

COLORADO RIVER BOARD OF CALIFORNIA

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December 1, 2014

**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:

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| Date: Wednesday, December 10, 2014 |
| Time: 3:00 p.m. |
| Place: Livorno Room Caesar's Palace 3570 Las Vegas Boulevard South Las Vegas, NV 89109 Tel: (866) 227-5938; FAX: (702) 731-7172 |

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

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

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

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, December 10, 2014
3:00 p.m.

Lovorno Room
Caesar's Palace
3570 Las Vegas Boulevard South
Las Vegas, NV 89109

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)
In accordance with California Government Code, Section 54954.3(a)
3. Administration
 - a. Consideration and Approval of the Minutes of the Meeting held November 19, 2014 (**Action**)
 - b. Adoption of the 2015 Colorado River Board meeting schedule (**Action**)
4. Report from Terry Fulp, Lower Colorado Regional Director, U.S. Bureau of Reclamation
5. Report from Don Barnett, Executive Director, Colorado River Basin Salinity Control Forum
6. "Year in Review" presentation regarding achievements during 2014
 - a. Review status of Basin States drought contingency planning
 - 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
7. 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
8. Update regarding the 2014 California Drought

9. Announcements/Notices

10. 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.

11. Other Business

- a. Next Board Meeting: Regular Meeting
January 14, 2015
10:00 a.m.
Vineyard Room
Holiday Inn Ontario Airport
2155 East Convention Center Way
Ontario, CA 91764-4452
Tel: (909) 212-8000, Fax: (909) 418-6703

Minutes of Meeting
COLORADO RIVER BOARD OF CALIFORNIA
Wednesday, November 19, 2014

A meeting of the Colorado River Board of California (Board) was held at the Steve Robbins Administration Building, Coachella Valley Water District, 75-515 Hovley Lane East, Palm Desert, California, 92211 on Wednesday, November 19, 2014.

Board Members and Alternates Present

Stephen Benson
Dana Bart Fisher, Jr., Chairman
Franz De Klotz
Henry Kuiper
Glen Peterson
David Pettijohn

John Powell Jr.
Jack Seiler
Michael Touhey
Jeanine Jones, Designee
Department of Water Resources

Board Members and Alternates Absent

James Hanks
James McDaniel
Doug Wilson
Bud Pocklington
David Vigil

Others Present

Steve Abbott
Tim Blair
Tom Buschatzke
Robert Cheng
Chuck Cullom
Dan Denham
Matt Dessert
Craig Elmore
Christopher Harris
Bill Hasencamp
Michael Hughes
Jim James
Lisa Johansen
Lori Jones
Eric Katz
Kathy Kunysz
Tom Levy
Lindia Liu
Kara Mathews

Jan Matusak
Mike Morgan
Kathy Murphy
Jessica Neuwerth
Thang (Vic) Nguyen
Carrie Oliphant
Autumn Plourd
Angela Rashid
Eric Ruckdaschel
Harry Ruzgerian
Tom Ryan
Tina Shields
Ed Smith
Joanna Smith
Mark Stuart
Tanya Trujillo
Joseph Vanderhorst
Mark Van Vlack
Jerry Zimmerman

CALL TO ORDER

Chairman Fisher announced the presence of a quorum and called the meeting to order at 1:37 p.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 October 15, 2014 Colorado River Board Meeting

Chairman Fisher asked if there was a motion to approve the October 15, 2014 minutes. Mr. De Klotz moved that the minutes be approved, seconded by Mr. Peterson. By unanimous support, the October 15, 2014, meeting minutes were approved. Executive Director Trujillo noted that the final meeting minutes would incorporate comments and edits made by Mr. Jan Matusak from the Metropolitan Water District.

2015 Board Meeting Schedule

Ms. Trujillo reported that the recommendation for next year's meeting schedule is to return to a more traditional meeting schedule with meetings held primarily in Ontario with a few out-of-town meetings. One of next year's meetings will include a meeting hosted by the San Diego County Water Authority in October 2015.

COLORADO RIVER BASIN WATER REPORT & DROUGHT UPDATE

Colorado River Basin Water Report

Executive Director Trujillo reported that as of November 3, 2014, the water level at Lake Mead was at 1082.82 feet with 10.25 million acre-feet (MAF) of storage, or 39% of capacity, while the water level at Lake Powell was at 3605.54 feet with 12.29 MAF of storage, or 51% of capacity. The total System active storage as of November 2 was 29.96 MAF, or 50% of capacity, which is almost 350,000 acre-feet (AF) higher than one year ago when the System storage was also at 50% of capacity. As of November 6, 2014, the Upper Colorado River Basin reservoirs, other than Lake Powell, ranged from 65% to 95% of their capacities. Ms. Trujillo reported that there was above normal precipitation throughout the Colorado River Basin (Basin) in September, which was followed by below average precipitation in October. The unregulated inflow into Lake Powell as of October was 10.38 MAF, or 96% of average.

Ms. Trujillo reported that the November 4, 2014 U.S. Drought Monitor map

indicates that the Western U.S. is still experiencing widespread drought. While there had been some drought relief in Wyoming and Colorado, the California drought conditions were still the most severe with 55% of the state in the exceptional drought category (the most severe drought category).

The Basin States Technical Committee met on October 16 and received an updated hydrologic forecast and update from Reclamation. Reclamation estimates a most probable release from Lake Powell this year of nine million acre-feet. The release will start out as an 8.23 million acre feet release and will probably be increased after the April review. Regarding the probability of shortages under the 2007 Guidelines, there is a zero percent chance of shortage in 2015, and the latest predictions show a 25 percent chance of a first tier of shortage in 2016, and a 53 percent chance of shortage in 2017.

Basin States Technical Committee Meeting, October 16th, Las Vegas, Nevada

The Basin States Technical Committee held its bi-annual meeting in Las Vegas on October 16 to receive an update on Colorado River Basin reservoir operations and hydrology, forecasting, and status reports on a variety of Basin projects and programs.

The Colorado River Basin Forecast Center provided an update on its latest forecast for 2015. Reclamation provided an update regarding proposed modeling changes to the Colorado River Simulation System (CRSS) and Mid-Year Operations Probabilistic Model (MTOM). Updates were provided on topics including Minute 319 implementation, the California drought, Salton Sea issues, and weather modification programs. The next Technical Committee meeting has been tentatively scheduled for April 28, 2015.

An initial briefing was held by the Colorado River Basin Forecast Center on November 6, which was primarily a review of the 2014 season to evaluate how accurate the center's predictions were. The center concluded that the results were pretty accurate but they identified a few areas to refine and improve upon. The next presentation will occur on December 9, 2014, and sessions are scheduled on a monthly basis after that. One of the presentation slides included a review of the water year hydrology indicating that the better hydrology occurred primarily in the latter months. On average, the majority of the Basin received below-average precipitation.

Also noted was the USGS 2010 summary of estimated water use in the U.S. that analyzes water withdrawals throughout the country. California has the highest level of withdrawals in the nation. On a nationwide basis, the report concludes that water use in 2010 was 13 percent lower than what was recorded in 2005.

State and Local Reports

Mr. Mark Stuart from the California Department of Water Resources (DWR) provided an overview of current hydrologic and water supply conditions in the state. With the exception of San Luis Obispo and Santa Barbara, the precipitation was below

normal for the month of October in Southern California, with Los Angeles at 44% of average. The Northern Sierra Precipitation Index indicates receipt of 3.8 inches of precipitation, which is normal for this time of the year. Statewide, precipitation was at 55% of average, runoff at 35% of average, and reservoir storage is at 60% of average. For State Water Project (SWP) facilities, Oroville is at about 950,000 AF (27% of capacity) and San Luis at 197,000 AF (19% of capacity). The total SWP storage is at 30% of capacity. Other reservoirs are well below their historic average levels.

Mr. Stuart noted that DWR recently released the updated California Water Plan 2013 and Bulletin 132-12, which provides a summary of State Water Project operations for 2011.

Board Member Peterson stated that MWD's combined reservoir storage as of November 1 is at 45% of capacity. Mr. Peterson reported that MWD has a target to divert a total of 1.172 MAF by end of the year from the Colorado River. Mr. Peterson also noted that MWD's water deliveries have started to decline as a result of the conservation and public outreach efforts.

California Drought Update

Ms. Trujillo noted that the state of emergency issued in January was still in effect and that 55% of the state continues to be in the exceptional drought category. Ms. Trujillo noted that the California Water Plan includes a Colorado River-specific section that included input from CRB agencies. She also noted that on November 13, Governor Brown co-hosted the Western Governors' Association Drought Forum in Sacramento, which focused on agricultural issues. Board Member Jeanine Jones reported that the Drought Forum highlighted that drought impacts are site specific, so the same drought event may have different consequences for different sectors depending on location. Advances in technology and practices such as drip irrigation and scheduling have also been key tools to allow producers to deal with the drought.

Ms. Jones reported that federal and state agencies are coordinating on preparation of a Drought Contingency Plan for operation of the projects while still complying with regulatory requirements related to protecting listed fish species.

Ms. Jones presented a graph comparing El Nino, Neutral and La Nina conditions within the Colorado River Basin and concluded that there is essentially no statistical significance between the categories.

Ms. Trujillo noted that the California voters passed Proposition 1 on November 4th and provided background regarding potential funding opportunities for the Colorado and Coastal regions.

Update regarding Basin States Drought Contingency Planning efforts

Ms. Trujillo updated the Board regarding the status of the ongoing discussions

among the seven Basin States regarding contingency planning for a continued drought. The Upper Basin States and the Lower Basin states have each been developing their own strategies. Ms. Trujillo provided an overview of the Lower Basin States' process and previewed the request for approval from the Board to authorize the Executive Director to sign a Memorandum of Understanding with other parties in the Lower Basin relating to continuing the contingency drought planning efforts over the next few years.

Ms. Trujillo reminded the Board that the ongoing 14-year drought has led to the discussions, which were initiated through a meeting with the Secretary of the Interior a year and a half ago, for contingency planning if the hydrology does not improve. The States have a history of prior successes in the Basin such as the 2007 Guidelines for the coordinated operations of Lake Powell and Lake Mead and for shortage sharing in the Lower Basin. One of the goals of the current round of contingency planning discussions is to ensure that the 2007 Guidelines are protected and that they can function as they were designed to function through 2026.

The Board's interests have been consistent with the statutory authorization to protect California's rights and interests with respect to the use of the waters of the Colorado River. Ms. Trujillo explained that in the Lower Basin, the goals are to store more water in Lake Mead on a voluntary basis and to find more flexibility to use water during low reservoir conditions but there is sometimes a tension between those two goals. One initial step of the process has been the completion of the Pilot System Conservation Program, which was started by an agreement among the Metropolitan Water District, the Central Arizona Project, Southern Nevada Water Authority, the Denver Water in the Upper Basin and the United States Bureau of Reclamation to contribute funds that could be used to encourage conservation projects that would be used to generate water for the system. The water would not be reserved for any particular funder, but would be generated for the benefit of the system. As mentioned during a prior Board meeting, Reclamation initiated the first step in implementing that program in the Lower Basin by sending out a Request for Proposals to Section 5 contractors, seeking requests for projects that could be funded through the program. Reclamation received several proposals and will evaluate those proposals with the funding entities to determine which projects might be approved through that process.

The Resolution proposed for Board action would demonstrate a continued commitment to the drought contingency planning process. Ms. Trujillo walked through several provisions of the Resolution. The Resolution acknowledges the Colorado River Board's statutory authority and interests in protecting the waters of the State of California and acknowledges that the Law of the River, including the Compact, the Boulder Canyon Project Act, the Colorado River Basin Project Act and the Consolidated Decree in Arizona v. California, are important elements of the Law of the River. The Resolution acknowledges that the Colorado River Basin States have a long history of working together within the Law of the River to meet challenges as they arise and to develop innovative water management strategies for the benefit of the Colorado River system. The Resolution highlights the 2007 Guidelines for the coordinated operations of Lake Powell and Lake Mead. The Resolution also notes that in 2003, California agencies

entered into the Quantification Settlement Agreement (QSA) that has been successfully implemented over the past ten years. The QSA and other agreements in California have led to the conservation and transfer of over two million acre-feet of water from agricultural to municipal uses and have helped keep California within its normal apportionment under the Law of the River. The Resolution reiterates the Board's support for the continued implementation of the QSA agreements and other water management agreements that have helped California effectively utilize its Colorado River resources. The Resolution recognizes the need to continue to address the ongoing challenges associated with the continued drought within California and within the Colorado River Basin. The Resolution notes that the Colorado River Board and other water management agencies in California have participated with the other Lower Division States and with the Upper Division States to develop strategies and programs that can be implemented in a coordinated fashion in the Basin to respond to the drought. The Resolution notes that the drought contingency planning efforts will be ongoing and will require the involvement of additional parties. The Resolution supports the ongoing efforts and notes that a Memorandum of Understanding (MOU) for pilot drought response actions is being developed and will help guide the actions as the Lower Basin States move forward. The Resolution asks for authority for the Executive Director to execute the MOU. The MOU describes efforts that would be taken to create additional volumes of water to store in the reservoir and is structured to build off of the existing pilot system conservation agreement. The MOU involves commitments from the Central Arizona Project, Metropolitan Water District and the Southern Nevada Water Authority and the United States to use their best efforts to generate additional volumes of water to be stored in Lake Mead and to coordinate those efforts with other agencies in the Basin. The MOU contains a commitment to continue to work together within the Lower Basin and anticipates re-consultation no later than August of 2016, to evaluate the success of the process.

Board member Benson asked whether the MOU was a public document, and Ms. Trujillo responded that it was still under development and had not yet been publicized, but that she could provide copies of the draft if anyone needed it.

With no further discussion, Board member Kuiper moved to adopt the Resolution in support of the drought contingency planning process and to authorize the Executive Director to sign the MOU with the other Lower Basin entities. The motion was seconded by Board member Peterson. The motion passed with no opposition.

Presentation by the Central Arizona Project regarding a proposal to create Intentionally Created Surplus in Arizona

Ms. Trujillo introduced Tom Buschatzke from the State of Arizona's Department of Water Resources and Chuck Cullom from the Central Arizona Project (CAP) who was invited to make a presentation regarding CAP's proposal to create a new category of Intentionally Created Surplus (ICS) water. Mr. Cullom thanked the Board for the opportunity to share CAP's proposal to create Extraordinary Conservation ICS that is intended to create part of the water supply CAP is committing to use its best efforts to

create through the MOU. Mr. Cullom stated that when CAP originally undertook the development of an extraordinary conservation ICS program, it failed to understand some of the difficulties involved and he congratulated the California agencies who have been leaders in the Lower Basin in the creation of ICS and in developing unique and innovative partnerships among MWD, PVID and IID. Mr. Cullom stated that those examples have been useful to CAP as it attempts to develop new ways to develop water supplies to store in Lake Mead through the ICS program.

Mr. Cullom provided background information about CAP. The CAP is a 336-mile aqueduct system that takes about 1.6 million acre-feet of water from the Colorado River and delivers it to 57 urban water users and 18 irrigation districts and 11 Native American communities in Central Arizona. Mr. Cullom noted that the CAP serves approximately 5.2 million people and approximately 300,000 acres of irrigated land. Mr. Cullom described the priorities of the water uses within Arizona, with the high priority uses being for Tribes and irrigation districts and indicated that CAP has a lower priority. CAP has a contract to divert approximately 1.415 million acre-feet of water but also has the ability to divert unused water within Arizona's apportionment. Mr. Cullom noted that CAP typically diverts 1.6 million acre-feet of water per year. Mr. Cullom described the relative priorities within the CAP system among tribal water, municipal water and irrigation water. CAP has a category of "excess water" that it estimates will be approximately 75,000 acre-feet in 2015 and 2016, which would largely go to the Arizona Water Banking Authority as the replenishment function of CAP to replace groundwater that is pumped by certain municipalities through a special permit. If the shortage triggers of the 2007 Guidelines are reached, CAP would have an initial reduction in supply of 320,000 acre-feet of water per year and Mr. Cullom described how the reductions would be administered with the CAP system.

CAP's goal through the MOU is to store 345,000 acre-feet of water in Lake Mead during 2014-2017 through two methods –by committing to reduce Arizona's diversion of water below its 2.8 million acre-foot apportionment thus saving water in Lake Mead in order to avoid a shortage and to reduce risk for Colorado River water users from low reservoir elevations, and through the development of an Extraordinary Conservation ICS program. Mr. Cullom stated that CAP is targeting the creation of up to 100,000 acre-feet of ICS in both 2015 and 2016 for a total of 200,000 acre-feet. Because of the risk of shortage, the goal is to create the storage volumes by the end of 2016 because if there is a shortage, CAP has a limited ability to store water in Lake Mead because it will be taking a reduction of 320,000 acre-feet. Mr. Cullom described CAP's proposal to create ICS through two programs – by reducing deliveries to the agricultural customers and by using local supplies. Agricultural users would be paid to reduce their CAP consumption, and 9 districts have already expressed interest in the new program which has the potential to generate approximately 80,000 acre-feet of savings in both 2015 and 2016. For the replacement supply piece, Mr. Cullom described that municipal customers would be paid to replace a portion of their CAP supply with some other local supply. Mr. Cullom estimated that the program could generate approximately 15,000 acre-feet in 2015 and that potential programs with the Arizona Water Banking Authority are being explored. To summarize the proposal, Mr. Cullom explained that ICS would be created when CAP

reduces its diversion of Colorado River water as a result of a reduced order for CAP water delivery. Mr. Cullom explained that the agricultural users would either fallow land, use deficit irrigation techniques or use a local supply when it was available. CAP would propose to stay within the 2007 Guidelines's annual ICS creation limit for Arizona of 100,000 acre-feet and an account total of 300,000 acre-feet.

Mr. Cullom explained that the CAP Board has approved the ICS plan and has amended its agricultural policy to allow CAP to not remarket the water saved through demand reductions. Mr. Cullom stated that CAP intends to prepare an ICS Creation Plan and an exhibit to the 2007 Guidelines' Forbearance Agreement and to seek conditional approval of the ICS Creation Plan as soon as possible and to seek approval from the parties to the Forbearance Agreement, who are the Arizona Department of Water Resources, Southern Nevada Water Authority, the Colorado River Commission of Nevada, Metropolitan Water District, Palo Verde Irrigation District, IID, Coachella Valley Water District and the City of Needles, in the coming months.

Board Member Peterson asked Mr. Cullom how much water CAP has been storing since 2000. Mr. Cullom noted that the Arizona Water Banking Authority has stored about three million acre-feet underground to firm up municipal and industrial CAP contract priorities and to firm Indian water rights settlements. Mr. Cullom noted that Arizona has also stored approximately 600,000 acre-feet of groundwater for the Southern Nevada Water Authority. Approximately 89,000 acre-feet of water had been stored for MWD that had been recovered from 2007-2010.

Board Member Peterson asked about the capability of pulling the groundwater out and Mr. Cullom responded that there is a current recovery capacity of permitted recovery wells in some of the irrigation districts of approximately 40,000 acre-feet which is the approximate amount that would be necessary to firm CAP's M&I customers under a tier 3 shortage.

Ms. Trujillo asked whether a program would proceed with the agricultural districts that had already signed up for the program even if an ICS program did not go forward. Mr. Cullom stated that CAP hoped to move forward with a successful ICS program with the support and assistance of the Forbearance parties. He stated CAP is working to improve its proposed ICS Forbearance exhibit based on comments from California agencies and that CAP's intent was to meet with the agency staff to walk through the ICS Creation Plan before it is submitted to Reclamation and that a draft of the plan should be completed before November 26.

Ms. Trujillo noted that one of the comments received from the California agencies involved the level of verification that CAP was proposing for its programs. Mr. Cullom noted that CAP was working to demonstrate its water savings and that the CAP program may be more simple than the programs in place in California because the reduction in use would be measured at the point of diversion and not within the service area. Mr. Cullom noted that CAP regretted some of its efforts in the 2007 Guidelines process because some of the same questions are now being directed back at CAP. Ms. Trujillo stated that there

is an expectation of continued discussions with CAP regarding the Forbearance exhibit and that CAP will comply with the existing requirements in the Forbearance program. Mr. Cullom confirmed the intention to work through the discussions with the California agencies so that the agencies can make a well-informed and thoughtful decision about the Forbearance exhibit. Mr. Cullom stated the intention of CAP to host a tour of the CAP in the spring for the California agencies.

Board Member Pettijohn asked about the 75,000 acre-feet of excess water within CAP's supply pool. Mr. Cullom explained that if any higher priority water user was not using its allocation, an excess pool would be available for storage underground. Since 2009 the excess supply has decreased dramatically from a high of approximately 300,000 acre-feet in 2000.

Chairman Fisher thanked Mr. Cullom for presenting to the Board regarding the program and asked Mr. Buschatzke whether he would like to make any comments. Mr. Buschatzke stated that Arizona was comfortable with CAP's proposal and that CAP has a unique situation and can ensure diversion of less than 2.8 million acre-feet of water.

Mr. Buschatzke also stated that the State of Arizona intended to sign the MOU and did not have to go through its legislature for approval.

Mr. Benson asked whether CAP's ICS proposal would go through the normal BOR process and Mr. Buschatzke affirmed that CAP would follow the normal process and would require the parties to the Forbearance Agreement to approve the exhibit. Mr. Benson mentioned that IID had an interest in developing its on-farm conservation programs as future ICS projects.

COLORADO RIVER BASIN PROGRAM REPORTS

Colorado River Basin Water Supply and Demand Study

Ms. Trujillo reported that the workgroups and the Coordination Team are finalizing the review of the Phase 1 report, which will document the progress of the three workgroups which include the Agricultural Water Conservation, Productivity, and Transfers, Municipal and Industrial Water Conservation and Reuse, and Environmental and Recreational Flows. The Phase 1 report includes options and strategies for additional conservation for both the agricultural and municipal sectors. Ms. Trujillo noted that the report acknowledges the challenges associated with increasing conservation measures, as a multitude of conservation efforts have been underway in the Basin for several years. It is anticipated that the summary chapter of the Phase 1 report will be completed in early December.

Minute 319 Implementation

Ms. Trujillo reported that Mexico had recently revised its 2014 delivery schedule, and indicates that it intends to defer delivery of an additional 56,000 acre-feet of

Colorado River water this year. This amount will be added to Mexico's deferred delivery account. Reclamation's final 2014 water accounting report will also reflect the deduction of the approximately 105,000 acre-feet that was utilized for the environmental pulse flow during spring 2014.

Ms. Trujillo also reported that a workshop was held in Mexicali, Mexico on October 28 to introduce the System Conservation Pilot Program to Mexican representatives. Ms. Trujillo indicated that the Mexican contingent expressed interest in the pilot program and may develop proposals for projects that could be funded through the program.

Ms. Trujillo reported that other binational workgroups continue to meet and work on various issues. The Hydrology workgroup is focused on providing information to Mexican participants regarding how drought conditions in the United States are evaluated and classified, and the methods associated with water supply forecasting and water use accounting. The Environmental Flows workgroup continues to work on a report describing preliminary monitoring results associated with 2014 pulse flow release. Ms. Trujillo indicated that the workgroups will be meeting again in December.

