

## **MEETING AGENDA**

### **Southern Nevada Water Authority Integrated Resource Planning Advisory Committee 2020**



**Wednesday, December 18, 2019**

**3:00 p.m.**

**Colorado River Conference Rooms, Southern Nevada Water Authority  
100 City Parkway, Seventh Floor, Las Vegas, Nevada**

---

*All items on the agenda are for action by the Advisory Committee, unless otherwise indicated. Items may be taken out of order. The board may combine two or more agenda items for consideration, and the board may remove an item from the agenda or delay discussions relating to an agenda item at any time.*

---

#### **CALL TO ORDER**

#### **COMMENTS BY THE GENERAL PUBLIC**

NO ACTION MAY BE TAKEN: This is a period devoted to comments by the general public pertaining to items on this agenda. If you wish to speak to the Advisory Committee about items within its jurisdiction, but not appearing on this agenda, you must wait until the “Comments by the General Public” period listed at the end of this agenda. Please limit your comments to three minutes or less. No action may be taken upon a matter not listed on the posted agenda.

1. *For Possible Action:* Approve agenda and minutes from the November 20, 2019 meeting
2. *For Information Only:* Receive an overview of Southern Nevada’s water resources
3. *For Possible Action:* Receive an overview of potential new water resources for Southern Nevada that can be developed through Colorado River partnerships
4. *For Possible Action:* Discuss potential facility and resource recommendations

#### **COMMENTS BY THE GENERAL PUBLIC**

NO ACTION MAY BE TAKEN: At this time, the Advisory Committee will hear general comments from the public on matters under the jurisdiction of the Committee. Please limit your comments to three minutes or less. No action may be taken upon a matter not listed on the posted agenda.

**THIS MEETING HAS BEEN PROPERLY NOTICED AND POSTED IN THE FOLLOWING LOCATIONS:**

City of Boulder City, City Hall  
401 California Avenue  
Boulder City, NV

City of North Las Vegas, City Hall  
2250 Las Vegas Boulevard North  
North Las Vegas, NV

City of Henderson, City Hall  
240 Water Street  
Henderson, NV

Clark County Government Center  
500 S. Grand Central Parkway  
Las Vegas, NV

Las Vegas Valley Water District  
1001 S. Valley View Boulevard  
Las Vegas, NV

Southern Nevada Water Authority  
100 City Parkway  
Las Vegas, NV

Clark County Water Reclamation District  
5857 East Flamingo Road  
Las Vegas, NV

City of Las Vegas, City Hall  
495 South Main Street  
Las Vegas, NV

The Southern Nevada Water Authority makes reasonable efforts to assist and accommodate persons with physical disabilities who desire to attend the meeting. For assistance, call Jordan Bunker at (702) 258-7296 at least 24 hours prior to the meeting.

Agendas for this meeting and others are available online. Visit [snwa.com](http://snwa.com).



## INTEGRATED RESOURCE PLANNING ADVISORY COMMITTEE 2020 MEETING SUMMARY

*November 20, 2019, 3:00 p.m.*

*Colorado River Conference Rooms, Southern Nevada Water Authority  
100 City Parkway, 7th Floor, Las Vegas, Nevada*

IRPAC members present:	Ken Evans	Peter Guzman
	Carol Jefferies	Andy Maggi
	Tom Morley	John Restrepo
	Virginia Valentine	

IRPAC members absent:	Paul Moradkhan	Bob Murnane
	Jonas Peterson	Phil Ralston

Staff present:	John Entsminger	Dave Johnson
	Julie Wilcox	Kevin Bethel
	Ken Albright	Andy Belanger
	Tabitha Fiddymment	Peter Jauch
	Greg Kodweis	Doa Meade
	Colby Pellegrino	Katie Horn
	Jordan Bunker	

Others present:	Terry Murphy, Facilitator
	Guy Hobbs, Financial Consultant

### **PUBLIC COMMENT**

There were no speakers.

### **SUMMARY OF ACTIVITIES**

The Southern Nevada Water Authority's (SNWA) Integrated Resource Planning Advisory Committee 2020 (IRPAC 2020) met on Wednesday, November 20, 2019. The meeting began at 3:11 p.m.

*#1 Approve agenda and minutes from the October 30, 2019 meeting.* Tom Morley motioned to approve the agenda and minutes from the October 30<sup>th</sup> meeting. The agenda and minutes were approved.

Terry Murphy discussed a potential time change for future committee meetings and mentioned that the SNWA Board of Directors would like the committee to discuss an advertising agreement between the SNWA and the Las Vegas Raiders at January's IRPAC meeting when conservation initiatives will be presented.

*#2 Receive an overview of the SNWA's capital planning efforts.* Dave Johnson, Deputy General Manager of Engineering and Operations, gave an overview of the SNWA's capital planning efforts beginning by reviewing the regional water system and the SNWA's role as a water wholesaler to local purveyors. He also discussed the SNWA's capital approach in four major buckets, including the Major Construction and Capital Plan (MCCP), the operating capital (smaller asset management), capital equipment (vehicles and tools), and the Lower Las Vegas Wash.

When planning for future facilities, Mr. Johnson mentioned that the SNWA considers four principal variables: 1) capacity 2) reliability 3) redundancy, and 4) resource maximization. He discussed each variable, its planning consideration and stated that many large infrastructure projects in the past required significant lead time from the time the decision was made to the time that the infrastructure became operational. Peter Guzman asked if the length of time to complete projects was due to financing to which Mr. Johnson responded that most times it is due to the complexity of the project and its components, including initial evaluation, pre-design, design, permitting, right-of-way acquisition and construction.

Mr. Johnson stated that today's regional water system has sufficient capacity to meet current demands, but not future demand with the planned economic development efforts throughout Southern Nevada. He discussed the MCCP, which is the document established to help meet the community's water needs, and stated that it needs to be updated to account for these new, future demands. This document requires approval by the SNWA Board of Directors and all its purveyor member agencies.

*#3 Receive an overview of proposed regional water and power facilities recommended for inclusion in the SNWA's Major Construction and Capital Plan.* Mr. Johnson introduced many MCCP candidate projects beginning with the Horizon Lateral, and gave an overview of the existing SNWA South Valley Lateral and the need for future infrastructure to improve capacity, reliability and redundancy to the system. In 2008, a proposed new lateral on that part of the system was contemplated, but shelved due to the recession impacts. Mr. Johnson stated that by 2024, the existing South Valley Lateral will be at 90% capacity, and a new lateral is needed to meet demands. To meet future demands, a scoping process is underway to evaluate the need for a new lateral. Mr. Guzman commented that it may be beneficial for the SNWA to highlight the economic impact that a project of this magnitude will have on the community in terms of job creation. Tom Morley asked if there was a plan to communicate to the public about the proposed lateral project. Mr. Entsminger stated that public roll out can be part of the committees' deliberation as we get further into the process. Andy Maggi asked about tunneling near or through the Sloan Canyon conservation area. Mr. Johnson responded that this project will likely fall outside the conservation area. Ken Evans also commented on the significant economic impact that design, construction and long-term maintenance of this infrastructure will have on the community. Mr. Johnson shared the management of these proposed facilities and SNWA's existing facilities are part of the MCCP.

He then gave an overview of the Garnet Valley Water System, which is a 16-parcel industrial park in North Las Vegas. He shared the anticipated facilities that are part of the project, a proposed timeline and estimated costs. Mr. Evans asked if this estimate assumes that the land acquisition and rights-of-way are already in place. Mr. Johnson stated that this project timeline has not yet gone into that type of detail, but that it falls under the design component. He also stated that most of the routing will be done on an existing right-of-way, but that these are still just initial estimates. Mr. Evans asked if these major projects can be done concurrently to which Mr. Johnson stated these projects are all planned to be constructed concurrently to meet water demand.

Mr. Johnson proceeded to give an overview of the Garnet Valley Wastewater System, which will maximize water resources by constructing a means to return Apex's used water back to Lake Mead for return-flow credits. He spoke to the existing out-of-valley water use policy, which is to provide for the long-term sustainable development of resources and reduce demand impacts to Colorado River resources. He shared the anticipated facilities that are part of this project, a proposed timeline and estimated costs. Virginia Valentine asked that if the SNWA paid for the backbone of the system, would



the City of North Las Vegas (CNLV) be responsible for paying for the treatment. Mr. Johnson stated that the SNWA would construct the system, and the CNLV would operate the system and bill their customers accordingly. Mr. Evans asked if the residents of the CNLV would pay the connection fees. John Entsminger, General Manager, stated that there would still need to be service laterals and other infrastructure constructed by the CNLV, so it would be up to them to recover their costs. He also stated that in terms of financing this and other projects that will be discussed with the committee, the SNWA's initial assumption is that Connection Charges will be one of the primary mechanisms for financing, along with Infrastructure and Commodity Charges, but that finances will be discussed more in-depth at a future meeting. Ms. Valentine asked how much water is expected to be returned for credit. Mr. Johnson stated that the latest water demand figure from the CNLV is 16 MGD and an estimated 8 MGD would be returned. He stated that the area has not yet been developed, but the reason for the infrastructure is to ensure that water is returned to the wastewater treatment facility. John Restrepo asked what role, if any, the Clark County Water Reclamation District will have in the project. Mr. Entsminger stated that, in this case, the jurisdictional boundaries fall under the CNLV's wastewater system.

Mr. Johnson then gave an overview of the proposed Boulder City Wastewater System, which is also intended to maximize water resources that currently do not have any way to be returned to Lake Mead for return-flow credits. Boulder City currently sends approximately 1.3 MGD to evaporation ponds annually, and this proposed project would provide a pipeline to convey an estimated 1 MGD to the City of Henderson's treatment facility and return it to the Las Vegas Wash. He reviewed the anticipated facilities that are part of this project, a proposed timeline and estimated costs. Mr. Entsminger stated that the estimated \$26 million would save approximately 1,300 acre-feet of water today and more if Boulder City expands, noting that this water is currently being evaporated. Carol Jefferies asked if the 1,300 acre-feet of water savings is an annual figure, to which Mr. Entsminger affirmed.

Mr. Johnson proceeded to give an overview of a large-scale solar photovoltaic (PV) project, which will improve capacity, reliability, redundancy and maximize resources. Until recently, the SNWA has been participating voluntarily to meet the Nevada Renewable Portfolio Standard of 25 percent by 2025. Under recent legislation, the SNWA is now mandated to comply with the goal, and Mr. Johnson stated that this project is critical to meeting the new standard and reviewed the anticipated facilities that are part of this project, a proposed timeline and estimated costs. Mr. Evans asked if the transmission lines can be shared with others, to which Mr. Johnson replied in the affirmative and discussed additional wheeling revenue. ibV Energy, a private company who is constructing the energy project, will build, own and operate the solar PV plant and the SNWA will enter into a 25-year Power Purchase Agreement with an 8-mile expansion to its existing transmission system. Ms. Jefferies asked if the SNWA will pay for the construction of the transmission lines. Mr. Johnson stated that the SNWA will fund the transmission lines, and Mr. Entsminger added that the SNWA wants to own its own transmission lines because it is a strategic asset which offers the organization energy stability.

Mr. Johnson then gave an overview of a various asset management projects, which primarily relate to rehabilitation or improvement to the existing regional water system. He discussed upgrades to the SNWA's Stage 2 infrastructure, aging in-valley water storage and transmission facilities, an ozone rehabilitation at the SNWA's water treatment facilities, filter improvements at the Alfred Merritt Smith Water Treatment Facility, and an in-valley maintenance facility that will be required with an increased project workload. John Restrepo asked where a new building for maintenance would be constructed. Mr. Johnson stated that there are several possibilities, but one option is on the LVVWD's Valley View campus. Mr. Restrepo asked if land would need to be purchased for the other options. Mr. Johnson stated that estimates have included the acquisition of land. He also stated that the Low Lake Level

Pumping Station has a few, smaller projects that remain in order to complete the station and they would be included in an updated MCCP. He noted other asset management projects, including asset management software replacement, a microbiology research lab retrofit, SCADA upgrades, water quality testing equipment and a system-wide valve actuator upgrade. Mr. Maggi asked for some examples of emerging contaminants as it relates to microbiology. Mr. Johnson stated that Microcystis is an issue of concern and that a lab retrofit will allow for better testing and measuring for these types of issues. He then gave a cost estimate overview of all the total asset management projects and a total of all MCCP facility project costs.

Mr. Johnson discussed the operating capital budget, which is made up of 190 smaller asset management projects and the capital equipment budget, which includes items such as tools, machines and vehicles. He also discussed the Lower Las Vegas Wash, which requires significant work to address erosion. The SNWA estimates the current rate of erosion in the Lower Wash is 2 – 3 vertical feet per year. He shared information about the anticipated structures that are part of this project, as well as estimated costs.

#### **Total MCCP Facility Project Costs**

Horizon Lateral	\$1,596.7 million
Garnet Valley Water	129.8 million
Garnet Valley Wastewater	120.0 million
Boulder City Wastewater System	26.0 million
Large-Scale Solar PV Project	20.8 million
Asset Management	229.7 million
<b>Total</b>	<b>\$2.1 billion</b>

#### **Total SNWA Capital**

Major Construction and Capital Plan	\$3,003.3 million
Facilities	\$2,123.0 million
Resources	\$880.3 million
Operating Capital	176.7 million
Capital Equipment	50.0 million
Lower Las Vegas Wash	122.5 million
<b>TOTAL SNWA CAPITAL</b>	<b>\$3.35 billion</b>

Mr. Johnson then gave a total for the SNWA capital, which totals \$3.35 billion. Mr. Entsminger added that some of it is covered by existing revenue streams. Mr. Restrepo asked if the operating capital will be spent over time to which Mr. Johnson responded that it would be spent over an approximately 10-year period.

Ms. Murphy mentioned that those not in attendance will receive the same information prior to the next committee meeting. She asked for further questions from the committee, closed the meeting and stated that the next meeting will be held December 18<sup>th</sup>.

#### **PUBLIC COMMENT**

There were no speakers.

#### **ADJOURNMENT**

The meeting was adjourned at 4:28 p.m.

# WATER RESOURCES

12.18.2019



SOUTHERN NEVADA WATER AUTHORITY™

# Total SNWA Capital

Major Construction and Capital Plan	\$3,003.3 million
<i>Facilities</i>	<i>\$2,123.0 million</i>
<i>Resources</i>	<i>880.3 million</i>
Operating Capital	176.7 million
Capital Equipment	50.0 million
<u>Lower Las Vegas Wash</u>	<u>122.5 million</u>
<b>TOTAL SNWA CAPITAL</b>	<b>\$3.35 billion</b>

# Total SNWA Capital

Major Construction and Capital Plan	\$3,165.6 million
<i>Facilities</i>	\$2,123.0 million
<i>Resources</i>	880.3 million
<i>Resources/Conservation Contingency*</i>	162.3 million
Operating Capital	176.7 million
Capital Equipment	50.0 million
<u>Lower Las Vegas Wash</u>	<u>122.5 million</u>
<b>TOTAL SNWA CAPITAL</b>	<b>\$3.51 billion</b>

\*Contingency includes funding needed for new resources or new conservation projects

A large stack of blue pipes, likely for water or gas, is shown in a warehouse or storage yard. The pipes are stacked in multiple layers, with some showing technical markings like '11S PIC 1120' and 'VINALTECH'. A small 'ACCEPTED' stamp is visible on one of the pipes. The text 'RESOURCE HISTORY' is overlaid in a large, white, sans-serif font in the center of the image.

# RESOURCE HISTORY

# HISTORY OF WATER RESOURCES



Spring and groundwater sources met Southern Nevada's minimal water demands in the early 1900s.

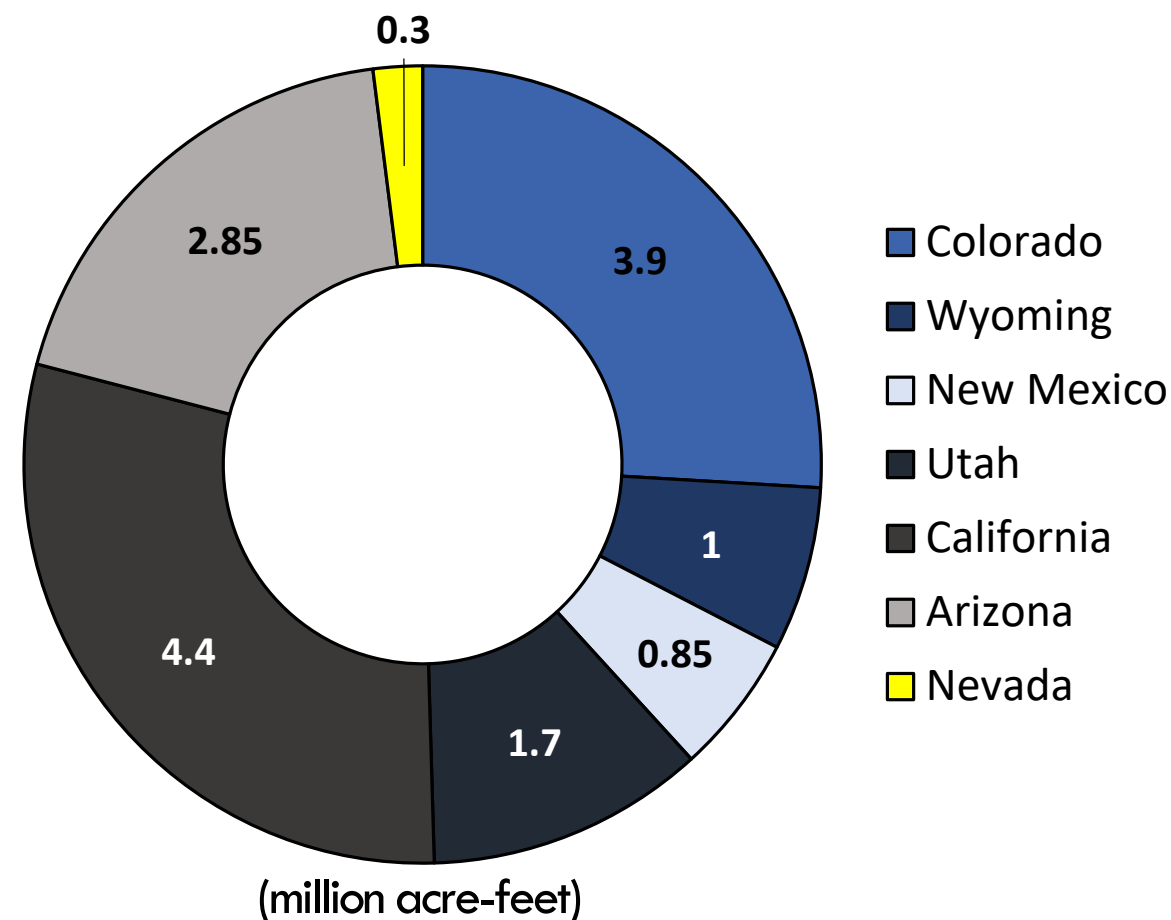


## COLORADO RIVER ALLOCATIONS (1920s)

Meanwhile, negotiations were underway to divide Colorado River water among its basin states.

In 1922, the **Colorado River Compact** was signed, dividing the river's flows equally between the Upper and Lower Basins.

In 1928, the **Boulder Canyon Project Act** funded the construction of Boulder Dam, but also established specific allocations for the three lower basin states.

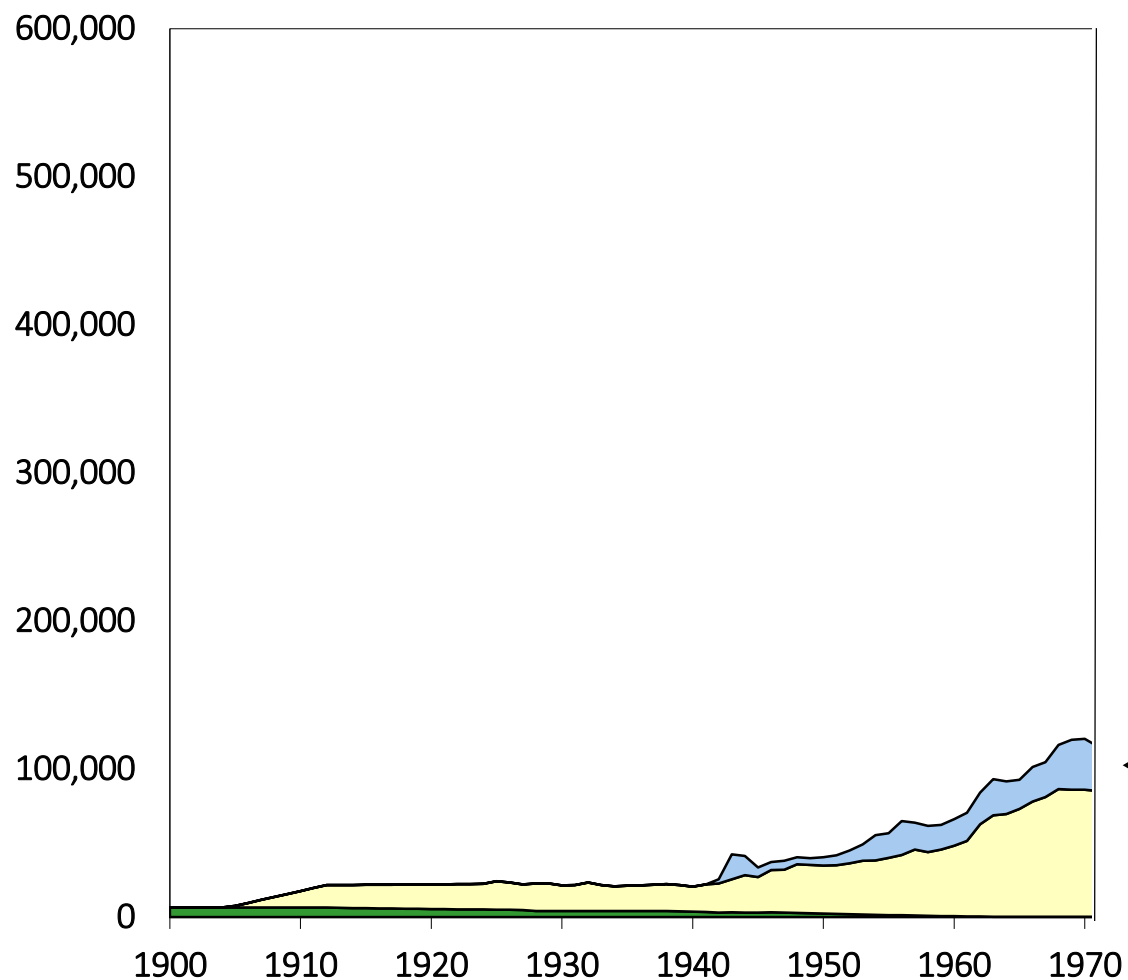




## U.S. - MEXICO TREATY

The **Mexican Water Treaty of 1944** committed 1.5 million acre-feet of Colorado River flows to Mexico annually.

