Integrated Resource Planning Advisory Committee

June 18, 2014

Hydrologic Impacts to Lake Mead

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Meeting Topics

- **SNWA fund reserve update**
- **Drought update**
- **Hydrologic uncertainty**
- **Attribute development**
- **Committee information needs**

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SNWA Fund Reserves Update

Recommendation No. 6:

Separate money added to the New Expansion Debt Service fund and related interest attributed to the 2014 and 2015 phased-in rates from the remainder of the fund balance and use it to only offset forecasted operating deficits in 2016 to 2021 and not for any other purposes

IRPAC MODEL:

$20.9 million would be collected from phased-in rates during FY 2013-14 and FY 2014-15.

ACTUALS:

Budget forecasts currently show revenues are on target with IRPAC phased-in rate projections.

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SNWA Fund Reserves Update

Recommendation No. 7:

Allocate Connection Charge revenues in excess of the 2014 base year to pay the following:

a. Early payment of debt or capital expenditures
b. Water rate reductions

Recommendation No. 8:

If fund balance exceeds $280 million, excess funds can be used to fund only:

a. Redeeming outstanding bonds
b. Moderate rate increases
c. Reduce water rates

FY 2014-15 Budget Projections:

	Proposed 06/30/2015
Excess Connection Charges (#7)	**$ 19.1**
Funds in Excess of Target Balance (#8)	**3.1**
	$ 22.2 mil

It's projected that by July 2015, $22 million will be in excess of IRPAC's target fund balance and available for the options set forth by the committee.

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SNWA Fund Reserves Update

Earlier this year, the SNWA reduced its FY2015 labor budget from $72 million to $66 million, which included the elimination of 49 full-time positions.

The savings ($6 million) were applied to asset management efforts.

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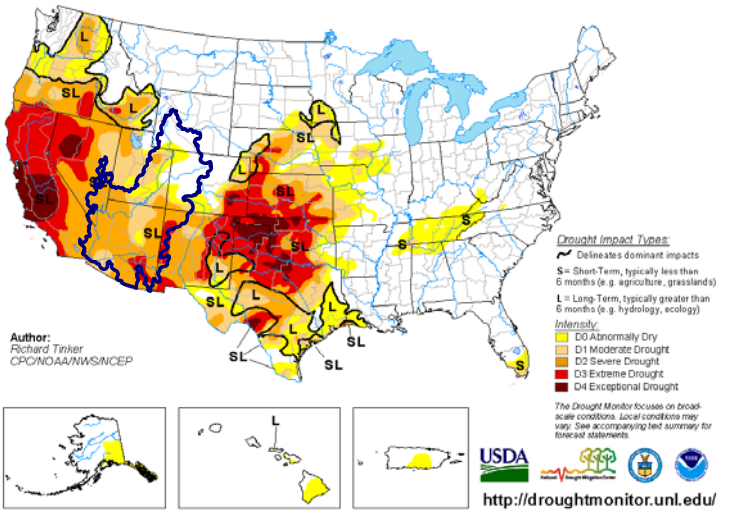
Drought Update

Drought Monitor

(June 3, 2014)



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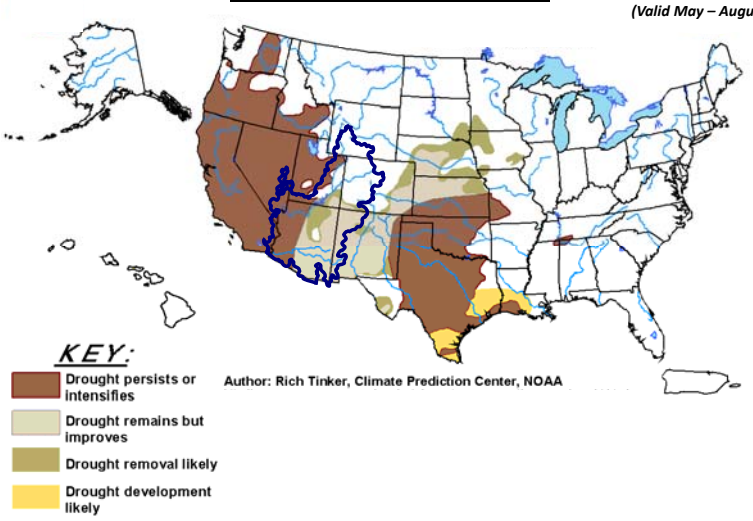
Drought Update

Seasonal Drought Outlook

(Valid May – August 2014)



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

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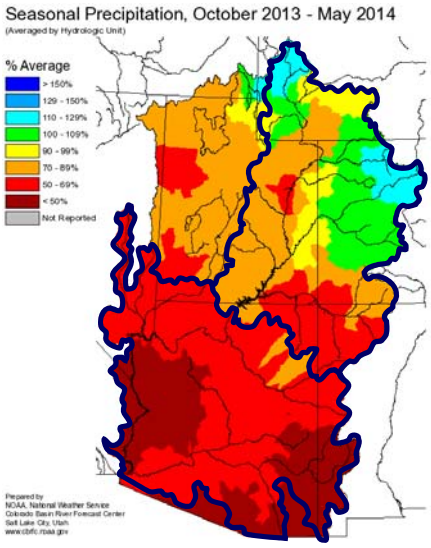
Drought Update

- **May inflow to Lake Powell:** 89% of average
- **Snow Pack:** N/A
- **Water Year 2014 Precipitation:** 98% of average
- **Forecasted Water Year 2014 Inflow to Lake Powell:** 99% of average



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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%	99%	103%
May	80%	45%	98%	99%
Jun	77%	44%		
Jul	80%	41%		
Aug	81%	40%		
Sept	90%	46%		
Actual	91%	47%		