Salinity Control Forum, Work Group, and Advisory Council

Ms. Trujillo reported that the Salinity Control Forum and Advisory Council met on October 29 and 30 of 2014 in Santa Fe, New Mexico. The Forum adopted the 2014 Triennial Review (Review), which sets the standards for the Salinity Control Program (Program) for the next three years with the goal to achieve an additional 67,000 tons of salinity control per year by 2017. During the meeting Reclamation provided an update on the status of the Paradox Valley Injection Well EIS. Ms. Trujillo reported that she passed on to Reclamation the importance of the project and the need to develop an emergency plan in the event the well fails prior to the completion of the current EIS process. Ms. Trujillo noted that she will meet with the Upper Basin Regional Director in December in Salt Lake City, Utah to obtain a more thorough response from Reclamation on their funding plan for the EIS completion, and for planning and implementation of the alternatives once they are chosen.

Ms. Trujillo reported that Reclamation is moving forward with a Request for Information for an alternative design to develop a commercial market for the brine. More information is expected after the next Salinity Control Workgroup meeting in February. The next Paradox Well Cooperating Agency meeting is scheduled for January of next year.

Ms. Trujillo reported that another issue is the potential for a deficit in the Lower Basin's cost share for the Program. She reported that Tom Buschatzke from Arizona, is a member of the Forum, and is spearheading the underfunding strategy with Pat Tyrrell, a representative from Wyoming. A committee is in place to work on developing some strategies. Because the Forum recognizes that it will require a legislative fix to remedy

the situation, it is trying to move forward with a solution that is acceptable to all seven Basin States. One of the two goals is to obtain a better balance between the Lower and Upper Basins cost shares because the Lower Basin currently contributes 85 percent and Upper Basin contributes 15 percent. Ms. Trujillo noted that the second goal was to obtain contributions from entities in Arizona because currently the Lower Basin contributions are funded from power revenues from users only in California and Nevada. The next Forum meeting is scheduled for May 20 and 21, 2015 in Salt Lake City, Utah. The next Workgroup meeting will be hosted by California starting on February 17, 2015.

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

Mr. Harris reported that the Glen Canyon Dam Technical Work Group (TWG) met in Phoenix, Arizona on October 28-29, 2014. This was the last meeting for Dr. Jack Schmidt as Chief of the Grand Canyon Monitoring and Research Center as he has resigned from federal service and is returning to his teaching position at Utah State University. Dr. Scott Vanderkooi, the deputy chief will fill in as the acting GCMRC Chief until the USGS makes a selection in early 2015.

Mr. Harris reported that recent research on the status of the Lees Ferry trout population indicates that this population may be beginning a cycle of decline. The observed decline in health and vigor of the Lees Ferry trout population may be related to the lack of sufficient food for these fish. The researchers speculate that trout management flows could actually result in thinning out some of these trout and restoring a balance between available food resources and numbers of rainbow trout. This could reduce the potential out-migration of rainbow trout from the Lees Ferry Reach down to the confluence with the Little Colorado River where the endangered humpback chub tend to congregate.

Mr. Harris also reported that the USFWS is kicking off a process to prepare a revised recovery plan for the humpback chub. Dr. Rich Valdez will head up the recovery team preparing the new recovery plan. The team will include native fish experts and personnel from both of the USFWS's Regions 2 and 6. A draft of the revised recovery plan is expected to be released for public review and comment in late-2015.

Regarding the status of the Long-Term Experimental and Management Plan EIS process, Mr. Harris reported that Reclamation has confirmed that all of the modeling analyses will be completed for each of the proposed alternatives being evaluated in the draft EIS. This includes the hydropower economic impacts model. Completing these modeling analyses means that the completion schedule for the draft LTEMP EIS will be delayed, and that a draft EIS will be released for review and comment in early 2015. The USFWS indicated that it will have a draft biological opinion associated with the LTEMP EIS during the summer 2015.

Mr. Harris reported that the Southern Nevada Water Authority recently conducted a webinar associated with potential Lake Mead water quality impacts related to implementation of the LTEMP. Based upon significant modeling and analyses performed by SNWA, at this juncture there does not appear to be any significant water quality concerns or impacts associated with implementation of any of the alternatives currently under consideration in the LTEMP EIS process. SNWA indicated that it will be sharing the modeling and monitoring data, via a technical report, to the LTEMP co-lead agencies and Argonne National Laboratory for inclusion in the draft EIS.

Finally, Mr. Harris reported that Reclamation initiated implementation of its third high-flow experimental release under the 2012 HFE Protocol on November 10, 2014. This was a 96-hour event that achieved a maximum magnitude release of 37,500 cfs, and was intended to remobilize and redistribute approximately 1.5 million metric tons of sediment that had accumulated just below the confluence with the Paria River since July 2014. Of the 37,500 cfs release, 15,000 cfs was released through the jet-tubes and bypassed the Glen Canyon Dam powerplant. Reclamation and the GCMRC hope to have some preliminary results of this HFE release available for distribution at the Annual Reporting meeting in January 2015 in Phoenix, Arizona.

Lower Colorado River Multi-Species Conservation Program

Mr. Harris reported that the Lower Colorado River Multi-Species Conservation Program (LCR MSCP) held a Steering Committee meeting on October 22, 2014, at which the underfunding strategy to address the FY-2011 through FY-2014 funding shortfall was formally adopted. All federal and non-federal parties will have paid their underfunding amounts through the conclusion of FY-2015.

Mr. Harris reported that Reclamation provided an update on the status of the Hualapai Indian Tribe Water Rights Settlement, which would also facilitate the acquisition of the Planet Ranch Property on the Bill Williams River for LCR MSCP purposes. Mr. Harris reported that Arizona's La Paz and Mohave Counties continue to express concern regarding the potential economic impacts associated with the land and water transfers being authorized in the proposed legislation.

Mr. Harris also reported that the LCR MSCP would be celebrating the tenth anniversary of its implementation with a tour April 7-9, 2015. It is anticipated that Interior Secretary Sally Jewell will attend the formal dedication of the Laguna Conservation Area on April 7th, and it is hoped that those instrumental in the founding of the program will attend.

Finally, Mr. Harris reported that the U. S. Fish and Wildlife Service have reopened the comment period for the proposed critical habitat designation for the threatened yellow-billed cuckoo. The comment period reopened on November 10, 2014 and will close on January 12, 2015. Mr. Harris reported that the Board had already submitted comments and doesn't intend to submit any additional comments.

Announcements/Notices

Ms. Trujillo reported that the Board packet includes information regarding the next round of WaterSMART grants which include Title 16 and Water Conservation and Efficiency Projects. Ms. Trujillo stated that she would provide an update on the implementation status of the WaterSMART grants in the future.

Ms. Trujillo introduced Tina Shields from the Imperial Irrigation District to speak about IID's recently filed petition with the State Water Resources Control Board regarding the restoration of the Salton Sea. Ms. Shields explained that the State Water Resources Control Board is the permitting agency overseeing the water transfers with San Diego and the other portions of the Quantification Settlement Agreement (QSA). The petition asks the State Water Resources Control Board to reconvene the consultation process with the affected parties to discuss the Salton Sea restoration plan. The petition requested a six-month facilitated process to evaluate restoration options and opportunities. At the end of that process, a workshop would be convened to evaluate whether the restoration of the Salton Sea should be a condition of the QSA permit.

Ms. Shields explained that when the transfer was approved in 2002/2003, the intention for setting up 15 years of mitigation water deliveries was meant to allow time for the restoration plan to move forward. Unfortunately, within three years the mitigation deliveries will be discontinued and there is no plan to transition from the mitigation flows to restoration activities. Ms. Shields stated that copies of the petition were available and that she was happy to provide more information regarding the permit, if needed. IID is currently waiting for response from the State Water Resources Control Board.

Board member Pettijohn asked about the impact to the existing transfer if the State Water Resources Control Board decides to make the restoration of the Salton Sea a contingency of the transfer permit and the restoration does not go forward. Ms. Shields admitted that would be a problem but explained that the permit requires certain actions to occur in order for the transfers to proceed, one of which is the State's responsibility to provide funding for mitigation of the Salton Sea. Once funding from the agencies has concluded, the State has an obligation to continue funding mitigation activities. Ms. Shields explained that it would be more effective to implement restoration activities instead of continuing to spend money to mitigate the problem. Ms. Shields stated that the State's \$9 billion dollar restoration plan is too costly to implement and that restoration planning efforts need to be refocused to create a more manageable plan that focuses on the immediate effects of the receding shoreline, such as air quality. Ms. Shields stressed that the State needs to reopen discussions and planning on this issue now and avoid waiting until the mitigation deliveries conclude in three years.

Ms. Trujillo reported that the Association of California Water Agencies (ACWA) conference is scheduled for December 2nd through December 5th in San Diego. Many of the CRB's agencies are members of ACWA and participate in the conference. In

addition, the Colorado River Water Users Association is scheduled in December in Las Vegas, Nevada which also coincides with the timing of the next Board meeting.

Chairman Fisher reported that this would be Vice Chairman Franz De Klotz's last meeting with the Colorado River Board. Mr. Fisher noted that Mr. De Klotz served on the Board on behalf of Coachella and performed his duties well. Mr. De Klotz thanked Mr. Fisher and stated that it had been a pleasure to serve on the Board.

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. Benson seconded by Mr. Pettijohn, and unanimously carried, the meeting was adjourned at 3:20 p.m. on November 19, 2014.

COLORADO RIVER BOARD OF CALIFORNIA
2015 SCHEDULE OF MEETINGS

The standard schedule for the Colorado River Board of California is to hold a board meeting on the Wednesday following the second Tuesday of each month. In keeping with that schedule, the following schedule of meetings is proposed for calendar year 2015. The meeting location will primarily be in Ontario, California but meetings will also be held at other locations to accommodate interest from the Board. The timing of meetings at non-Ontario locations will be subject to coordination with the hosting member agency. Meetings held in Ontario will continue to begin at 10 am. Notice of meetings will continue to be issued at least 10 days in advance of the meeting.

January 14, 2015 - Ontario

February 11, 2015 - Ontario

March 11, 2015 - The Metropolitan Water District of Southern California (exact meeting time and location to be determined later)

April 15, 2015 - Ontario

May 13, 2015 - Ontario

June 10, 2015 - Ontario

July 15, 2015 - Ontario

August 12, 2015 - Ontario

September 9, 2015 - Ontario

October 14, 2015 - San Diego County Water Authority (exact meeting time and location to be determined later)

November 18, 2015* - Imperial Irrigation District (exact meeting time and location to be determined later)

December 9, 2015 - Las Vegas, NV (meeting coincides with the Colorado River Water Users Association meetings -- December 9-11, 2015)

* November meeting date changed from normal schedule to avoid a conflict with Veteran's Day

MEMORANDUM OF UNDERSTANDING AMONG
THE UNITED STATES OF AMERICA, THROUGH THE
DEPARTMENT OF THE INTERIOR,
BUREAU OF RECLAMATION,
THE CENTRAL ARIZONA WATER CONSERVATION DISTRICT,
THE METROPOLITAN WATER DISTRICT OF SOUTHERN CALIFORNIA,
THE SOUTHERN NEVADA WATER AUTHORITY,
THE ARIZONA DEPARTMENT OF WATER RESOURCES,
THE COLORADO RIVER BOARD OF CALIFORNIA
AND
THE COLORADO RIVER COMMISSION OF NEVADA
FOR PILOT DROUGHT RESPONSE ACTIONS

I. PARTICIPANTS

This Memorandum of Understanding, (hereinafter referred to as “MOU”), is made and entered into this ____ day of _____, 2014 (“Effective Date”), by and between the UNITED STATES OF AMERICA (“United States”) represented by the Secretary of the Interior (“Secretary”) acting through the Bureau of Reclamation (“Reclamation”), the CENTRAL ARIZONA WATER CONSERVATION DISTRICT, a multi-county water conservation district duly organized and existing under the laws of the State of Arizona (“CAWCD”), THE METROPOLITAN WATER DISTRICT OF SOUTHERN CALIFORNIA, a regional public water district duly organized under California law (“MWD”), and the SOUTHERN NEVADA WATER AUTHORITY, a political subdivision of the State of Nevada (“SNWA”, and together with CAWCD and MWD, the “Municipal Water Agencies”). The ARIZONA DEPARTMENT OF WATER RESOURCES, an agency of the State of Arizona acting pursuant to A.R.S. Section 45-107 (“ADWR”), the COLORADO RIVER BOARD OF CALIFORNIA, an agency created under California Water Code Sections 12500-12541 (“CRB”), and the COLORADO RIVER COMMISSION OF NEVADA, an agency of the State of Nevada under NRS Sections 538.041 to 538.251 (“CRCN”), are participants to this MOU for purposes of Sections II., III.E, IV, and V.

Additional entities that may be of assistance in implementing drought response actions contemplated by this MOU may be added from time to time in the manner set forth in Section IV.B.

II. RECITALS

A. WHEREAS, in December 2007, the Secretary executed the Colorado River Interim Guidelines for Lower Basin Shortages and the Coordinated Operations for Lake Powell and Lake Mead (“2007 Guidelines”) for implementing the Criteria for Coordinated Long-Range Operation of Colorado River Reservoirs Pursuant to the Colorado River Basin Project Act;

B. WHEREAS, the Colorado River System suffers from the effects of a drought that began 15 years ago, leading to substantially decreased water elevation levels in both Lakes Mead and Powell;

C. WHEREAS, Colorado River System modeling projections show increasing near-term risk that water elevations in both Lakes Mead and Powell could decline to levels that would not only trigger shortage conditions in Lake Mead operations as set forth in the 2007 Guidelines, but could also impact the ability to draw or benefit from water in the lakes, including severely impacting hydropower resources;

D. WHEREAS, in December 2012, Reclamation and the seven Colorado River Basin States completed the Colorado River Basin Water Supply and Demand Study (“Basin Study”), with the purpose of defining future imbalances in water supply and demand in the Colorado River System through the year 2060, and developing and analyzing options and strategies to resolve those imbalances. The Basin Study concludes that without further proactive actions, there may be a long-term potentially significant imbalance in future water supply and demand.

Options to address these imbalances include, without limitation, augmentation of the system and increased agricultural and municipal water conservation;

E. WHEREAS, water agencies in the Colorado River Basin provide water to over 30 million residents in the United States, meeting basic human needs and sustaining vital economic functions regionally and nationally. Based on their many shared interests, the Municipal Water Agencies and other agencies within the Colorado River Basin have worked together for over 20 years on initiatives to develop water supplies, manage demand through conservation, and operate facilities to use Colorado River System water for the benefit of multiple interests;

F. WHEREAS, all CAWCD municipal customers supplied by the Central Arizona Project, including Phoenix and Tucson, have been successful in reducing per capita consumption by making significant investments in conservation, reuse, and infrastructure. The City of Phoenix has reduced water use by 35 percent since 1980, while approximately 97 percent of the City of Scottsdale's reclaimed water is reused for turf irrigation or recharge efforts. CAWCD municipal customers remain committed to expand these investments;

G. WHEREAS, in MWD's service area, southern California urban agencies have funded a wide variety of agricultural and urban conservation measures that have allowed the State of California to reduce its use of Colorado River water by 20 percent since 2002. In addition, through investments in water conservation and local supply management, including recycling, urban southern California imports less water today than it did 20 years ago, despite a significant increase in the region's population. MWD remains committed to expand these efforts;

H. WHEREAS, through significant investment in a variety of aggressive conservation measures, SNWA's annual consumptive use of water from the Colorado River decreased by nearly 100,000 acre-feet between 2002 and 2013, despite a population increase of

480,000 people over that same period. This equates to a reduction of approximately 30 percent in southern Nevada's gallons per capita per day demand. Southern Nevada currently reclaims nearly all of its wastewater, either through Colorado River return flow credits or direct reuse. SNWA remains committed to expand these efforts;

I. WHEREAS, the Municipal Water Agencies and Reclamation provided funding for design and construction of the Warren H. Brock (Drop 2) Reservoir that saves approximately 70,000 acre-feet of water annually; provided funding for a pilot project for operation of the Yuma Desalting Plant from May 2010 to March 2011, which conserved over 30,000 acre-feet; and agreed to contribute capital for the pilot program of water infrastructure improvements in Mexico to conserve water, in exchange for 124,000 acre-feet of water;

J. WHEREAS, MWD and SNWA have used Extraordinary Conservation, Imported, and Tributary Conservation Intentionally Created Surplus ("ICS") programs to fund conservation programs resulting in a total of more than one-half million acre-feet of conserved water stored in Lake Mead at the beginning of 2014;

K. WHEREAS, the United States acting through Reclamation, the Municipal Water Agencies, and Denver Water, separate and apart from this MOU, entered into an agreement for a Pilot Program for Funding the Creation of Colorado River System Water Through Voluntary Water Conservation and Reductions in Use dated July 30, 2014 ("System Conservation Pilot") in an effort to examine the efficacy of basin-wide solutions to the increasing near-term risk that Lakes Powell and Mead could continue to decline. For the first time, the parties in the System Conservation Pilot committed to spending up to \$11,000,000 during the next two years to develop water for the system rather than any individual user. Reclamation and the Municipal Water Agencies recognize that measures in addition to those contemplated by the System Conservation Pilot are needed in both the short and long term;

L. WHEREAS, in addition to the actions identified above, the States of California, Arizona, and Nevada (the “Lower Division States”) and a number of water users located in those states (together with the Lower Division States, the “Lower Division States and Water Users”) have worked cooperatively with the Secretary and Reclamation since 2013 to identify approaches and additional voluntary proactive measures that federal, state and local entities can take in a coordinated fashion to plan for and respond to drought and address long-term supply and demand sustainability in the Lower Basin;

M. WHEREAS, a fundamental component of Lower Basin drought contingency planning is voluntary development of additional quantities of water stored in Colorado River reservoirs, in particular Lake Mead, necessary to reduce the risk of Lake Mead reaching critical reservoir elevations (“Protection Volume(s)”). From those cooperative discussions, the Lower Division States and Water Users identified the goal of developing between 1.5 and 3.0 million acre-feet of Protection Volume between 2014 and 2019. Protection Volumes could be generated, for example, through new or expanded programs to create ICS (as such term is defined in the 2007 Guidelines), reductions in water use, reductions in off-stream storage of Colorado River water, or other actions that result in increased Lake Mead elevations; and

N. WHEREAS, Reclamation, the Municipal Water Agencies, ADWR, CRB, and CRCN desire pursuant to the terms of this MOU to work among the Lower Division States and Water Users to reduce the risks associated with the ongoing historic drought in the Colorado River Basin.

THEREFORE, mindful of the circumstances outlined in these Recitals, Reclamation, the Municipal Water Agencies, ADWR, CRB, and CRCN express their mutual understanding as follows:

III. PILOT DROUGHT RESPONSE ACTIONS

A. PURPOSE

Reclamation and the Municipal Water Agencies desire to take initial steps between 2014 and 2017 towards generating additional water in Lake Mead to reduce the risk of reaching critical reservoir elevations in a manner consistent with the Law of the River including, but not limited to, the Consolidated Decree in *Arizona v. California*, 547 U.S. 150 (2006) and the 2007 Guidelines.

B. PROTECTION VOLUMES

i. Working together, Reclamation and the Municipal Water Agencies will use their best efforts to create Protection Volumes between 2014 and 2017, as set forth in more detail in this MOU. Some methods of creating Protection Volumes may already be in use, but the creation of Protection Volumes may involve expansion, additions or changes to existing methods or programs, as appropriate.

ii. SNWA will use best efforts to create 45,000 acre-feet of Protection Volume between 2014 and 2017. SNWA may use a combination of the following to create Protection Volumes: restarting Coyote Spring Valley groundwater deliveries to Lake Mead, recovery of banked groundwater in Arizona or Nevada, additional leases or purchases of Muddy or Virgin River water rights, and reductions in off-stream storage of Colorado River water.

iii. CAWCD will use best efforts to create 345,000 acre-feet of Protection Volume between 2014 and 2017. CAWCD may intentionally create system water and anticipates using creation of Extraordinary Conservation ICS to create Protection Volumes.

iv. MWD will use best efforts to create 300,000 acre-feet of Protection Volume between 2014 and 2017 for the dual purpose of providing short-term drought relief in California and reducing the likelihood of Lake Mead reaching critical reservoir

elevations. MWD may fund conservation projects to create or defer delivery of ICS water to create Protection Volumes. To meet these Protection Volumes, MWD will need flexibility during low reservoir conditions.

v. Reclamation will use best efforts to create 50,000 acre-feet of Protection Volume between 2014 and 2017 that will be dedicated as system water. Reclamation is anticipated to use a combination of the following to create Protection Volumes: efficiency improvements, operational improvements, and creation of system water.

vi. Reclamation and the Municipal Water Agencies will consult on the suitability and appropriateness of adding additional mechanisms to create Protection Volumes, if and when such mechanisms are identified.

C. MISCELLANEOUS PROTECTION VOLUME TERMS

Water generated through the initial funding of \$11 million for the System Conservation Pilot will not be counted towards Reclamation's and the Municipal Water Agencies' Protection Volumes; provided, however, Reclamation and the Municipal Water Agencies may agree that upon any expansion of the System Conservation Pilot, water generated through such expansion may be counted towards Reclamation's and the Municipal Water Agencies' Protection Volumes in any proportion agreed upon by Reclamation and the Municipal Water Agencies.

D. IDENTIFICATION AND TRACKING OF PROTECTION VOLUMES

Reclamation and the Municipal Water Agencies will work together to identify and track achievement of Protection Volume goals set forth in Section III.B of this MOU, and will consult at least annually to discuss actions taken under this MOU.

E. FURTHER ASSURANCES

Reclamation, the Municipal Water Agencies, ADWR, CRB, and CRCN will cooperate with the others, and with any additional participants that are included in the MOU

pursuant to Section IV.B, as appropriate, to implement voluntary actions undertaken to create Protection Volumes. From time to time, and when requested, Reclamation and the Municipal Water Agencies will share information about the identification and tracking of Protection Volumes with the Lower Division States and Water Users and the Upper Division States. Reclamation and the Municipal Water Agencies will consult at least annually with ADWR, CRB, and CRCN to discuss actions taken under this MOU.

F. URGENT NEEDS

If any Municipal Water Agency is faced with operating conditions that have the potential to adversely affect its ability to meet Direct Delivery Domestic Use needs, as defined in the 2007 Guidelines, a consultation will be initiated as requested by any Municipal Water Agency to discuss ways to address such potential impacts.

IV. FURTHER ACTIONS AND ASSISTANCE OF OTHER ENTITIES

A. CONSULTATION

Reclamation, the Municipal Water Agencies, ADWR, CRB, and CRCN recognize that voluntary actions by other entities from each of the Lower Division States will be essential to implement and build on the voluntary actions identified in this MOU. In addition to consulting with each other, Reclamation, the Municipal Water Agencies, ADWR, CRB, and CRCN agree to seek the participation of additional entities within the Lower Division States at the times and for the purposes set forth below:

i. Implementation of Additional Drought Response Actions: After gaining experience related to the successes and challenges associated with voluntary actions to create Protection Volumes, Reclamation, the Municipal Water Agencies, ADWR, CRB, and CRCN agree to initiate consultation not later than August 2016 with the specific objective of developing

additional Protection Volumes, by extending, revising or adding to the activities implemented in this MOU.

ii. Planning to Address Long Term Sustainability: Voluntary actions identified in Section III.B of this MOU represent and contain elements of both drought response and sustainability actions. Notwithstanding the importance of implementing these voluntary actions, Reclamation, the Municipal Water Agencies, ADWR, CRB, and CRCN recognize that additional actions among Reclamation and the Lower Division States and Water Users will be needed to address the existing water supply and demand imbalance and long-term sustainability of the Colorado River system within the Lower Basin, and will necessarily include additional flexibility for water users during low reservoir conditions. It is with this recognition that Reclamation, the Municipal Water Agencies, ADWR, CRB, and CRCN commit, throughout the term of this MOU, to continued and increased focus on identifying and addressing these concerns and will discuss the progress of discussions related to the prioritization, funding and implementation for such additional actions during the August 2016 consultation process with the goal of implementing additional actions prior to 2020. In addition to these consultations, Reclamation will work to plan and implement actions to replace, recover and reduce system losses from the Colorado River System.

iii. Initiating Further Drought Response Actions: In any year that Lake Mead is projected, based on the Minimum Probable forecast contained in the April 24-Month Study, to be at or below 1,060 feet on December 31st of that year, Reclamation will request that the Lower Division States and Water Users immediately reinstate consultations with the specific objective of identifying additional actions to significantly reduce the potential of reaching Lake Mead elevation 1,020 feet and initiating actions to begin to achieve that objective by December 31st of that year.

iv. Revisiting Necessity for Drought Response Actions: In any year that Lake Mead is projected, based on the Most Probable forecast contained in the April 24-Month Study, to be above 1,105 feet on December 31st of that year, Reclamation will reinitiate consultations, with the specific objective of revisiting whether it is appropriate to continue, revise, or terminate ongoing drought response actions.

