Integrated Resource Planning Advisory Committee

Meeting 2:

Southern Nevada's Water Resources & Regional Facilities

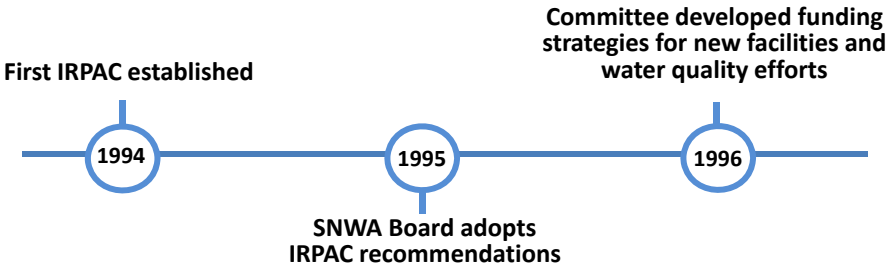
CHALLENGES (1990S)

September 12 Meeting Recap:

- **Planners assumed Nevada's Colorado River allocation would last indefinitely**
- **Southern Nevada's population estimates always ran low; planners significantly underestimated growth**
- **The SNWA was formed in 1991 to address water resource issues regionally**
- **The SNWA convened its first integrated planning committee in the mid-1990s to address a number of issues for the community, namely facility needs**

CHALLENGES (1990S)

To address the challenges facing the community, the SNWA convened the first Integrated Resource Planning Advisory Committee (IRPAC).



IRPAC

IRPAC made key recommendations related to:

- **Facilities**
- **Resources**
- **Finance**

IRPAC — Facilities and Operations Agreement

To construct and operate new facilities, a Facilities and Operations Agreement was forged among SNWA member agencies and required:

- **The SNWA to develop a Capital Improvement Program**
- **The SNWA to develop an Operating Plan**
- **The Purveyor Members to fund the improvements and operations of the Southern Nevada Water System**
- **The SNWA to establish fees to fund new facilities, based on capacity and reliability needs**

IRPAC — Capital Improvement Program

<u>SNWA's Capital Improvement Program:</u>

- **Developed to meet the increasing system capacity needs of Southern Nevada**
- **Designed to provide a total of 900 MGD capacity to Las Vegas Valley**
- **$2.1 billion public works program**
- **Designed in phases; facilities constructed just in time**

IRPAC — Facility Recommendations

- **Build a new treatment and transmission facility immediately, large enough to be reliable and provide backup in the event of a catastrophic event.**

  In 2002, the River Mountains Water Treatment Facility becomes operational and provides an additional 150 MGD of regional treatment capacity.

  In 2006, regional capacity reaches 900 MGD.

- **Expand the existing Southern Nevada Water System to capacity as soon as possible.**

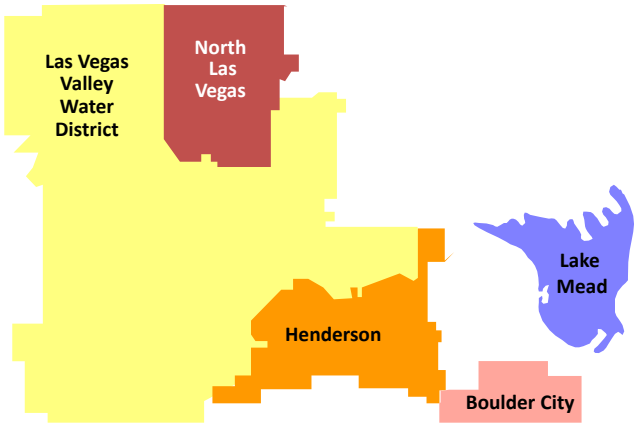
  In 1999, Alfred Merritt Smith Water Treatment Plant capacity was increased from 400 MGD to 600 MGD.

- **Implement a phased and expandable water facilities program.**

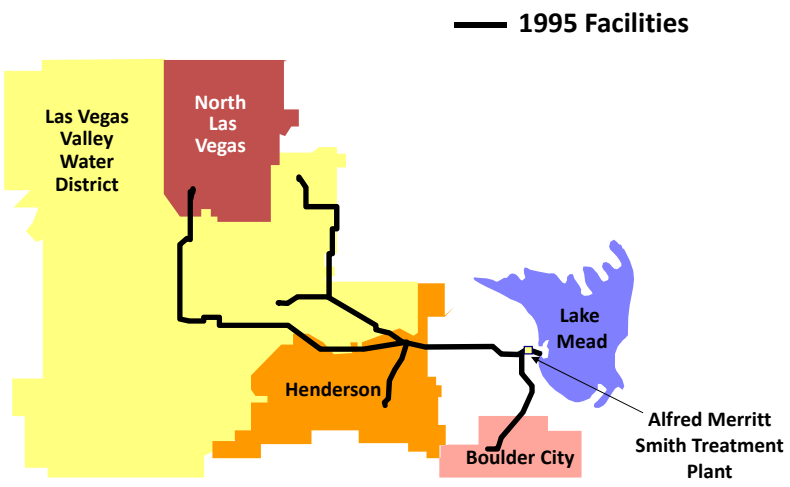
  In 1995, the SNWA Board approved a phased Capital Improvements Program (later retired in 2010 following the completion of $2 billion in projects) to build "just in time" facilities

IRPAC — Facility Expansion

Regional Water System



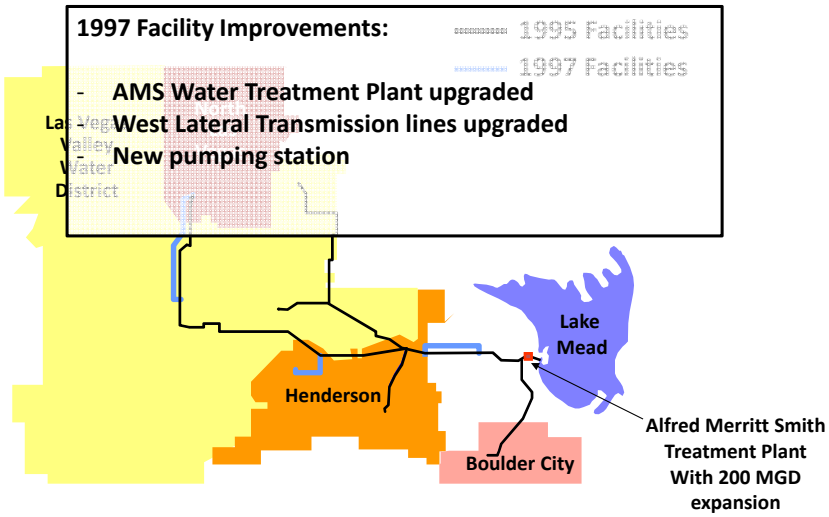
IRPAC — Facility Expansion



IRPAC — Facility Expansion

1997 Facility Improvements:

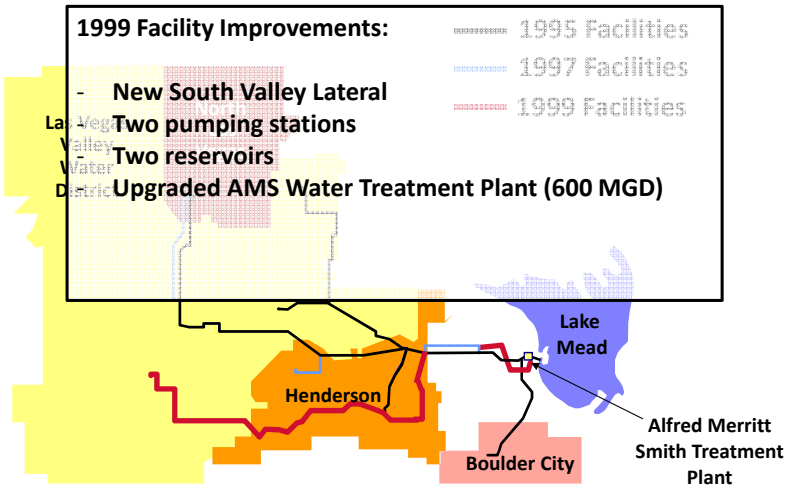
- AMS Water Treatment Plant upgraded
- West Lateral Transmission lines upgraded
- New pumping station