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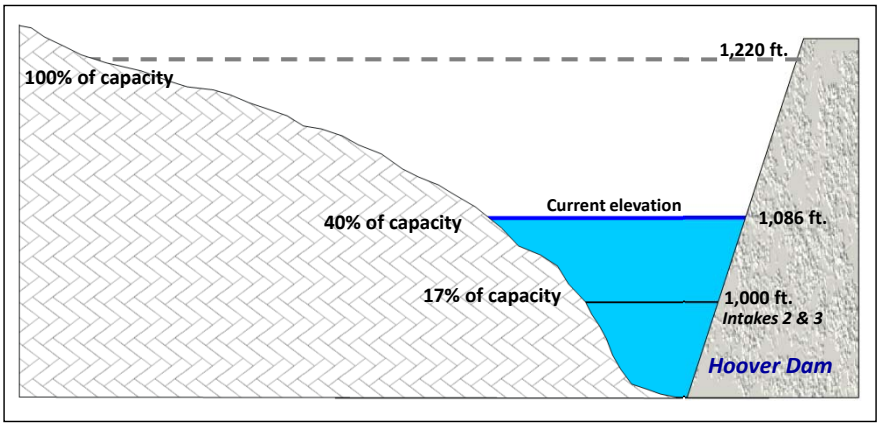
Drought Update

Lake Mead Capacity - Current



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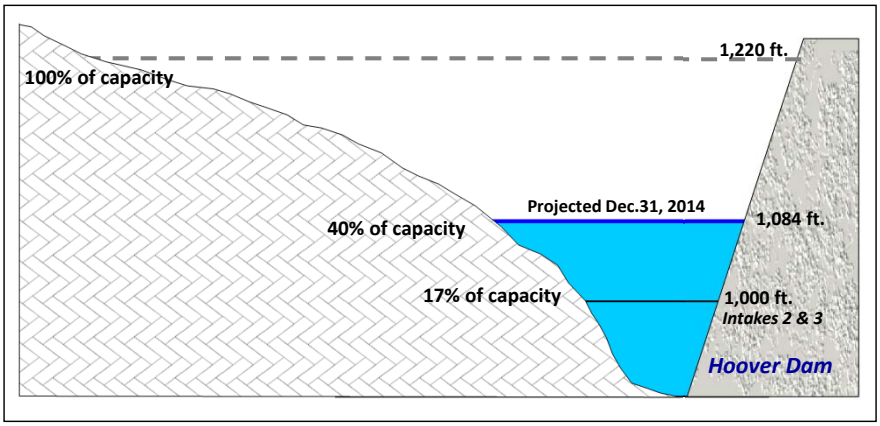
Drought Update

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



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Meeting Topics

February:	**Welcome, review of committee scope, purpose and need**
March:	**Colorado River laws, structure and related agreements**
April:	**Climate change, Colorado River Basin Study and projected lake elevations**
May:	**Committee tour**

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Brad Udall's Take Home Points

- Climate change is real, here now, not stopping, 1000-year commitment
- Climate Change is Water Change
- Colorado River is overallocated AND overused
- Colorado River flows very likely to decline by 2050 (-9%??)
- Drought of last 13 Years is unprecedented and shows about a 15% reduction relative to 15 maf
- Colorado River demands likely to increase but by how much?
- Extreme events are being impacted by climate change
- Expect to see lakes Powell and Mead continue to fluctuate significantly
- Climate Change will impact Lower Basin and Upper Basin in very different ways
- Science will never be certain; but we already know much
- Science unlikely to provide more accuracy beyond what we already have, at least in next decade and maybe longer
- Smart solutions should be robust to range of uncertainty so as to manage risk

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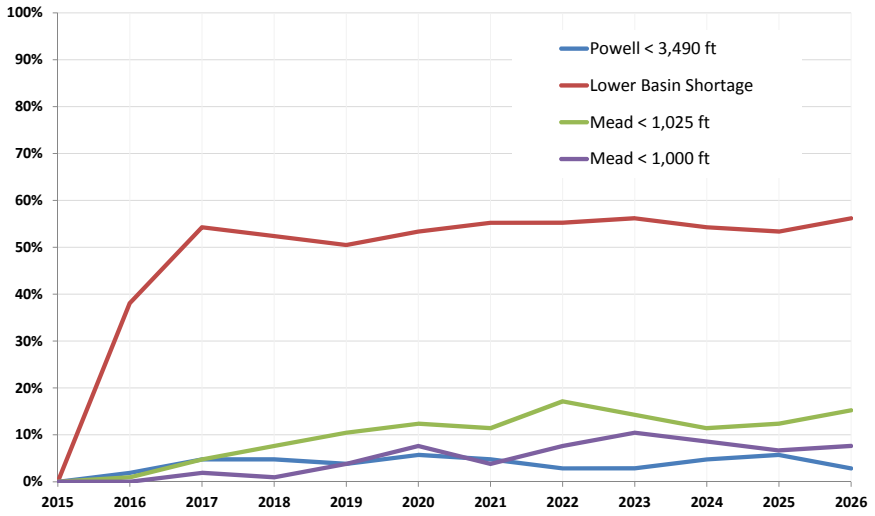
Current Projections: Historical Hydrology