B. ADDITIONAL PARTICIPANTS

Reclamation, the Municipal Water Agencies, ADWR, CRB, and CRCN acknowledge that other entities may be of assistance from time to time in the generation of Protection Volumes contemplated hereunder, and agree that such entities may upon approval of Reclamation, the Municipal Water Agencies, ADWR, CRB, and CRCN which approval shall not be unreasonably withheld, become participants in this MOU for purposes of activities set forth in Section III.E, this Section IV, and Section V; provided, however, the addition of such entities shall not materially alter the terms of this MOU.

V. GENERAL PROVISIONS

A. This MOU will become effective upon the date set forth in Article I of this MOU (the Effective Date) and will remain in effect until December 31, 2019 (“Term”).

B. Nothing in this MOU is intended to or shall be construed to limit or affect in any way the authority or legal responsibilities of any participant. Nothing in this MOU binds any participant to perform beyond their respective authorities.

C. Nothing in this MOU may be construed to obligate Reclamation, the United States, any Municipal Water Agency, ADWR, CRB, or CRCN to any current or future expenditure of resources in advance of the availability of appropriations. Nor does this MOU

obligate Reclamation, any Municipal Water Agency, ADWR, CRB, or CRCN to spend funds on any particular project or purpose, even if funds are available.

D. The mission requirements, funding, personnel, and other priorities of the participants may affect their ability to undertake actions to achieve the goals identified in this MOU.

E. Specific activities that involve the transfer of money, services, or property between Reclamation and another participant are not contemplated under the scope of this MOU. To the extent that any such activities are subsequently considered between or among any of the participants, execution of separate agreements or contracts will be required.

F. Nothing in this MOU is intended to or shall be construed to restrict the participants from participating in similar activities or arrangements with other public or private agencies, organizations, or individuals.

G. This MOU is not intended to, and does not, create any right or benefit, substantive or procedural, enforceable at law or in equity by any person or entity against any participant, including a participant's Departments, Agencies, entities, officers, employees, or agents.

H. Any information furnished between the participants under this MOU may be subject to the Freedom of Information Act, 5 U.S.C. § 552, et seq. (FOIA) and respective state authorities. Reclamation and the other participants agree to consult each other regarding any such relevant requests and prior to releasing potentially privileged or exempt documents.

I. This MOU is subject, as applicable, to the laws of the United States of America.

J. All cooperative work under the provisions of this MOU will be accomplished without discrimination against any employee because of race, sex, creed, color, national origin, or any other legally protected class as identified in Federal or applicable state law.

K. This MOU shall remain in effect for an initial term as set forth in this MOU and may be renewed if the participants agree.

L. Each participant in this MOU will consult with the other participants in a timely manner to ensure coordination prior to release of any written statements intended for widespread publication that refer to this MOU.

M. Nothing in this MOU may be interpreted to imply that a participant endorses any product, service, or policy of the other participants, except as specifically set forth in this MOU. No participant will take any action or make any statement that suggests or implies such type of endorsements.

N. No participant in this MOU will be considered to have waived any policy, administrative or legal right hereunder.

O. This MOU may be amended, modified, or supplemented only by the written, signed agreement of the participants.

P. No Member of or Delegate to the Congress, or Resident Commissioner, or official of CAWCD, MWD, SNWA, ADWR, CRB, or CRCN or any Elector or Electors may benefit from this MOU other than as a water user or landowner in the same manner as other water users or landowners.

Q. No participant in this MOU intends for this MOU to confer any benefit upon any person or entity not a signatory to this MOU, whether as a third-party beneficiary or otherwise.

R. This MOU may be executed in counterparts, each of which will be an original and all of which, together, constitute only one MOU.

S. POINTS OF CONTACT

To the extent that written notices and/or requests are undertaken under the terms of this MOU, the participants may be contacted at the following addresses:

RECLAMATION:

Regional Director
Lower Colorado Region
Attention: LC-1000
500 Fir Street
Boulder City, NV 89005

CAWCD:

Central Arizona Water Conservation District
23636 North 7th Street
Phoenix, AZ 85024-3801
Attn: General Manager

MWD:

The Metropolitan Water District of Southern California
P.O. Box 54153
Los Angeles, CA 90054-0153
Attn: General Manager

SNWA:

Southern Nevada Water Authority
1001 South Valley View Boulevard, MS #485
Las Vegas, NV 89153
Attn: General Manager

ADWR:

Arizona Department of Water Resources
3550 North Central Avenue
Phoenix, AZ 85012
Attn: Director

CRB:

Colorado River Board of California
770 Fairmont Avenue, Suite 100
Glendale, CA 91203-1068
Attn: Executive Director

CRCN:

Colorado River Commission of Nevada
555 E. Washington Avenue, Suite 3100

Las Vegas, NV 89101
Attn: Executive Director

A participant may change its address by giving the other participants notice of the change in writing.

IN WITNESS WHEREOF, the participants hereto have executed this MOU on the day and year first written above.

Approved as to legal sufficiency:

THE UNITED STATES OF AMERICA

By: _____

By: _____

Terrance J. Fulp
Lower Colorado Regional Director
Bureau of Reclamation

Approved as to form:

**CENTRAL ARIZONA WATER
CONSERVATION DISTRICT**

By: _____
Jay M. Johnson
General Counsel

By: _____
David V. Modeer
General Manager

**THE METROPOLITAN WATER
DISTRICT OF SOUTHERN
CALIFORNIA**

By: _____

Jeffrey Kightlinger
General Manager

Approved as to form:

**SOUTHERN NEVADA WATER
AUTHORITY**

By: _____
Gregory J. Walch
General Counsel

By: _____
John J. Entsminger
General Manager

Approved as to form:

**ARIZONA DEPARTMENT OF WATER
RESOURCES**

By: _____
Kenneth C. Slowinski
Chief Counsel

By: _____
Michael J. Lacey
Director

**COLORADO RIVER BOARD OF
CALIFORNIA**

By: _____

Tanya Trujillo
Executive Director

Approved as to form:

**COLORADO RIVER COMMISSION
OF NEVADA**

By: _____
Jennifer Crandell
Special Counsel Attorney General

By: _____
Jayne Harkins
Executive Director

An aerial photograph of the Colorado River Delta, showing a winding river through a vast, arid landscape. The terrain is a mix of brown and tan, with some white, possibly salt-encrusted, areas. In the foreground, a large, stylized tree with a thick trunk and many branches is superimposed over the image, its roots extending towards the bottom left. The sky is clear and blue, with distant mountains visible on the horizon.

Minute 319 Colorado River Delta Environmental Flows Monitoring

Initial Progress Report

December 4, 2014

Authority

This report and study was carried out by the United States and Mexico in accordance with Section III.6- Water for the Environment and ICMA/ICS Exchange Pilot Program under Minute 319 of the International Boundary and Water Commission, United States and Mexico entitled “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”, dated November 20, 2012. This interim report was prepared as a step in furtherance of Minute No. 319 Art. III.6.f, and includes information on the environmental results achieved by the delivery of water pursuant to the pilot program.

Participating Agencies

International Boundary and Water Commission
United States and Mexico

For the United States:

Environmental Defense Fund

Sonoran Institute

The Colorado River Basin States

The Nature Conservancy

University of Arizona

U.S. Department of the Interior, Bureau of Reclamation

U.S. Geological Survey

For Mexico:

El Colegio de la Frontera Norte

Comisión Nacional de Áreas Naturales Protegidas

Comisión Nacional del Agua

Pronatura Noroeste

Universidad Autónoma de Baja California

Acknowledgements

This report was prepared for the International Boundary and Water Commission by Dr. Karl Flessa (University of Arizona), Dr. Eloise Kendy (The Nature Conservancy) and Karen Schlatter (Sonoran Institute) on behalf of all the people and organizations engaged in monitoring in the Colorado River Delta under Minute 319.

These efforts represent a collaborative effort of many entities who directly and indirectly participated in all phases of this study promoting a binational partnership among federal agencies, universities, and non-governmental organizations.

*Cover photo credit, Colorado River connecting to the delta- Francisco Zamora with support from LightHawk

Pulse Flow and Base Flow Monitoring Funding Provided By:

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Anne Ray Charitable Trust
Anonymous
Colegio de la Frontera Norte
Comisión Nacional de Áreas Naturales Protegidas
Comisión Nacional del Agua
The David and Lucile Packard Foundation
Environmental Defense Fund
International Boundary and Water Commission, United States and Mexico
LightHawk
Pronatura Noroeste
Raise the River
Sonoran Institute
Sonoran Joint Venture
The Nature Conservancy
University of Arizona
U.S. Department of the Interior, Bureau of Reclamation
U.S. Geological Survey
Universidad Autónoma de Baja California
Walton Family Foundation

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1.0 INTRODUCTION AND EXECUTIVE SUMMARY

1.1 INTRODUCTION

Minute No. 319 (Minute 319), 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, was signed by the two Sections of the International Boundary and Water Commission (IBWC) on November 20, 2012. A component of Minute 319 is Section III.6, Water for the Environment and ICMA/ICS Exchange Pilot Program (ICMA – Intentionally Created Mexican Allocation; ICS – Intentionally Created Surplus), which outlines that the “pilot program will arrange for the means to create 158,088 acre-feet (195 mcm) of water for base flow and pulse flow for the Colorado River Limitrophe and its delta by means of the participation of the United States, Mexico, and non-governmental organizations.” “Implementation of this Minute will provide a mechanism to deliver both base flow and pulse flow”...”tentatively during 2014 but no later than 2016.” “[T]he information developed through implementation of this Minute will be used to inform future decisions regarding binational cooperative efforts to address proactive actions in the Colorado River Delta.” “To provide for the delivery of the base flow and pulse flow for environmental purposes under this Minute, the Commissioners [of both Sections of the IBWC] will direct the Consultative Council and the Environmental Work Group to prepare a Delivery Plan, which will include a schedule of monthly flows, delivery points and volumes in an amount of approximately 105,392 acre-feet (130 mcm) for pulse flow and 52,696 acre-feet (65 mcm) for base flow.” A portion of the funds provided in Section III.6.d by the United States will provide funding for projects in Mexico which will generate 50% of this pulse flow. The sources of water to implement this flow shall be from ICMA created or water deferred by Mexico under Section III.1. The Consultative Council and Environmental Work Group formed and tasked a binational Environmental Flows Team (Table 1) to develop the Delivery Plan (membership included representatives of U.S. and Mexican Federal and State agencies and non-governmental organizations).

As part of the pilot program, Minute 319 required that “resources for a joint investigation of the different aspects of the pilot program should be obtained. The resources for this investigation should be provided by the United States and Mexico.” Environmental flows were one of the items to be investigated through an evaluation of the “the ecosystem response, most importantly the hydrological response, and secondarily, the biological response.” To achieve this goal, the binational Environmental Flows Team worked with scientists and experts to develop plans for ecosystem response monitoring. Ecosystem monitoring was conducted before, during, and after the March 23 to May 18, 2014 pulse flow. Monitoring activities were conducted in the riparian corridor of the Colorado River Delta (Fig. 1) by binational teams (Table 2) and these activities will continue through 2017. This Initial Progress Report summarizes activities and preliminary results through July 24, 2014. Additional reporting will follow with the preparation of an Interim Report by December 2016 and a Final Report by June 2018.

1.2 EXECUTIVE SUMMARY

As provided in Minute 319 of the U.S.-Mexico Water Treaty of 1944, a pulse flow of approximately 130 million cubic meters (105,392 acre-feet) was released to the riparian corridor of the Colorado River Delta from Morelos Dam at the U.S.-Mexico border. The water was delivered over an eight-week period

that began on March 23, 2014 and ended on May 18, 2014. Peak flows were released early in this period to simulate a spring flood. Some pulse flow water was released to the riparian corridor via Mexicali Valley irrigation canals.

Base flow volumes totaling 65 mcm (52,696 acre-feet) are also being delivered to new and pre-existing restoration areas during the term of Minute 319 through December 31, 2017. One hundred and twenty-nine hectares (320 acres) of non-native vegetation in the Laguna Grande area were cleared and graded to promote regeneration of native vegetation. Portions of the site were hydro-seeded with native vegetation and 38 hectares (94 acres) of the site were planted with native trees. In the Miguel Aleman restoration site, 35 hectares (86 acres) were cleared and graded and of these, 10 hectares (25 acres) were planted with native trees.

The monitoring program established by Minute 319 assembled baseline information on the hydrology and biology of the riparian corridor and deployed binational, multi-agency teams of scientists during and after the pulse flow. Results of these efforts through July 24, 2014 are reported in this interim report.

Ground-based and remotely-sensed data were collected to evaluate the ecosystem response to the pulse flow.

Surface water from the pulse flow rapidly infiltrated into the sandy subsurface in the first 60 km (37 miles) downstream of Morelos Dam. Scour and deposition modified the channel bed topography, but bank erosion of the existing channel was minor. Smaller volumes inundated the river channel farther downstream, including areas that had been prepared for restoration of native vegetation. Pulse flow surface water reached the Gulf of California on May 15, 2014.

The water table rose in response to the pulse flow. Groundwater effects dampened with increasing distance from the active channel. The initial slow groundwater-level rise in dry sediment was followed by more rapid changes in groundwater levels as the sediment saturated. The water table then declined at varying rates after its peak.

Seeds of both native and non-native vegetation dispersed during the pulse flow release and recession. Both native and non-native vegetation germinated in response to the pulse flow. Seedlings of native species were present primarily in Reaches 1 and 4 (Figure 1). Preliminary remote-sensing data and aerial observations suggest that greenness has increased, compared to prior years, since the pulse flow.

As expected, surveys of resident birds, in the short time since the pulse flow, showed little change over previous years. Populations of migratory birds are affected by many factors in addition to changes in the delta's riparian habitats.

Future work includes additional analyses of hydrologic and biological data collected during and immediately after the pulse flow, periodic ground-based and remotely-sensed monitoring of new and pre-existing vegetation, monitoring of ground water behavior in restoration sites, comparison of pre- and post-pulse flow Lidar data on topography and vegetation cover, and monitoring of bird life. Future reports are scheduled for December 2016 and June 2018.

Co-Chairs

Osvel Hinojosa, Pronatura Noroeste
Jennifer Pitt, Environmental Defense Fund

Team Members

Gilbert Anaya, International Boundary and Water Commission, US Section
Francisco Bernal, International Boundary and Water Commission, Mexican Section
Tom Buschatzke, Arizona Department of Water Resources
Yamilett Carillo, Colorado River Delta Water Trust
Adrian Cortez, International Boundary and Water Commission, US Section
Peter Culp, Squire Patton Boggs
Carlos de la Parra, Colegio de la Frontera Norte
Albert Flores, International Boundary and Water Commission, US Section
José Gutiérrez, CONAGUA
Kasandra Gutiérrez, CONAGUA
Ted Kowalski, Colorado Water Conservation Board
José Luis López Gerardo, CONAGUA
Mario López Pérez, CONAGUA
Jennifer McCloskey, United States Department of the Interior Bureau of Reclamation
Don Ostler, Upper Colorado River Commission
Carlos Pena, International Boundary and Water Commission, US Section
Antonio Rascón, International Boundary and Water Commission, Mexican Section
Adriana Reséndez, International Boundary and Water Commission, Mexican Section
Adriana Rodríguez, CONAGUA
Seth Shanahan, Southern Nevada Water Authority
Eduardo Soto, CONANP
Tanya Trujillo, Colorado River Board of California
Laura Vecerina, United States Department of the Interior, Bureau of Reclamation
Terri Wilson, United States Department of the Interior, Bureau of Reclamation
Amy Witherall, United States Department of the Interior, Bureau of Reclamation
Francisco Zamora, Sonoran Institute

Table 1. Representatives of the binational Minute 319 Environmental Flows Team

Project Management Team

Karl W. Flessa, Co-Chief Scientist, University of Arizona
Carlos de la Parra-Rentería, Co-Chief Scientist, Colegio de la Frontera Norte
Eloise Kendy, The Nature Conservancy
Karen Schlatter, Sonoran Institute

Hydrology Team

Jeff Kennedy, U.S. Geological Survey
James Leenhouts, U.S. Geological Survey
Erich Mueller, U.S. Geological Survey
Jorge Ramírez-Hernández, Universidad Autónoma de Baja California
J. Eliana Rodríguez-Burgueño, Universidad Autónoma de Baja California
Jack Schmidt, U.S. Geological Survey
Margaret Shanafield, Flinders University
Anna Morales, International Boundary and Water Commission, U.S. Section
Francisco Bernal, International Boundary and Water Commission, Mexican Section

Vegetation and Wildlife Team

Ed Glenn, University of Arizona
Martha Gomez-Sapiens, University of Arizona
Osvel Hinojosa-Huerta, Pronatura Noroeste
Karen Schlatter, Sonoran Institute
Pat Shafroth, U. S. Geological Survey
Eduardo Soto, Comisión Nacional de Áreas Naturales Protegidas

River Corridor Team for the Lower Delta

Karen Schlatter, Sonoran Institute
Francisco Zamora-Arroyo, Sonoran Institute

Remote-Sensing Team

Ed Glenn, University of Arizona
Pamela Nagler, U.S. Geological Survey
Steve Nelson, Independent scientist
Jeff Milliken, Bureau of Reclamation
Francisco Zamora-Arroyo, Sonoran Institute

Table 2. Representatives of binational teams responsible for monitoring the ecosystem response of the pulse flow and base flow.

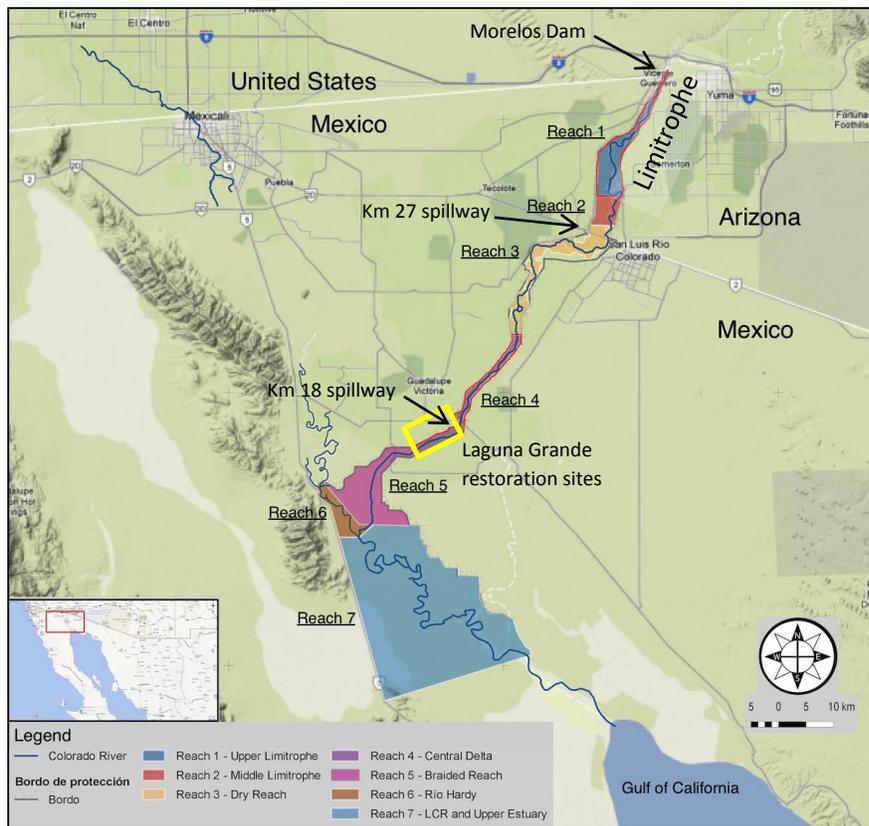


Figure 1. Colorado River Delta study reaches for Minute 319 monitoring activities.

2.0 SUMMARY OF MONITORING METHODOLOGY

The following list describes the general monitoring activities that have been conducted before, during, and after the pulse flow.

- Baseline (pre-pulse flow) conditions from published reports and from field observations were summarized.
- Surface-water discharge, groundwater behavior, and water salinity were measured during the pulse flow. Geophysical techniques were used in the Limitrophe section of the study area (i.e., Reach 1 and 2) to further understand the immediate groundwater response to the pulse flow.
- Post-pulse flow groundwater monitoring is on-going.
- Pulse flow arrival times were tracked on the ground using direct observations and temperature sensors.
- Scour chains, topographic surveys, grain-size analyses, and suspended sediment samples were used to estimate erosion and deposition.
- The areal extent of inundation was documented as the flow progressed, using direct observations and aerial and satellite (Landsat, WorldView) images.
- Light Detection and Ranging data were acquired before and after the pulse flow to document topographic changes resulting from the pulse flow and to help map the distribution, composition, and structure of vegetation.

- Topography was surveyed along 21 transects perpendicular to the channel in order to relate the germination, growth, and survival of new vegetation to changes in channel and floodplain topography.
- Germination of native and non-native vegetation was surveyed along 21 transects co-located with topographic survey transects and groundwater monitoring sites. The influx of seeds, changes in soil salinity and texture, and vegetation cover along the 21 transects were monitored before and during the pulse flow.
- One hundred and twenty-nine hectares (320 acres) of non-native vegetation in the Laguna Grande area were cleared and graded to promote regeneration of native vegetation. Portions of the site were hydro-seeded with native vegetation and 38 hectares (94 acres) of the site were planted with native trees. Detailed surveys of new vegetation, groundwater conditions, soil conditions, and bird populations were conducted.
- In the Miguel Aleman restoration site, 35 hectares (86 acres) were cleared and graded and of these, 10 hectares (25 acres) site were planted with native trees.
- Vegetation health (“greenness”) assessments that began in 2000 using satellite-based remote-sensing data are on-going.
- Photographic images at fixed locations within the riparian corridor shortly before and during the pulse flow were assembled. Repeat photography continues to be collected.
- Baseline vegetation and riparian bird surveys (begun in 2002) and marsh bird surveys (begun in 2004) were expanded to include additional areas in the Limitrophe, restoration sites and elsewhere.
- Zooplankton and water quality continue to be monitored between the Gulf of California and the lowermost river reaches.