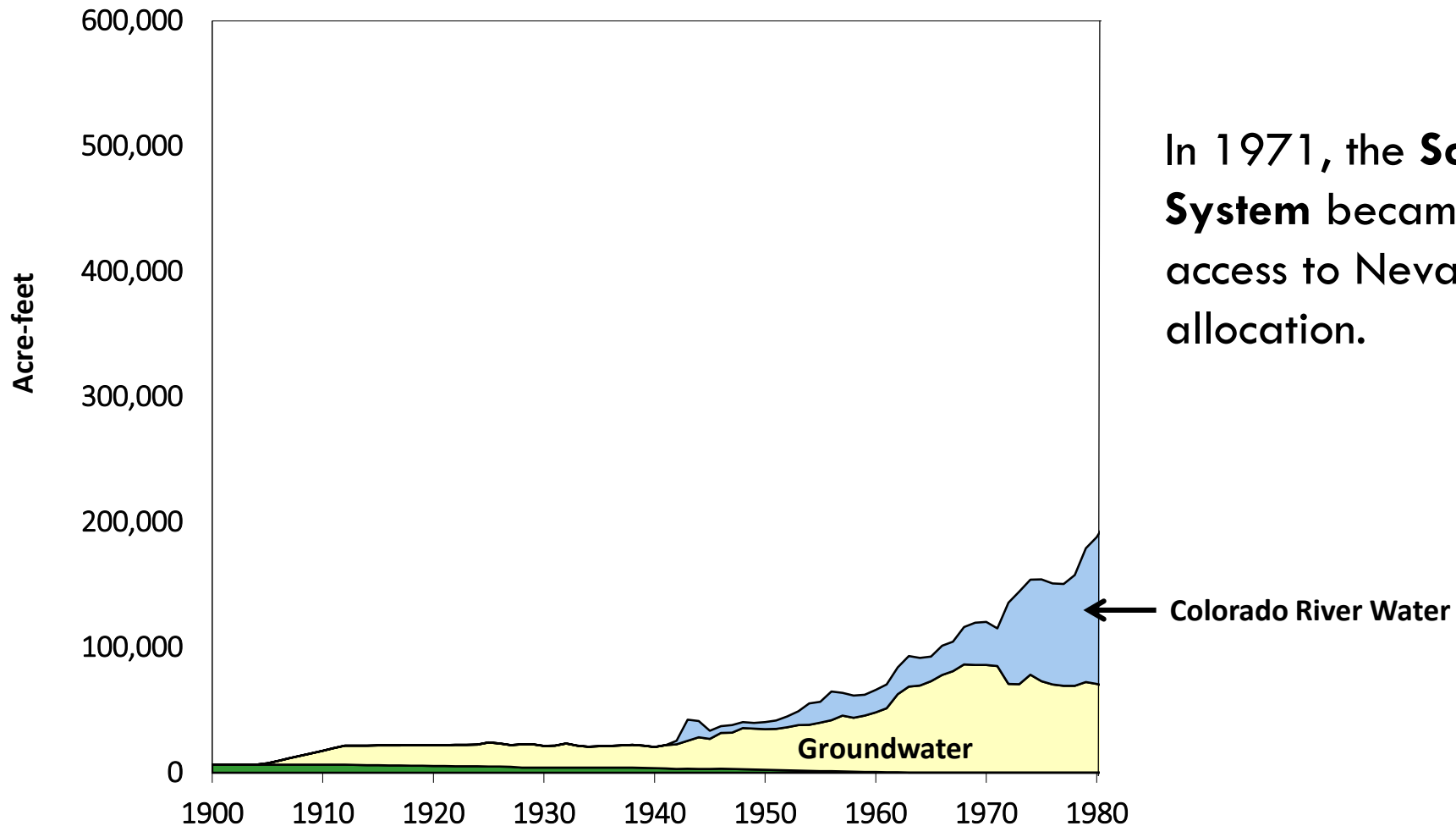
# RELIANCE ON GROUNDWATER



Through the 1970s, Southern Nevada relied exclusively on groundwater supplies to meet demands until infrastructure was constructed in Lake Mead.

← Colorado River Water

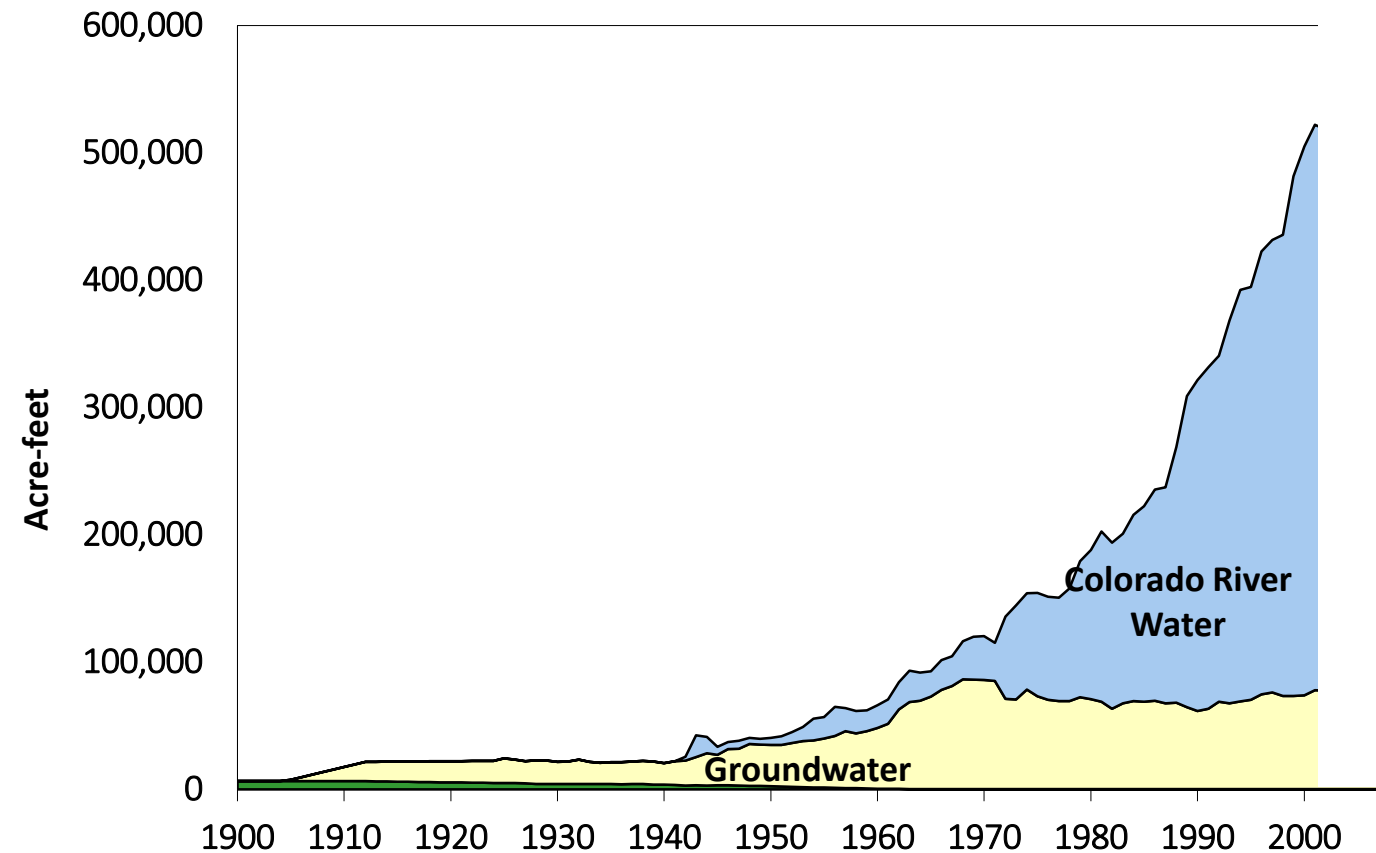
# CONSTRUCTION OF SNWS



In 1971, the **Southern Nevada Water System** became operational, which provided access to Nevada's Colorado River allocation.

# RELIANCE ON COLORADO RIVER

In the 1980s and 1990s, Southern Nevada experienced unprecedented levels of growth, which required more reliance on Colorado River supplies.



# SOUTHERN NEVADA GROUNDWATER BANK

In 1987, the Las Vegas Valley Water District and City of North Las Vegas began injecting treated Colorado River water from Lake Mead into the valley's primary aquifer in years when allocation exceeded demand.

There are currently 54 dual-use recharge/recovery wells with a total injection capacity of about 100 million gallons per day.



***SNWA RESOURCE***

**Southern Nevada Groundwater Bank  
Resources Available: 335,000 AF  
Recovery limited to 20,000 AFY**

## SEEKING ADDITIONAL RESOURCES



In 1989, the Las Vegas Valley Water District filed groundwater permit applications in Central and Eastern Nevada.

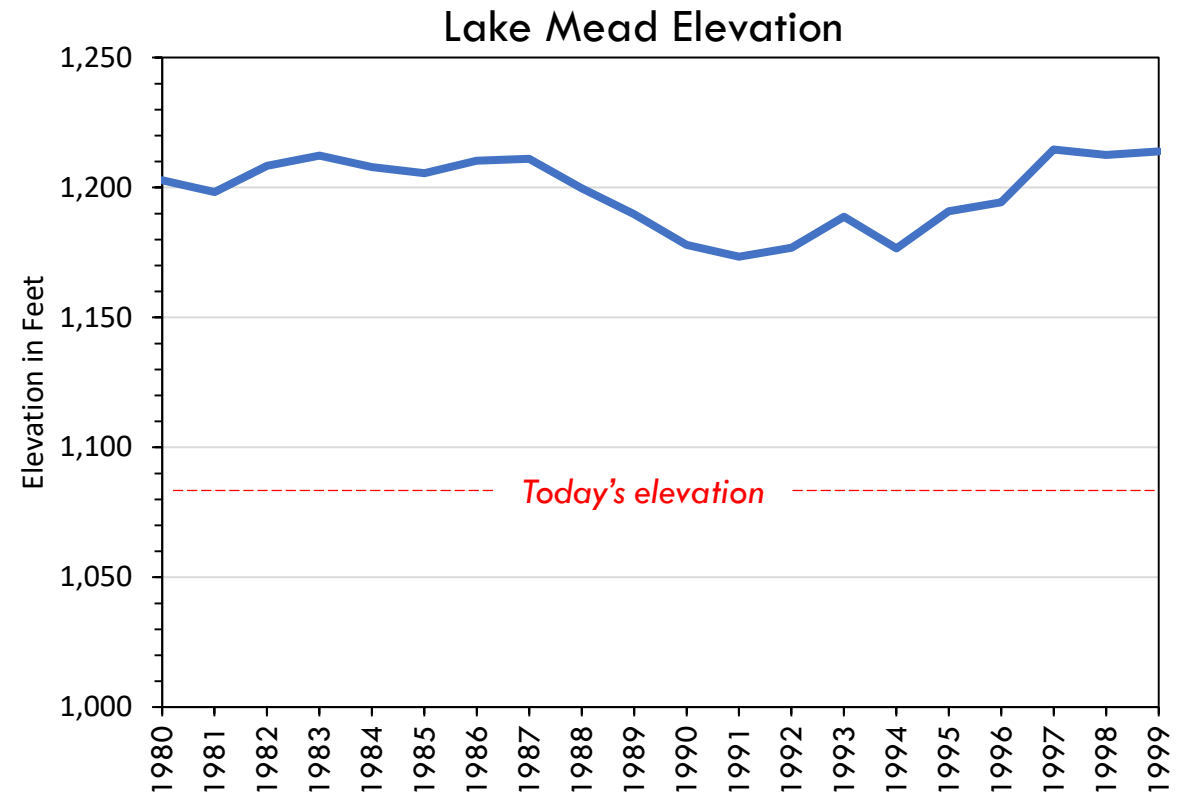


# HIGH INFLOWS

During this time, the Colorado River enjoyed a period of high inflows.

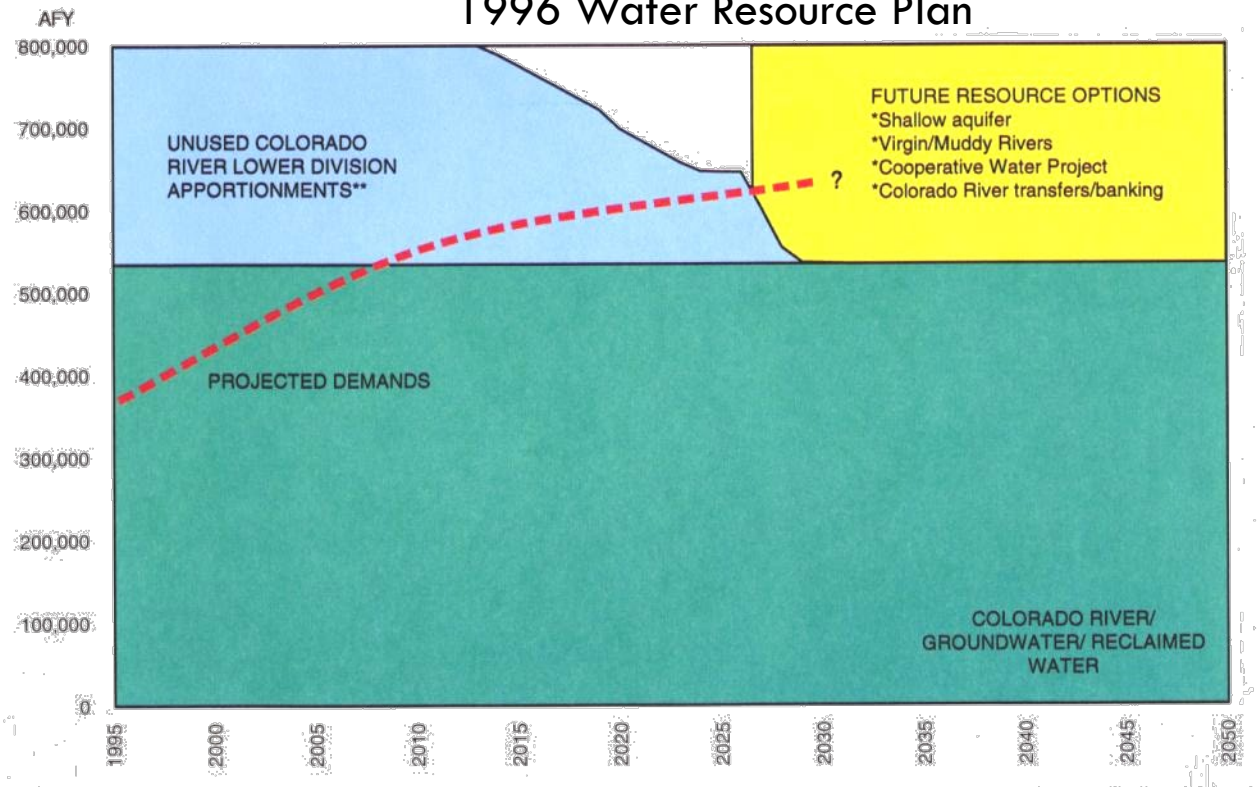


Hoover Dam, 1999



# MEETING DEMANDS

1996 Water Resource Plan



The 1996 Water Resource Plan anticipated unused Colorado River water would meet demands until 2030.



# BANKING RESOURCES

SNWA sought opportunities to bank unused Colorado River resources.

In 2001 and 2002, SNWA and the state of Arizona entered into agreements that ultimately allowed SNWA to bank up to 1.2 million acre-feet of Nevada's Colorado River resources in Arizona's groundwater aquifer.

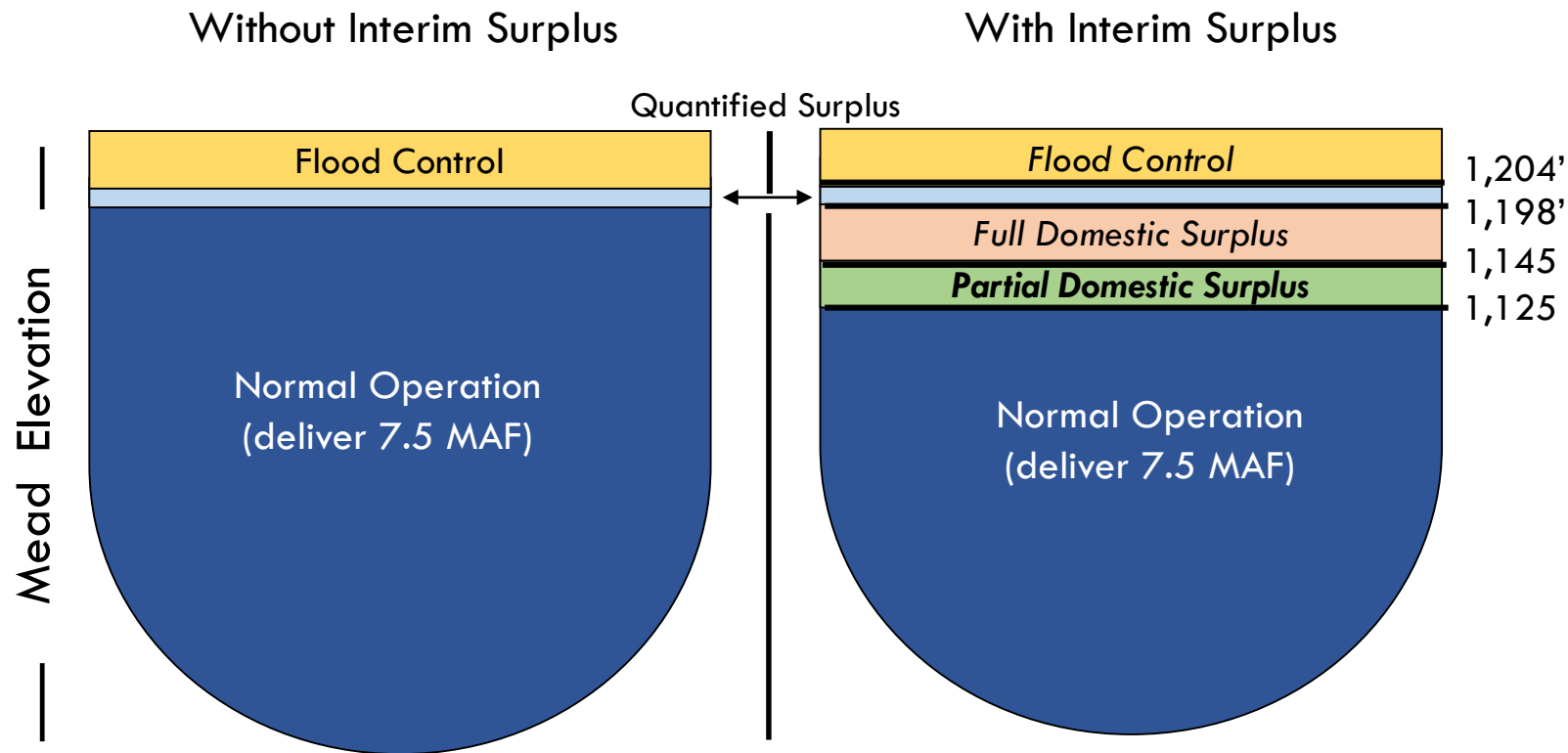


***SNWA RESOURCE***

**Arizona Water Bank**  
**Resources Available: 614,000 AF; Recovery limited to 40,000 AFY**  
**\$5.5 million proposed in MCCP Amendment**

# 2001 INTERIM SURPLUS GUIDELINES

Throughout the 1990s, SNWA worked with other Colorado River Lower Basin States to outline a framework how states can use and share surplus Colorado River water.



# ONSET OF DROUGHT

Following adoption of the Interim Surplus Guidelines, drought significantly reduced storage levels in Lakes Powell and Mead, underscoring the need for a cooperative approach to drought among the Basin States.



Jan. 2000, Elevation: 1,214 ft.



Dec. 2003, Elevation: 1,139 ft.

# BANKING RESOURCES

With the ongoing threat of drought, SNWA sought additional opportunities to bank unused Colorado River resources.



Beginning in 2004, SNWA and the state of California entered into agreements that ultimately allow California to store Nevada's unused Colorado River water in California.

Water is stored in reservoirs throughout Southern California. When needed, SNWA will access California's Colorado River allocation in Lake Mead.



## 2004: ONGOING DROUGHT



In 2004, the Basin States were in conflict over how much water should be released from Lake Powell.

