

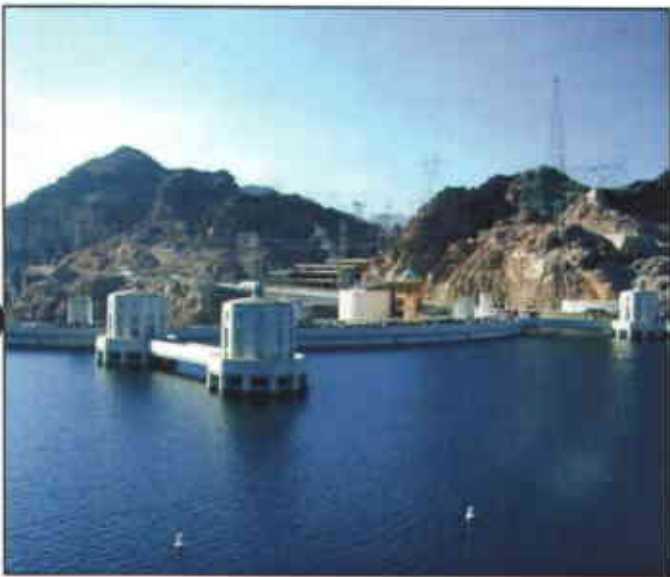
# Spring, Cave, Dry Lake and Delamar Valleys



Presentation for  
Holmes, Brothers and Entsminger Testimony  
September 26, 2011



SOUTHERN NEVADA  
WATER AUTHORITY

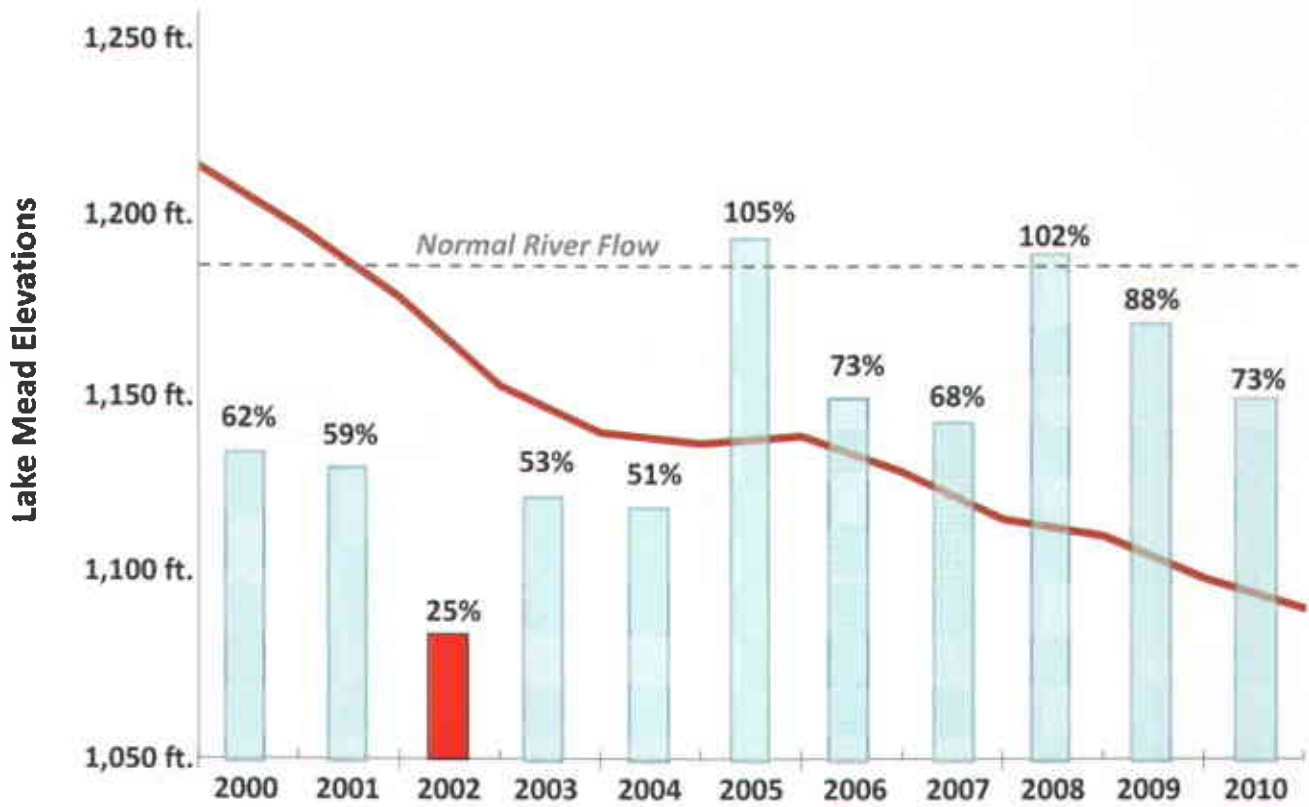


2000



2011

## Colorado River Annual Inflows and Lake Mead Water Elevations



**Table 1-1 Groundwater Rights and Applications  
Planned to be Conveyed through the GWD Project**

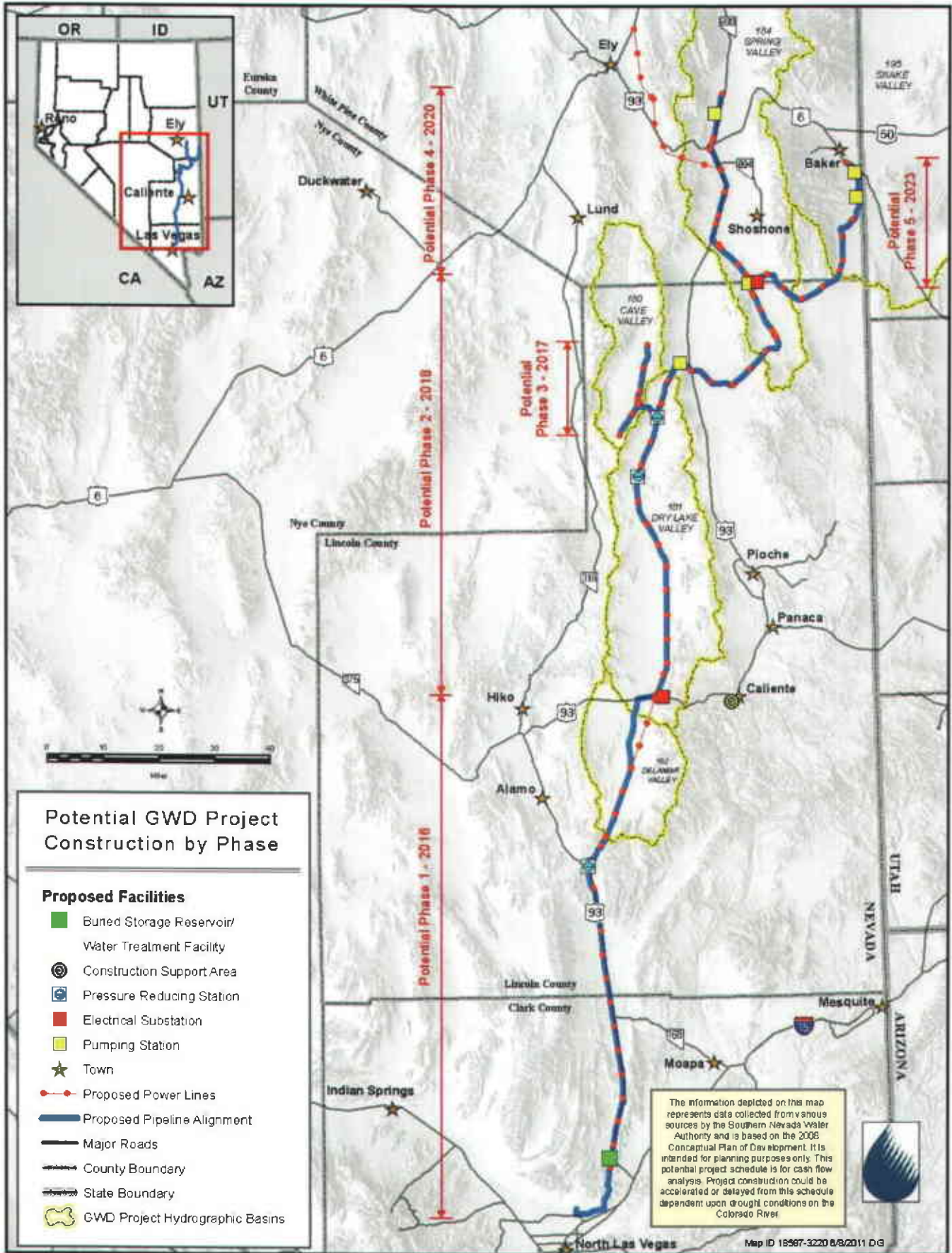
| <b>Hydrographic Basin</b>    | <b>Existing<br/>Groundwater Rights<br/>(afy)</b> | <b>Existing Agricultural<br/>Groundwater Rights<br/>(afy)</b> | <b>Groundwater<br/>Applications<br/>(afy)</b> |
|------------------------------|--|---|---|
| <b>SNWA</b>                  |  |   |   |
| Spring Valley                | 60,000   | 8,000   |   |
| Snake Valley                 |  |   | 50,679  |
| Cave Valley                  | 4,678  |   |   |
| Dry Lake Valley <sup>a</sup> | 10,084   |   |   |
| Delamar Valley <sup>a</sup>  | 993  |   |   |
| <b>Subtotal</b>              | <b>75,755</b>                                    | <b>8,000</b>  | <b>50,679</b>                                 |
| <b>Lincoln County</b>        |  |   |   |
| Dry Lake Valley <sup>a</sup> | 1,500  |   | 1,009 <sup>b</sup>                            |
| Delamar Valley <sup>a</sup>  | 1,500  |   |   |
| Lake Valley                  |  | 11,300  |   |
| to be determined             |  | approx. 20,700  |   |
| <b>Subtotal</b>              | <b>3,000</b>                                     | <b>approx. 33,000</b>   |   |
| <b>TOTAL</b>                 |  |   | <b>approx. 170,434</b>                        |

afy: acre-feet per year

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Figure 1 – GWD Project by Phase



## Colorado River Annual Inflows and Lake Mead Water Elevations

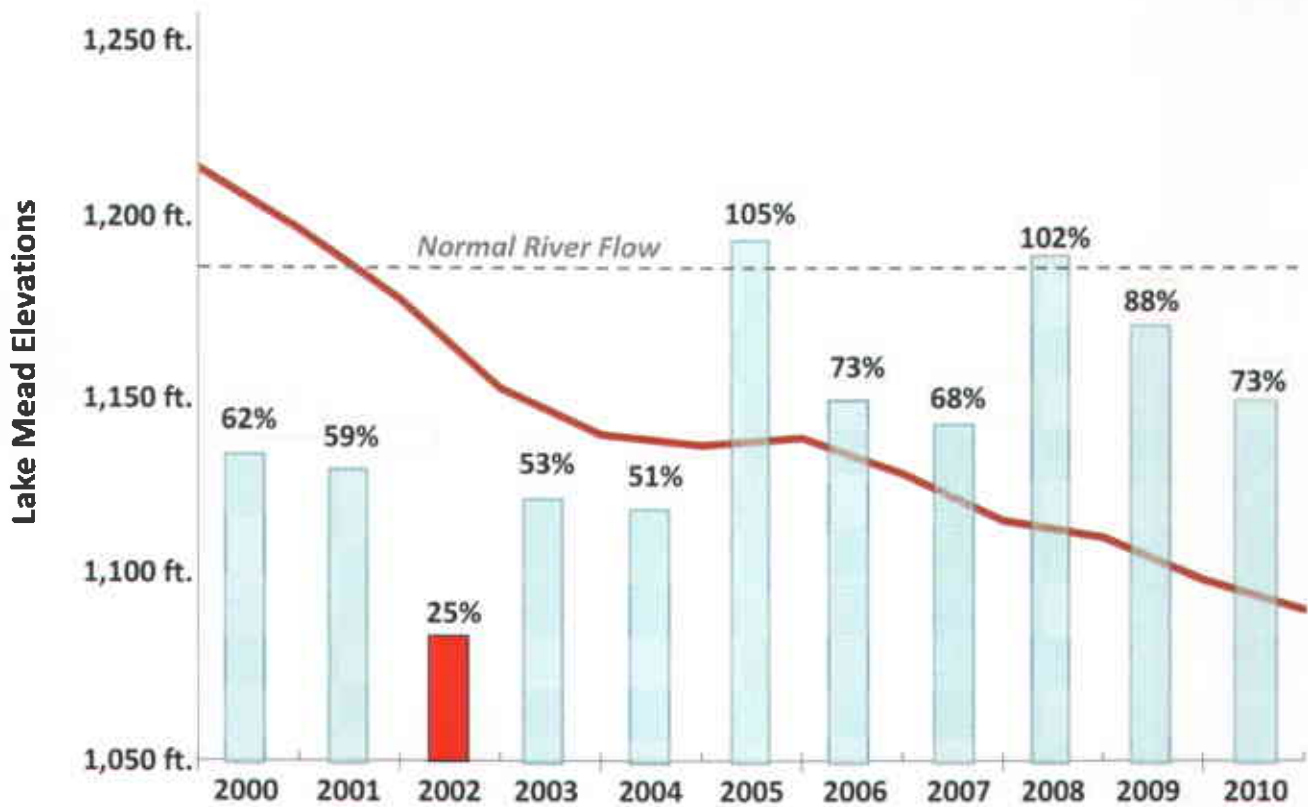


FIGURE 28 – Projected Water Demands and Future Resources (under normal Colorado River conditions)

