Integrated Resource Planning Advisory Committee

March 26, 2014

Colorado River Basin States

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Meeting Topics

- **Colorado River – overview and management**
- **Basin States response to drought**
- **U.S. – Mexico Colorado River relations**
- **Drought update**

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Colorado River Basin

The Colorado River is shared by its seven bordering states.

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Colorado River Basin

The Colorado River is governed by a series of agreements, collectively known as the "Law of the River."

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Reopening the Compact?

- Logistics of amending the Compact.
- Nevada could only gain more water if six other states agreed to take less.
- Renegotiations would take decades – solutions are needed now.
- The flexibility of the Law of the River allows the states to develop solutions that address present-day issues.

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Colorado River Basin - Oversight

The U.S. Secretary of the Interior serves as the water master in the Lower Basin.

The Bureau of Reclamation operates the majority of the system's main reservoirs.

<u>Other Federal Agencies</u>
Fish and Wildlife Service (FWS)
National Park Service (NPS)
Bureau of Indian Affairs (BIA)
International Boundary and Water Commission (IBWC)

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1922 Colorado River Compact

1922 Colorado River Compact

- **Defined the relationship between the Upper Basin states and the Lower Basin states**
- **7.5 million acre-feet allocated to each**
- **Requires Upper Basin to deliver 75 MAF on 10-year average**

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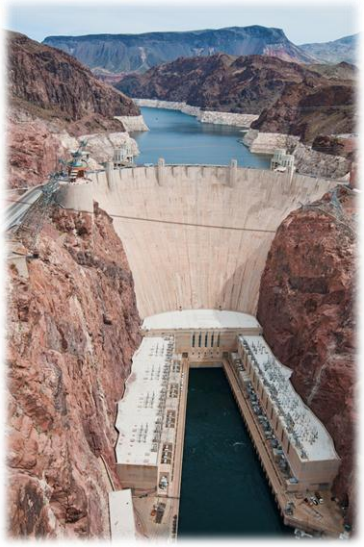
Boulder Canyon Project Act



Boulder Canyon Project Act (1928)

- **Authorized construction of Hoover Dam**
- **Apportioned 7.5 MAF between Arizona, California and Nevada (Lower Basin states)**
- **Section 5 contracts**

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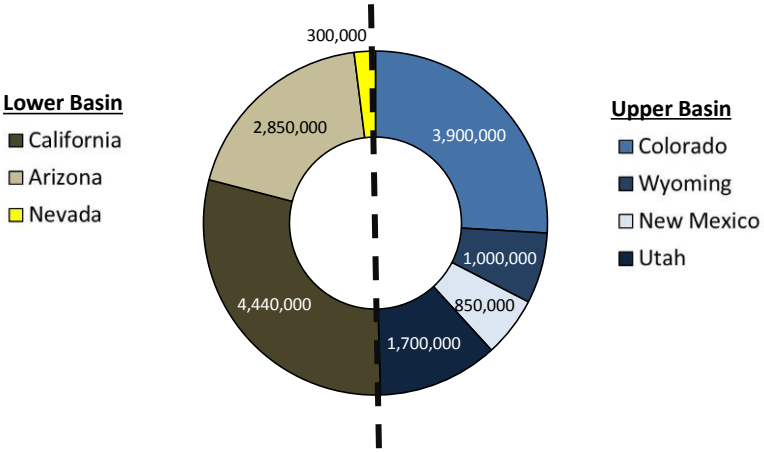
Colorado River Allocations

Ultimately, allocations were divided based on existing demands (largely agricultural) and projected growth of demands.



