

RECLAMATION

Managing Water in the West

Moving Forward after the Colorado River Basin Water Supply & Demand Study

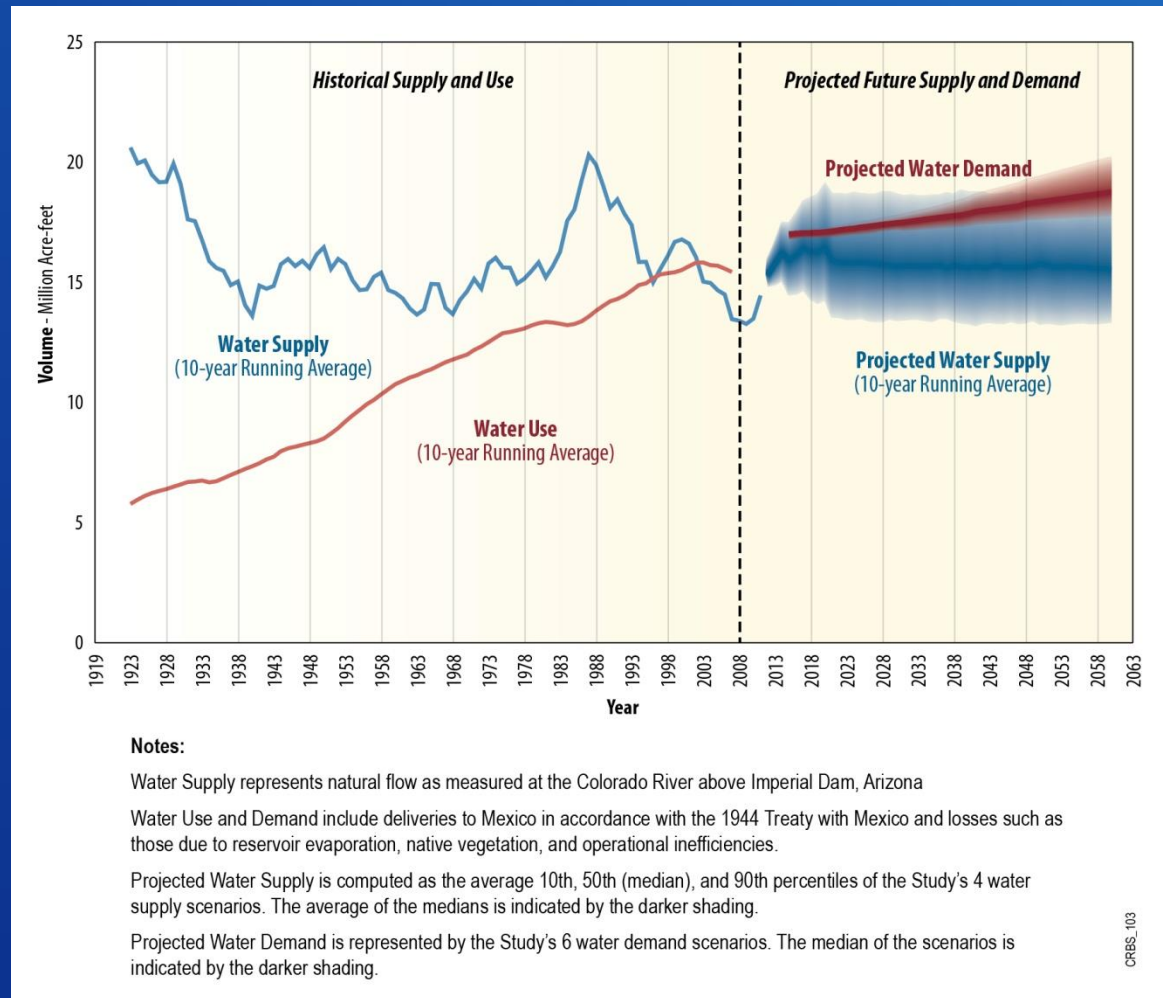
**Upper Colorado River Basin Water Forum
Grand Junction, CO
November 6, 2014**