* Projected using January 2014 CRSS

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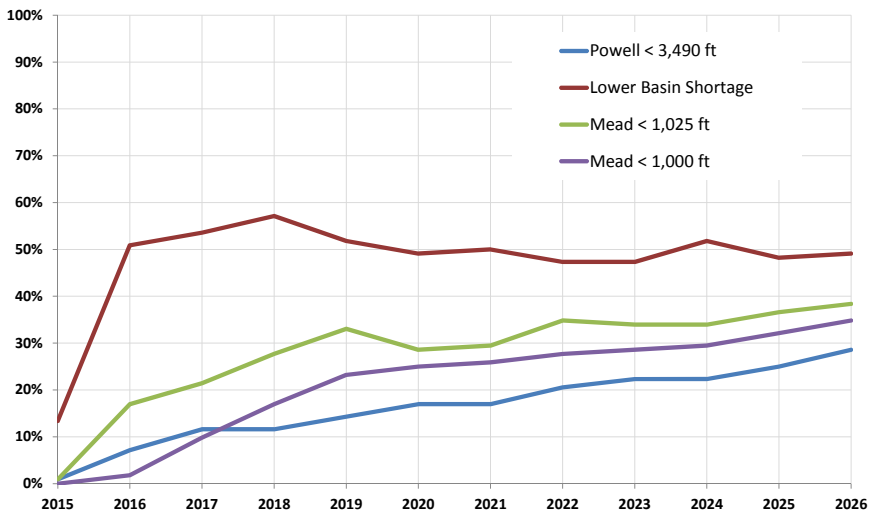
Current Projections: GCM-Driven Hydrology



* Projected using January 2014 CRSS

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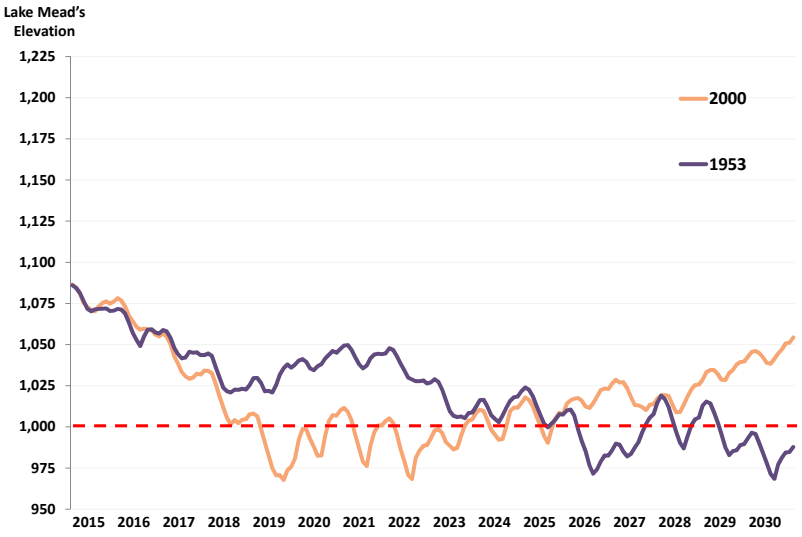
Representations of Ongoing Drought



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Lowered Lake Elevation Impacts to SNWA

- **Water quality**
- **Reduced operating flexibility**
- **Access to water supplies (access lost at 1,000 feet)**
- **Additional treatment costs**
- **New facility costs**
- **Supplemental resource costs**

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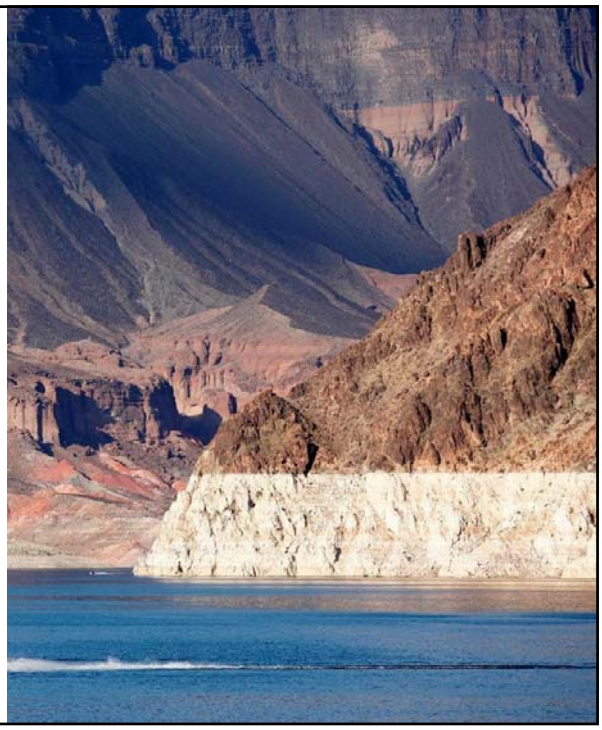
Impacts of hydrologic uncertainty on SNWA's Intake Systems



SNWA Intake System - Introduction

Over the years, the SNWA intake system has been improved for increased operational flexibility.

By 2005, the system was capable of meeting 900 million gallons per day demands.

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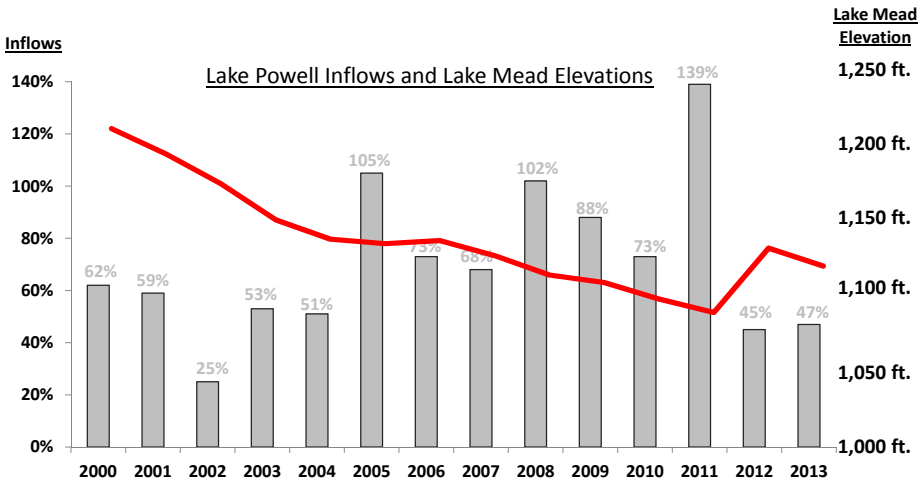
SNWA Intake System - Introduction

Beginning in the early 2000s, Colorado River inflows declined. As a result, Lake Mead water elevations fell.