3.0 INITIAL RESULTS

3.1 PULSE FLOW AND BASE FLOW WATER DELIVERIES

The pulse flow delivered a total of 132¹ million cubic meters (mcm) (107,000 acre-feet [af]) to the riparian corridor of the Colorado River Delta, starting March 23 and ending on May 18, 2014. Water was delivered from Morelos Dam, and from the Km 27 spillway of Canal Reforma (river km 37; river mile 23) and the Km 18 spillway of Canal Barrote (river km 79; river mile 49) (Fig. 1 and Fig. 2).

¹¹ 130 mcm were delivered as the pulse flow delivery, and an additional 2 mcm were delivered as operational surplus.

PULSE FLOW DELIVERY

MARCH 23 - MAY 18, 2014

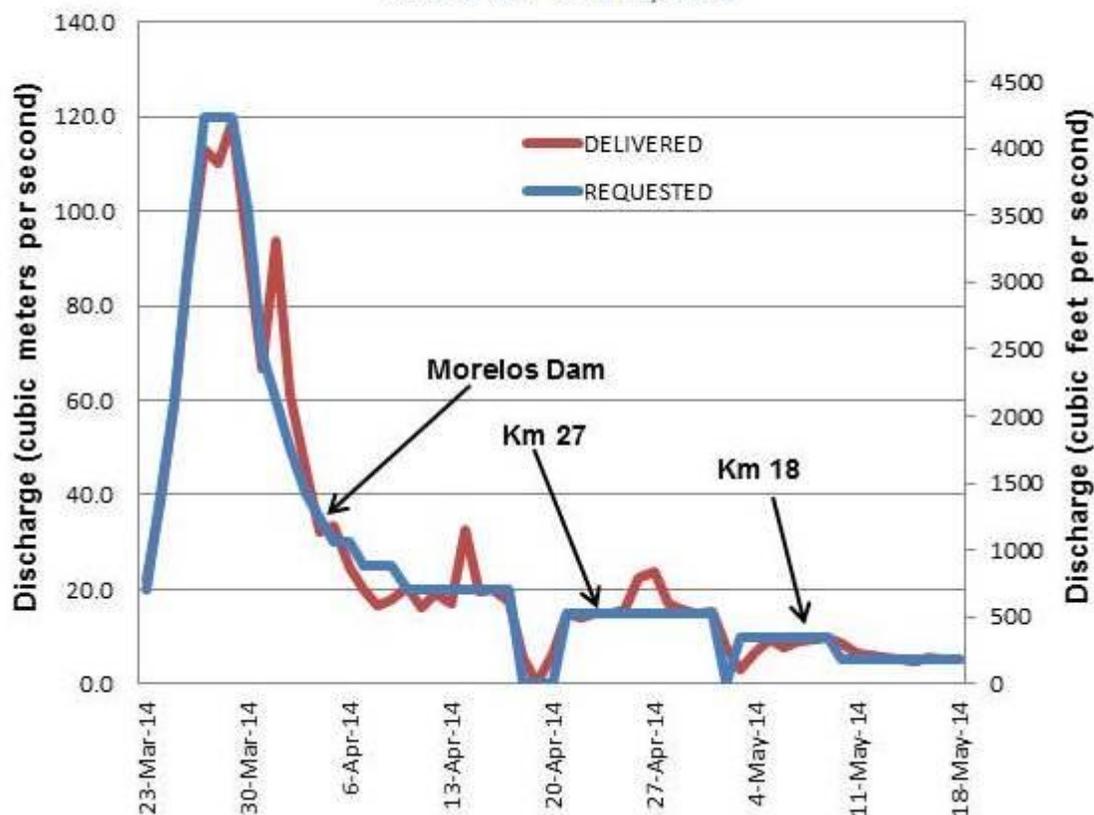


Figure 2. Delivered and requested pulse flow water deliveries to the study area. Scheduled Morelos Dam deliveries began on March 23 and ended on April 17; deliveries from the Km 27 spillway of Canal Reforma (at river km 37; river mile 23) began on April 13 and ended on May 1; deliveries from the Km 18 spillway of Canal Barrote (at river km 79; river mile 49) began on May 3 and ended on May 18, 2014. Source: Mexican Section of IBWC.

Since November 20, 2012, the Colorado River Delta Water Trust has delivered base flows to the Laguna Grande and Miguel Aleman restoration sites. Base flows to support habitat restoration are scheduled to continue through 2017 and official accounts of past base flow deliveries are not available at this time.

3.2 SURFACE WATER

Published records, satellite images and direct observations indicate that surface water from the Colorado River had not reached the sea since at least 2000.

Streamflow decreased rapidly with increasing distance downstream (Fig. 3). The pulse flow's surface water front advanced at highly variable rates (Fig. 4; from about 1 to 20 km per day or 0.5 to 13 miles per day), advancing faster when the channel surface was wet than when it was dry. The pulse flow reached the Laguna Grande restoration sites in Reach 4 on April 5-6. Pulse flow releases from the Km 18 spillway, which began on May 3, enabled the water front to resume its downstream flow; pulse flow water connected with tidal water from the Gulf of California in the afternoon of May 15, 2014 (Fig. 5).

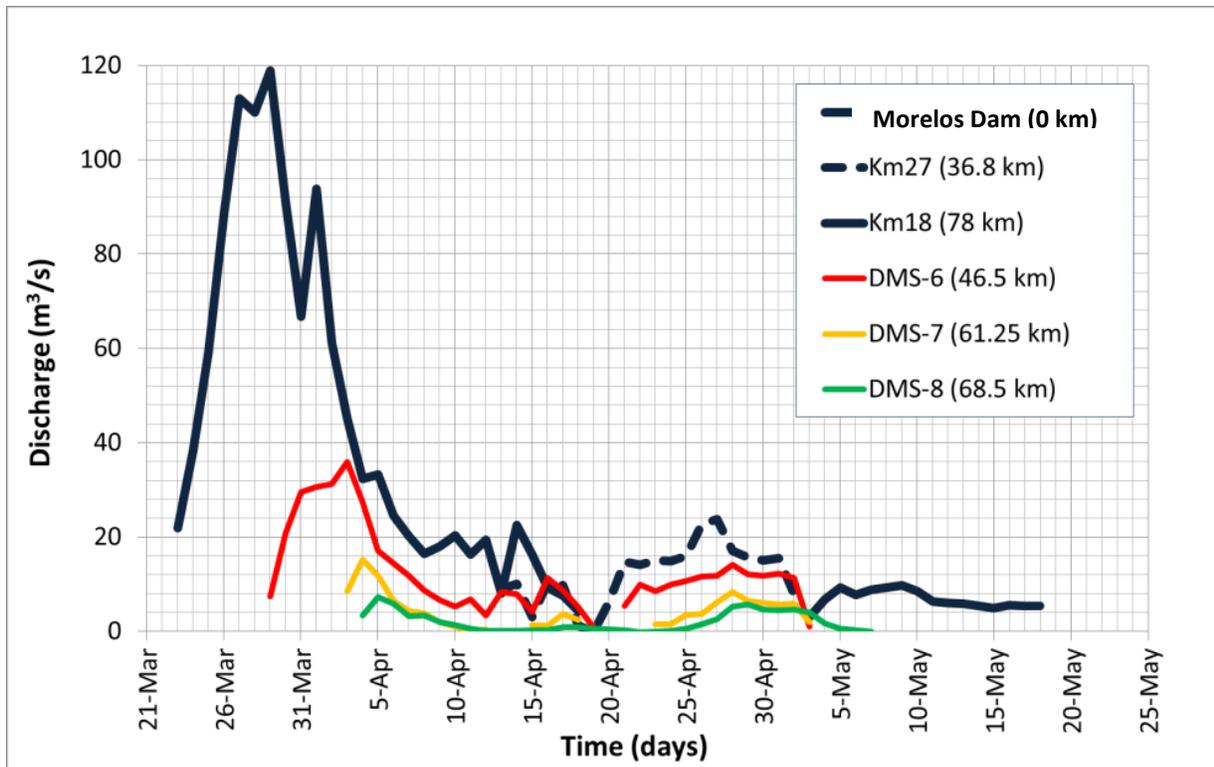


Figure 3. Variation in discharge through time at three discharge measuring stations (DMS 6, 7 and 8 – colored lines) in Reach 3 and discharges at Morelos Dam (Presa Morelos) and at the Km 27 and Km 18 spillways (black lines). Note the delay in the time of peak flows, and the reduced discharges at the measuring stations relative to the Morelos Dam and Km 27 spillway. Km 18 releases occurred downstream of DMS 8 and had no effect on the discharges measured upstream. Scale conversion: 100 m³/s (cubic meters per second) is approximately 3,500 ft³/sec (cfs). Distance information (in parenthesis) indicates distance of measuring stations from Morelos Dam, in kilometers.

Surface flows were slowed or impeded by vegetation in the channels, diverted into former meanders, or ponded behind road crossings or informal, locally constructed dams. Less than one percent of the total pulse flow release mixed with tidal waters from the Gulf of California for this operational release strategy (Fig. 6). Surface flow from the pulse stopped about May 24, 2014. Surface flows inundated approximately 1,830 hectares (ha) (4,522 acres) of channel and floodplain. Approximately 50 ha (120 acres) of the 109 ha (270 acres) of the prepared areas in the Laguna Grande restoration area were flooded.



Figure 4. Progress of surface pulse flow water. Source: U.S. Department of the Interior, Bureau of Reclamation.



Figure 5. View looking north, from tidal waters of the Gulf of California (lower) to approaching Colorado River pulse flow (upper). **A.** Tidal channel (lower) and Colorado River (upper) May 13, 2014. **B.** Flooded area at high tide (lower, muddy water) connected with pulse flow of Colorado River (upper, blue water). May 15, 2014. Both images by Francisco Zamora, Sonoran Institute, with aerial support from LightHawk.

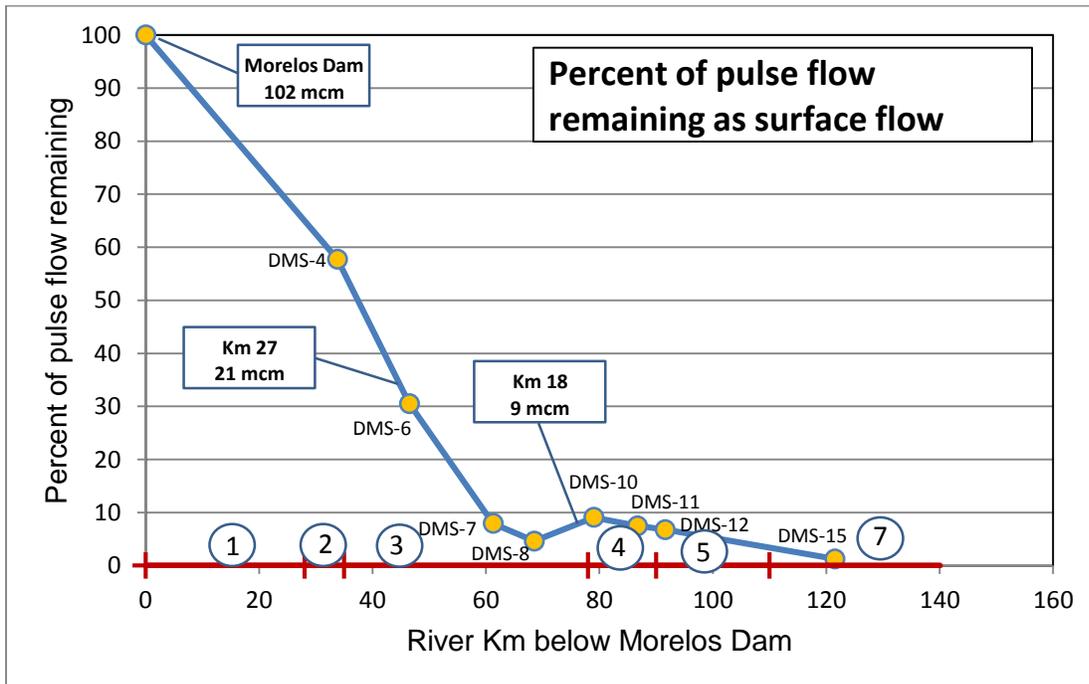


Figure 6. Percentage of total pulse flow remaining as surface flow with increasing distance (as river km) downstream from Morelos Dam. Morelos Dam released 102 million cubic meters (mcm) = 83,000 acre-feet (af); Km 27 spillway released 21 mcm = 17,000 af; Km 18 spillway released 9 mcm = 7,000 af. DMS numbers refer to discharge measuring stations. Circled numbers between red tick marks indicate river reaches. Distance scale: 60 river km = 37 miles; 100 km = 62 miles.

3.3 GROUNDWATER

Information on baseline groundwater conditions from published studies showed that the pre-pulse water table was at or near the surface in Reach 1, decreased sharply in Reaches 2 and 3, was close to the surface in Reach 4, and decreased again until the confluence with the Hardy River.

Most of the pulse flow's water infiltrated to groundwater, transpired from plants, evaporated from soil and water surfaces, or was retained in soil and topographic depressions. A significant portion of the pulse flow water infiltrated into the aquifer beneath Reaches 1, 2 and 3. More than 90 percent of the water released from Morelos Dam and Km 27 spillway did not flow farther than river km 60 (river mile 37), 26 km (16 mi) downstream of the Southerly International Boundary (Fig. 6).

The water table in all reaches rose in response to the pulse flow. Aquifer response to the pulse flow varied along the river, across transects, and with time. Generally, groundwater behavior mimicked surface-water fluctuations. Groundwater effects dampened with increasing distance from the active channel. The initial slow groundwater-level rise in dry sediment was followed by more rapid changes in groundwater levels as the sediment saturated. The water table then declined at varying rates after its peak (Fig 7). Quantitative models are being developed to describe and predict infiltration behavior of surface water under various conditions.

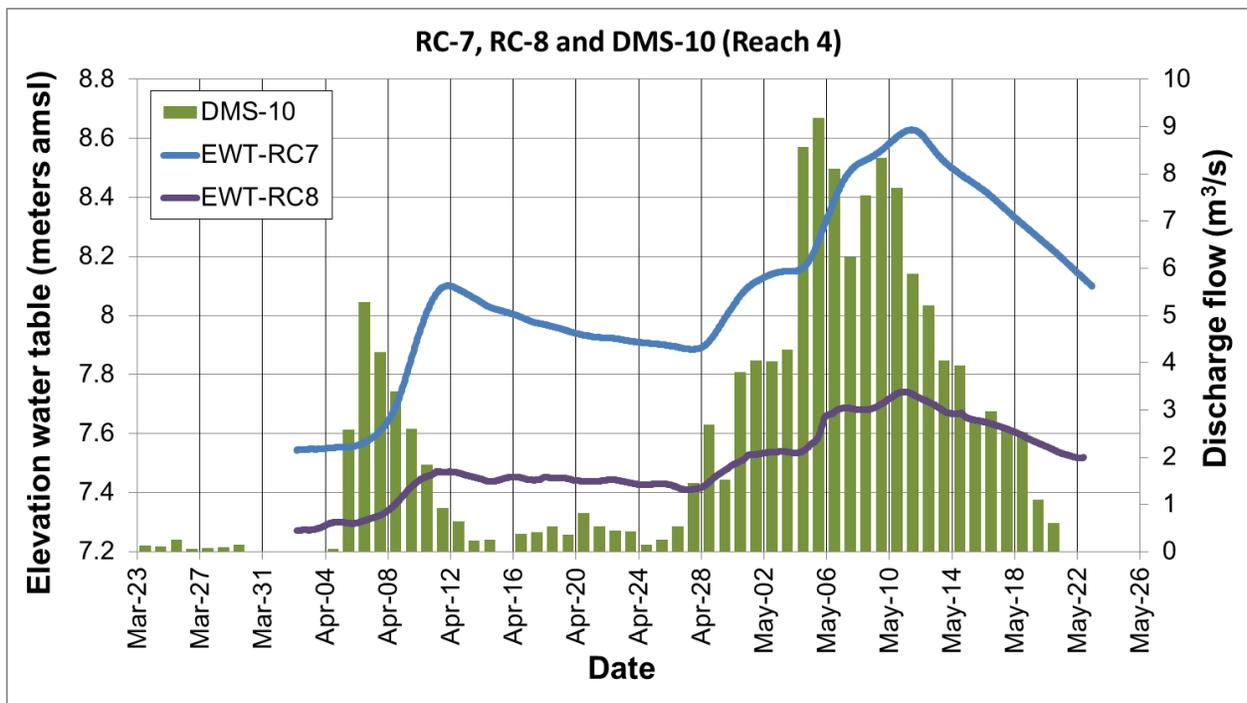


Figure 7. Example of groundwater response to pulse flow in Reach 4. Green bars show surface discharge at DMS 10 through time. Solid lines show elevation of water table (EWT) above mean sea level at two locations downstream (RC-7, RC-8) of DMS 10. English equivalents: 8.8 m = 29 ft; 10 cms = 353 cfs.

3.4 GEOMORPHOLOGY

Baseline assessments of riparian geomorphology are based on high-resolution pre-pulse topographic surveys along 36 cross-channel transects, and pre-pulse airborne Lidar surveys.

Channel and floodplain sediments are predominantly sand. In places, the pulse flow scoured sediment to depths of approximately one meter (3.3 ft), and deposited about two meters (6.6 ft) of sediment farther downstream. Scour and deposition modified the channel bed topography (Fig. 8), but bank erosion of the existing channel was minor. Models are being developed of sediment movement under different flow regimes in order to understand and predict geomorphic changes resulting from river flows.

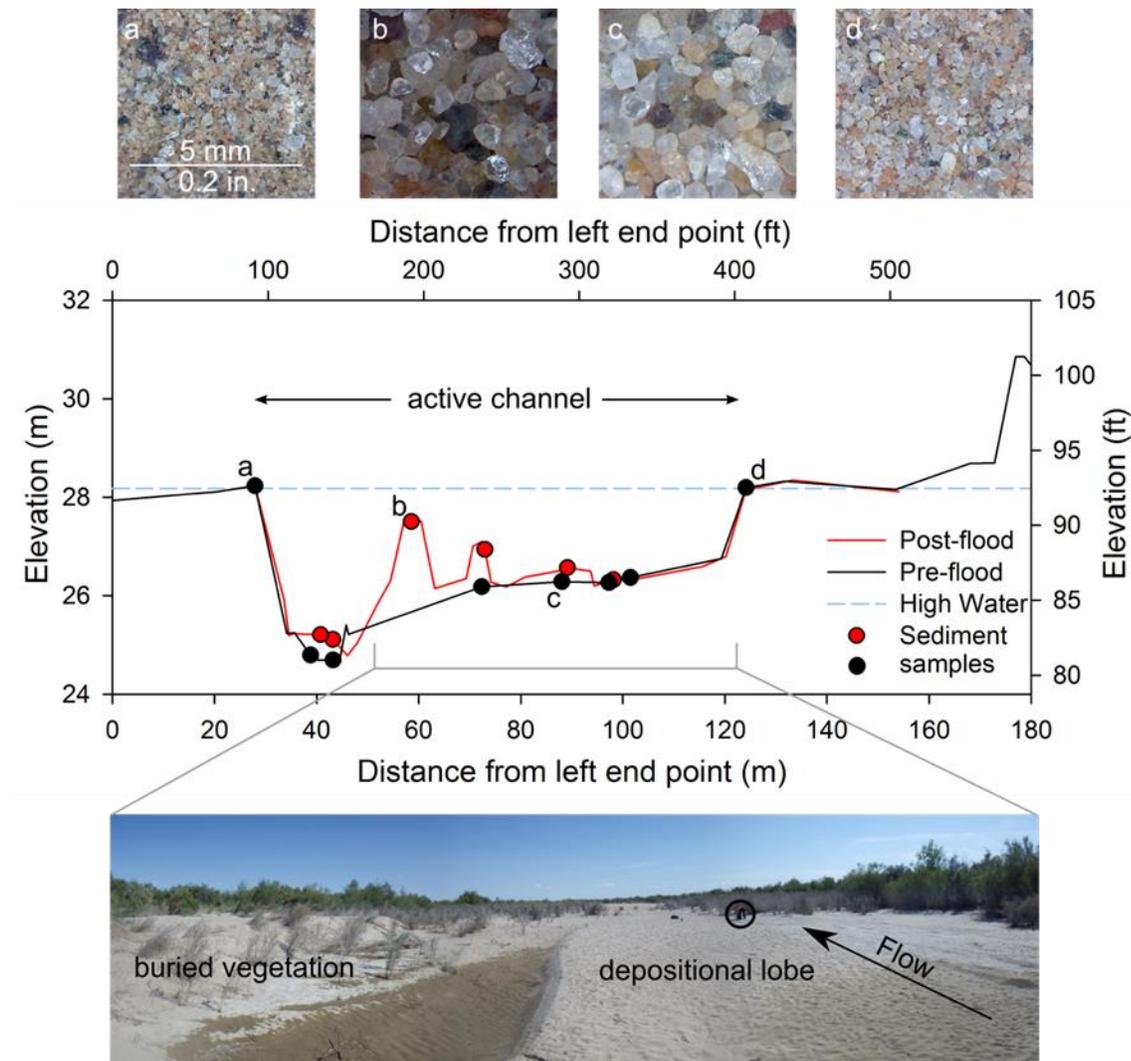


Figure 8. Example of channel change at USGS cross section 12 in the Limitrophe reach (32° 34' 20" N; 114° 48' 36" W [NAD83]). (Top) Microscope camera ("sandcam") images of sediment at different locations across the channel as indicated in the middle panel. (Middle) Pre- and post-flood surveys showing net aggradation at this cross-section. Black and red dots show the location of pre- and post-flow sediment samples, respectively. Vertical axes show elevation above mean sea-level (NAVD88). (Bottom) Image looking downstream at the cross-section; a person is circled for scale at the location of the cross-section.

3.5 VEGETATION

Baseline information on the distribution of vegetation and presence of seedlings is based on the published literature, ongoing surveys by Pronatura Noroeste, and 21 pre-pulse seedling surveys.

Seeds of both native and non-native vegetation dispersed during the pulse flow release and recession. Both native and non-native vegetation germinated in response to the pulse flow (Fig 9). Seedlings of native species were present primarily in Reaches 1 and 4.



Figure 9. Cottonwood (left) and willow (right) seedlings in the Laguna Grande restoration site on May 17, 2014, approximately 1.5 months following the arrival of the pulse flow to the site. Seedlings are approximately 4-5cm (1.8 inches) in height.

Seedlings of non-natives, principally *Tamarix* spp. (saltcedar), were common in all reaches. The survival of native and non-native seedlings through the first summer after the pulse flow was assessed in October 2014.

Growth and survival of native and non-native seedlings will mostly depend on soil moisture derived from groundwater. Green vegetation, as measured by the MODIS satellite sensor, decreased steadily in all river reaches from 2000 through April 9, 2014 (Fig. 10), indicating increased plant water stress. Preliminary remote-sensing data (June 2014) and aerial observations suggest that greenness has increased since the pulse flow. Landsat 8 imagery over all river reaches showed a 36% increase in NDVI (Normalized Difference Vegetation Index - a measure of greenness) in June, 2014 compared to June, 2013. NDVI increased in all reaches except Reach 4, where vegetation had been cleared prior to the flow

event to promote flooding and germination, and Reach 6, which drains the Rio Hardy and is above the confluence with the Colorado River. A marked greening occurred in Reach 7 at the end of the pilot canal where water from the pulse spilled onto the floodplain.