- Drought remained a looming threat to system management
- The Secretary of the Interior asked states to develop shortage criteria
- The states spent more than two years developing a proposal with support from the U.S. Bureau of Reclamation

## **2007 INTERIM GUIDELINES**

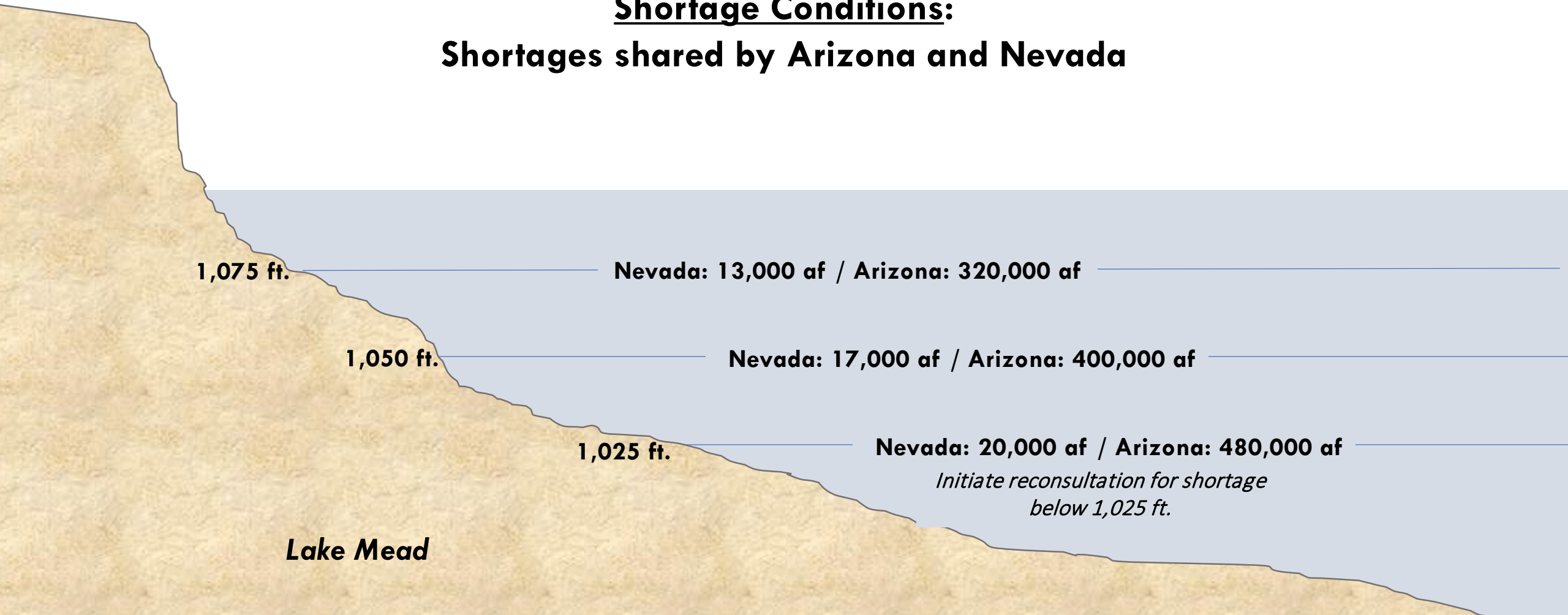
**The Interim Guidelines addressed a number of ongoing basin concerns:**

- Coordinated operations of the system's two largest reservoirs: Lake Powell and Lake Mead
- Shortage volumes for Arizona and Nevada based on Lake Mead's elevations
- The modification and extension of the Interim Surplus Guidelines
- The ability to store water in Lake Mead (ICS)

# 2007 INTERIM GUIDELINES: Shortage Conditions

## Shortage Conditions:

### Shortages shared by Arizona and Nevada



# 2007 INTERIM GUIDELINES: Intentionally Created Surplus

## Previous Committee Recommendations

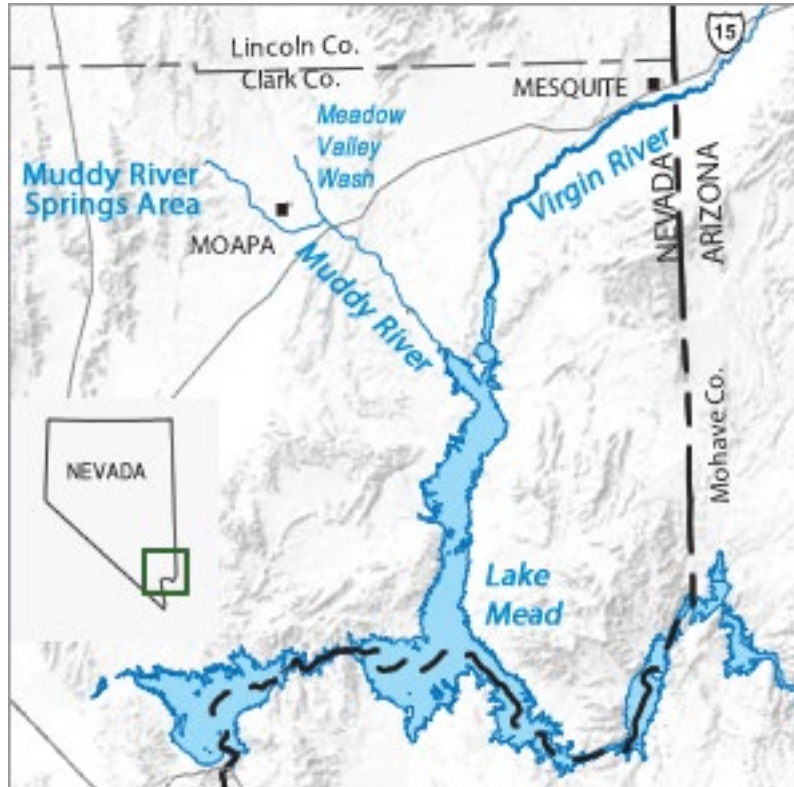
- Place top priority on Colorado River Water resources (1994)
- Pursue delivery of pre-Compact Muddy and Virgin River Rights (2004)

**Intentionally Created Surplus (ICS)** can be created or credited to a water user through actions that conserve water and increase Lake Mead storage

- ICS included in SNWA Resource Plan:
  - Tributary Conservation (permanent)
  - Extraordinary Conservation (temporary)
  - System Efficiency (temporary)



# 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 conditions

## ICS: Extraordinary Conservation

- Allows states to implement projects that conserve water to increase Lake Mead elevations
- Examples: Land fallowing, canal lining and storage of Tributary ICS in Lake Mead

# ICS: System Efficiency



**System Efficiency ICS** allows states to fund projects that conserve Colorado River water.

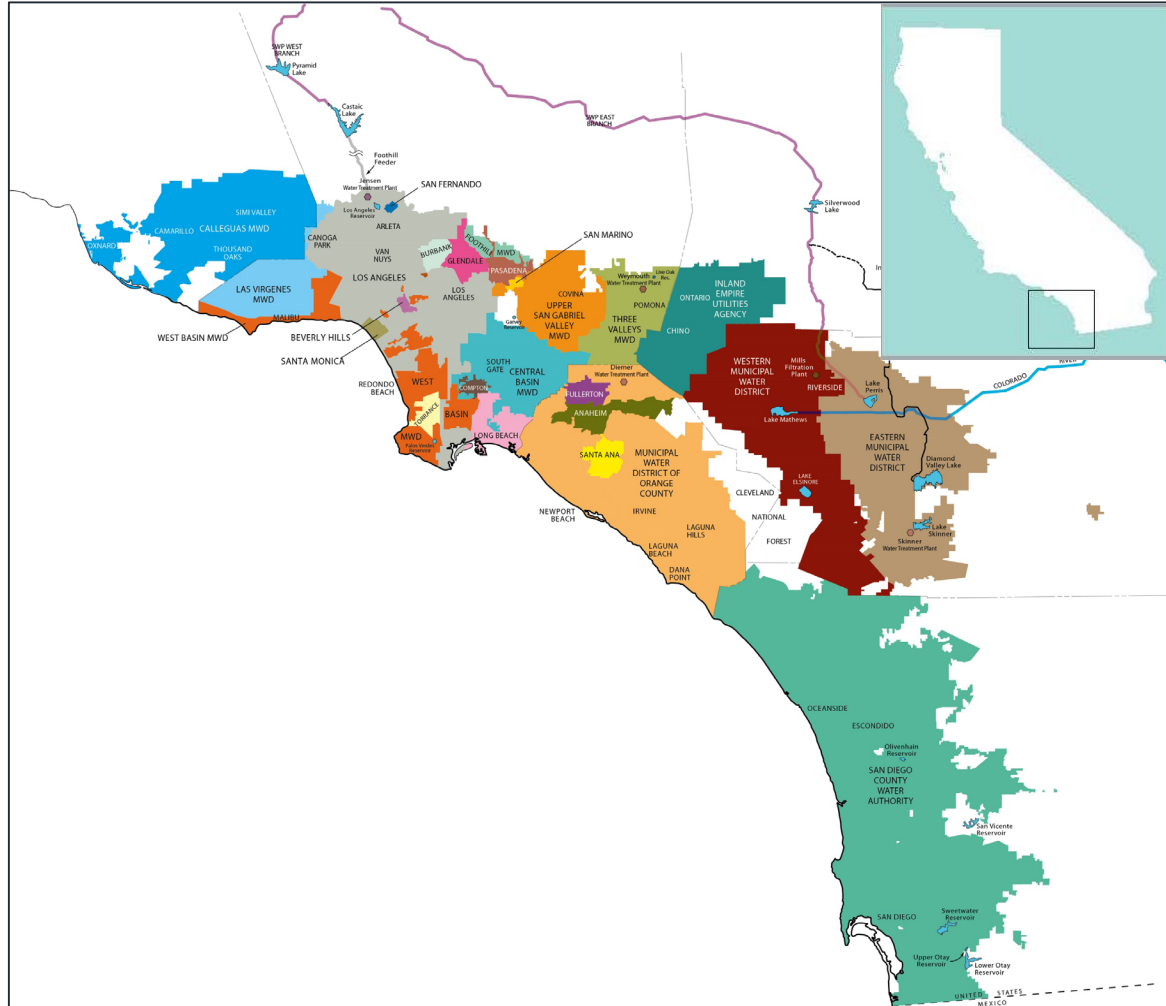
# Central Arizona Project (CAP)



- 336-mile system that delivers Colorado River water to central and southern Arizona (80% of state population)
- Overseen by the Central Arizona Water Conservation District – a partner on Colorado River projects and initiatives



# Metropolitan Water District of Southern California



- Regional wholesaler that provides water to 19 million people in Los Angeles, Orange, Riverside, San Bernardino, San Diego and Ventura Counties in California
- Supplies include Colorado River, Northern California and local supplies
- Partner with SNWA and other Basin States on various Colorado River programs

# ICS: Yuma Desalting Plant

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



# ICS: 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

## ICS: Yuma Desalting Plant



Yuma Desalting Plant

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

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

As part of 2009 collaborations, a series of studies were completed to estimate future costs of retrofitting the facility to operate long term.



## ICS: Brock Reservoir

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

- Stores Colorado River water that would otherwise be delivered to Mexico in excess of their Treaty allocation caused by canal outages, changed weather conditions, high runoffs, etc.
- Allows the Bureau of Reclamation to capture water when supply is in excess of demand, and conserve water in Lake Mead
- Completed in 2010



## 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)

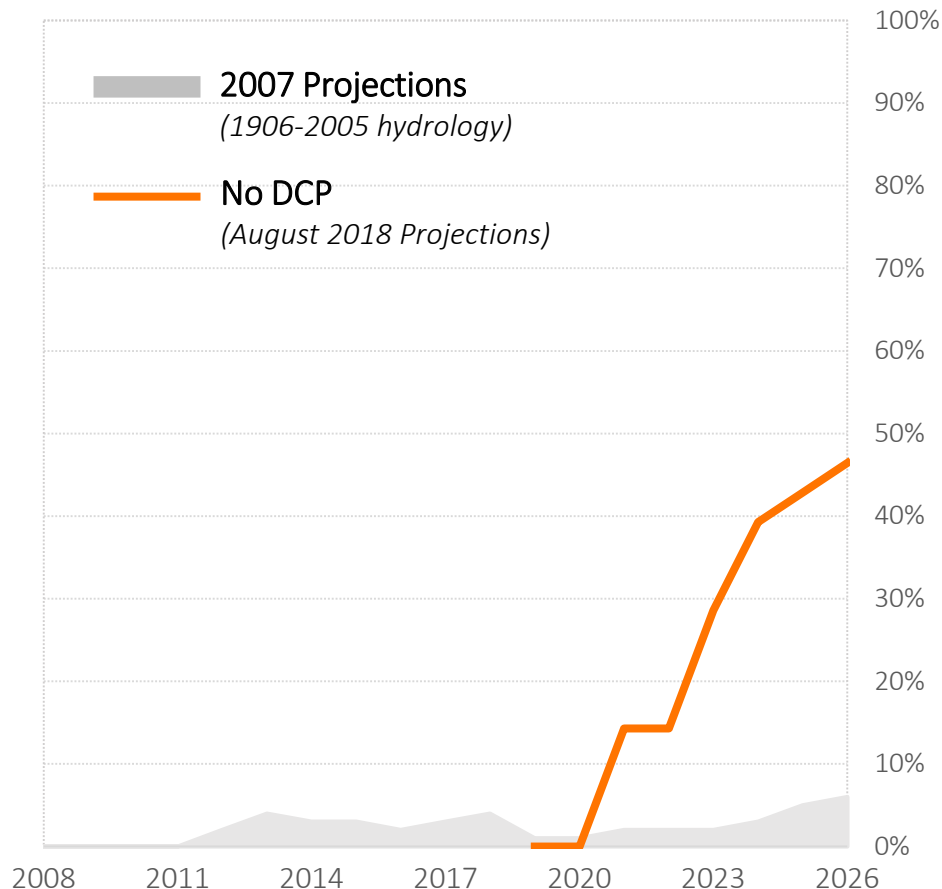


## Bi-National Discussions

- 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
- MINUTE 319** (2012): Established shared responsibility in weathering shortages and benefitting from surpluses; established framework for a permanent agreement and bi-national ICS
- MINUTE 323** (2017): Established pilot program for creation of additional Binational ICS, affirmed commitment from Mexico to participate in shortages

# DROUGHT CONTINGENCY PLANNING

Stress Test Hydrology (1988-2015)



After 14 years of sustained drought, the threat of reaching critical elevations in the Basin's two principal reservoirs had significantly increased.

In 2014, the Colorado River Basin States began to evaluate and develop strategies to reduce the risk.

- Memorandum of Understanding (2014)
- System Conservation (2014)

# DROUGHT CONTINGENCY PLANNING

## UPPER BASIN

### GOALS:

- Reduce risk of Lake Powell reaching critically low elevations (3,490 ft. / 3,525 ft.)
- Reduce risk of involuntary curtailment within Upper Basin to maintain compliance with 1922 Compact

### KEY ELEMENTS

- CRSPA initial units drought response operations
- Demand Management Storage capacity

## LOWER BASIN

### GOALS:

- Reduce risk of Lake Mead elevations from below 1,020 ft.

### KEY ELEMENTS

- Creates water contributions
- Removes disincentives to storing water in Lake Mead
- Enhances ability to store and access water in Lake Mead



# DROUGHT CONTINGENCY PLANNING

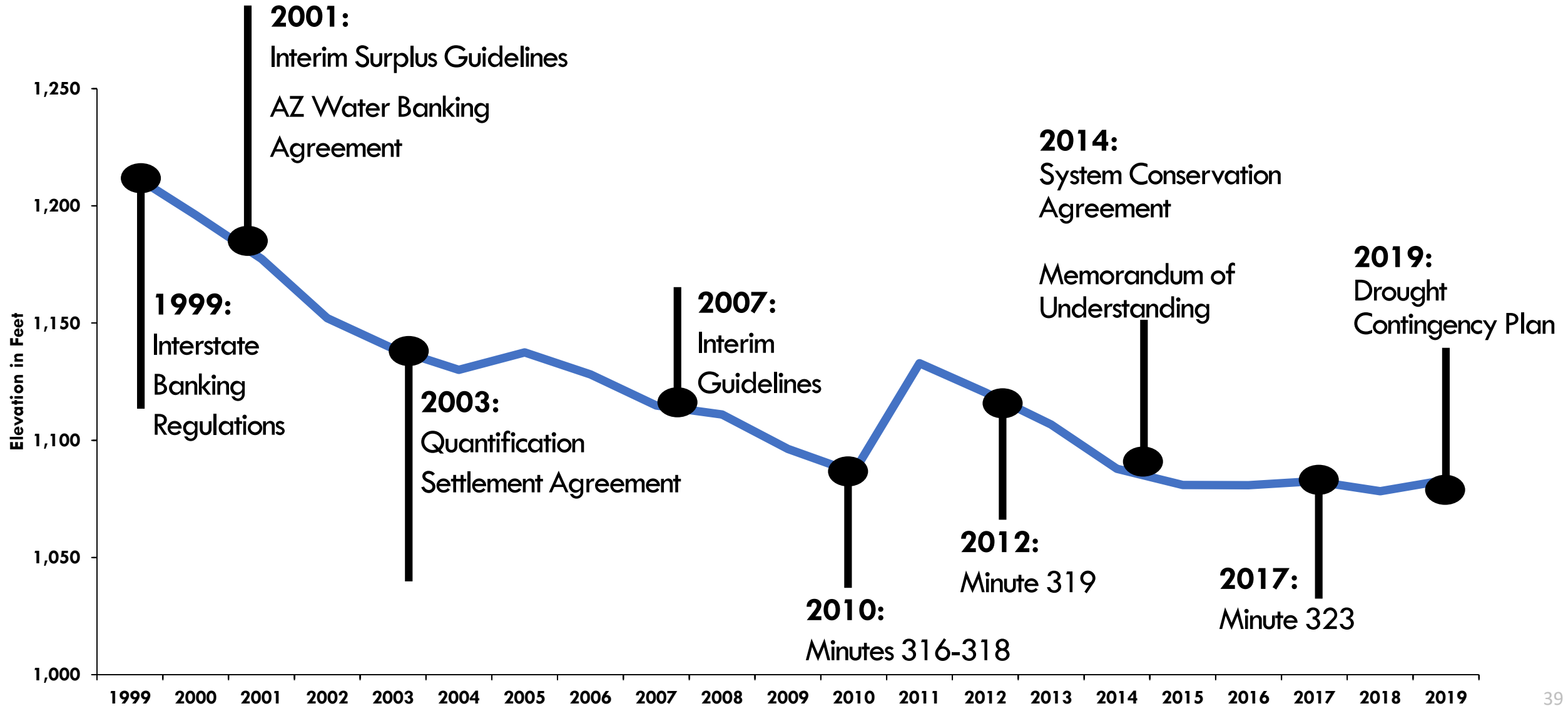
## 2007 Interim Guidelines, Minute 323, Lower Basin Drought Contingency Plan & Binational Water Scarcity Contingency Plan

Lake Mead Elevation (ft msl)	2007 Interim Guidelines Shortages		Minute 323 Delivery Reductions	Total Combined Reductions	DCP Contributions			Binational Water Scarcity Contingency Plan Savings	Combined Volumes by Country US: (2007 Interim Guidelines Shortages + DCP Contributions) Mexico: (Minute 323 Delivery Reductions + Binational Water Scarcity Contingency Plan Savings)					Total Combined Volumes
	AZ	NV	Mexico	Lower Basin States + Mexico	AZ	NV	CA	Mexico	AZ Total	NV Total	CA Total	Lower Basin States Total	Mexico Total	Lower Basin States + Mexico
1,090 - >1,075	0	0	0	0	192	8	0	41	192	8	0	200	41	241
1,075 - >1050	320	13	50	383	192	8	0	30	512	21	0	533	80	613
1,050 - >1,045	400	17	70	487	192	8	0	34	592	25	0	617	104	721
1,045 - >1,040	400	17	70	487	240	10	200	76	640	27	200	867	146	1,013
1,040 - >1,035	400	17	70	487	240	10	250	84	640	27	250	917	154	1,071
1,035 - >1,030	400	17	70	487	240	10	300	92	640	27	300	967	162	1,129
1,030 – 1,025	400	17	70	487	240	10	350	101	640	27	350	1,017	171	1,188
<1,025	480	20	125	625	240	10	350	150	720	30	350	1,100	275	1,375

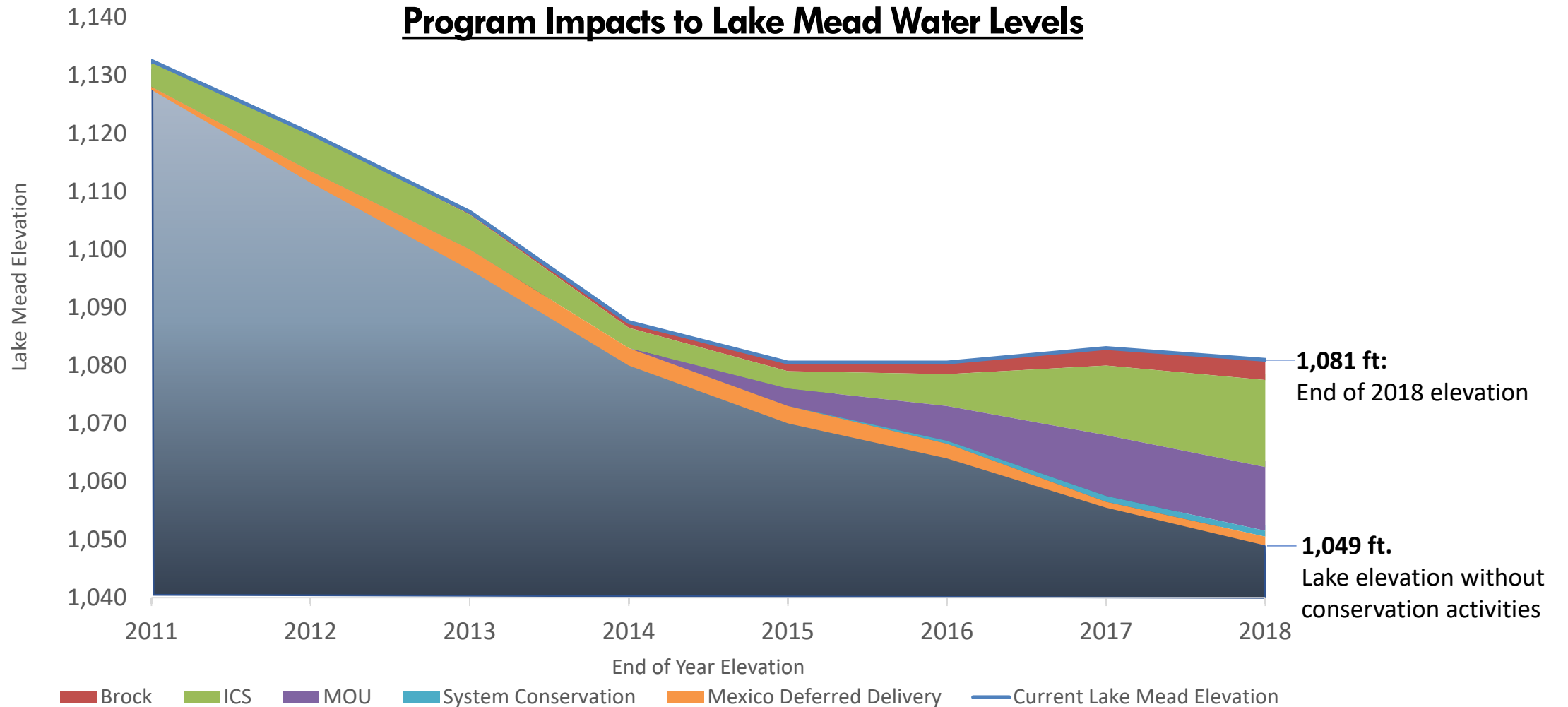
# DROUGHT CONTINGENCY PLAN

- Reduces risk of Colorado River reservoirs reaching critical elevations
- Creates tools for the Upper Basin to manage Lake Powell for power and future compact requirements
- Includes California as a participant in protecting Lake Mead
- Triggers Mexico's agreement to store additional volumes of conserved water in Lake Mead
- Adds new levels of DCP Contributions to protect Lake Mead
- Creates additional incentives to store and access additional ICS, including during shortages