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SNWA Intake System – Drought Response

As the drought worsened,
the SNWA shifted from growth-related facilities
to those that sustained system reliability
and protected water quality.

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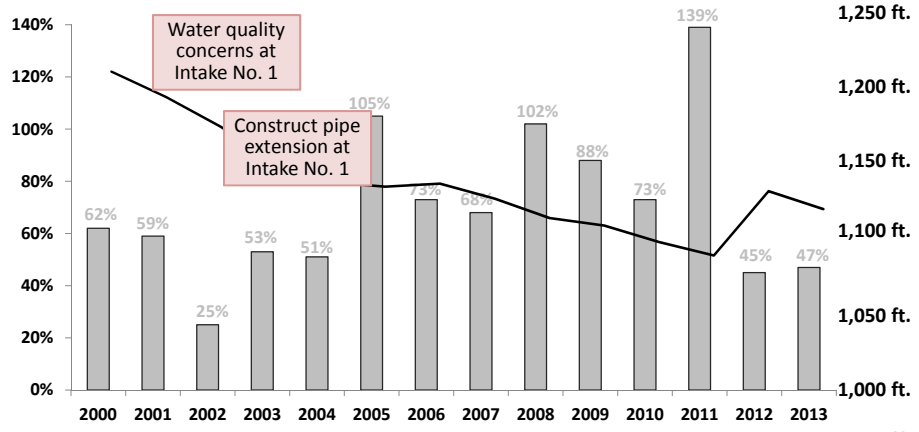
SNWA Intake System – Drought Response

Timeline of Intake Issues and Events



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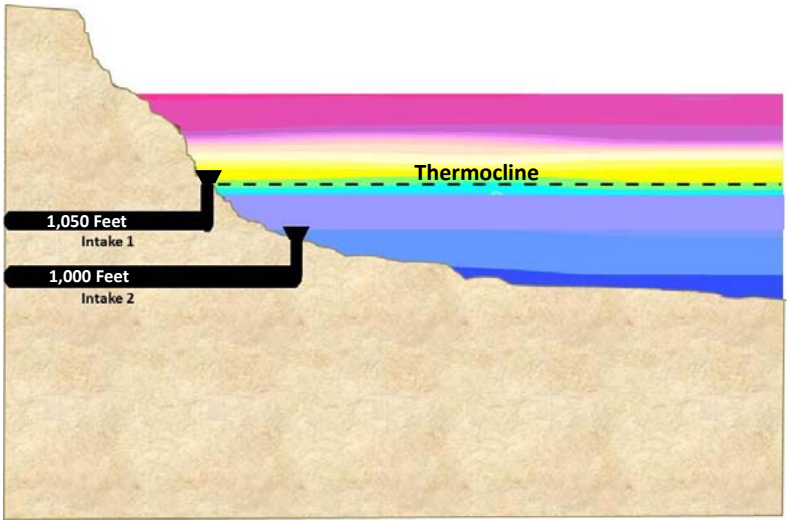
SNWA Intake System – Drought Response

Intake Schematic (2004)



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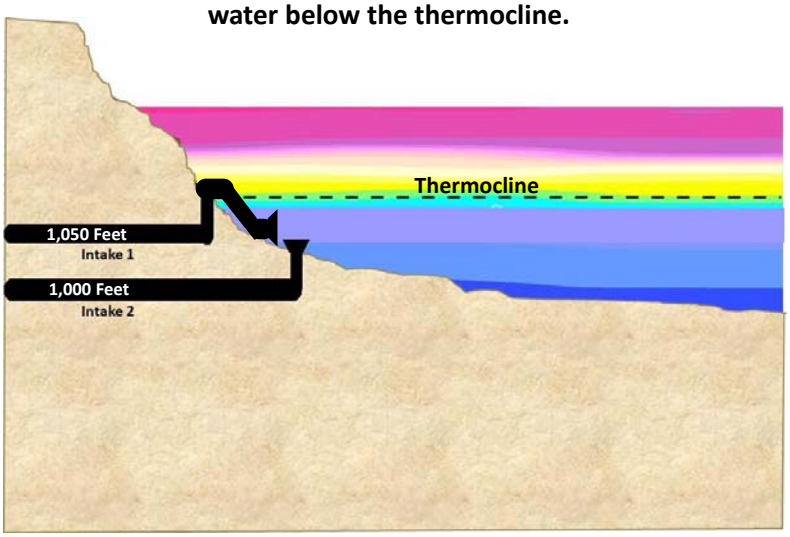
SNWA Intake System – Drought Response

The intake extension allowed SNWA to access water below the thermocline.