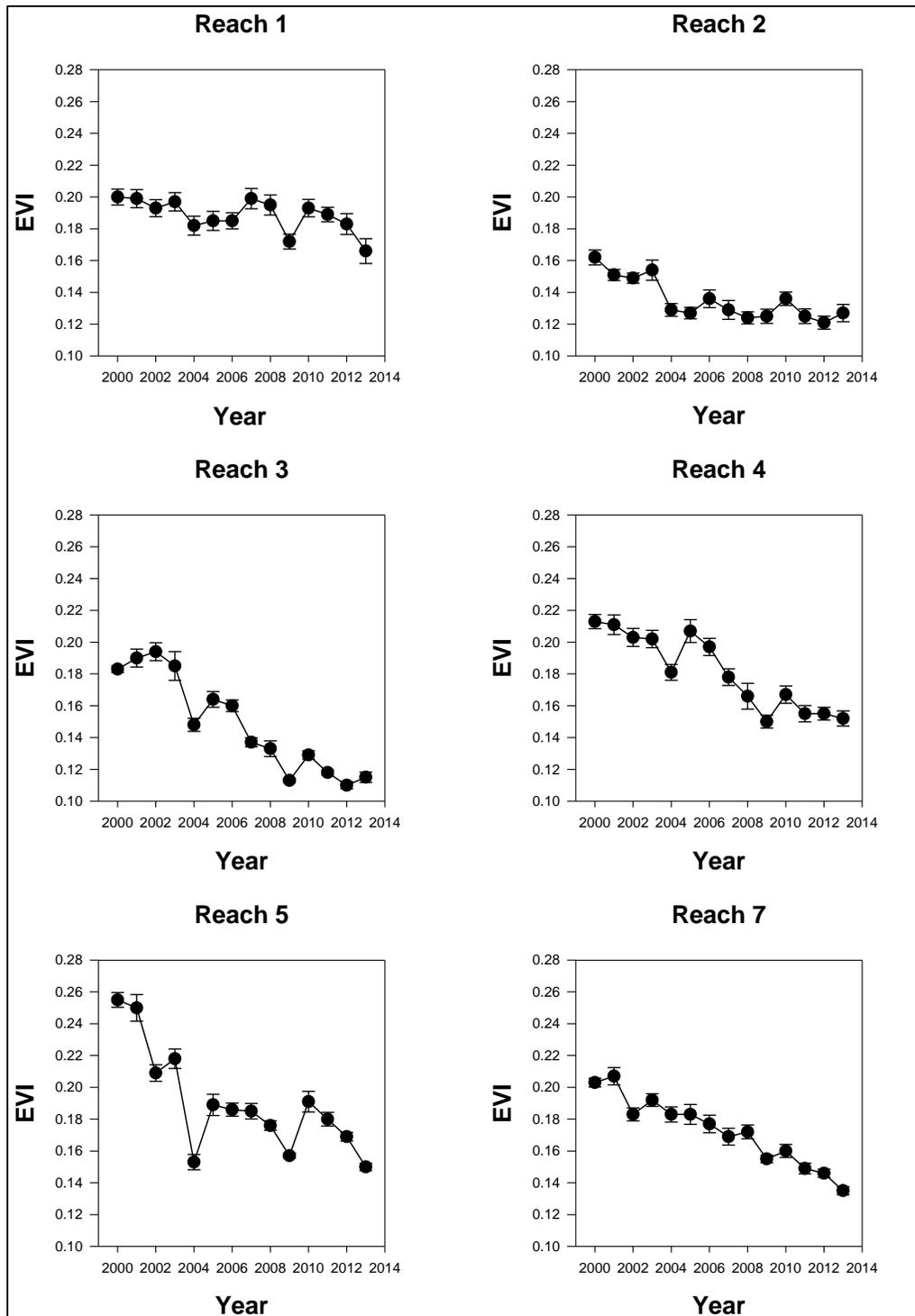


Figure 10. Decrease in the Enhanced Vegetation Index (EVI) from MODIS imagery in Colorado River Delta river reaches, 2000- April 9, 2014. Annual means are based on 23 16-day composite collections at 5 sites per reach.

Error bars are standard errors of means. Across reaches, EVI decreased by 31%, which corresponds to a 59% decrease in green foliage density after subtracting out the value for bare soil (about 0.1).

3.6 BIRDS

Baseline (pre-pulse) information about birds has been assembled from the published literature and ongoing surveys of birds conducted by Pronatura Noroeste since 2002.

Average abundance of birds in the riparian corridor has increased from 2002 to 2013, but species diversity has decreased (Fig. 11) and composition has changed. The abundance of riparian-dependent land birds and breeding water birds has declined, while the abundance of birds related to agricultural and urban development, exotic birds, and raptors has increased. Spring 2014 surveys were conducted during the pulse flow; winter 2014 surveys were conducted in January 2014 before the pulse; summer 2014 surveys were conducted after the pulse. No changes were observed in the spring 2014 surveys in the riparian zone relative to the previous spring. Preliminary analyses suggest an increased presence of migratory birds along open water areas but the abundance of migratory birds is controlled by many factors in addition to changes in this local habitat. Bird abundance and species richness were higher in the active restoration sites than throughout the rest of the floodplain. Bird populations are expected to change if existing and new vegetation responds to the pulse flow. Such changes should be evident from longer-term monitoring activities.

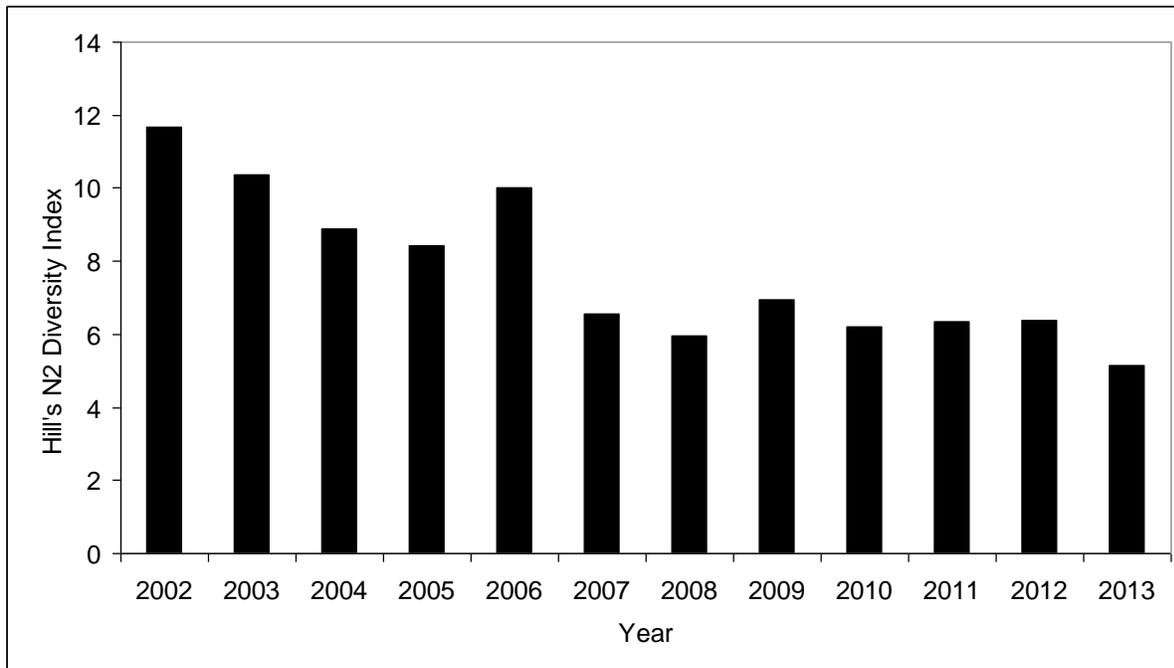


Figure 11. Average avian diversity (Hill's N2 Diversity Index) per point from 2002 to 2013 at 136 survey sites along the floodplain of the Colorado River in Mexico, between the Southerly International Boundary and the confluence of the Colorado with the Hardy River.

4.0 CONTINUING ACTIVITIES

The immediate, direct hydrological effects of the pulse flow will become evident as additional data are gathered and analyzed. The biological response to the pulse flow will take more time to develop, and will require additional monitoring, analysis, and synthesis. Existing vegetation response to the pulse flow and groundwater levels will be tracked, as will the survival and growth of new vegetation, the success of active restoration efforts, changes in bird populations, and changes in zooplankton.

Hydrology and biology are closely linked in this arid environment. A wealth of high-quality data continues to be collected to assess the ecosystem response of the pulse flow. Understanding hydrology and biology response in the riparian zone of the Colorado River Delta is essential to understanding the effects of the pulse flow of 2014.

Steering Committee Schedule

2015

- 2/25 **Financial Work Group Conference Call**
9:00 am pst(10:00 mst) – 10:30 am pst(11:30 mst)
- 2/25 **Work Group Conference Call – Revisions PDD Planet Ranch**
1:00 pm pst (2:00 mst) – 2:30 pm pst(3:30 mst)
- 4/6 **Work Group Meeting 1:30 pdt/mst**
Yuma, AZ
- 4/7 – 4/9 **“10 yr Anniversary Tour”**
- 4/22 **Steering Committee Meeting 9:30 am – 12:30 pm pdt/mst**
McCarran Airport, Las Vegas
- 5/6 - 5/7 **Work Group Meeting – Review of FY16 Work Plan**
5/6 Start 9:30 am pdt/mst - 5/7 End 1:00 pm pdt/mst
Arizona Department of Water Resources, Phoenix
- 6/24 **Steering Committee Conference Call 9:30 – 10:30 am pdt/mst**
- September **Work Group Meeting**
- 10/28 **Steering Committee Meeting**

Future Steering Committee Meetings

| | | | |
|----------|-----------|----------|-----------|
| 4/27/16 | Meeting | 4/26/17 | Meeting |
| 6/22/16 | Conf Call | 6/28/17 | Conf Call |
| 10/26/16 | Meeting | 10/25/17 | Meeting |

Related Conferences

- 12/10 – 12/2014 Colorado River Water Users (CRWUA) Annual Conference
Las Vegas, NV
- 1/7-8/2015 Colorado River Aquatic Biologists (CRAB) Meeting
Laughlin, NV
- 1/27-29/2015 Colorado River Terrestrial and Riparian (CRTR) Meeting
Laughlin, NV

Dec 01, 2014

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>

| | PERCENT | Content 1000 ac-ft (kaf) | Elev. (Feet above mean sea level) | 7-Day Release (CFS) |
|--|---------|--------------------------------|---|---------------------------|
| CURRENT STORAGE | FULL | | | |
| LAKE POWELL | 49% | 11,929 | 3601.87 | 8,500 |
| * LAKE MEAD | 39% | 10,309 | 1083.57 | 12,100 |
| LAKE MOHAVE | 84% | 1,520 | 636.32 | 9,500 |
| LAKE HAVASU | 93% | 576 | 447.77 | 4,300 |
| TOTAL SYSTEM CONTENTS ** | 50% | 29,742 | | |
| As of 11/30/2014 | | | | |
| SYSTEM CONTENT LAST YEAR | 50% | 29,570 | | |
| * 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 | 49% | 1,123 | | |
| Painted Rock Dam | 0% | 0 | 530.00 | 0 |
| Alamo Dam | 6% | 55 | 1089.13 | 10 |
| Forecasted Water Use for Calendar Year 2014 (as of 12/1/2014) (values in kaf) | | | | |
| NEVADA | | | 226 | |
| SOUTHERN NEVADA WATER SYSTEM | | | | 200 |
| OTHERS | | | | 26 |
| CALIFORNIA | | | 4,557 | |
| METROPOLITAN WATER DISTRICT OF CALIFORNIA | | | | 1,079 |
| IRRIGATION DISTRICTS | | | | 3,371 |
| OTHERS | | | | 107 |
| ARIZONA | | | 2,773 | |
| CENTRAL ARIZONA PROJECT | | | | 1,622 |
| OTHERS | | | | 1,151 |
| TOTAL LOWER BASIN USE | | | | 7,556 |
| DELIVERY TO MEXICO - 2014 (Mexico Scheduled Delivery + Preliminary Yearly Excess ¹) | | | | 1,537 |
| OTHER SIGNIFICANT INFORMATION | | | | |
| UNREGULATED INFLOW INTO LAKE POWELL - DECEMBER FINAL FORECAST DATED 12/1/2014 | | | | |
| | | MILLION ACRE-FEET | % of Normal | |
| OBSERVED WATER YEAR 2014 | | 10.380 | 96% | |
| OBSERVED APRIL-JULY 2014 | | 6.923 | 97% | |
| NOVEMBER OBSERVED INFLOW | | 0.418 | 88% | |
| DECEMBER INFLOW FORECAST | | 0.360 | 99% | |
| | | Upper Colorado Basin | Salt/Verde Basin | |
| WATER YEAR 2015 PRECIP TO DATE ² | | 83% (4.7") | 40% (1.7") | |
| CURRENT BASIN SNOWPACK ² | | 95% (3.3") | 21% (0.1") | |

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

² Precipitation and snowpack values may vary significantly from week-to-week this early in the water year.

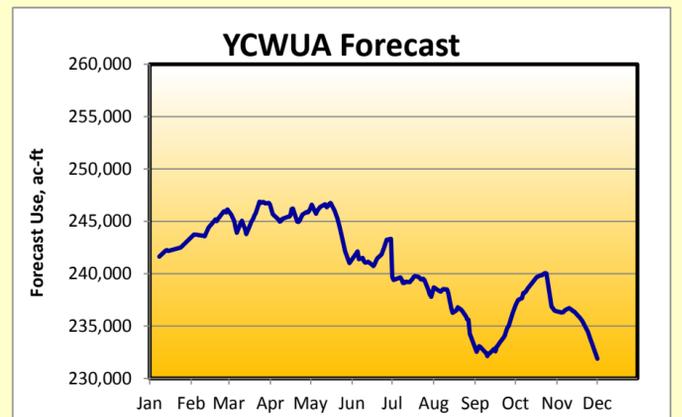
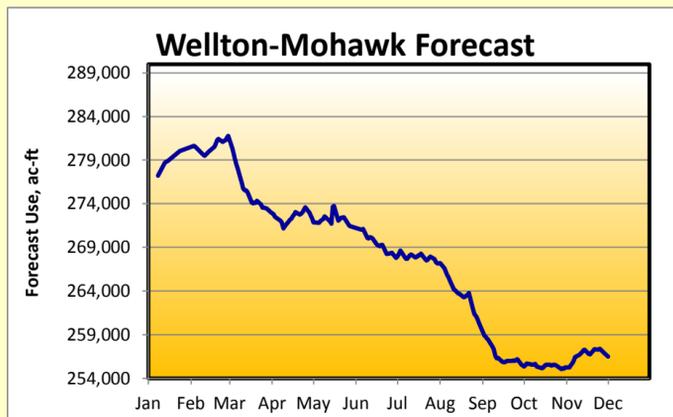
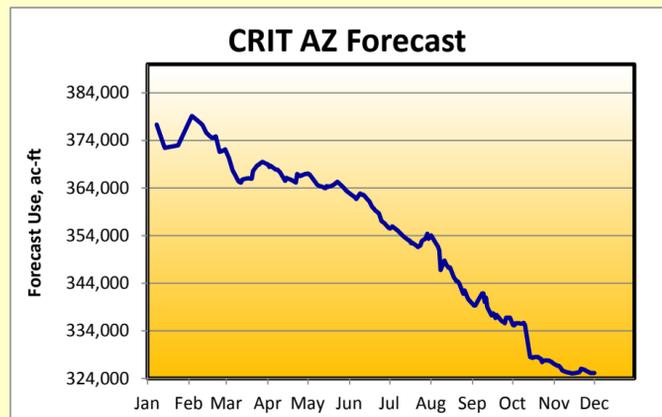
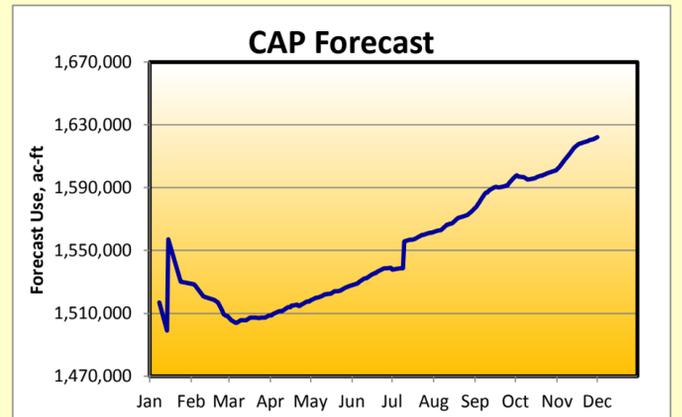
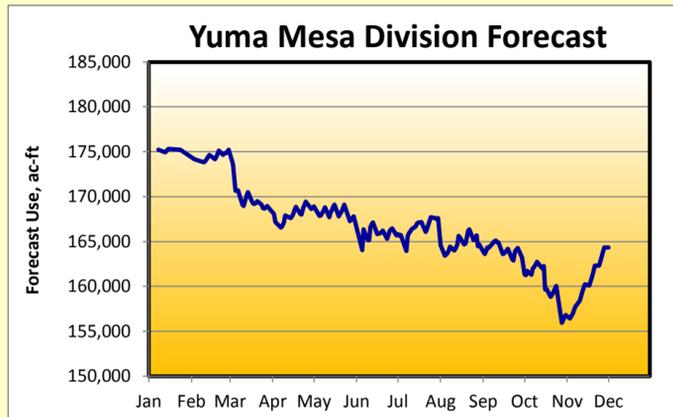
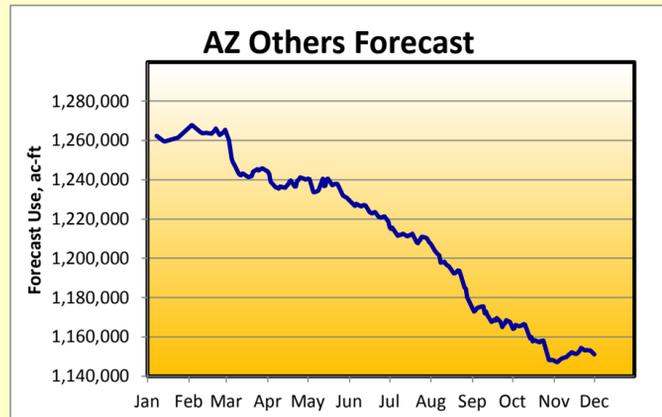
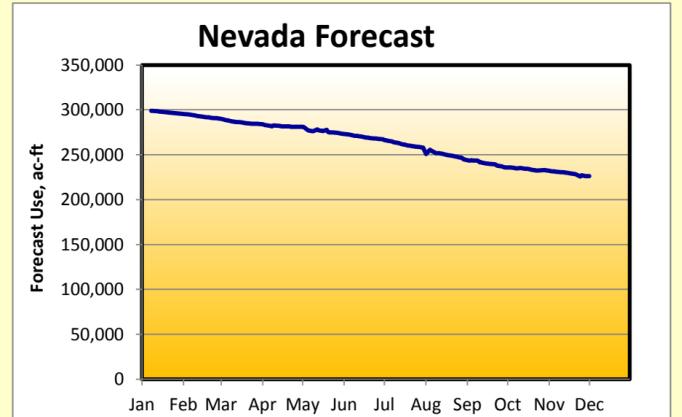
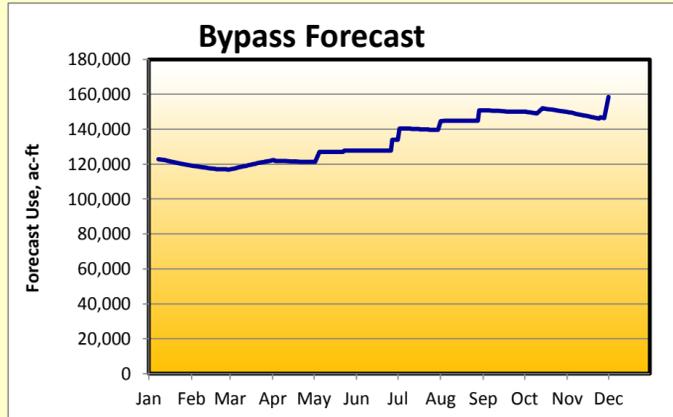
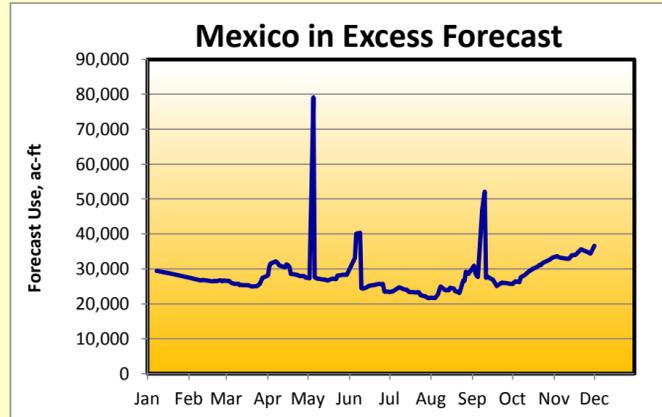
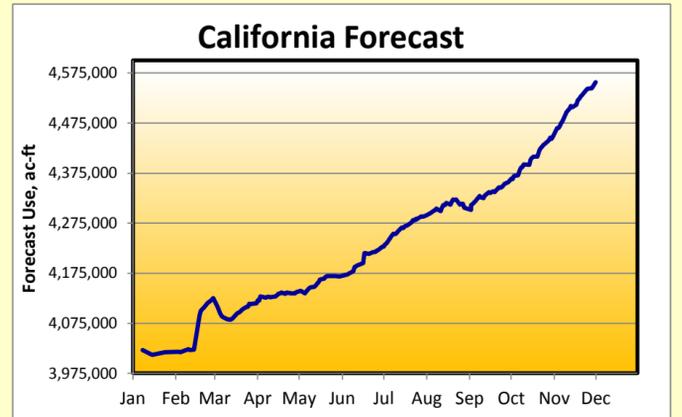
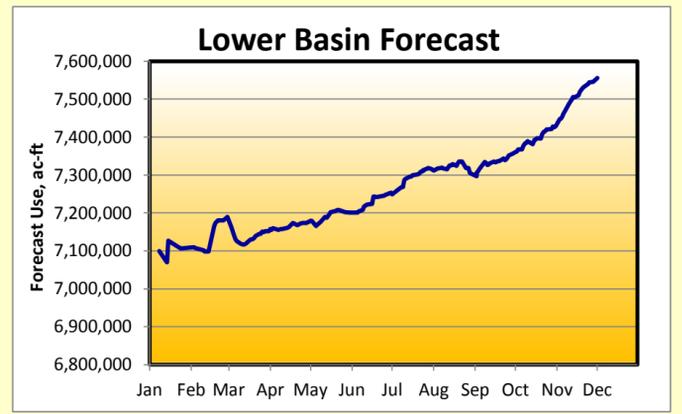
**U.S. BUREAU OF RECLAMATION
LOWER COLORADO REGION
PROVISIONAL CY2014**

ARIZONA, CALIFORNIA, NEVADA, MEXICO
FORECAST OF END OF YEAR CONSUMPTIVE USE
FORECAST BASED ON USE TO DATE AND APPROVED ANNUAL WATER ORDERS¹
(ACRE-FEET)

WATER USE SUMMARY

| | Use To Date CY2014 | Forecast Use CY2014 | Approved Use ² CY2014 | Excess to Approval CY2014 |
|--|------------------------|------------------------|-------------------------------------|------------------------------|
| ARIZONA | 2,618,018 | 2,773,278 | 2,790,734 | -17,456 |
| CALIFORNIA | 4,407,311 | 4,556,552 | 4,057,609 | 498,943 |
| NEVADA | 214,402 | 226,135 | 300,000 | -73,865 |
| STATES TOTAL³ | 7,239,731 | 7,555,965 | 7,148,343 | 407,622 |
| MEXICO IN SATISFACTION OF TREATY (Including downward delivery) TO MEXICO AS SCHEDULED | 1,473,511 1,441,898 | 1,536,613 1,500,000 | 1,500,000 | 36,613 |
| MEXICO IN EXCESS OF TREATY BYPASS PURSUANT TO MINUTE 242 | 31,613 133,182 | 36,613 158,456 | | |
| TOTAL LOWER BASIN & MEXICO | 8,846,424 | 9,251,034 | | |

1/ Incorporates Jan-Sept 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.