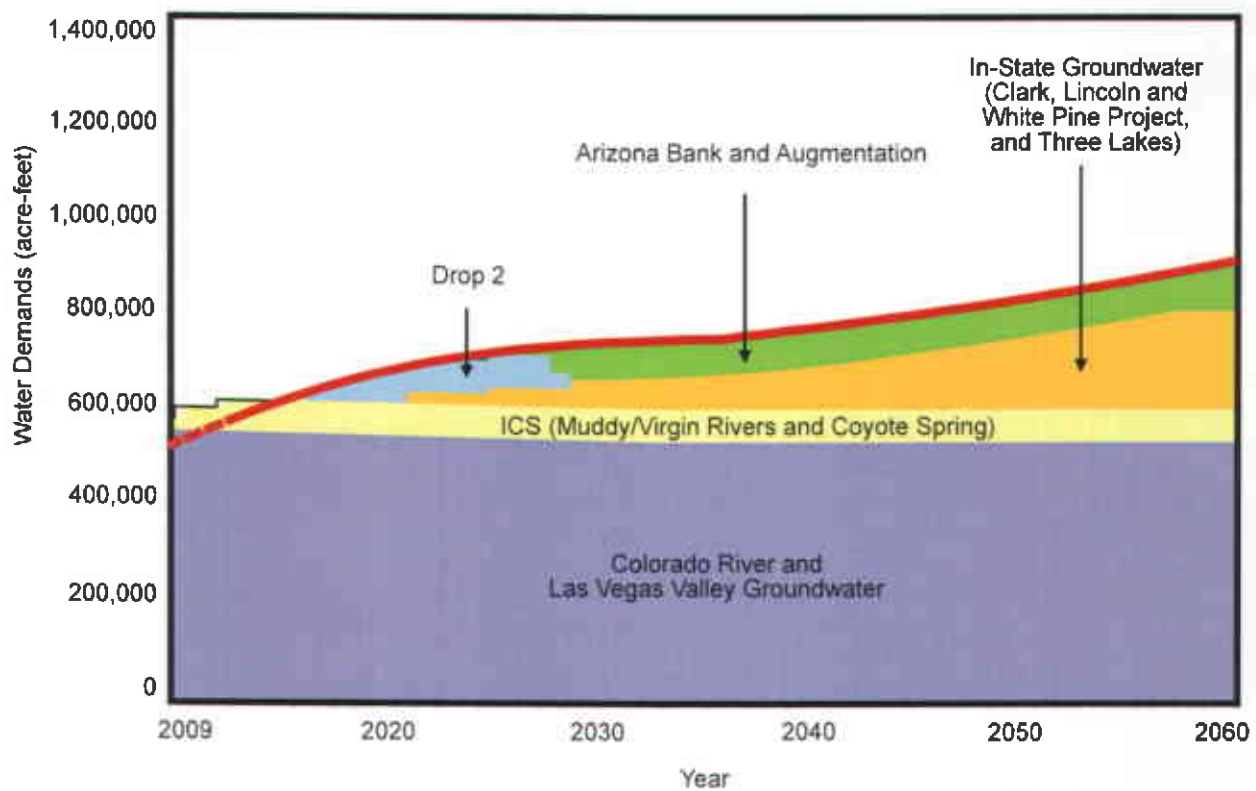
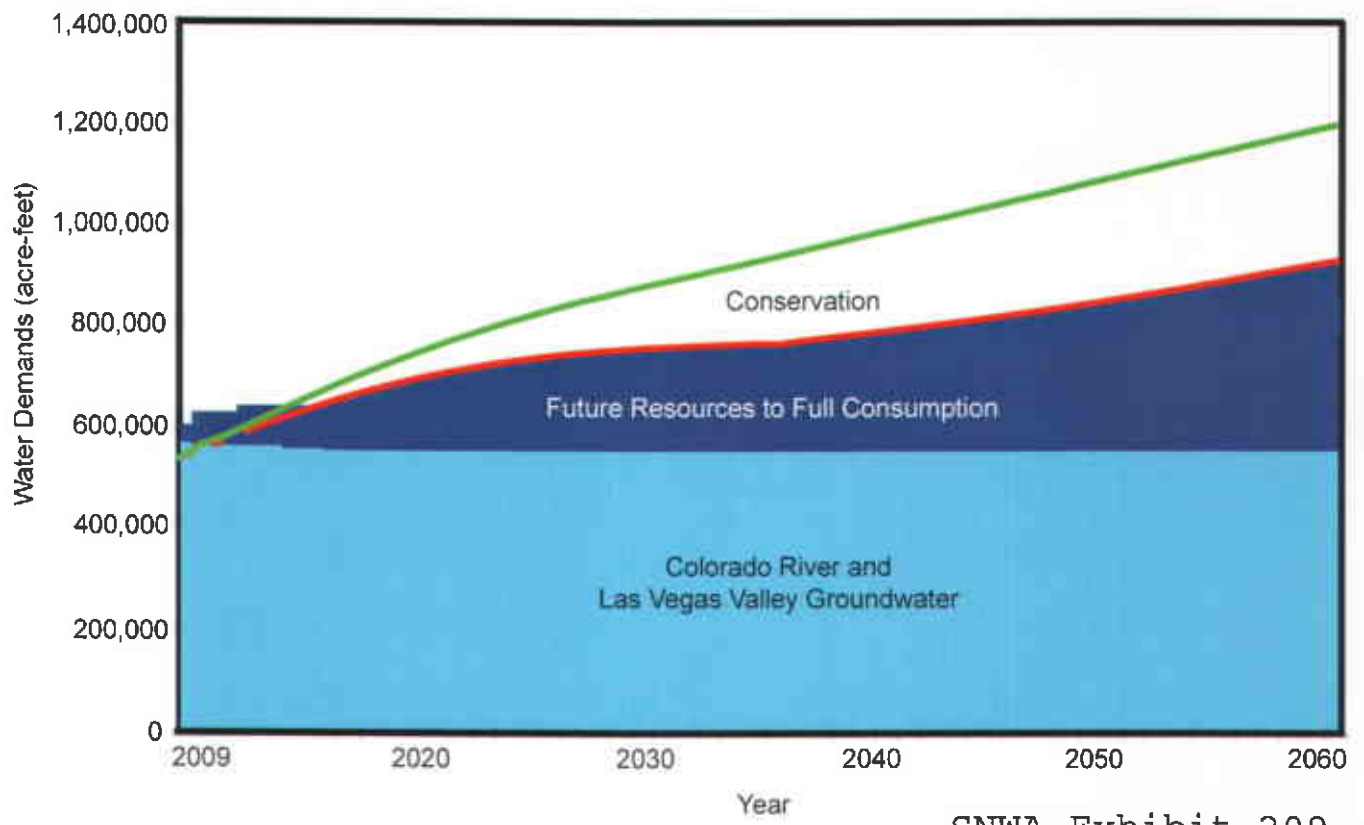




FIGURE 27 – Summary of Projected Water Demands and Water Resources



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FIGURE 24 – Summary of SNWA Water Demands and Conservation

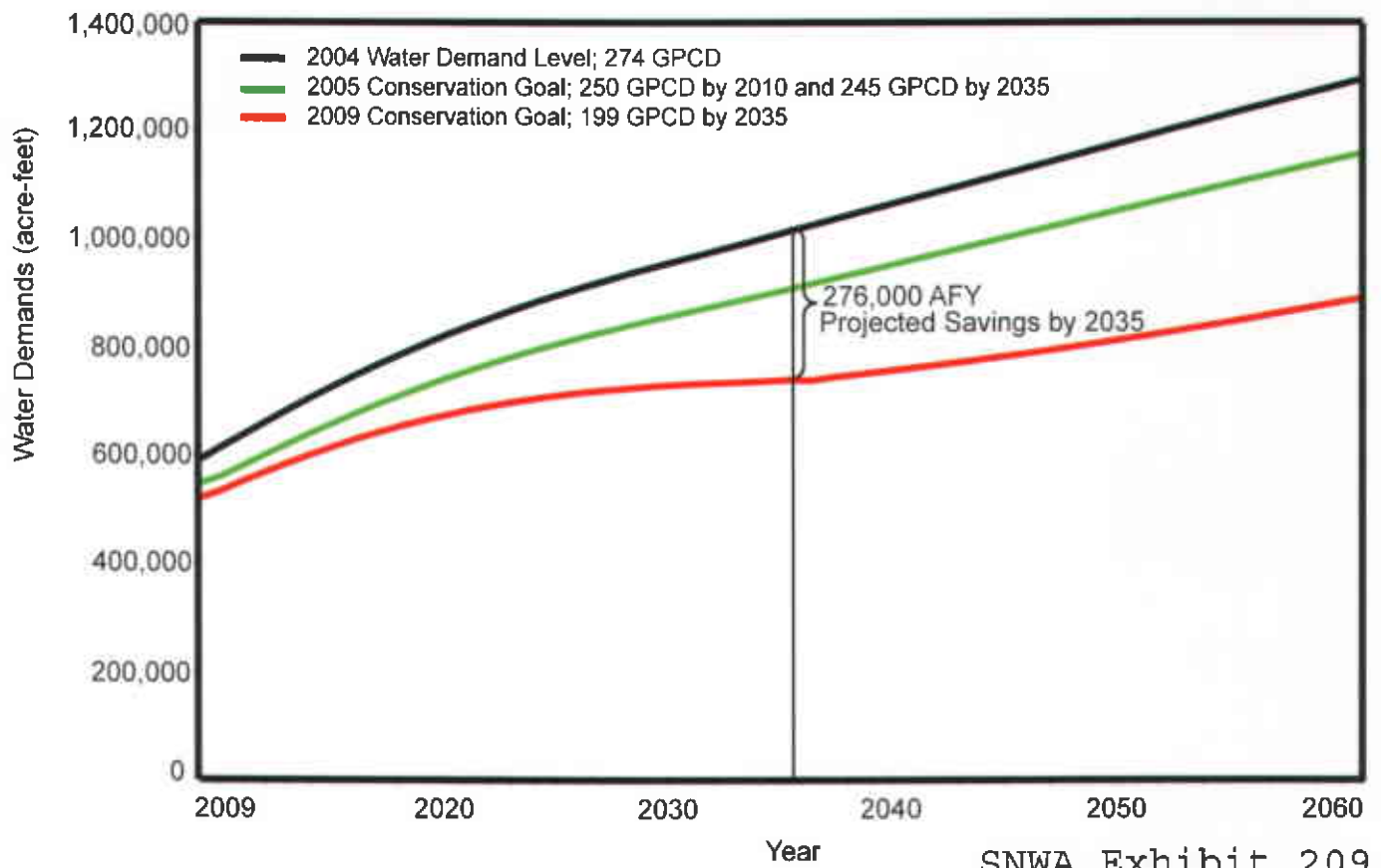
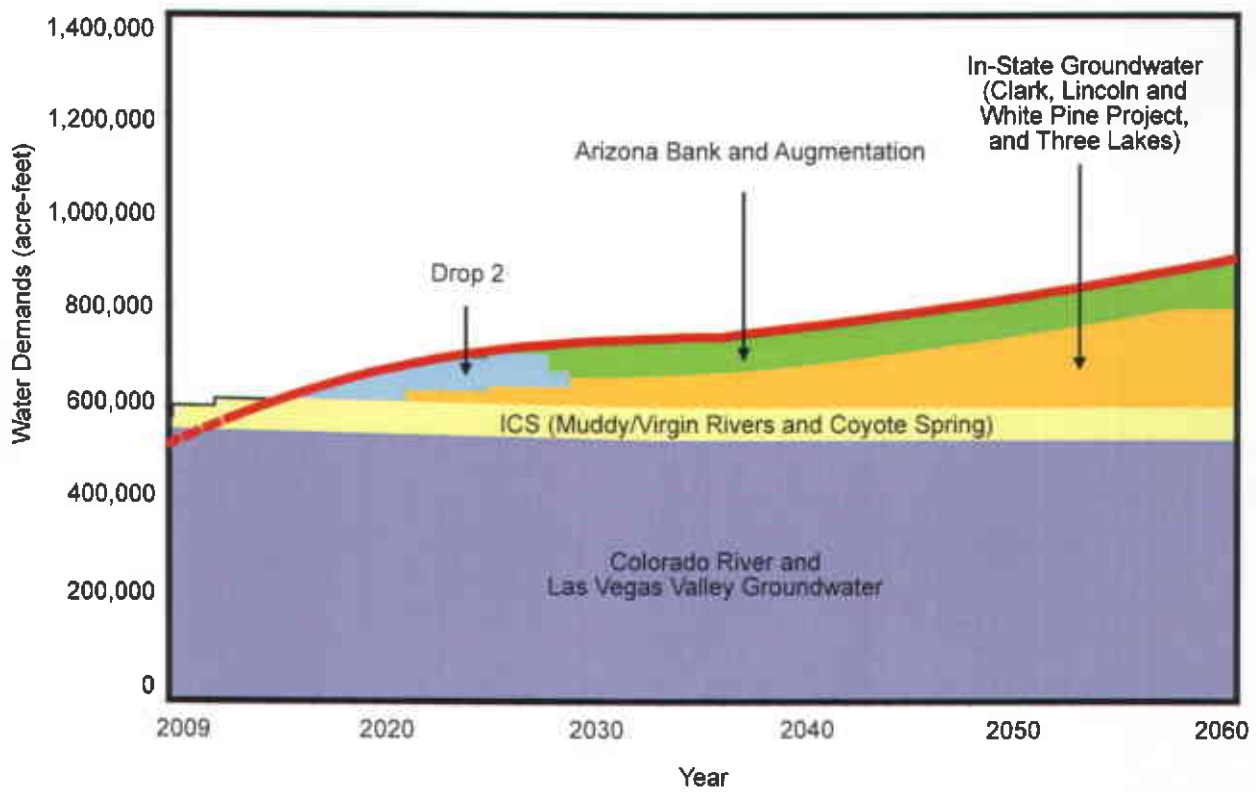
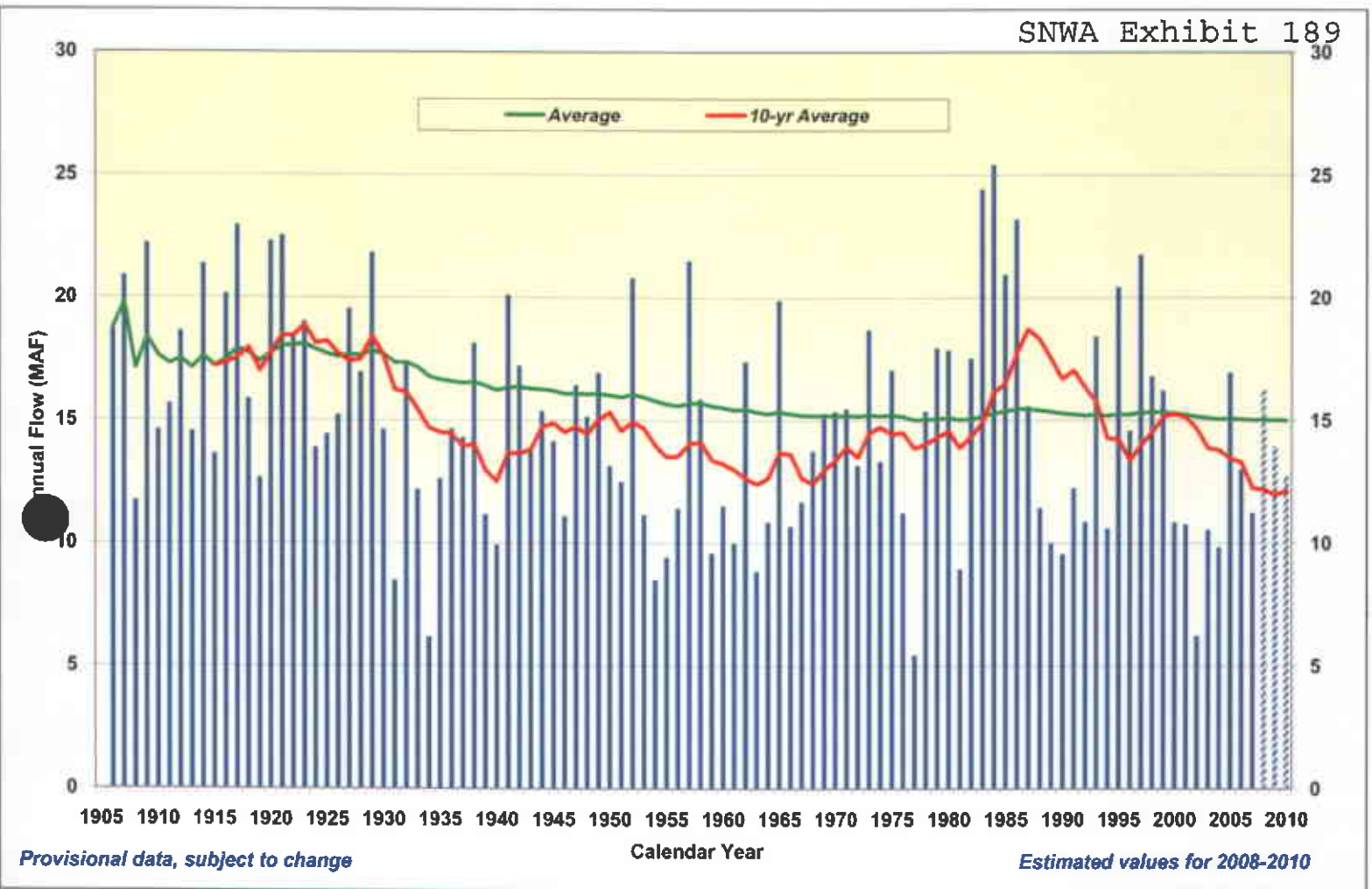