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SNWA Intake System – Drought Response

Lake Mead Intake No. 1 Extension:

- **Avoided higher treatment costs**
- **Accesses better source water quality**
- **Does not increase intake capacity**
- **Does not protect Lake Mead Intake No. 1 from elevations below 1,050 feet**

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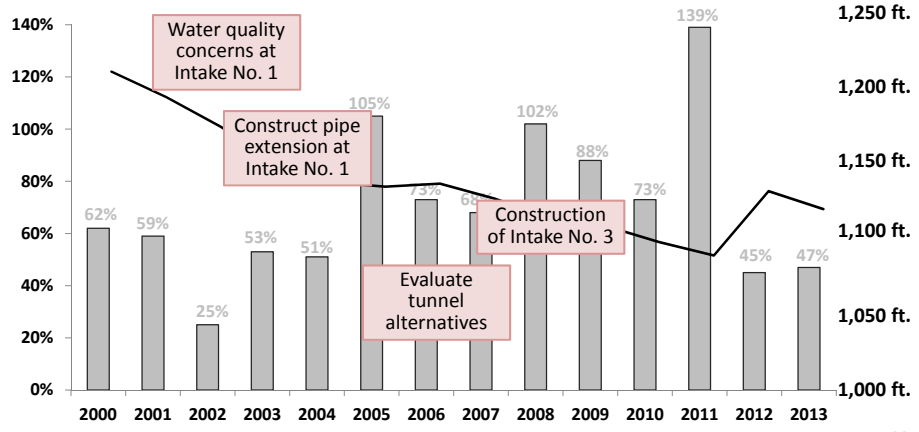
SNWA Intake System – Drought Response

Timeline of Intake Issues and Events



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SNWA Intake System – Intake No. 3

Why a Third Intake?

WATER QUALITY
At lower lake levels, intakes downstream of the Las Vegas Wash are subject to degraded water quality

WATER TREATMENT PROCESSES
Additional water treatment processes would be required to meet regulations for treating water above the thermocline and close to the Wash outfall

RELIABILITY
In the event of a failure, one intake would not be able to serve the community's growing population during peak periods

COSTS
Additional treatment processes could cost hundreds of millions of dollars (estimated 2004 dollars, current estimates are closer to $1 billion)

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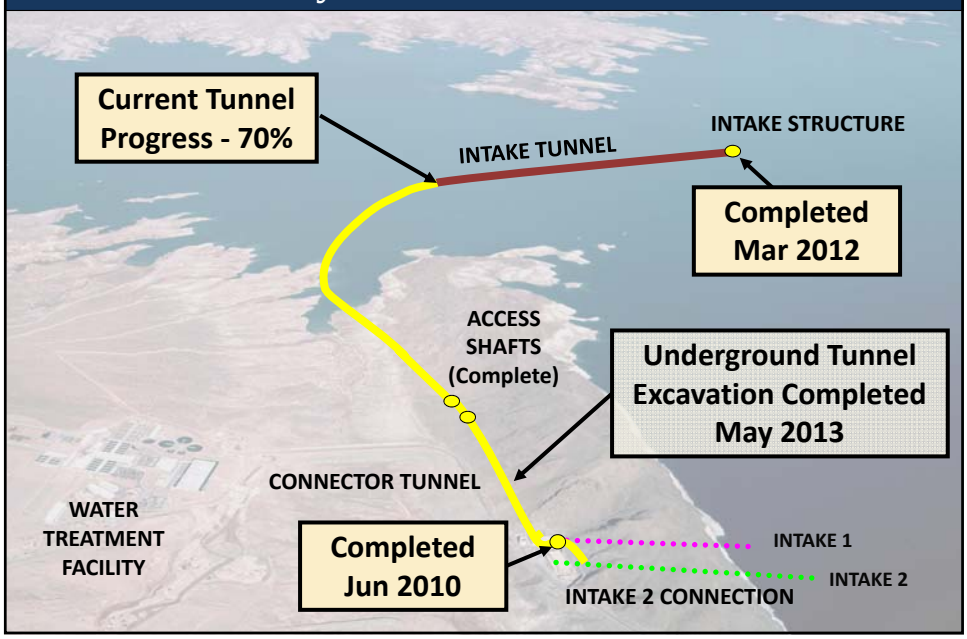
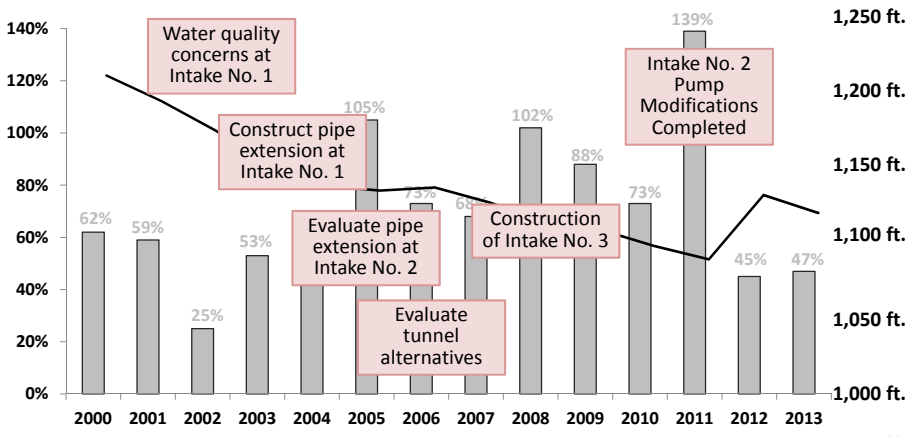
SNWA Intake System – Intake No. 3



SNWA Intake System – Drought Response

Timeline of Intake Issues and Events



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SNWA Intake System – Drought Response

In 2011, pump modifications were completed at Intake Pumping Station No. 2.

The pumping capacity of Lake Mead Pumping Station No. 2 was increased from 600 million gallons per day to 720 million gallons per day.

The additional capacity allowed Lake Mead Intake No. 2 to meet peak demands in the event Intake No. 1 was offline due to lowered lake elevations.

