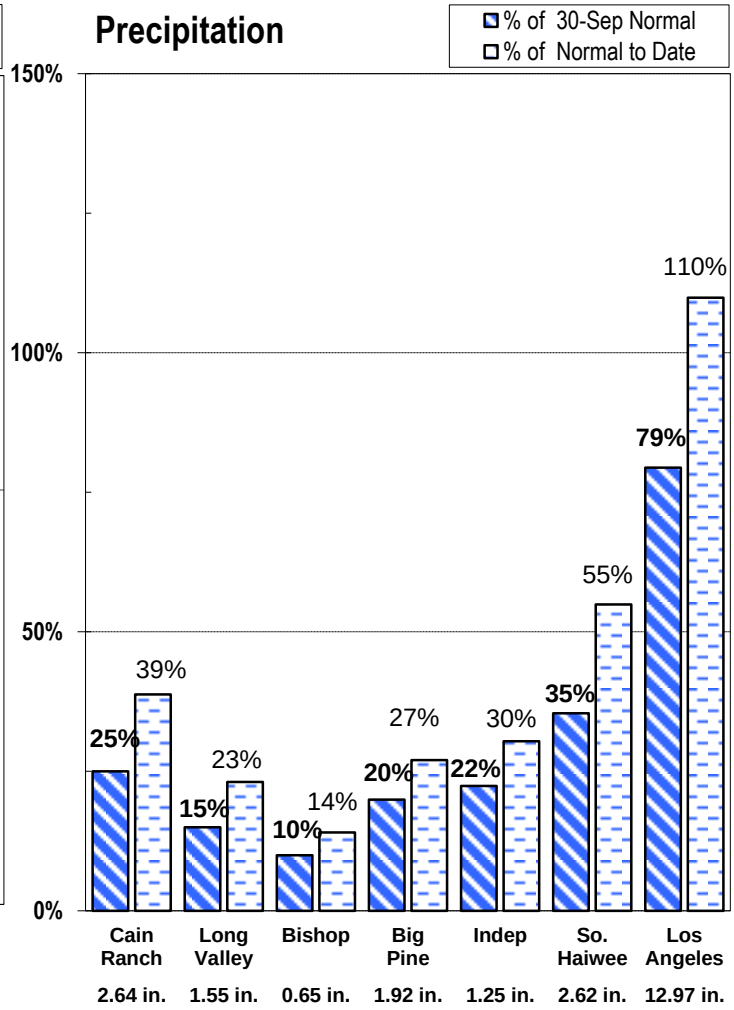
October 1, 2005 - February 28, 2015



EASTERN SIERRA
CURRENT PRECIPITATION CONDITIONS
March 2, 2015







Measurement as Inches Water Content; Precipitation totals are cumulative for water year beginning Oct 1

Bi-Weekly Drought Brief
Thursday, February 19, 2015

CURRENT CONDITIONS

Recent Precipitation: This January finished as one of the driest Januaries on historical record, with very little precipitation throughout the state. In early February, rainfall from a major statewide storm event provided 90% of the February monthly average rainfall for the Northern Sierra, and 52% for the San Joaquin Valley. Less rain fell further south in the state during this storm.

Below are precipitation totals (in inches) from Monday, February 2 through Tuesday, February 17, and year-to-date rainfall based on the water year cycle (October 1, 2014 to September 30, 2015).

- **Bakersfield:** 0.07" (3.43")
- **Folsom Dam:** 2.05" (22.96")
- **Fresno:** 0.47" (3.87")
- **Hetch Hetchy:** 3.27" (12.56")
- **Los Angeles:** 0.02" (5.73")
- **Modesto:** 1.39" (8.79")
- **Oroville:** 3.40" (22.64")
- **Pacific House:** 7.28" (21.92")
- **Redding:** 6.32" (28.80")
- **Riverside:** 0.00" (2.88")
- **Sacramento:** 2.28" (11.60")
- **San Diego:** 0.00" (5.30")
- **Shasta Dam:** 10.44" (45.76")
- **Willits:** 6.68" (34.36")

Precipitation Forecast: High pressure over California will continue to keep weather dry and warm throughout the state this week. Slightly cooler temperatures are likely for next week but continued dry weather is expected to persist.

Snow Survey: The February manual snowpack survey recorded California snowpack at 19% of normal to date, and 12% of the April 1 average. The next statewide manual snow survey will be conducted at the beginning of March. The snowpack as measured on February 10, using automated sensors shows snowpack at 23% of average to date, and 17% of the April 1 average which is a drop of 2 percent over the past week. The automated sensor results captured the additional snowpack, resulting from the early February storms, which is not reflected in the manual survey.

Reservoir Levels (% capacity): The early February storm event brought a much needed boost in storage to the state's major Northern California reservoirs. Statewide, the storm generated net gains for reservoirs that totaled in excess of 1.0 million acre-feet. Reservoirs in the southern portion of the state did not benefit significantly from this storm event, as precipitation mostly fell further north.

Reservoir Levels as of February 16 remain low, including: Castaic Lake 34% of capacity (40% of year to date average); Don Pedro 42% of capacity (61% of average); Exchequer 8% of capacity (15% of average); Folsom Lake 54% of capacity (102% of average); Lake Oroville 46% of capacity (69% of average); Lake Perris 34% (42% of average); Millerton Lake 36% of capacity (56% of average); New Melones 25% of capacity (41% of average); Pine Flat 15% of capacity (29% of average); San Luis 58% of capacity (71% of average); Lake Shasta 53% of capacity (77% of average); and Trinity Lake 44% of capacity (62% of average). An update of water levels at other smaller reservoirs is also available.

Fire Activity: In 2014, CAL FIRE responded to almost 1,000 more wildfires than the 5-year average. Since the beginning of 2015, CAL FIRE has responded to over 150 wildfires across the state, including the Round Fire in Inyo County, which has burned over 7,000 aces and is 100% contained. CAL FIRE continues to monitor the drought situation and prepare for the wildfire season ahead while maintaining staffing that meets the current threat. Should the need arise, CAL FIRE is positioned to augment staffing as required.

Statewide Open Burn Ban Update: Due to recent rain, local outdoor burn bans have been lifted across much of the State. Most areas still require homeowners to obtain a burn permit. For those areas where the ban has been lifted, daily fire and weather conditions will dictate whether burning is permissible that day. The burn ban, issued last July, prohibits certain outdoor burning in the State Responsible Areas (SRA).

Vulnerable Water Systems: The State Water Board's Drinking Water Program continues to provide technical and funding assistance to several communities facing drinking water shortages and is monitoring water systems across the state to determine if new support is needed. As of this week, a total to date of $14.4 million has been identified for specific emergency drinking water projects out of $15 million appropriated in March 2014 for this purpose.

KEY ACTION ITEMS FROM THIS WEEK

- **State Water Board Approves Elements of Temporary Urgency Change Petition for SWP and CVP:** On Wednesday, February 4, the State Water Board issued an order approving most elements of the January 23 temporary urgency change petition submitted by the Department of Water Resources and U.S. Bureau of Reclamation to adjust flow and water quality requirements that govern inflows and outflows in the Sacramento-San Joaquin Delta and operation of the Delta Cross Channel Gates for the next two months. These requirements help control salinity in the Delta and protect fish and wildlife uses, and water quality for municipal, industrial and agricultural uses.

  The State Water Board held a Public Workshop on Wednesday, February 18 to receive public comments on the Temporary Change Order. The workshop included panel presentations by the Department of Fish and Wildlife and stakeholder groups. The State Water Board is now reviewing all comments received to determine if changes to the Order are appropriate.

- **CDFW Approves Restoration Grants Including $3.5 Million for Drought Projects:** On Wednesday, February 11, the Department of Fish & Wildlife announced its selection of grants to restore and protect river and estuarine habitat for coastal salmon and steelhead trout. This year's selection includes both traditional restoration projects as well as special projects to respond to the drought and improve fisheries habitat on private and state forestlands.

- **State Board Streamlines Process to Apply for Drinking Water Funds:** On Friday, February 6, the State Water Board announced that they have streamlined access to its Drinking Water State Revolving Fund (DWSRF) in order to make it easier for water systems to apply for funds. The DWSRF program, which was transferred to the State Board from the Department of Public Health in July, offers below-market-rate loans to water providers to upgrade their drinking water systems to meet state and federal safe drinking water standards.

- **State Water Board Orders More Information from Diverters Claiming Senior Delta Water Rights:** On Wednesday, February 4, the State Water Board has required individuals claiming senior water rights in the Sacramento-San Joaquin Delta watershed to provide detailed information on the water rights they claim, and the diversions associated with those rights. The order comes after the State Water Board received information that some riparian and pre-1914 water right holders may be illegally diverting stored water in the Sacramento and San Joaquin watersheds, and the Delta.

- **State Board Releases Report on Improving Oversight of Water Right Systems during Drought:** On Friday, January 30, the State Water Board released a report that outlines ways to improve the enforcement of the state's water rights system. The report addresses issues ranging from improving the accuracy and timeliness of supply and demand data to increasing public outreach. These recommendations for improvement are based on the State Water Board's review and implementation of the water rights system this past year, and is viewed as a way to improve the water rights enforcement process as California faces the likelihood of a fourth consecutive dry year.

- **$50 million in Drought Relief for Western States Detailed during Drought Response Press Conference:** On Friday, February 2, the Department of Interior (DOI) announced the availability of $50 million in federal grants for drought relief in the western states. The $50 million for Western Drought Response was made available through the Consolidated and Further Continuing Appropriations Act of 2015, which will enable the U.S. Bureau of Reclamation to work with water districts and other water users to increase efficiency and conservation of available water.

- **Conservation Partners Sought for Drought-related Wind Erosion Prevention:** On Wednesday, February 11, the USDA Natural Resources Conservation Service (NRCS) in California announced that they are looking to partner with local, city, county, or irrigation districts to address wind erosion risks on fallow farmland due to California's ongoing drought. Approximately $4 million will be available through the Emergency Watershed Protection Program (EWP) which will assist agricultural producers and rural landowners install conservation practices and limit the effects of wind erosion.

- **Emergency Food Aid, Rental and Utility Assistance**: The Department of Social Services (CDSS) has provided to date over 495,650 boxes of food to community food banks in drought-impacted counties. Approximately 435,600 boxes of food have been picked up by 231,871 households. By this Friday, February 20, an additional 12,000 boxes will be delivered to five counties. Local food banks continue to target food aid to residents most impacted by drought.

  The non-profit group La Cooperativa continues to distribute the $10 million state-funded emergency rental assistance to impacted families and individuals across counties most impacted by the drought. As of Tuesday, February 17, the Department of Housing and Community Development (HCD) has reported that a total of $8,557,364 is committed; and $7,338,693 in funds has been issued to 4,462 applicants in 21 counties.

  The Department of Community Services and Development (CSD) created a $600,000 program to help families pay their water bills. This program targets families through 10 agencies that are experiencing "exceptional" drought. As of January, CSD has completed the Drought Water Assistance Program Pilot.

CSD has also implemented a $400,000 Migrant and Seasonal Farmworker (MSFW) drought assistance program, in coordination with the California Human Development (CHD), Central Valley Opportunity Center (CVOC), Center for Employment Training (CET) and Proteus, which provides assistance in employment training and placement services to individuals impacted by the drought. As of Friday, February 6, 128 clients are enrolled in employment training programs, 30 clients have obtained employment, and 128 clients are receiving employment support services. CSD has also reported that a total of $394,653 has been spent to assist participants in completing training employment programs.

- **Californians Achieve Strong Water Conservation Gains in December:** The State Water Board announced on Tuesday, February 3, that Californians cut back on water use by 22% in December as compared with the same period last year, which is the largest water conservation gain since state officials began tracking the data last summer. The sharp climb in water conservation marks the first time the state has attained Governor Brown's goal of a 20% reduction in water use.

- **Save Our Water Message Delivered 210 Million Times in 2014:** During the February 3 State Water Board meeting, Save Our Water officials announced that the Save Our Water campaign achieved 210 million impressions delivering water conservation messages on television, radio, social media, and websites in 2014. This achievement was made possible by the additional funding given to the campaign last year, which helped to expand its reach into new channels and markets, and paid advertising.

- **Water Saving Tips Promoted Across the State:** Californians made strides in 2014 to save water during one of the worst droughts in generations. For 2015, SaveOurWater.com urges Californians to make a New Year's resolution to save water daily as a permanent lifestyle change. Save Our Water's newly revamped website makes it even easier for Californians to learn how to save water indoors, outdoors, and at work. The website features the theme "Conservation: California's Year-Round Resolution." Visitors can sign up for daily email tips and grow the public awareness campaign by sharing Save Our Water Twitter and Facebook feeds.

  This campaign will expand beyond the general public to feature corporate and business efforts. Save Our Water is also building an easy-to-use digital water calculator, to be unveiled in March that will help people figure out how much water they currently use and how certain practices could cut that volume both indoors and outdoors.

- **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, $227 million has been expended, 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. In the event drought conditions continue through next year, the proposed 2015-16 Governor's Budget includes an additional $115 million to continue critical drought response efforts.

- **Governor's Drought Task Force:** The Task Force continues to take actions that conserve water and coordinate state response to the drought.

Local Government

- **MWD Outlines Drought Scenarios that Could Result in Mandatory Rationing This Summer:** This past December, the Metropolitan Water District (MWD) of Southern California revised its allocation plan which equally distributes water supply reductions among member agencies during shortages. On Tuesday, February 9, the MWD outlined a range of allocation actions and scenarios to its Board of Directors that may require the district to make wholesale cutbacks by July 1. MWD's Board will consider its options in April, but if a supply allocation is adopted, there is a possibility that it could result in water rationing throughout Southern California this summer.

- **Local Emergency Proclamations**: A total of 60 local Emergency Proclamations have been received to date from city, county, and tribal governments, as well as special districts:

    - **24 Counties:** Glenn, Inyo, Humboldt, Kern, Kings, Lake, Madera, Mariposa, Merced, Modoc, Plumas, Santa Barbara, San Bernardino, San Joaquin, San Luis Obispo, Shasta, Siskiyou, Sonoma, Sutter, Trinity, Tulare, Tuolumne, Yuba, and El Dorado.

    - **13 Cities:** City of Willits (Mendocino County), City of St. Helena (Napa County), City of Calistoga (Napa County), City of American Canyon (Napa County), City of Santa Barbara (Santa Barbara County), City of Montague (Siskiyou County), City of Live Oak (Sutter County), City of San Juan Bautista (San Benito County), City of Lodi (San Joaquin County), City of Portola (Plumas County), City of Ripon (San Joaquin County), City of Rio Dell (Humboldt County), and City of West Sacramento (Yolo County).

    - **9 Tribes:** Hoopa Valley Tribe (Humboldt County), Yurok Tribe (Humboldt County), Tule River Indian Tribe (Tulare County), Karuk Tribe (Siskiyou/Humboldt Counties), Sherwood Valley Pomo Indian Tribe (Mendocino County), Yocha Dehe Wintun Nation (Yolo County), Cortina Indian Rancheria (Colusa County), Kashia Band of Pomo Indians of the Stewarts Point Rancheria (Sonoma County), and Picayune Rancheria of Chukchansi Indians (Madera County).

    - **14 Special Districts:** Brooktrails Township (Mendocino County), Lake Don Pedro Community Services District (Stanislaus County), Placer County Water Agency (Placer County), Twain Harte Community Services District (Tuolumne County), Carpinteria Valley Water District (Santa Barbara County), Meiners Oaks Water District (Ventura County), Mariposa Public Utility District (Mariposa County), Goleta Water District (Santa Barbara County), Montecito Water District (Santa Barbara County), Tuolumne Utilities District (Tuolumne County), Mountain House Community Service District (San Joaquin County), Nevada Irrigation District (Nevada County), Upper San Gabriel Valley Municipal Water District (Los Angeles County), and Lake Berryessa Resort Improvement District (Napa 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.

- **County Drought Taskforces:** A total of 29 counties have established drought task forces to coordinate local drought response. These counties include: Butte, Glenn, Humboldt, Imperial, Kern, Kings, Lake, Madera, Mendocino, Merced, Modoc, Monterey, Nevada, Orange, Placer, Plumas, Sacramento, San Francisco, San Joaquin, San Luis Obispo, San Mateo, Santa Barbara, Siskiyou, Stanislaus, Sutter, Tehama, Tulare, Tuolumne, and Yolo.

- **Tribal Taskforce:** A total of 3 tribes have established drought task forces to coordinate tribal drought response. These tribes include: Hoopa Valley Tribe (Humboldt County), Yurok Tribe (Humboldt Counties) and Sherwood Valley Tribe (Mendocino 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