FIGURE 28 – Projected Water Demands and Future Resources (under normal Colorado River conditions)





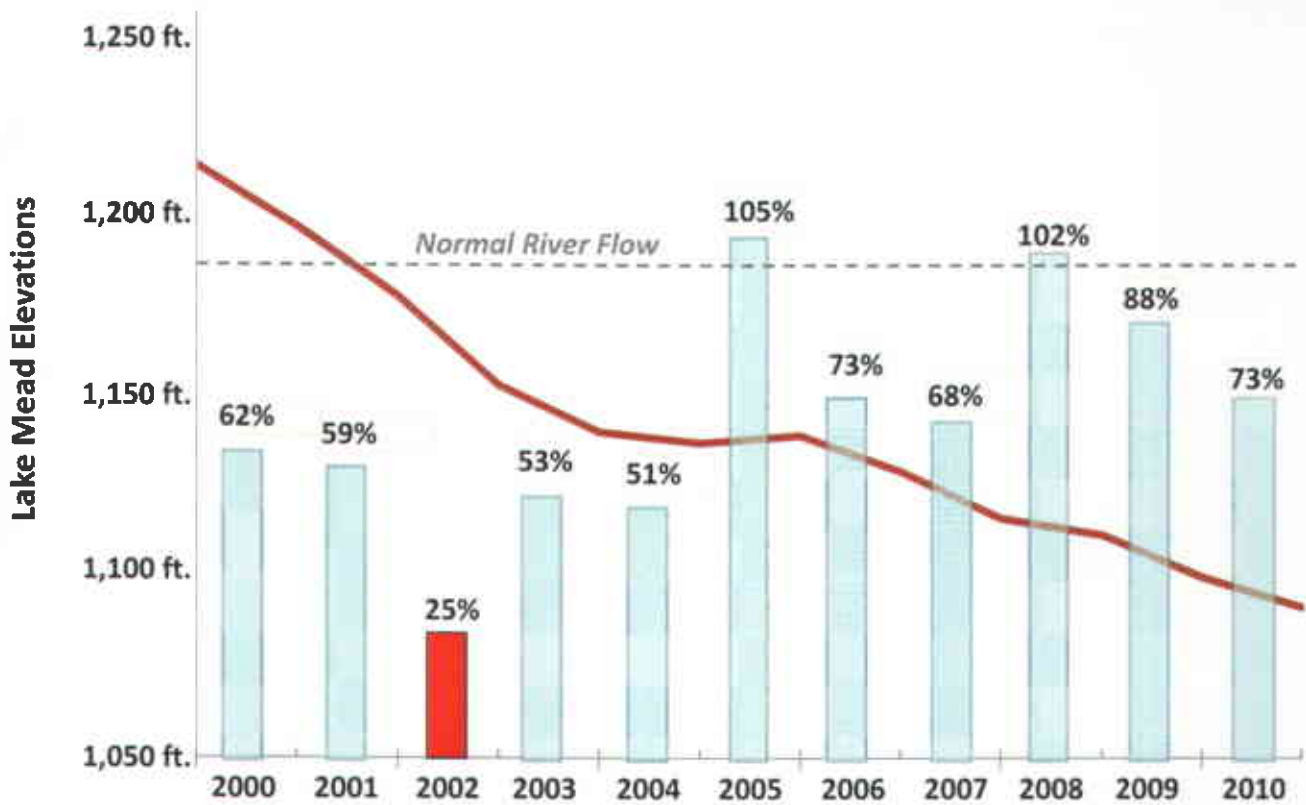
Provisional data, subject to change

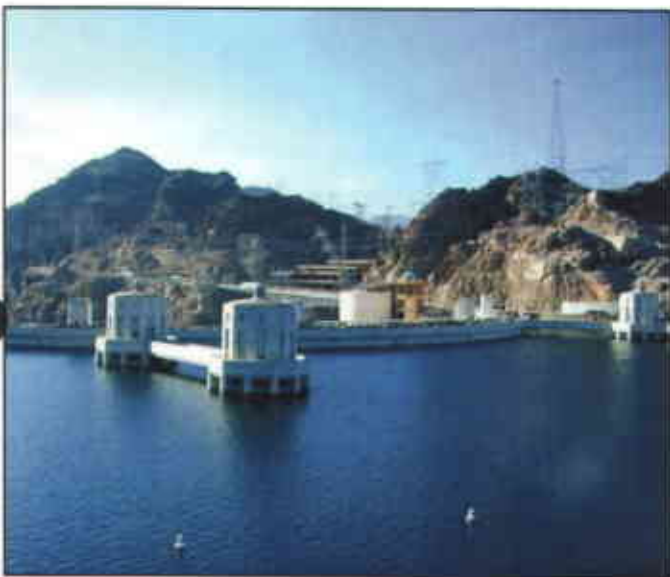
Estimated values for 2008-2010

Source: Prairie, pers. comm. (2010)

**Figure 8-1**  
**Colorado River at Lees Ferry, Arizona—Natural Flow**

## Colorado River Annual Inflows and Lake Mead Water Elevations



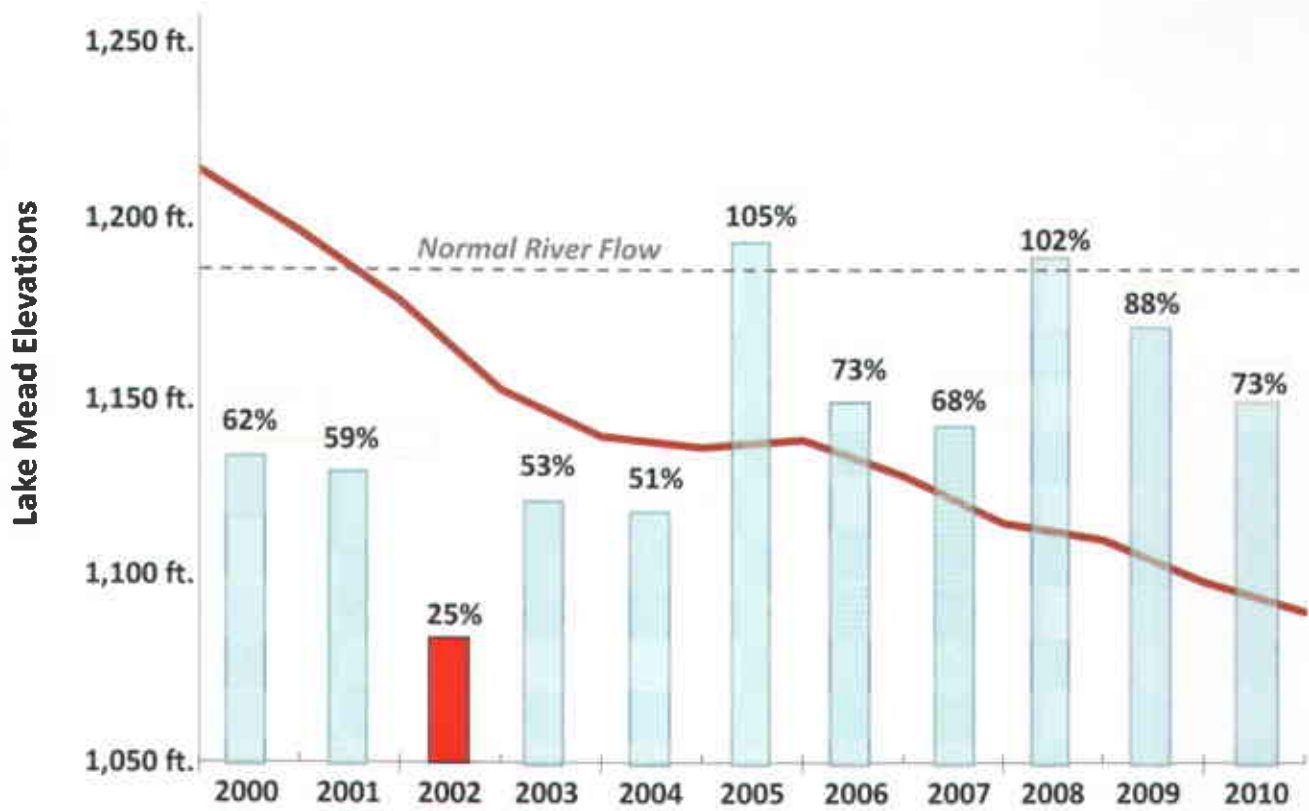


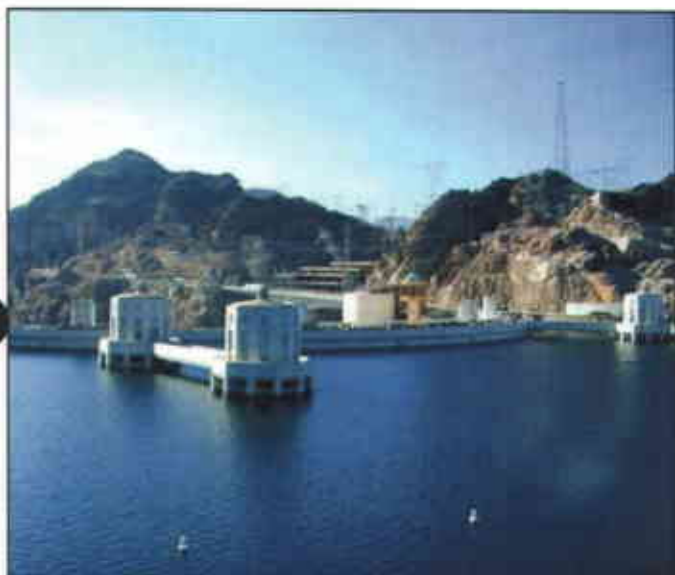
2000



2011

## Colorado River Annual Inflows and Lake Mead Water Elevations





2000



2011



- 2 -

from its apportioned share of the Colorado River, it is clear that Nevada will be unable to rely solely on the Colorado River during prolonged droughts or to meet its future demands. However, Colorado also believes that the Lower Basin, as a whole, has developed more "Colorado River System" water than it is legally entitled to pursuant to the Colorado River Compact and we therefore expressed significant concerns about the development of any additional surface water supplies from the Colorado River or its tributaries in the Lower Basin. Colorado did support the development of non-tributary groundwater supplies in Nevada and we believe the development of non-tributary groundwater is critical to meeting the long-term water supplies needs for Nevada. Towards that end we urged Nevada to proceed with construction of the infrastructure necessary to develop and deliver those groundwater supplies. We continue to support the development of Nevada's non-tributary groundwater resources, but remain very concerned about the development of any additional surface water supplies at this time.

In addition to considering the "no action" alternative, and given this background, the EIS team for this project needs to consider the following:

1. Consideration should be given to the viability of the project if it were to be developed solely on non-tributary groundwater resources available to Nevada.
2. The EIS team should consider the potential for augmentation of Colorado River System water through desalination, weather modification and other means that could add wet water to the Colorado River Basin. Such projects are needed in order for Colorado to support the proposed project. Absent such augmentation or reductions in the overall use by the Lower Basin, Colorado has significant concerns with the development of the proposed project. The project will diminish flows into Lake Mead by over 100,000 acre-feet per year. This is Colorado River System water and is subject to the terms of the Colorado River Compact of 1922. Diminished inflow to Lake Mead is detrimental to Upper Basin interests because it increases the risk that Upper Basin uses will be curtailed. It may also adversely impact power generation.
3. The EIS should consider the effects of reduced inflow to Lake Mead and the Colorado River on the salinity of the Colorado River. Would these reductions adversely impact the ability of the U.S. to comply with Minute 242 to the Mexican Treaty?

Colorado would note that we are in substantial agreement with the comments submitted on behalf of Wyoming. Again, thanks very much for the opportunity to comment on this important EIS.