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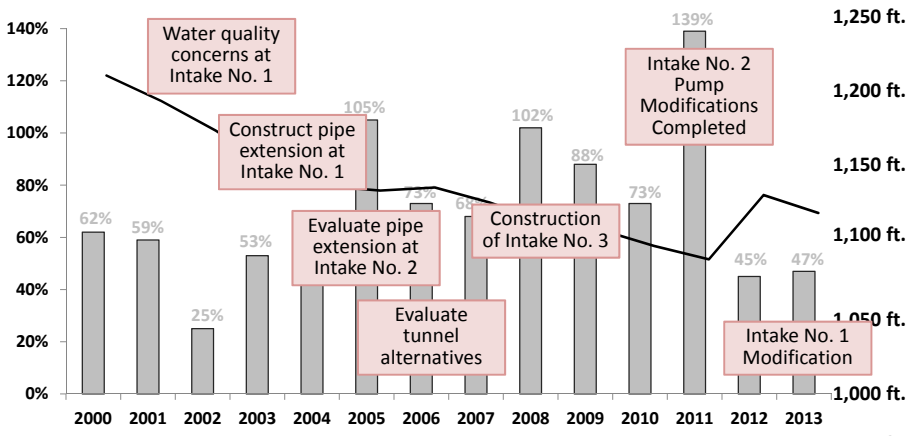
SNWA Intake System – Drought Response

Timeline of Intake Issues and Events



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SNWA Intake System – Drought Response

In September 2013, the SNWA Board ratified a modification to the Intake No. 3 contract to modify Intake No. 1.

- **A reduction in annual water deliveries could drop Lake Mead water elevations low enough to render Intake No. 1 inoperable by spring 2015.**
- **The connection required a shutdown of Intake Pumping Station No. 1 (IPS-1) and sole reliance on the remaining Intake Pumping Station No. 2 (IPS-2).**
- **It was critical the modification was completed during the winter months while demand was low.**