U.S. Department of the Interior
Bureau of Reclamation

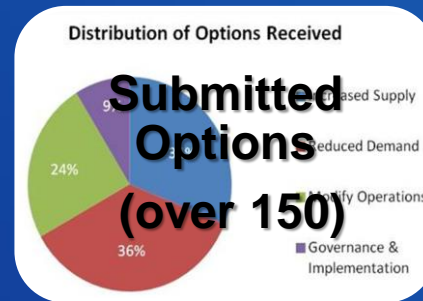
Recap of the Colorado River Basin Water Supply and Demand Study

- Completed in 2012 and conducted by Reclamation and the Basin States, in collaboration with stakeholders throughout the Basin
- Objective was to assess potential future imbalances and options to address those imbalances
- Found that a range of imbalances is plausible and the long-term median is about 3.2 MAF by 2060



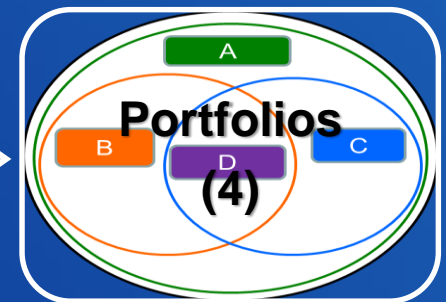
Recap of the Colorado River Basin Water Supply and Demand Study

- Over 150 options were submitted that represented a wide range of ideas
- Representative options were grouped to form portfolios that represented different strategies
- Each portfolio performed well in reducing resource vulnerability – tradeoffs explored
- There are no silver bullets; a wide range of solutions are needed



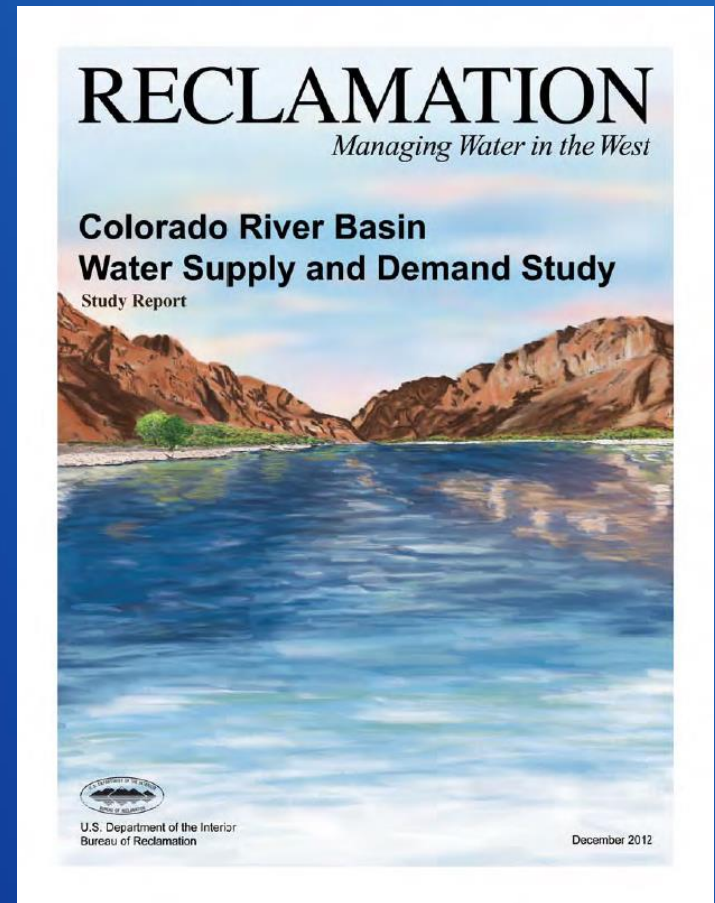
Representative Options (40)

- M&I Conservation
- Reuse
- Ag Conservation
- Water Transfers
- Water Banking
- Etc.