# COLORADO RIVER – MAJOR AGREEMENTS TIMELINE

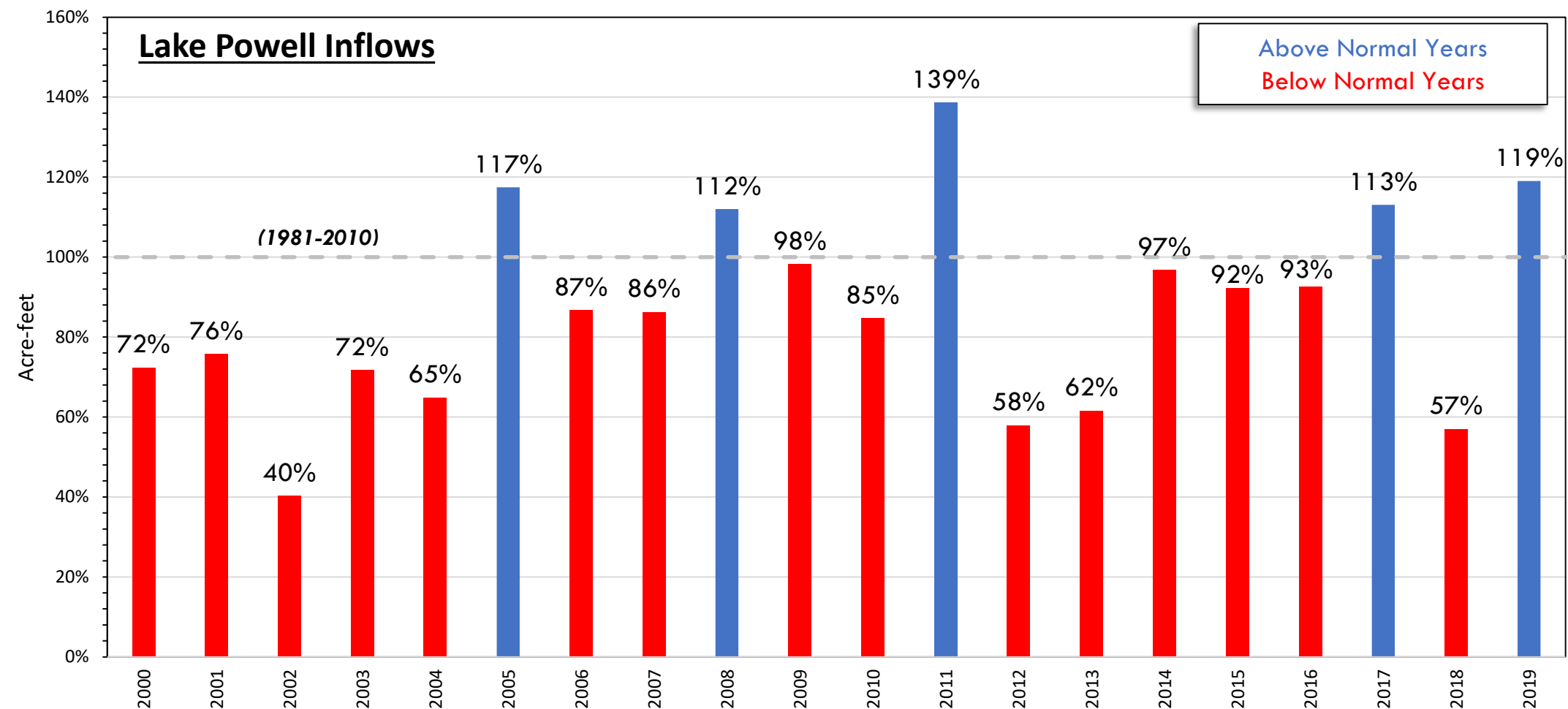


# COLORADO RIVER INVESTMENTS WORK



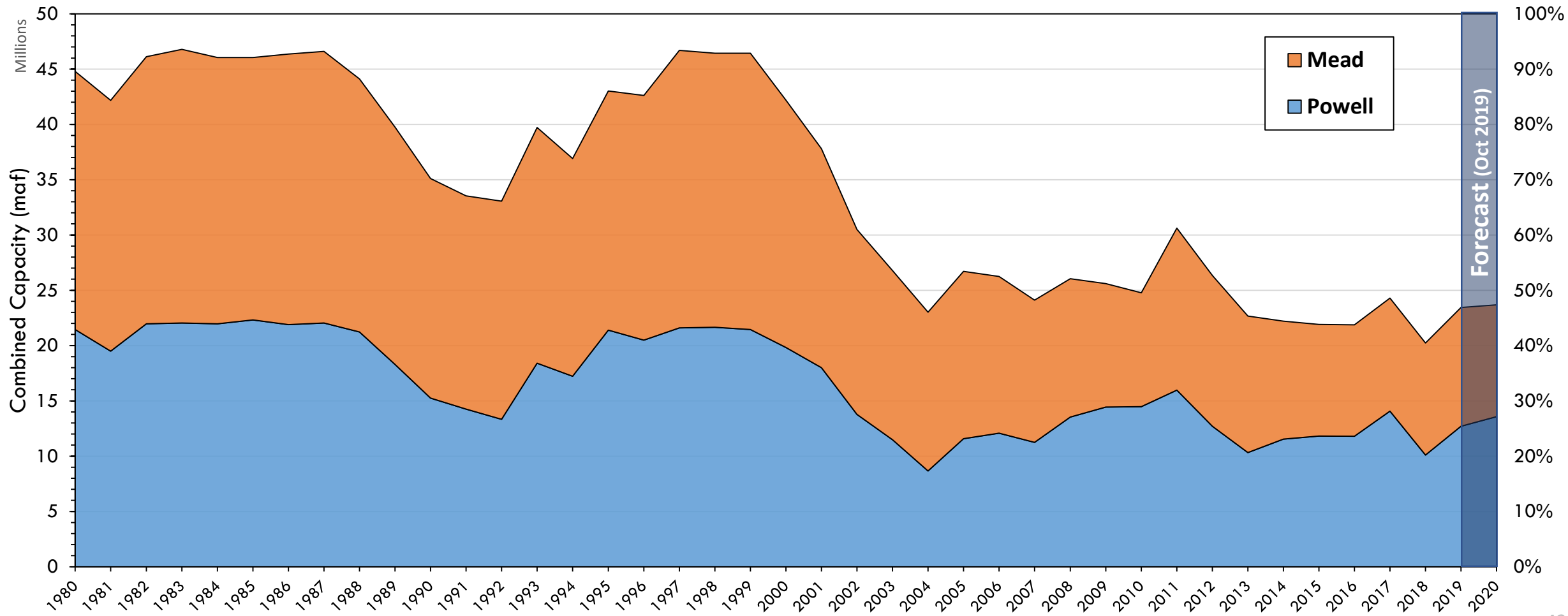
# HYDROLOGY UPDATE

**Inflow to the Colorado River Basin remains below average.**



# HYDROLOGY UPDATE

**Storage within the Basin's two major reservoirs remain less than 50%.**





A large stack of blue pipes, likely for industrial or construction use, is shown. The pipes are stacked in a way that creates a strong sense of depth and repetition. The text 'RESOURCE PLANNING' is overlaid in a large, white, sans-serif font in the center of the image. The background is a solid blue color, matching the pipes.

# RESOURCE PLANNING



# WATER RESOURCE PLANNING

## Various factors influence SNWA's resource planning efforts

### Drought

- Potential for declared shortages
- Access to Lake Mead through existing infrastructure
- Water quality impacts at low reservoir levels

### Climate change

- Mid- to long-term reductions in natural Colorado River inflows
- Projected increases in water consumption due to increased temperatures and changing precipitation patterns

### Economic Conditions

- Impact of economy on water consumption

### Adaptive Management

- Facility improvements
- Conservation
- Interstate collaboration



# SNWA WATER RESOURCE PLAN



The guidance document for SNWA's planning efforts is the Water Resource Plan.

- Created in 1996, as a result of a 1994 IRPAC recommendation
- Identifies existing water resource assets and options
- Evaluates and projects demands and supplies under different scenarios
- Updated annually

# SNWA WATER RESOURCE PORTFOLIO

SNWA's Water Resource Portfolio includes a diverse set of resource options to reliably meet current and future demands.

Permanent Resources	Temporary Resources	Future Resources
Colorado River (SNWA)	Southern Nevada Groundwater Bank	Virgin River/Colorado River Augmentation
Nevada Unused Colorado River (Non-SNWA)	Interstate Bank (Arizona)	Transfers/Exchanges
Tributary Conservation ICS	Interstate Bank (California)	In-State Groundwater
Las Vegas Valley Groundwater Rights	Intentionally Created Surplus (storage in Lake Mead)	Desalination

## SNWA PERMANENT RESOURCES

Permanent Resource	Quantity
Colorado River (SNWA)	276,205 AFY, which includes Nellis AFB rights
Nevada Unused Colorado River (Non-SNWA)	Subject to availability
Tributary Conservation ICS	Muddy and Virgin River surface water rights that pre-date 1929 14,700 AFY permanent rights + 17,200 AFY of Leased Rights
Las Vegas Valley Groundwater Rights	LVVWD: 40,760 AFY NLV: 6,201 AFY

## SNWA TEMPORARY RESOURCES

Temporary Resource	Quantity
Southern Nevada Groundwater Bank	Water stored in Las Vegas Groundwater Basin via injection wells 335,000 AF (Limited to 20,000 AF per year)
Interstate Bank (Arizona)	Nevada's unused Colorado River stored in Arizona's groundwater aquifers 614,000 AF (Recovery limited to 40,000 AFY under normal conditions)
Interstate Bank (California)	Nevada's unused Colorado River stored in California 330,000 AF (Assumes recovery of up to 30,000 AFY)
Intentionally Created Surplus (storage in Lake Mead)	System Efficiency ICS-Brock: 400,000 AF (Recovery limited to 40,000 AFY) System Efficiency ICS-YDP: 3,050 AF Extraordinary Conservation ICS: 269,000 AF Bi-National ICS: 23,750 AF ICS TOTAL: 695,800 AF (Recovery limited to 300,000 AFY)



# SNWA FUTURE RESOURCES

Future Resource	Quantity
Virgin River/Colorado River Augmentation	<p>In 1994, the SNWA was permitted 113,000 AFY of Virgin River water rights.</p> <p>The SNWA suspended development of those rights in exchange for a commitment among the Basin States to pursue development of 75,000 AFY of permanent water supplies for Nevada</p>
Desalination	<p>SNWA is engaged with other Basin States, the Bureau of Reclamation and Mexico to evaluate desalination projects in California and Mexico.</p>
Transfers/Exchanges	<p>Projects that move water resources from willing sellers to willing buyers.</p>
In-State Groundwater	<p>Groundwater permits and applications within Nevada</p>

## **FUTURE RESOURCES: In-State Groundwater**

The SNWA has groundwater permits and applications in southern and eastern Nevada.

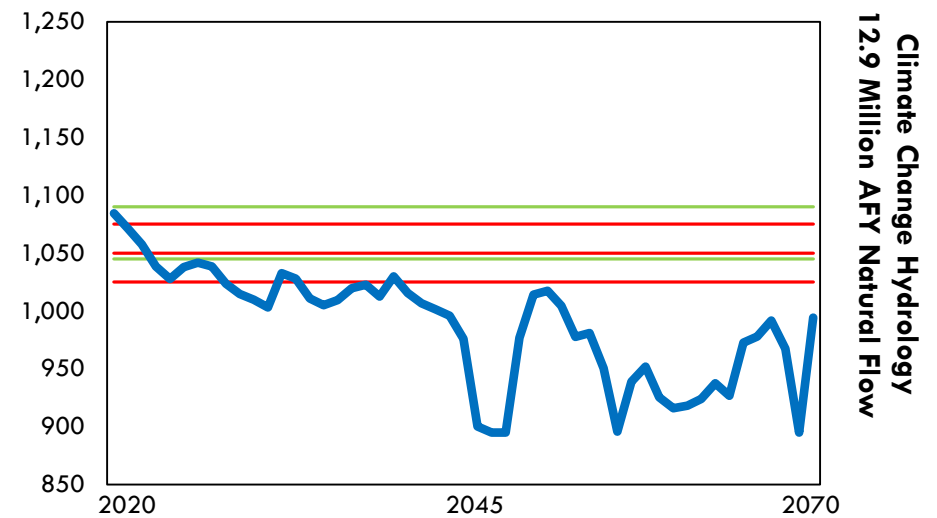
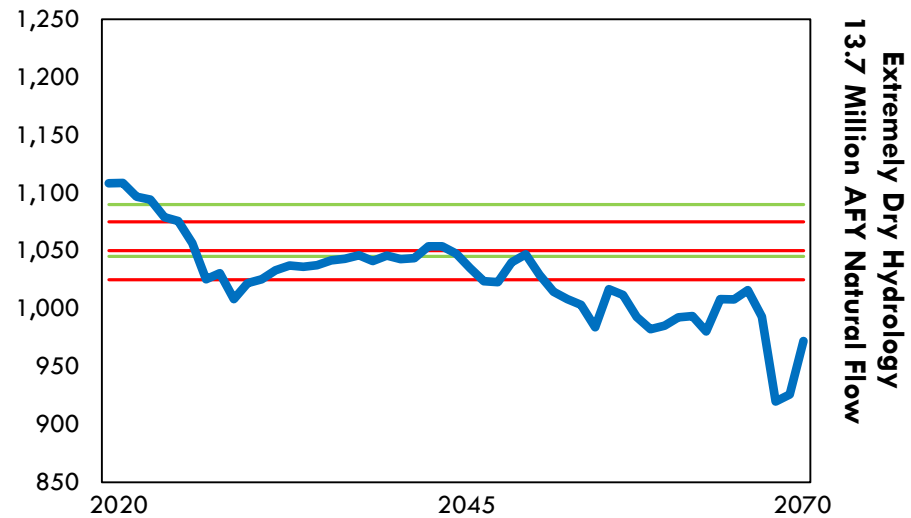
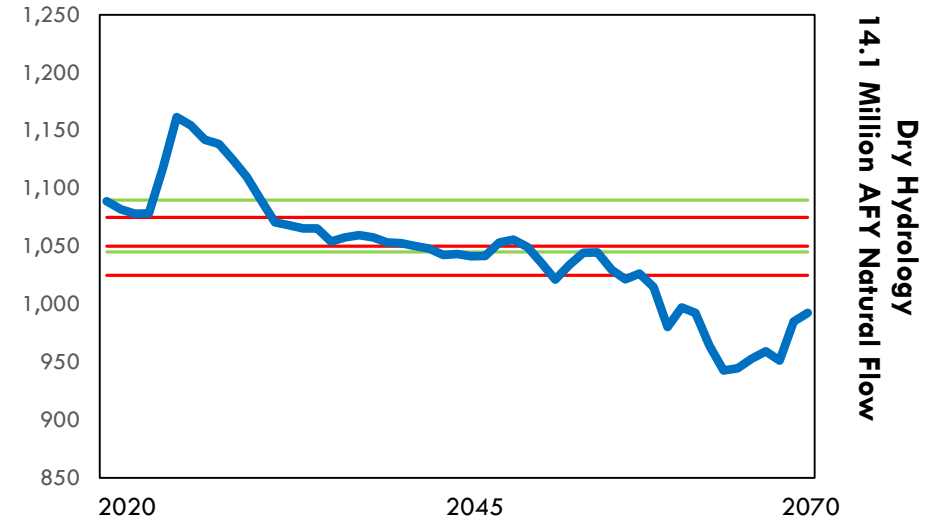
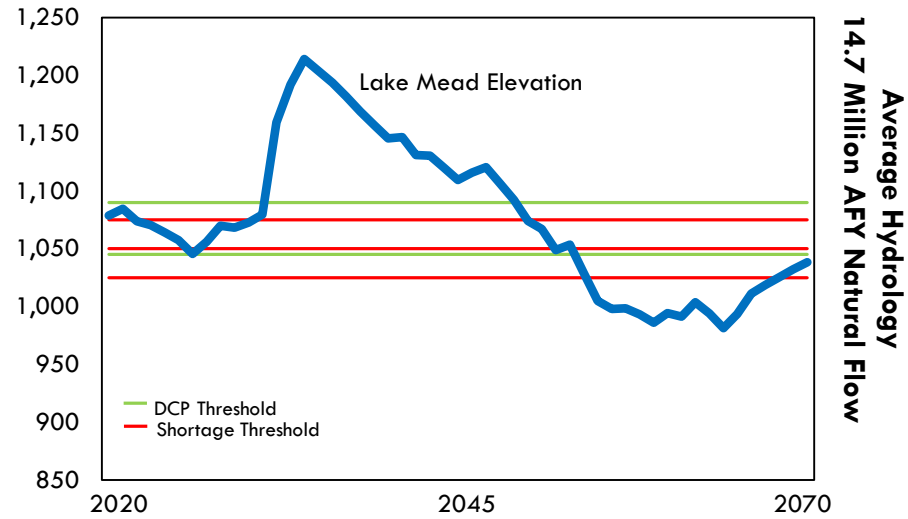
Some of these are permitted, while others require further review and analysis.

Pursuant to a 2005 Integrated Water Planning Advisory Committee recommendation, the SNWA continues to pursue permitting activities.

The SNWA Board has not authorized and this MCCP amendment does not include funding for constructing the Groundwater Development Project.