RECLAMATION

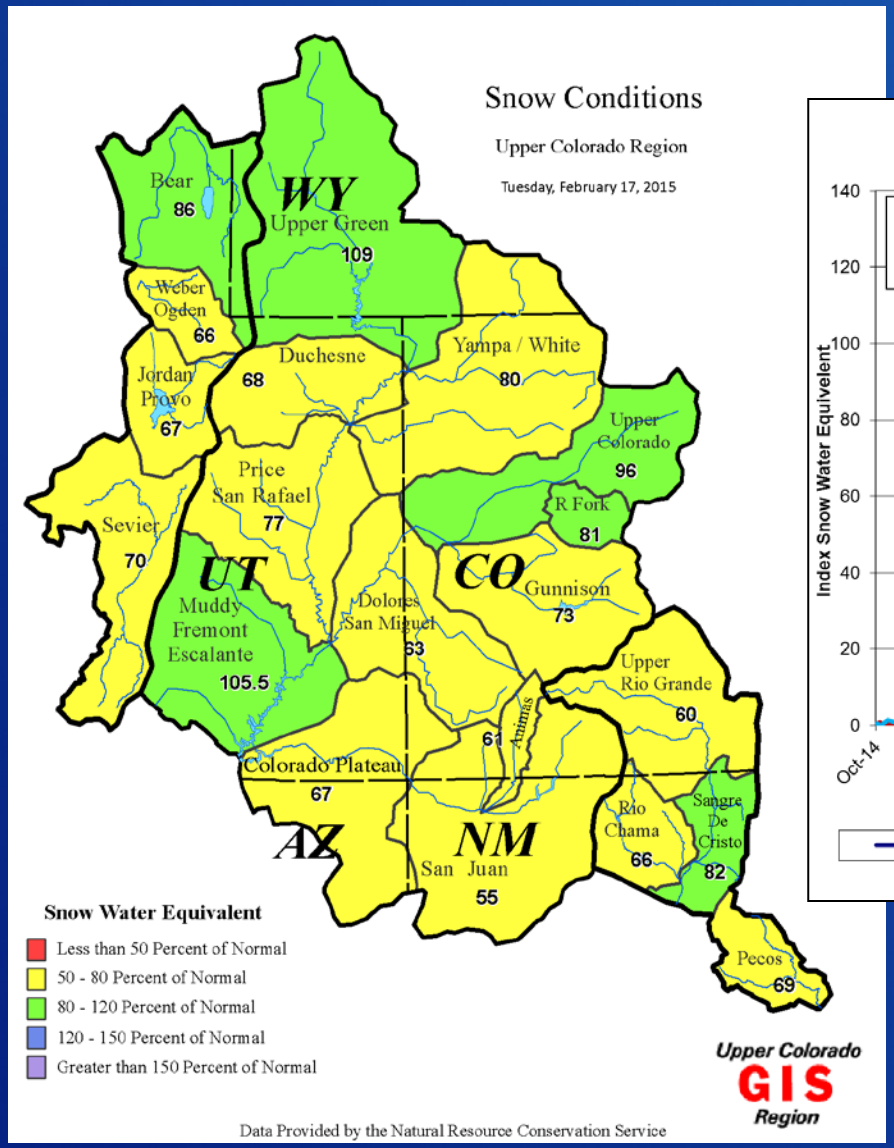
Managing Water in the West

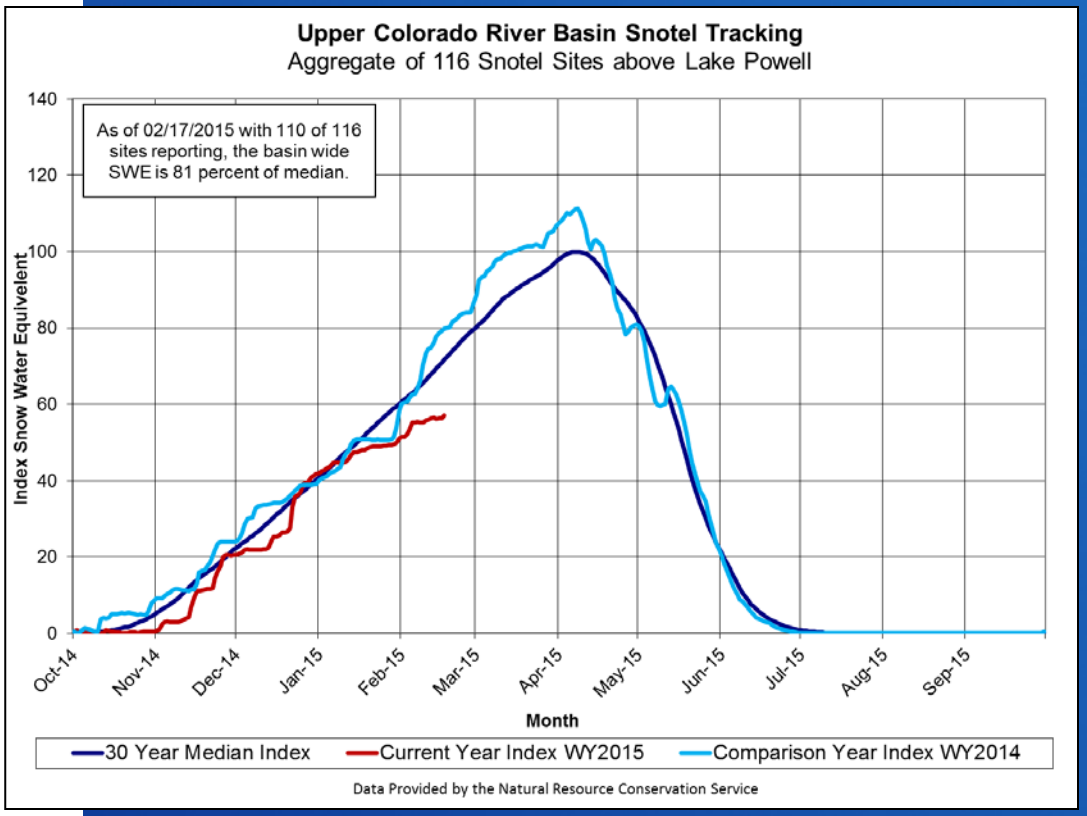
The Colorado River: Current and Projected Future Conditions

Update for the Basin States Webinar
February 17, 2015

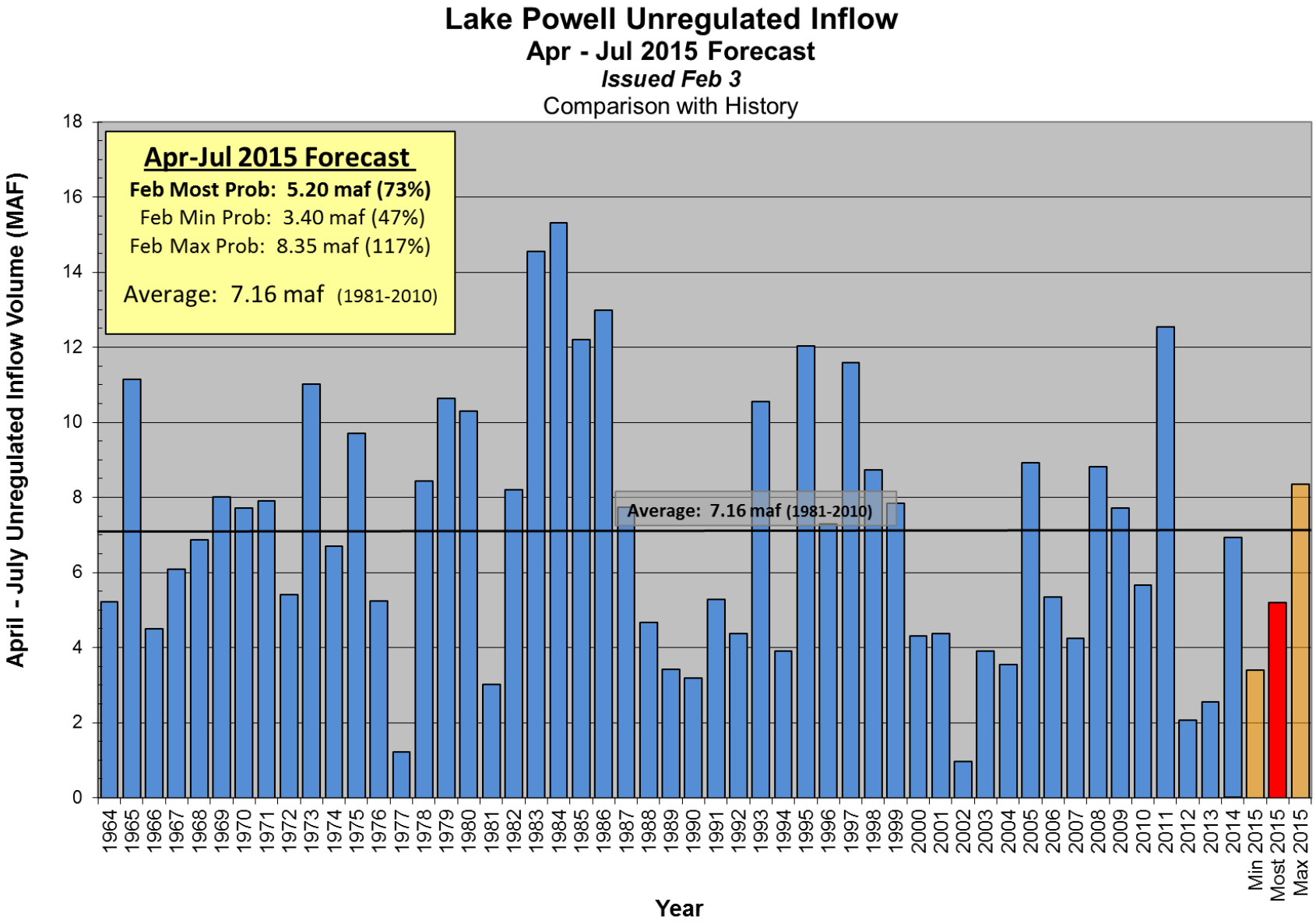
U.S. Department of the Interior
Bureau of Reclamation

Upper Basin Snow Conditions





RECLAMATION



RECLAMATION

Colorado River Basin Storage
(as of February 17, 2015)

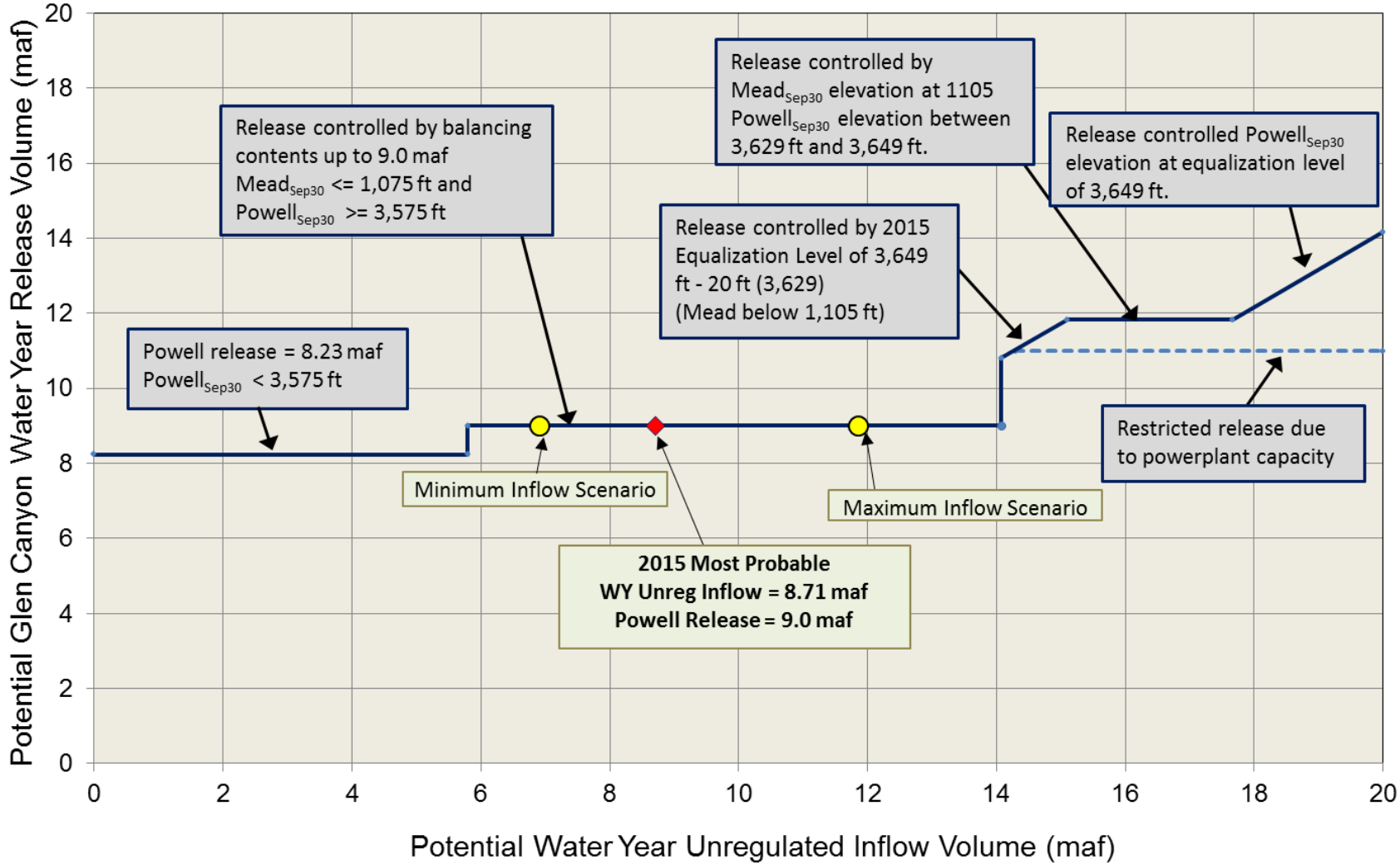
Current Storage	Percent Full	MAF	Elevation (Feet)
Lake Powell	46%	11.07	3,593
Lake Mead	41%	10.78	1,089
Total System Storage*	49%	29.30	NA

***Total system storage was 28.87 maf or 48% this time last year**

RECLAMATION

Potential Lake Powell Release Scenarios

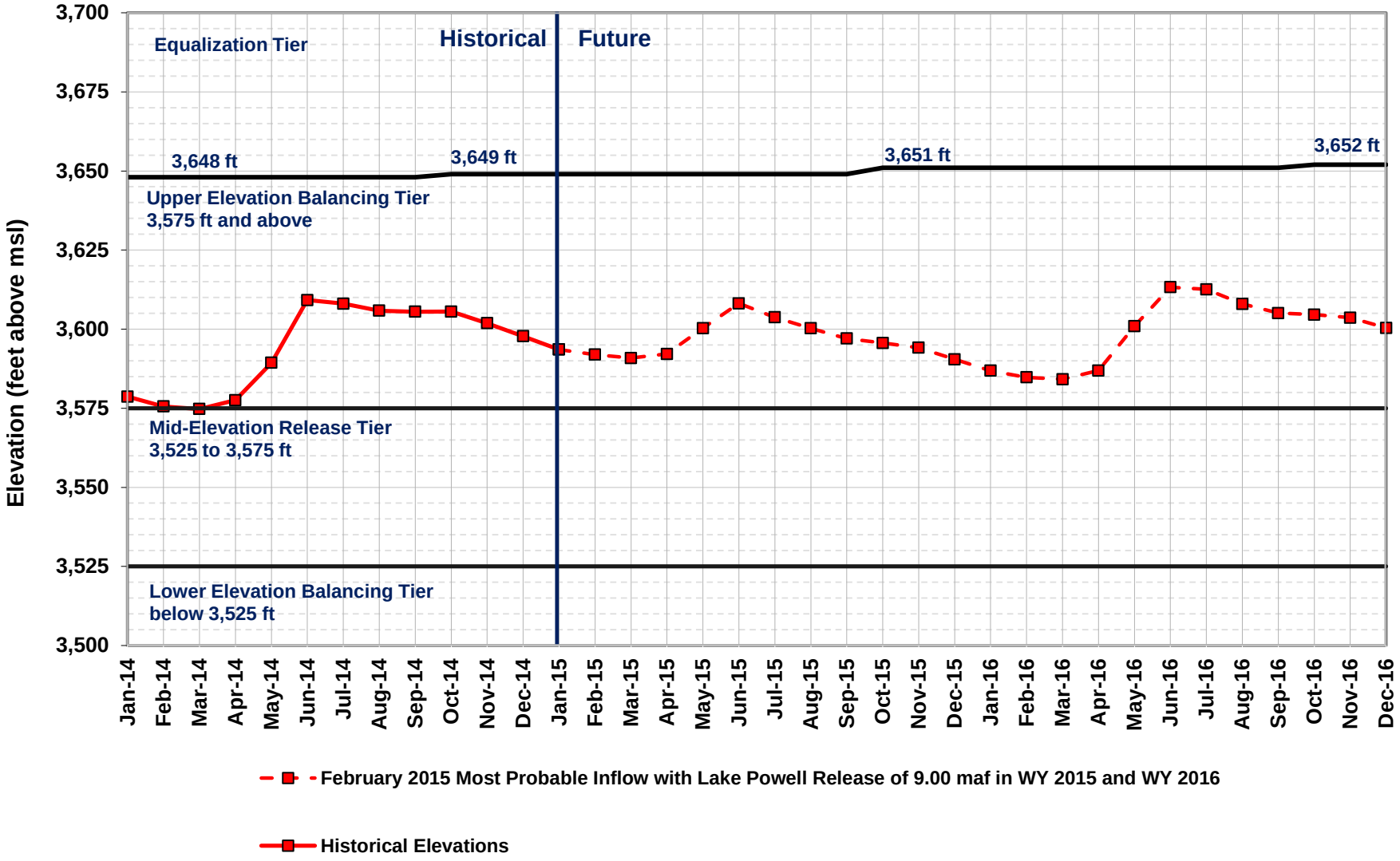
Water Year 2015 Release Volume as a Function of Unregulated Inflow Volume
based on February 2015 24-Month Study Conditions



RECLAMATION

Lake Powell End of Month Projected Elevations

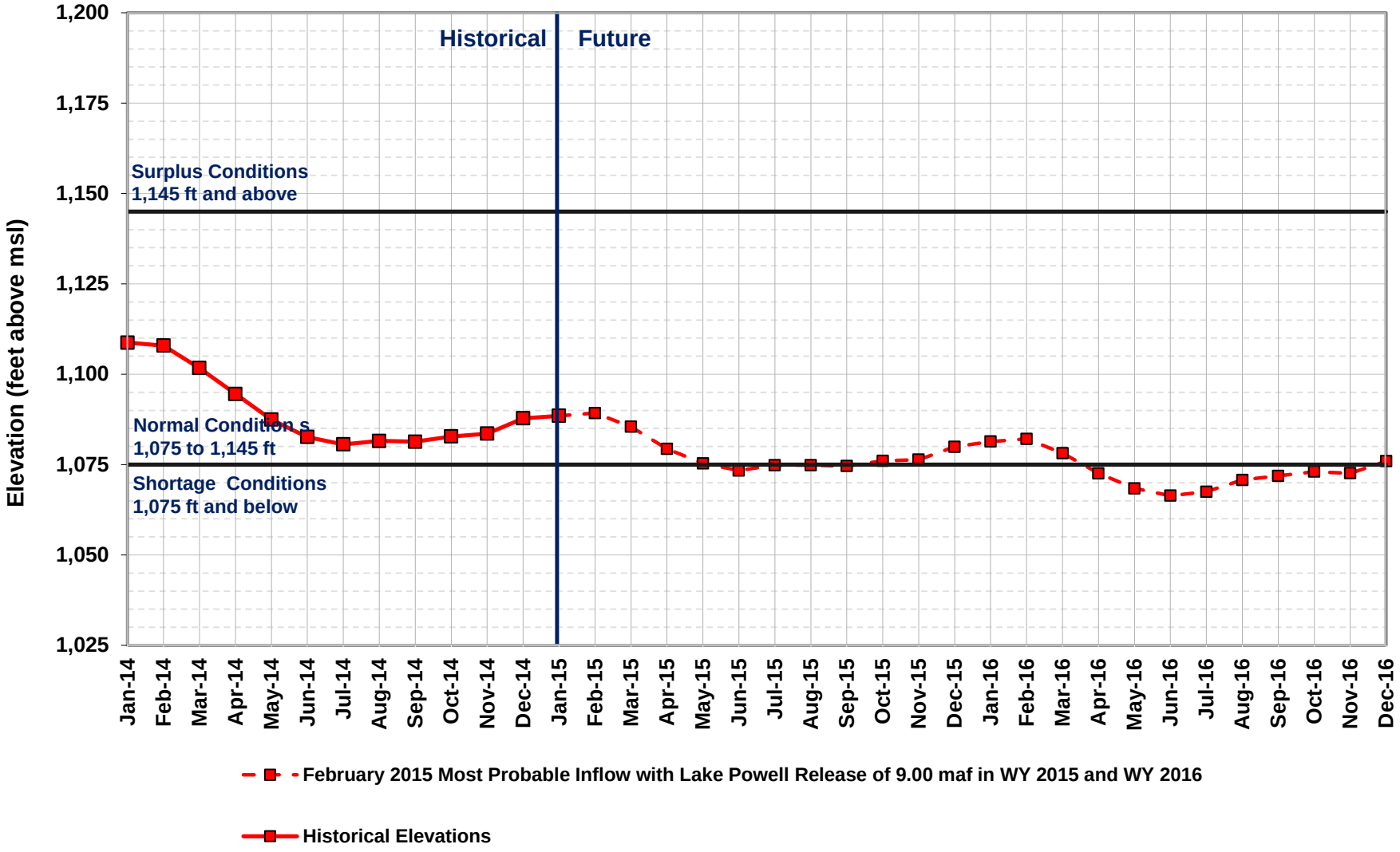
Projections from February 2015 24-Month Study Inflow Scenarios



RECLAMATION

Lake Mead End of Month Projected Elevations

Projections from February 2015 24-Month Study Most Probable Inflow Scenario



RECLAMATION

January 2015 CRSS - Key Modeling Assumptions

- Run starts in January 2015
- Initial conditions are December 2014 actual elevations
  - Powell: 3,597.75 feet
  - Mead: 1,087.79 feet
- Input hydrology is developed by resampling the observed natural flow record (1906-2010) resulting in 105 sequences
  - 2011 and 2012 natural flows will be incorporated in April run
- Upper Basin demands are per the 2007 UCRC schedule
- Lower Basin demands are per with Interim Guidelines Final EIS with ICS schedules updated in December 2009