“Future Considerations and Next Steps” identified in the Study

- Water Use Efficiency and Reuse
- Water Banks
- Water Transfers
- Water Supply Augmentation
- Watershed Management
- Tribal Water
- Environmental Flows
- Data and Tool Development
- Climate Science Research
- Partnerships

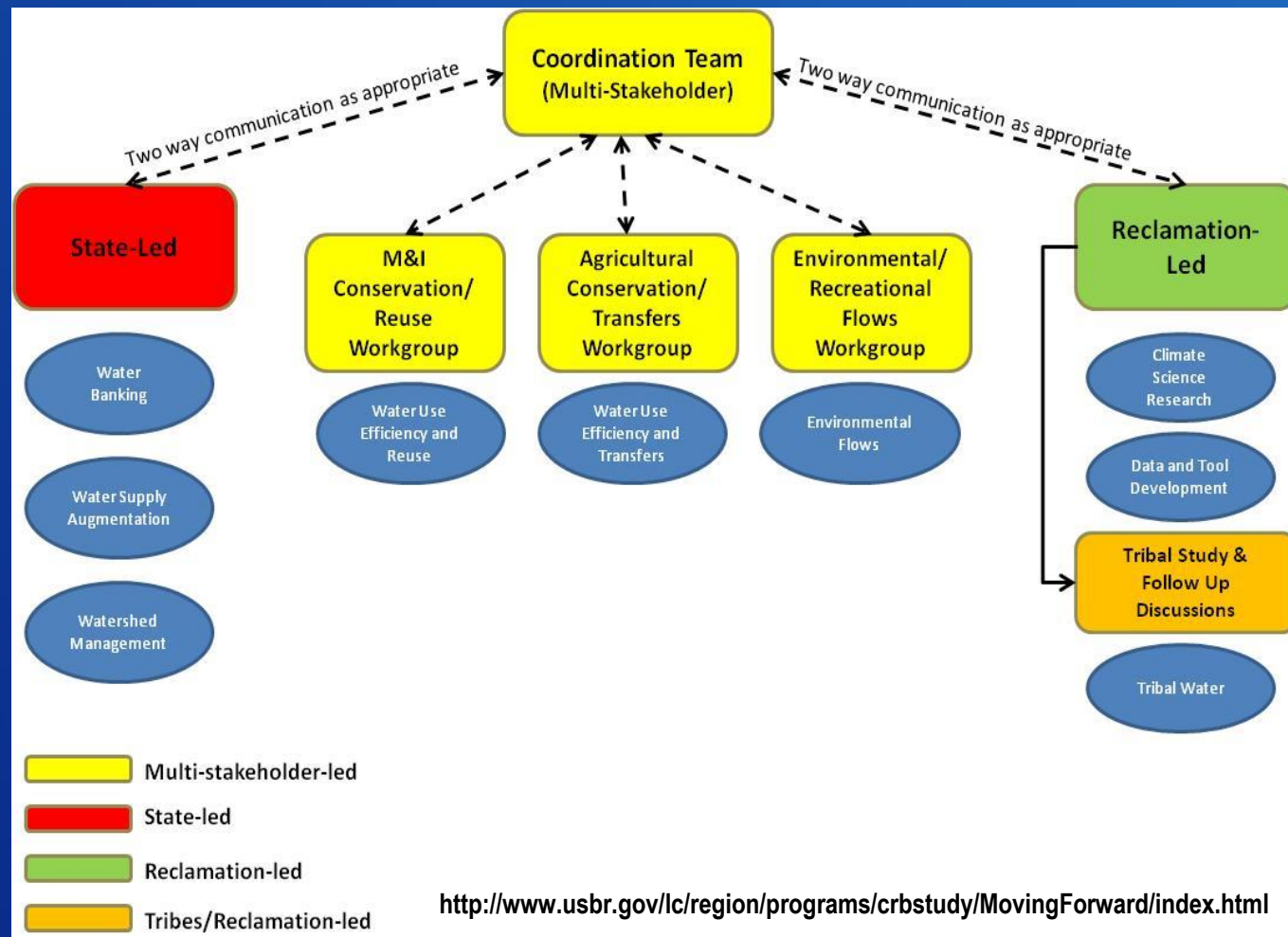


<http://www.usbr.gov/lc/region/programs/crbstudy.html>

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Moving Forward to Address Challenges Identified in the Study

- Addressing future imbalances will require diligent planning and collaboration at all levels
- In May 2013 the *Moving Forward* process was initiated to build on technical foundation and partnerships established in the Study



Moving Forward: Colorado River Basin Ten Tribes Partnership Tribal Water Study



Agreement Regarding Importance of the Colorado River Basin Tribal Water Study As Identified in the Colorado River Basin Water Supply and Demand Study