Mexican Treaty of 1944

Colorado River Delta, Mexico

Mexican Treaty of 1944

- **Committed 1.5 million acre-feet of flows to Mexico annually**
- **Deliveries could be curtailed under "extraordinary drought"**

Upper Colorado River Compact

Lake Powell, Utah

Upper Colorado River Compact (1948)

- **Created Upper Colorado River Commission**
- **Apportioned the Upper Basin's 7.5 million acre-feet allocation**

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Arizona v. California Decree (1964)

Arizona v. California (1964)

If more than 7.5 MAF is available for consumptive use in Lower Basin, the Secretary of the Interior will apportion 50% to California, 46% to Arizona and 4% to Nevada (Sections II.B.2 and II.B.6)

- **No rights to recurrent use of the water shall accrue (use it or lose it)**

If less than 7.5 MAF is available for use in Lower Basin, demands will be met based on pre-1928 water rights (regardless of state lines) (Section II.B.3)

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Colorado River Basin Project Act

Central Arizona Project

Colorado River Basin Project Act (1968)

- **Authorized construction of a number of projects in the basins, including the Central Arizona Project**
- **Long-range operating criteria**
- **Apportionment of shortages**

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Interim Surplus Guidelines

Lake Mead, 1999

Interim Surplus Guidelines (2001)

- **Developed following a period of high-flow years in the system**
- **Outlined a framework to allow Lower Basin States share surplus Colorado River water**
- **Provided time for California to reduce Colorado River use to its 4.4 million AFY allocation**

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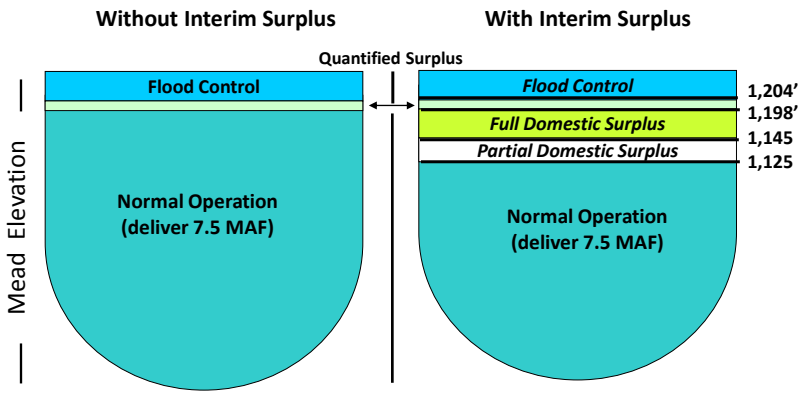
Interim Surplus Guidelines



Interim Surplus Guidelines

Following adoption of the Interim Surplus Guidelines, drought significantly reduced storage levels in Lakes Powell and Mead.

Jan. 2000 Elevation: 1,214 ft.

Dec. 2003 Elevation: 1,139 ft.

2004-2005 Timeline

At that time, significant disagreements between the Upper and Lower Basins, as well as among the Lower Basin states included:

- **2005 Annual Operating Plan disagreement** (2004 hydrology)
- **Article II.B.2 of the Decree in AZ v. CA (50/46/4)** (Wheeling)
- **Quantity and timing of shortage**

Secretary Norton May 2005 Letter

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2005-2007 Timeline

Drought underscored the need for the states to take a cooperative approach to basin management.

Fishing Dock, Lake Mead

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Interim Guidelines

In 2005, the Basin States began evaluating options for reservoir operations and shortage criteria.

- **Drought remained a looming threat to system management**
- **The Secretary of the Interior initiated the development of an EIS in response to the drought**
- **The states spent more than two years developing a proposal with support from the Bureau of Reclamation**

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Interim Guidelines

The Interim Guidelines addressed a number of ongoing basin concerns:

- **Coordinated operations of the system's two largest reservoirs: Lake Powell and Lake Mead**
- **Shortage conditions**
- **The expiration of Interim Surplus Guidelines**
- **A framework for a new type of surplus (II.B.2)**

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Interim Guidelines – *Coordinated Operations*

Coordinated Operations of Lake Powell and Lake Mead:

- **Previously, Lakes Powell and Mead were operated largely independently - Lake Powell released an established amount of water regardless of Lake Mead's elevations**
- **The guidelines optimizes operations of Lakes Powell and Mead, allowing the maximum utilization of each reservoir**

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Interim Guidelines – *Coordinated Operations*

