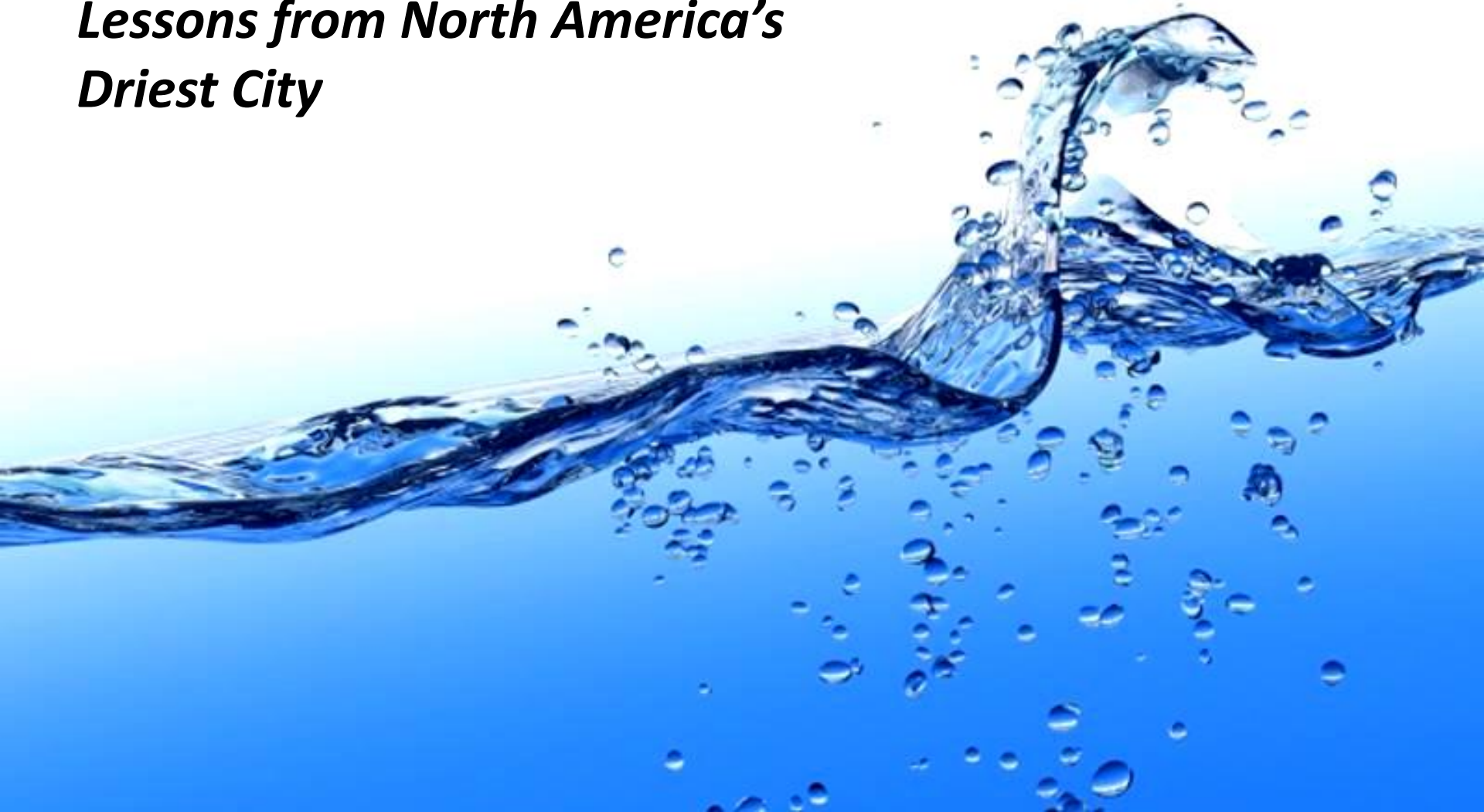
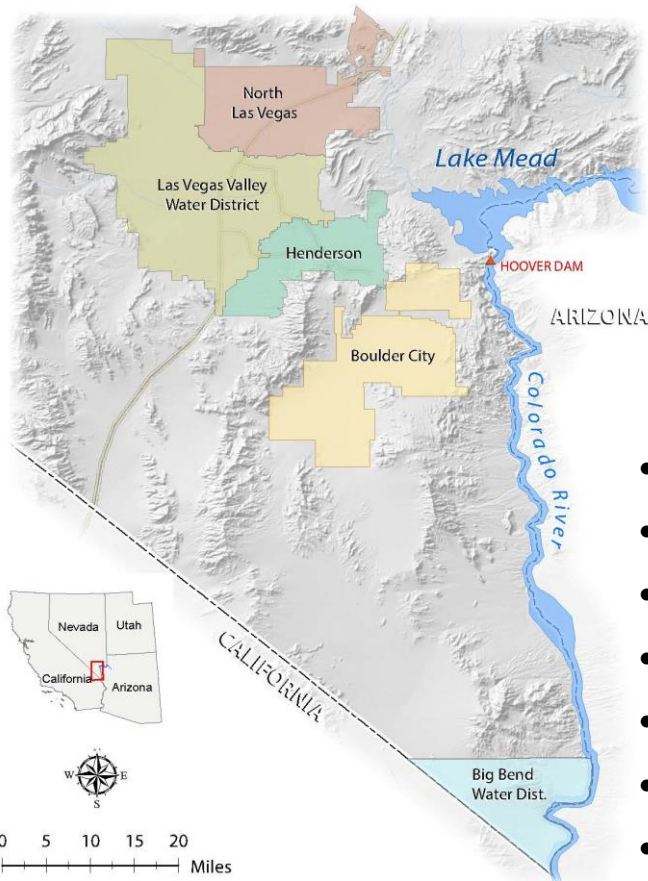