Whereas, As part of its implementation of the SECURE Water Act of 2009, Subtitle F, The Omnibus Public Land Management Act of 2009 (Public Law 111-11, March 30, 2009), the Bureau of Reclamation (Reclamation) has established a program of Basin Studies within the western United States to address the growing need for information and tools to aid water resource managers; and,

Whereas, the purpose of this effort is to undertake comprehensive water studies that define options for meeting future water demands in river basins in the western United States where imbalances in water supply and demand exist or are projected; and,

Whereas, the studies performed under the SECURE Water Act (P.L. 111-11) should include consideration of actions to address the projected impacts of drought and climate change; and,

Whereas, one of the first basins examined under the Basin Study Program was the Colorado River Basin; and,

Whereas, during the development and preparation of the Colorado River Basin Water Supply and Demand Study (Study), Reclamation and participating tribal representatives recognized that:

The Indian Reserved Water Rights of the tribes of the Colorado River Basin are unique and have attributes that must be recognized under federal law and distinguished from state law water rights; and,

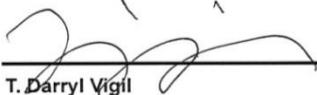
The Indian Reserved Water Rights of the tribes of the Colorado River Basin account for approximately 2.9 million acre-feet of annual diversion rights of the total apportionment of the Colorado River in the United States; and,

The Study does not fully account for tribal water demand nor reflect the potential use of tribal water by others nor show the potential impact on Colorado River Basin water supply if a substantial amount of the presently unused or unquantified tribal water is used by the tribal water rights holders prior to 2060; and,

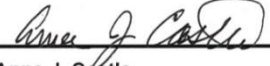
Whereas, In the final Study Report, Reclamation and the Colorado River Basin Tribes Partnership (Ten Tribes Partnership) identified their commitment to joint future planning efforts that build on the scientific foundation of the Study and advance critical information beyond the limited assessment of tribal water in the Study.

Therefore, the undersigned representatives of the Department of the Interior and Ten Tribes Partnership state and agree,

In recognition of the aforementioned, the Department of the Interior (acting through Reclamation) and the Ten Tribes Partnership agree to undertake the Colorado River Basin Tribal Water Study. Both parties acknowledge the importance of prompt initiation, thorough development, and timely completion of this study. Work on the study will begin in 2013 with anticipated completion by December 2015. Reclamation and the Ten Tribes Partnership commit to work together in this endeavor in the spirit of collaboration and partnership. By doing so, Reclamation and the Ten Tribes Partnership hope to bring the tribal perspective to bear in identifying, analyzing, and documenting these important matters.