Lake Powell Elevation	Lake Powell Operational Tier	Lake Powell Active Storage
3,700 ft.		24.32 MAF
	Equalization Tier *Equalize, avoid spills or release 8.23 MAF*	
3,636-3,666 ft.		15.54 – 19.29 MAF
	Upper Elevation Balancing Tier *Release 8.23 MAF;* *if Lake Mead < 1,075 feet; balance contents with a min/max release of 7 and 9 MAF*	
3,575 ft.		9.52 MAF
	Mid-Elevation Release Tier *Release 7.48 MAF;* *If Lake Mead < 1,025 ft., release 8.23 MAF*	
3,525 ft.		5.93 MAF
	Lower Elevation Balancing Tier *Balance contents with a min/max release of 7.0 and 9.5 MAF*	
3,370 ft.		0 MAF

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Interim Guidelines – *Coordinated Operations*

Glen Canyon Institute's "Fill Mead First" Proposal

OVERVIEW: Management strategy to transfer storage from Lake Powell to Lake Mead for the benefit of Lake Mead and Glen Canyon (Arizona)

- **Legal Implications:** Upper Basin States unable to meet delivery requirements
- **Environmental:** Exacerbate erosion, impacts to environmentally-sensitive species
- **Hydropower:** Loss of hydropower to Upper Basin customers, including American Indian tribes
- **Hydrologic:** No data on seepage losses; higher evaporation in Lake Mead

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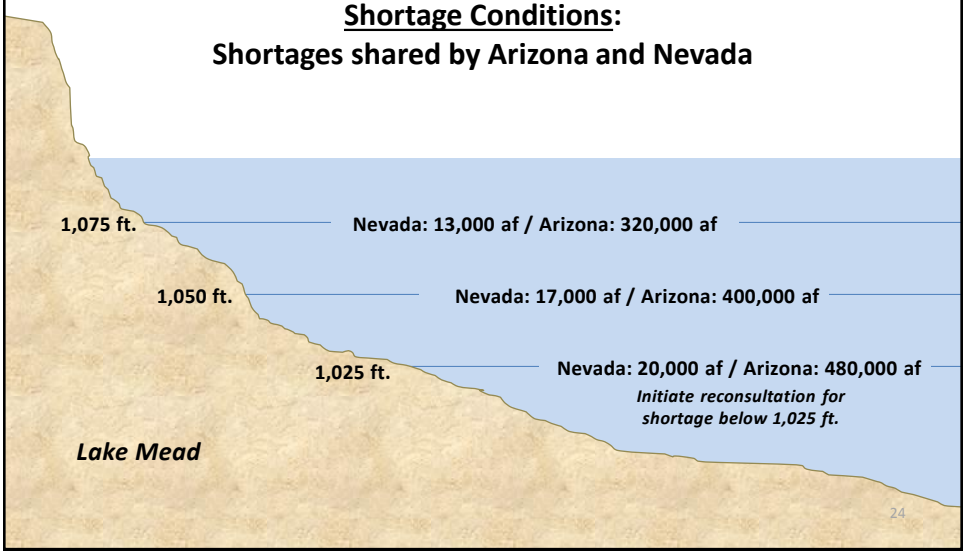
Interim Guidelines – *Shortage Conditions*

Shortage Conditions:
Shortages shared by Arizona and Nevada



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Interim Guidelines – *ISG Amendments*

Extension of the Interim Surplus Guidelines:

- **The Interim Surplus Guidelines were set to expire in 2016**
- **The new guidelines amended the previous Surplus Guidelines and extended them through 2026**
- **As amended, the Interim Surplus Guidelines allow Nevada to access an additional 100,000 acre-feet per year of surplus if Lake Mead's elevation is above 1,145 feet (previously 1,125)**

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Interim Guidelines – *Intentionally Created Surplus*

Intentionally Created Surplus:

- **Solves Article II.B.2 conflict**
- **ICS can be created or credited to a water user through actions that conserve water and increase Lake Mead storage**
- **Four types of ICS:**
  - **Tributary Conservation**
  - **Imported**
  - **Extraordinary Conservation**
  - **System Efficiency**