IRPAC — Facility Expansion

1999 Facility Improvements:

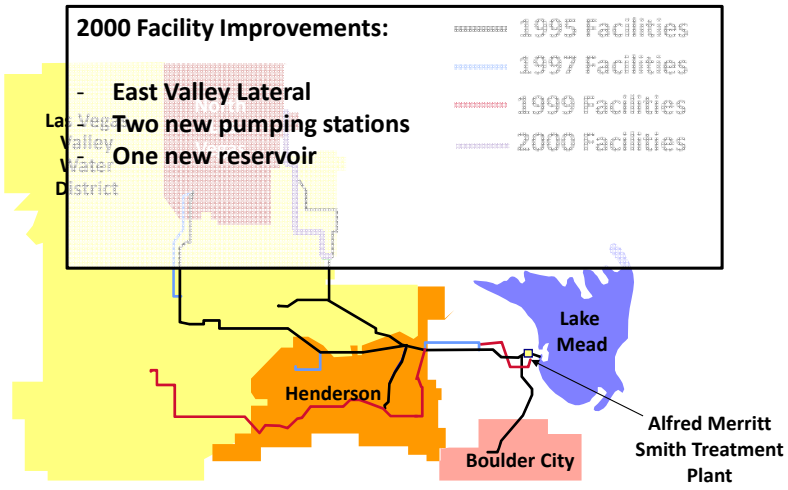
- New South Valley Lateral
- Two pumping stations
- Two reservoirs
- Upgraded AMS Water Treatment Plant (600 MGD)



IRPAC — Facility Expansion

2000 Facility Improvements:

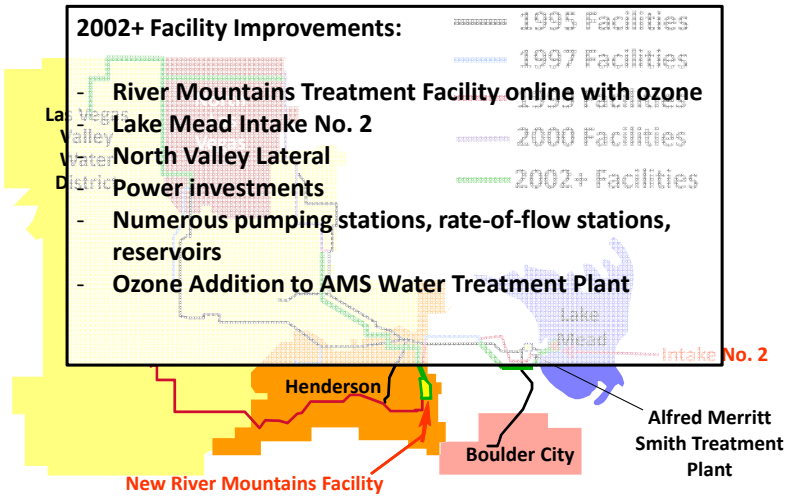
- East Valley Lateral
- Two new pumping stations
- One new reservoir



IRPAC — Facility Expansion

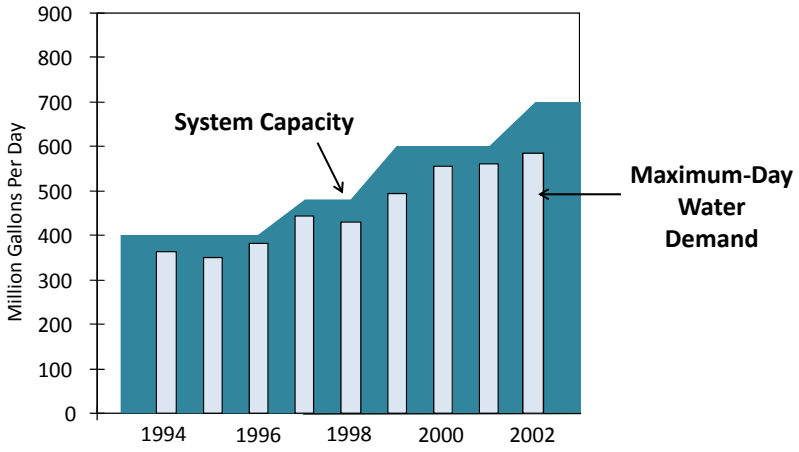
2002+ Facility Improvements:

- River Mountains Treatment Facility online with ozone
- Lake Mead Intake No. 2
- North Valley Lateral
- Power investments
- Numerous pumping stations, rate-of-flow stations, reservoirs
- Ozone Addition to AMS Water Treatment Plant



IRPAC — Facility Expansion

IRPAC — Sizing Facilities



IRPAC — Facility Expansion

Facility	Original Completion Target	Actual Completion
Alfred Merritt Smith Treatment Facility Expansion	1997	1997
River Mountains Tunnel	1997	1997
River Mountains Lateral and Pumping Station	1999	1999
South Valley Lateral and Pumping Station	1999	1999
River Mountains Pumping Station Expansion	2006	2004
River Mountains Treatment Facility Expansion	2008	2006
East Valley Lateral and Pumping Stations	2008	2000 (Phase 1) 2005 (Phase 2)
North Valley Lateral and Pumping Stations	2008	2000 (Phase 1) 2005 (Phase 2)
Decatur Pumping Station	2008	2005
Horizon Ridge Reservoir Expansion	2012	2005

IRPAC — Resource Recommendations

IRPAC made key recommendations related to:

- **Facilities**
- **Resources**
- **Finance**

IRPAC — Resource Recommendations

IRPAC RECOMMENDATIONS - RESOURCES

- **Seek permanent, long-term water supplies. Develop a water resource plan to meet future water demands.**
  In 1996, the SNWA developed its Water Resource Plan. The plan is reviewed annually and includes a 50-year planning horizon.

- **Place top priority on Colorado River water resources.**
  In 1997, the SNWA began purchasing Muddy and Virgin River water.
  In 2001, the BOR's Interim Surplus Guidelines were finalized. The guidelines allow the SNWA to use additional Colorado River supplies when available.
  In 2004, SNWA and CRC entered into an agreement to bank up to 1.25 MAF in Arizona.

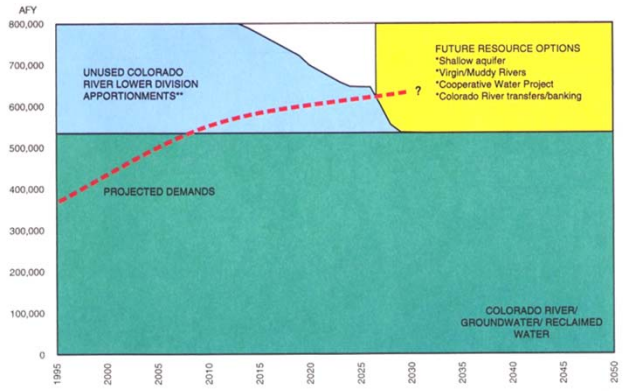
IRPAC — Resource Recommendations

SNWA Water Resource Plan:

- **Comprehensive overview of Southern Nevada's water resources and demands.**
- **Outlines how the SNWA will meet demands over a 50-year horizon.**
- **Reviewed annually and updated as needed.**
- **Utilized by the State Engineer to sign subdivision maps, permitting construction in Southern Nevada.**
- **Relied upon by rating agencies (Included with SEC filings and reviewed for bond sales)**

IRPAC — Resource Recommendations

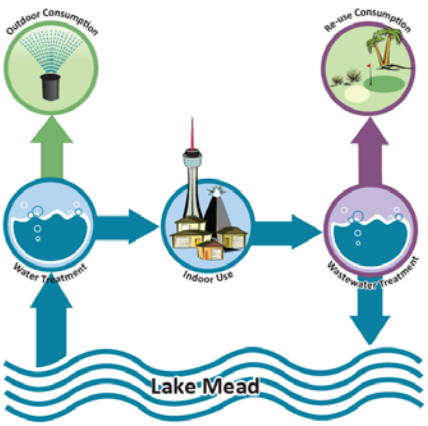
In 1996, the SNWA's first water resource plan anticipated Colorado River water would exclusively meet Southern Nevada's demands until 2030.