Sincerely,



Rod Kubarcich  
Director

RK/drs

cc: Southern Nevada Water Authority  
Colorado Congressional Delegation  
Colorado Water Conservation Board Members  
Seven Colorado River Basin State Representatives

Flood Protection • Water Project Planning and Finance • Stream and Lake Protection  
Water Supply Protection • Conservation Planning

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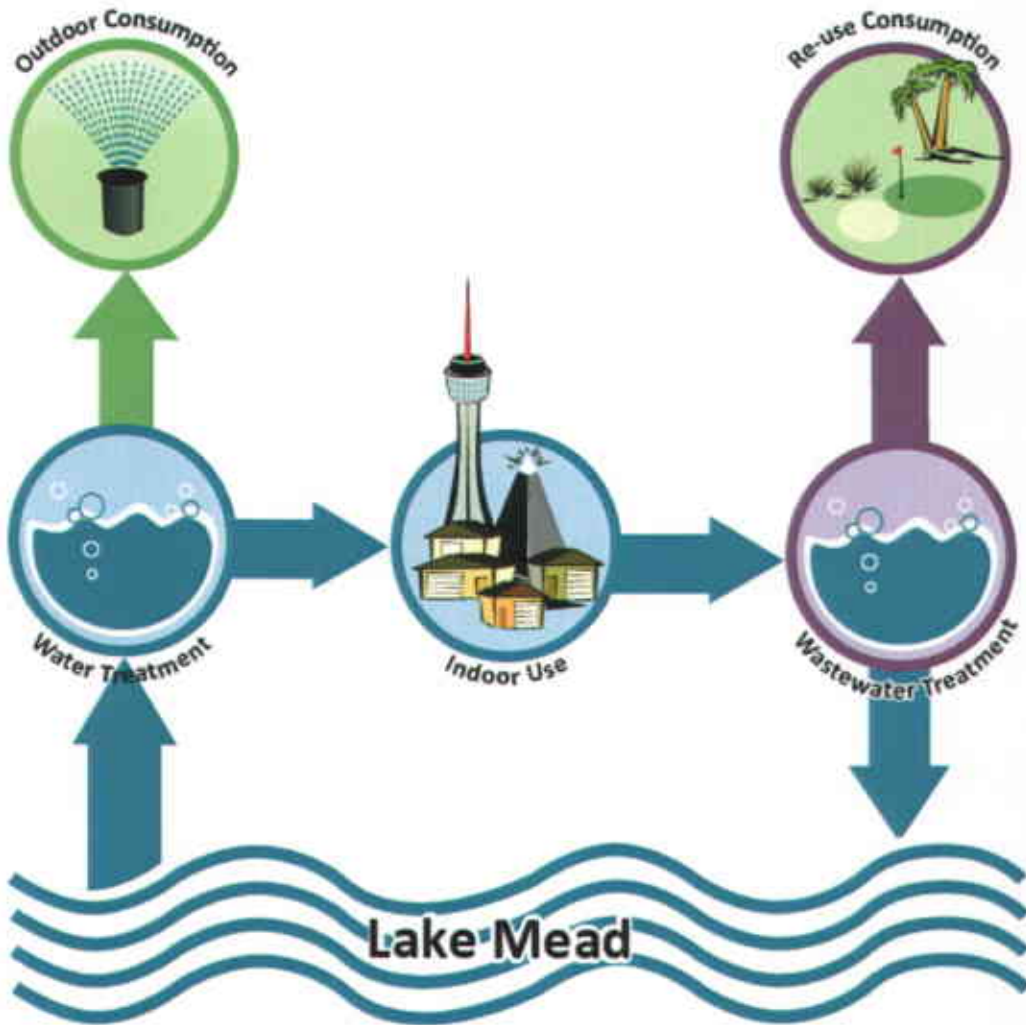
Figure 30 – Nevada Share of Shortage

| Lake Mead Water Level | Nevada Shortage | Arizona Shortage |
|-----------------------|-----------------|------------------|
| 1,075 - 1,050 ft.     | 13,000 afy      | 320,000 afy      |
| 1,050 - 1,025 ft.     | 17,000 afy      | 400,000 afy      |
| Below 1,025 ft.       | 20,000 afy      | 480,000 afy      |
|                       | Reconsultation  |                  |

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Figure 34 – Severe Shortage Plan

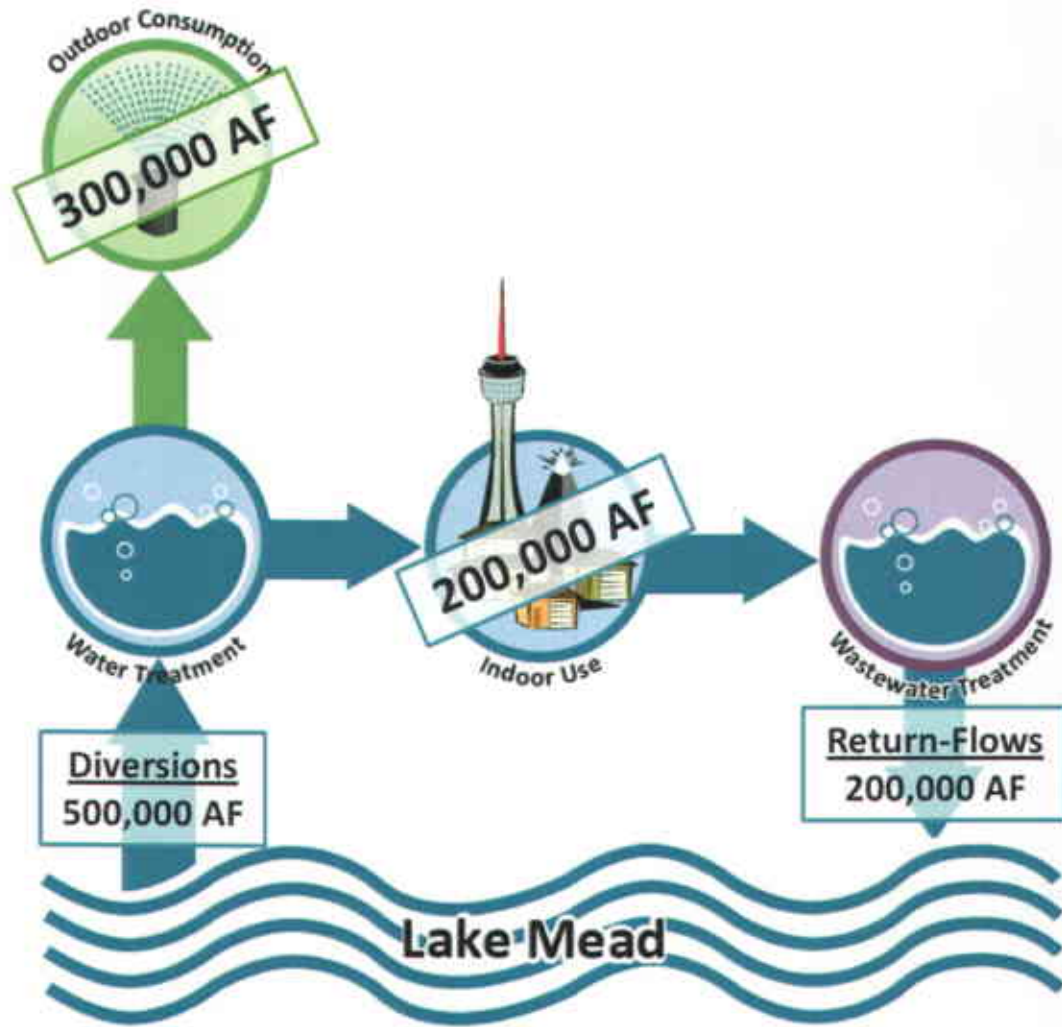
| Lake Mead Elevation | Goal  | Action  |
|---------------------|---|---|
| 1,075 to 1,025 ft.  | Preserve lead time for new facility development.  | <p>Construct Clark, Lincoln and White Pine Counties Groundwater Development Project.</p> <p>Examine demand-management needs over and above existing conservation goals/annual targets.</p>  |
| 1,025 to 1,000 ft.  | Preserve Lake Mead elevation of 1,000 ft.         | <p>Reconsult with the Secretary of the Interior and Basin States on additional Colorado River shortage management strategies.</p> <p>Implement additional demand-management measures through mandatory policies to offset further Colorado River Basin supply shortages.</p> <p>Examine potential for temporary infrastructure to extend the operational capabilities of SNWA's intakes in Lake Mead.</p> |
| Below 1,000 ft.     | Preserve water supply for health and safety uses. | <p>Maximize use of available groundwater supplies (Southern Nevada Groundwater Bank and in-state resources).</p> <p>Significantly limit non-essential uses.</p>   |



## SCENARIOS

- **Baseline**
- **Increased Indoor Conservation**  
*Assuming a reduction of 50,000 AF indoors*
- **Increased Outdoor Conservation**  
*Assuming a reduction of 75,000 AF outdoors*
- **Increased Indoor & Outdoor Conservation**  
*Assuming a reduction of 50,000 AF indoors and 75,000 AF outdoors*
- **Increased Reuse**  
*Assuming an increase of 50,000 AF in reuse*

# BASELINE SCENARIO



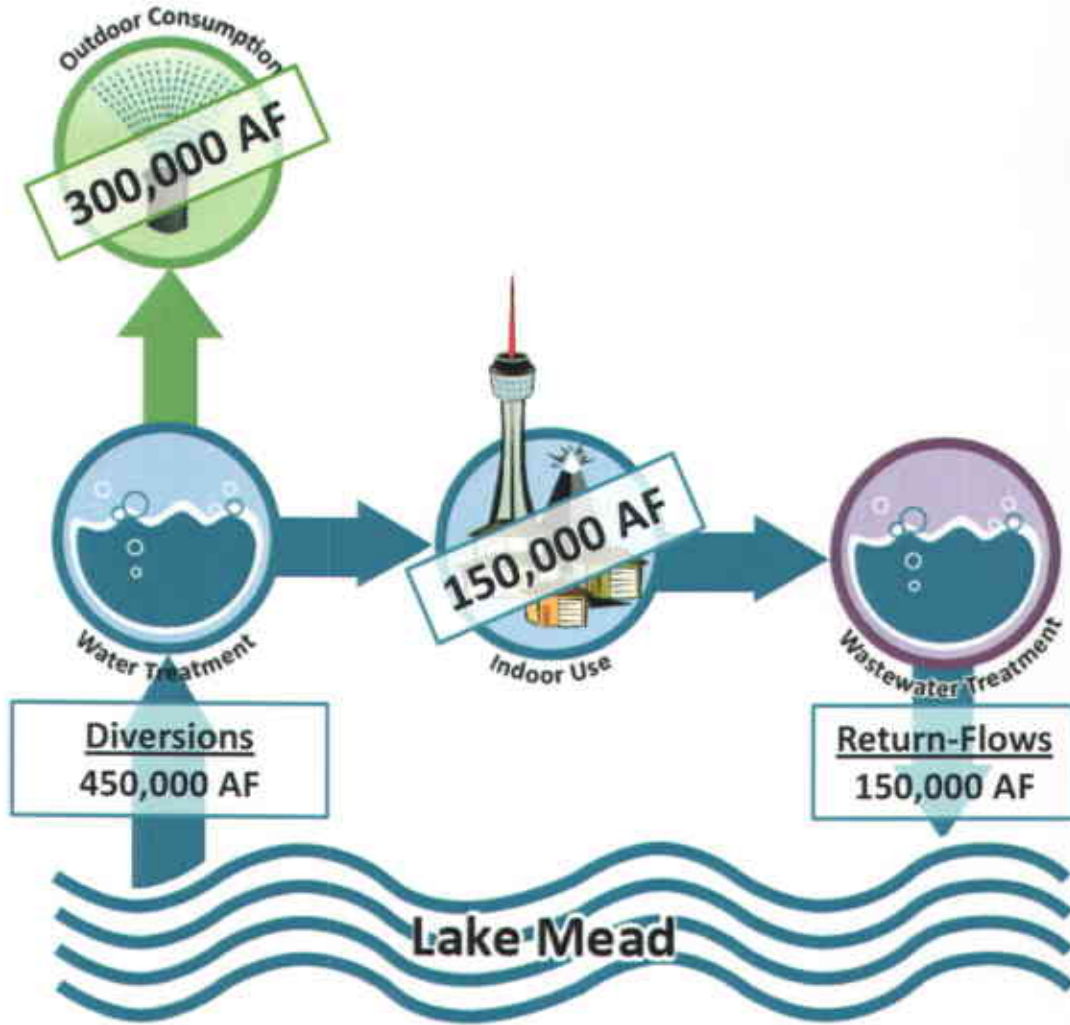
**TOTAL  
NET USE:**  
300,000  
acre-feet

## SCENARIOS

- **Baseline**
- **Increased Indoor Conservation**  
*Assuming a reduction of 50,000 AF indoors*
- **Increased Outdoor Conservation**  
*Assuming a reduction of 75,000 AF outdoors*
- **Increased Indoor & Outdoor Conservation**  
*Assuming a reduction of 50,000 AF indoors and 75,000 AF outdoors*
- **Increased Reuse**  
*Assuming an increase of 50,000 AF in reuse*

# Increased Indoor Conservation

(50,000 af reduction)



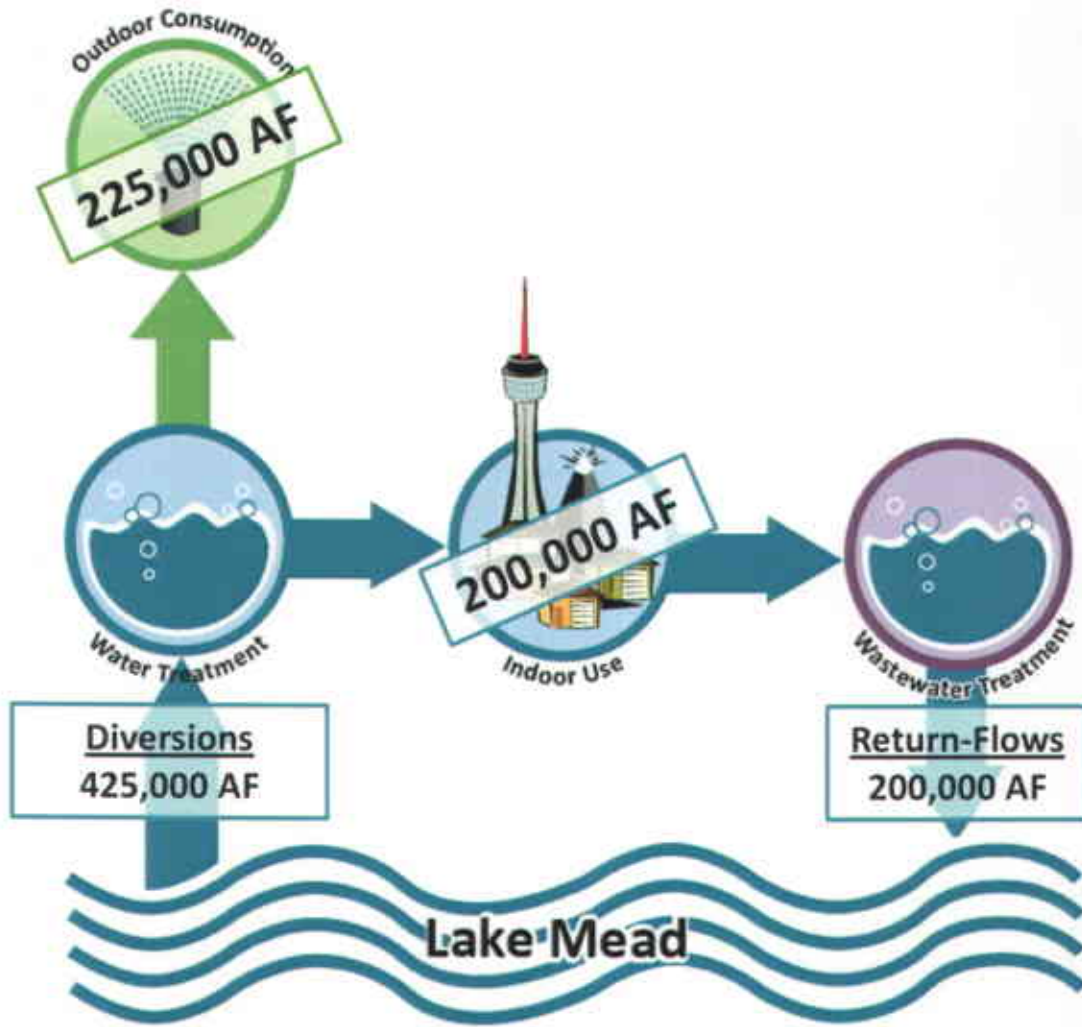
**TOTAL  
NET USE:  
300,000  
acre-feet**



## SCENARIOS

- **Baseline**
- **Increased Indoor Conservation**  
*Assuming a reduction of 50,000 AF indoors*
- **Increased Outdoor Conservation**  
*Assuming a reduction of 75,000 AF outdoors*
- **Increased Indoor & Outdoor Conservation**  
*Assuming a reduction of 50,000 AF indoors and 75,000 AF outdoors*
- **Increased Reuse**  
*Assuming an increase of 50,000 AF in reuse*