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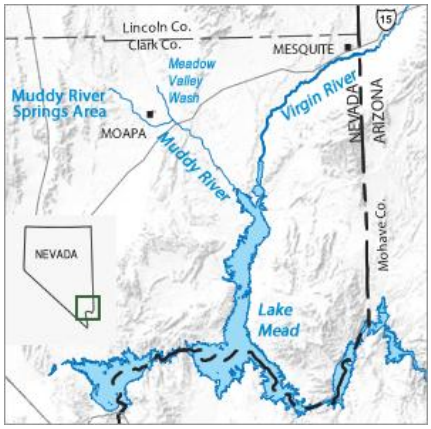
Interim Guidelines – *Tributary Conservation ICS*

ICS: Tributary Conservation



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Interim Guidelines – *Tributary Conservation ICS*

ICS: Tributary Conservation

- **Allows Nevada to acquire rights in its tributaries that were in use for agriculture prior to the adoption of the Boulder Canyon Project Act (1929) and convey them to the Colorado River for storage and credit**
- **Resources available in shortage**

SNWA: Muddy and Virgin River Tributary Conservation ICS
Resources Currently Available: ~30,000 afy owned or controlled

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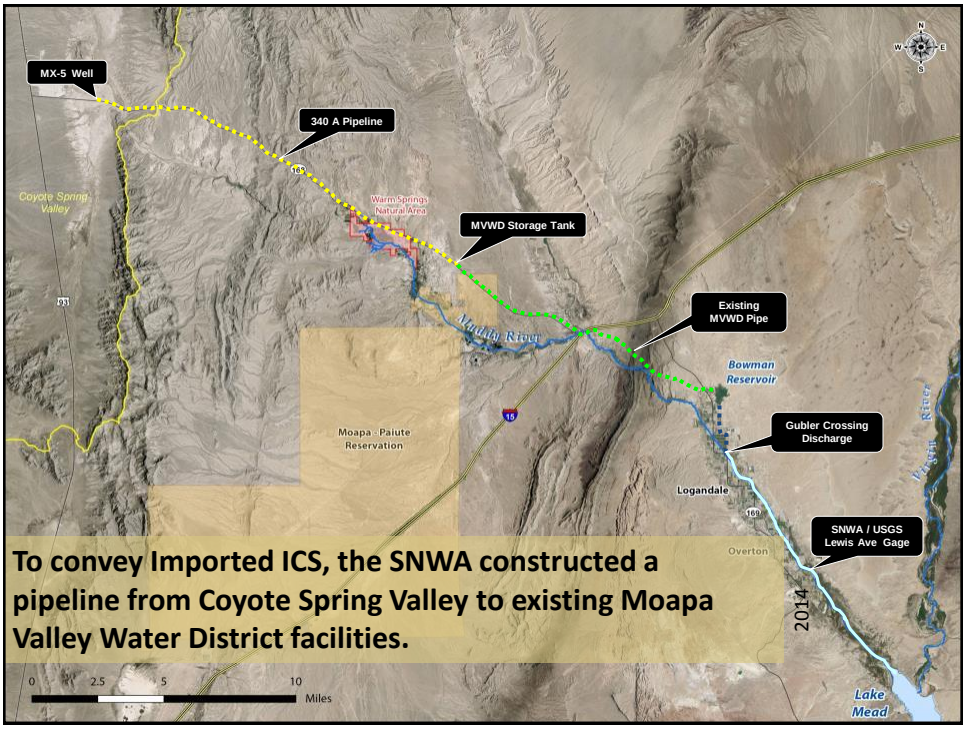

To convey Imported ICS, the SNWA constructed a pipeline from Coyote Spring Valley to existing Moapa Valley Water District facilities.

2014

Interim Guidelines – *Imported ICS*

ICS: Imported

- **Allows Nevada to convey non-Colorado River water to the river for credit**
- **Resources available in shortage**

SNWA: Coyote Spring Groundwater Imported ICS
Resources Currently Available: 9,000 acre-feet owned

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Interim Guidelines – *Extraordinary Conservation*

ICS: Extraordinary Conservation

- **Allows states to implement projects that conserve water through extraordinary measures to increase Lake Mead elevations**
- **Examples: Land fallowing, canal lining, storage of Tributary & Imported ICS in Lake Mead**
- **Stored water in Lake Mead cannot be taken during shortage**