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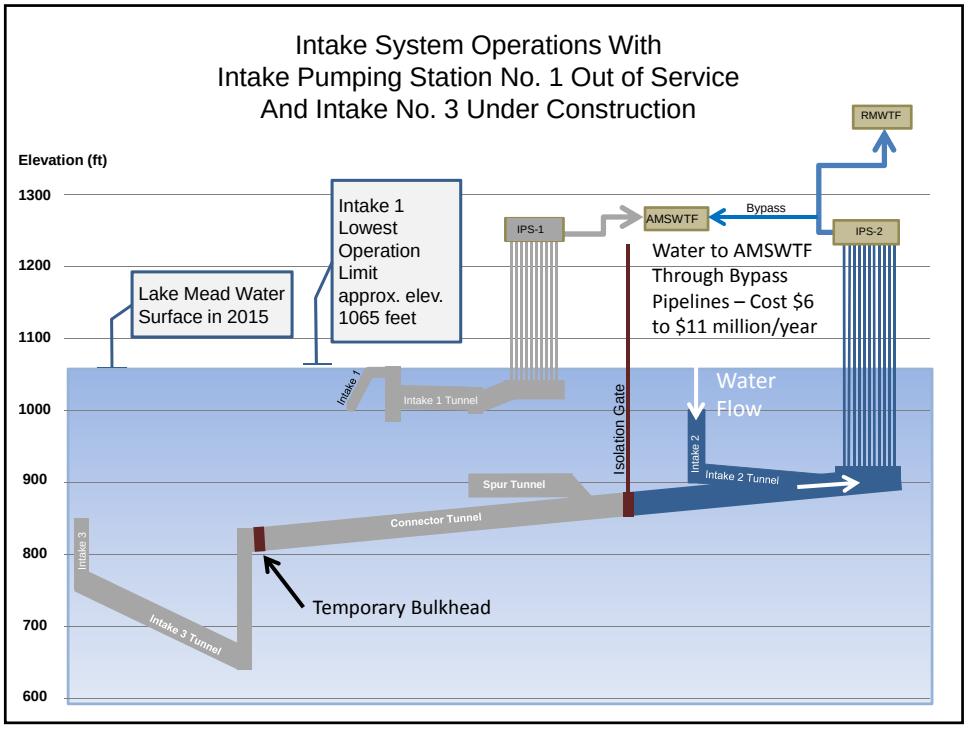
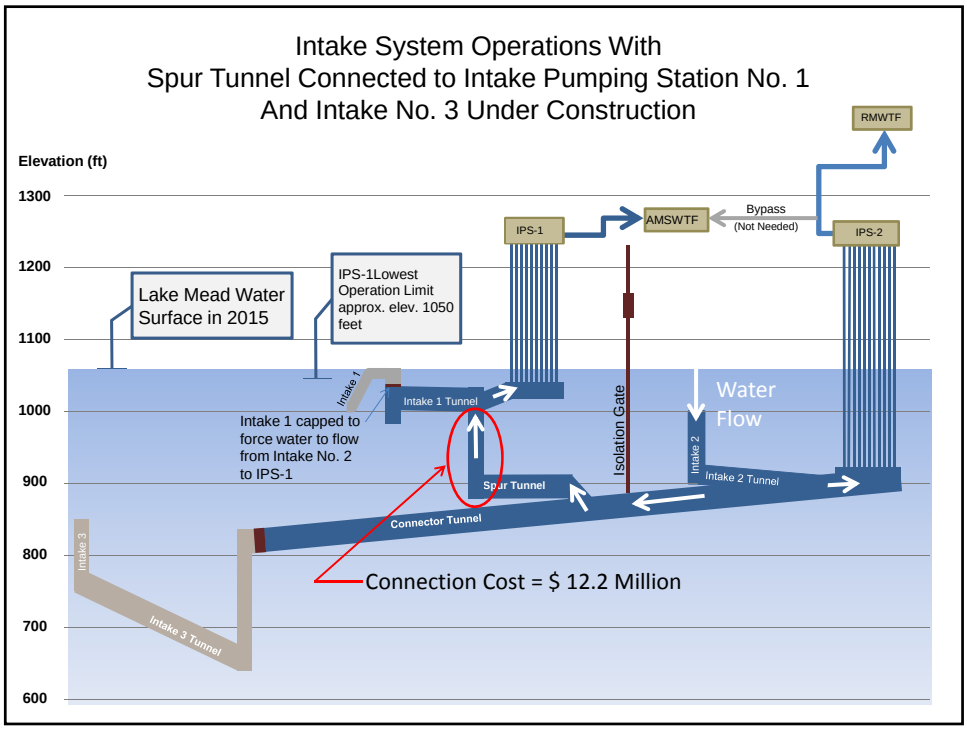
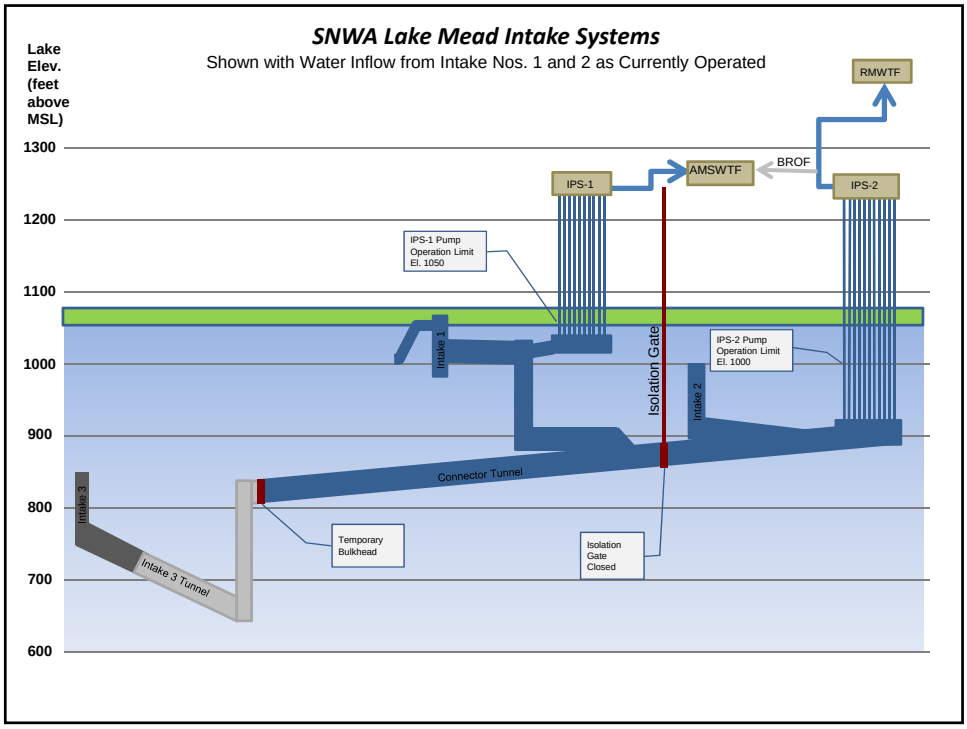
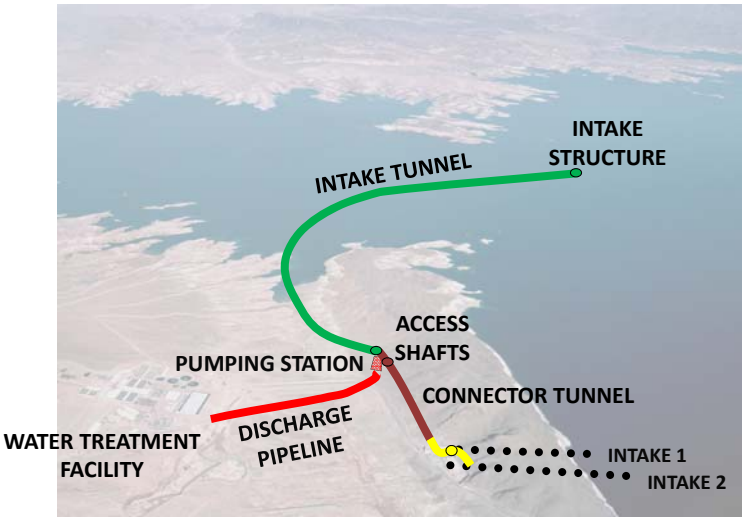

Intake System Operations With
Intake Pumping Station No. 1 Out of Service
And Intake No. 3 Under Construction
Elevation (ft)
1300
1200
1100
1000
900
800
700
600
RMWTF
Bypass
AMSWTF
IPS-1
IPS-2
Intake 1
Lowest
Operation
Limit
approx. elev.
1065 feet
Lake Mead Water
Surface in 2015
Water to AMSWTF
Through Bypass
Pipelines – Cost $6
to $11 million/year
Water
Flow
Intake 1
Intake 1 Tunnel
Isolation Gate
Intake 2
Intake 2 Tunnel
Spur Tunnel
Connector Tunnel
Intake 3
Intake 3 Tunnel
Temporary Bulkhead


Intake System Operations With
Spur Tunnel Connected to Intake Pumping Station No. 1
And Intake No. 3 Under Construction
Elevation (ft)
1300
1200
1100
1000
900
800
700
600
RMWTF
Bypass
(Not Needed)
AMSWTF
IPS-1
IPS-2
Lake Mead Water
Surface in 2015
IPS-1Lowest
Operation Limit
approx. elev. 1050
feet
Intake 1
Intake 1 Tunnel
Intake 1 capped to
force water to flow
from Intake No. 2
to IPS-1
Water
Flow
Isolation Gate
Intake 2
Intake 2 Tunnel
Spur Tunnel
Connector Tunnel
Intake 3
Intake 3 Tunnel
Connection Cost = $ 12.2 Million



SNWA Intake System – Intake No. 3

As it was designed, Intake No. 3 included a pumping station and discharge pipeline (costs as designed: ~$300 million).