# Increased Outdoor Conservation (75,000 af reduction)

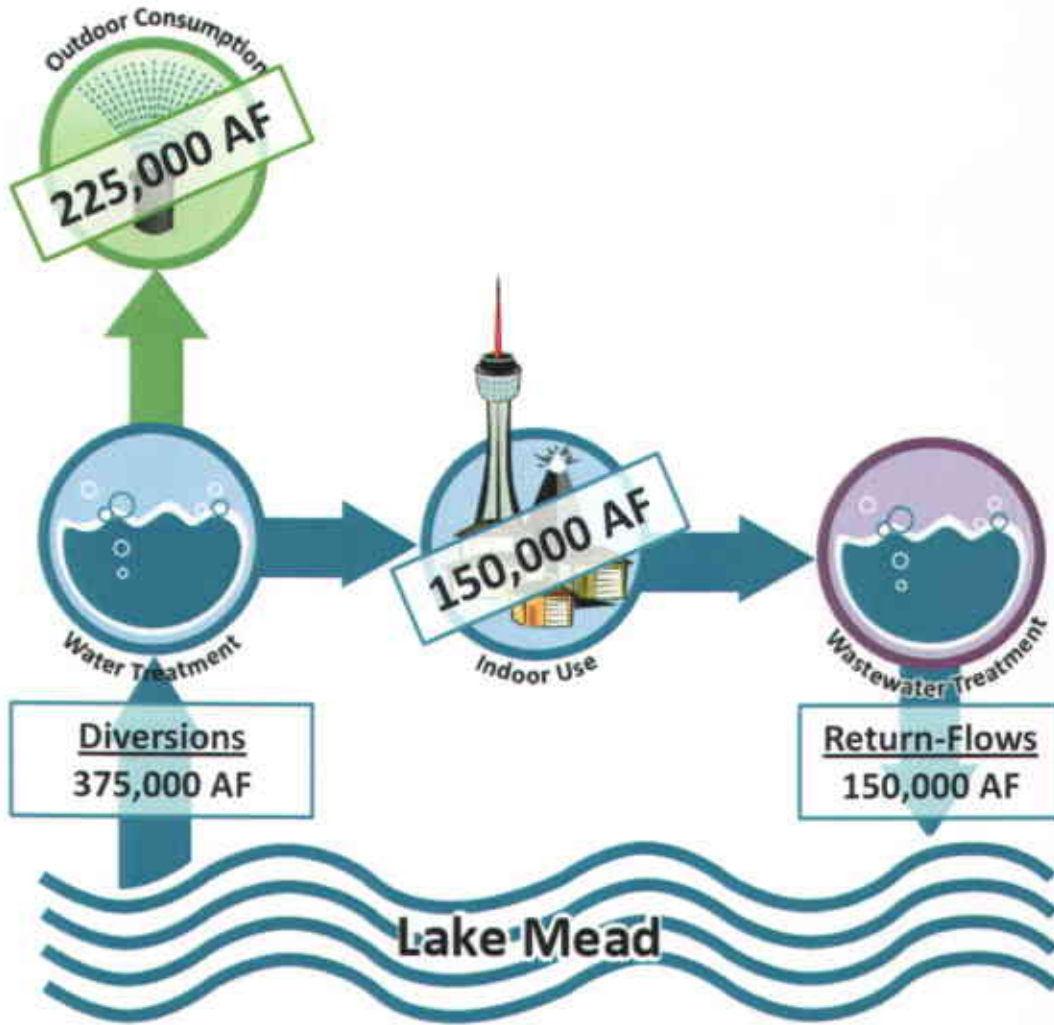


**TOTAL  
NET USE:  
225,000  
acre-feet**

## SCENARIOS

- **Baseline**
- **Increased Indoor Conservation**  
*Assuming a reduction of 50,000 AF indoors*
- **Increased Outdoor Conservation**  
*Assuming a reduction of 75,000 AF outdoors*
- **Increased Indoor & Outdoor Conservation**  
*Assuming a reduction of 50,000 AF indoors and 75,000 AF outdoors*
- **Increased Reuse**  
*Assuming an increase of 50,000 AF in reuse*

**Increased Indoor and Outdoor Conservation**  
(125,000 af reduction)



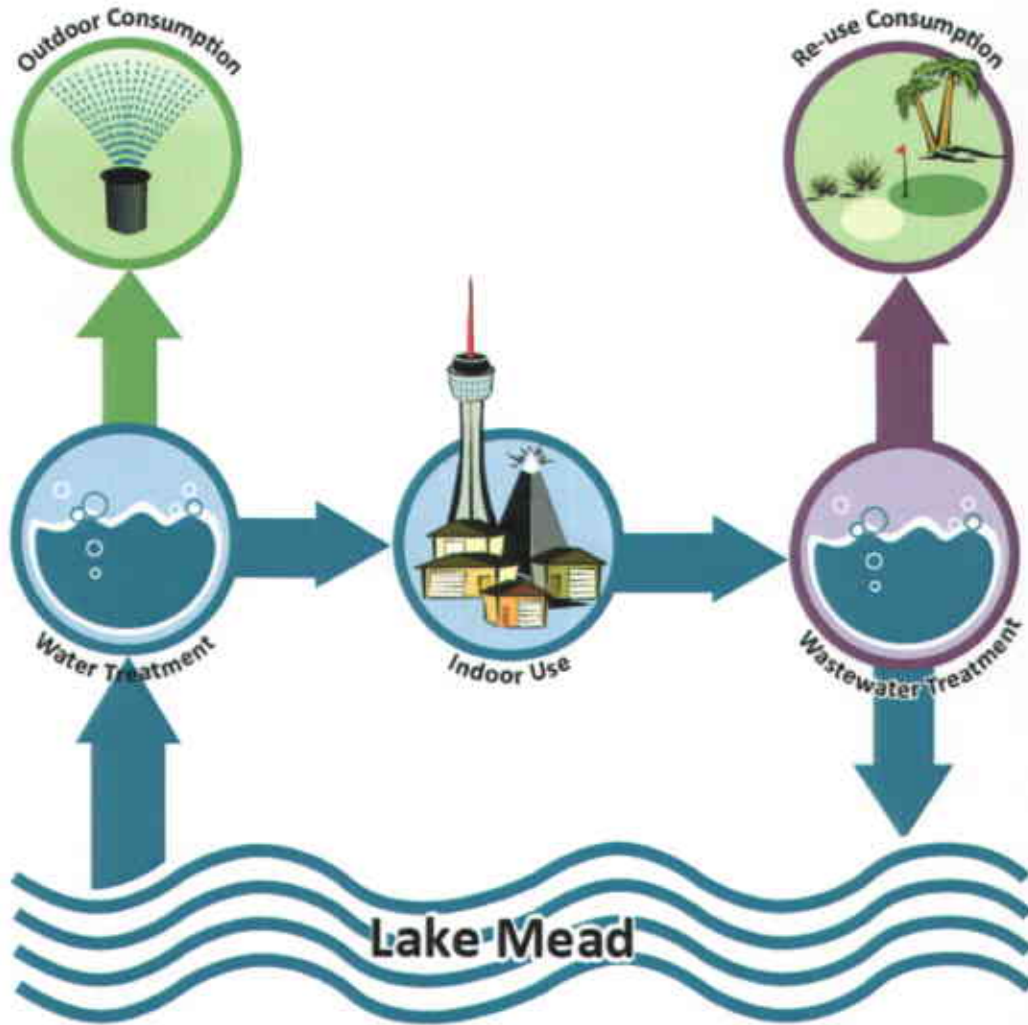
**TOTAL  
NET USE:  
225,000  
acre-feet**

## SCENARIOS

- **Baseline**
- **Increased Indoor Conservation**  
*Assuming a reduction of 50,000 AF indoors*
- **Increased Outdoor Conservation**  
*Assuming a reduction of 75,000 AF outdoors*
- **Increased Indoor & Outdoor Conservation**  
*Assuming a reduction of 50,000 AF indoors and 75,000 AF outdoors*
- **Increased Reuse**  
*Assuming an increase of 50,000 AF in reuse*