RECLAMATION

January 2015 CRSS - Modifications

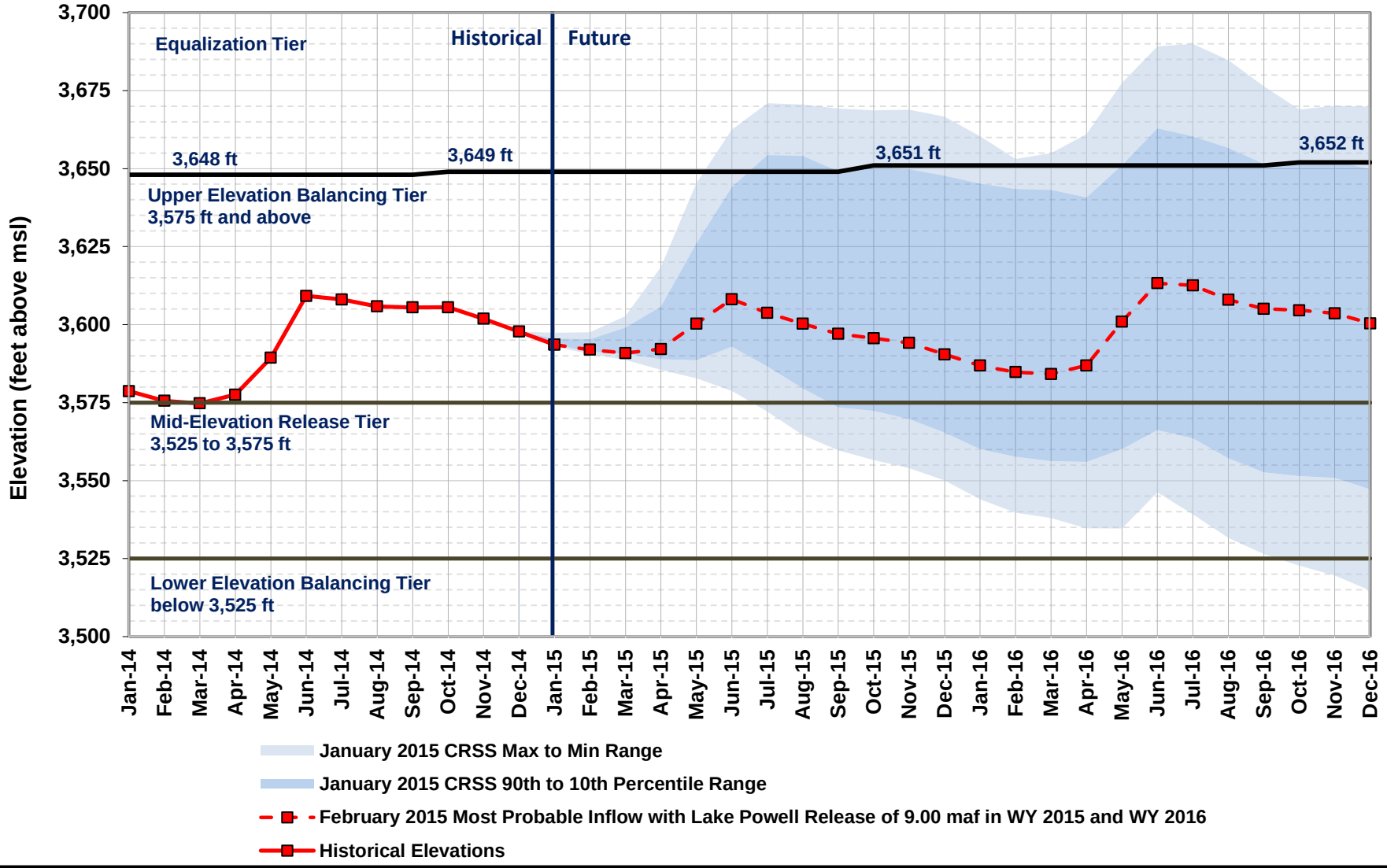
- Several assumptions were modified to better reflect operational assumptions

  - 2015 Lower Basin use modified to match January 24-MS use
  - Algorithm to forecast Mead EOWY elevation modified to match assumptions used in the 24-MS
  - Algorithm to forecast Powell EOWY elevation modified to adjust UB demands and UB reservoir regulation in low flow years

RECLAMATION

Lake Powell End of Month Projected Elevations

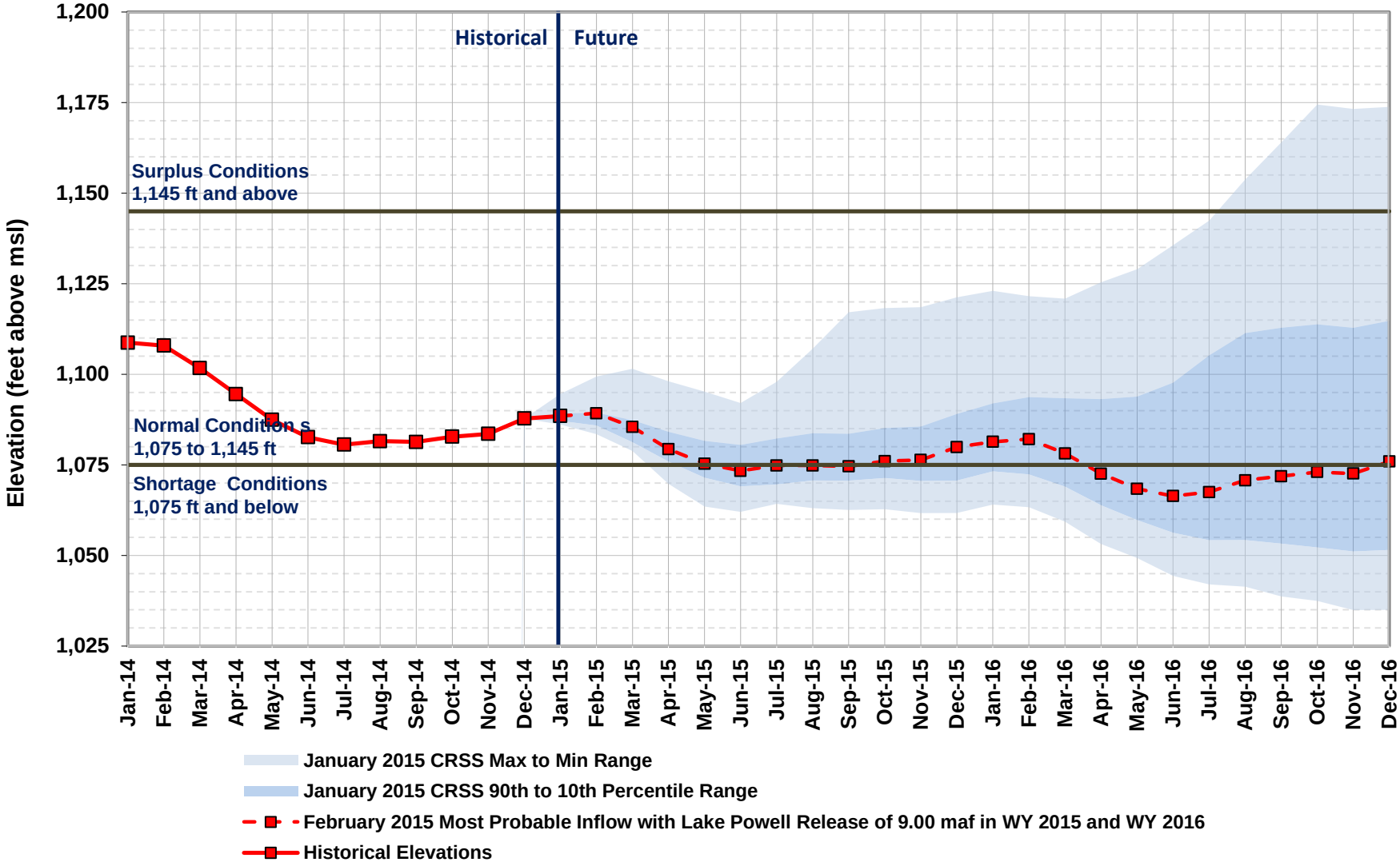
Projections from February 2015 24-Month Study Inflow Scenarios



RECLAMATION

Lake Mead End of Month Projected Elevations

Projections from February 2015 24-Month Study Most Probable Inflow Scenario



RECLAMATION

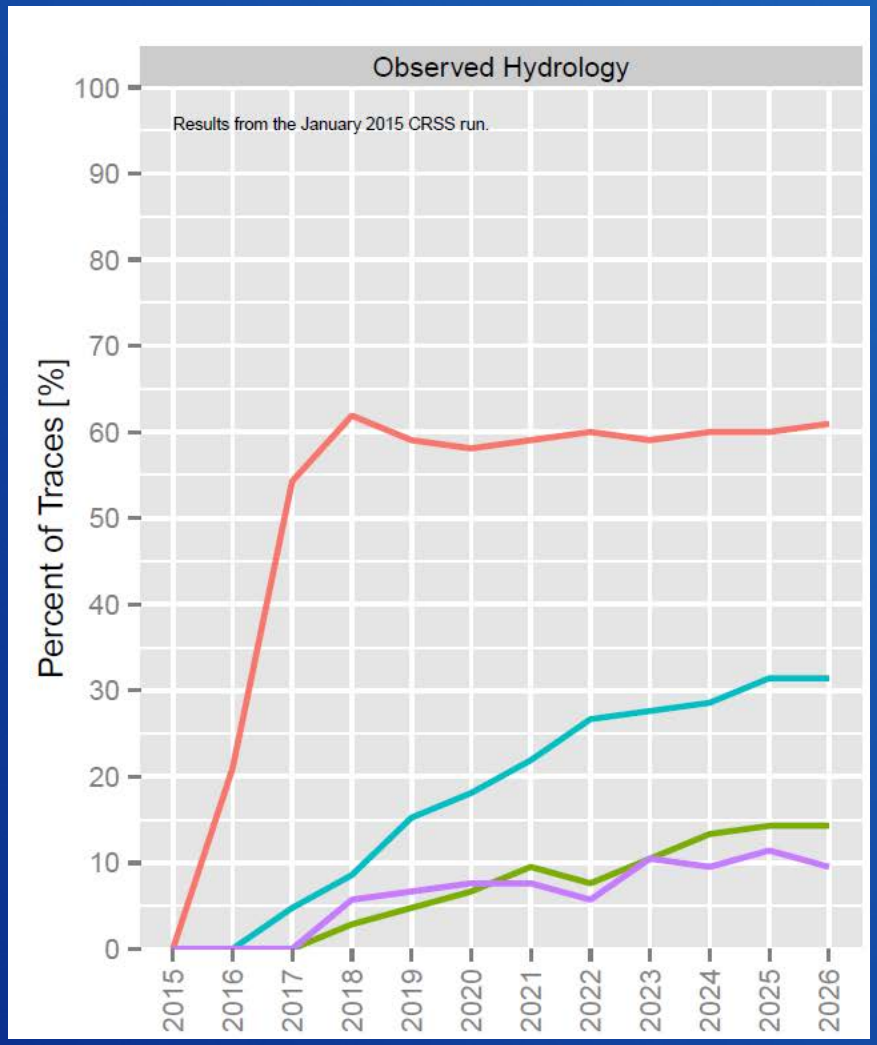
Percent of Traces with Event or System Condition

Results from January 2015 CRSS[1,2,3] (values in percent)

	Event or System Condition	2015	2016	2017	2018	2019
Upper Basin – Lake Powell	**Equalization Tier**	**7**	**23**	**23**	**26**	**30**
	Equalization – annual release > 8.23 maf	*7*	*23*	*23*	*26*	*29*
	Equalization – annual release = 8.23 maf	*0*	*0*	*0*	*0*	*1*
	Upper Elevation Balancing Tier	**93**	**50**	**53**	**52**	**44**
	Upper Elevation Balancing – annual release > 8.23 maf	*85*	*42*	*42*	*41*	*32*
	Upper Elevation Balancing – annual release = 8.23 maf	*8*	*8*	*10*	*11*	*12*
	Upper Elevation Balancing – annual release < 8.23 maf	*0*	*0*	*1*	*0*	*0*
	Mid-Elevation Release Tier	**0**	**27**	**20**	**13**	**17**
	Mid-Elevation Release – annual release = 8.23 maf	*0*	*0*	*0*	*1*	*1*
	Mid-Elevation Release – annual release = 7.48 maf	*0*	*27*	*20*	*12*	*16*
	Lower Elevation Balancing Tier	**0**	**0**	**4**	**9**	**9**
Lower Basin – Lake Mead	**Shortage Condition – any amount (Mead ≤ 1,075 ft)**	**0**	**21**	**54**	**62**	**59**
	Shortage – 1st level (Mead ≤ 1,075 and ≥ 1,050)	*0*	*21*	*45*	*40*	*33*
	Shortage – 2nd level (Mead < 1,050 and ≥ 1,025)	*0*	*0*	*9*	*19*	*19*
	Shortage – 3rd level (Mead < 1,025)	*0*	*0*	*0*	*3*	*7*
	Surplus Condition – any amount (Mead ≥ 1,145 ft)	**0**	**0**	**5**	**8**	**14**
	Surplus – Flood Control	*0*	*0*	*0*	*1*	*2*
	Normal or ICS Surplus Condition	**100**	**79**	**41**	**30**	**27**

[1] Reservoir initial conditions based on the observed levels on December 31, 2014.
[2] Hydrologic inflow traces based on resampling of the observed natural flow record from 1906-2010.
[3] Percentages shown may not be representative of the full range of future possibilities that could occur with different modeling assumptions.

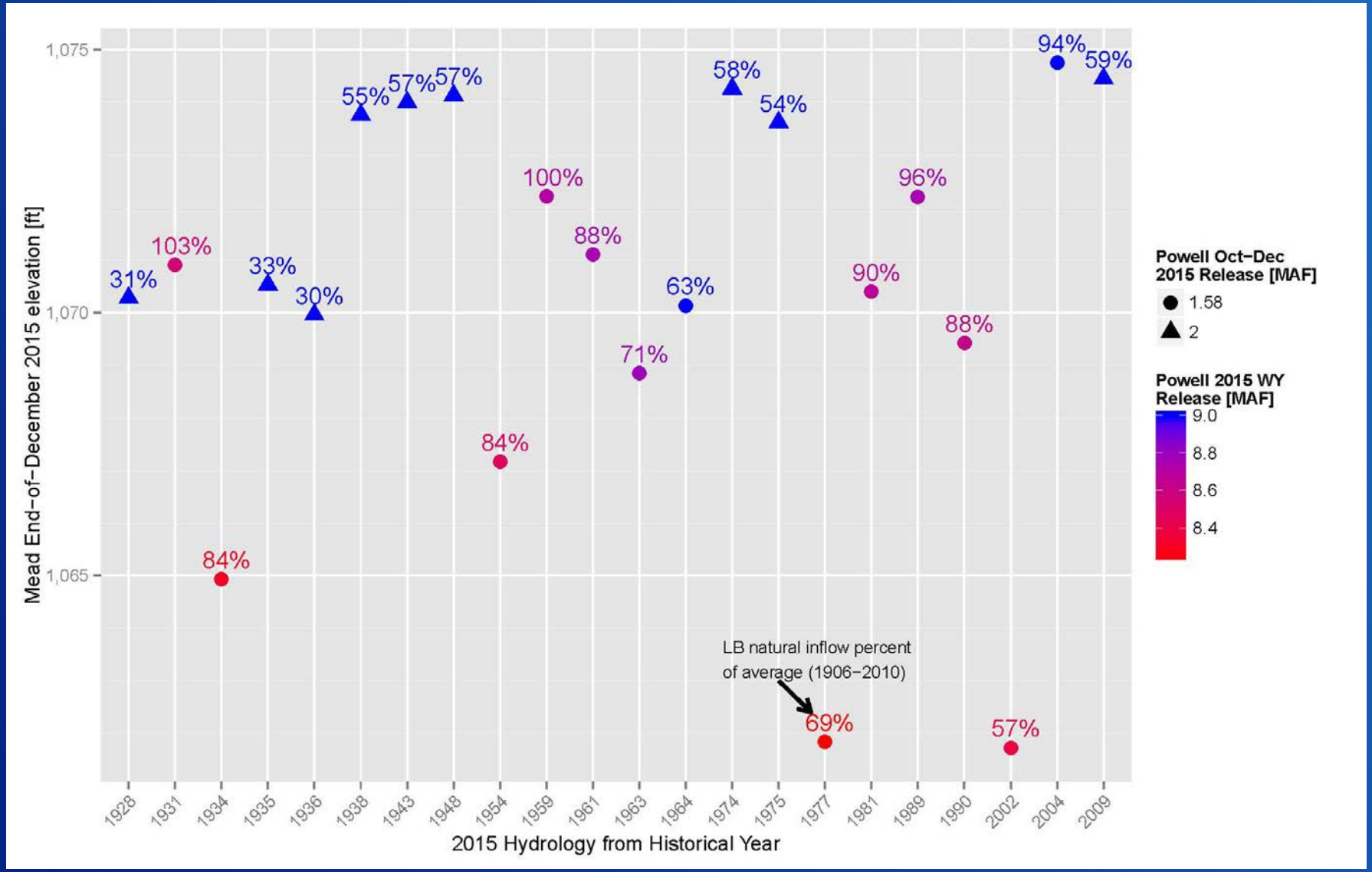
RECLAMATION



LB Shortage | Mead < 1,000' in Any Month | Mead < 1,025' in Any Month | Powell < 3,490' in Any Month

RECLAMATION

Traces with Lower Basin Shortage in 2016



RECLAMATION

Conditional Probabilities*

- If Lake Powell 2016 WY Release = 9.0 MAF (41% chance)
  - Chance of 2017 Lower Basin Shortage: 58%
    - Shortage – 1st level: 58%
    - Shortage – 2nd level: 0%
- If Lake Powell 2016 WY Release = 8.23 MAF (8% chance)
  - Chance of 2017 Lower Basin Shortage: 56%
    - Shortage – 1st level: 56%
    - Shortage – 2nd level: 0%
- If Lake Powell 2016 WY Release = 7.48 MAF (27% chance)
  - Chance of 2017 Lower Basin Shortage: 93%
    - Shortage – 1st level: 57%
    - Shortage – 2nd level: 36%

*Computed using Jan 2015 CRSS results

RECLAMATION

The Colorado River: Current and Projected Future Conditions

For further information: http://www.usbr.gov/lc/region

RECLAMATION

RECLAMATION

Managing Water in the West

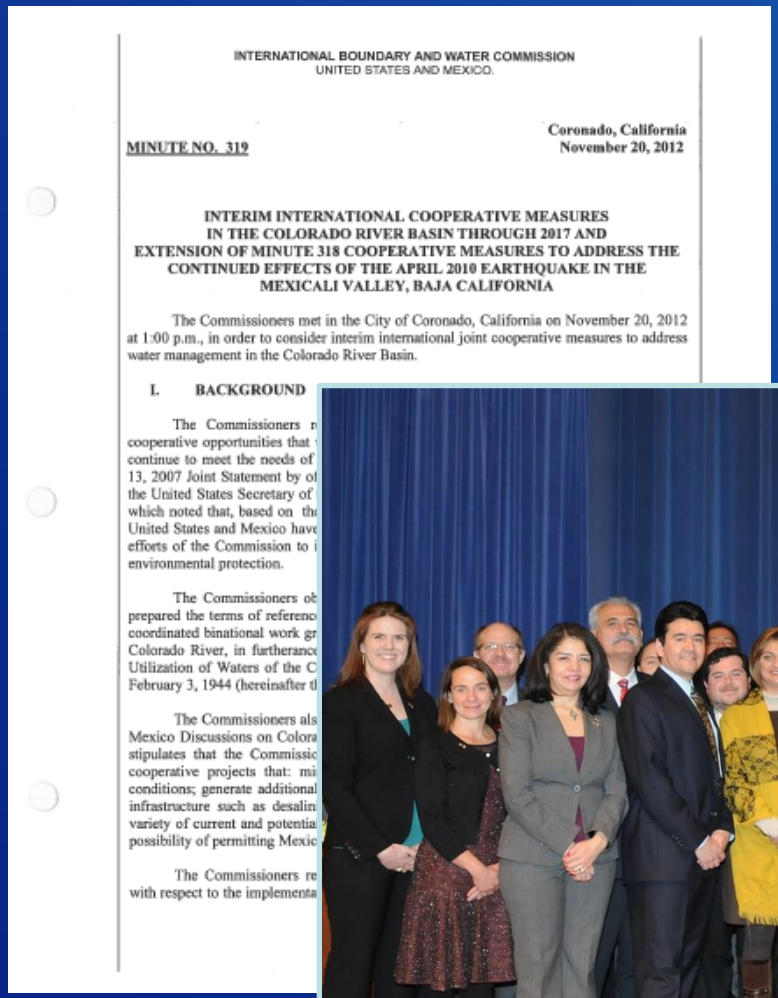
Minute 319 and Minute 32X Discussion

Basin State Principals Meeting

February 18, 2015

U.S. Department of the Interior
Bureau of Reclamation

Minute 319 Implementation



INTERNATIONAL BOUNDARY AND WATER COMMISSION
UNITED STATES AND MEXICO.