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SNWA Intake System – Intake No. 3

Reasons for IPS-3 deferral:

- **Due to technological challenges at the time, Intake Pumping Station No. 3 was designed to pump only to an elevation of 1,000 feet.**
  - **Pump modifications at Intake No. 2 increased its capacity to meet summer's peak demands; the additional capacity that IPS-3 afforded was no longer needed in the short term.**
- **At the time of design, it was not anticipated that Lake Mead's elevations would go below 1,000 feet.**
- **Cost savings**

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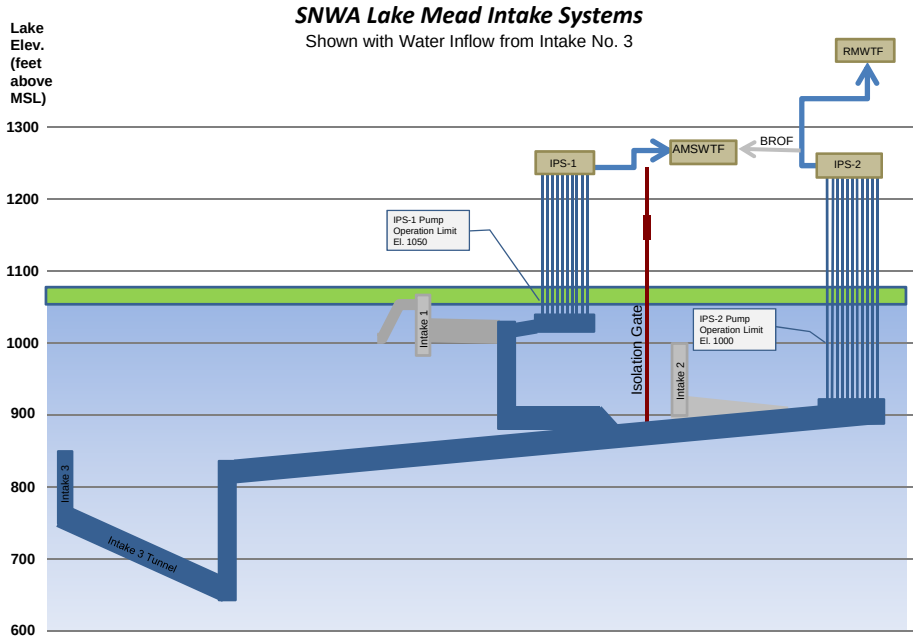

Potential Alternatives

- **Additional conservation**
- **Interstate cooperation**
- **Facilities**
- **Supplies**

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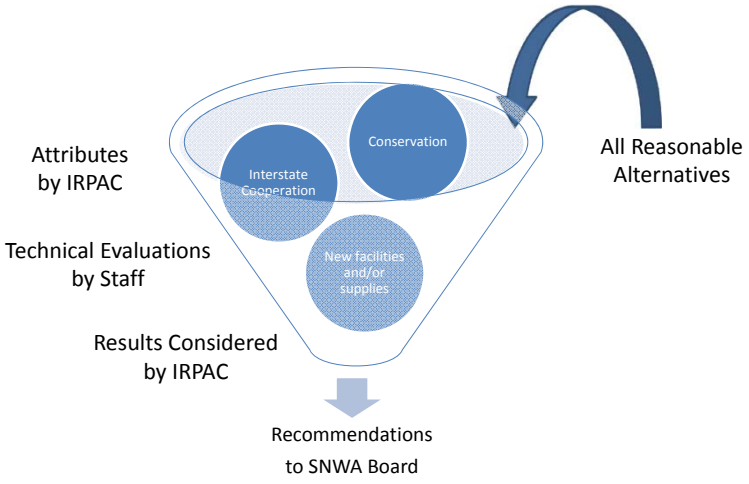
Analysis of Alternatives Using Attributes



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Importance of Attributes

- **Help to establish criteria against which alternatives can be compared**
- **Must be easy to understand**
- **Are non-redundant**
- **Can be measured**
- **Concise in number**

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Attributes and Performance Measures

Performance measures indicate how well attributes are being met.

Attributes	Performance Measures
Cost Effective	Water rates
Vulnerability to Climate Change	Frequency of water shortages Amount of climate change influence on a given water resource

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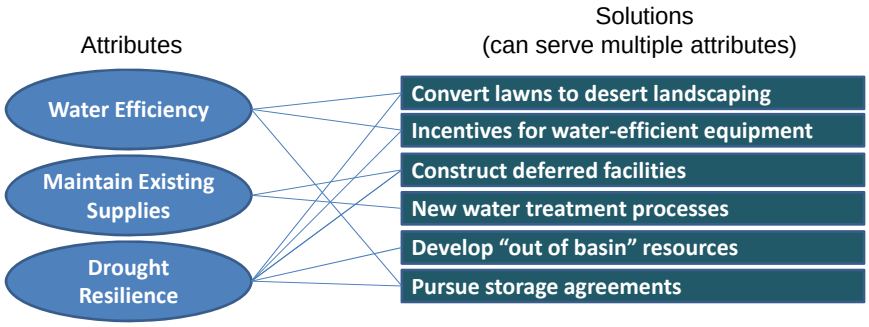
Attributes vs. Solutions

- Attributes help define the **what** we are trying to achieve
- Solutions represent **how** we could get there



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Now What?

- **Questions?**
- **What else is needed?**
- **What other information is required?**

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Upcoming Meetings

July 23

No meeting in August

September 10

October 15

November 5

December 3

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