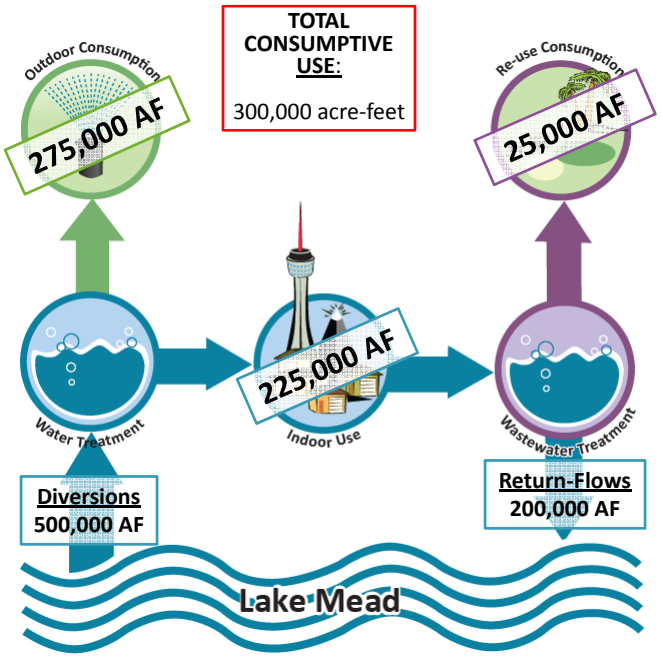
ABOUT: RETURN-FLOW CREDITS

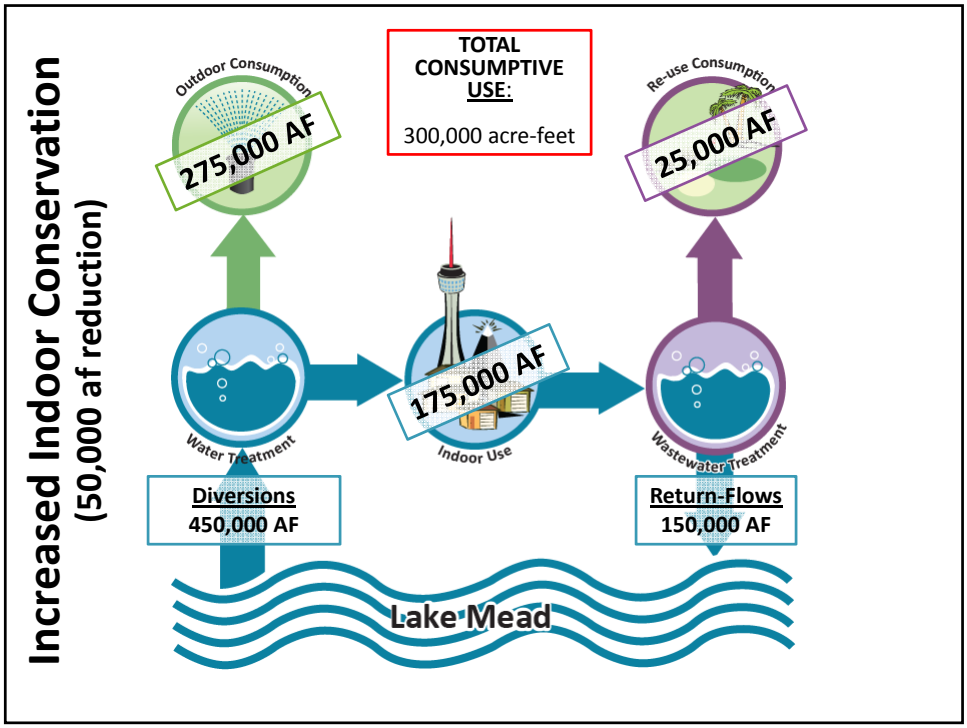
Return-flow Credits:

Nevada receives a Colorado River "credit" for every gallon of treated wastewater returned to Lake Mead to be used again.



BASELINE SCENARIO





IRPAC — Resource Recommendations

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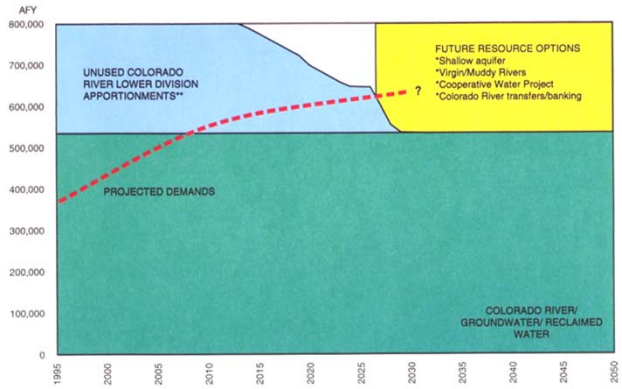
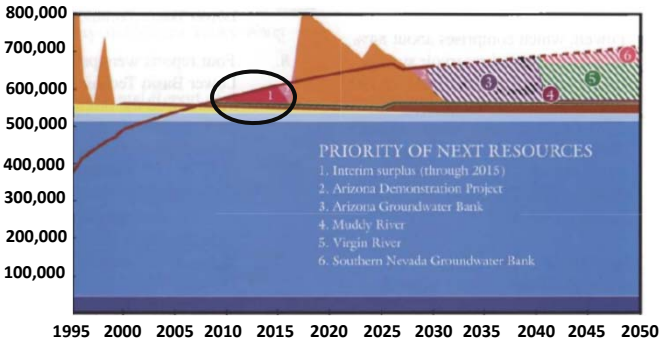


1999 Water Resource Plan

Three years later, the 1999 Water Resource Plan identified surplus Colorado River water available to meet demands.



1999 Water Resource Plan

<u>Interim Surplus:</u>

Surplus Colorado River water, available only when Lake Mead elevations exceed established levels.

Lake Mead, 1999

IRPAC — Finance Recommendations

IRPAC made key recommendations related to:

- **Facilities**
- **Resources**
- **Finance**

IRPAC — Finance Recommendations

IRPAC RECOMMENDATIONS - FINANCE

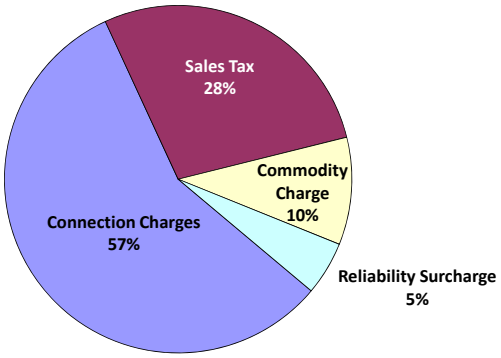
- **Study different approaches to financing and rate setting.**

As part of the IRPAC's second planning process, the committee developed recommendations specific to funding new facilities:

- **The "growth pays for growth" model.**
- **The principle that water rates should contribute to new facilities.**
- **Incorporation of sales tax as a revenue source.**
- **Increased revenues should help fund conservation programs.**

IRPAC — Finance Recommendations

The Capital Improvements Program's funding plan (1995) utilized funding sources from growth-based revenues.



Note: Percentages estimated over lifetime of CIP

IRPAC — Finance Recommendations

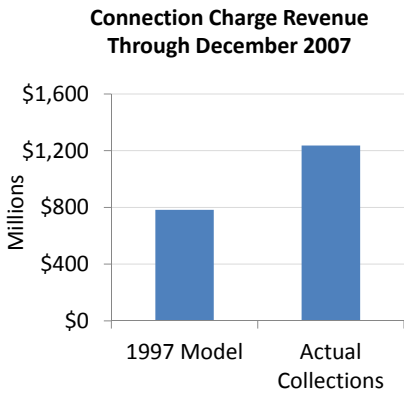
<u>Sales Tax</u>

- **The SNWA receives ¼ of one cent of taxable sales in Clark County**
- **Recommendation of IRPAC committee – intended to offset the community's 40 million annual visitors need for a safe and reliable water supply**
- **Intended to stabilize the CIP Funding Plan**
- **Approved by 72 percent of voters in 1998; collections began the following year**

IRPAC — Finance Recommendations

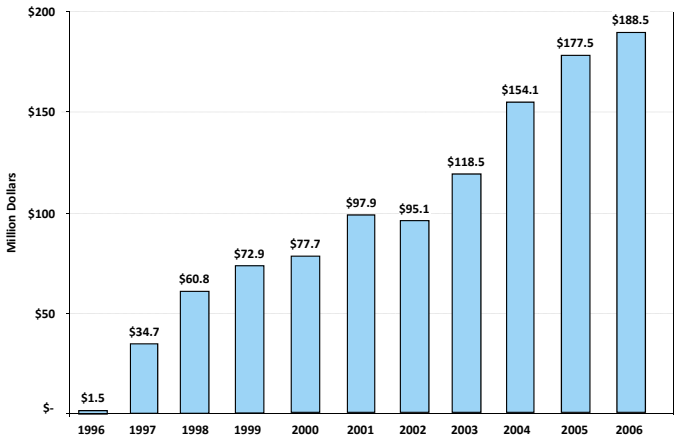
Connection Charges

- **A fee for each new connection within the SNWA service area**
- **Due to periods of unanticipated high growth, the SNWA under-forecasted connection revenues.**



IRPAC — Finance Recommendations

Connection charge revenue proved to be a stable source of revenue during the late 1990s and into the 2000s.