MINUTE NO. 319

Coronado, California
November 20, 2012

INTERIM INTERNATIONAL COOPERATIVE MEASURES IN THE COLORADO RIVER BASIN THROUGH 2017 AND EXTENSION OF MINUTE 318 COOPERATIVE MEASURES TO ADDRESS THE CONTINUED EFFECTS OF THE APRIL 2010 EARTHQUAKE IN THE MEXICALI VALLEY, BAJA CALIFORNIA

The Commissioners met in the City of Coronado, California on November 20, 2012 at 1:00 p.m., in order to consider interim international joint cooperative measures to address water management in the Colorado River Basin.

I. BACKGROUND

The Commissioners n
cooperative opportunities that
continue to meet the needs of
13, 2007 Joint Statement by ol
the United States Secretary of
which noted that, based on th
United States and Mexico have
efforts of the Commission to i
environmental protection.

The Commissioners ob
prepared the terms of referenc
coordinated binational work gr
Colorado River, in furtherance
Utilization of Waters of the C
February 3, 1944 (hereinafter t

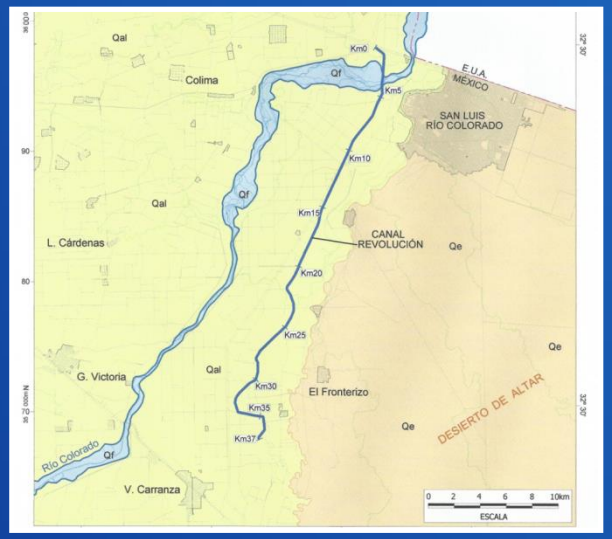
The Commissioners als
Mexico Discussions on Colora
stipulates that the Commissic
cooperative projects that: mi
conditions; generate additional
infrastructure such as desalin
variety of current and potentia
possibility of permitting Mexic

The Commissioners re
with respect to the implementa

Elements of Minute 319

- Extension of Minute 318
- Distribution of Flows Under High Elevation Reservoir Conditions
- Distribution of Flows Under Low Elevation Reservoir Conditions
- Intentionally Created Mexican Allocation
- Salinity
- Water for the Environment and ICMA/ICS Exchange Pilot Program
- International Projects

Damaged canal in Mexicali Valley



Pilot Project Canal Lining

RECLAMATION

U.S. Financial Commitments

Purpose	Min. 319 Commitment by 12/31/2017	Amount Currently Available	Amount Requested By Mexico
Pulse Flow and ICMA/ICS Exchange Pilot	$18 M	$9.6 M	Anticipate request in 2015
Environmental Restoration	$3 M	$900K	$620K
Miguel Aleman	$350k	$350k	$325K

- **Additional $1M spent on monitoring between the two countries to date.**

RECLAMATION

Summary of Key Team Updates

- All-American Canal Turnout
- Basin Conditions and Hydrology
- Environmental Flows
- Pilot Project Canal Lining
- Rosarito Desalination

Willow seedlings established by pulse flow, Laguna Grande. Photo: October 2014

Rosarito Desalination

RECLAMATION

Key implementation "lessons learned" thus far

- Pulse flow
- Funding
- Other items (clarification, operations, etc.)

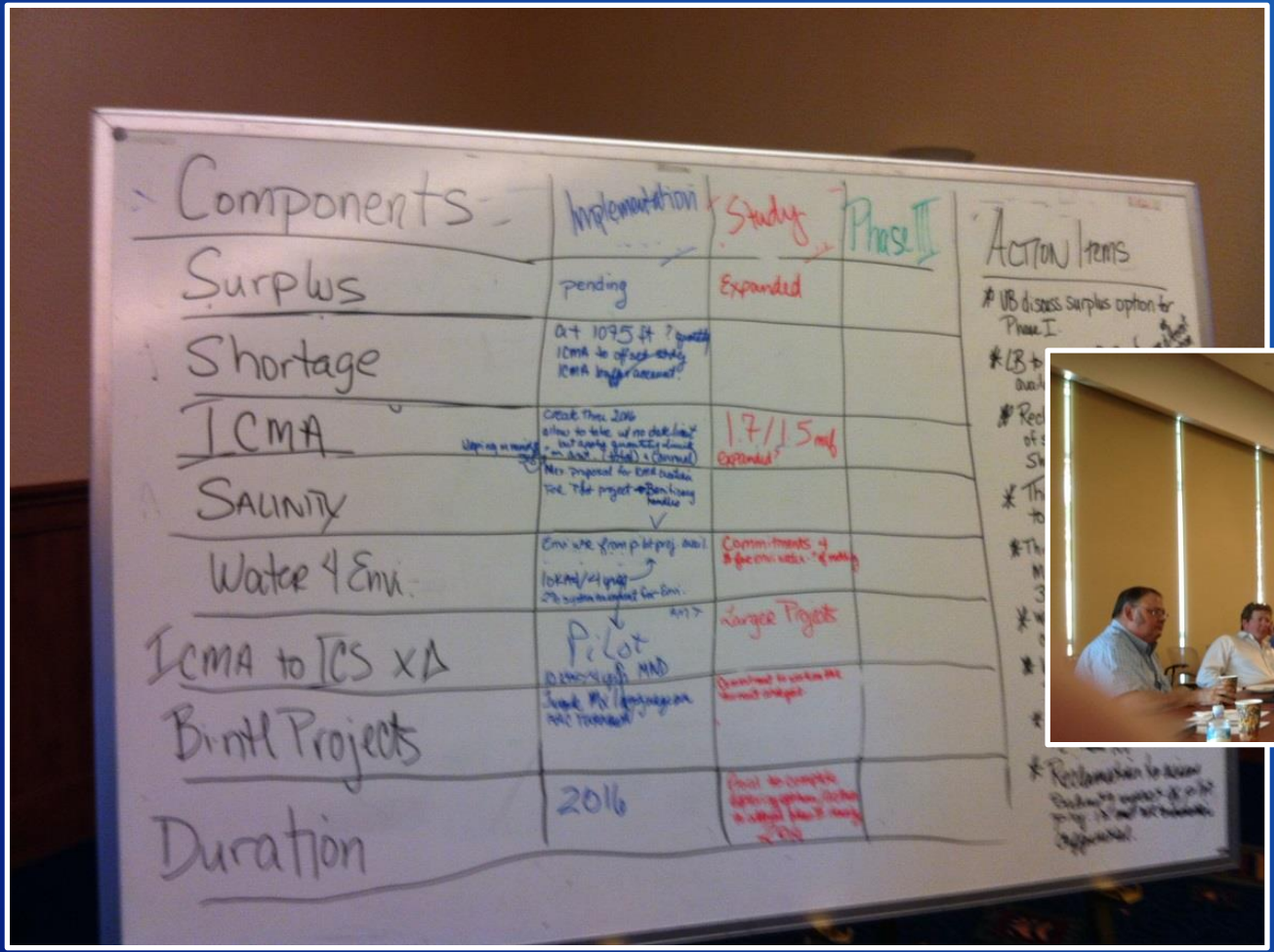
RECLAMATION

Expected/Upcoming meetings

- February 19 – U.S.-only Minute 32X Brainstorming Meeting, SNWA
- February 27 – Binational Basin Conditions and Hydrology Team Meeting, Tijuana
- March 23 to 25 – Science Team Conference, Mexicali
- May 12 or 14 – Binational Stakeholders Meeting (Principal Level), San Diego or Tijuana

RECLAMATION

Group Discussion on Goals/Approach/Next Steps re: 32X



RECLAMATION

Agenda

February 17-19, 2015
Diamond Valley Lake, Hemet, CA

Work Group 1:00 pm start (2/17)

1) Welcome/Introductions

2) Reclamation
   a) Leadership/positions
   b) Paradox
      i) Operations Update
      ii) EIS/Alternatives Study
         (1) Terry Stroh replacement
         (2) MASIP CRB
         (3) Evaporation Pond CRB
         (4) 2nd Well CRB
         (5) RFI from Industry
         (6) Delegation of Authority for EIS
      iii) Contingency Plan
      iv) Budgeting for implementation of preferred alternative
      v) Model Runs for Paradox Briefing Document
      vi) Dolores River salt pickup calculation (regression model)
   c) Financial Update/Report on Basin Funds
      i) Targets for EOY LBDF
      ii) Program Financial Status
      iii) Congressional Funding Requests
      iv) SIR available Funds
   d) FOA
      i) Schedule for Solicitation
      ii) Anticipated dates of ARC
      iii) Comments on 2015 Solicitation
   e) Acquisitions, Report on Progress, Process improvements

3) NRCS
   a) RCPP Awards and Impacts
   b) Discuss improvements to FAR
   c) Format changes for M&E Reports
   d) Other

Work Group 8:30 am start (2/18)

1) BLM
   a) Accounting for BLM Salinity Efforts
   b) Follow up on BLM efforts to procure a line item Salinity Control Program Authorization

2) Economic Damages
   a) Report from Sub-Committee
   b) Presentation on model changes updates
   c) Review Sub-Committee tasks scope

3) Hoover Power Analysis

4) Forum Brochures

5) Forum Policies Review

6) FWS
   a) Discussion of depletion charges from FAR report, net accounting

7) Upper Basin Benefits
   a) Collection of edits/follow up on assignments
   b) Steps to Finalize Document

8) System Conservation Pilot Projects

9) 2017 Triennial Review
   a) Schedule
   b) Request for new Map and accompanying section (addition to damages discussion)
   c) Modeling effort for next review

10) Input on From WG on next Salinity 101 topic
   a) Program Ceiling
   b) More in Depth discussion on the Program Funding
   c) Role of FWS, EPA, BLM

11) Next Meeting(s)
   a) May 18-19, Salt Lake City, (In Conjunction with Forum Meeting)
   b) July 8-10, Salt Lake City
   c) September 14-16, ????

Tour 12:00 pm start (2/18)

Lunch provided by MWD at DVL training Facility

Starting Feb 18 around noon, there will be a tour of Eastern MWD's facilities.
We are coordinating with Jolene Walsh of EMWD. Jolene will provide an itinerary.
The purpose of this tour is to provide EMWD an opportunity to explain their system constraints and how higher saline water affects their recycle operations, in addition how it may impact groundwater recharge and sewage treatment plant releases.

TAG 8:00 am start (2/19)

1. Welcome/Introductions – If needed

2. Funding Recommendations LCRBDF

3. SIR Proposals
   a. Presentation/Overview
   b. Discussions/Questions
   c. Funding Recommendations
   d. Report/Summary on studies completed in previous year.

Adjourn 12:30 pm

RECLAMATION

Managing Water in the West

Paradox Briefing Documents

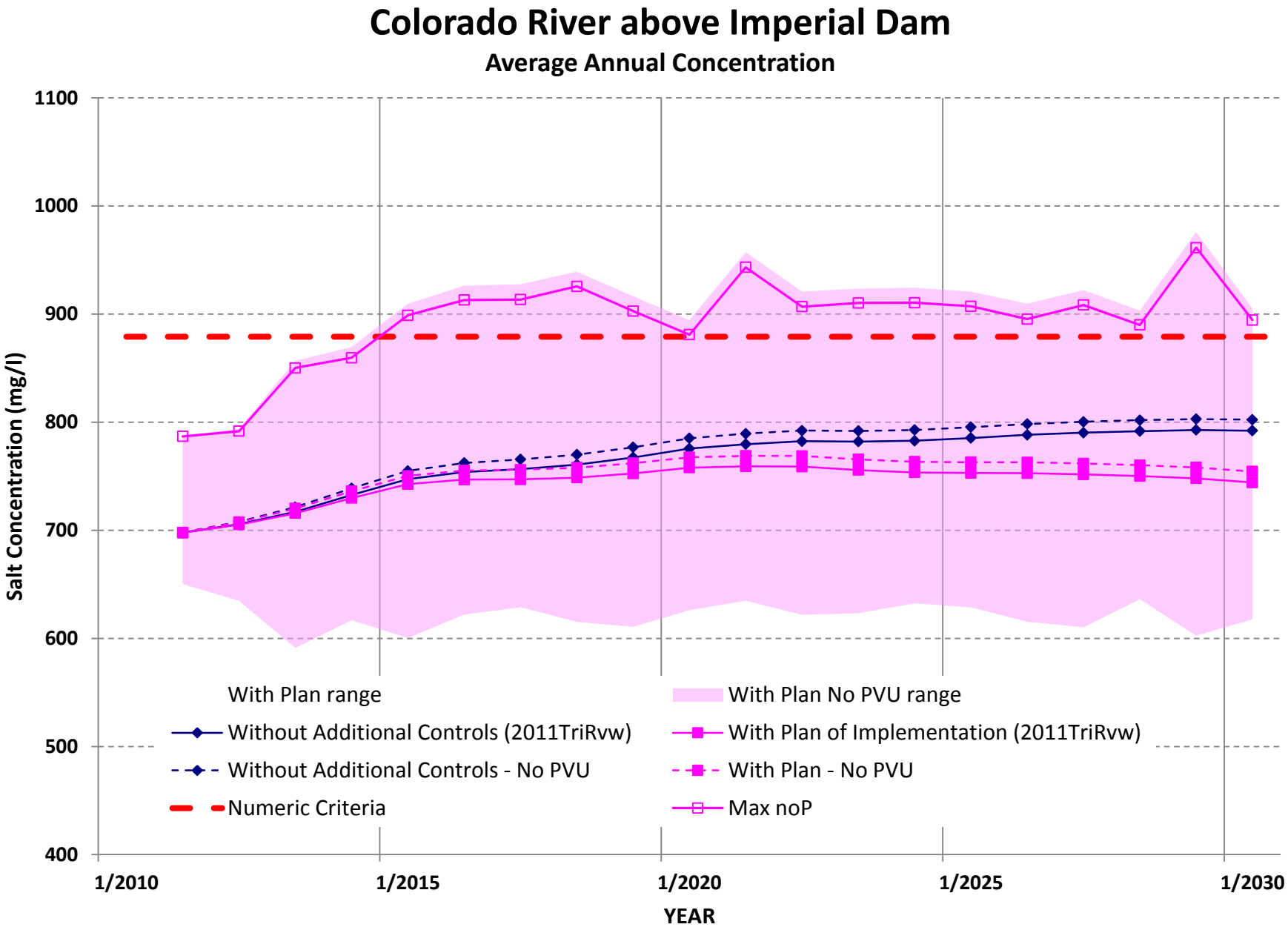
Salinity Control Workgroup
Hemet, CA
February 18, 2015

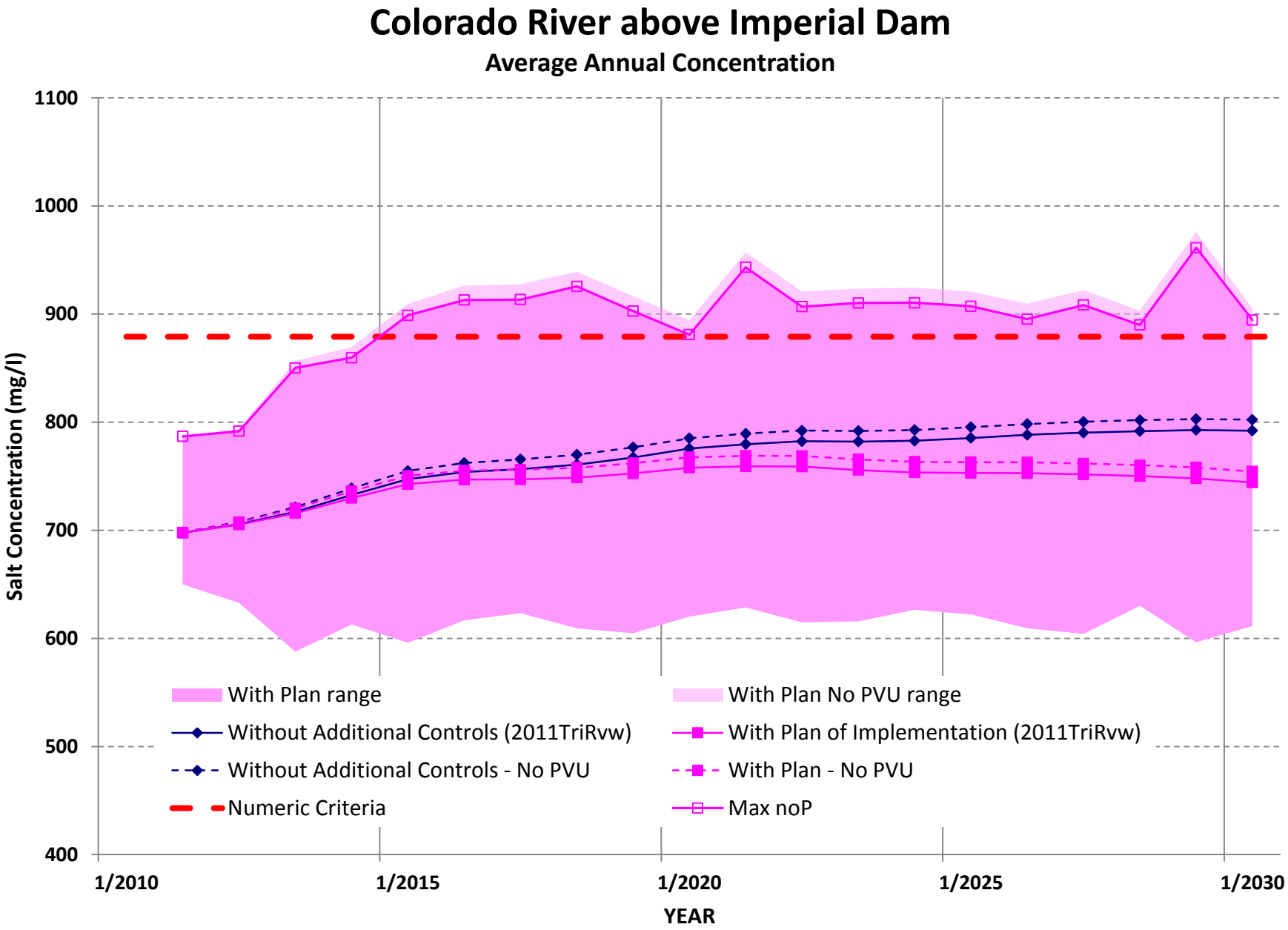
U.S. Department of the Interior
Bureau of Reclamation