SNWA: Converted Muddy and Virgin River water
Resources Currently Stored in Lake Mead: 138,000 acre-feet
Maximum Storage in Lake Mead: 300,000 acre-feet

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Interim Guidelines – *System Efficiency ICS*

ICS: System Efficiency

- **Allows states to fund projects that conserve Colorado River water**
- **Water stored in Lake Mead is not available in shortage**

Existing SNWA Resources:

- Brock Reservoir (Drop 2 Project): 400,000 af available to Nevada (Annual Limit: 40,000 af)
- Yuma Desalting Plant (YDP): 3,050 af currently in storage in Lake Mead

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Interim Guidelines – *System Efficiency ICS*

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Interim Guidelines – *Yuma Desalting Plant*

- **Largest plant of its kind in the United States**
- **Constructed to desalt Wellton-Mohawk water**
- **Water discharged to Colorado River**
- **Reduces releases from river system reservoirs**

Nevada's Goal: Determine availability and cost of obtaining interim water supply from YDP operations for municipal needs.

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Interim Guidelines – *Yuma Desalting Plant*

In 2006, a demonstration run took place to meet five objectives:

- **Show that the plant can run**
- **Clarify performance and cost estimates**
- **Demonstrate use of current technology**
- **Improve overall plant readiness**
- **Provide measurements of water quality impacts**

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Interim Guidelines – *Yuma Desalting Plant*

Yuma Desalting Plant

During the pilot run, 30,496 acre-feet of water were delivered and included in water deliveries to Mexico.

This preserved an equivalent volume of water that was credited as System Efficiency ICS to the funders

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Interim Guidelines – *Brock Reservoir*

SNWA helped fund the construction of the Brock Reservoir – a reservoir located outside Yuma, Arizona.

- **Stores Colorado River water that was called for, but not fully utilized for numerous reasons (canal outages, changed weather conditions, high runoffs)**
- **Allows the Bureau of Reclamation to capture water when supply is in excess of demand, and conserve water in Lake Mead**
- **Completed in 2010**

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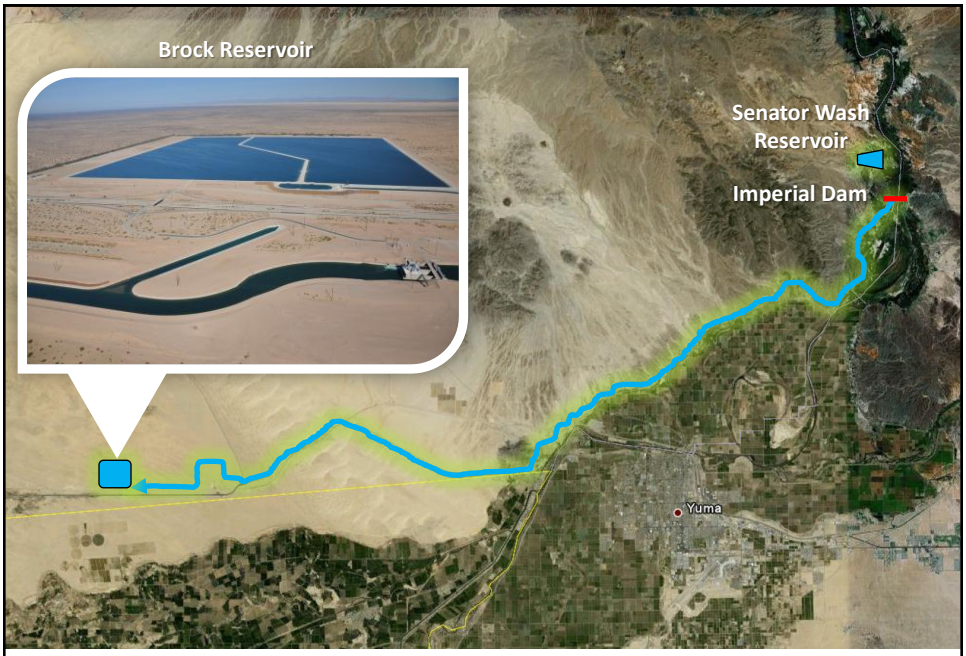

Interim Guidelines

Additional activities during negotiations:

- **Revised return-flow credit methodology: Allows for the accounting of additional Nevada groundwater resources.**
- **The package to Interior Secretary Kempthorne included a letter that identified provisions regarding Mexico.**

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Augmentation Study

Immediately following approval of the Interim Guidelines, the Basin States released a report that evaluated options for long-term augmentation of the Colorado River.