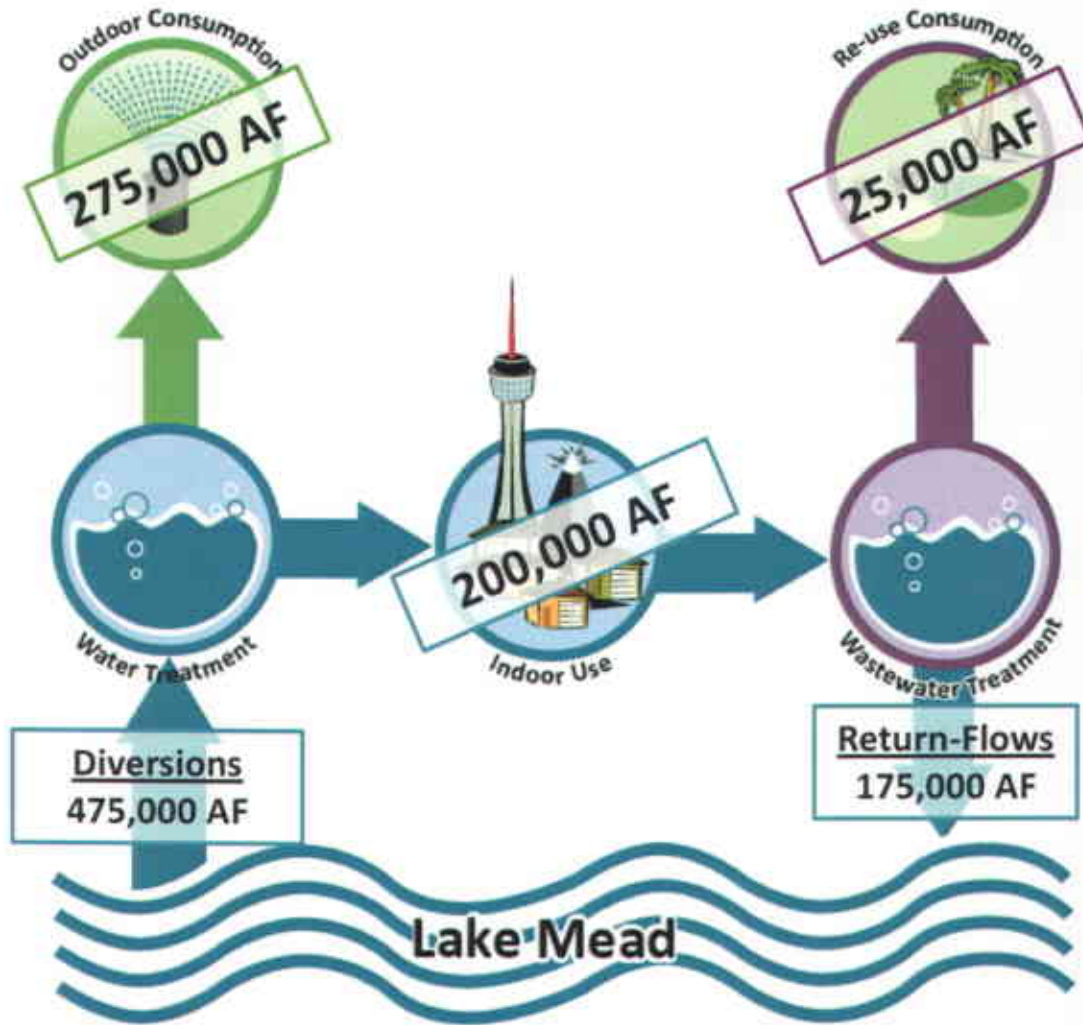
# BASELINE SCENARIO

## With REUSE



# BASELINE SCENARIO

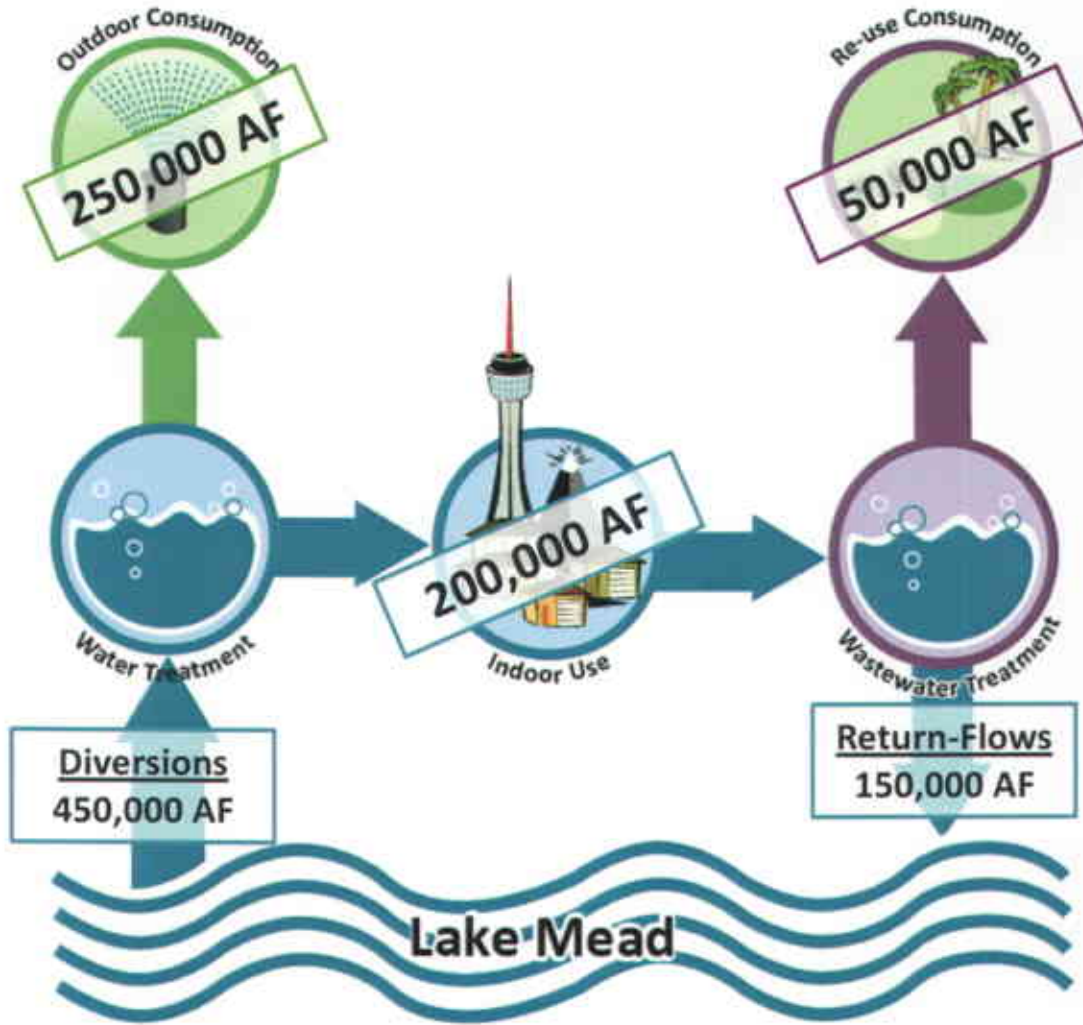
with 25,000 AF of REUSE



**TOTAL  
NET USE:**  
300,000  
acre-feet

# INCREASED REUSE

Additional 25,000 AF of Reuse



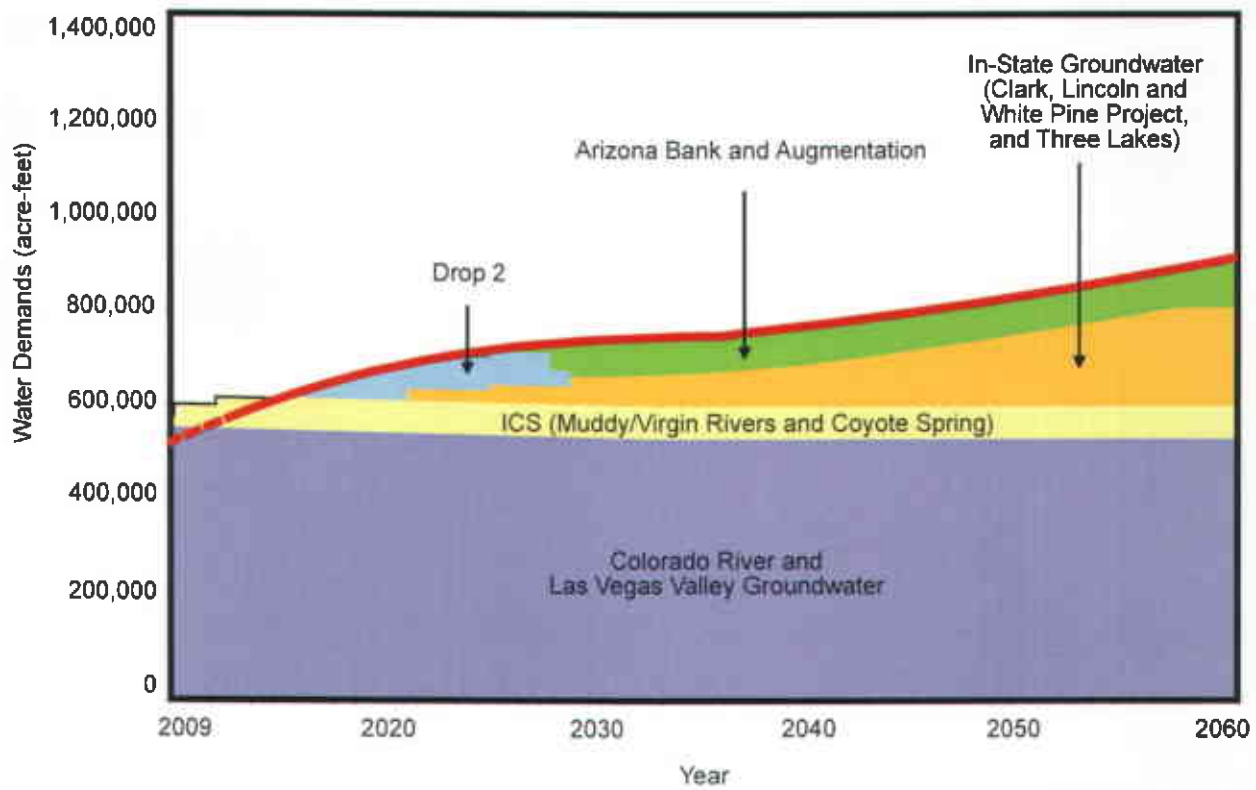
**TOTAL  
NET USE:**  
300,000  
acre-feet



|  | USER DEMAND (afy)   |         |         | Outdoor<br>as a % of<br>Total Use | Returns to<br>Lake Mead | Consumptive<br>Use | Additional<br>Resources<br>Available |
|--|---------------------|---------|---------|-----------------------------------|-------------------------|--------------------|--------------------------------------|
|  | TOTAL<br>DIVERSIONS | Outdoor | Indoor  |                                   |                         |                    |                                      |
| <b>Scenario:<br/>Baseline</b>  | 500,000             | 300,000 | 200,000 | 60%                               | 200,000                 | 300,000            | -                                    |
| <b>Scenario 2:<br/>Indoor Conservation<br/>(100,000 af reduction)</b>  | 450,000             | 300,000 | 150,000 | 67%                               | 150,000                 | 300,000            | NO                                   |
| <b>Scenario 3:<br/>Outdoor Conservation<br/>(75,000 af reduction)</b>  | 425,000             | 225,000 | 200,000 | 53%                               | 200,000                 | 225,000            | Yes<br>33%                           |
| <b>Scenario 4:<br/>Indoor/Outdoor Cons.<br/>(125,000 af reduction)</b> | 325,000             | 225,000 | 150,000 | 69%                               | 150,000                 | 225,000            | Yes<br>33%                           |

|   | USER DEMAND (afy) |         |        |         | Outdoor & Reuse as a % of Total Use | Returns to Lake Mead | Consumptive Use | Additional Resources Available |
|---|-------------------|---------|--------|---------|-------------------------------------|----------------------|-----------------|--------------------------------|
|   | TOTAL DIVERSIONS  | Outdoor | Reuse  | Indoor  |                                     |                      |                 |                                |
| <b>Scenario: Baseline</b>   | 500,000           | 300,000 |        | 200,000 | 60%                                 | 200,000              | 300,000         | -                              |
| <b>Scenario 2: Reuse – Current Operations</b><br>(25,000 af replacement of Potable Water) | 475,000           | 275,000 | 25,000 | 200,000 | 60%                                 | 175,000              | 300,000         | NO                             |
| <b>Scenario 3: Increased Reuse</b><br>(50,000 af replacement of Potable Water)            | 450,000           | 250,000 | 50,000 | 200,000 | 60%                                 | 150,000              | 300,000         | NO                             |

FIGURE 28 – Projected Water Demands and Future Resources (under normal Colorado River conditions)



## Clark County Population Estimates and Forecasts

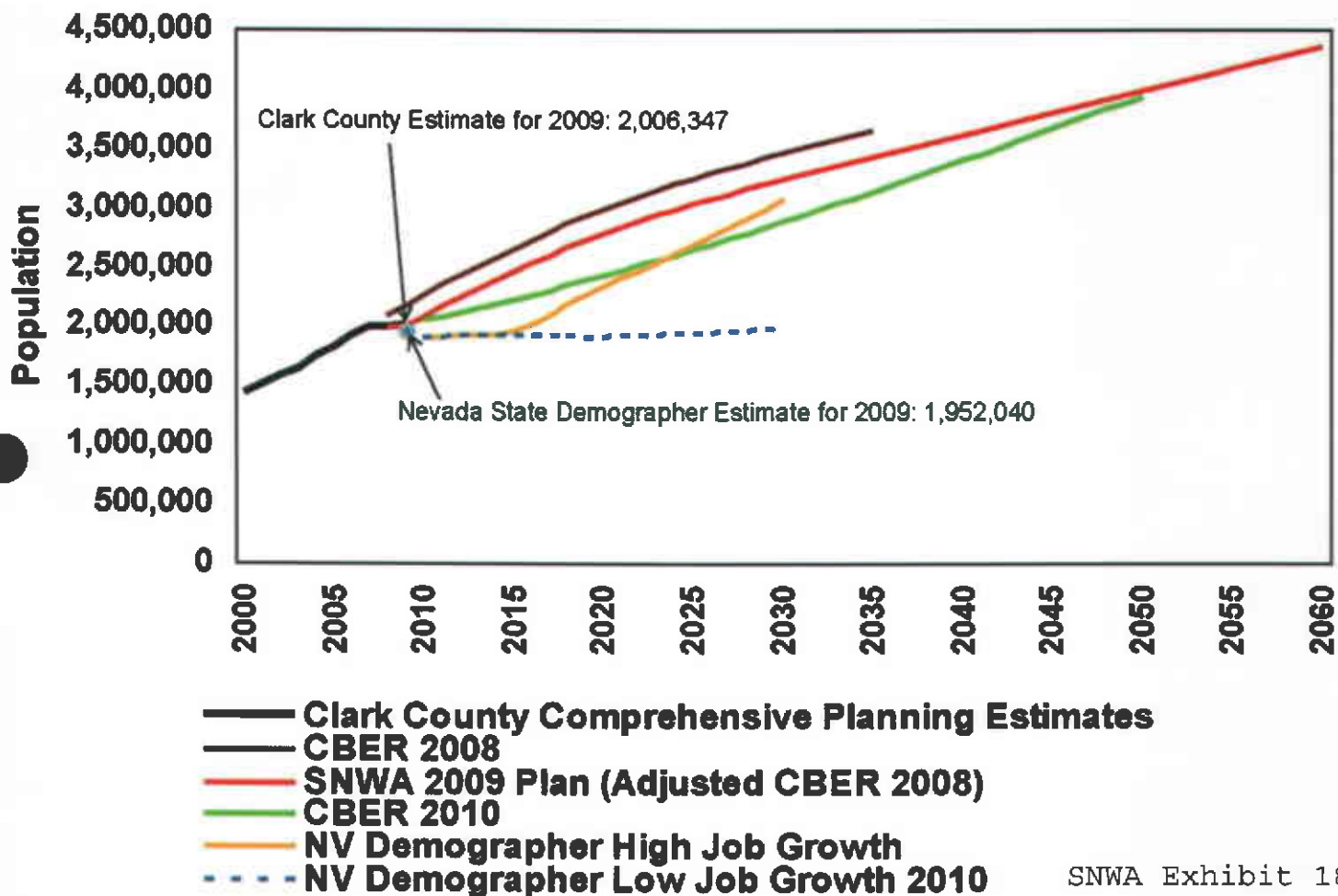
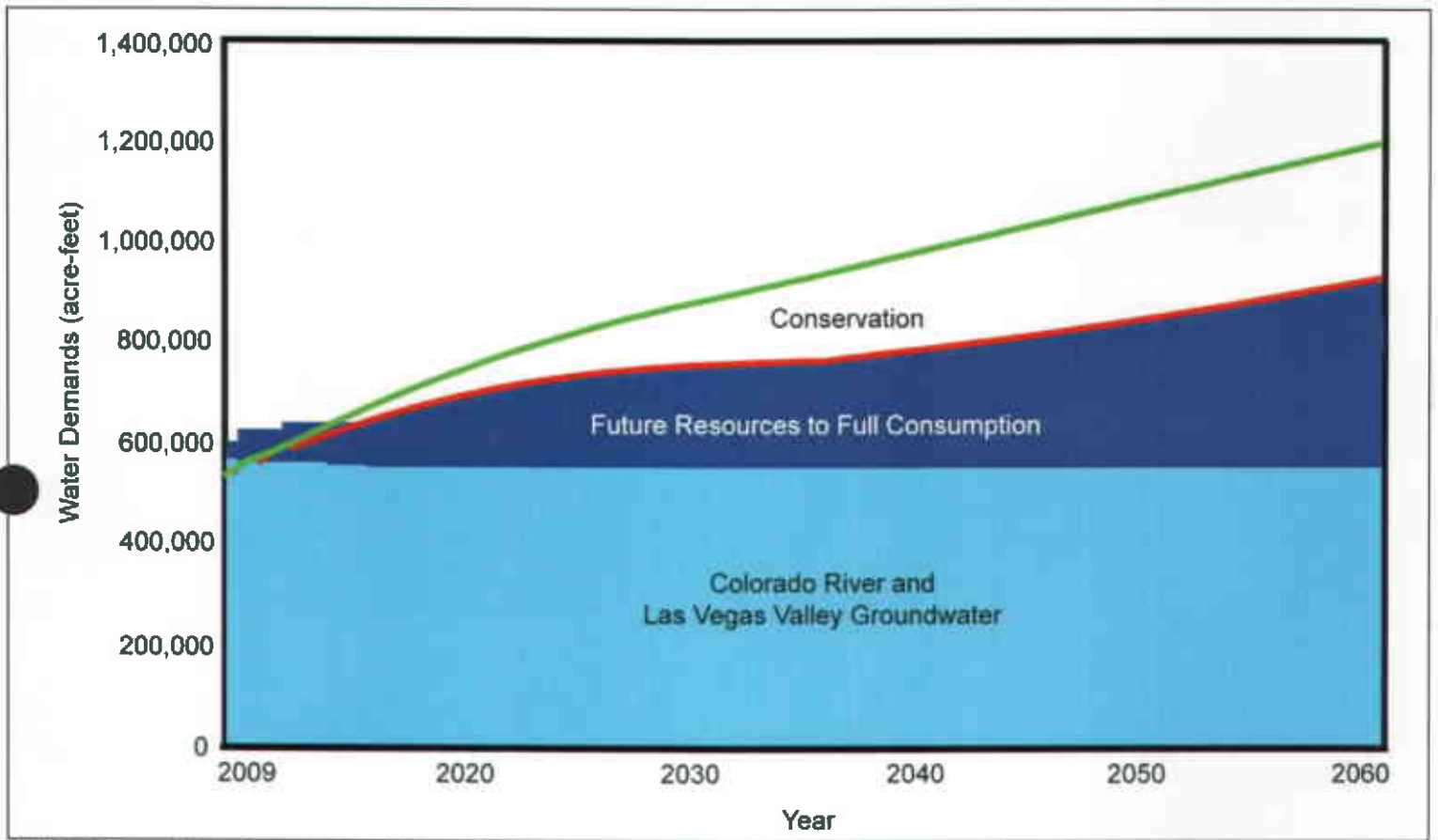