IRPAC — Finance Recommendations

Other CIP Funding Sources

Commodity Charges:

- **A fee for every 1,000 gallons used by customers within the SNWA service area (volume-based)**

Reliability Surcharge:

- **Excise tax (0.25% of total water bill for residents; 2.5% for other customers within Henderson, North Las Vegas and LVVWD only)**
- **Limited to a cap, imposed by the NV State Legislature**

IRPAC — Finance Recommendations

Over time, additional revenue sources were implemented to fund facilities.

- **Proceeds from land sales (Southern Nevada Public Lands Management Act)**
- **Revenue was not used in modeling because it is inconsistent and unreliable**

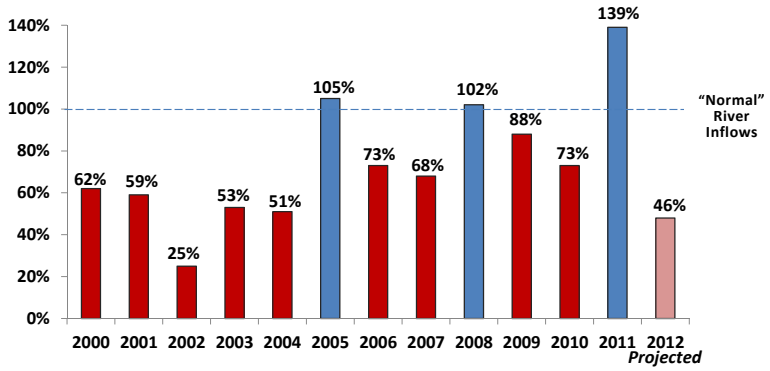
THE 1990S

By the end of the 1990s:

- **Colorado River reservoirs were near-full**
- **Growth in Southern Nevada continued at unprecedented levels**
- **SNWA revenues met annual debt service obligations while also adding to its reserves**

DROUGHT: THE BEGINNING

In 2000, the Colorado River began to experience severe drought conditions that continue to present day.

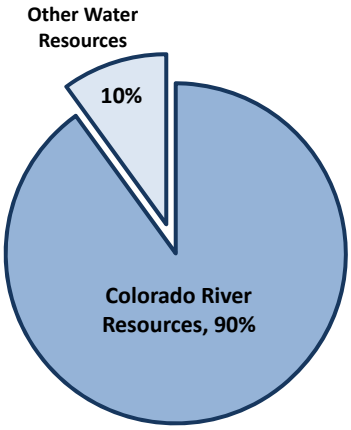


DROUGHT: THE BEGINNING

Lake Mead Marina (2002-2003)

It didn't take long for Lake Mead to realize drought's impacts.

DROUGHT: CONCERNS

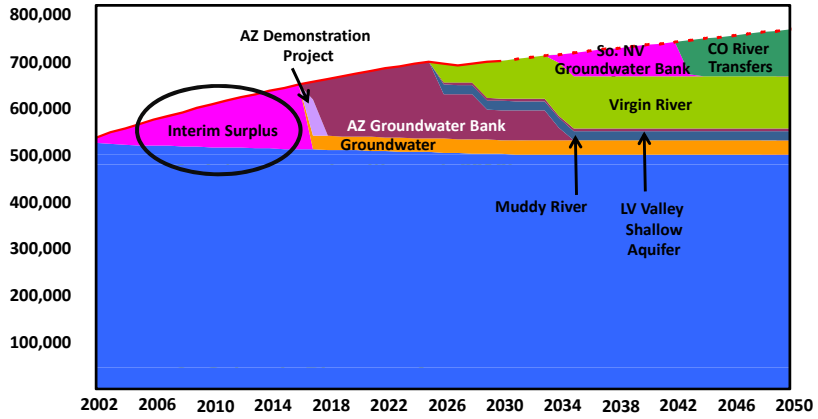


REASON FOR CONCERN:

We rely on the Colorado River meet 90 percent of Southern Nevada's water needs.

DROUGHT: CONCERNS

The 2002 Water Resource Plan again required Colorado River surpluses to meet near-term demands.



DROUGHT: CONCERNS

As lake levels fell, it became apparent surpluses would not be available.

Lake Mead, 2007

ONGOING DROUGHT ISSUES

1983

2006

By the mid-2000s, continued drought conditions caused further declines in Lake Mead elevations.

DROUGHT: RESPONSE

Drought response required four major activities for the SNWA:

- **Reducing demands/water conservation**
- **Colorado River negotiations**
- **Securing alternate supplies**
- **Addressing infrastructure needs**

REDUCING DEMANDS

REDUCING DEMANDS:

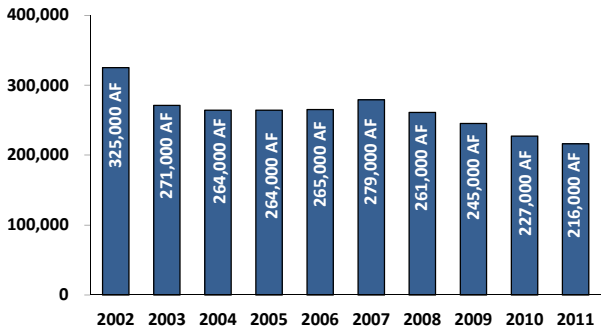
In 2002, the SNWA initiated a drought planning process.

The process resulted in an aggressive plan to reduce water demands, which led to interim and permanent changes to how the community uses water.

- Seasonal watering schedules
- Landscape development restrictions
- Golf course water budgets
- Increased water rates
- More aggressive incentives for the Water Smart Landscapes Program

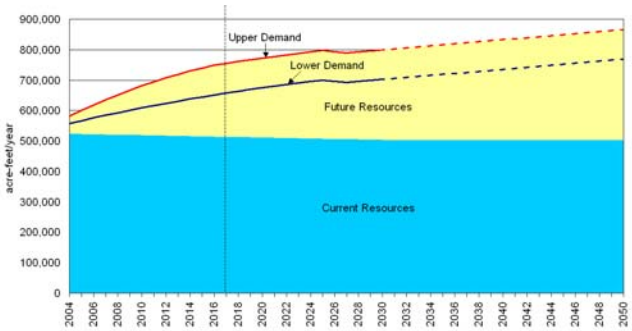
REDUCING DEMANDS

Southern Nevada's consumptive water use declined by about 36 billion gallons between 2002 and 2011, despite addition of nearly 400,000 people



REDUCING DEMANDS

The 2004 Water Resource Plan was updated to reflect the community's drought response would replace any lost resources from declining lake levels.



Future Resources

2004-2016
- Interim Surplus/Drought Response
- Bank recovery (AZ and NV)
- In-state Resources

2017-2050
- In-state Resources
- Transfers and Exchanges

DROUGHT: RESPONSE

Drought response required four major activities for the SNWA:

- **Reducing demands/water conservation**
- **Colorado River negotiations**
- **Securing alternate supplies**
- **Addressing infrastructure needs**

COLORADO RIVER NEGOTIATIONS

COLORADO RIVER NEGOTATIONS:

Drought is not a Nevada issue – it's a regional issue and requires cooperation and flexible management from all of its users.

Throughout the 2000s, the SNWA participated in consultations among Colorado River users, resulting in a number of historic agreements:

- **California Water Banking**
- **Interim Guidelines for Lower Basin Shortages and Coordinated Operations for Lake Powell and Lake Mead**

COLORADO RIVER NEGOTIATIONS

The "Interim Guidelines" provides for:

- **Shortage sharing guidelines among states**
- **Coordinated reservoir operations of Lake Powell and Lake Mead**
- **A new classification of water: Intentionally Created Surplus**

Colorado River Negotiations

Shortage Sharing

Lake Mead Water Level	Nevada's Shortage
1,075 – 1,050 feet	13,000 AFY
1,050 – 1,025 feet	17,000 AFY
Below 1,025 feet	20,000 AFY *Reconsultation with Secretary of Interior*

Colorado River Negotiations

Coordinated Operations of Lakes Powell and Mead

- **Provides for the coordinated management of the Colorado River system's two major reservoirs.**
- **Intended to protect levels of both reservoirs in years of high and low inflows.**

Colorado River Negotiations

Intentionally Created Surplus (ICS)

- **Allows the development of water supplies, separate from the Colorado River, to be conveyed to the river for credit.**
- **Also allows for extraordinary conservation of Colorado River water through projects.**
- **Some ICS water can be used during shortage.**
- **The SNWA has secured three resources that are designated as ICS water:**
  - **Brock Reservoir**
  - **Muddy and Virgin River leases/permits**
  - **Coyote Spring Groundwater**

DROUGHT: Response

Drought response required four major activities for the SNWA:

- **Reducing demands/water conservation**
- **Colorado River negotiations**
- **Securing alternate supplies**
- **Addressing infrastructure needs**

SECURING ALTERNATE SUPPLIES

SECURING ALTERNATE SUPPLIES:

To replace a reduction in supplies due to shortage, the SNWA requires a resource that is separate and apart from the Colorado River.