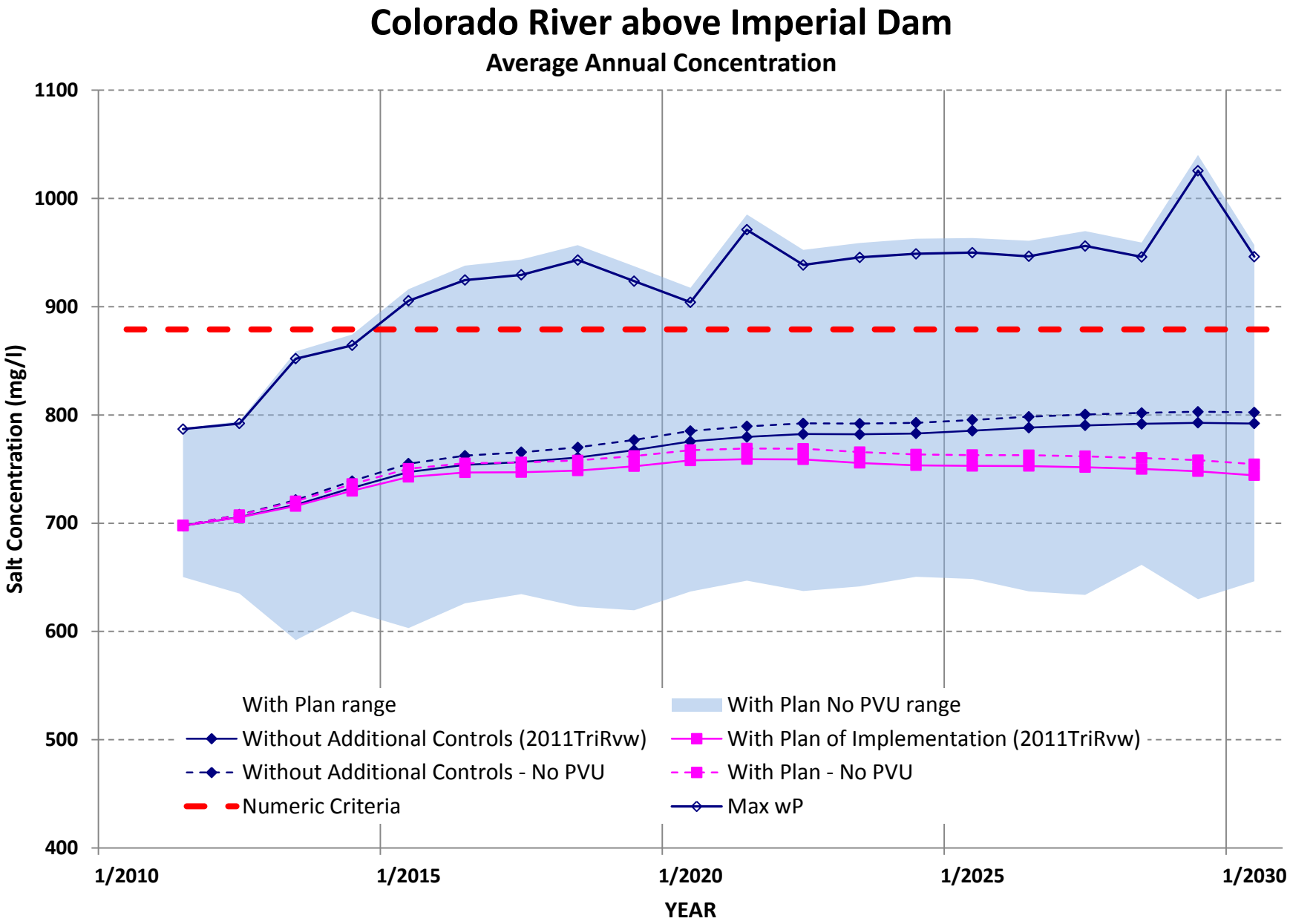
Paradox Briefing

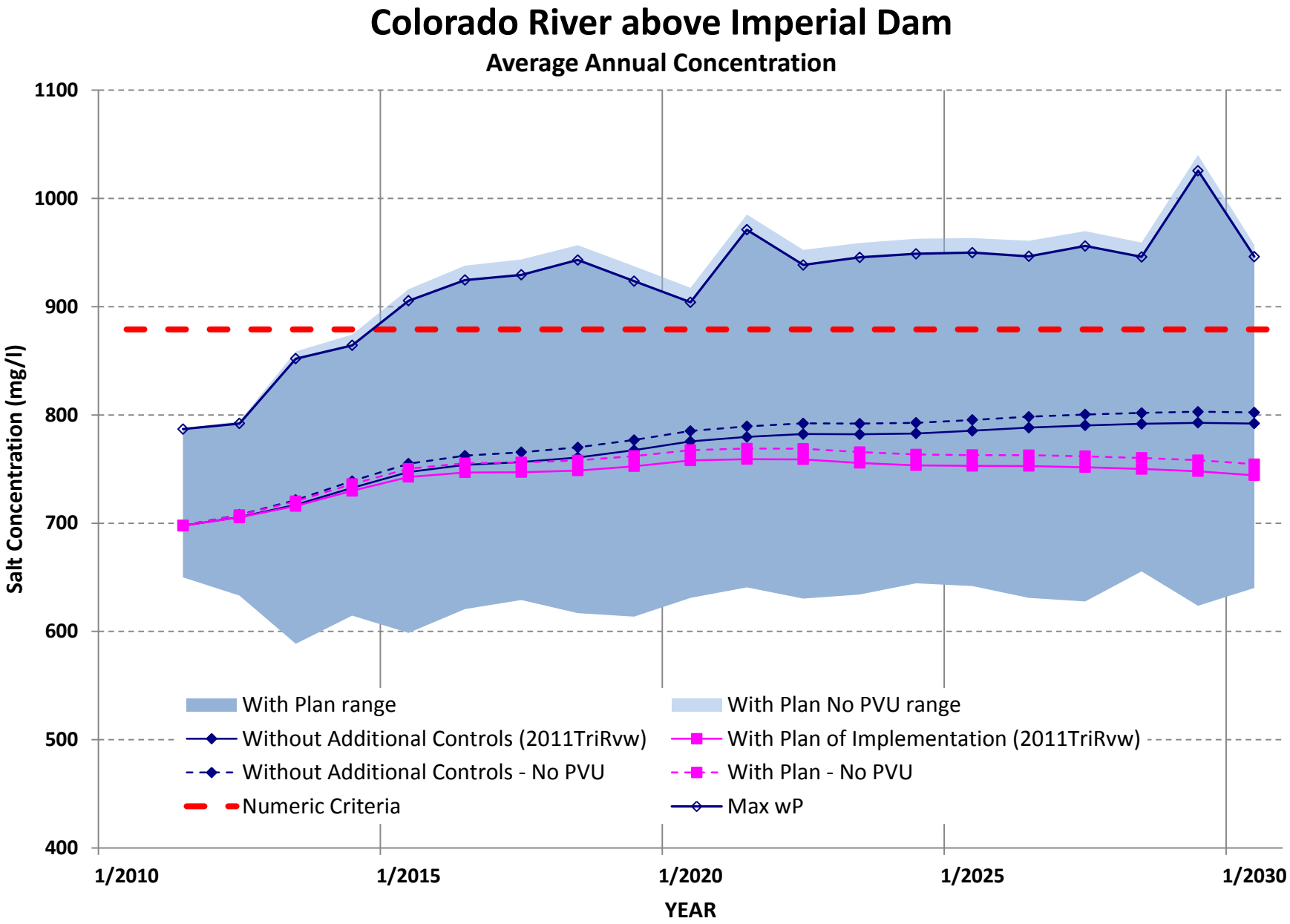
- **Failure of the existing PVU is projected to increase salinity levels in the Colorado River by 9-10 mg/L at Hoover Dam.**
  - 2011 Triennial Review Model found by 2030 salinity would increase by 9-10 mg/L at all three numeric criteria sites in the lower Colorado River and with or without the plan of implementation.
- Impact during a severe drought and looking at a “worst case” scenario
  - 2011 Triennial Review Model found by 2030 salinity would increase by 15.2 mg/L above the maximum annual salinity concentration.
  - Trace 81 1986-2005 hydrology

RECLAMATION


Colorado River above Imperial Dam
Average Annual Concentration
Salt Concentration (mg/l)
1100
1000
900
800
700
600
500
400
1/2010
1/2015
1/2020
1/2025
1/2030
YEAR
With Plan range
With Plan No PVU range
Without Additional Controls (2011TriRvw)
With Plan of Implementation (2011TriRvw)
Without Additional Controls - No PVU
With Plan - No PVU
Numeric Criteria
Max noP

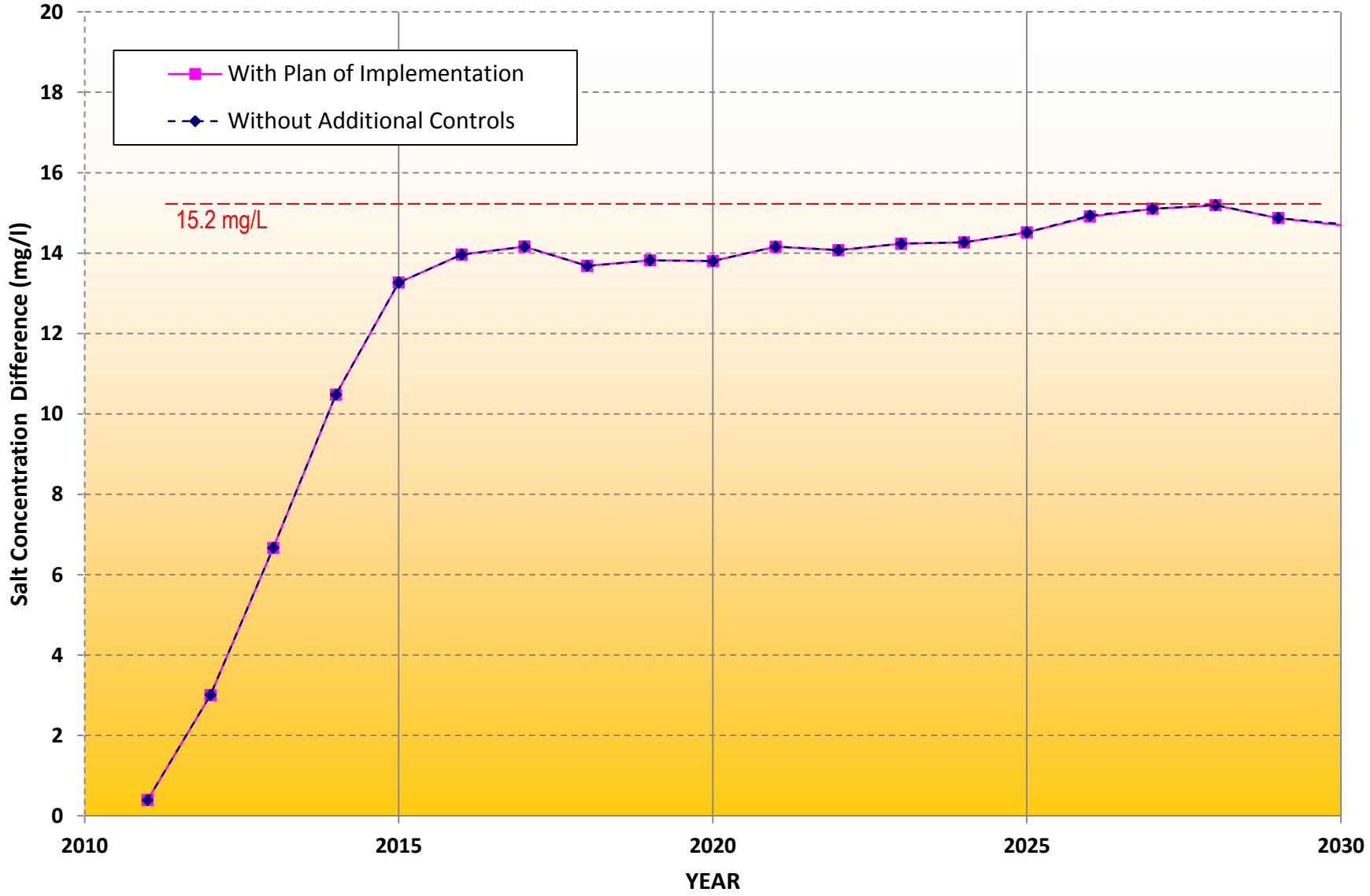

Colorado River above Imperial Dam
Average Annual Concentration
Salt Concentration (mg/l)
1100
1000
900
800
700
600
500
400
1/2010
1/2015
1/2020
1/2025
1/2030
YEAR
With Plan range
With Plan No PVU range
Without Additional Controls (2011TriRvw)
With Plan of Implementation (2011TriRvw)
Without Additional Controls - No PVU
With Plan - No PVU
Numeric Criteria
Max noP


Colorado River above Imperial Dam
Average Annual Concentration
Salt Concentration (mg/l)
1100
1000
900
800
700
600
500
400
1/2010
1/2015
1/2020
1/2025
1/2030
YEAR
With Plan range
With Plan No PVU range
Without Additional Controls (2011TriRvw)
With Plan of Implementation (2011TriRvw)
Without Additional Controls - No PVU
With Plan - No PVU
Numeric Criteria
Max wP

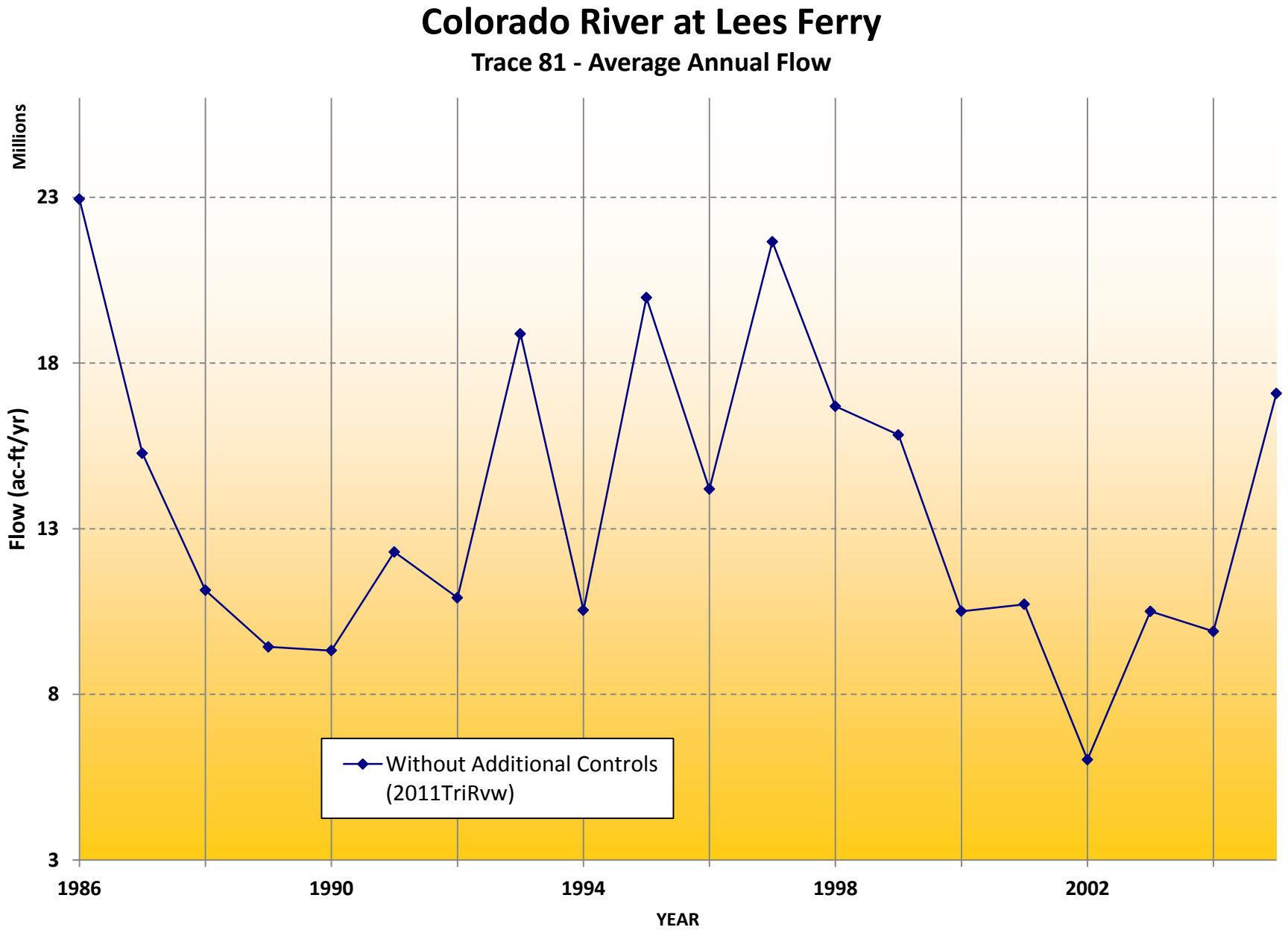

Colorado River above Imperial Dam
Average Annual Concentration
Salt Concentration (mg/l)
1100
1000
900
800
700
600
500
400
1/2010
1/2015
1/2020
1/2025
1/2030
YEAR
With Plan range
With Plan No PVU range
Without Additional Controls (2011TriRvw)
With Plan of Implementation (2011TriRvw)
Without Additional Controls - No PVU
With Plan - No PVU
Numeric Criteria
Max wP

Colorado River above Imperial Dam

Average Annual Concentration Difference



RECLAMATION


Colorado River at Lees Ferry
Trace 81 - Average Annual Flow
Millions
Flow (ac-ft/yr)
23
18
13
8
3
1986
1990
1994
1998
2002
YEAR
Without Additional Controls (2011TriRvw)

RECLAMATION

Managing Water in the West

Roadmap for a Second Injection Well Alternative

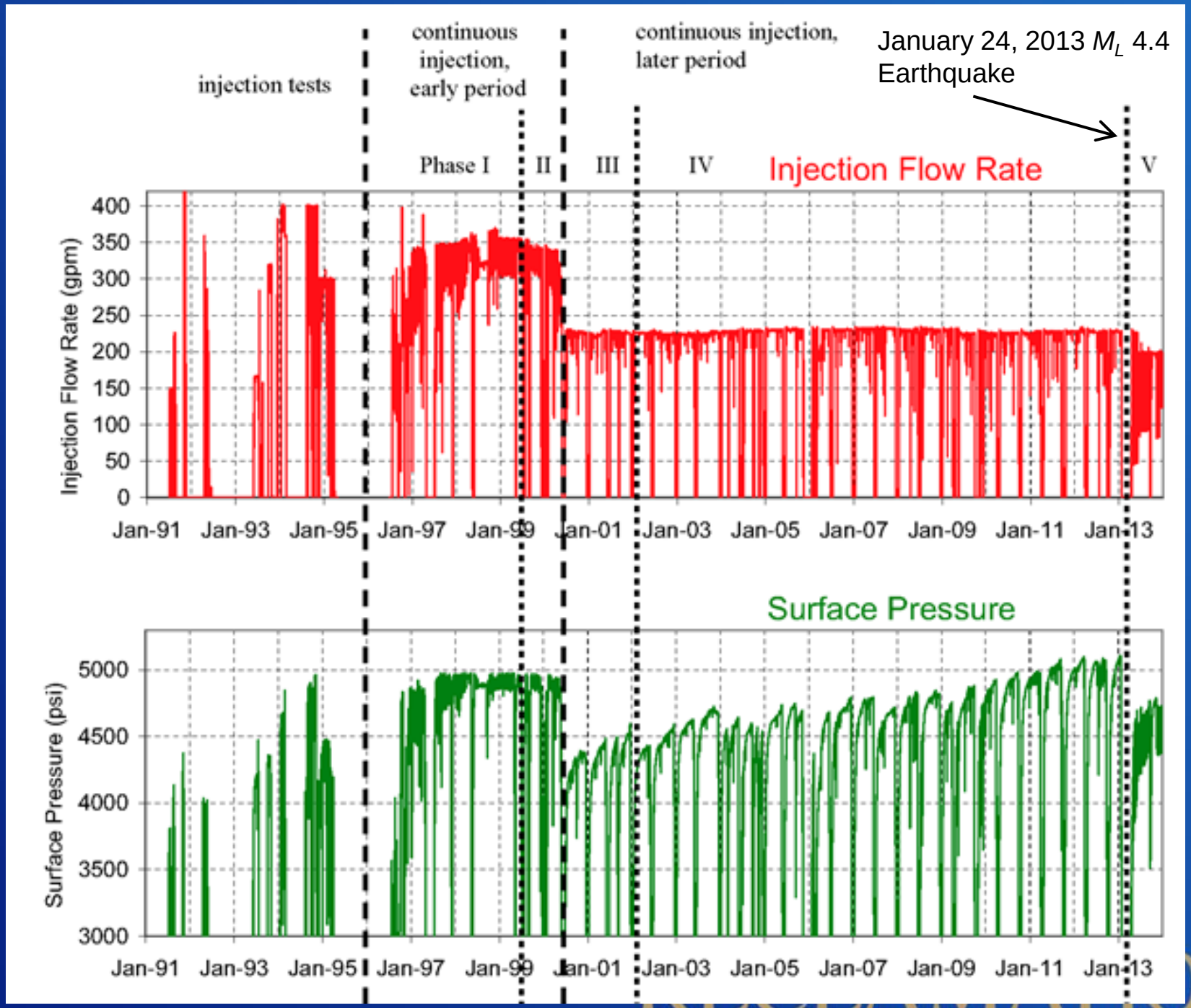
Paradox Valley Unit, Colorado

U.S. Department of the Interior
Bureau of Reclamation

Need for Alternative

- Until 2013, maximum wellhead pressures were trending upwards each year, and threatened to exceed the MASIP within a few years.
- After the January 24, 2013 M_L 4.4 induced earthquake, the average injection rate was reduced, and the shut-in schedule was modified in an effort to reduce the trend of increasing wellhead pressures.