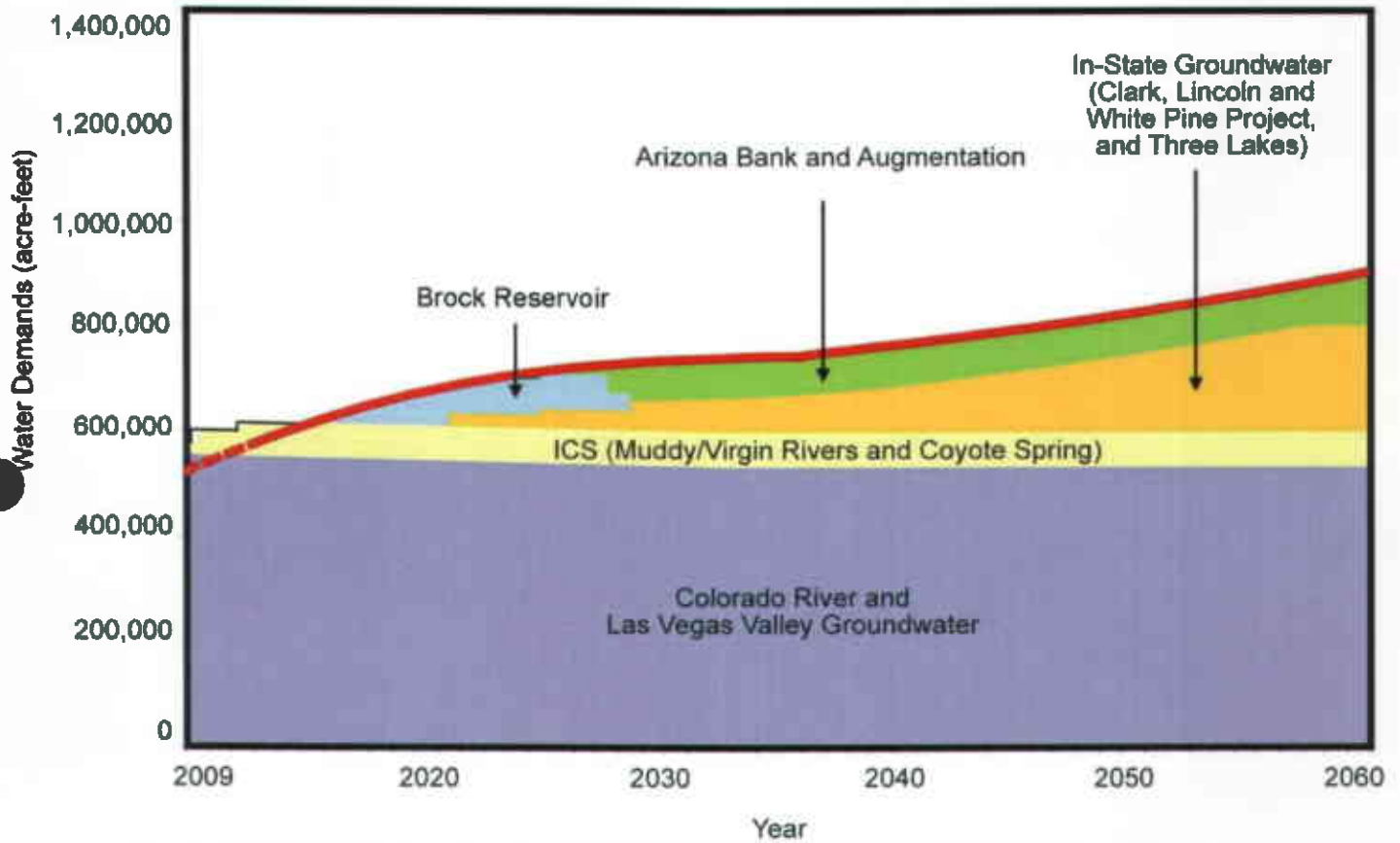
Figure 5-1  
 Clark County Population Projections (CBER and Nevada State Demographer)



Note: Green Line - Demand inclusive of 2005 Conservation Goal (250 gpcd by 2010 and 245 gpcd by 2035)  
 Red Line - Demand inclusive of 2009 Conservation Goal (199 gpcd by 2035)

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**Figure 6-1**  
**Summary of Projected Water Demands and Water Resources**



**Figure 6-2**  
**Projected Water Demand and Future Resources**  
 (Under Normal Colorado River Conditions)

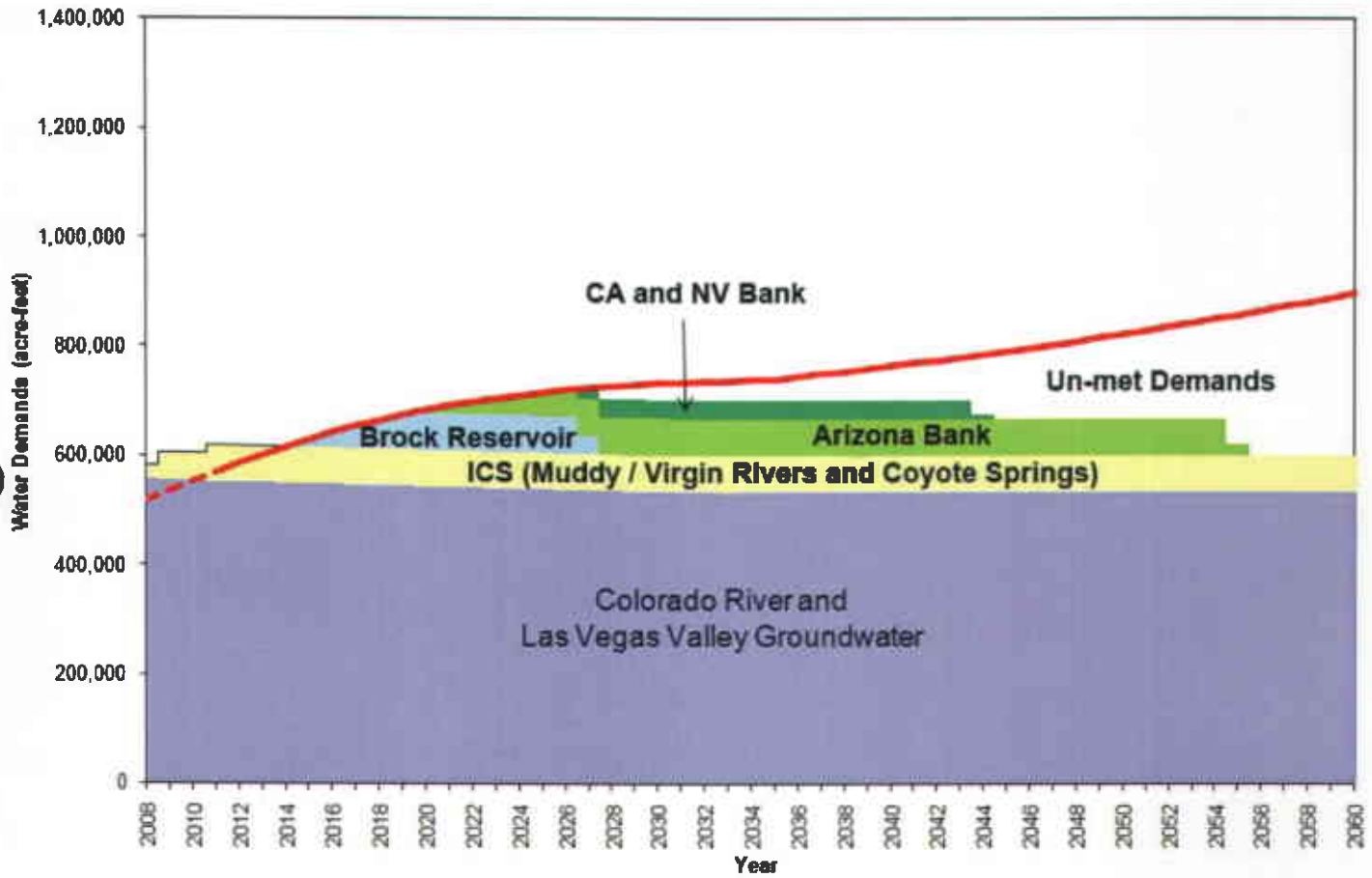


Figure 6-3

2009 Water Resource Plan without In-State Groundwater and Augmentation

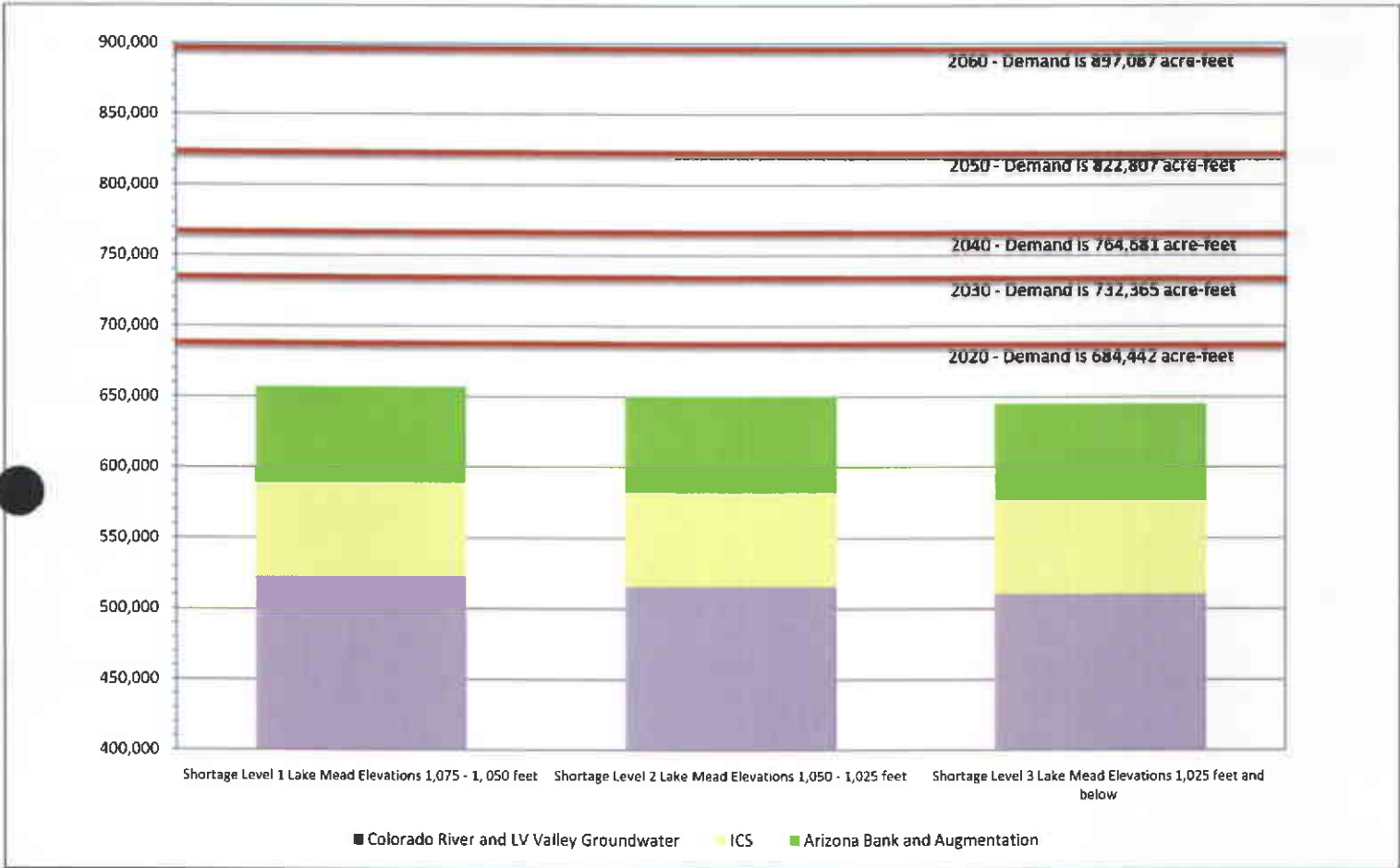
# **Table 6-1**

## **SNWA Projected Water Demand (Diversion Quantities)**

| <b>Year</b> | <b>SNWA Water Demand<br/>(acre-feet)</b> |
|-------------|--|
| 2020        | 684,442                                  |
| 2030        | 732,365                                  |
| 2040        | 764,681                                  |
| 2050        | 822,807                                  |
| 2060        | 897,087                                  |

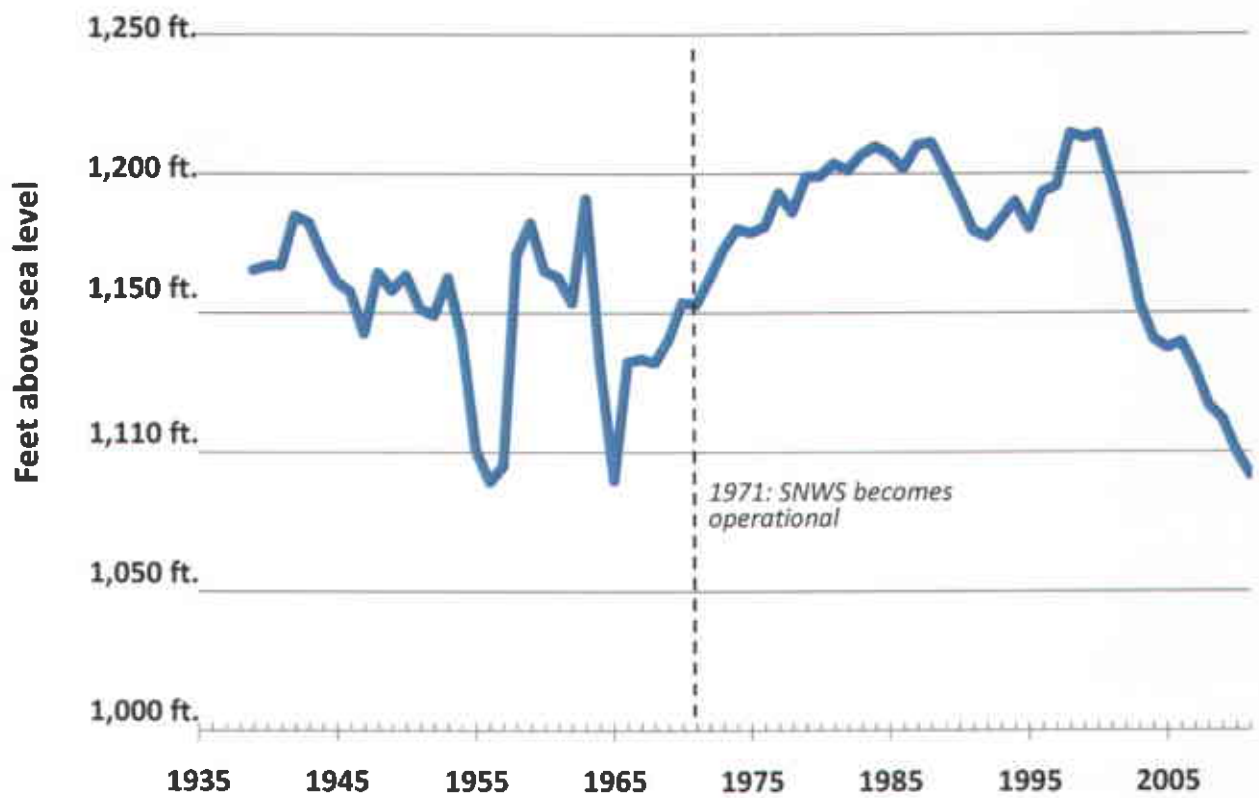
Note: SNWA water demands are based on the 2009 Water Resource Plan (SNWA, 2009a)