**U.S. BUREAU OF RECLAMATION
LOWER COLORADO REGION
PROVISIONAL CY2014**

NOTE:

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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 | Forecast | Estimated | Excess to | Diversion | Forecast | Approved | Excess to |
|---|------------------|------------------|-----------|-----------|------------------|------------------|------------------|-----------|
| | To Date | Use | Use | Estimated | To Date | Diversion | Diversion | Approved |
| | CY2014 | CY2014 | CY2014 | CY2014 | CY2014 | CY2014 | CY2014 | CY2014 |
| CALIFORNIA PUMPERS | 1,874 | 1,959 | 1,959 | --- | 3,347 | 3,499 | 3,499 | 0 |
| FORT MOJAVE INDIAN RESERVATION, CA | 7,944 | 8,116 | 8,996 | --- | 14,766 | 15,086 | 16,720 | -1,634 |
| CITY OF NEEDLES (includes LCWSP use) | 1,847 | 1,931 | 1,931 | 0 | 2,602 | 2,720 | 2,720 | 0 |
| METROPOLITAN WATER DISTRICT | 1,067,608 | 1,078,738 | 546,660 | --- | 1,070,282 | 1,081,676 | 549,763 | --- |
| COLORADO RIVER INDIAN RESERVATION, CA | 3,294 | 3,444 | 3,444 | --- | 5,652 | 5,909 | 5,909 | 0 |
| PALO VERDE IRRIGATION DISTRICT | 418,411 | 423,309 | 428,892 | --- | 904,928 | 946,928 | 957,250 | -10,322 |
| YUMA PROJECT RESERVATION DIVISION | 55,357 | 57,211 | 47,886 | --- | 94,136 | 99,836 | 102,700 | -2,864 |
| YUMA PROJECT RESERVATION DIVISION - INDIAN UNIT | --- | --- | --- | --- | 43,775 | 46,975 | 49,100 | -2,125 |
| YUMA PROJECT RESERVATION DIVISION - BARD UNIT | --- | --- | --- | --- | 50,361 | 52,861 | 53,600 | -739 |
| YUMA ISLAND PUMPERS | 4,758 | 4,974 | 4,974 | --- | 8,609 | 9,001 | 9,001 | 0 |
| FORT YUMA INDIAN RESERVATION - RANCH 5 | 646 | 675 | 675 | --- | 1,168 | 1,221 | 1,221 | 0 |
| IMPERIAL IRRIGATION DISTRICT | 2,436,107 | 2,538,129 | 2,544,150 | -6,021 | 2,425,758 | 2,532,194 | 2,645,857 | --- |
| SALTON SEA SALINITY MANAGEMENT | 78,436 | 90,000 | 90,000 | 0 | 81,660 | 92,342 | 93,451 | --- |
| COACHELLA VALLEY WATER DISTRICT | 330,219 | 347,219 | 352,000 | -4,781 | 345,181 | 362,933 | 366,370 | --- |
| OTHER LCWSP CONTRACTORS | 622 | 650 | 650 | --- | 972 | 1,016 | 1,016 | 0 |
| CITY OF WINTERHAVEN | 66 | 69 | 69 | --- | 99 | 104 | 104 | 0 |
| CHEMEHUEVI INDIAN RESERVATION | 122 | 128 | 128 | --- | 10,847 | 11,340 | 11,340 | 0 |
| TOTAL CALIFORNIA | 4,407,311 | 4,556,552 | | | 4,970,007 | 5,165,805 | 4,766,921 | |

CALIFORNIA ADJUSTED APPORTIONMENT CALCULATION

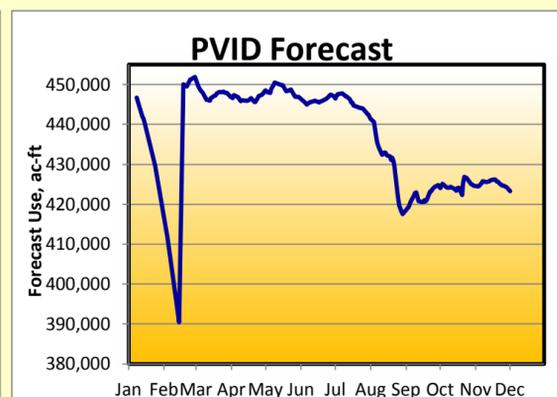
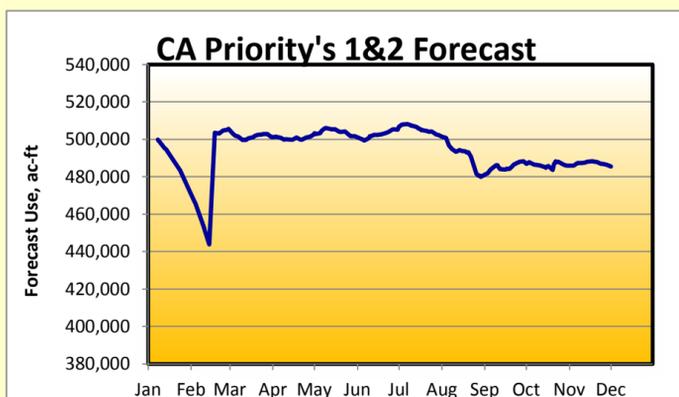
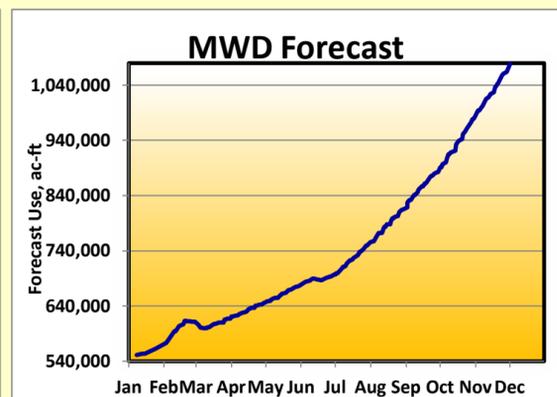
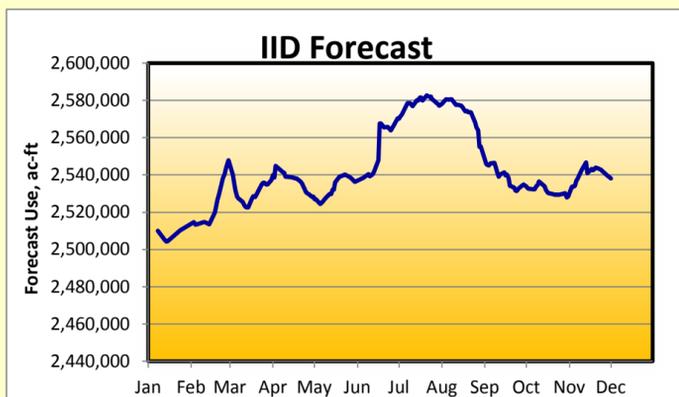
| | |
|--|------------------|
| California Basic Apportionment | 4,400,000 |
| Payback of IOPP Overrun (IID) | -117,391 |
| Intentionally Created Surplus Water (IID) | -25,000 |
| Creation of Extraordinary Conservation ICS (MWD) | -200,000 |
| Total State Adjusted Apportionment | 4,057,609 |
| Excess to Total State Adjusted Apportionment | 498,943 |

ISG ANNUAL TARGET COMPARISON CALCULATION

| | |
|---|------------------|
| Priorities 1, 2, 3b Use (PVID+YPRD+Island+PVID Mesa) | 485,494 |
| MWD Adjustment | -65,494 |
| Total California Agricultural Use (PVID+YPRD+Island+IID+CVWD) | 3,370,842 |
| California Agricultural Paybacks | 117,391 |
| Misc. PPRs Covered by IID and CVWD | 14,500 |
| California ICS Creation (IID ICS) | 25,000 |
| Total Use for Target Comparison ¹ | 3,462,239 |
| ISG Annual Target (Exhibit B) | 3,455,000 |
| Amount over/(under) ISG Annual Target | 7,239 |

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

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



**U.S. BUREAU OF RECLAMATION
LOWER COLORADO REGION
PROVISIONAL CY2014**

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 \(Water Accounting Reports\)](#)

| <u>WATER USER</u> | <u>Use To Date CY2014</u> | <u>Forecast Use CY2014</u> | <u>Estimated Use CY2014</u> | <u>Excess to Estimated Use CY2014</u> | <u>Diversion To Date CY2014</u> | <u>Forecast Diversion CY2014</u> | <u>Approved Diversion CY2014</u> | <u>Excess to Approved Diversion CY2014</u> |
|---|---------------------------|----------------------------|-----------------------------|---------------------------------------|---------------------------------|----------------------------------|----------------------------------|--|
| ARIZONA PUMPERS | 17,123 | 17,902 | 17,902 | --- | 26,493 | 27,698 | 27,698 | 0 |
| LAKE MEAD NRA, AZ - Diversions from Lake Mead | 142 | 145 | 145 | --- | 142 | 145 | 145 | 0 |
| LAKE MEAD NRA, AZ - Diversions from Lake Mohave | 182 | 190 | 190 | --- | 182 | 190 | 190 | 0 |
| DAVIS DAM PROJECT | 1 | 1 | 1 | --- | 52 | 54 | 54 | 0 |
| BULLHEAD CITY | 5,175 | 5,852 | 8,523 | --- | 7,723 | 8,733 | 12,720 | -3,987 |
| MOHAVE WATER CONSERVATION | 473 | 495 | 495 | --- | 706 | 738 | 738 | 0 |
| BROOKE WATER LLC | 201 | 210 | 210 | --- | 303 | 317 | 317 | 0 |
| MOHAVE VALLEY IDD | 18,740 | 20,204 | 22,617 | --- | 34,702 | 37,413 | 41,883 | -4,470 |
| FORT MOJAVE INDIAN RESERVATION, AZ | 34,541 | 35,621 | 42,120 | --- | 63,964 | 65,964 | 78,000 | -12,036 |
| GOLDEN SHORES WATER CONSERVATION DISTRICT | 228 | 238 | 238 | --- | 341 | 357 | 357 | 0 |
| HAVASU NATIONAL WILDLIFE REFUGE | 4,704 | 4,780 | 3,563 | --- | 37,005 | 37,895 | 41,820 | -3,925 |
| LAKE HAVASU CITY | 7,399 | 7,988 | 9,083 | --- | 11,934 | 12,884 | 14,650 | -1,766 |
| CENTRAL ARIZONA PROJECT | 1,498,777 | 1,622,226 | 1,528,908 | --- | 1,498,777 | 1,622,226 | 1,528,908 | --- |
| TOWN OF PARKER | 330 | 339 | 359 | --- | 768 | 820 | 935 | -115 |
| COLORADO RIVER INDIAN RESERVATION, AZ | 317,440 | 325,094 | 376,964 | --- | 588,169 | 615,940 | 662,402 | -46,462 |
| EHRENBURG IMPROVEMENT ASSOCIATION | 233 | 244 | 244 | --- | 328 | 343 | 343 | 0 |
| CIBOLA VALLEY IRRIGATION DISTRICT | 16,213 | 16,951 | 16,951 | --- | 22,675 | 23,707 | 23,707 | 0 |
| CIBOLA NATIONAL WILDLIFE REFUGE | 12,187 | 12,741 | 12,741 | 0 | 19,656 | 20,550 | 20,550 | 0 |
| IMPERIAL NATIONAL WILDLIFE REFUGE | 2,502 | 2,616 | 2,616 | 0 | 4,040 | 4,224 | 4,224 | 0 |
| YUMA PROVING GROUND | 444 | 464 | 550 | --- | 444 | 464 | 550 | -86 |
| GILA MONSTER FARMS | 4,419 | 4,631 | 5,244 | --- | 7,600 | 8,088 | 9,156 | -1,068 |
| WELLTON-MOHAWK IDD | 250,559 | 256,512 | 278,000 | -21,488 | 366,254 | 384,883 | 424,997 | --- |
| CITY OF YUMA | 13,301 | 14,453 | 16,452 | -1,999 | 22,565 | 24,795 | 26,358 | -1,563 |
| MARINE CORPS AIR STATION YUMA | 1,302 | 1,384 | 1,718 | --- | 1,302 | 1,384 | 1,718 | -334 |
| UNION PACIFIC RAILROAD | 29 | 31 | 24 | --- | 44 | 48 | 48 | 0 |
| UNIVERSITY OF ARIZONA | 533 | 541 | 536 | --- | 533 | 541 | 536 | 5 |
| YUMA UNION HIGH SCHOOL DISTRICT | 324 | 326 | 148 | --- | 416 | 419 | 200 | 219 |
| DESERT LAWN MEMORIAL | 44 | 46 | 46 | --- | 63 | 66 | 66 | 0 |
| NORTH GILA VALLEY IDD | 11,451 | 11,220 | 12,384 | --- | 45,833 | 48,989 | 51,963 | -2,974 |
| YUMA IRRIGATION DISTRICT | 37,018 | 38,275 | 42,991 | --- | 64,948 | 68,448 | 76,600 | -8,152 |
| YUMA MESA IDD | 113,241 | 114,815 | 116,324 | --- | 184,731 | 191,598 | 208,488 | -16,890 |
| UNIT "B" IRRIGATION DISTRICT | 20,537 | 21,059 | 20,408 | --- | 27,726 | 29,226 | 33,450 | -4,224 |
| FORT YUMA INDIAN RESERVATION | 1,335 | 1,396 | 1,396 | --- | 2,056 | 2,150 | 2,150 | 0 |
| YUMA COUNTY WATER USERS' ASSOCIATION | 224,824 | 231,852 | 241,118 | --- | 337,955 | 357,955 | 383,000 | -25,045 |
| COCOPA INDIAN RESERVATION | 1,830 | 2,189 | 6,599 | --- | 1,849 | 2,414 | 10,055 | -7,641 |
| RECLAMATION-YUMA AREA OFFICE | 236 | 247 | 247 | --- | 236 | 247 | 247 | 0 |
| RETURN FROM SOUTH GILA WELLS | | | | | | | | |
| TOTAL ARIZONA | 2,618,018 | 2,773,278 | 2,788,055 | | 3,382,515 | 3,601,913 | 3,689,223 | |
| CAP | 1,498,777 | 1,622,226 | | | | 1,622,226 | | |
| ALL OTHERS | 1,119,241 | 1,151,052 | 1,259,147 | | | 1,979,687 | 2,160,315 | |
| YUMA MESA DIVISION, GILA PROJECT | 161,710 | 164,310 | 250,000 | -85,690 | | 309,035 | | |

ARIZONA ADJUSTED APPORTIONMENT CALCULATION

| | |
|--|-----------|
| Arizona Basic Apportionment | 2,800,000 |
| Payback of IOPP overruns - (Cocopah and Beattie) | -266 |
| CAGR/YMIDD Pilot Conservation Program ¹ | -9000 |
| Total State Adjusted Apportionment | 2,790,734 |
| Excess to Total State Adjusted Apportionment | -17,456 |
| Estimated Allowable Use for CAP | 1,641,740 |

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

**U.S. BUREAU OF RECLAMATION
LOWER COLORADO REGION
PROVISIONAL CY2014**

NOTE:

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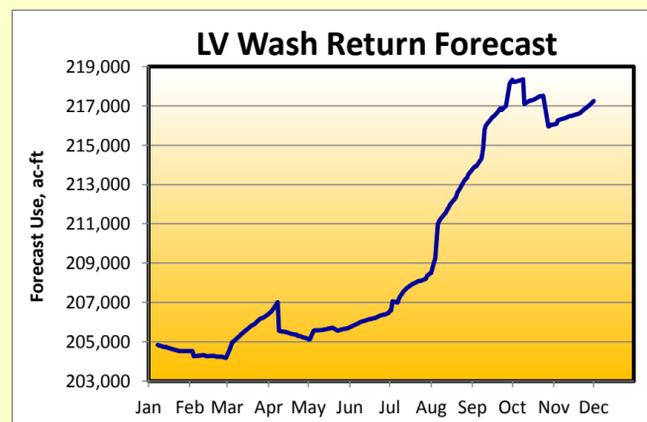
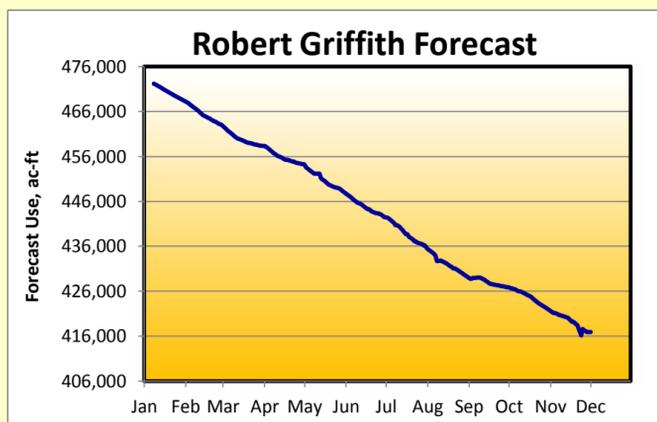
NEVADA WATER USERS
FORECAST OF END OF YEAR CONSUMPTIVE USE
FORECAST BASED ON USE TO DATE AND APPROVED ANNUAL WATER ORDERS

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

| WATER USER | Use To Date CY2014 | Forecast Use CY2014 | Estimated Use CY2014 | Excess to Estimated Use CY2014 | Diversion To Date CY2014 | Forecast Diversion CY2014 | Approved Diversion CY2014 | Excess to Approved Diversion CY2014 |
|---|---------------------------|----------------------------|-----------------------------|---------------------------------------|---------------------------------|----------------------------------|----------------------------------|--|
| ROBERT B. GRIFFITH WATER PROJECT (SNWS) | 387,118 | 416,920 | 473,360 | -56,440 | 387,118 | 416,920 | 473,360 | -56,440 |
| LAKE MEAD NRA, NV - Diversions from Lake Mead | 394 | 429 | 568 | --- | 394 | 429 | 568 | -139 |
| LAKE MEAD NRA, NV - Diversions from Lake Mohave | 152 | 167 | 224 | --- | 152 | 167 | 224 | -57 |
| BASIC MANAGEMENT INC. | 5,844 | 6,438 | 8,208 | --- | 5,844 | 6,438 | 8,208 | -1,770 |
| CITY OF HENDERSON (BMI DELIVERY) | 12,795 | 13,689 | 15,878 | --- | 12,795 | 13,689 | 15,878 | -2,189 |
| NEVADA STATE DEPT. OF FISH & GAME | 9 | 10 | 12 | -2 | 373 | 399 | 300 | --- |
| PACIFIC COAST BUILDING PRODUCTS INC. | 773 | 845 | 928 | --- | 773 | 845 | 928 | -83 |
| BOULDER CANYON PROJECT | 38 | 40 | 40 | --- | 69 | 72 | 72 | 0 |
| BIG BEND WATER DISTRICT | 2,164 | 2,387 | 2,062 | --- | 4,094 | 4,514 | 4,961 | -447 |
| FORT MOJAVE INDIAN TRIBE | 2,321 | 2,455 | 3,685 | --- | 3,464 | 3,664 | 5,500 | -1,836 |
| LAS VEGAS WASH RETURN FLOWS | -197,206 | -217,245 | -204,964 | --- | | | | |
| TOTAL NEVADA | 214,402 | 226,135 | 300,001 | -56,442 | 415,076 | 447,137 | 509,999 | -62,961 |
| SOUTHERN NEVADA WATER SYSTEM (SNWS) | 189,912 | 199,675 | | | | 416,920 | | |
| ALL OTHERS | 24,490 | 26,460 | | | | 30,217 | | |
| NEVADA USES ABOVE HOOVER | 209,917 | 221,293 | | | | 438,959 | | |
| NEVADA USES BELOW HOOVER | 4,485 | 4,842 | | | | 8,178 | | |

| 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 | -73,865 |



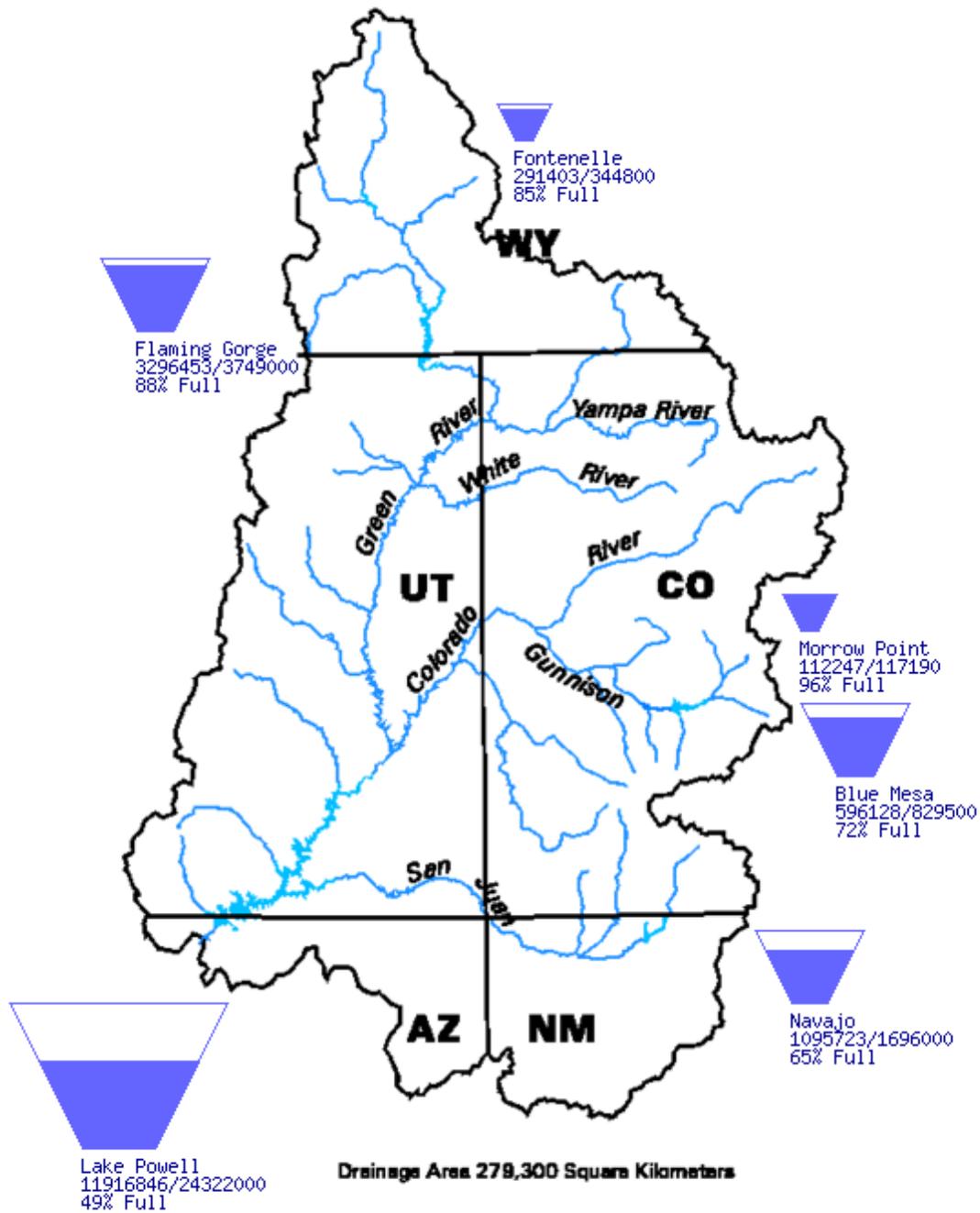
NOTES: Click on Nevada Schedules and Approvals above for incoming diversion schedules and approvals.