# The SNWA's Water Resource Plan considers a variety of hydrologic scenarios in its planning efforts.

*All scenarios project Lake Mead elevations through year 2070*

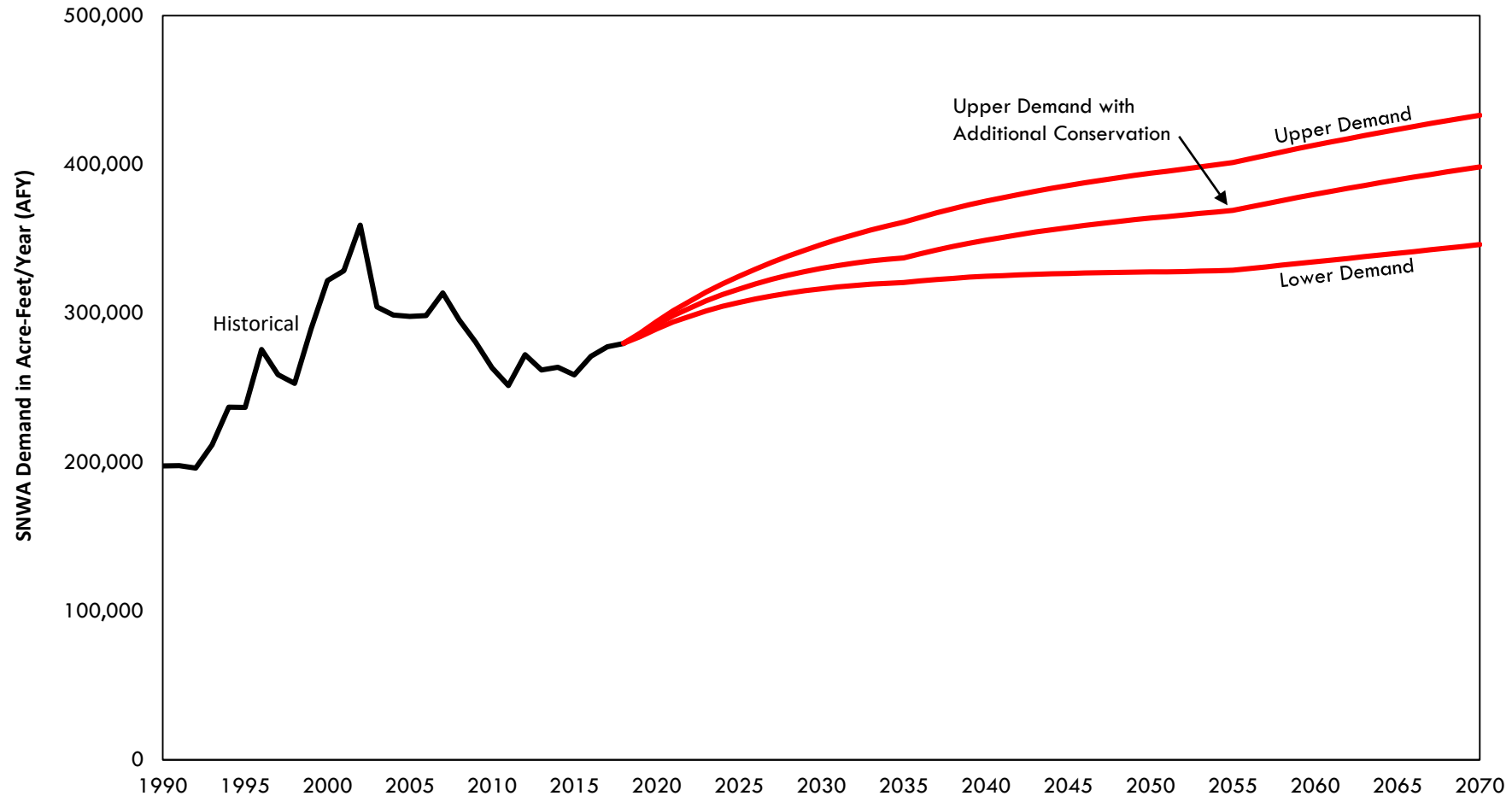


# DEMAND SCENARIOS

## Population and GPCD

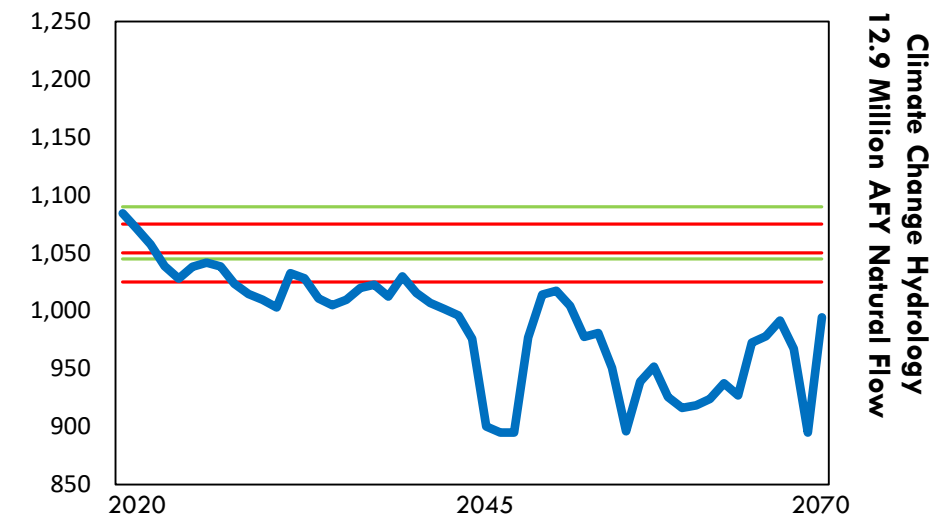
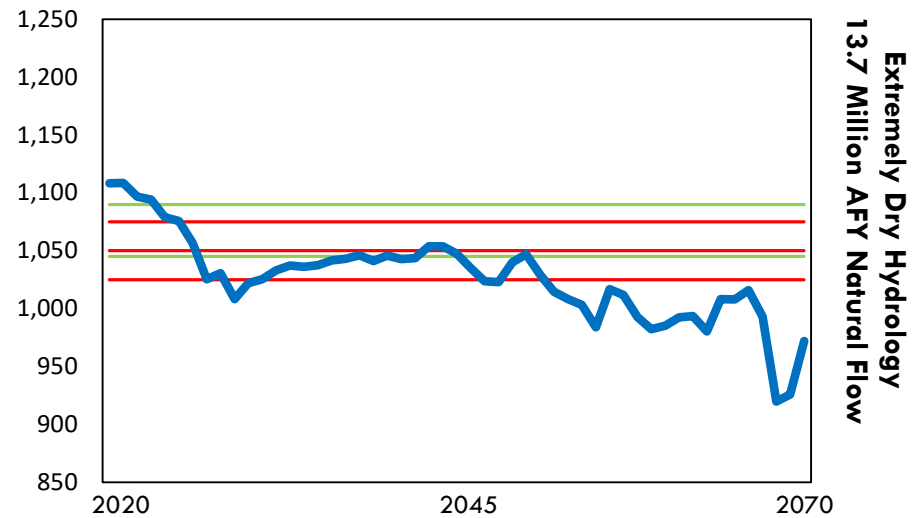
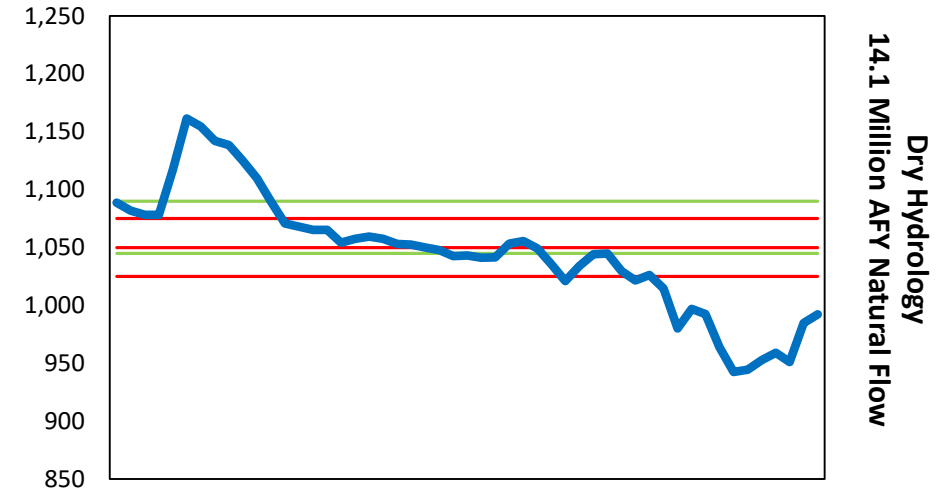
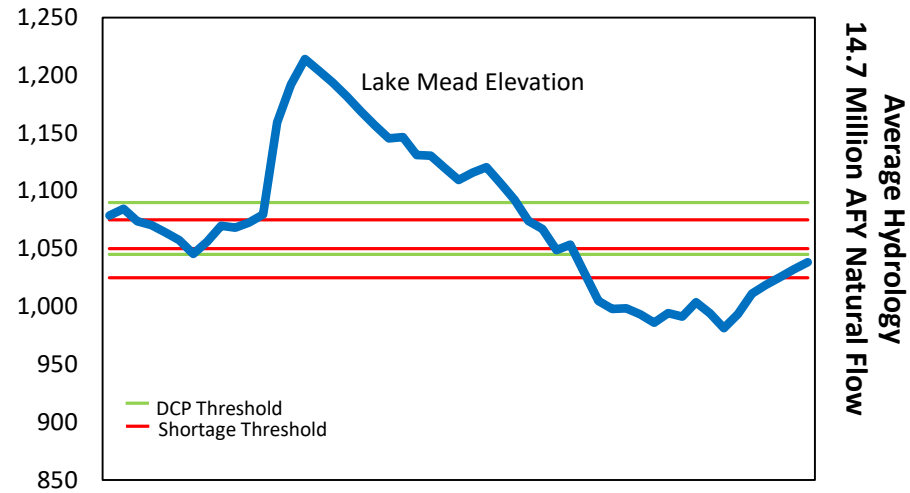
	Lower Demand	Upper Demand	Upper Demand Additional Conservation
<b>Population</b>	UNLV CBER 2019	UNLV CBER 2019 +15% in 2039 and +25% in 2069	UNLV CBER 2019 +15% in 2039 and +25% in 2069
<b>Gallons Per Capita Per Day (GPCD)</b>	105 by 2035 100 in 2055+	105 by 2035 100 in 2055+	98 by 2035 92 in 2055+

## The SNWA considered three water demand projections as part of the 2019 plan update.



# The SNWA's Water Resource Plan considers a variety of hydrologic scenarios in its planning efforts.

*All scenarios project Lake Mead elevations through year 2070*





# DEMAND-SUPPLY SCENARIOS SUMMARY

## *Timing of Future Resources*

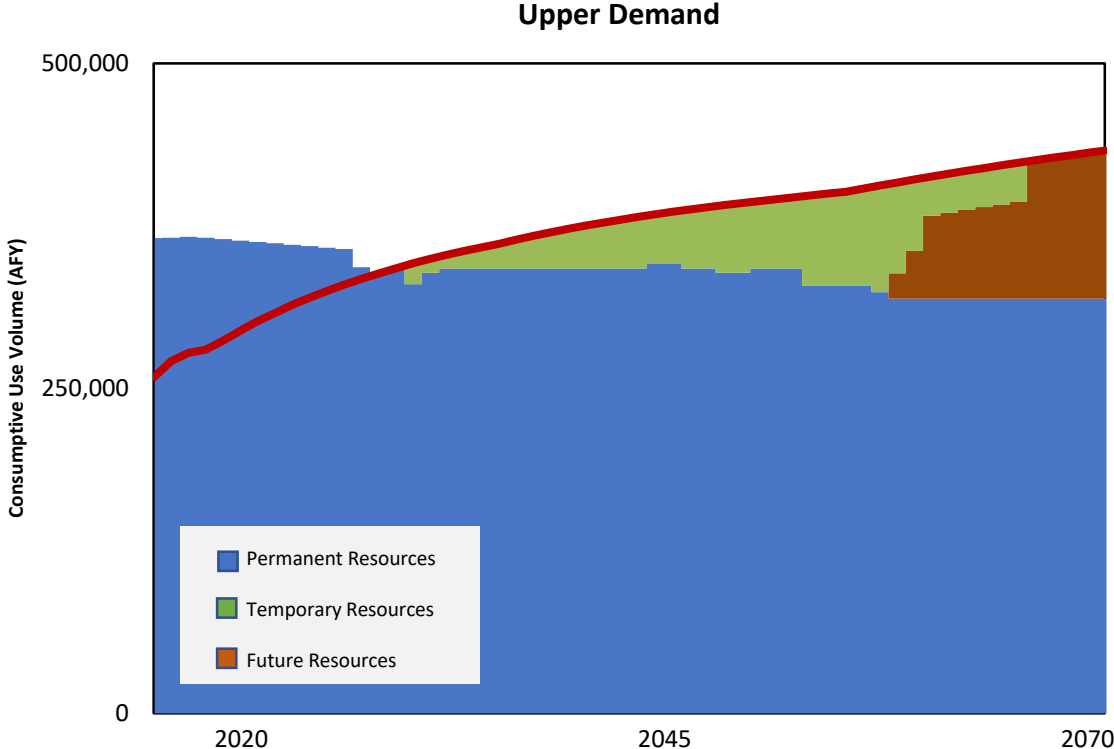
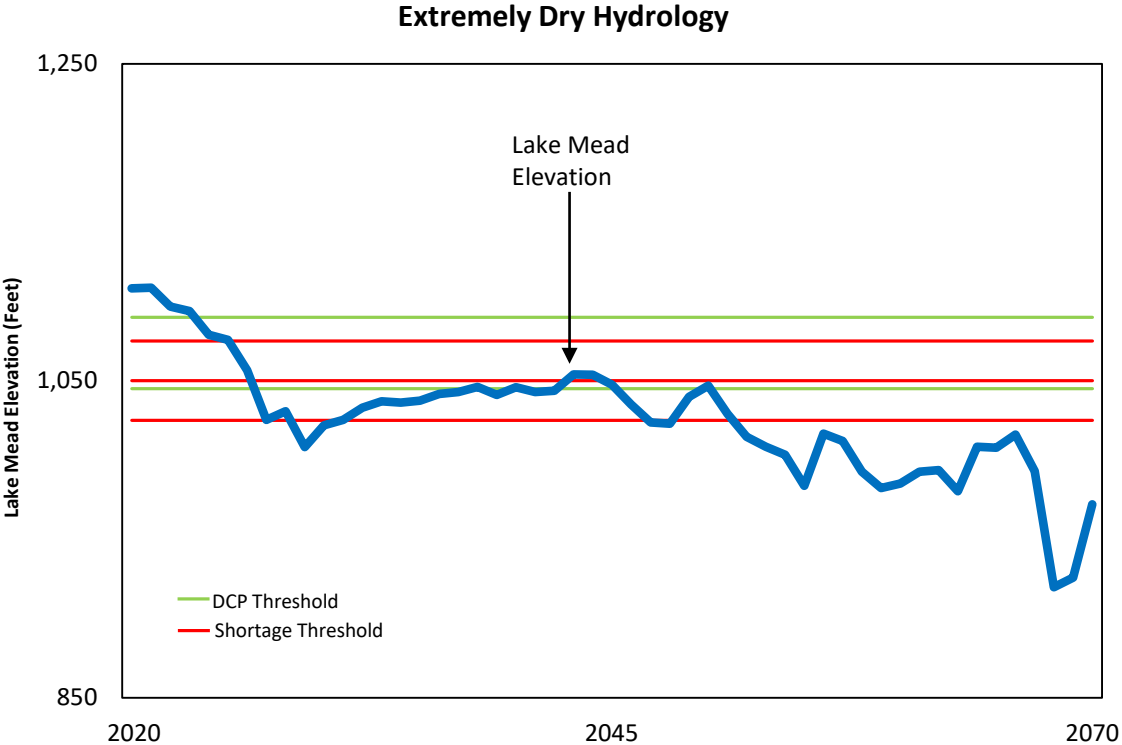
---

Hydrology	Lower Demand	Upper Demand	Upper Demand Additional Conservation
Average	Outside Planning Horizon	2062	Outside Planning Horizon
Dry	Outside Planning Horizon	2061	Outside Planning Horizon
Extremely Dry	Outside Planning Horizon	2058	2067
Climate Change	Outside Planning Horizon	2050	2058

---

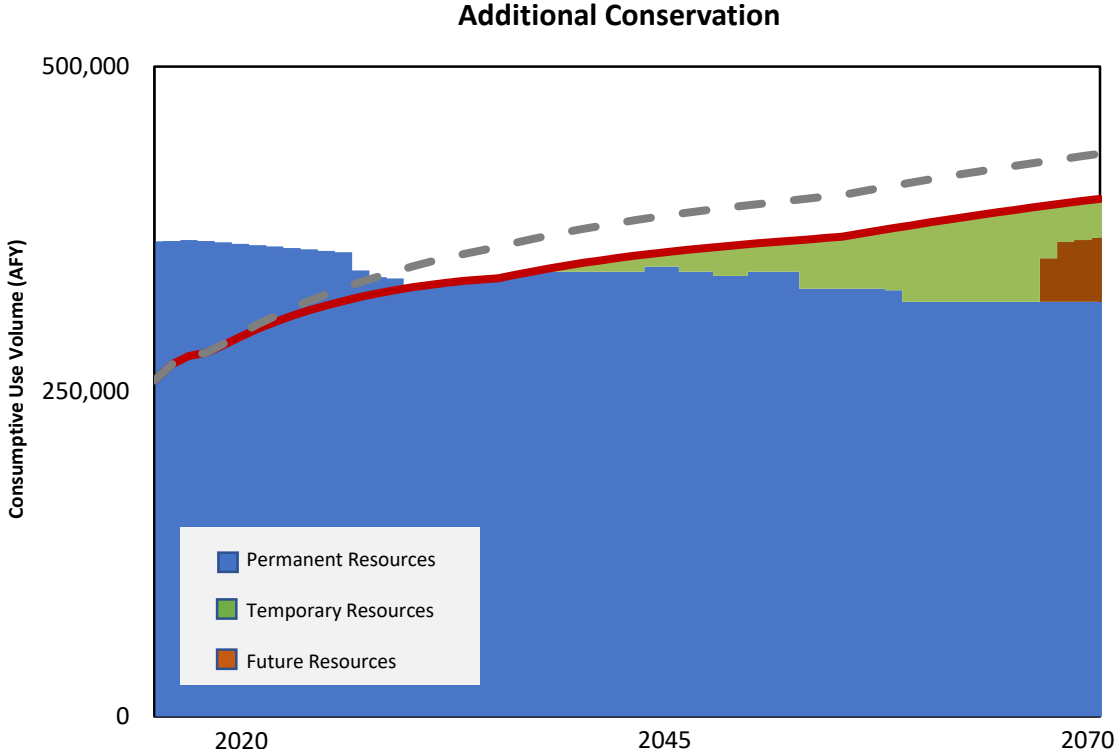
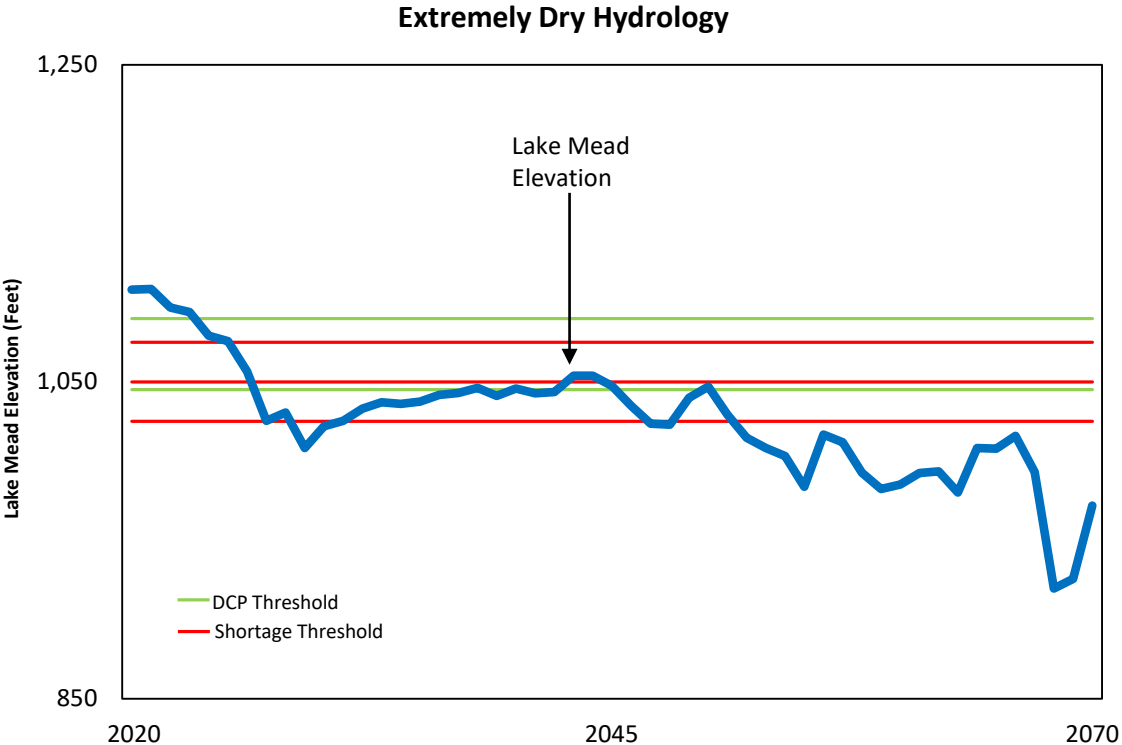
# EXTREMELY DRY HYDROLOGY

(13.7 Million AFY Natural Flow)



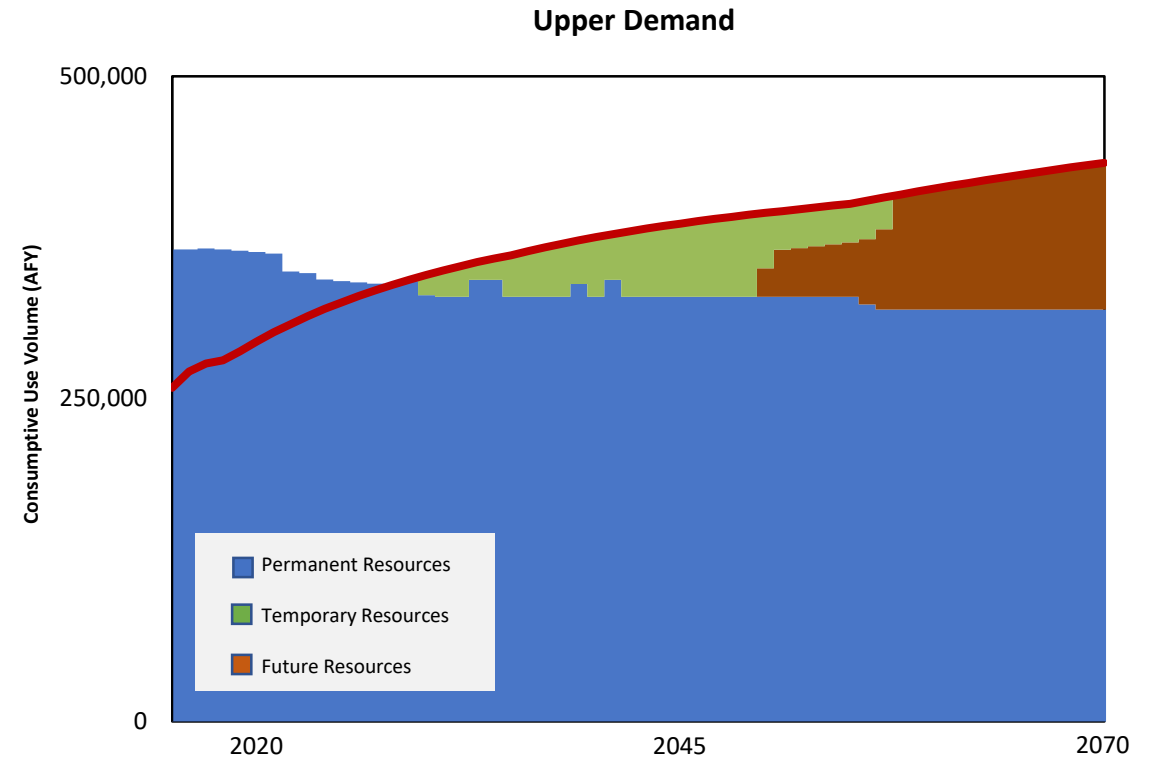
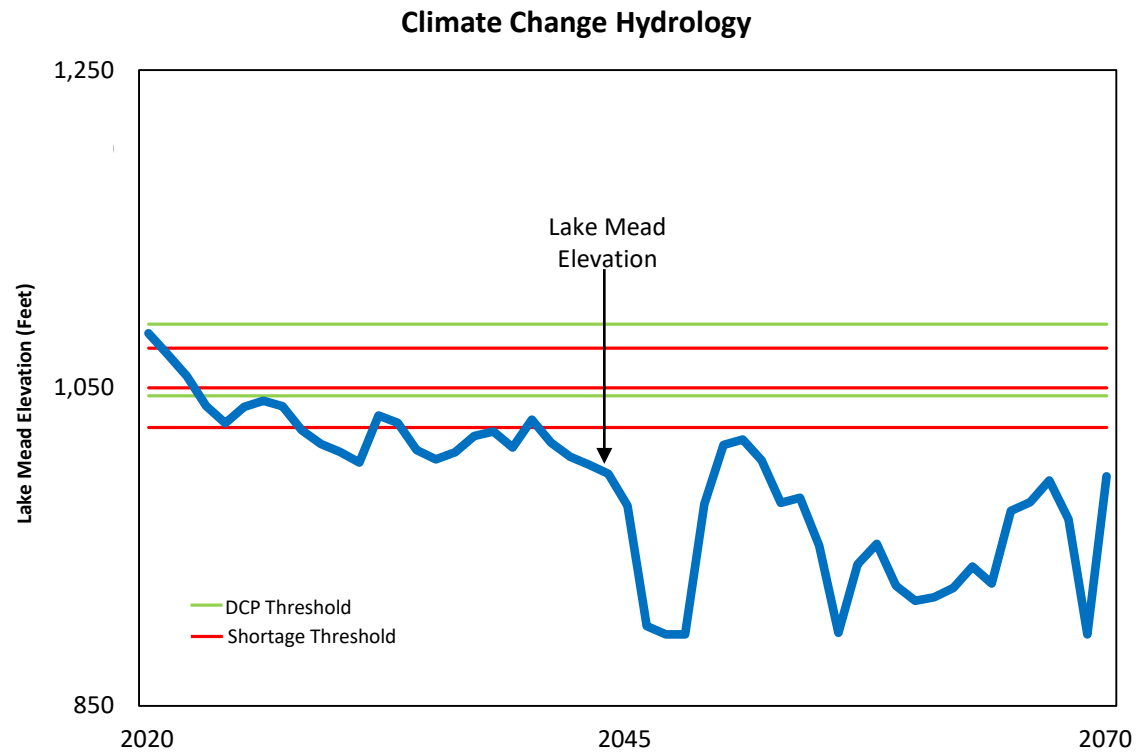
# EXTREMELY DRY HYDROLOGY

(13.7 Million AFY Natural Flow)