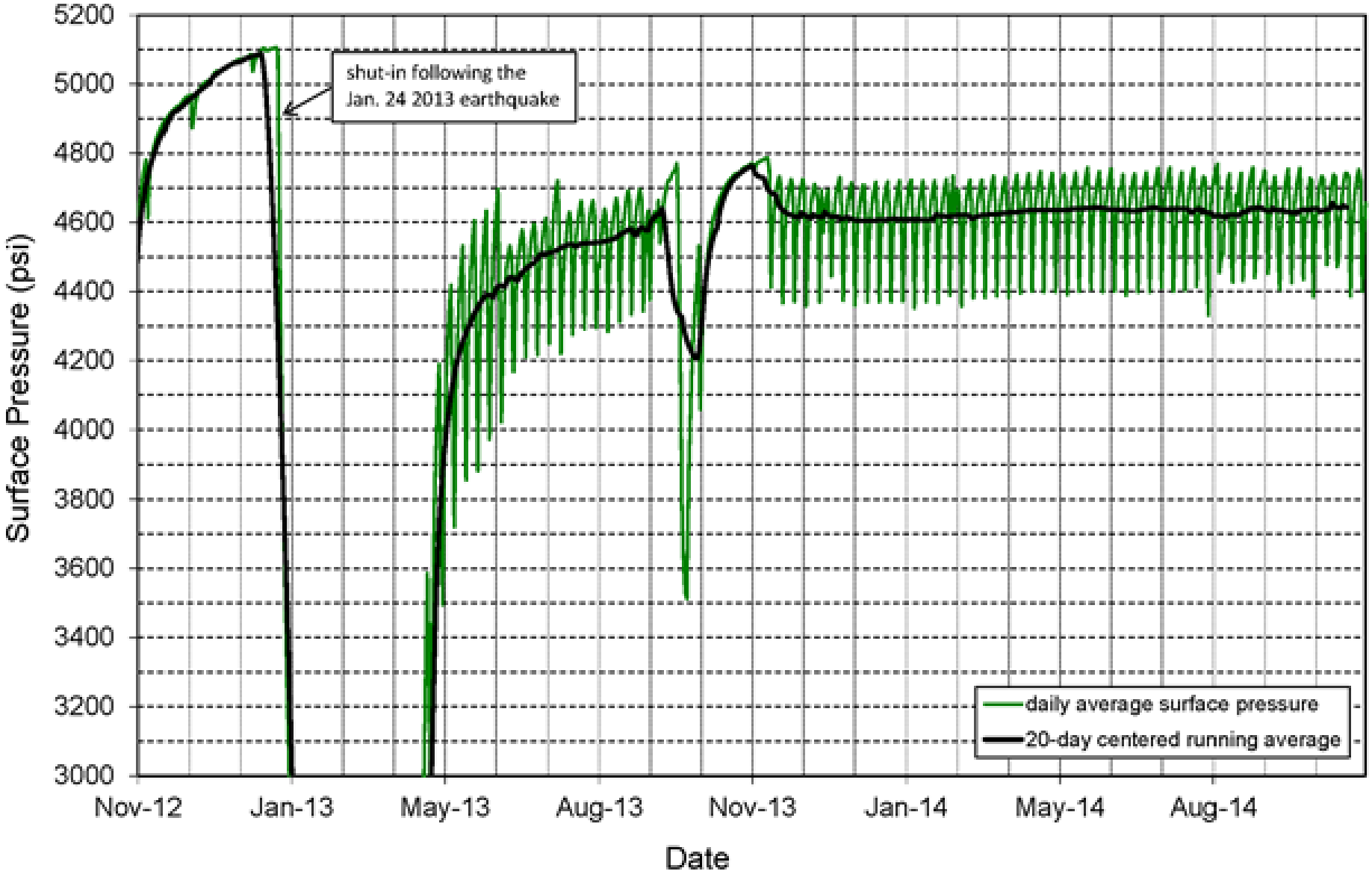
RECLAMATION


injection tests
continuous injection, early period
continuous injection, later period
January 24, 2013 M_L 4.4 Earthquake
Phase I
II
III
IV
V
Injection Flow Rate
Injection Flow Rate (gpm)
400
350
300
250
200
150
100
50
0
Jan-91
Jan-93
Jan-95
Jan-97
Jan-99
Jan-01
Jan-03
Jan-05
Jan-07
Jan-09
Jan-11
Jan-13
Surface Pressure
Surface Pressure (psi)
5000
4500
4000
3500
3000

Post-earthquake, Conditions Have Changed

- Operational changes made after the 2013 earthquake have changed the pre-earthquake situation:
  - Average pressures, and the trend of increasing pressures, have been reduced.
  - Seismicity rates have decreased.
  - However, less salt is being disposed each year of because of the injection rate reduction.
- The timeline for bringing an alternative online has been extended by at least several years because of the operational changes made in 2013.
- The need for an alternative remains:
  - Pressures will continue to rise, although more slowly than before, and eventually may reach the levels seen before 2013.
  - Project is less efficient than before, and annual benefits are reduced because the well disposes of less brine each year.
  - Project remains vulnerable to single points of failure (e.g. increasing pressure trend due to reservoir changes, casing deformation, infill, etc.).

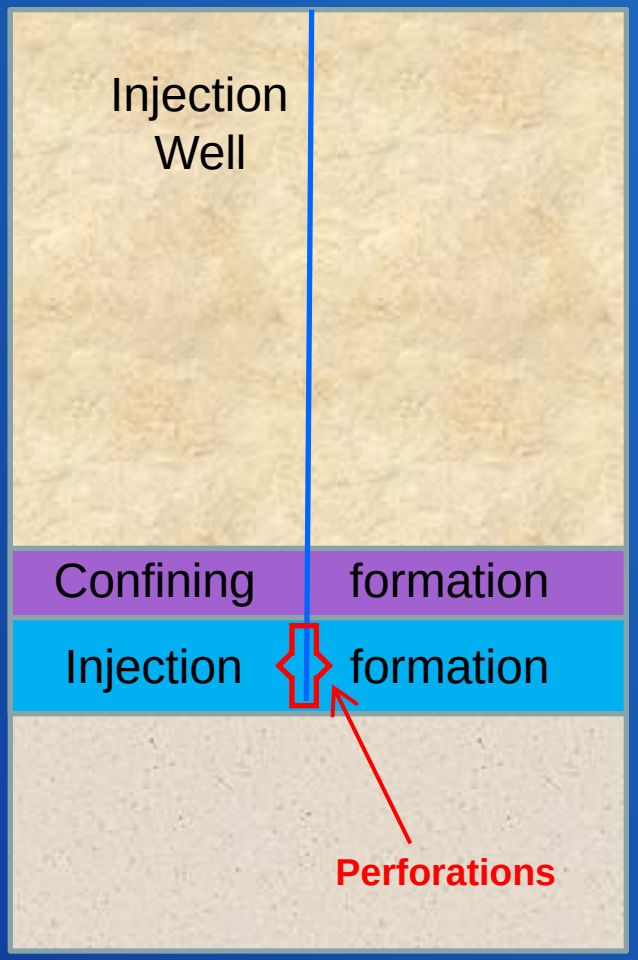
RECLAMATION



RECLAMATION

What's Needed to Site a Second Well?

- Detailed subsurface geologic model, including formation properties
  - Some data are available only from a nearby exploratory or wildcat well
- Minimize impacts
  - Hazards from induced earthquakes
  - NEPA compliance
  - EPA permit
- Feasible and cost-effective to construct, operate, and maintain



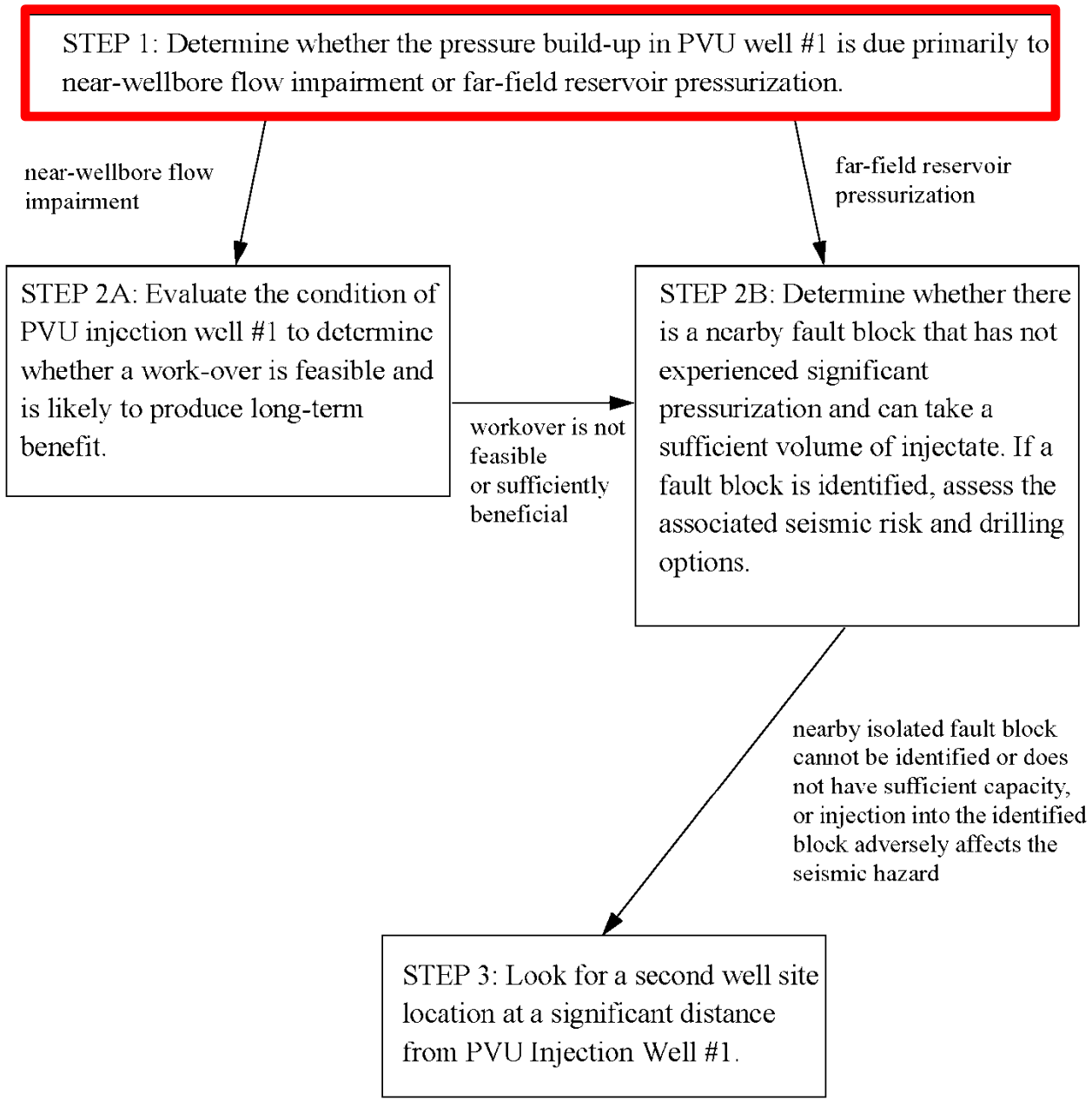
RECLAMATION

Prior Work on Second Well Alternative

Review of previous studies and second well site recommendations	2012
SECOND WELL SITE CRB MEETING #1	Dec. 2012
Changes to injection operations in response to M_L 4.4 earthquake	Jan. 2013
Development of initial roadmap and flowchart	2013

RECLAMATION

Second Well Site Investigation Flowchart



RECLAMATION

STEP1: Determine if pressure build-up is due to near-wellbore flow impairment or far-field reservoir pressurization

- Modeling of injection pressure-flow data
- Analyses of seismicity data

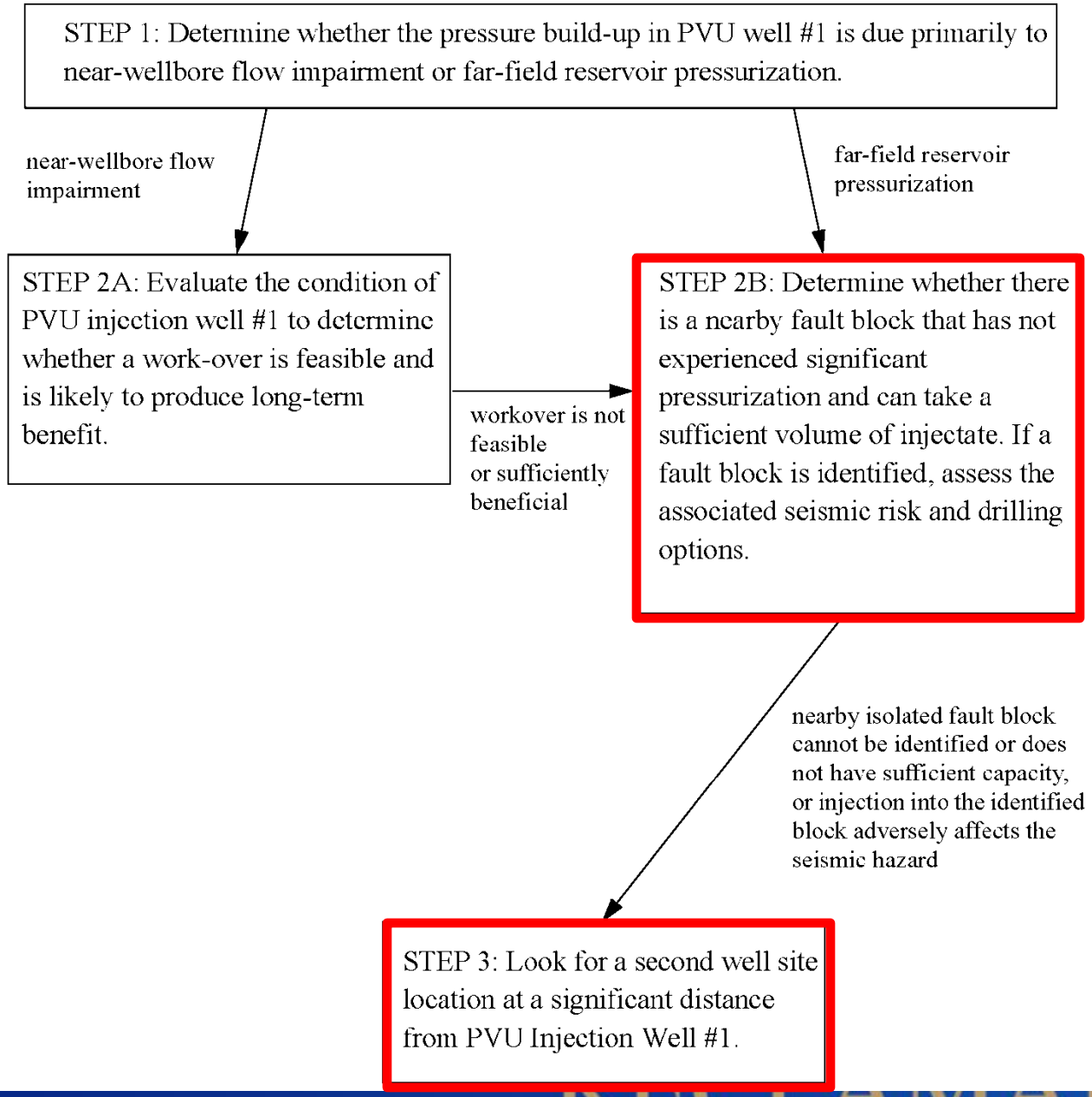
CONCLUSIONS:

- Pressure build-up is due to reservoir pressurization at distances of several km from well.
- Work-over is not likely to produce significant benefits.
- Need to consider second well or other alternatives.

MILESTONE: Conclusions affirmed by CRB in Jan 2015

RECLAMATION

Second Well Site Investigation Flowchart



RECLAMATION

STEPS 2B & 3: Investigate nearby & more distant potential second well site locations

1. Develop subsurface geologic model:
   - Seismic reflection data (existing & new).
   - Well logs.
   - Induced seismicity.
   - Gravity and magnetic data (existing & new).
   - Satellite radar data (INSAR analysis).
   - Eventually, will need nearby wildcat or exploratory well.

RECLAMATION

STEPS 2B & 3: Investigate nearby and more distant potential second well site locations

2. Evaluate suitability and feasibility of potential well sites:

- Reservoir size.
- Seismic hazard.
- Distance from extraction well field.
- Elevation and accessibility.
- Preliminary infrastructure assessment.
- Preliminary drilling assessment.

Progress to Date

- Subsurface geologic model updated using high-resolution earthquake locations.
- Additional seismic reflection data licensed and reprocessed.
- Existing gravity and magnetic data obtained and processed.
- Regional well log database updated.
- Analysis of maximum earthquake magnitude and seismic hazard factors.
- Analysis of relation between seismicity and injection operations.