- **Highly technical**
- **Did not address legal, political or policy factors**
- **Completed with cooperation among all seven states**

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Basin Study

In 2009, a process was initiated among the Basin States and the Bureau of Reclamation for a larger, more comprehensive study of the Basin.

- **Assessed future water supply and demand imbalances**
- **Assessed risks to Basin resources, including climate change**
- **Evaluated opportunities for resolving imbalances and to mitigate impacts to resources**
- **Does not result in decisions – intended for dialogue, reference and planning purposes**

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Basin Study - Findings

Study findings:

- **Median supply and demand imbalance in 2060 is 3.2 million acre-feet / year**
- **The range of supply and demand imbalances ranges from 0 to nearly 8 million acre-feet / year**

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Basin Study – Resource Options

More than 150 options submitted and evaluated for inclusion within the study

- INCREASED SUPPLY – Reuse, desalination, importations
- REDUCED DEMAND – Conservation (municipal, agricultural, industrial demands)
- MODIFY OPERATIONS – Transfers and exchanges, water banking
- GOVERNANCE & IMPLEMENTATION – Stakeholder committees, population control, reallocation

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Bi-national Discussions

Following completion of the 2007 Guidelines, bi-national discussions between the United States and Mexico occurred more frequently.

- **The countries recognized that long-term success of the Interim Guidelines depends on formal understandings between the two countries to manage environmental concerns, shortages and other trans-boundary water issues**
- **Additional opportunities for joint investments (desalination, agricultural modernization)**

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Bi-national Discussions

MINUTE 316 (2010):
Provides water for the Cienega de Santa Clara to replace losses from the Yuma Desalting Plant test run

MINUTE 317 (2010):
Established bi-national consultative council; set framework for future negotiations

MINUTE 318 (2010):
Authorized reservoir storage mechanism to allow storage of earthquake losses

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Bi-national Discussions

MINUTE 319 (2012):

- **5-year agreement (establishes framework for permanent agreement)**
- **Shared responsibility in weathering shortages and benefitting from surpluses**
- **Addresses reservoir storage and salinity concerns**
- **Acknowledges that water should flow to the Colorado River Delta ecosystem**
- **Establishes framework for future management beyond the 5-year pilot program**
- **Establishes provisions for bi-national ICS**

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Bi-national Discussions - ICS

Morelos Dam, Mexico

Pilot program entails US and Mexican investment in conservation projects that will yield environmental and water benefits for the US and Mexico

SNWA will receive 23,750 acre-feet of Binational ICS credits in Lake Mead

Environmental pulse flow occurring this week

What's Next for the Basin States

- **Working with Colorado River partners to improve river and reservoir conditions on a Basin-wide scale**
- **Implementing components of the Basin Study**
- **Discussions about what happens if Lake Mead's elevation falls below 1,025 feet**

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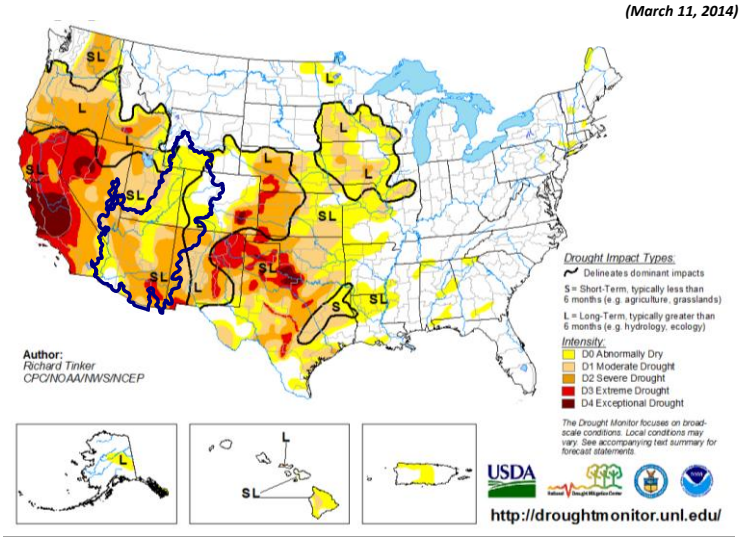
Drought Update