SECURING ALTERNATE SUPPLIES

The SNWA has been working to secure additional in-state groundwater resources for more than 20 years.

Securing Alternate Supplies

Securing these resources requires two separate, but equally important activities:

- Acquiring water rights
- Obtaining rights-of-way

Securing Alternate Supplies

Water Rights:

In 2012, the Nevada State Engineer permitted 84,000 acre-feet of Nevada's unused groundwater supplies.

Rights-of-Way:

In August 2012, the Bureau of Land Management released the Final Environmental Impact Statement (FEIS), indicating its preference to permit the SNWA to develop a portion of the state's unused groundwater supplies.

DROUGHT: RESPONSE

Drought response required four major activities for the SNWA:

- **Reducing demands/water conservation**
- **Colorado River negotiations**
- **Securing alternate supplies**
- **Addressing infrastructure needs**

ADDRESSING INFRASTRUCTURE

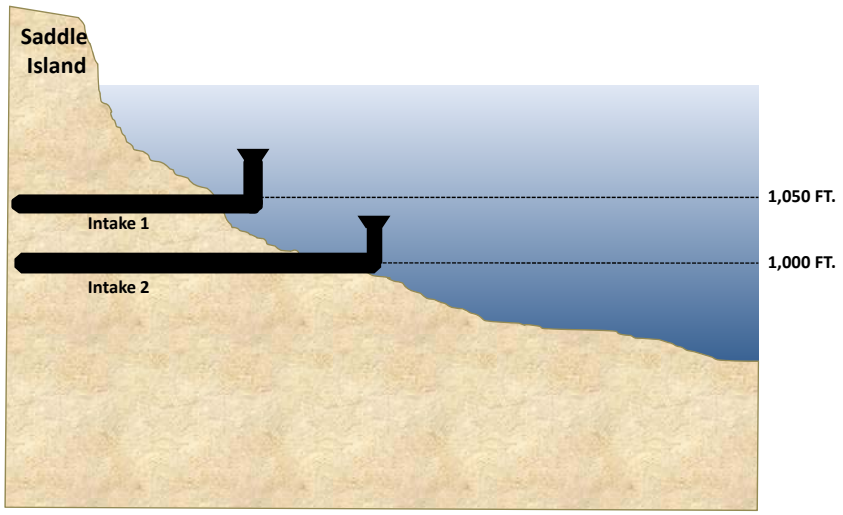
INFRASTRUCTURE:

Existing infrastructure required immediate improvements to protect Southern Nevada from drought impact of lower Lake Mead water levels.

- **Modifications were required to extend Intake No. 1 to maintain access to best water quality. (2004)**
- **An additional intake in Lake Mead was necessary to protect against potential loss of Intake No. 1. (2005)**
- **Additional capacity was needed at Intake No. 2's pumping station to temporarily defer construction of a third pumping station. (2006)**

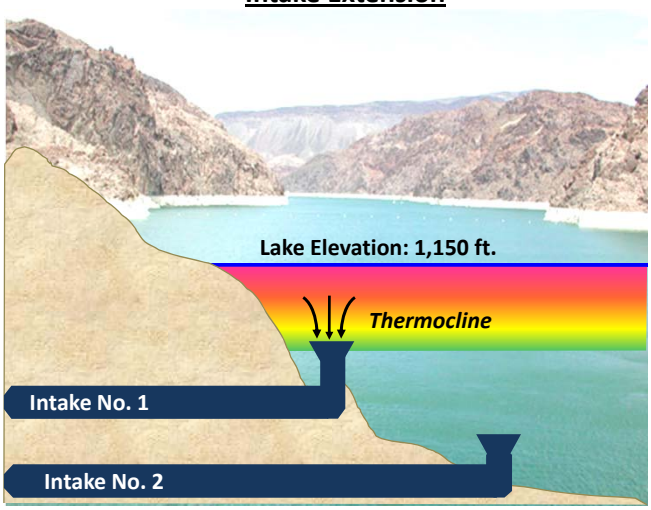
Addressing Infrastructure

Lake Mead Intake Profile (2002)



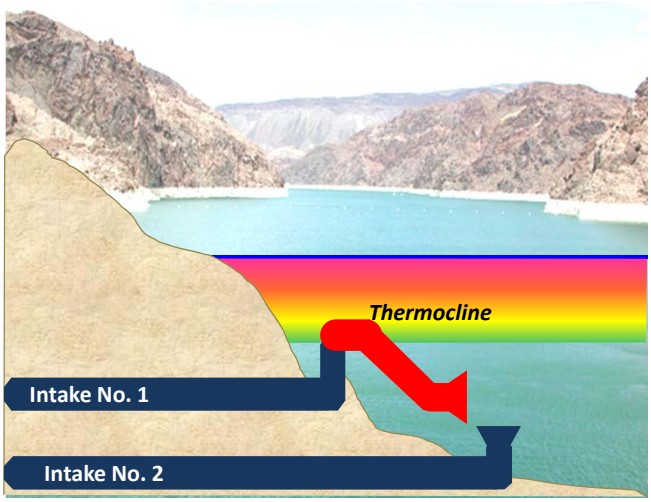
Addressing Infrastructure

Intake Extension



Addressing Infrastructure

Intake Extension - 2004



Addressing Infrastructure

Higher capacity pumps were installed at Intake Pumping Station No. 2.

- **Expanded Intake No. 2 pumping capacity**
- **Protected Southern Nevada from service interruptions for the short term in the event Intake Pumping Station No. 1 was unavailable due to low lake levels.**

Addressing Infrastructure

Drought was the catalyst for the SNWA to explore the need for an additional intake in Lake Mead.

Drought

- **Lake Mead levels were continuing their rapid decline**
- **Access to best water quality deep in Lake Mead was impaired by declining lake levels**

Demands

- **Both intakes are needed to reliably satisfy water demands in the long term**
- **The pumping capacity of Intake No. 1 would have to be replaced to if lake levels continued to decline**

Addressing Infrastructure

Continued

Regulations / Treatment

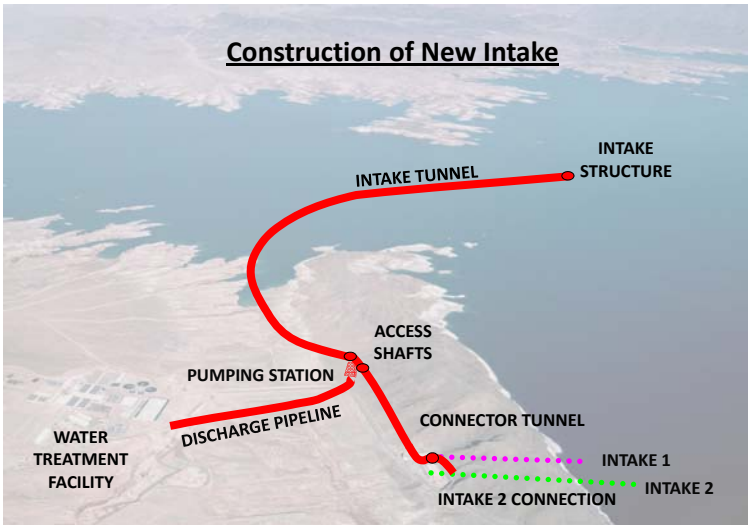
- **Water quality regulations were becoming more difficult to meet, especially with declining lake levels**
- **Constructing water treatment process improvements could have been more expensive than constructing a new intake to avoid the need for treatment improvements**
- **Additional treatment process could cost $85 million in annual operating costs on top of the capital cost**

Addressing Infrastructure

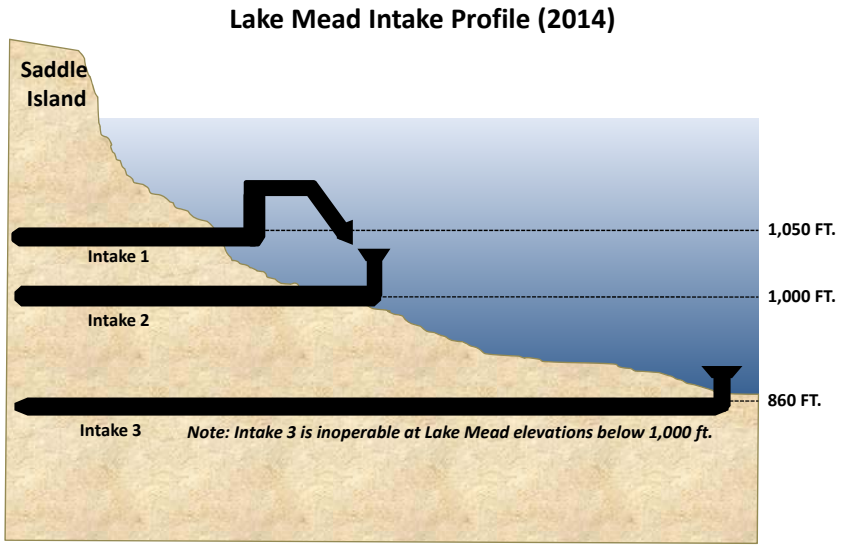
In 2005, the decision was made to construct a third intake.