RECLAMATION

STEPS 2B & 3: Investigate nearby and more distant potential second well site locations

MILESTONES:

- Preliminary drilling design and feasibility — Sept. 2015
- Preliminary update of geologic model (workshop) — Dec. 2015
- Final geologic model (workshop) — Sept. 2016
- Site selection and ranking — Oct. 2016

- SECOND WELL SITE CRB MEETING #2 — Dec. 2016

RECLAMATION

Final Steps:

- Exploratory well final design — Mar. 2017
- Exploratory well drilling and logging — June 2018
- Final site assessment — Sept. 2018
- Production well initial design — Dec. 2018
- SECOND WELL SITE CRB MEETING #3 — Mar. 2019

- Production well final design
- Production well drilling and completion
- Construction of surface facilities
- Production well testing and permitting

RECLAMATION

RECLAMATION

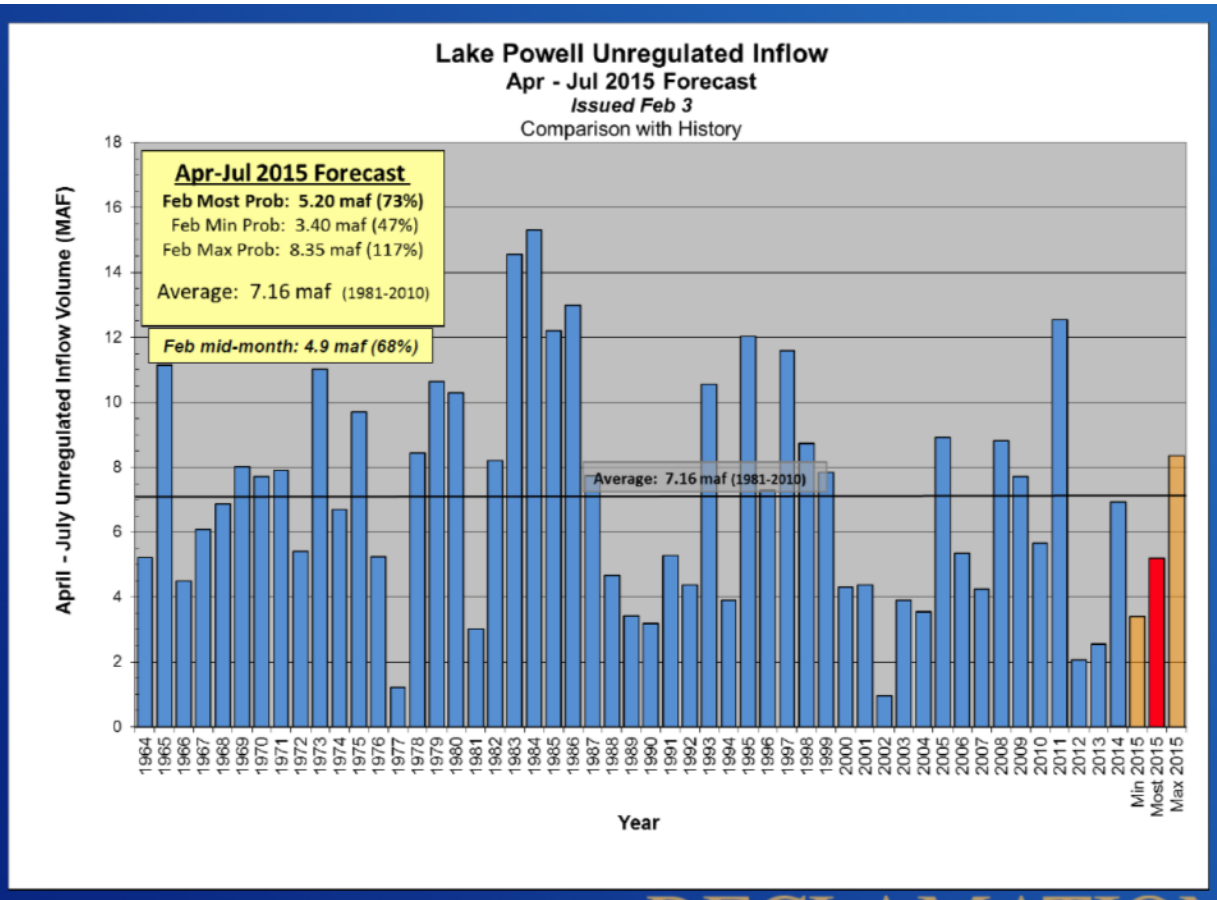
Managing Water in the West

Basin Hydrology, Operations and 2016 Hydrograph

Adaptive Management Work Group

February 25-5, 2015

U.S. Department of the Interior
Bureau of Reclamation



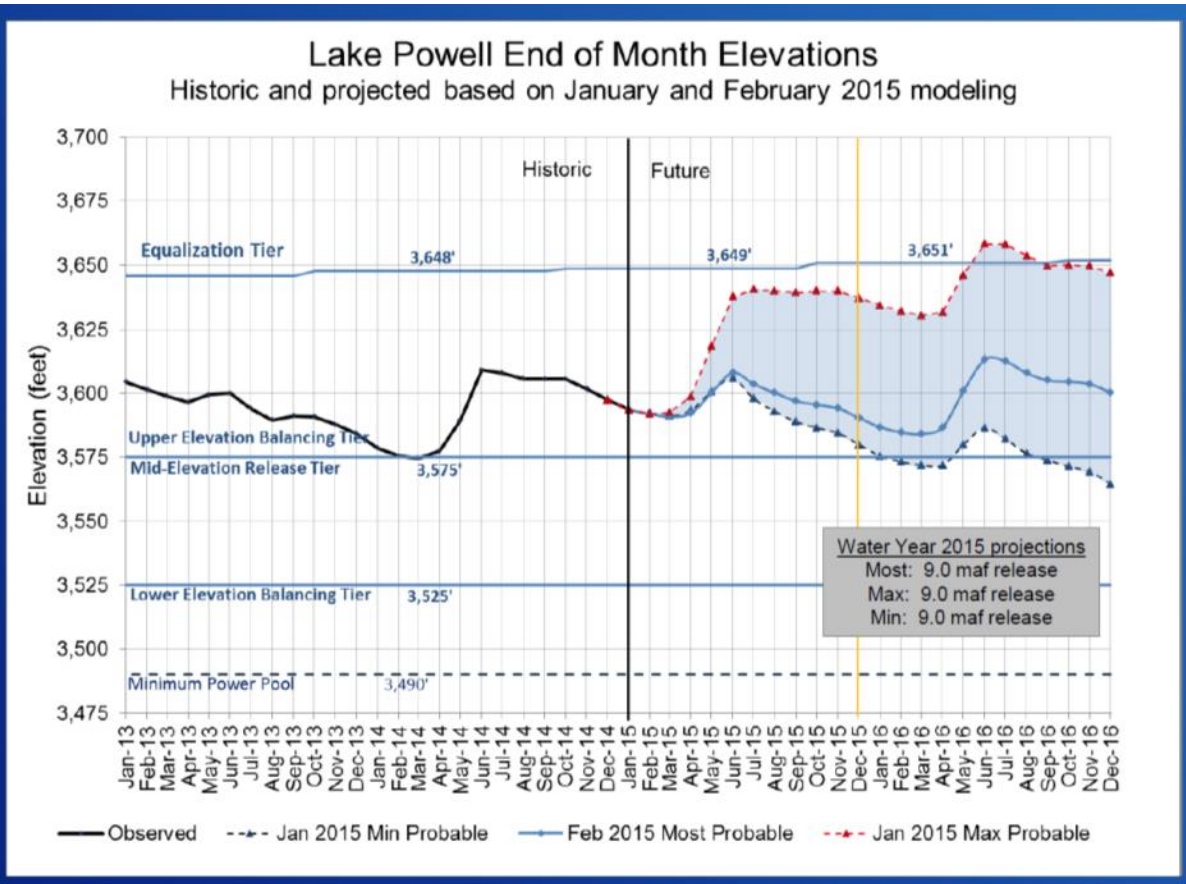
RECLAMATION

Lake Powell 2015 Operating Tier
Upper Elevation Balancing

- Tier was set in August 2014
- Start with 8.23 maf release
- Use April 24-Month Study projections of end of water year storage to potentially adjust
- Balancing: 8.23 - 9.0 maf
- Equalization: > 8.23 maf

Lake Powell		
Elevation (feet)	Operation According to the Interim Guidelines	Live Storage (maf)[1]
3,700	**Equalization Tier** Equalize, avoid spills or release 8.23 maf	24.3
3,636 - 3,696 (2008-2026)	**Upper Elevation Balancing Tier**[3] Release 8.23 maf; if Lake Mead < 1,075 feet, balance contents with a min/max release of 7.0 and 9.0 maf	16.5 - 19.3 (2008-2026)
3,675	**Mid-Elevation Release Tier** Release 7.48 maf; if Lake Mead < 1,025 feet, release 8.23 maf	9.6
3,525	**Lower Elevation Balancing Tier** Balance contents with a min/max release of 7.0 and 9.5 maf	5.9
3,490		4.0
3,370		0

RECLAMATION



RECLAMATION

2016 Projected Annual Release

(Based on January and February 2015 modeling)

- **Min probable**: 8.23 maf release

  (increasing likelihood with decreasing hydrology)

- **Most probable**: 9.0 maf release

  (Upper Elevation Balancing, between 8.23 and 9.0 maf)

- **Max probable**: ~11.7 maf release

  (with April adjustment to equalization)

RECLAMATION

Alternatives Analyzed in LTEMP EIS

- Alternative A: No-Action Alternative
- Alternative B: Balanced Resource Alternative
- Alternative C: Condition-Dependent Adaptive Strategy
- Alternative D: Hybrid Alternative
- Alternative E: Resource-Targeted Condition-Dependent Alternative
- Alternative F: Seasonally Adjusted Steady Flow Alternative
- Alternative G: Year-Round Steady Flow Alternative

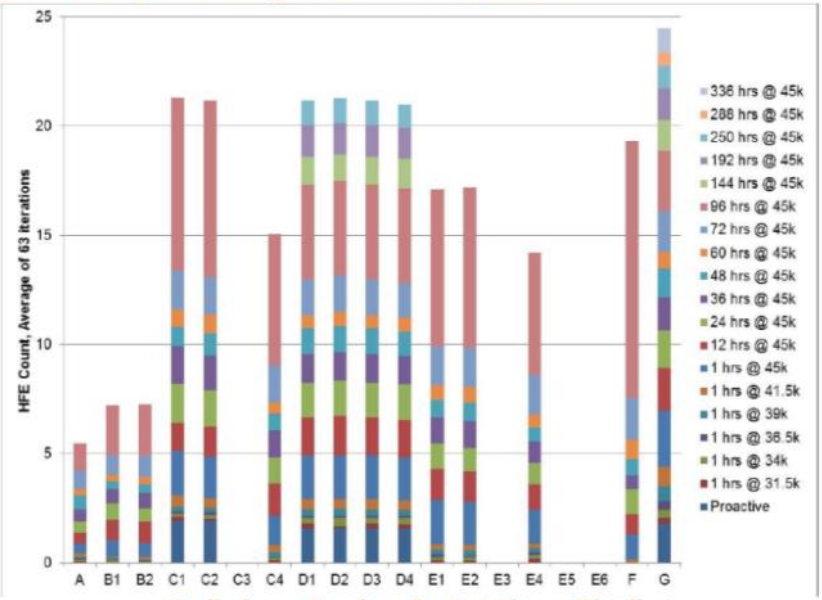
Glen Canyon Dam
Long-Term Experimental and Management Plan EIS

Alternative Key (Handout)

LTEMP Alternative/Long Term Strategy Key

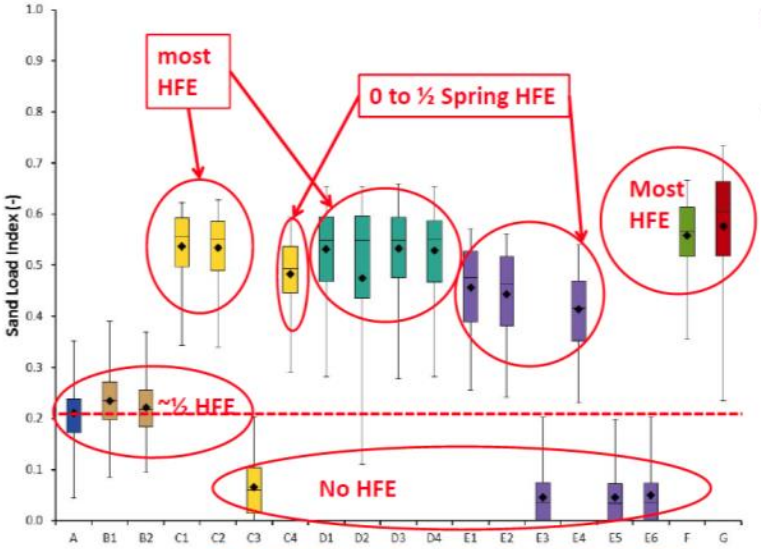
Characteristics of Alternative	A (No-Action)	B1	B2	C1	C2	C3	C4	D1	D2	D3	D4	E1	E2	E3	E4	E5	E6	F	G
Spring High Flow Experiments (SHFs)	until 2020	[illegible]	[illegible]	yes	yes	no	no	3 or less	3 or less	3 or less	3 or less	No second SHF in period	No second SHF in period	no	no	no	no	yes*	yes
Fall High Flow Experiments (HFEs)	until 2020			yes	yes	no	yes	yes	yes	yes	yes	yes	yes	no	yes	no	no	yes	yes
Spring Preactive HFE	no	no	no	yes, ≥ 10 kcaf years	yes, ≥ 10 kcaf years	no	no	yes, ≥ 10 kcaf years	yes, ≥ 10 kcaf years	yes, ≥ 10 kcaf years	yes, ≥ 10 kcaf years	no	no	no	no	no	no	no*	yes, ≥ 10 kcaf years
Extended Duration HFEs	no	no	no	yes, fixed volume	yes, fixed volume	no	yes, fixed volume	4 full to 250 hours	4 full to 250 hours	4 full to 250 hours	4 full to 250 hours	no	no	no	no	no	no	no	spring and fall to 250 hours
Low Fall Hydrology Completion	no	no	no	yes, before and after HFE	yes, before and after HFE	yes, before and after HFE	yes, before and after HFE	yes, before and after HFE	yes, before and after HFE	yes, before and after HFE	yes, before and after HFE	yes, before fall HFE	yes, before fall HFE	yes, before fall HFE	yes, before fall HFE	yes, before fall HFE	yes, before fall HFE	no	no
Low summer flows (LSFs)	no	no	no	no	yes	no	no	yes	yes, second SF years only	yes	no	no	yes	no	no	yes	no	no	no
Bug Flows	no	no	no	no	no	no	no	no	yes	no	no	no	no	no	no	no	no	no	no
Mechanical Trout removal	until 2020	yes	yes	no	no	yes	yes	triggered by HBC & trout #	triggered by HBC & trout #	triggered by HBC & trout #	triggered by HBC & trout #	no	no	yes	yes	no	no	no	yes
Trout Management Flows (TMFs)	Trout only	yes	yes	yes	no	no	no	yes	yes	no	yes	yes	no	no	no	no	yes	no	yes
Humpback Improvement Flows	no	no	yes	no	no	no	no	no	no	no	no	no	no	no	no	no	no	no	no
Daily Fluctuation Range Avg	MLFF	1.08% of MLFF	150% of MLFF	75% MLFF	75% MLFF	75% MLFF	75% MLFF	125% MLFF Sep-Dec/25% Jan-Aug	125% MLFF Sep-Dec/25% Jan-Aug	125% MLFF Sep-Dec/25% Jan-Aug	125% MLFF Sep-Dec/25% Jan-Aug	11.0% MLFF	11.0% MLFF	11.0% MLFF	11.0% MLFF	11.0% MLFF	11.0% MLFF	none	none
DHT Volumes	MLFF	same as MLFF	same as MLFF	90% MLFF	90% MLFF	90% MLFF	90% MLFF	same as MLFF	same as MLFF	same as MLFF	same as MLFF	same as MLFF	same as MLFF	same as MLFF	same as MLFF	same as MLFF	same as MLFF	75% MLFF	100% MLFF
Fall (Aug-Nov) monthly volumes	MLFF levels	same as MLFF	same as MLFF	77% of MLFF	77% of MLFF, 75% w/ GIF	77% of MLFF	77% of MLFF	90% of MLFF, 65% w/ GIF	90% of MLFF, 65% w/ GIF	90% of MLFF, 65% w/ GIF	90% of MLFF	95% of MLFF	95% of MLFF, 65% w/ GIF	95% of MLFF	95% of MLFF	95% of MLFF, 65% w/ GIF	95% of MLFF	75% of MLFF	100% of MLFF

HFE Count, average of all iterations



Preliminary Results—Do Not Cite or Distribute

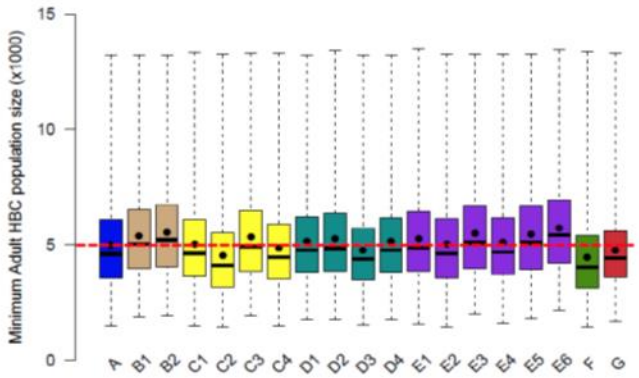
Sand Load Index



- More HFEs = higher SLI
- Alternative D in top tier, performs as well as C, better than E

Preliminary Results—Do Not Cite or Distribute

Lowest Adult HBC pop. (x1,000)

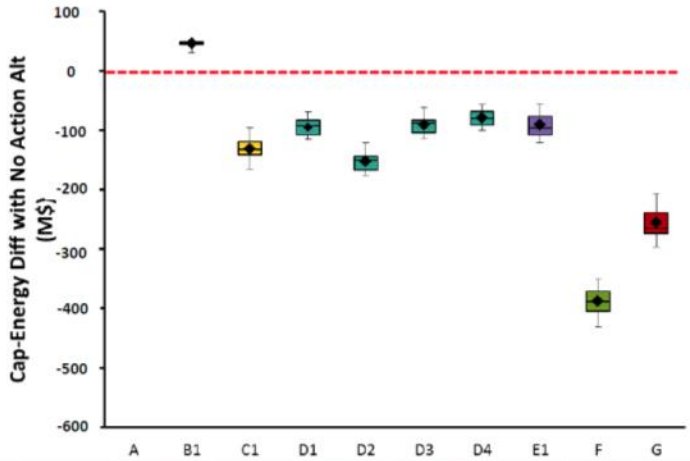


- Fewer outmigrants and warmer temperatures result in more chub
- Because of the effect on trout, number of chub increases with increasing fluctuations, fewer HFEs, and more TMFs
- D1, D2, D4, C1, C4, E1, E4 are comparable to A (No-Action)
- B1, B2, C3, E3, E5, and E6 have more than no-action (fewer HFEs)
- D3, C2, C4 have fewer than no-action (no TMFs)
- F, G have fewer than no-action (steadier flows)

Preliminary Results—Do Not Cite or Distribute

Glen Canyon Dam
Long-Term Experimental and Management Plan EIS

Difference in NPV From No Action (Cap & Energy) 20-yr study period; NGCT replacement



Alternative	A	B1	C1	D1	D2	D3	D4	E1	F	G
Mean (M$)	0.00	45.38	-131.44	-94.82	-152.78	-91.32	-79.81	-91.53	-387.85	-255.94
Value Rank	2	1	7	6	8	4	3	5	10	9

Summary of Overall Rate Impact Differences Among Alternatives

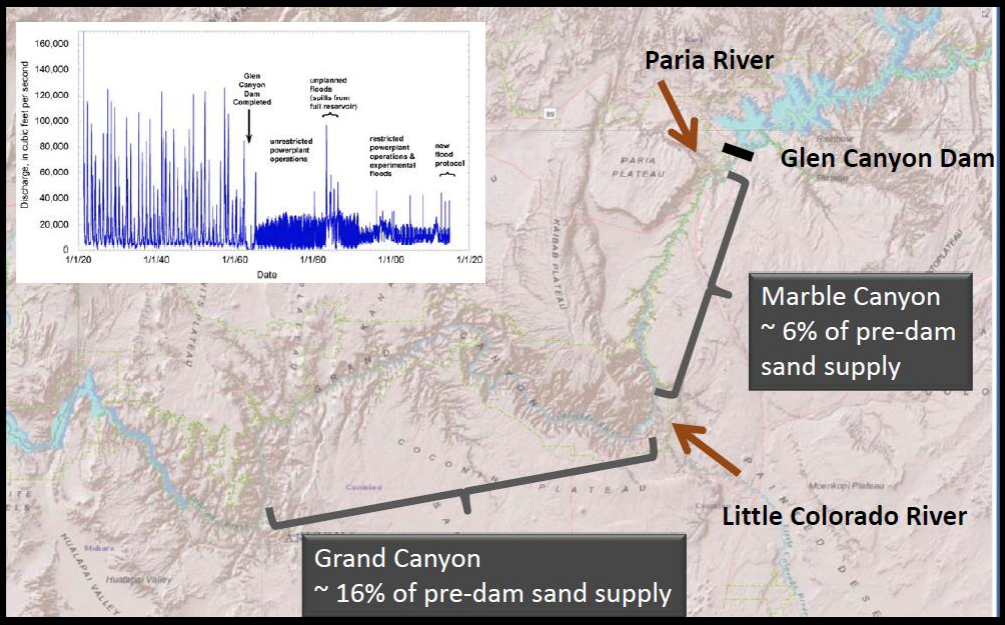
- The table below summarizes results of the various alternatives in terms of percent rate impacts to retail consumers across years and for the highest impact year. The second column demonstrates that on a weighted basis Alternative F leads to less than .6% retail rate increase. Alternatives E1 and D4 result in much smaller rate impacts. For the maximum impact year, the median increase is less than .7% in all cases and is .25% for Alternative E1.