Drought Monitor

(March 11, 2014)



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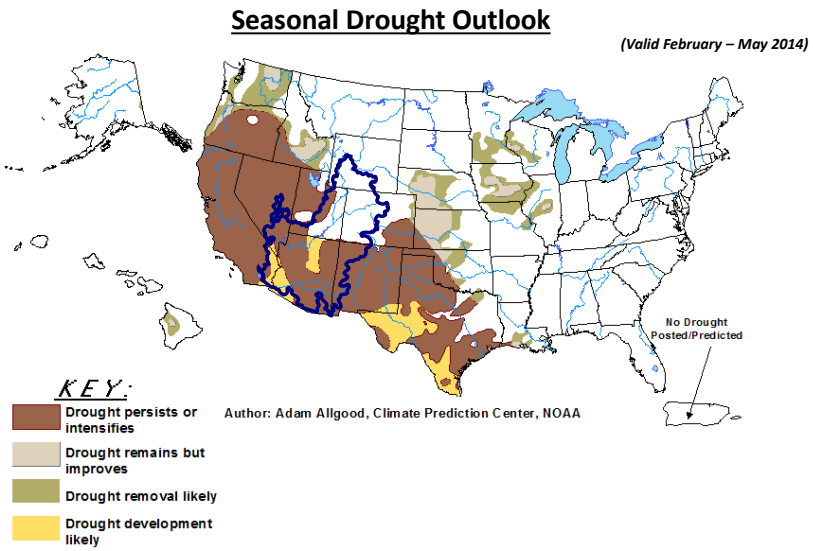
Drought Update



Source: National Oceanic Atmospheric Administration and the U.S. Department of Commerce

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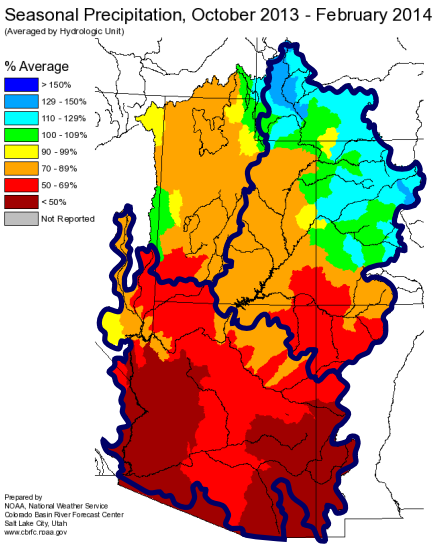
Drought Update

- **February inflow to Lake Powell:** 84% of average
- **Snow Pack:** 113% of average
- **Water Year 2014 Precipitation:** 103% of average
- **Forecasted Water Year 2014 Inflow to Lake Powell:** 105% of average



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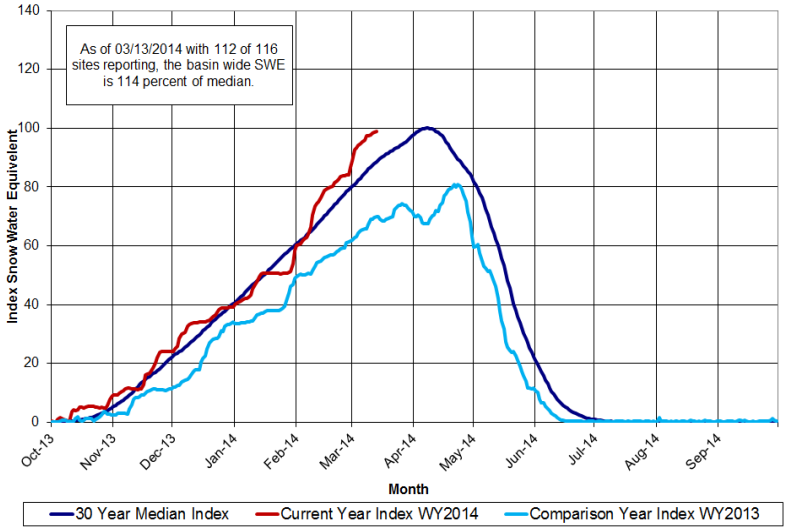
Drought Update