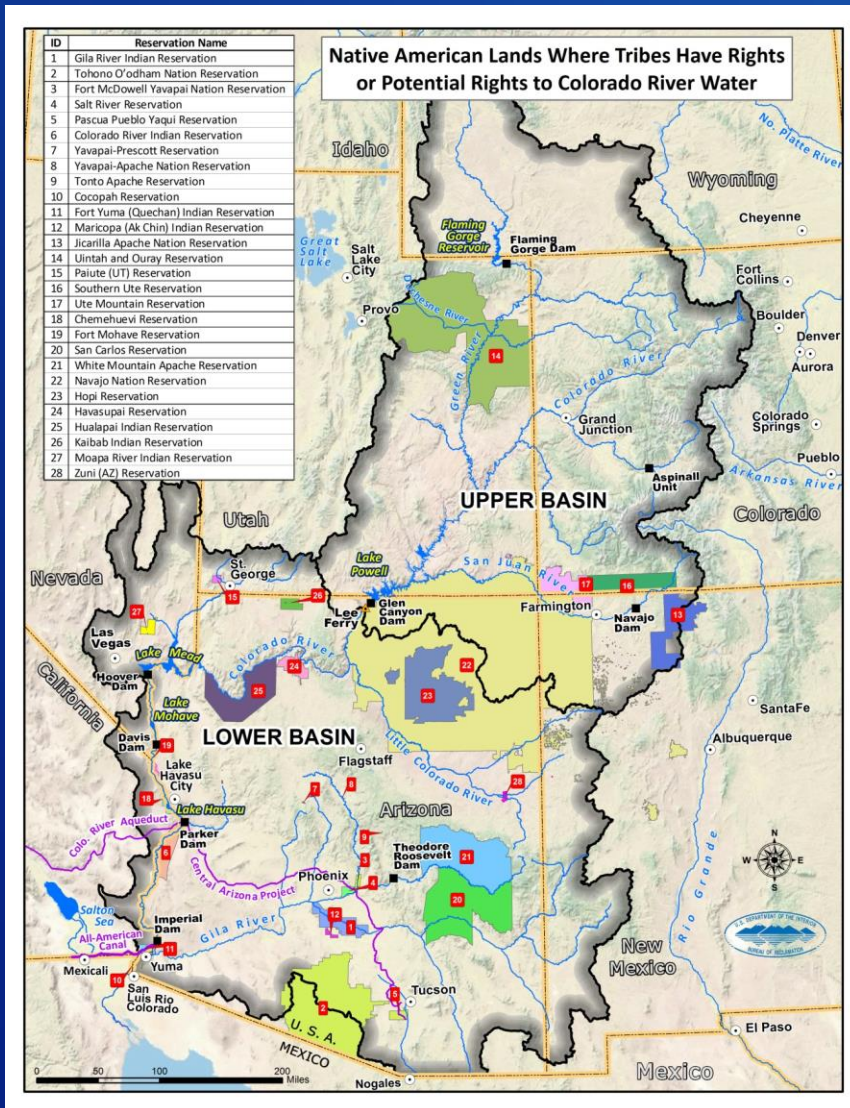
T. Darryl Vigil
Chairman
Colorado River Basin Tribes Partnership



Anne J. Castle
Assistant Secretary - Water and Science
U.S. Department of the Interior

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Colorado River Basin Ten Tribes Partnership Tribal Water Study



- Study Objectives
 - Assess current and future water use for those tribes of the Ten Tribes Partnership
 - Assess system impacts resulting from the development of tribal water
 - Identify tribal water development challenges and opportunities
- Builds off the limited assessment of tribal water issues conducted in the Colorado River Basin Study
- Conducted jointly by Reclamation and the Ten Tribes Partnership
- Approximately a 2-year Study which began in September 2013

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Moving Forward: Climate Science Research

- In July Reclamation and Collaborators released new suite of bias corrected and downscaled climate and hydrology projections
- New suite of projections is an addition to, not a replacement of, the projections used in the Colorado River Basin Study
- New projections show some differences for the Colorado River Basin

Available for download at:
http://gdodcp.ucllnl.org/downscaled_cmip_projections

Downscaled CMIP3 and CMIP5 Hydrology Projections

Release of Hydrology Projections, Comparison with Preceding Information, and Summary of User Needs

Bureau of Reclamation

Climate Analytics Group

Climate Central

Lawrence Livermore National Laboratory

National Center for Atmospheric Research

Santa Clara University

Scripps Institution of Oceanography

U.S. Army Corps of Engineers

U.S. Geological Survey



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Downscaled CMIP3 and CMIP5 Climate and Hydrology Projections

This site is best viewed with [Chrome](#) (recommended) or [Firefox](#). Some features are unavailable when using Internet Explorer. Requires JavaScript to be enabled.

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Downscaled CMIP3 climate projections' documentation and release notes available [here](#).

Summary

This archive contains fine spatial resolution translations of climate projections over the contiguous United States (U.S.) developed using two downscaling techniques (monthly BCSO Figure 1, and daily BCCA Figure 2), and hydrologic projections over the western U.S. (roughly the western U.S. Figure 3) corresponding to the monthly BCSO climate projections.

Archive content is based on global climate projections from the [United Climate Research Program's](#) (UCRP's) Coupled Model Intercomparison Project phase 2 (CMIP2) multi-model dataset referenced in the Intergovernmental Panel on Climate Change Fourth Assessment Report, and the phase 5 (CMIP5) multi-model dataset that is informing the IPCC Fifth Assessment.

For information about downscaled climate and hydrology projections development, please see the [About](#) page.