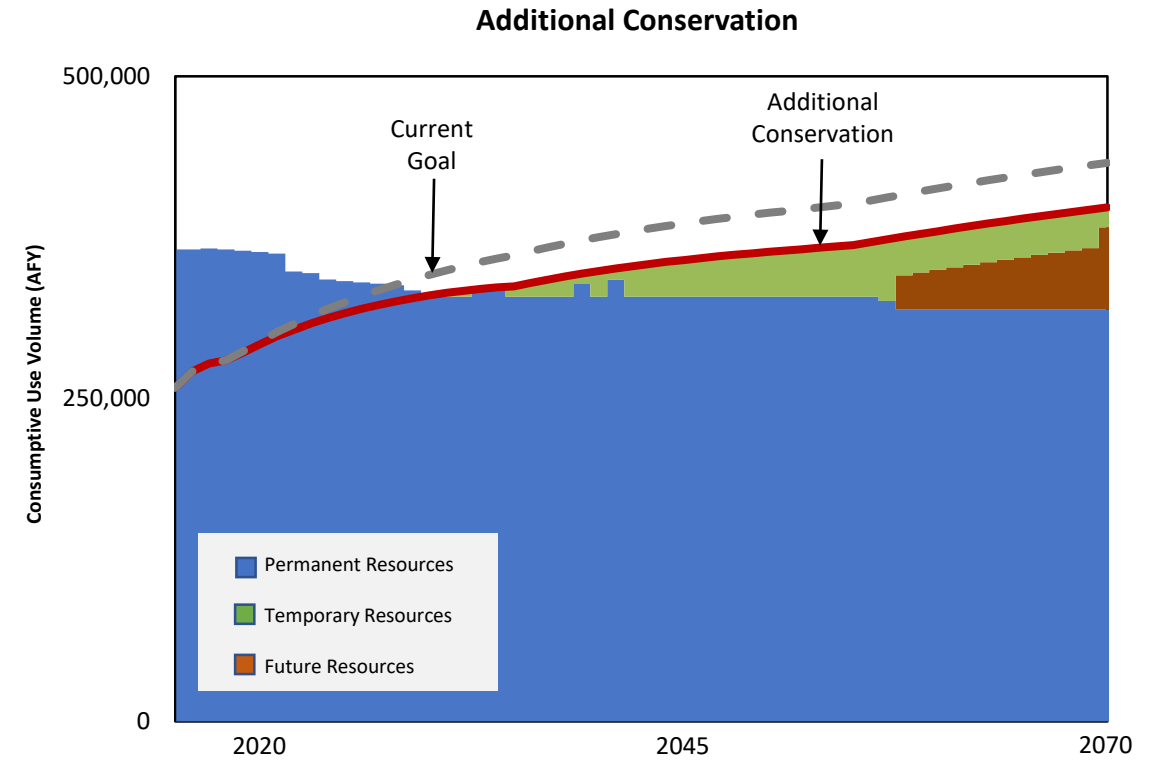
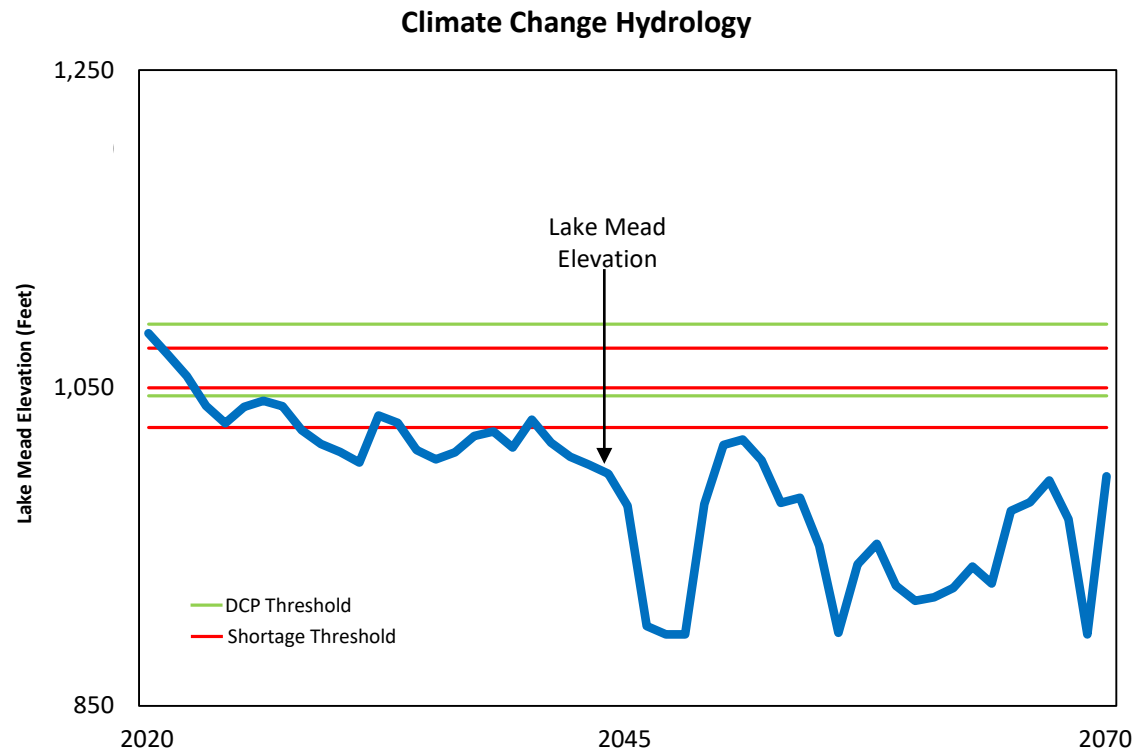
# CLIMATE CHANGE HYDROLOGY SCENARIO

(12.9 Million AFY Natural Flow)



# CLIMATE CHANGE HYDROLOGY SCENARIO

(12.9 Million AFY Natural Flow)



A photograph of a large stack of blue pipes, likely for water or wastewater treatment, with a blue overlay and white text. The pipes are stacked in a way that creates a sense of depth, with some pipes in the foreground and others receding into the background. The text is centered and reads: 

# **NEW RESOURCE SUPPLIES FOR INCLUSION WITHIN THE MCCP**



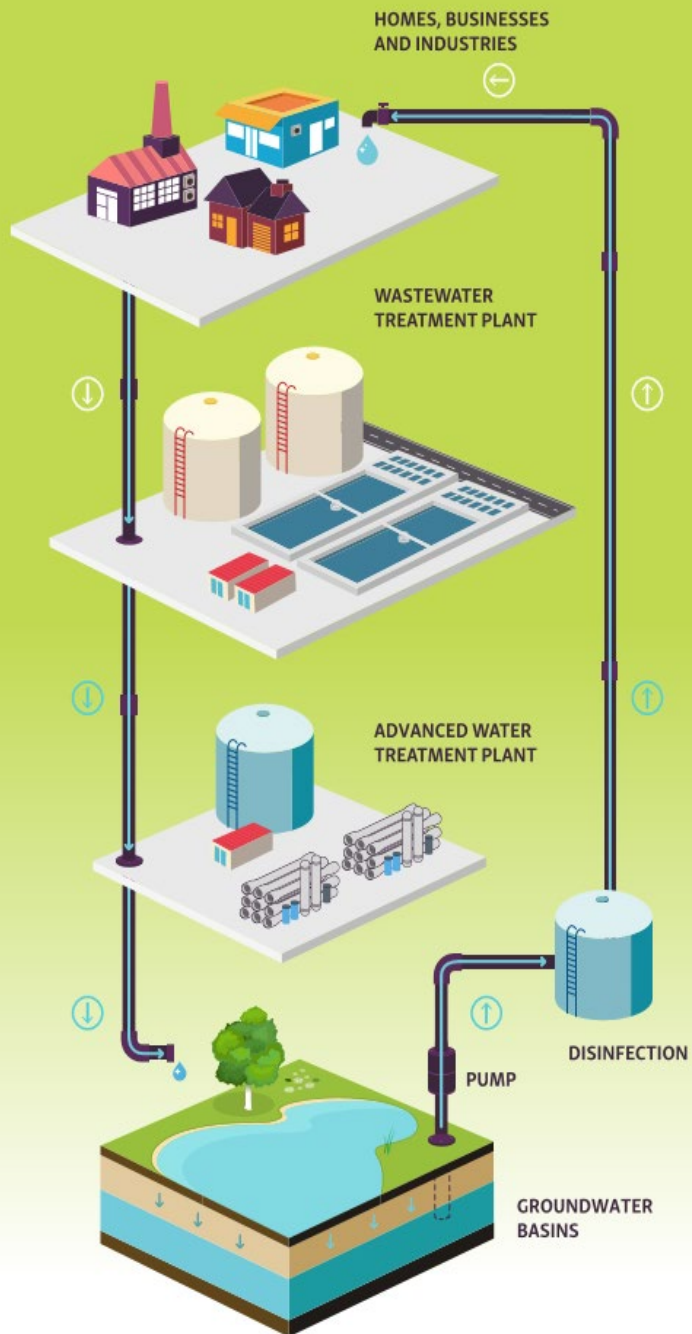
# COMMITTEE CONSIDERATIONS

The SNWA has been successful working with Colorado River Basin partners to flexibly manage Colorado River resources.

- Future projects take time to evaluate, negotiate, fund and construct
- The SNWA must be prepared to take action when an opportunity becomes available
- The M CCP amendment includes \$587.7 million to fund these projects with a contingency amount if they become available

A large stack of blue pipes, likely for water infrastructure, is shown from a low angle looking down the length of the stack. The pipes are stacked in a way that creates a strong sense of perspective, leading the eye towards the background. A semi-transparent blue overlay covers the entire image, and white text is centered over it. The text reads "METROPOLITAN'S REGIONAL RECYCLED WATER PROGRAM".

# METROPOLITAN'S REGIONAL RECYCLED WATER PROGRAM



# MWD REGIONAL RECYCLED WATER PROGRAM

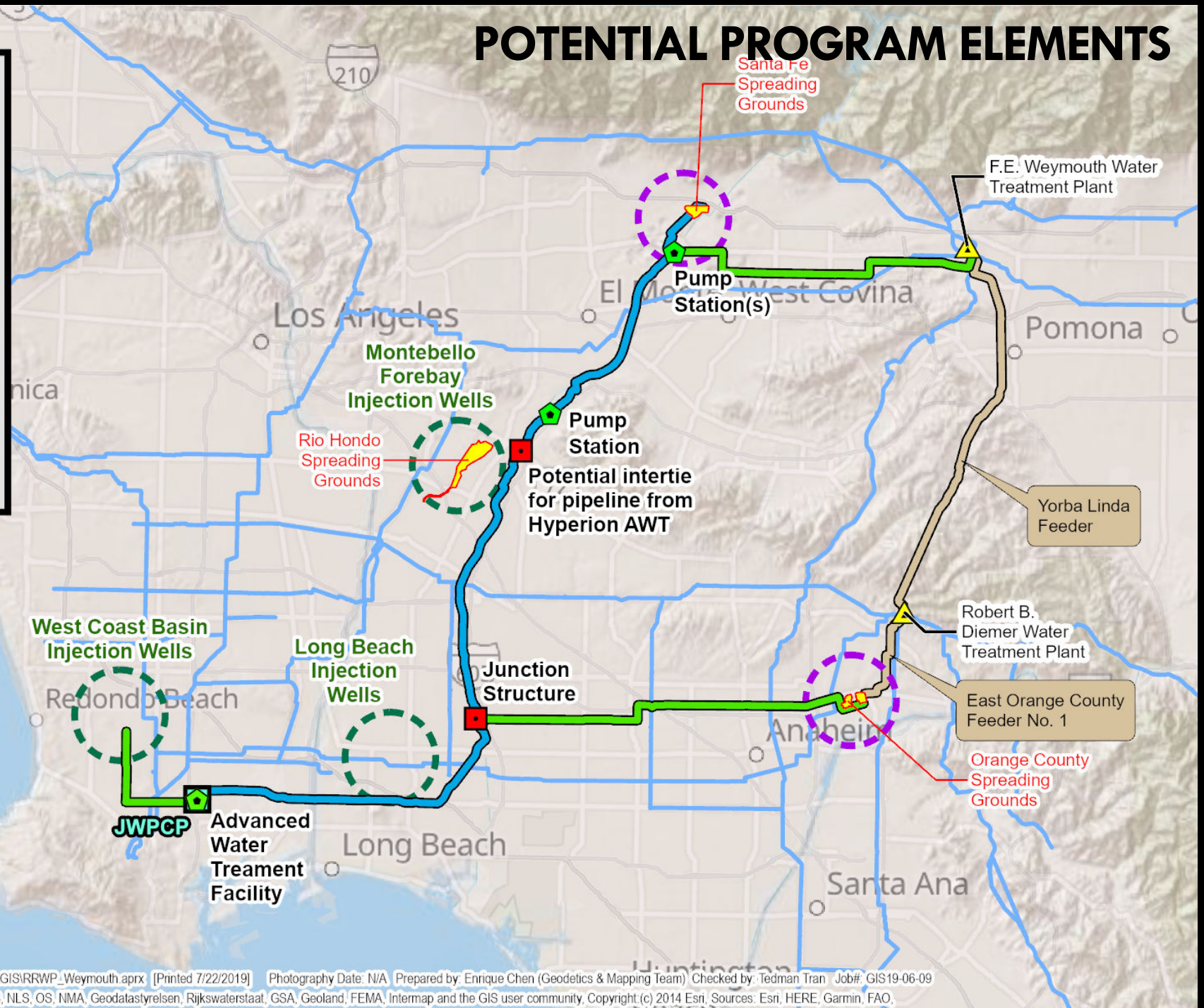
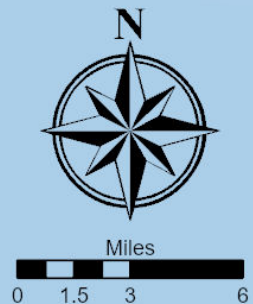
- Collaboration between Metropolitan Water District of Southern California (MWD) and Los Angeles County Sanitation Districts
- Used water from customers would flow to wastewater treatment plants, and then again to a more advanced water treatment plant. From there, it would be injected into groundwater wells for future use.

Total Project Cost: \$3.4 billion to construct



# POTENTIAL PROGRAM ELEMENTS

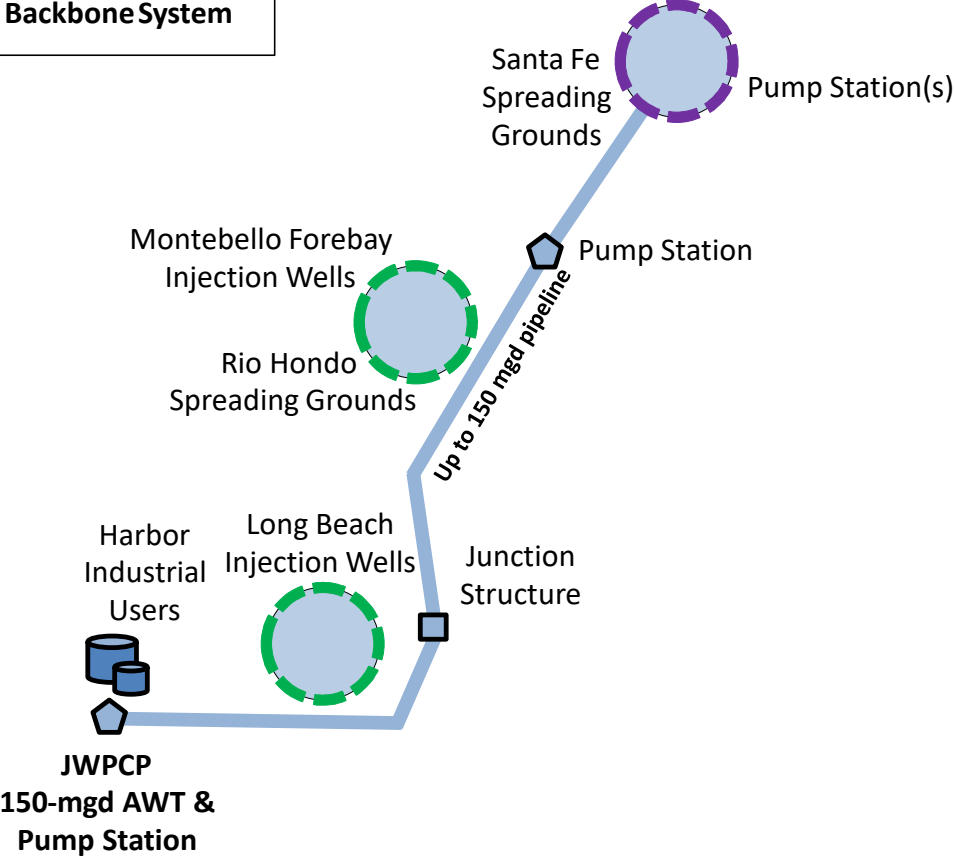
- Junction Structure
- Pump Stations
- Spreading Grounds
- Spreading
- Injection Wells
- Backbone System
- Future Options
- Existing Mainlines
- Other MWD Mainlines



# MWD REGIONAL RECYCLED WATER PROGRAM

(Phase 1 – backbone)

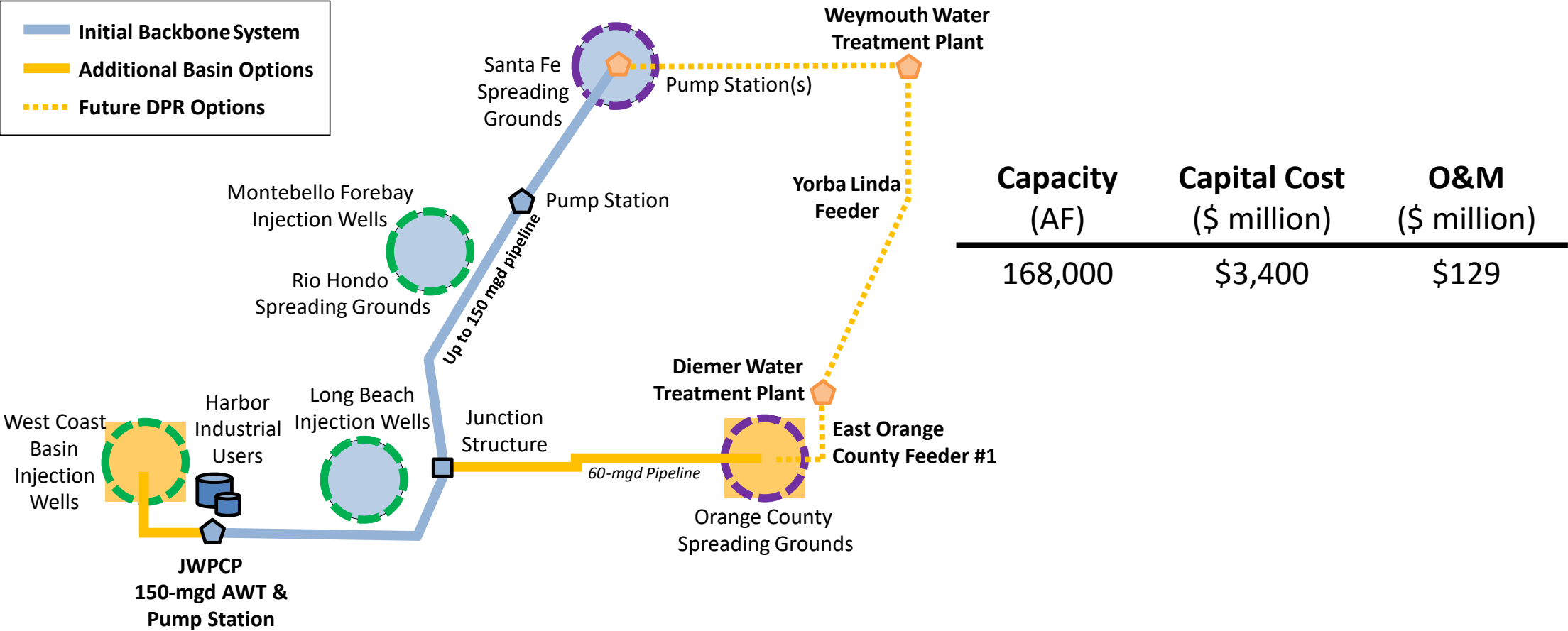
Initial Backbone System



Capacity (AF)	Capital Cost (\$ million)	O&M (\$ million)
112,000	\$2,600	\$69

# MWD REGIONAL RECYCLED WATER PROGRAM

(complete program)





# MWD REGIONAL RECYCLED WATER PROGRAM



- SNWA may have the opportunity to participate in the program.
- SNWA would access those resources from Lake Mead through an exchange with Metropolitan.

The background of the slide is a photograph of numerous large, blue, cylindrical pipes stacked in rows. The pipes are arranged in a way that creates a strong sense of perspective, leading the eye towards the center of the image. A semi-transparent blue overlay is applied to the entire photograph, which serves as a backdrop for the title text.

# YUMA DESALTING PLANT

# YUMA DESALTING PLANT

FINAL

## YUMA DESALTING PLANT (YDP) LONG-TERM OPERATIONAL ALTERNATIVE SUMMARY REPORT



August 2013

Jointly Authorized By  
Central Arizona Water Conservation District  
Metropolitan Water District of Southern California  
Southern Nevada Water Authority

Colorado River Water Consultants  
4040 South Eastern Avenue, Suite 330  
Las Vegas, NV 89119 USA  
Tel: (702) 732-0448

PROJECT NO. 177459

- Several sources and treatment options were evaluated
- Volume and flow would have to be agreed upon by the Lower Basin States and Mexico

Capacity (AF)	Capital Cost (\$ million)	O&M (\$ million)
30,000	\$146-\$281	\$18-\$22



# YUMA DESALTING PLANT



- SNWA may have the opportunity to participate in the program.
- SNWA would access those resources from Lake Mead, likely as ICS.

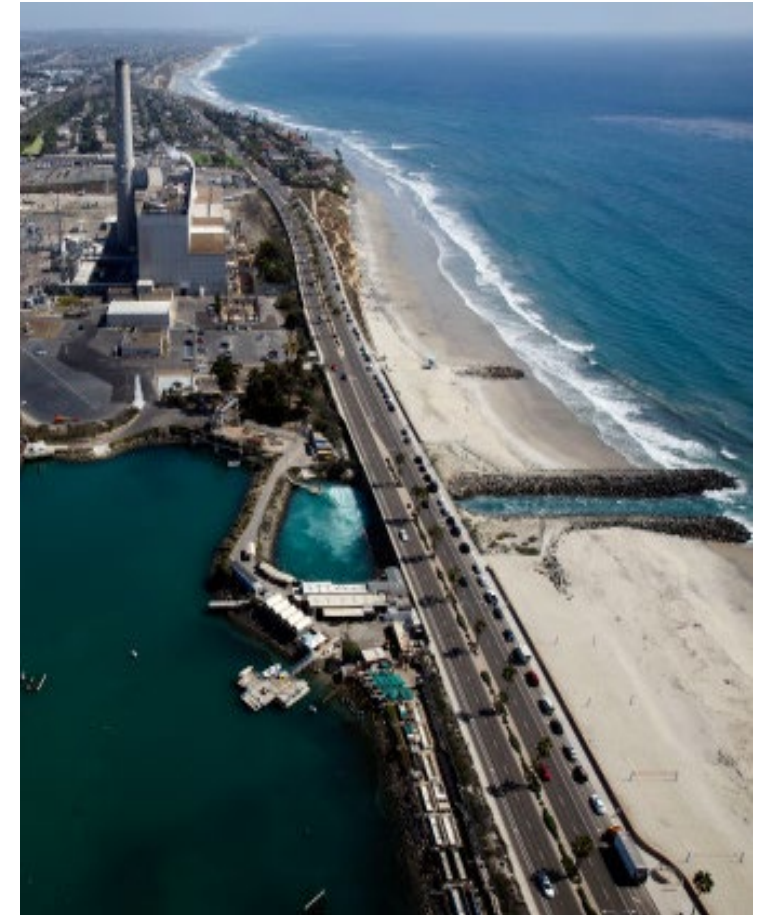


# CARLSBAD DESALINATION PLANT

# DESALINATION EXAMPLE: CARLSBAD DESALINATION PLANT

- Permitting began in 1998, construction completed in 2015
- Produces approximately 56,000 AFY
- Meets 10% of San Diego County's water demand

Capacity (AF)	Capital Cost (\$ million)	O&M (\$ million)
56,000	\$843	\$54-\$58





A photograph of large blue pipes stacked in a yard, with a blue overlay and the text 'RESOURCE IMPACTS'. The pipes are stacked in rows, and the text is centered in the middle of the image.