Upper Colorado River Basin Snow Accumulation



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Drought Update

Lake Powell Precipitation and Inflow Forecast

	2013 Water Year		2014 Water Year	
Month	Actual Precipitation	Inflows Forecast	Actual Precipitation	Inflows Forecast
Jan	72%	61%	96%	93%
Feb	78%	54%	102%	96%
Mar	76%	49%	103%	105%
Apr	78%	42%		
May	80%	45%		
Jun	77%	44%		
Jul	80%	41%		
Aug	81%	40%		
Sept	90%	46%		
Actual	91%	47%		

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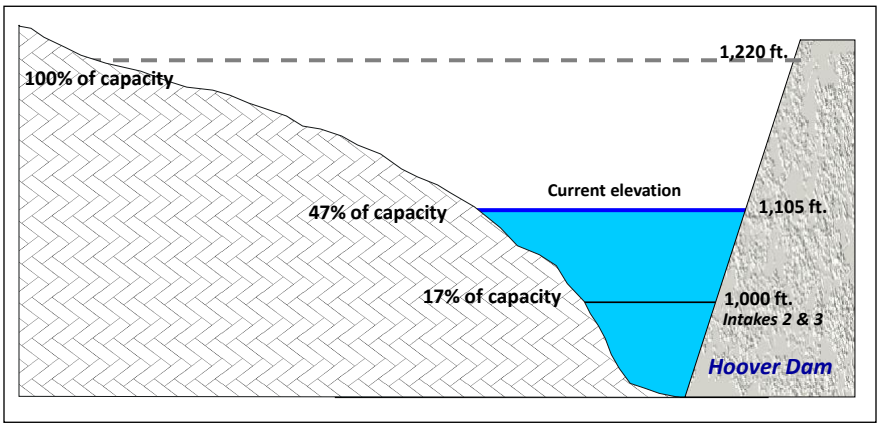
Drought Update

Lake Mead Capacity - Current



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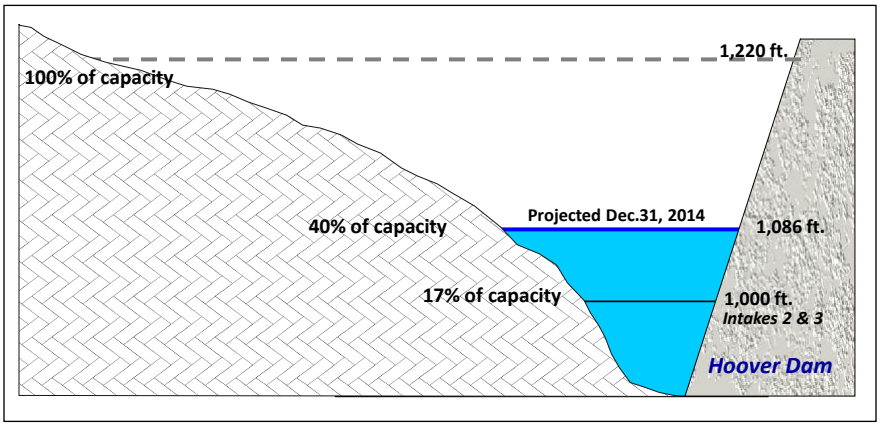
Drought Update

Lake Mead Capacity – Projected (Dec. 31, 2014)



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Upcoming Meetings

April 23: **Climate Change and Attribute Development**

May TBD: **Facility Tour**
(NO COMMITTEE MEETING IN MAY)

Future Topics:

- **Existing and deferred facilities**
- **Water quality and emerging issues**
- **SNWA environmental efforts**
- **Asset management**
- **Conservation**
- **Current and long-term water resources**
- **Funding impacts**

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