Purpose

The archive is meant to provide access to climate and hydrologic projections at spatial and temporal scales relevant to some of the watershed and basin-scale decisions facing water and natural resource managers and planners dealing with climate change. Such access permits several types of analyses, including:

- assessment of potential climate change impacts on natural and social systems (e.g., watershed hydrology, ecosystems, water and energy demands);
- assessment of local to regional climate projection uncertainty;
- risk-based exploration of planning and policy responses framed by potential climate changes exemplified by these projections.

Archive History

- November 2007: Archive launched, initially serving 112 projections of monthly BCSO CMIP5 temperature and precipitation projections over the contiguous U.S. for the period 1950-2099.
- December 2010: Archive expanded to include (1) gridded meteorological observations that guided BCSO CMIP5 application and (2) the intermediate datasets developed during BCSO application, namely the 2-degree "regional" global climate projections (i.e. over spatially interpolated global climate model results from native model resolution to a common 2-degree grid over the contiguous U.S.) and 2-degree bias-corrected versions of the regional projections.
- August 2011: Archive expanded to include (1) 53 projections of daily BCCA CMIP5 projections of minimum temperature, maximum

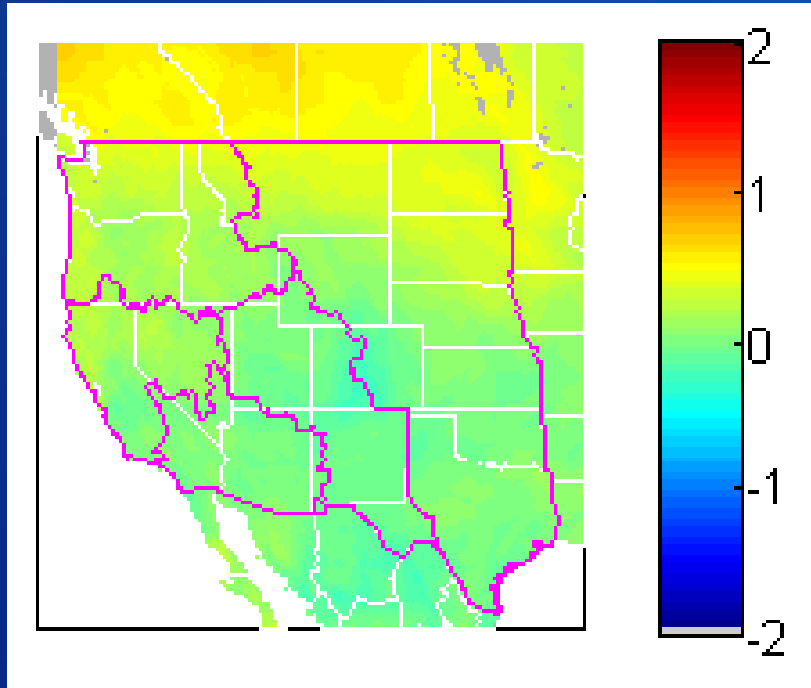
Figure 1. Central Tendency Changes in Mean-Avg. Precipitation over the contiguous U.S. From 1975-1999 to 2040-2059 for BCSO2, BCSO3, and Difference.

Mean-Average Precipitation Change, percent
CMIP5, 1975-1999 to 2040-2059, 50km

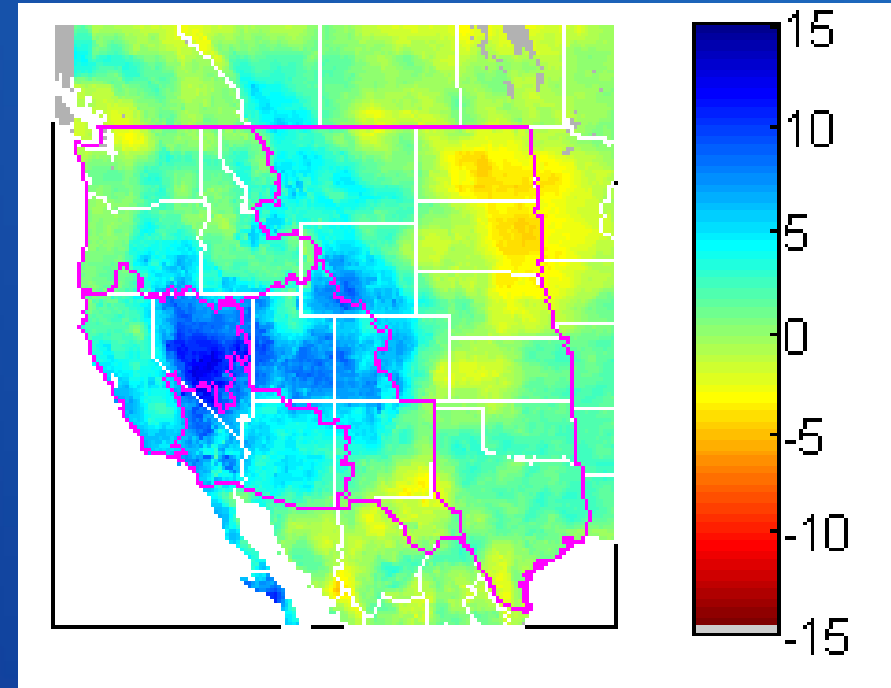
Mean-Average Precipitation Change, percent
CMIP5, 1975-1999 to 2040-2059, 50km