# RESOURCE IMPACTS

# DEMAND-SUPPLY SCENARIOS SUMMARY

## *Timing of Future Resources*

Hydrology	Lower Demand	Upper Demand	Upper Demand Additional Conservation
Average	Outside Planning Horizon	2062	Outside Planning Horizon
Dry	Outside Planning Horizon	2061	Outside Planning Horizon
Extremely Dry	Outside Planning Horizon	2058	2067
Climate Change	Outside Planning Horizon	2050	2058

# IMPACTS OF NEW SUPPLIES TO RESOURCE PLANNING

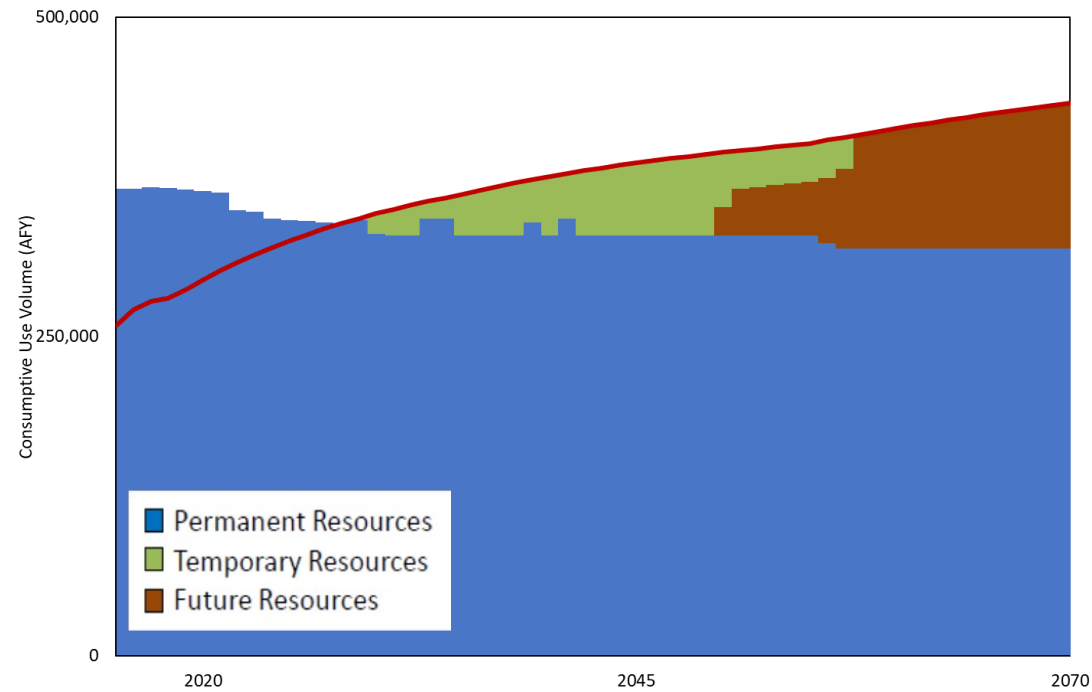
## HYDROLOGY SCENARIO: Climate Change with Upper Demand

Additional Volume	Scenario	Timing of Future Resources
BASECASE (2019 Water Resource Plan)	-	2050
+20,000 AFY	Resources online in 2039	2052
+20,000 AFY	Resources online in 2029	2056
+25,000 AFY	Resources online in 2039	2056
+25,000 AFY	Resources online in 2029	2057

# CLIMATE CHANGE HYDROLOGY SCENARIO W/UPPER DEMAND

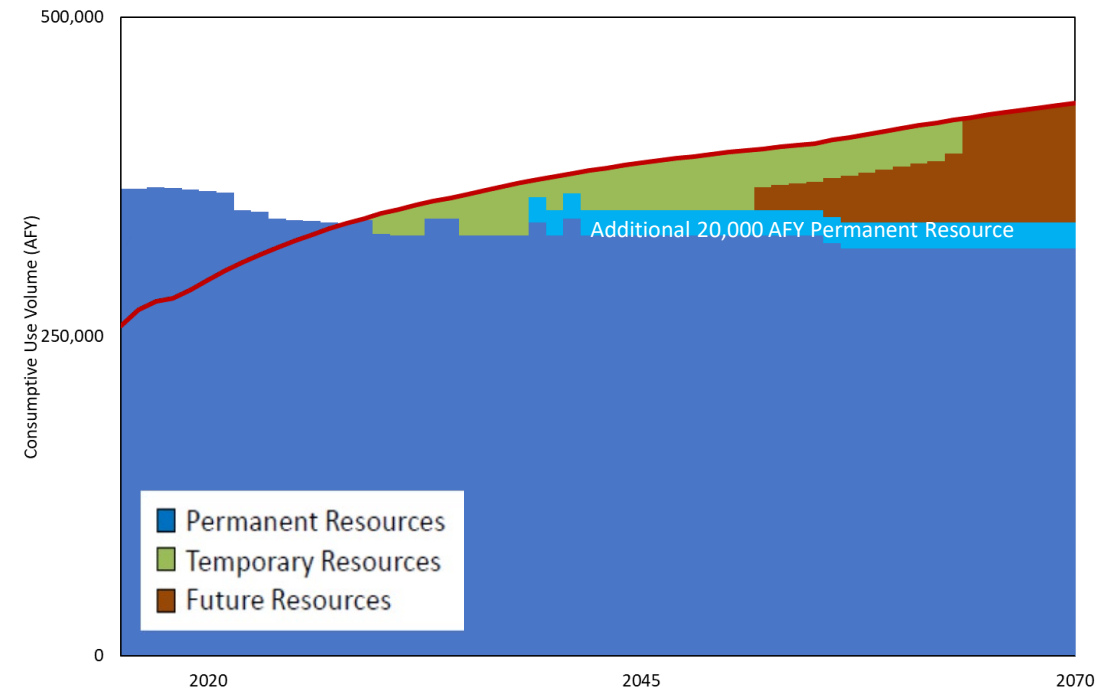
## Additional 20,000 AFY, online in 2039

Upper Demand – 2019 Resource Plan



**Future Resources needed in 2050**

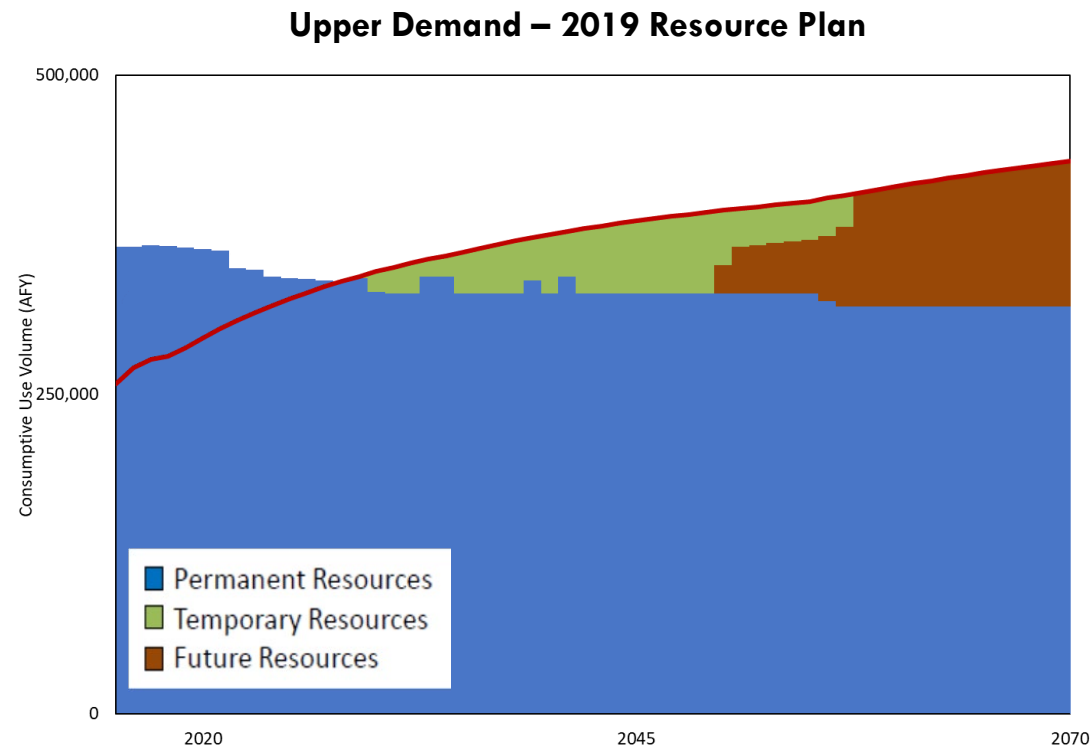
Upper Demand – 2019 Resource Plan w/additional Resource



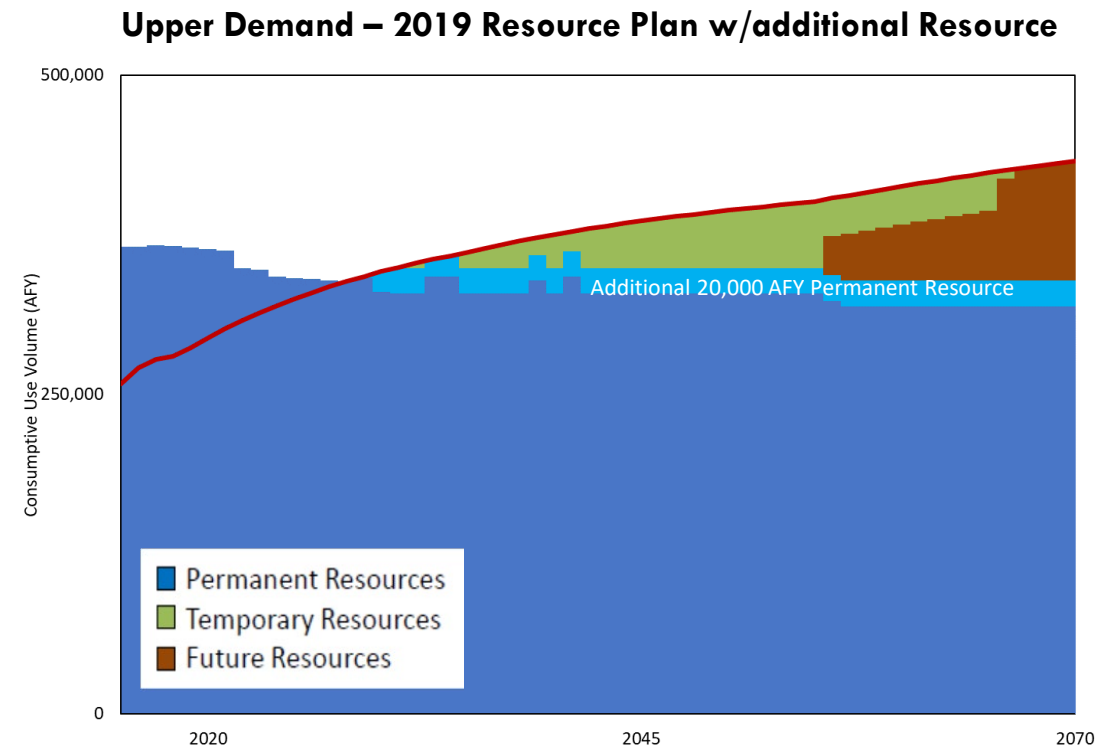
**Future Resources needed in 2052**

# CLIMATE CHANGE HYDROLOGY SCENARIO W/UPPER DEMAND

## Additional 20,000 AFY, online in 2029



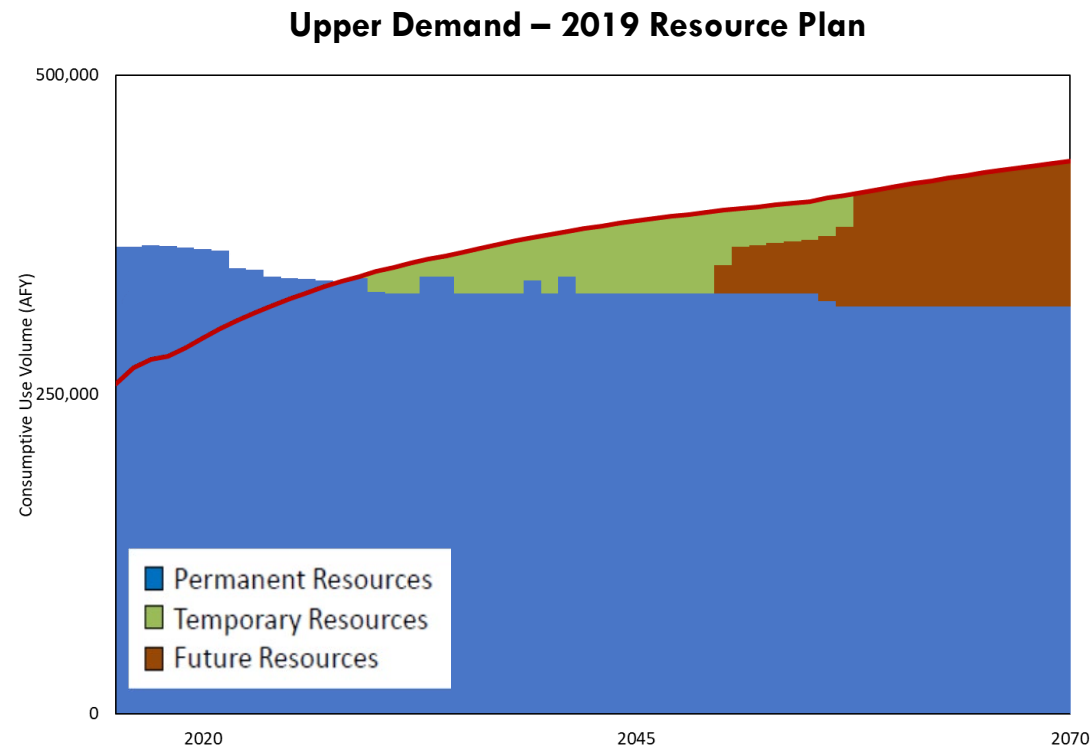
**Future Resources needed in 2050**



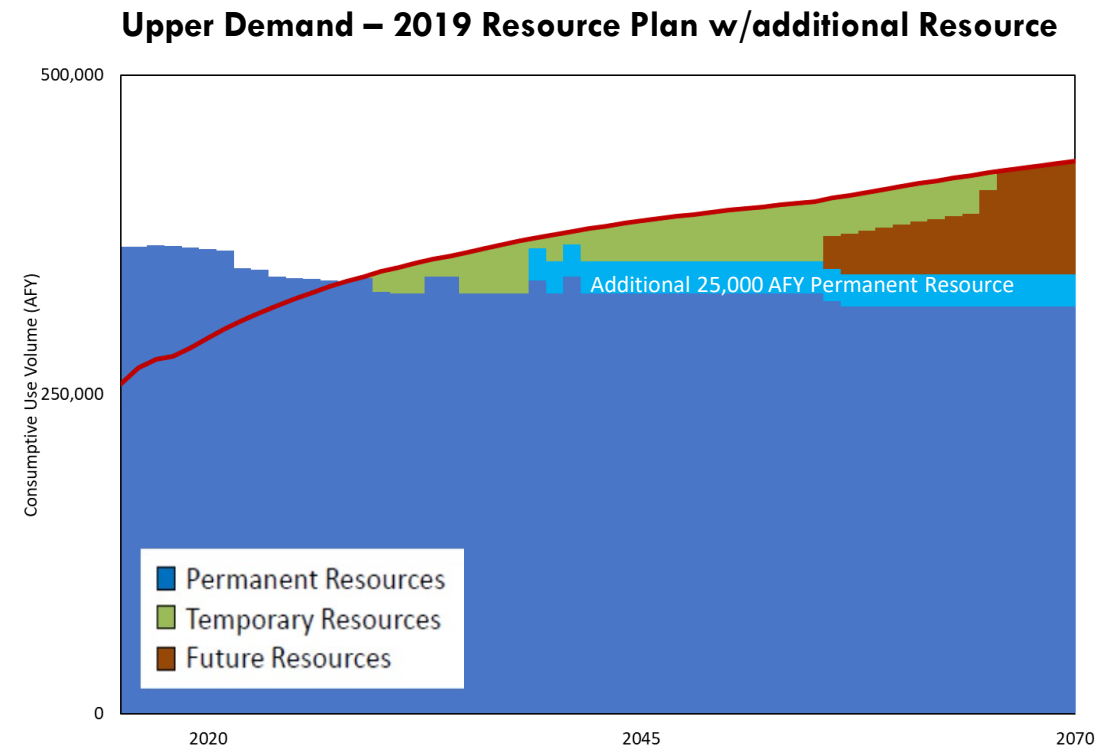
**Future Resources needed in 2056**

# CLIMATE CHANGE HYDROLOGY SCENARIO W/UPPER DEMAND

## Additional 25,000 AFY, online in 2039



**Future Resources needed in 2050**

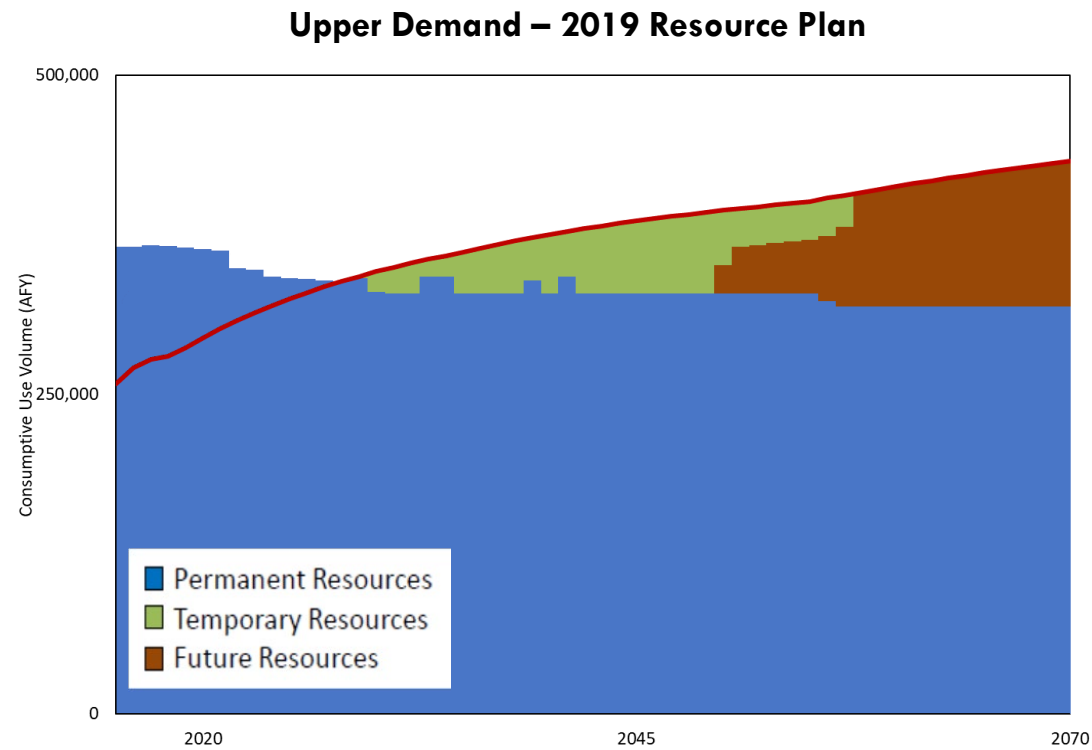


**Future Resources needed in 2056**

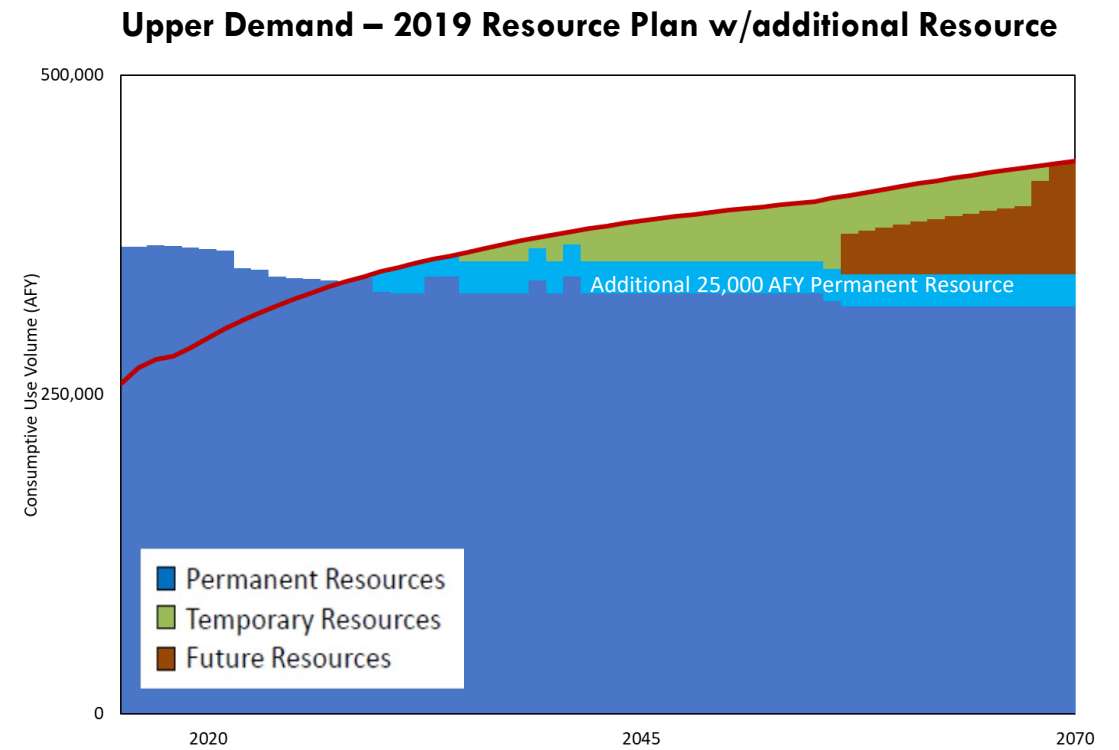


# CLIMATE CHANGE HYDROLOGY SCENARIO W/UPPER DEMAND

## Additional 25,000 AFY, online in 2029



**Future Resources needed in 2050**



**Future Resources needed in 2057**

# DEMAND-SUPPLY SCENARIOS SUMMARY

## *Timing of Future Resources*

Hydrology	Lower Demand	Upper Demand	Upper Demand Additional Conservation
Average	Outside Planning Horizon	2062	Outside Planning Horizon
Dry	Outside Planning Horizon	2061	Outside Planning Horizon
Extremely Dry	Outside Planning Horizon	2058	2067
Climate Change	Outside Planning Horizon	2050	2058