Upper Colorado Region Water Resources Group

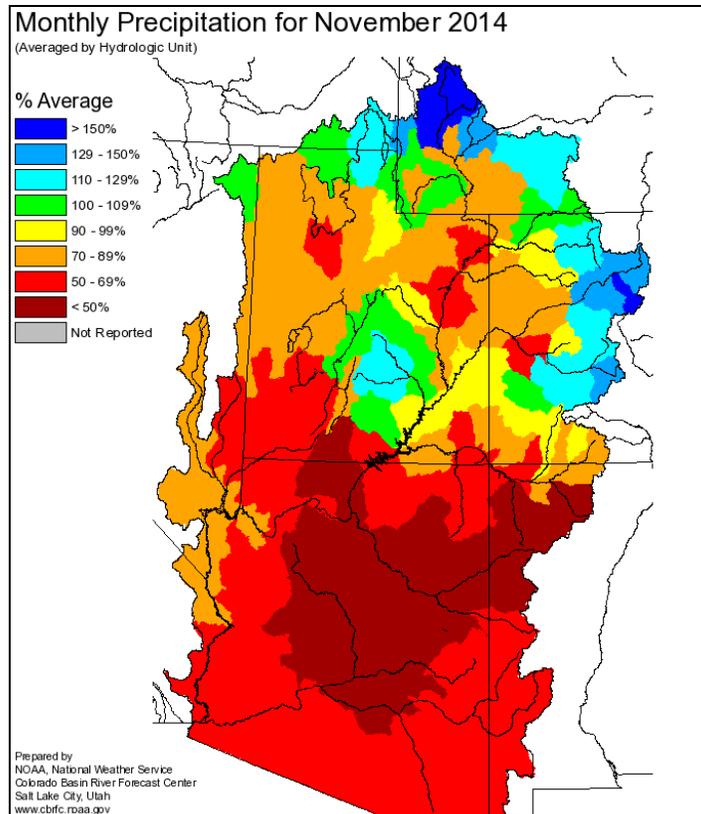
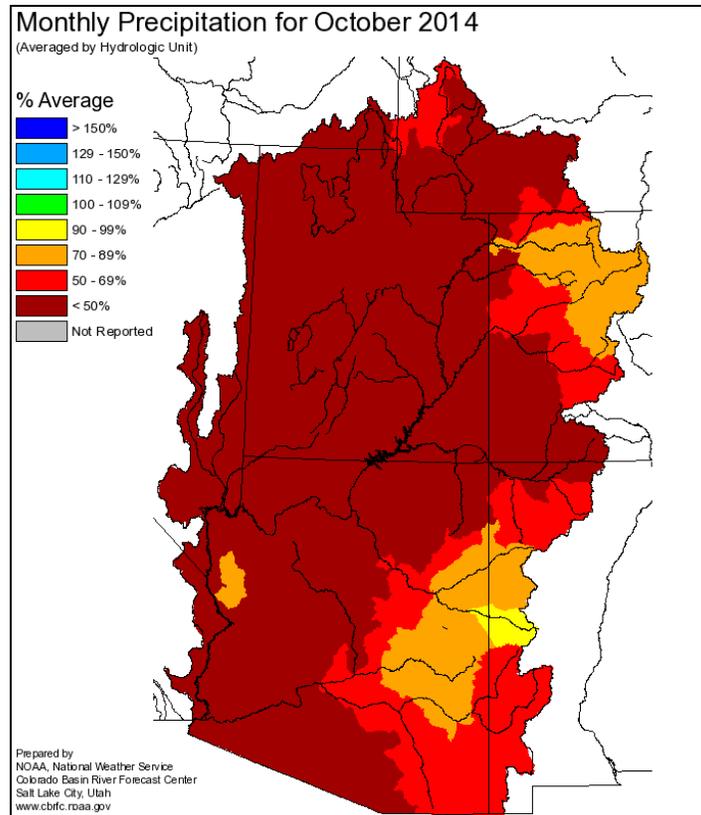
River Basin Tea-Cup Diagrams

Data Current as of:
12/01/2014

Upper Colorado River Drainage Basin



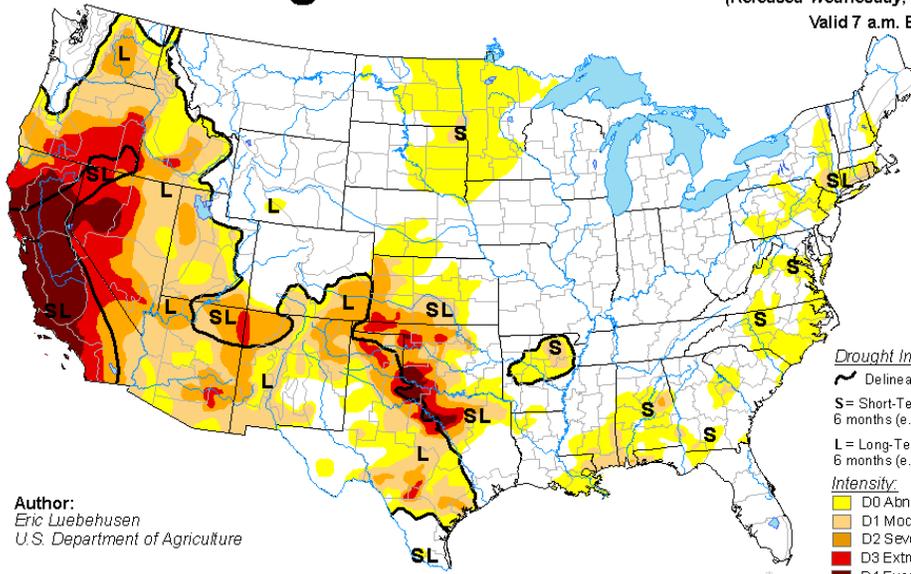
NOAA National Weather Service Monthly Precipitation Maps for October and November 2014



USDA United States Drought Monitor Map

U.S. Drought Monitor

November 25, 2014
 (Released Wednesday, Nov. 26, 2014)
 Valid 7 a.m. EST

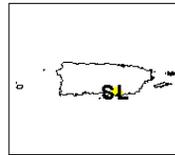
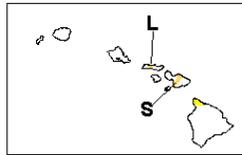
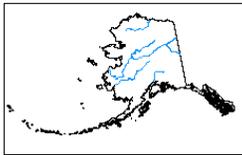


Author:
 Eric Luebehusen
 U.S. Department of Agriculture

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

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

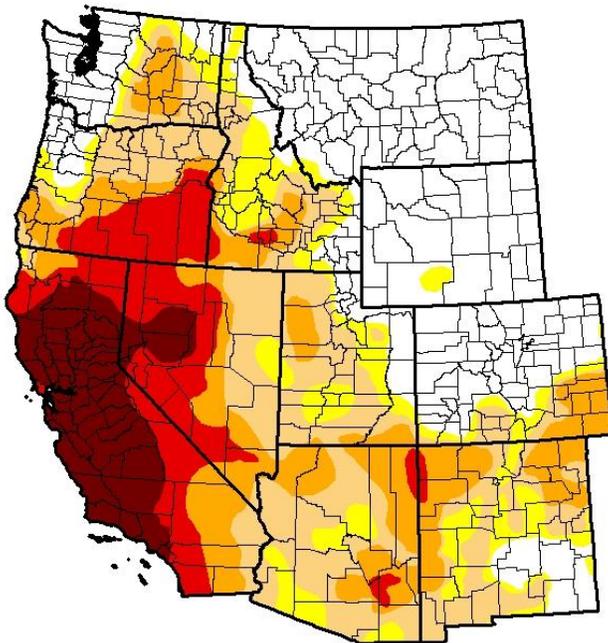
The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. See accompanying text summary for forecast statements.



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

U.S. Drought Monitor West

November 25, 2014
 (Released Wednesday, Nov. 26, 2014)
 Valid 7 a.m. EST



Drought Conditions (Percent Area)

| | None | D0-D4 | D1-D4 | D2-D4 | D3-D4 | D4 |
|---|-------|-------|-------|-------|-------|------|
| Current | 34.72 | 65.28 | 54.99 | 33.88 | 18.75 | 8.45 |
| Last Week <i>11/19/2014</i> | 34.66 | 65.34 | 54.99 | 33.88 | 18.75 | 8.45 |
| 3 Months Ago <i>9/26/2014</i> | 27.50 | 72.50 | 58.91 | 41.45 | 20.62 | 8.90 |
| Start of Calendar Year <i>1/25/2013</i> | 22.20 | 77.80 | 51.44 | 31.11 | 7.75 | 0.63 |
| Start of Water Year <i>9/30/2014</i> | 31.48 | 68.52 | 55.57 | 35.65 | 19.95 | 8.90 |
| One Year Ago <i>11/28/2013</i> | 29.00 | 71.00 | 49.99 | 30.86 | 7.56 | 0.63 |

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

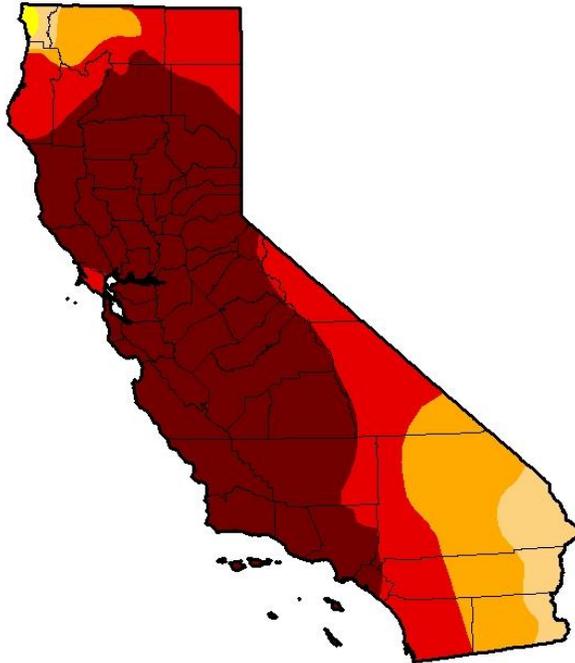
The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. See accompanying text summary for forecast statements.

Author:
 Eric Luebehusen
 U.S. Department of Agriculture



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

U.S. Drought Monitor California



November 25, 2014
(Released Wednesday, Nov. 26, 2014)
Valid 7 a.m. EST

Drought Conditions (Percent Area)

| | None | D0-D4 | D1-D4 | D2-D4 | D3-D4 | D4 |
|--|------|--------|--------|-------|-------|-------|
| Current | 0.00 | 100.00 | 99.72 | 94.42 | 79.69 | 55.08 |
| Last Week <i>11/19/2014</i> | 0.00 | 100.00 | 99.72 | 94.42 | 79.69 | 55.08 |
| 3 Months Ago <i>9/26/2014</i> | 0.00 | 100.00 | 100.00 | 95.42 | 81.92 | 58.41 |
| Start of Calendar Year <i>12/31/2013</i> | 2.61 | 97.39 | 94.25 | 87.53 | 27.59 | 0.00 |
| Start of Water Year <i>8/30/2014</i> | 0.00 | 100.00 | 100.00 | 95.04 | 81.92 | 58.41 |
| One Year Ago <i>11/29/2013</i> | 2.61 | 97.39 | 94.15 | 82.53 | 27.59 | 0.00 |

Intensity

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

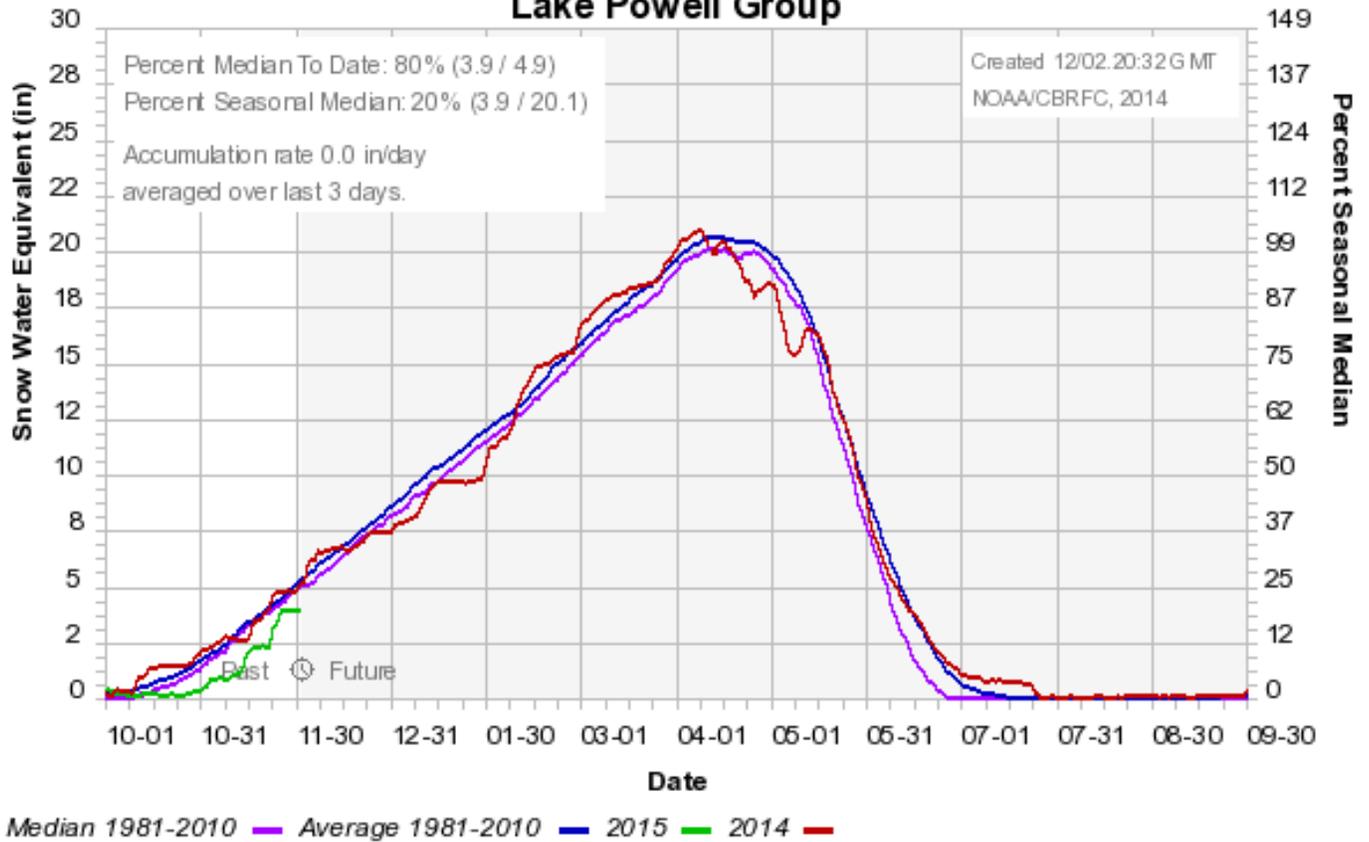
The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. See accompanying text summary for forecast statements.

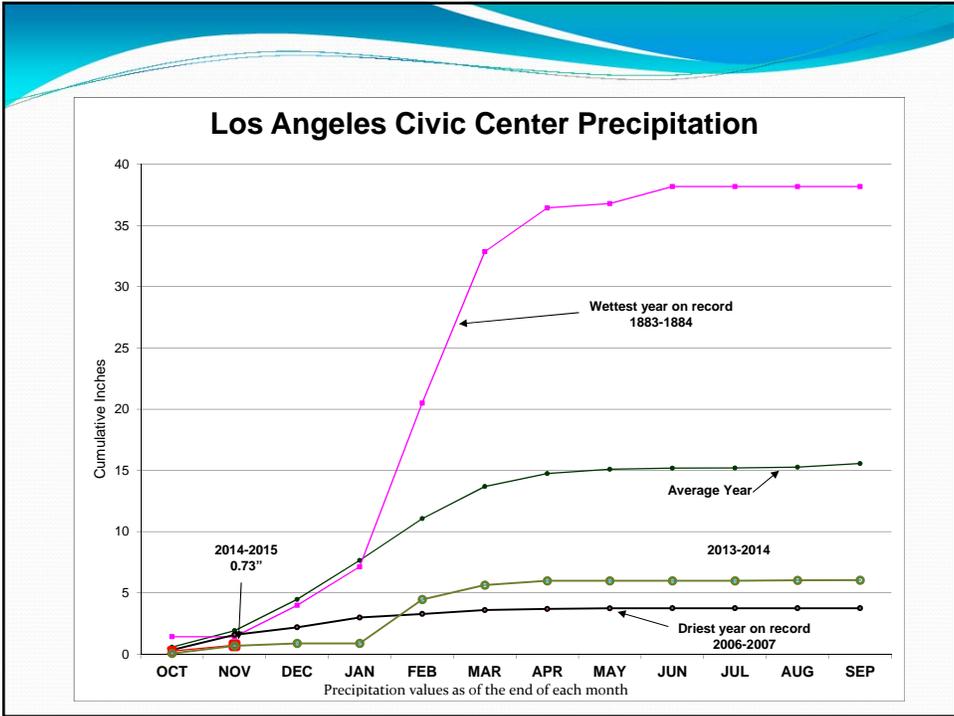
Author:
Eric Luebehusen
U.S. Department of Agriculture



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

Colorado Basin River Forecast Center Lake Powell Group



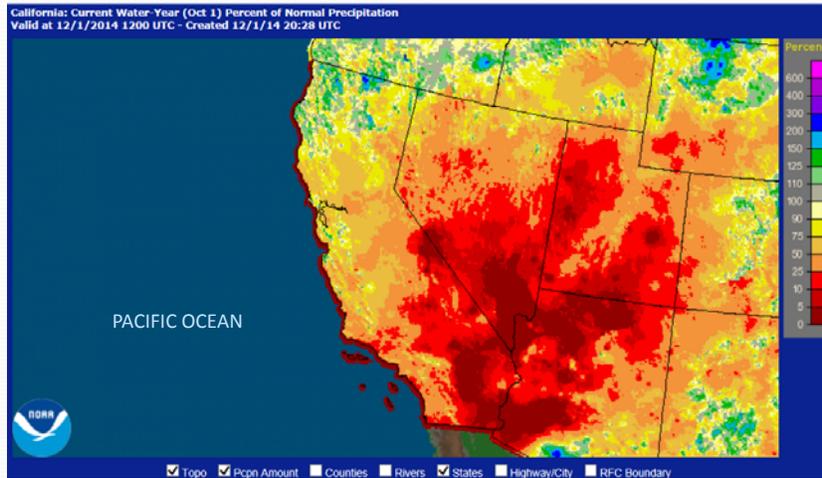


Precipitation at Six Major Stations in Southern California

From October 1, 2014 to November 30, 2014

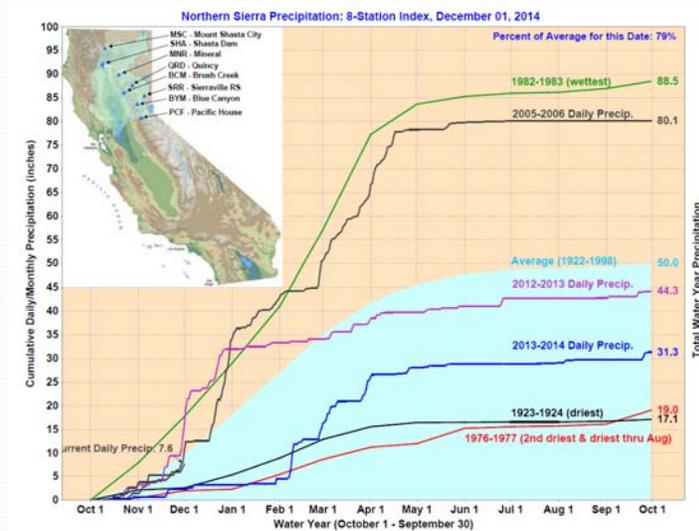
| Station | Precipitation in inches | | Average to Date | Percent of Average |
|-----------------|-------------------------|-----------------|-----------------|--------------------|
| | Nov | Oct 1 to Nov 30 | | |
| San Luis Obispo | 0.38 | 1.39 | 3.05 | 46% |
| Santa Barbara | 0.18 | 1.34 | 2.19 | 61% |
| Los Angeles | 0.48 | 0.73 | 1.92 | 38% |
| San Diego | 0.37 | 0.37 | 1.48 | 25% |
| Blythe | 0.00 | 0.03 | 0.54 | 6% |
| Imperial | 0.03 | 0.03 | 0.45 | 7% |

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

Statewide Summary of Water-Year Data

| Water Year | Precipitation (233 Stations) % of avg. | Runoff (31 Rivers) % of avg. | Res. Storage (155 Reservoirs) % of avg. | Sacto. Riv. Run-off * (MAF) |
|---|---|------------------------------------|---|-----------------------------------|
| 2009-10 | 110 | 90 | 105 | 15.9 |
| 2010-11 | 135 | 145 | 130 | 15.1 |
| 2011-12 | 75 | 60 | 95 | 11.8 |
| 2012-13 | 80 | 60 | 80 | 11.9 |
| Comparison of Water Year Data as of Nov 1 | | | | |
| 2013-14 | 25 | 65 | 75 | 0.3 |
| 2014-15 | 75 | 65 | 55 | 0.3 |

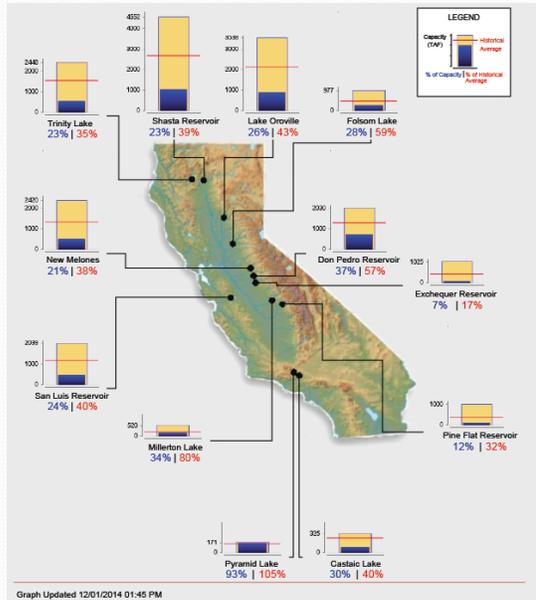
* The Sacramento River Run-off is the sum of the unimpaired water year flow from the Sacramento River above Bend Bridge near Red Bluff, Feather River inflow to Oroville, Yuba River at Smartville, and American River inflow to Folsom. The average annual run-off is 18.4 MAF.