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New Climate Science Research

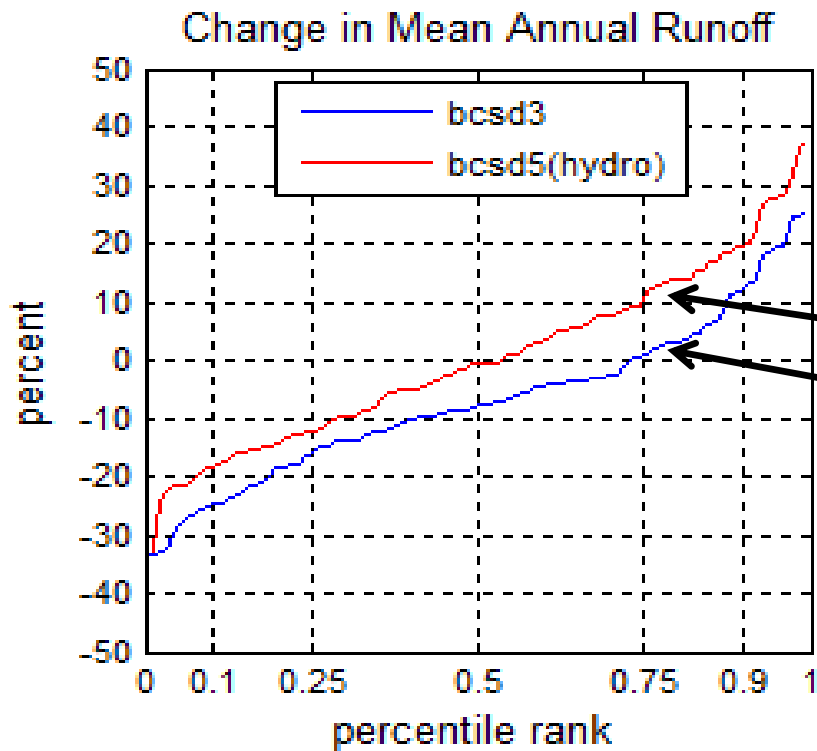


Mean annual Temperature Change,
degrees C (new – previous)
1970-1999 to 2040-2069, 50th percentile



Mean annual Precipitation Change,
percent (new – previous)
1970-1999 to 2040-2069, 50th percentile

Results of New Climate Science Research



Change in Mean Annual
Runoff at Lees Ferry
1970-1999 to 2040-2069

new

previous

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Summary

- The Colorado River Basin Water Supply and Demand Study identified several areas where next steps should be taken
- The *Moving Forward* process was launched in May 2013 to move forward in some of these areas with workgroup reports anticipated for December 2014
- Separate but coordinated efforts are also on-going, in particular, the Ten Tribes Partnership Tribal Water Study and furthering climate research
- We are continuing to evaluate new climate projections, but similar range of variability supports continuation of robust planning demonstrated in the Study

Moving Forward after the Colorado River Basin Water Supply & Demand Study

Questions?

For more information

• Basin Study: <http://www.usbr.gov/lc/region/programs/crbstudy.html>

• Next Steps:

<http://www.usbr.gov/lc/region/programs/crbstudy/MovingForward/index.html>

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