# IMPACTS OF NEW SUPPLIES TO RESOURCE PLANNING

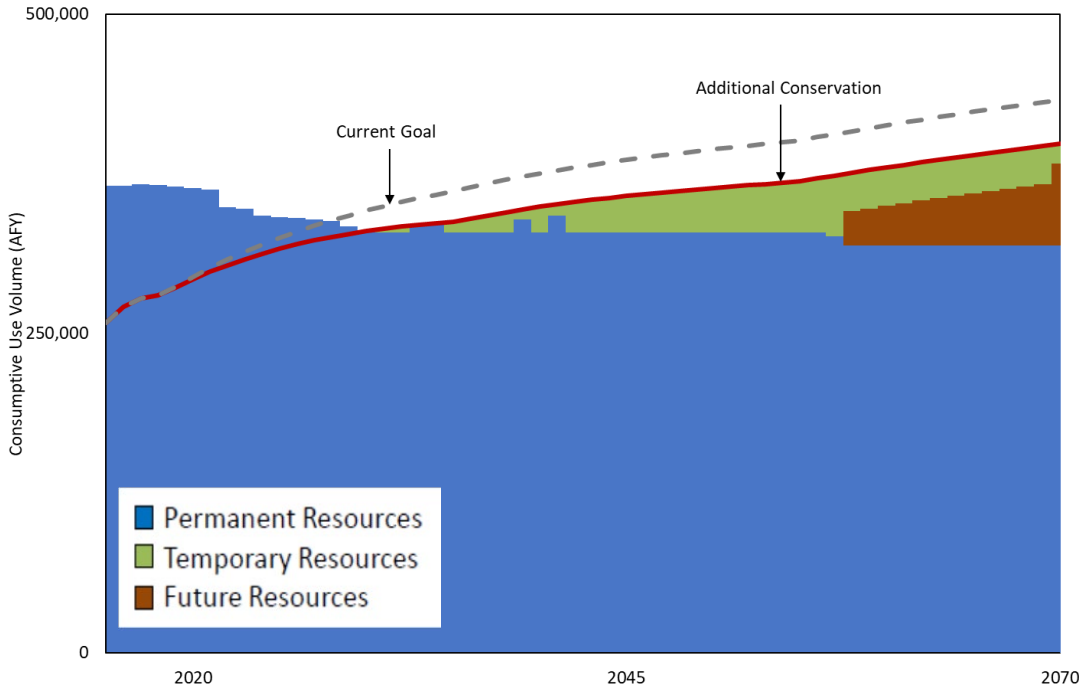
## HYDROLOGY SCENARIO: Climate Change with Upper Demand *and additional conservation*

Additional Volume	Scenario	Timing of Future Resources
BASECASE (2019 Water Resource Plan)	-	2058
+20,000 AFY	Resources online in 2039	2067
+20,000 AFY	Resources online in 2029	2068
+25,000 AFY	Resources online in 2039	2069
+25,000 AFY	Resources online in 2029	Outside of planning horizon

**CLIMATE CHANGE HYDROLOGY SCENARIO W/UPPER DEMAND & ADD'L CONSERVATION**

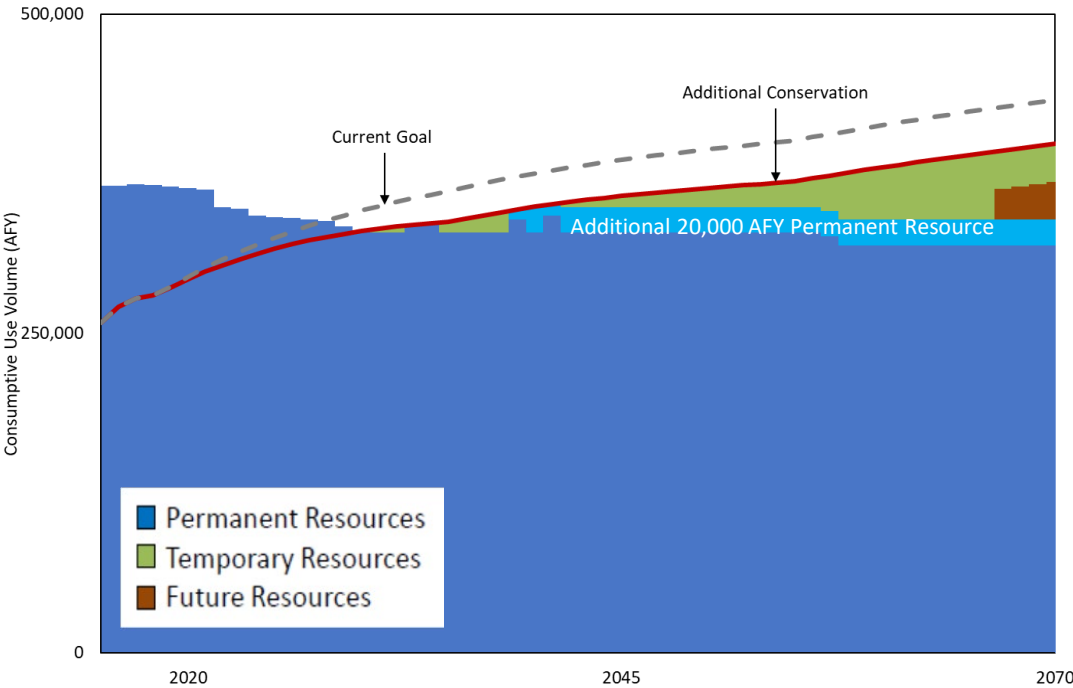
**Additional 20,000 AFY, online in 2039**

**Upper Demand & Add'l Conservation – 2019 Resource Plan**



**Future Resources needed in 2058**

**Upper Demand – 2019 Resource Plan w/additional Resource**

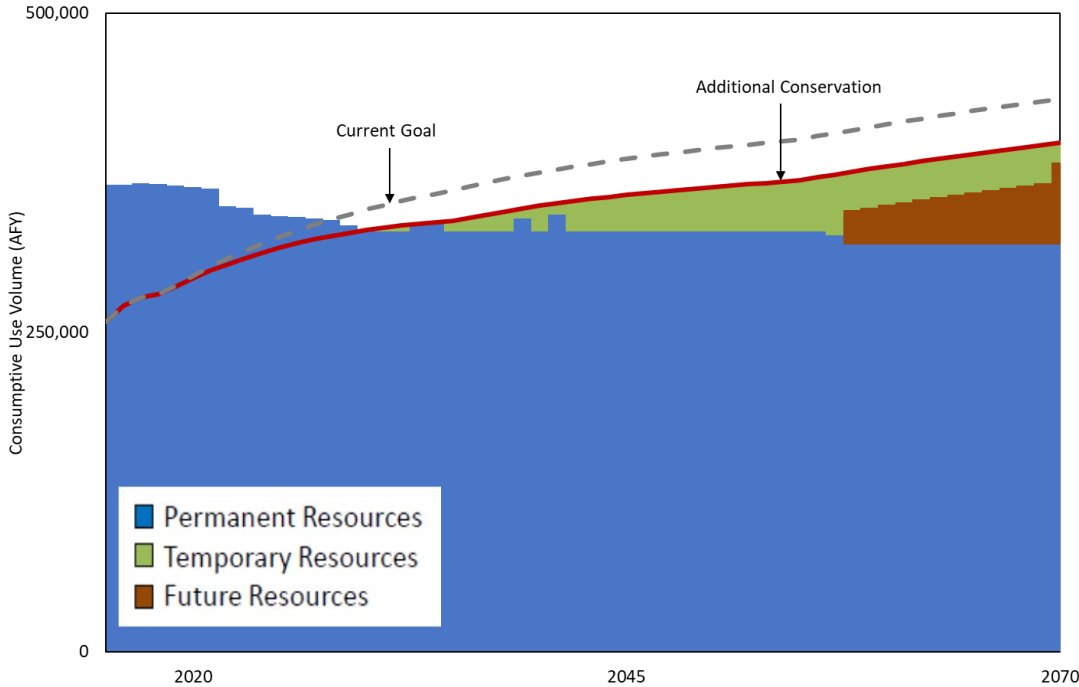


**Future Resources needed in 2067**

# CLIMATE CHANGE HYDROLOGY SCENARIO W/UPPER DEMAND & ADD'L CONSERVATION

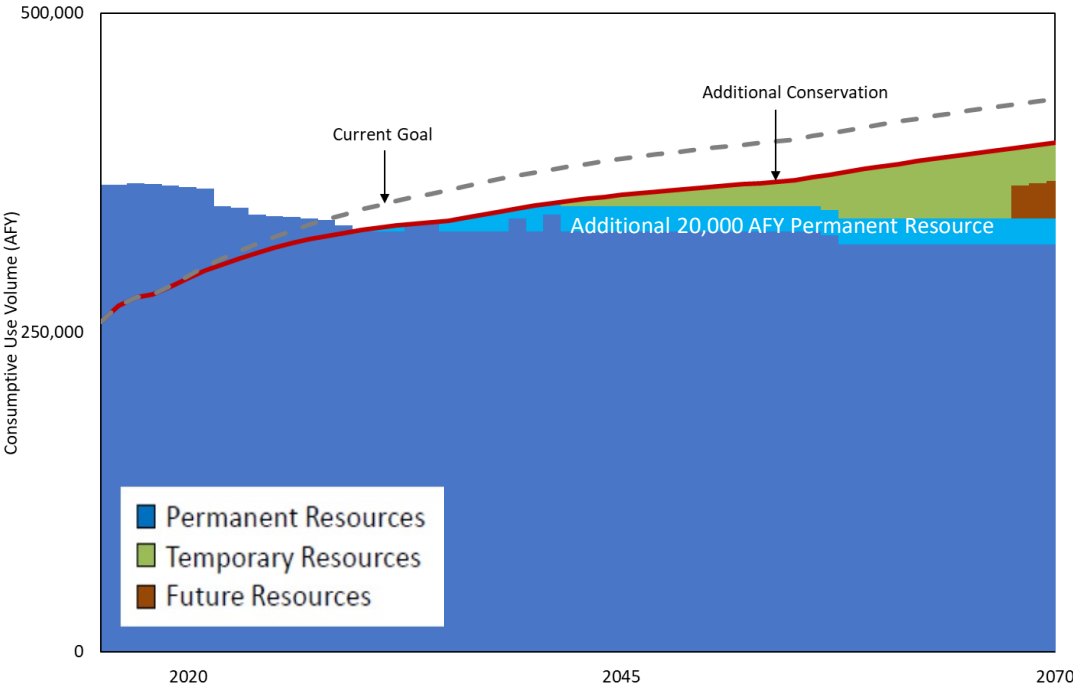
Additional 20,000 AFY, online in 2029

Upper Demand & Add'l Conservation – 2019 Resource Plan



Future Resources needed in 2058

Upper Demand – 2019 Resource Plan w/additional Resource

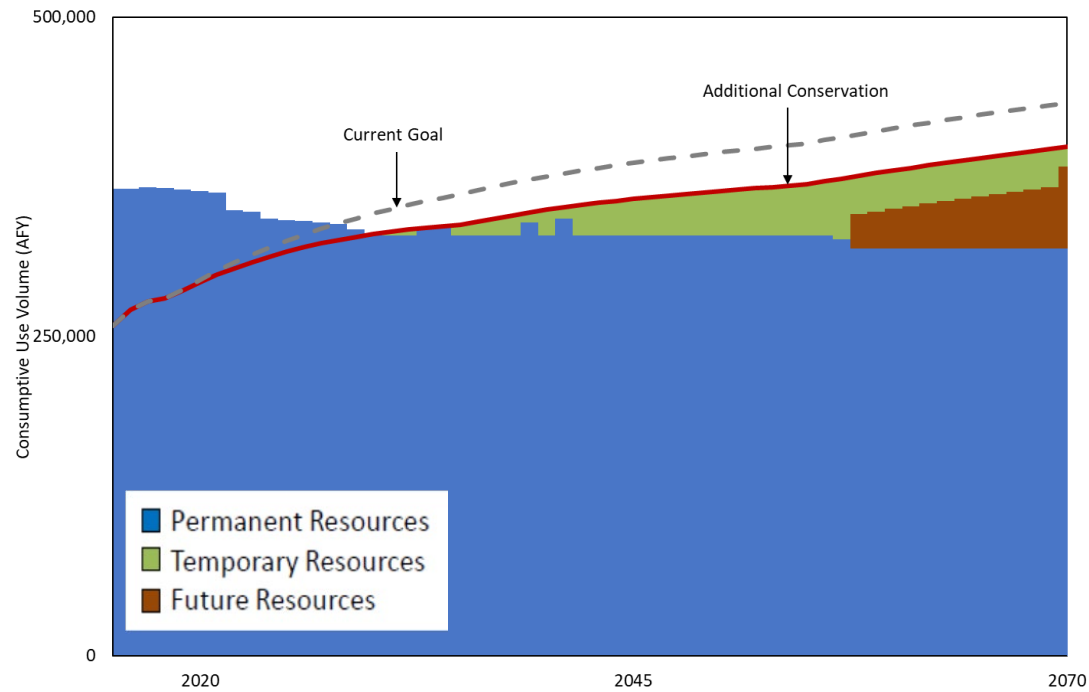


Future Resources needed in 2068

# CLIMATE CHANGE HYDROLOGY SCENARIO W/UPPER DEMAND & ADD'L CONSERVATION

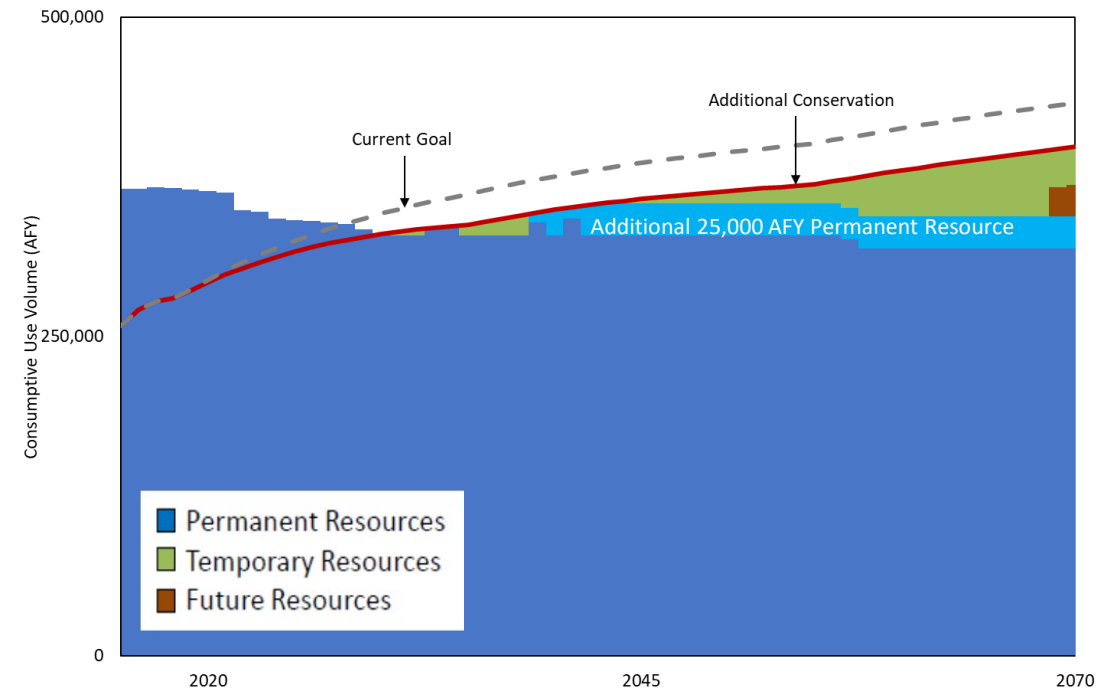
## Additional 25,000 AFY, online in 2039

Upper Demand & Add'l Conservation – 2019 Resource Plan



**Future Resources needed in 2058**

Upper Demand – 2019 Resource Plan w/additional Resource



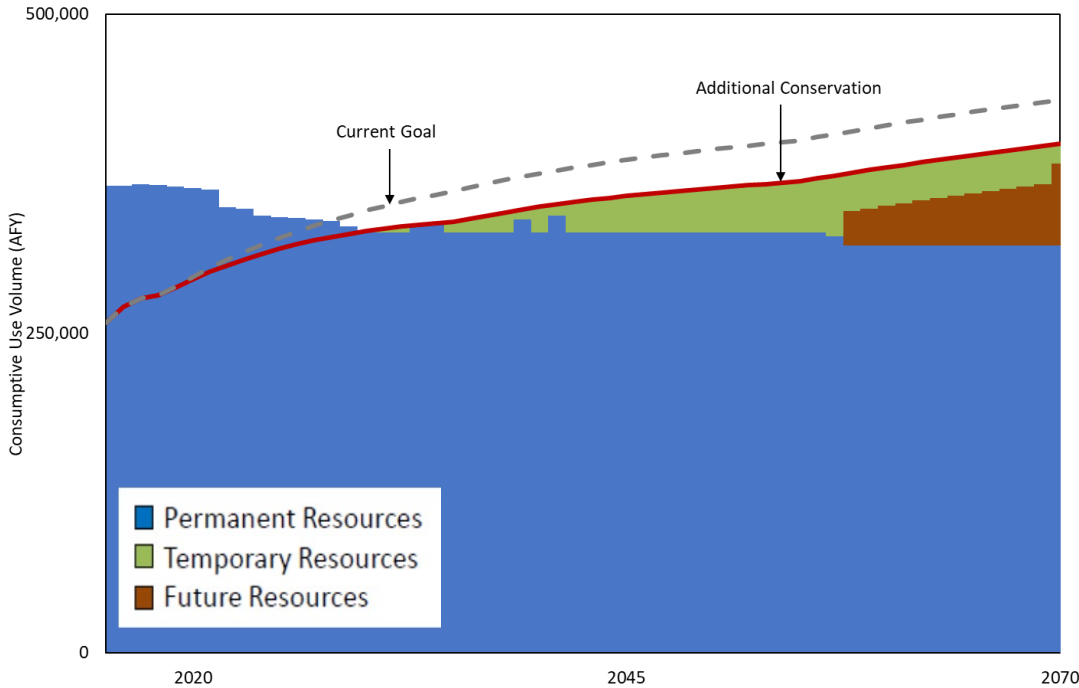
**Future Resources needed in 2069**



**CLIMATE CHANGE HYDROLOGY SCENARIO W/UPPER DEMAND & ADD'L CONSERVATION**

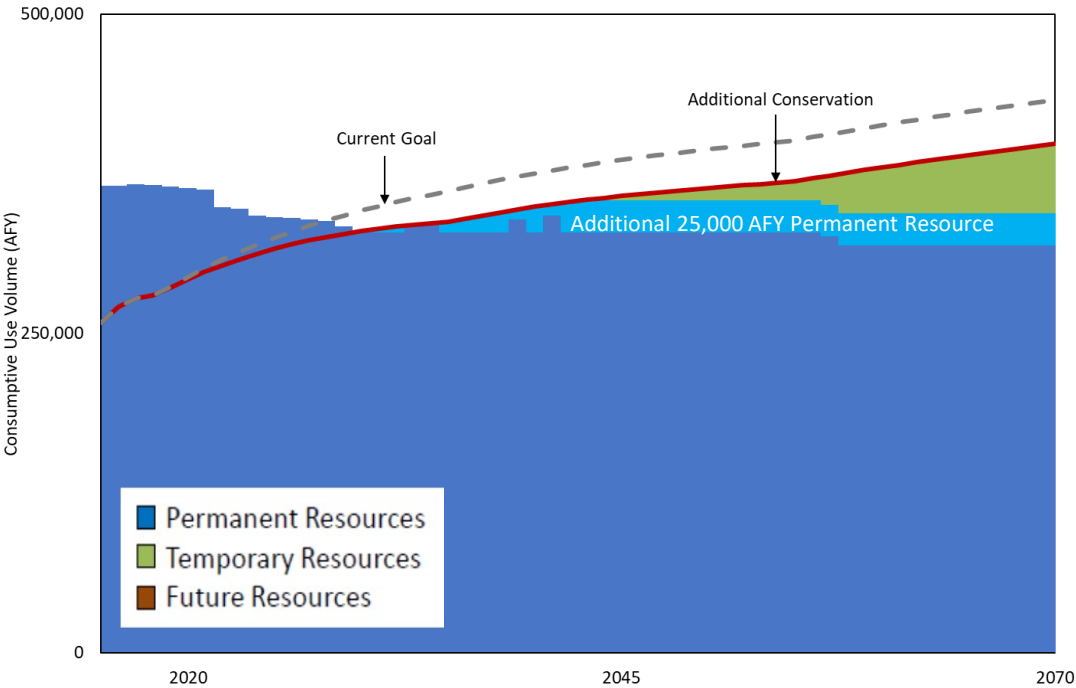
**Additional 25,000 AFY, online in 2029**

**Upper Demand & Add'l Conservation – 2019 Resource Plan**



**Future Resources needed in 2058**

**Upper Demand – 2019 Resource Plan w/additional Resource**



**Future Resources not needed**

## MCCP: Water Resources Capital

Future water supplies	\$587.7 million
Virgin and Muddy River	98.4 million
Minute 323	36.4 million
<u>Arizona Water Banking</u>	<u>5.5 million</u>
<b>Total Water Supplies</b>	<b>\$728.0 million</b>
<u>+ <i>Water Smart Landscaping</i></u>	<u>152.3 million</u>
	<b>\$880.3 million</b>
<u>+ Resources/Conservation Contingency</u>	<u>\$162.3 million</u>
<b>TOTAL MCCP RESOURCES</b>	<b>\$1.04 billion</b>

# Total SNWA Capital

Major Construction and Capital Plan	\$3,165.6 million
<i>Facilities</i>	\$2,123.0 million ✓
<i>Water Supplies</i>	728.0 million ✓
<i>Water Smart Landscaping</i>	152.3 million ○
<i>Resources/Conservation Contingency*</i>	162.3 million ○
Operating Capital	176.7 million ✓
Capital Equipment	50.0 million ✓
<u>Lower Las Vegas Wash</u>	<u>122.5 million ✓</u>
<b>TOTAL SNWA CAPITAL</b>	<b>\$3.51 billion</b>

\*Contingency includes funding needed for new water resources or new conservation projects