- **Meets both water quality and pumping capacity objectives**
- **Reduces treatment costs**
- **Preserves the ability to pump water at lower lake levels**
- **Provides operational flexibility for changing conditions**
- **Does not increase the total amount of water available to Southern Nevada**

Addressing Infrastructure



Addressing Infrastructure



Addressing Infrastructure

The third intake is a critical component to protecting Southern Nevada from drought impacts.

- **A new intake provides better water quality**
  - **Intake site avoids Las Vegas Wash outfall**
  - **Reduces treatment costs**
- **Provides operational flexibility for changing conditions**
  - **Preserves ability to access water at low lake levels**
  - **Provides additional capacity in the event Lake Mead Intake No. 1 is inoperable due to low lake levels**

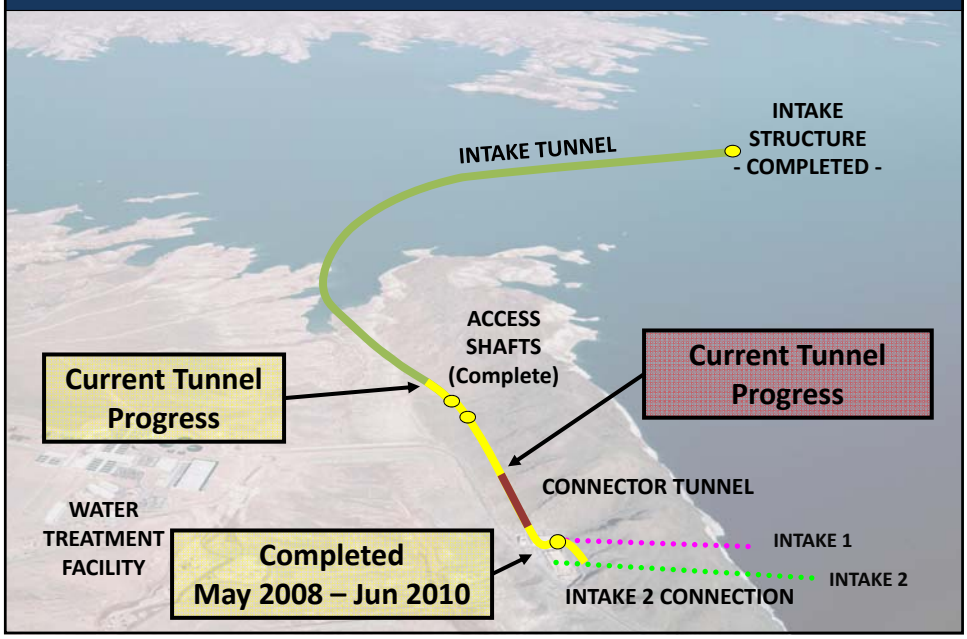
Addressing Infrastructure

Total Project Cost: $817 million

Spent to Date: $500 million

Estimated Completion: 2014

Intake No. 3: Current Progress



Intake No. 3: Current Progress

A number of project components have been completed:

- Intake 2 Connector
- Access Shaft
- Intake Structure
- Isolation Gate
- Isolation Gate Shaft
- Surge Shaft
- Starter Tunnel

Intake No. 3: Current Progress

Others remain ongoing:

Connector Tunnel (70% complete)

Intake Tunnel (10%)

Intake No. 3: Connector Tunnel

Intake No. 3: Connector Tunnel

Intake No. 3: Connector Tunnel

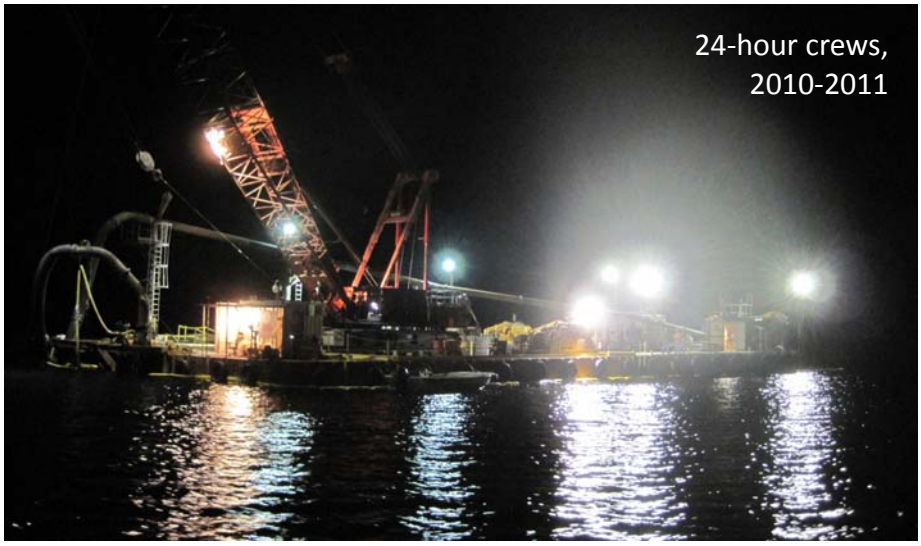
Intake No. 3: Starter Tunnel

Intake No. 3: Concrete Liners

Intake No. 3: Marine Work

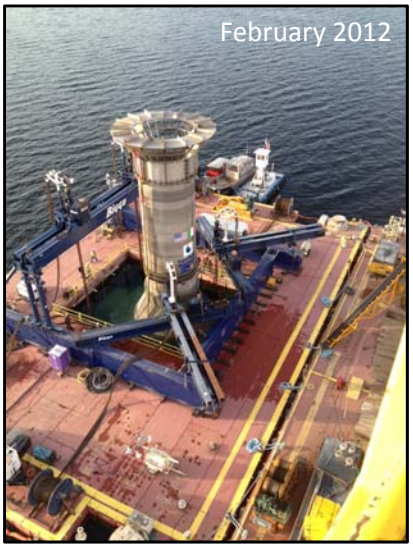
Intake No. 3: Intake Structure Fabrication