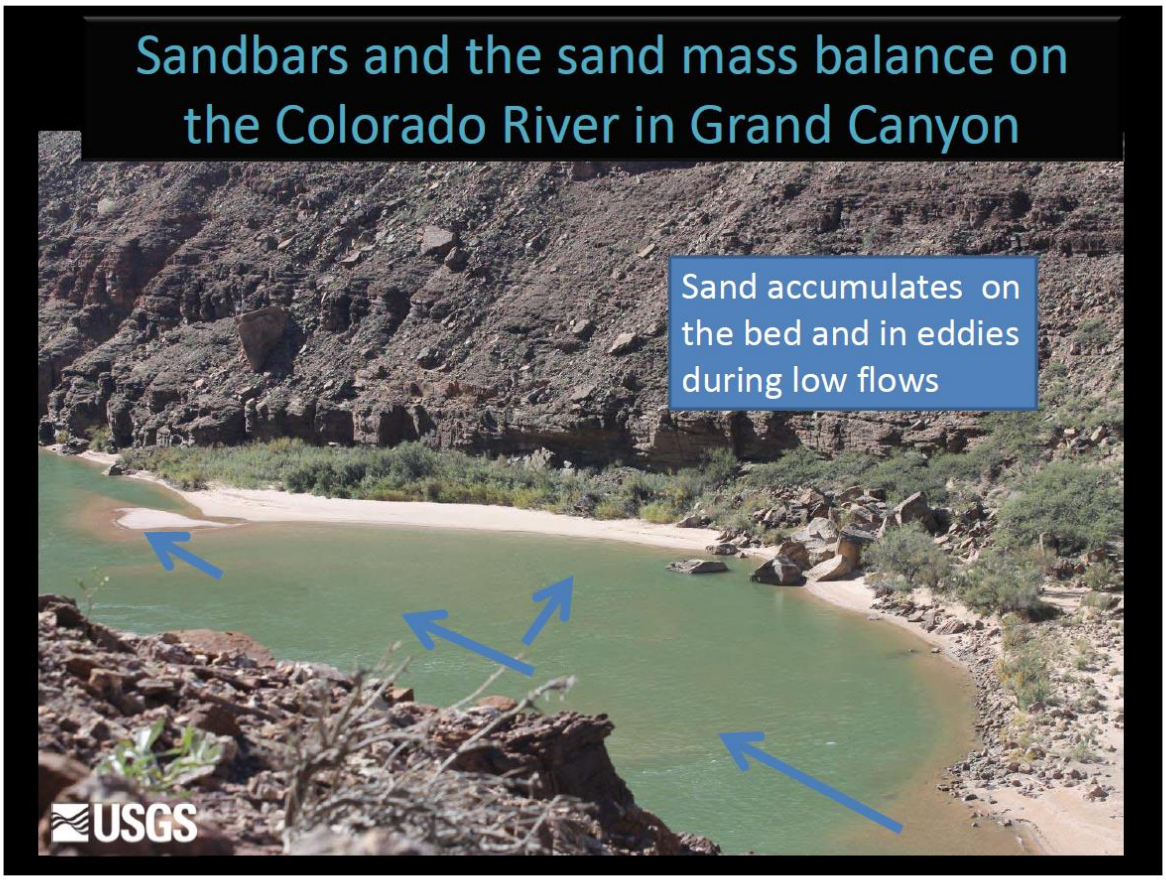
	Average Percent Rate Impact to All Retail Consumers Across Years	**Weighted Average Percent Rate Impact to All Retail Consumers (Adjusted Sales Basis) Across Years**	Weighted Average Percent Rate Impact to All Retail Consumers (Allocation Basis) Across Years	Maximum Average Percent Rate Impact to All Retail Consumers	Maximum Weighted Average Percent Rate Impact to All Retail Consumers (Adjusted Sales Basis)	50% Percentile Retail Percent Impact in High Impact Year	**50% Percentile Adjusted Sales Weighted Retail Percent Impact in High Impact Year**	50% Percentile Allocation Weighted Retail Percent Impact in High Impact Year
Alternative F	0.697%	**0.551%**	0.749%	1.135%	0.897%	0.714%	**0.699%**	0.942%
Alternative G	0.430%	**0.340%**	0.462%	0.684%	0.541%	0.430%	**0.421%**	0.567%
Alternative B1	-0.041%	**-0.033%**	-0.045%	0.023%	0.018%	-0.047%	**-0.047%**	-0.062%
Alternative C1	0.237%	**0.187%**	0.254%	0.509%	0.402%	0.320%	**0.314%**	0.422%
Alternative E1	0.120%	**0.095%**	0.129%	0.406%	0.321%	0.256%	**0.250%**	0.337%
Alternative D4	0.157%	**0.124%**	0.169%	0.580%	0.458%	0.365%	**0.357%**	0.481%

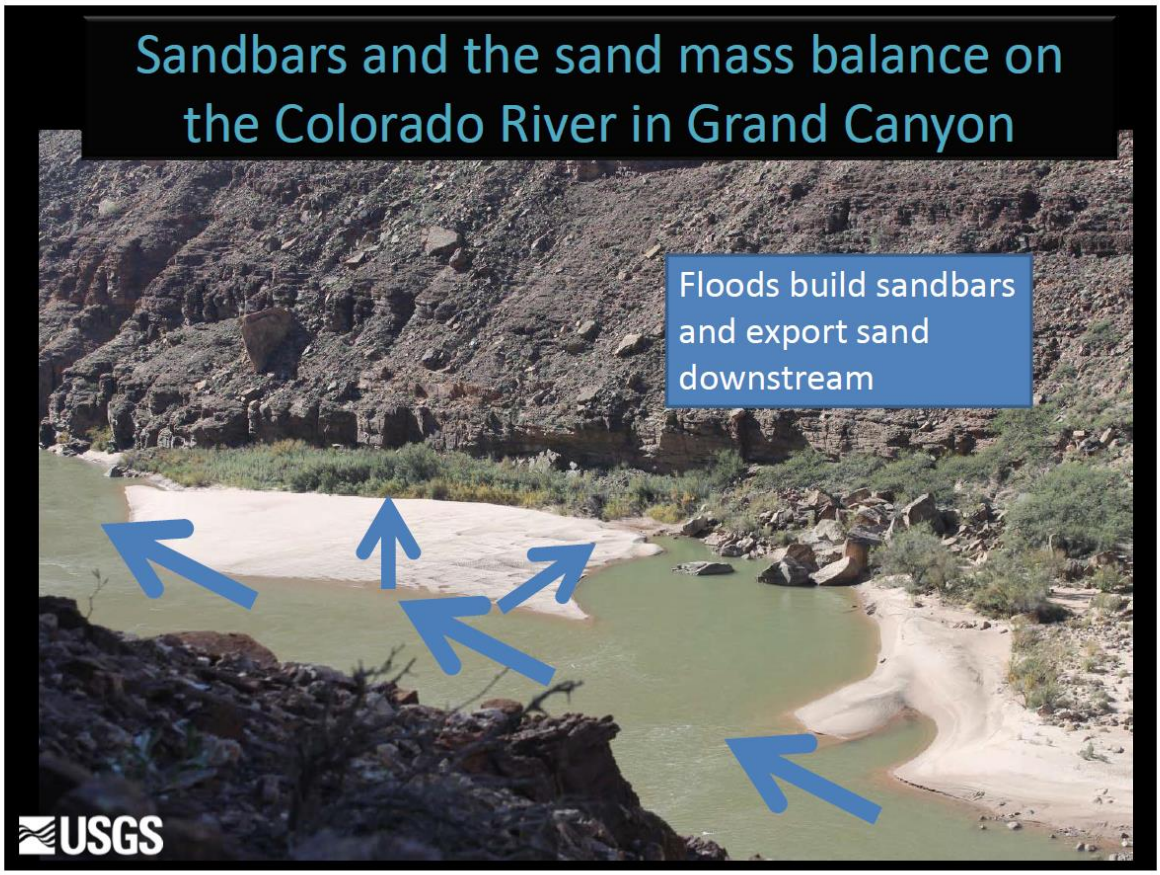
Sandbars and Sediment Storage in Marble and Grand Canyons: Response to Recent High-flow Experiments and Long-term Trends

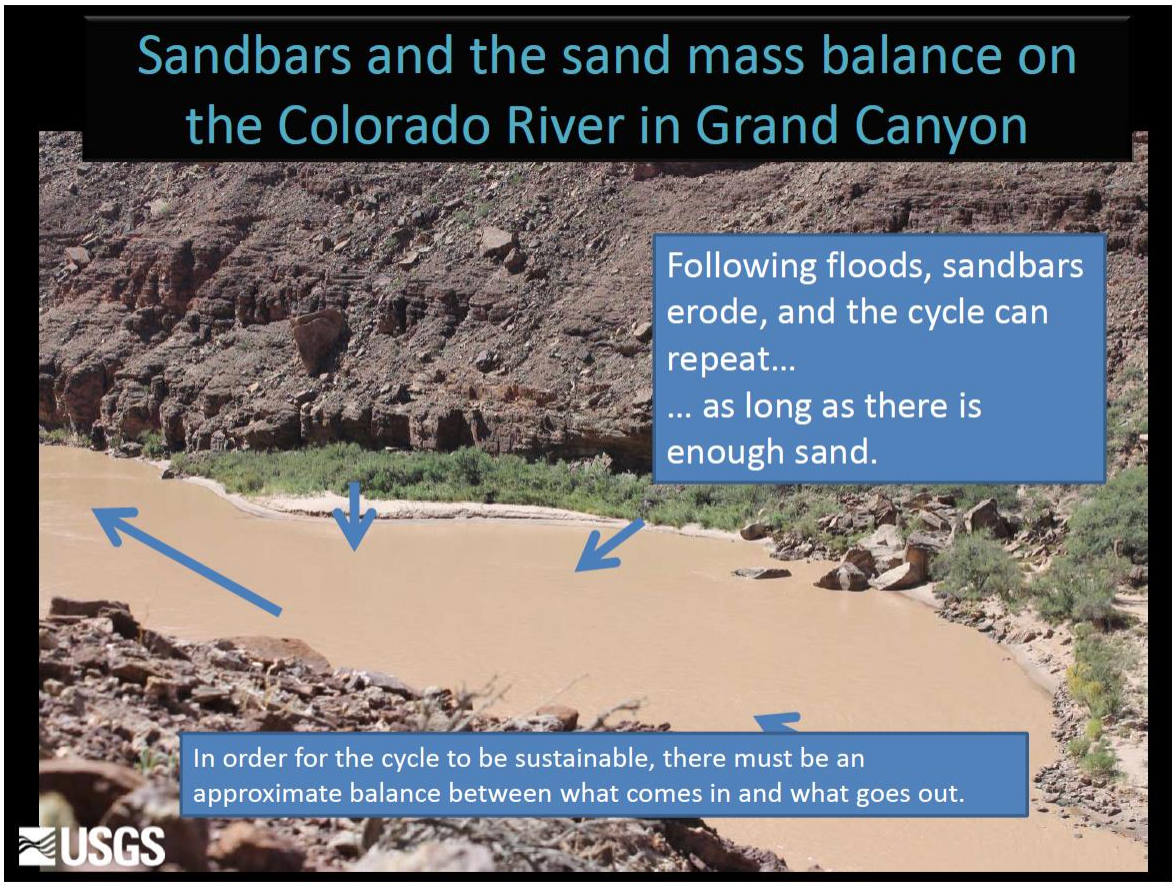
Paul Grams[1], Tim Andrews[1], Daniel Buscombe[1], Tom Gushue[1], Dan Hamill, Joseph Hazel[2], Matt Kaplinski[2], Keith Kohl[1], Erich Mueller[1], Robert Ross[1], Robert Tusso[1]
[1]U.S. Geological Survey, Grand Canyon Monitoring and Research Center
[2]Northern Arizona University

Review of Problem: Sediment budget affected by disruption of sand supply and change in flow regime




Sandbars and the sand mass balance on the Colorado River in Grand Canyon
Sand accumulates on the bed and in eddies during low flows
USGS


Sandbars and the sand mass balance on the Colorado River in Grand Canyon
Floods build sandbars and export sand downstream
USGS

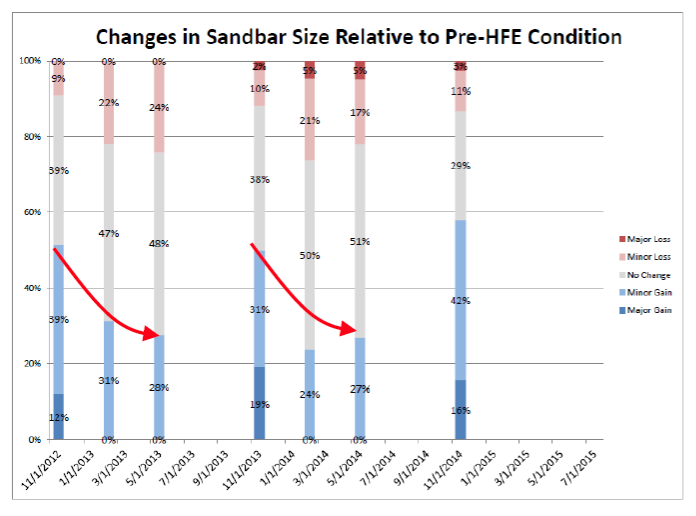


Photos at www.gcmrc.gov/sandbar/

2014 HFE

- 22 sites (58%) larger
- 11 sites (29%) no change
- 5 sites (13%) smaller

Response to HFE Protocol



2012 HFE 2013 HFE 2014 HFE

- Each of the HFEs in the past 3 years has resulted in sandbar deposition
  - They continue to erode in following 6 to 12 months

Photos at www.gcmrc.gov/sandbar/

Tusso et al. (preliminary data)

Summary

- Each HFE has resulted in sandbar deposition
- Bars continue to erode between HFEs
- No strong evidence for "progressive" increases in sandbar size
- Limited evidence that gradual downramp may result in bars that are less steep
- First three years of HFE protocol has been a period of low annual release volumes and good tributary sand supply
  - Bar deposition without depleting sand from storage
  - Sand has accumulated in Marble Canyon, replenishing sand evacuated during 2011 equalization
- Trends in sandbar volume 2012 to 2014
  - 65% of monitoring sites in Marble Canyon Larger than at start of HFE Protocol
  - 79% of monitoring sites in Grand Canyon Larger than at start of HFE Protocol

Lower Colorado River
Multi-Species Conservation Program
2005
2015
Celebrating 10 years
Save the Date:
~ April 7, 2015 ~
Join in the celebration of the 10th Anniversary of the
Lower Colorado River Multi-Species Conservation Program
and Dedication of the Laguna Division Conservation Area
Yuma, Arizona
More detailed invitations are arriving soon!

CAP
CENTRAL ARIZONA PROJECT

March 2, 2015

Mr. Terrance J. Fulp, Ph.D.
Regional Director
Lower Colorado Region
Bureau of Reclamation
P.O. Box 61470
Boulder City, NV 89006

Subject: 2015 CAP Colorado River Diversion Forecast - Modified

Dear Mr. Fulp:

On September 29, 2014, CAP notified Reclamation that it planned to divert 1.61 million acre-feet of Colorado River water in 2015. As we noted at the time, that diversion estimate was calculated to make full use of Arizona's 2.8 million acre-foot apportionment.

On December 10, 2014, CAP entered into a Memorandum of Understanding for Pilot Drought Response Actions (MOU) with Reclamation and others under which CAP committed to use its best efforts to create 345,000 acre-feet of Protection Volume in Lake Mead between 2014 and 2017.

By this letter, CAP is informing Reclamation that it intends to create 162,000 acre-feet of Protection Volume in 2015 and is amending its Colorado River diversion forecast accordingly. CAP plans to create Protection Volume in 2015 through a combination of methods:

Program/Activity (type)	Protection Volume (AF)
YMIDD Pilot Fallowing Program (system conservation)	7,000
CAP Ag Pool Forbearance (anticipated Extraordinary Conservation ICS)	81,000
CAP M&I Subcontract Supply Replacement (anticipated EC ICS)	15,000
CAP Intentionally Unused Apportionment (system conservation)	59,000
Total	162,000

While CAP acknowledges that its planned ICS programs have not yet been formally submitted or approved, we anticipate submission in coming weeks and approval this year for ICS creation. Consistent with this approach and the commitments in the MOU, CAP intends to proceed with both programs to develop Protection Volume in 2015.

To achieve the objectives of the MOU, CAP requests and expects Reclamation to retain the Protection Volume developed in 2015 in storage in Lake Mead.

As it does every year, CAP intends to adjust its pumping during 2015 to divert Arizona apportionment unused by higher priority Arizona entitlement holders, subject to the Protection Volume plans outlined above. In the event that Arizona's final 2015 use is less than 2.638 million acre-feet (2.8 MAF minus the planned Protection Volume), CAP requests that the additional unused amount also be left in system storage and treated as Protection Volume.

If you have any questions or require additional information, please contact me or Brian Henning (623-869-2567).

Sincerely,

Thomas W. McCann
Deputy General Manager
Operations & Maintenance

cc: Tom Buschatzke, Arizona Department of Water Resources
Leslie Meyers, Bureau of Reclamation – Phoenix Area Office
Steve Hvinden, Bureau of Reclamation – Boulder City Office
John Entsminger, Southern Nevada Water Authority
Jayne Harkins, Colorado River Commission Nevada
Tanya Trujillo, Colorado River Board of California
William Hasencamp, Metropolitan Water District of Southern California