**Figure 6-4**  
**Water Resource Deficits at Various Years**  
**(Designated Shortage Colorado River Conditions)**

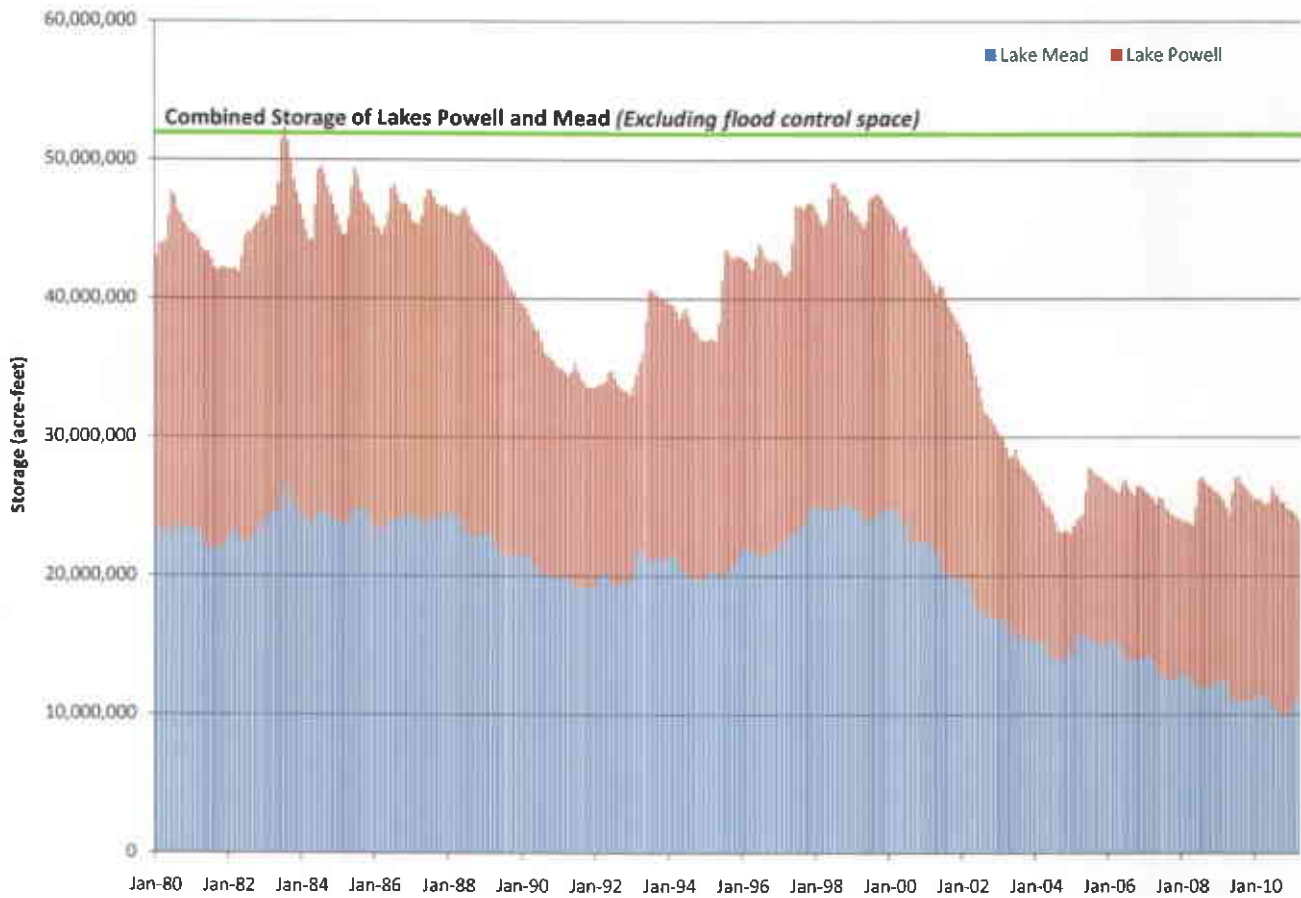
## Lake Mead Historic Water Elevations



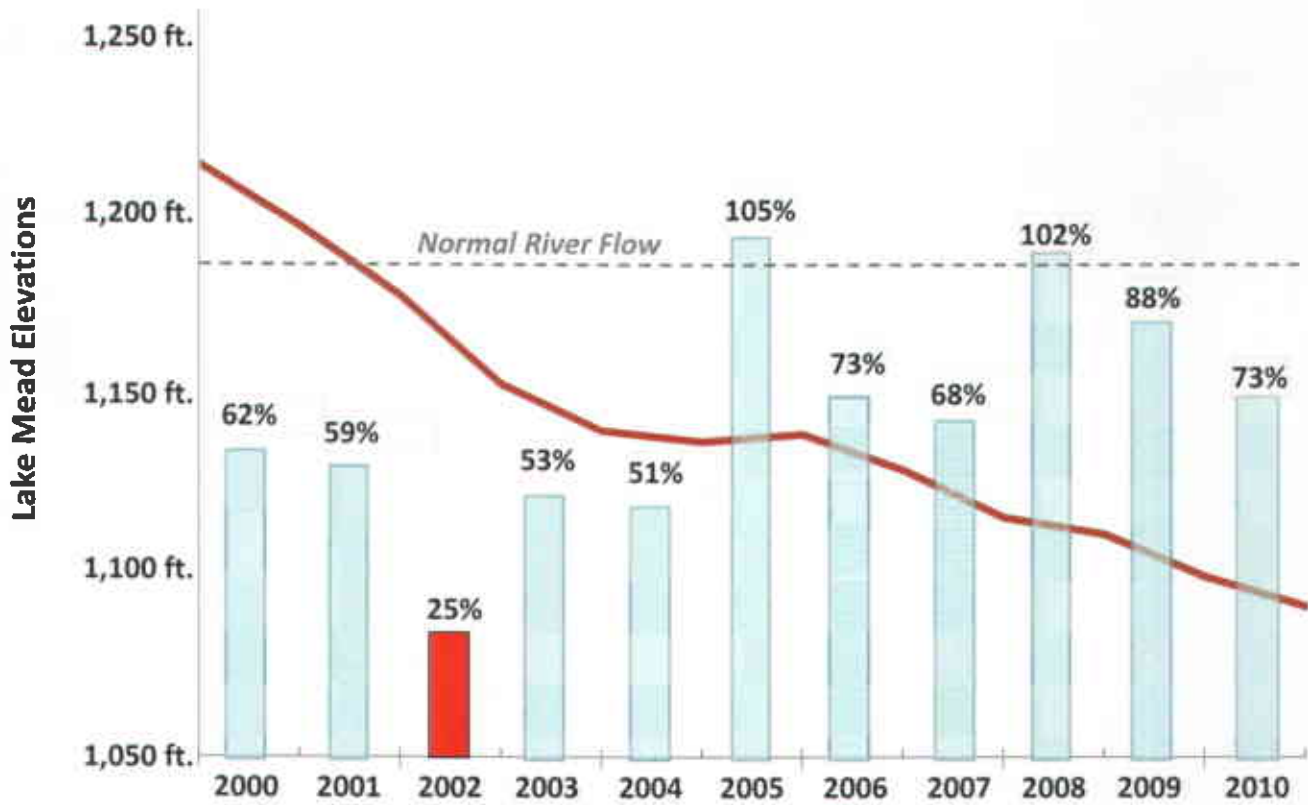
Source: <http://www.usbr.gov/lc/region/g4000/hourly/mead-elv.html>

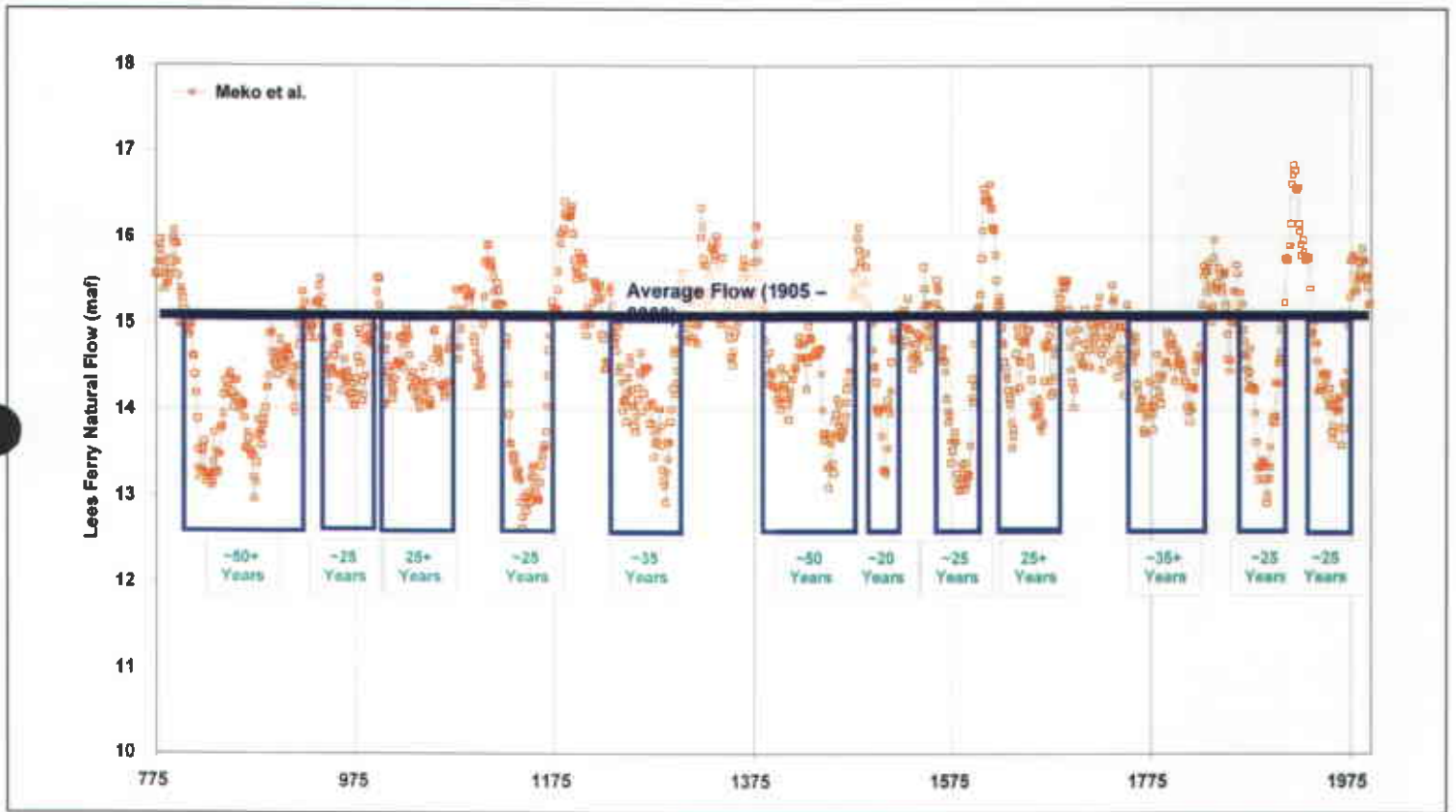
\*Figure uses January elevations of each year

## Combined Storage of Lakes Powell and Mead



## Colorado River Annual Inflows and Lake Mead Water Elevations





**Figure 7-1**  
**Colorado River Stream Flow Reconstruction** SNWA Exhibit 189



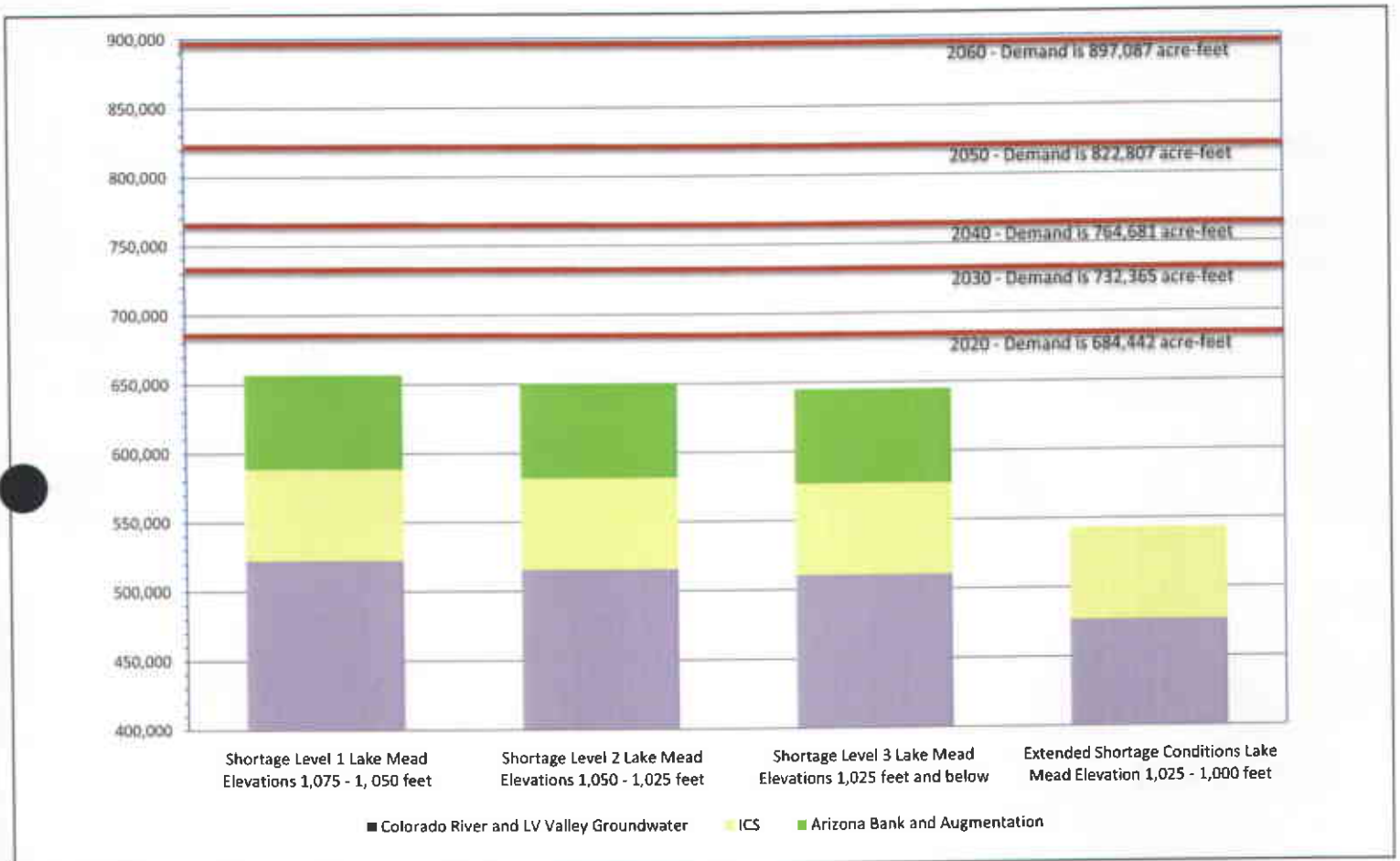
Source: Jerla, pers. comm. (2010)

**Figure A-2**  
**Probability of Shortage**

SNWA Exhibit 189

**Table A-1  
Frequency and Duration of Shortages**

|  | <b>Average</b> | <b>Minimum</b> | <b>Maximum</b> | <b>Median</b> |
|--|----------------|----------------|----------------|---------------|
| <b>Number of Shortage Sequences</b>                  | 1.90           | 1.00           | 4.00           | 2.00          |
| <b>Average Duration of Shortage Sequence (years)</b> | 15.52          | 2.67           | 49.00          | 11.58         |



**Figure 8-5**  
**Water Resources Deficits at Various Years**  
**(Designated and Extended Shortage)**