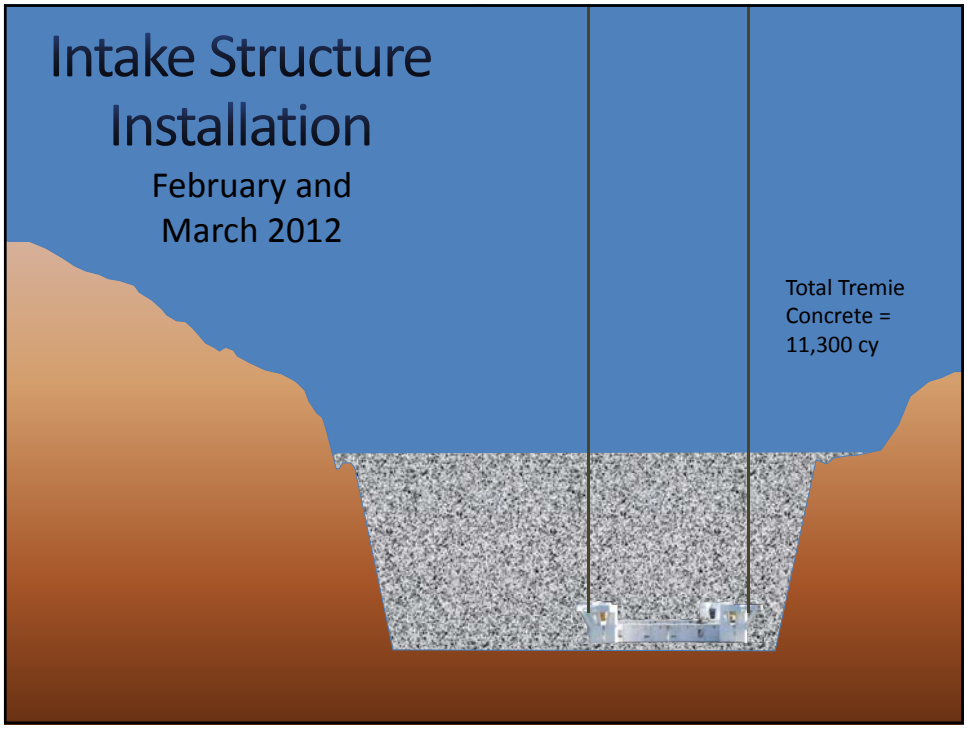
Intake No. 3: Intake Excavation



Intake No. 3: Assembled Intake Structure

Intake No. 3: Structure Lowering





Intake No. 3: Tremie Concrete Placement

Intake No. 3: Tremie Concrete Placement

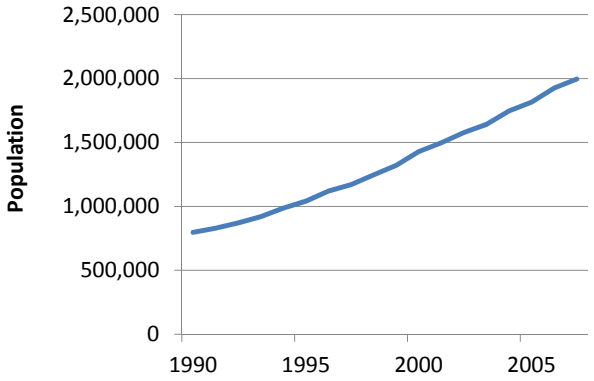
Intake No. 3

Without a third intake,
Southern Nevada is vulnerable to impacts of low lake levels.

- **Poor water quality may require expensive treatment methods.**
- **If Intake No. 1 is inoperable due to declined lake levels, the community would be solely reliant on Intake No. 2 for supply from Lake Mead.**
- **Limited capacity for increased supply to meet future demands.**
- **Given the probability of shortage, Intake No. 3 provides Southern Nevada the assurance that the SNWA can access and deliver a safe and reliable water supply for our community.**

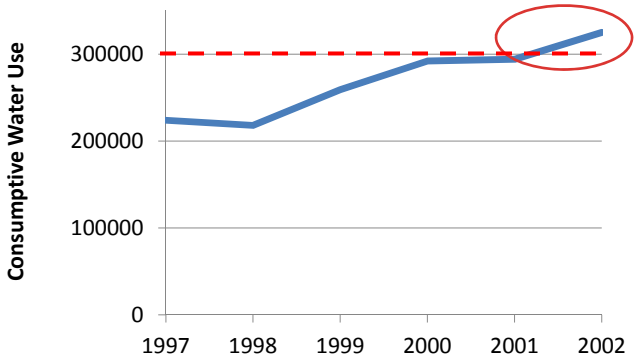
Ongoing Issues (2000s)

During this time, Southern Nevada's population showed no signs of slowing.



Ongoing Issues (2000s)

The community was exceeding its Colorado River allotment.



Integrated Water Planning Process

In 2004, another integrated water planning process was initiated to explore options for resource diversification to protect the community from drought.

The Integrated Water Planning Advisory Committee (IWPAC) was comprised of 29 members, including rural community representation.

IWPAC - Conservation Recommendations

IWPAC made key recommendations related to:

- **Conservation**
- **Resources**
- **Finance**

IWPAC - Conservation Recommendations

- **Pursue more aggressive promotion of water conservation through methods such as the reduction of turf.**
  Since inception, the SNWA's Water Smart Landscape program has removed more than 160 million square feet of turf, resulting in a savings of nearly 9 billion gallons annually.

- **Decrease total water demand from 272 GPCD to 250 GPCD by 2010, and to 245 GPCD by 2035.**
  After meeting its previous goal ahead of schedule, the SNWA Board adopted a new conservation goal of 199 GPCD by 2035 in 2009.
  The SNWA is on schedule to meet its goal, with a current GPCD of 222 (residential consumption is 75 GPCD).

IWPAC - Resource Recommendations

IWPAC made key recommendations related to:

- **Conservation**
- **Resources**
- **Finance**

IWPAC - Resource Recommendations

- **Pursue development of all resource options considered in IWPAC planning scenarios.**
  Developed a diverse portfolio of resource options including groundwater banks, in-state groundwater, Colorado River supplies and additional conservation.
  Hearings were conducted for the SNWA's water right applications in eastern Nevada.
- **Work with Colorado River Basin States and the Bureau of Reclamation to implement augmentation credits for non-Colorado resources.**
  Revised return-flow credit methodology to include in-state groundwater.
- **Continue to pursue ocean desalination as a long-term resource.**
  A Basin Study is currently underway to evaluate future basin demands and possible solutions including desalination.
  The SNWA has funded pilot studies in Yuma, Arizona and Rosarito, Mexico.

IWPAC - Resource Recommendations

- **Pursue delivery of pre-Compact Muddy and Virgin River rights.**
  The SNWA currently owns or leases 50,000 acre-feet per year of water rights on both rivers.
- **Utilize the Southern Nevada Water Bank and California Water Bank as "bridge resources" to meet supply deficiencies.**
  Banked significant resources in Southern Nevada and California.
  Amended the Arizona Water Banking agreement to guarantee 1.25 MAF of banked water in Arizona.
  Recently approved new agreement with the Metropolitan Water District of Southern California to bank additional water.
- **When available, utilize surplus and interim surplus Colorado River water.**
  The SNWA can utilize up to 100,000 AF of Interim Surplus if Lake Mead levels are above 1,145 ft.

IWPAC - Finance Recommendations

IWPAC made key recommendations related to:

- **Conservation**
- **Resources**
- **Finance**

IWPAC - Finance Recommendations

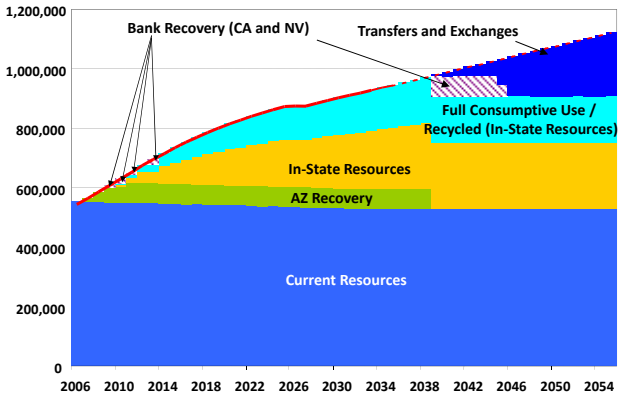
- **Pursue and extension of the quarter-cent sales tax.**
  In 2011, the Nevada State Legislature authorized the County Commission to extend the sales tax.

Water Resources

Drought response, coupled with ongoing growth and negotiations along the Colorado River, led to a number of changes to water resource planning throughout the 2000s.

2006 Water Resource Plan

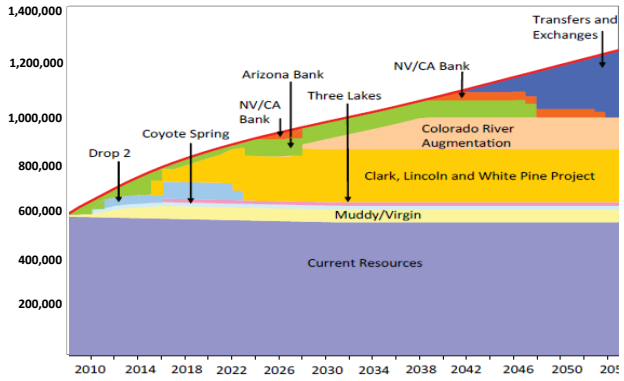
The 2006 Water Resource Plan was updated to include IWPAC's recommendations.



2008 Water Resource Plan

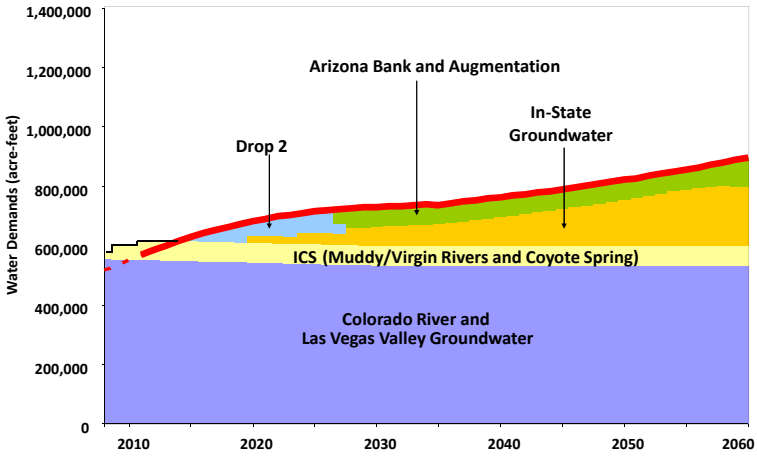
The 2008 Water Resource Plan included additional non-Colorado River supplies to meet demands.