Comparison of SWP Water Storage

| Reservoir | Capacity | 2013 Storage (acre-feet) | | 2014 Storage (acre-feet) | |
|--------------------|------------------|-----------------------------|--------------|-----------------------------|--------------|
| | | As of December 1 | % of Cap. | As of December 1 | % of Cap. |
| Frenchman | 55,475 | 27,419 | 49% | 19,090 | 34% |
| Lake Davis | 84,371 | 55,075 | 65% | 42,974 | 51% |
| Antelope | 22,564 | 17,348 | 77% | 16,000 | 71% |
| Oroville | 3,553,405 | 1,386,466 | 39% | 909,468 | 26% |
| TOTAL North | 3,715,815 | 1,486,308 | 40% | 973,132 | 26% |
| Del Valle | 39,914 | 29,793 | 75% | 29,840 | 75% |
| San Luis (DWR) | 1,062,180 | 233,698 | 22% | 310,847 | 29% |
| Pyramid | 169,901 | 166,808 | 98% | 167,396 | 99% |
| Castaic | 319,247 | 272,181 | 85% | 98,394 | 31% |
| Silverwood | 74,970 | 71,454 | 95% | 70,733 | 94% |
| Perris | 126,841 | 73,691 | 58% | 45,649 | 36% |
| TOTAL South | 1,793,053 | 847,625 | 47% | 722,859 | 40% |
| TOTAL SWP | 5,508,868 | 2,333,933 | 42% | 1,695,991 | 31% |

State Water Project Projected Deliveries:
As of May 30, 2014, the Table-A allocations for 2014 is 5%

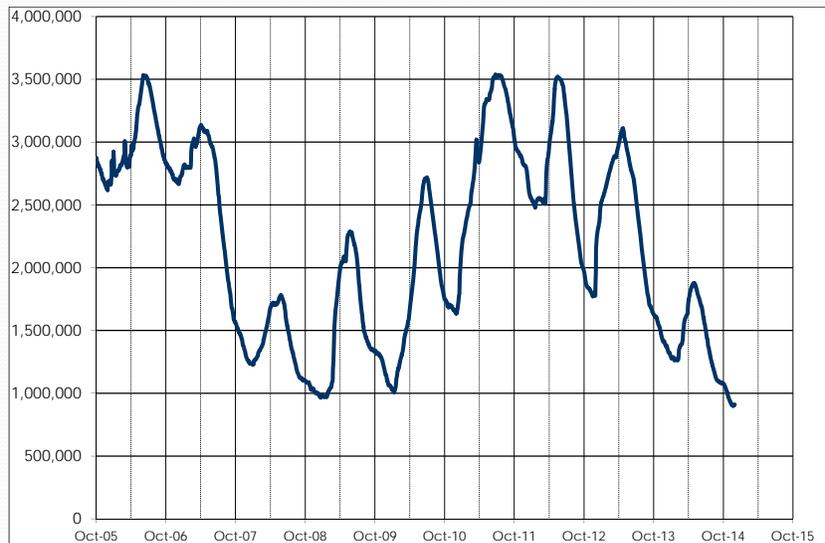
Current Reservoir Conditions



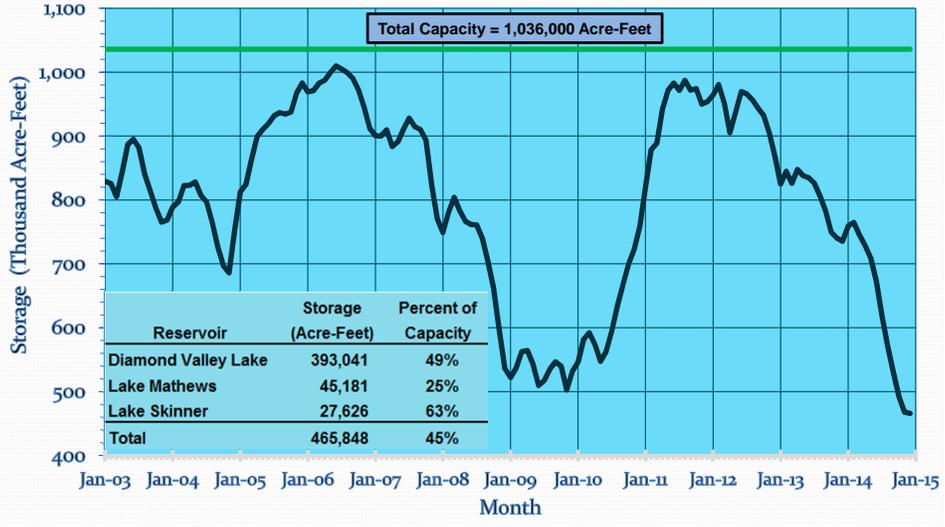
<http://cdec.water.ca.gov/cdecapp/resapp/getResGraphsMain.action>

Oroville Storage (acre-feet)

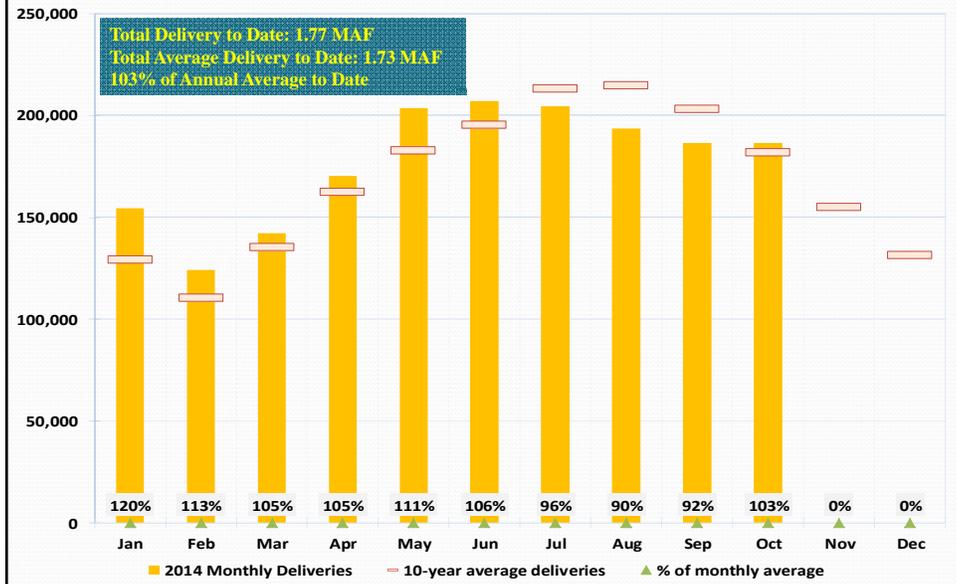
October 1, 2005 – December 1, 2014



MWD's Combined Reservoir Storage as of December 1, 2014 Lake Skinner, Lake Mathews, and Diamond Valley Lake



2014 Water Deliveries to Member Agencies (AF)





Bi-Weekly Drought Brief Monday, November 24, 2014

CURRENT CONDITIONS

Gov. Jerry Brown Says Drought will Test “Political Capacity to Collaborate”: On Thursday, November 13, Gov. Jerry Brown said tackling the drought that is wracking California and much of the western United States will "test our imagination, our science and our political capacity to collaborate." Speaking at the [Western Governors' Association \(WGA\) Drought Forum](#), a two-day event in Sacramento, Brown highlighted the need for creative thinking and continued conservation.

The Drought Forum was launched to foster a regional dialogue in which Western states and industry could share best practices on drought policy, preparedness and management, and seek to identify ways to mitigate the impact of drought on communities, economies and the environment.

Voters Approve State Proposition 1: On Tuesday, November 4, California voters passed Proposition 1, the [Water Quality, Supply and Infrastructure Improvement Act of 2014](#), which authorizes \$7.5 billion in funding for a range of water projects and programs as part of a comprehensive water plan for the state.

Fire Activity: CAL FIRE has responded to 5,532 wildfires across the state since January 1, burning 90,746 acres in state responsibility areas. This year's fire activity is above the year-to-date average of 4,488 wildfires on 86,982 acres. CAL FIRE responded to over 35 new wildfires last week.

Reservoir Levels (% capacity): [Reservoir Levels](#) as of November 20 remain low, including: Don Pedro 37%; Exchequer 8%; Folsom Lake 29%; Lake Oroville 25%; Millerton Lake 34%; New Melones 21%; Pine Flat 12%; San Luis 21%; Lake Shasta 23%; and Trinity Lake 23%. An update of water levels at [other smaller reservoirs](#) is also available.

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 over \$13.6 million has been identified for specific emergency drinking water projects out of \$15 million appropriated in March for this purpose.

Recent Precipitation: California experienced scattered amounts of precipitation during the last week. Precipitation totals (in inches) from Monday, November 17 through Monday, November 24:

- | | |
|------------------------------|----------------------------|
| • Folsom Dam: 0.51" | • Redding: 2.84" |
| • Hetch Hetchy: 0.91" | • Shasta Dam: 3.00" |
| • Modesto: 0.06" | • Sacramento: 0.48" |
| • Oroville: 1.32" | • Willits: 3.84" |

** This rainfall will have minimal effect on California's drought conditions, and reservoir water levels will remain largely unchanged. Due to low water supplies from the two previous dry years, California remains in drought conditions. **

KEY ACTION ITEMS FROM THIS WEEK

- **State Water Board Conservation Report Updates:** The State Water Board will be releasing water production figures for the month of November on Tuesday, December 2. Preliminary results indicate a decline in the amount of water conserved for the month of October 2014, as compared to October 2013, from the conservation levels achieved for the month of September. The State Water Board will be holding a workshop on Wednesday, December 17, in Los Angeles to discuss what additional actions it should take, if any, if drought conditions persist.
- **State Water Board Lifts Curtailments in the Russian River Watershed:** On Friday, November 19, the State Water Board lifted the water right curtailments for all post-1914 water right permits and licenses in the [Russian River watershed](#) based on water conservation savings in the watershed, recent increases in tributary flows, and reduced diversion demands as of Friday, October 31.

With this notice, the only curtailments remaining in effect are in the Scott River Watershed, Deer Creek (in accordance with the Emergency Fish Flow regulations) and for those water right holders subject to Term 91. Based on current and trending conditions, Term 91 for water rights holders in the Delta watershed may be lifted in the next 1-2 weeks.

- **Central Coast Water Board Approves Cambria Emergency Drought Project:** On Friday, November 14, the Central Coast Regional Water Quality Control Board approved permits allowing the [Cambria Community Services District](#) to operate an emergency water treatment system designed to increase the community's water supplies during the drought. The Central Coast Water Board worked closely with the State Water Board's Drinking Water Division in its review and approval process to protect public health. This is the first project in the state to use the Drinking Water Division's new regulations for direct groundwater augmentation.
- **State Water Board Lifts Curtailments for Pre-1954 Water Rights Holders:** On Wednesday, November 19, the State Water Board lifted water right curtailments in the [Sacramento and San Joaquin River watersheds](#) for water rights holders with a priority date of December 31, 1953 and earlier. This action is based on the switch in diversion demand from direct diversion to storage, and the reduced diversion demands as of Friday, October 31. According to the State Board's notice, this announcement does not affect other types of curtailments including Term 91 curtailment and curtailment orders for Deer Creek.
- **Workshop Series to Focus on Groundwater Implementation:** A series of regional workshops focused on [implementing new groundwater legislation](#) is scheduled for 2015. The workshops, titled "Implementing the Sustainable Groundwater Management Act: Local Governance Approaches and Considerations," is sponsored by ACWA, California Water Foundation, California State Association of Counties and Rural County Representative of California, and is intended for senior local government officials and water agency decision makers.

- **Emergency Food Aid, Rental and Utility Assistance:** The Department of Social Services (CDSS) has provided to date over 363,440 boxes of food to community food banks in drought-impacted counties. Approximately 315,960 boxes of food have been picked up by 168,398 households. By this Friday, November 28, an additional 8,400 boxes will be delivered to five counties. Local food banks continue to target this food aid to residents most impacted by the 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 Thursday, November 13, the Department of Housing and Community Development (HCD) has reported that a total of \$8,075,997 is committed; and \$6,435,471 in funds has been issued to 4,095 applicants in 20 counties.

The Department of Community Services and Development (CSD) has 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 Friday, November 14, CSD has reported that a total of \$315,837 has been issued to 1,767 households.

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, November 14, 114 clients are enrolled in employment training programs, 12 clients have obtained employment, and 93 clients are receiving employment support services. CSD has also reported that a total of \$228,070 has been spent to assist participants in completing training employment programs.

- **Bureau of Reclamation Invests \$9.2 million in Water and Power Research:** On Wednesday, November 19, the US Bureau of Reclamation (USBR) awarded \$9.2 million for [131 research projects](#) to develop innovative solutions that will provide tools to guide a sustainable water and power future for the West. The projects awarded will focus on five research priority areas which include increasing water supply through advanced water treatment technologies, improving water infrastructure reliability and safety, and optimizing hydropower and other forms of renewable energy. For more information, please visit [USBR Research and Development](#).
- **New San Joaquin River Watershed Website Launched:** On Thursday, November 13, the Coalition for Urban Rural Environmental Stewardship (CURES) announced the [launch of its](#) new website, www.sanjoaquinriverwaterquality.com, featuring information related to the San Joaquin River watershed. The website provides water monitoring data, studies, reports and articles about the San Joaquin River watershed. The website was developed using grant funding from the US Environmental Protection Agency and the State and Federal Contractors Water Agency.
- **San Diego Council Votes to Move Forward with Plan to Recycle Wastewater for Drinking:** The San Diego City Council on Tuesday, November 18, unanimously voted to move forward with a \$2.5 billion plan to recycle the city’s wastewater for drinking as part of its [Pure Water San Diego Program](#). Under the plan, the city would purify 83 million gallons per day by 2023 or enough to provide about one-third its water supply. Currently, 85% of San Diego’s water is imported.

- **Water Saving Tips Promoted Across the State:** The state's newly improved water conservation website, SaveOurWater.com, is promoting the "Don't Waste Summer" campaign. This campaign provides a new conservation tip each day for the 100 days of summer. Supporters can sign up for daily email tips, and share Save Our Water's [Twitter](#) and [Facebook](#) feeds for this public awareness campaign.
- **Statewide Open Burn Ban Update:** Due to recent rain in some parts of Northern California, several local burns have been lifted. However, a majority of the state remains under a burn ban due to drought conditions. The [burn ban](#) prohibits certain outdoor burning in the State Responsibility Area (SRA). For those areas where the ban has been lifted, daily fire and weather conditions will dictate whether burning is permissible that day.
- **Drought Response Funding:** \$687 million in state drought funding that was appropriated in March through emergency legislation continues to advance toward meeting critical needs. Over \$61 million of this funding addresses emergency water needs, food aid and housing assistance to drought-impacted communities. Nearly \$21 million of those funds are already in communities providing assistance and additional funds are being readied as drought impacts worsen. Nearly \$625 million of the emergency funds appropriated in March came from sources dedicated to capital improvements to water systems. Since March, state agencies have expedited grant approvals, getting over \$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 will be awarded this fall, with the remaining \$250 million granted by mid next-year. State government has also appropriated tens of millions in funding to CAL FIRE over its typical budget to enable staffing-up fire crews much earlier this fire season.
- **Governor's Drought Task Force:** The Task Force continues to meet daily to take actions that conserve water and coordinate state response to the drought.

Local Government

- **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:
 - **26 Counties:** Glenn, Inyo, Humboldt, Kern, Kings, Lake, Madera, Mariposa, Mendocino, Merced, Modoc, Napa, 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).
- **12 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).
- **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 30 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, Napa, 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

269th MEETING OF THE UPPER COLORADO RIVER COMMISSION

December 10, 2014

Caesar's Palace Hotel

Messina Room

Las Vegas, Nevada

9:30 am to 1:00 pm

Agenda

1. Call meeting to order – Roll Call – Introductions - Chairwoman Hannay
2. Filing of documents to conform meeting to By-Laws – Don Ostler
3. Approval of minutes of the June 20, 2014 meeting at Jackson Lake Lodge, Wyoming
4. Report of Chairwoman Hannay
5. Report of the Executive Director – Don Ostler
6. Discussion and acceptance of the Commission Audit Report – Don Ostler
7. Discussion and acceptance of the Commission Treasurer's Report – Don Ostler
8. Appointment of new Assistant Treasurer, Sergio Boderio of Wells Fargo – Jane Bird
9. Adoption of a Resolution for Restatement of the Commission Pension – Jane Bird
10. Adoption of a Resolution authorizing the Commission to administer system water conservation agreements – Shanti Rosset
11. Adoption of a Resolution regarding the Upper Basin Drought Contingency Plan – Ted Kowalski
12. Comments from Principal Deputy Assistant Secretary for Water and Science – Jennifer Gimbel
13. Report from the Fish and Wildlife Service – Tom Chart
14. Report from the Colorado River Salinity Control Forum – Don Barnett
15. Report from the Grand Canyon Monitoring and Research Center – Scott VanderKooi

Break – 15 minutes

16. Report from the Bureau of Reclamation – Jennifer McCloskey, Acting UC Regional Dir. and Terry Fulp, LC Regional director
17. Report from Western Area Power Administration – Lynn Jeka
18. Report from NOAA on the long range forecast of precipitation for the Colorado River Basin – Matt Rosencrans, NOAA Climate Prediction center
19. Other Business
20. Next Meeting (June 17-18 Colorado??)
21. Adjourn

2014 CRWUA Annual Conference

Tentative Agenda

Challenged but Unbroken: Sustaining the Colorado River

SPEAKERS AND SESSIONS SUBJECT TO CHANGE

WEDNESDAY, DECEMBER 10

8:00a –7:00p

Registration

8:00a –12:30p

Optional Tour (Additional Fee)

Hoover Dam - Space is limited so register early.

Tour departs from the shuttle exit located near the entrance to the Forum Shops (next to Fizz).

9:30a

Upper Colorado River Commission Meeting - Messina

2:00p – 5:00p

Exhibits Open

1:00p

Colorado River 101: Setting Policy for Success in Challenging Times - Florentine I-II

Moderator: Pam Pickard, President, Board of Directors, Central Arizona Project

James Newberry, President, Board of Directors, Colorado River District

Randy Record, Chair, Board of Directors, Metropolitan Water District of Southern California

Mary Beth Scow, Chair, Board of Directors, Southern Nevada Water Authority

2:30p

Engineering Colloquium: Navajo Reservoir Voluntary Shortage Sharing Agreement - Florentine III-IV

Moderator: Jason John, Principal Hydrologist, Navajo Nation Water Management Branch

Ryan Christianson, Southern Water Management Group Chief, U.S. Bureau of Reclamation

Mike Green, Project Manager, PNM Water Resources

Lionel Haskie, Operations and Maintenance Manager, Navajo Agricultural Products Industry

Scott Verhines - State Engineer, State of New Mexico

Darryl Vigil - Water Administrator, Jicarilla Apache Nation

Legal Colloquium: Clean Water Act, EPA/Corps Proposed Rule on Waters of the United States - Florentine I-II

Moderator: Keith Burron, Attorney, Associated Legal Group

Deborah Freeman, Attorney and Shareholder, Trout, Raley, Montaño, Witwer & Freeman, P.C.

David Johnson, Attorney, Central Arizona Project

Melinda Kassen, Principal, Waterjamin LPC

Don Parrish, Senior Director, Congressional Relations, American Farm Bureau Federation

5:30p

President's Reception- Lobby outside Palace III

Meet and greet photographer Jamey Stillings and view the artist's stunning images from "The Bridge at Hoover Dam"—documenting the construction of the Mike O'Callaghan - Pat Tillman Memorial Bridge

THURSDAY, DECEMBER 11

7:00a –4:00p

Registration

7:00a –7:00p

Exhibits Open

7:30a

State Breakfasts

Arizona State Caucus - Florentine III-IV
 California State Caucus - Florentine I-II
 Colorado State Caucus - Capri
 Nevada State Caucus - Livorno
 New Mexico State Caucus - Genoa
 Ten Tribes Partnership - Anzio
 Utah State Caucus - Emperors I
 Wyoming State Caucus - Modena

- 9:00a **Welcome and Keynote Address** - Palace III
 David Modeer, CRWUA President and General Manager, Central Arizona Project
Video Presentation - "Challenged but Unbroken: Sustaining the Colorado River"
- 9:30a **In the Heat of the Drought: Sustaining Our Basin Supplies** - Palace III
 Moderator: Tom McCann, Deputy General Manager, Central Arizona Project
 John Entsminger, General Manager, Southern Nevada Water Authority
 Terry Fulp, Lower Colorado Regional Director, U.S. Bureau of Reclamation
 Bill Hasencamp, Colorado River Program Manager, Metropolitan Water District of Southern California
 Michael Lacey, Director, Arizona Department of Water Resources
 Don Ostler, Executive Director, Upper Colorado River Commission
- 11:00a **Business Meeting**
- 11:15a **To Kill a Shortage: Targeting Augmentation and Conservation** - Palace III
 Moderator: Chuck Cullom, Colorado River Programs Manager, Central Arizona Project
 Tom Buschatzke, Assistant Director of Water Planning, Arizona Department of Water Resources
 Barry Lawrence, Project Manager, Wyoming Water Development Office
 Jennifer McCloskey, Lower Colorado Deputy Regional Director, U.S. Bureau of Reclamation
 Roy Rasmussen, Senior Scientist, National Center for Atmospheric Research
 Greg Walch, General Counsel, Southern Nevada Water Authority
- 12:30p **Lunch and Entertainment** - Augustus I-IV
 Dave Fitzsimmons, political cartoonist
- 2:00p **Basin Study Next Steps: Taking the Long View** - Palace III
 Moderator: Antonio Rossmann, Attorney, Rossmann and Moore, LLP, and Lecturer, UC Berkeley School of Law
 Introduction: Carly Jerla, Operations Research Analyst, U.S. Bureau of Reclamation
 Kay Brothers, Former Deputy General Manager, Southern Nevada Water Authority
 Taylor Hawes, Colorado River Program Director, The Nature Conservancy
 Darryl Vigil, Chairman, Colorado River Basin Tribes Partnership
 Mark Waage, Manager of Water Resources Planning, Denver Water
 Dr. Reagan Waskom, Director, Colorado Water Institute
- 3:30p **Environmental Restoration and the Art of Ecological Compromise - None of Us Win if All of Us Lose** - Palace III
 Moderator: Christopher Harris, Deputy Director, Colorado River Board of California
 10th Anniversary Video, Lower Colorado River Multi-Species Conservation Program (LCRMSCP)
 Stacy Beaugh, Executive Director, Tamarisk Coalition
 Osvel Hinojosa Huerta, Water and Wetlands Program Director, Pronatura Noroeste
 John Swett, LCRMSCP Manager, U.S. Bureau of Reclamation
- 5:00p – 7:00p **Percolation and Runoff** - Palace I-II

FRIDAY, DECEMBER 12

7:00a – 9: 30a

Exhibits Open

9:00a

Words with Friends: Dialogues from a D.C. Perspective - Palace III
Mike Connor, Deputy Secretary, U.S. Department of the Interior

Mexican Delegation Presentation - Palace III
Edward Drusina, U.S. Commissioner, International Boundary and Water Commission
Roberto Salmon, Mexican Commissioner, International Boundary and Water Commission

Adjournment

THURSDAY, DECEMBER 11 - SPOUSE AND GUEST ACTIVITIES

8:00a

Continental Breakfast and Prize Drawing - Emperors II
Rejuvenating from the Inside Out - The Easy Way
Angela Harris