2008 Water Resource Plan



2009 Water Resource Plan

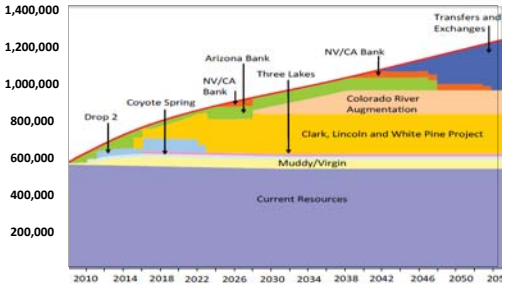
The 2009 Water Resource Plan reflected the Interim Guidelines' new designation of water supplies.



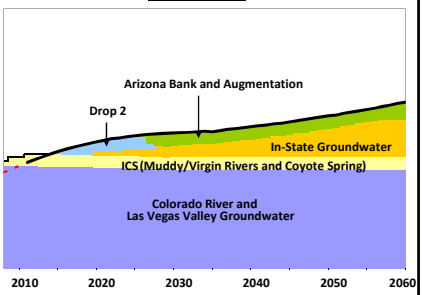
2009 Water Resource Plan

It also accounted for significant conservation savings as a result of the new conservation goal.

2008 Plan

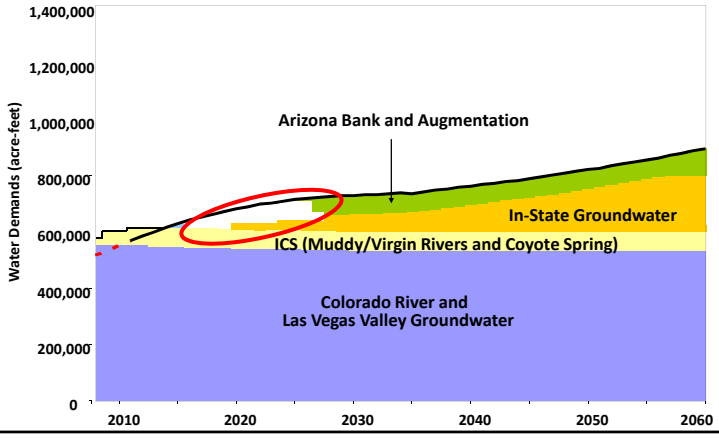


2009 Plan



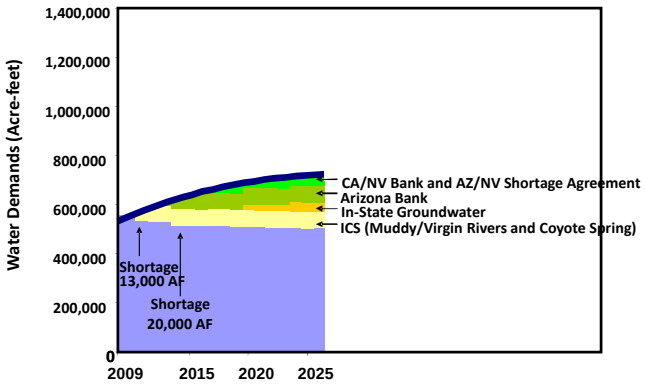
2009 Water Resource Plan

With implementation of the new shortage guidelines, some water resources became unavailable due to shortage.



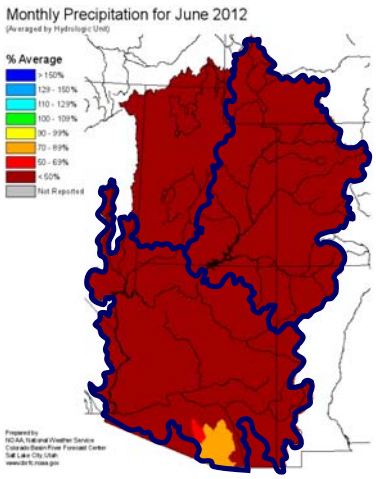
2009 Water Resource Plan

The 2009 Plan included a scenario to meet demands under shortage.

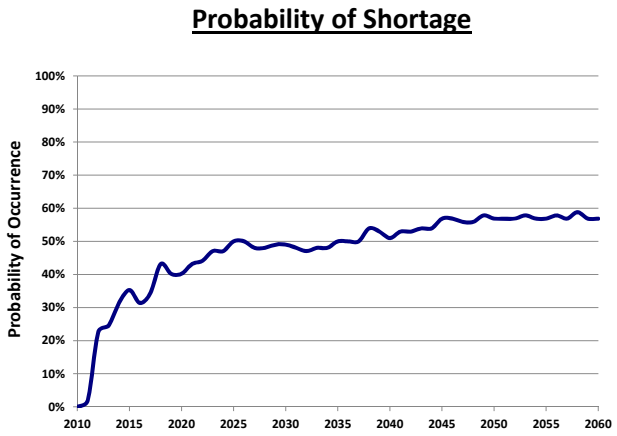


Colorado River Shortage

Drought conditions continue, underscoring the possibility of a shortage on the Colorado River.

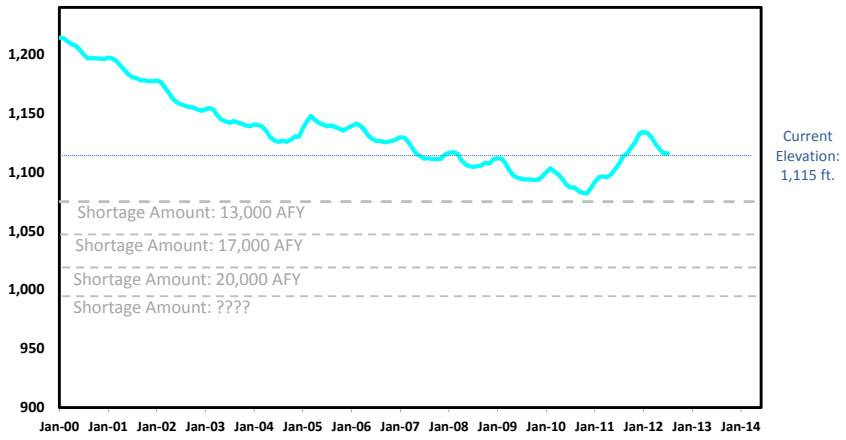


Colorado River Shortage



Bureau of Reclamation's Colorado River System modeling data

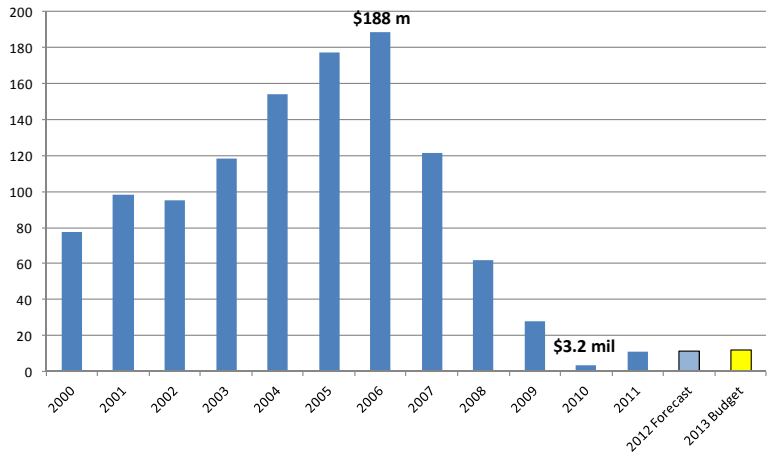
Colorado River Shortage



Source: Bureau of Reclamation, August 2012

FINANCE CHALLENGES

In addition to shortages, Southern Nevada's water managers are facing a significant challenge.



IRPAC MISSION

The Integrated Resource Planning Advisory Committee will evaluate current and near-term (2016) water charges, future resources, conservation, and facility needs in a way that supports adaptation to changing conditions, and develop recommendations on all these areas for the Southern Nevada Water Authority's Board of Directors.

SOUTHERN NEVADA WATER AUTHORITY®