Conservation Loves a Crisis:
*Lessons from North America's
Driest City*



The Southern Nevada Water Authority is a not-for-profit agency created in 1991 to provide a safe, reliable water supply for Southern Nevada.

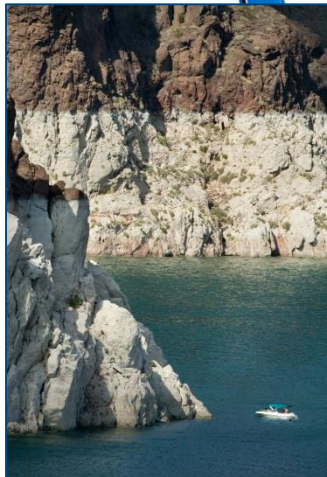


7 Member Agencies

- Big Bend Water District
- City of Boulder City
- City of Henderson
- City of Las Vegas
- City of North Las Vegas
- Clark County Water Reclamation District
- Las Vegas Valley Water District

Southern Nevada snapshot

- 4 inches (100 mm/yr) annual rainfall
- 1,600 square miles (4,100 km²)
- 2,000,000 Residents
- 43,000,000 Visitors Annually
- \$92 Billion Gross Domestic Product
- 73.3% of Nevada GDP



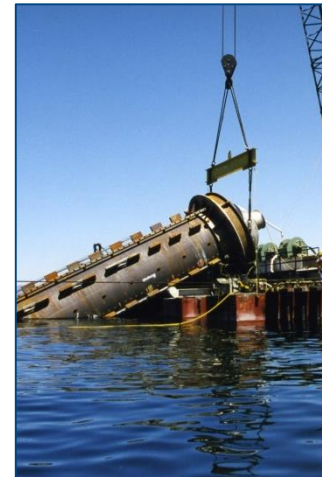
Regional water supply planning



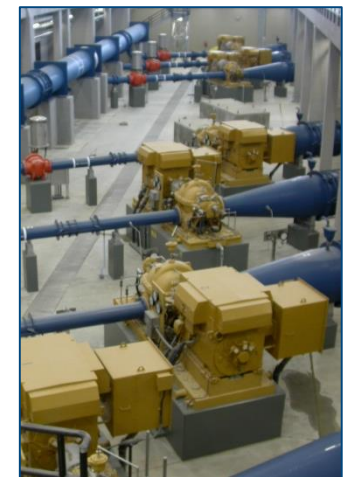
Conservation programming



Water Quality



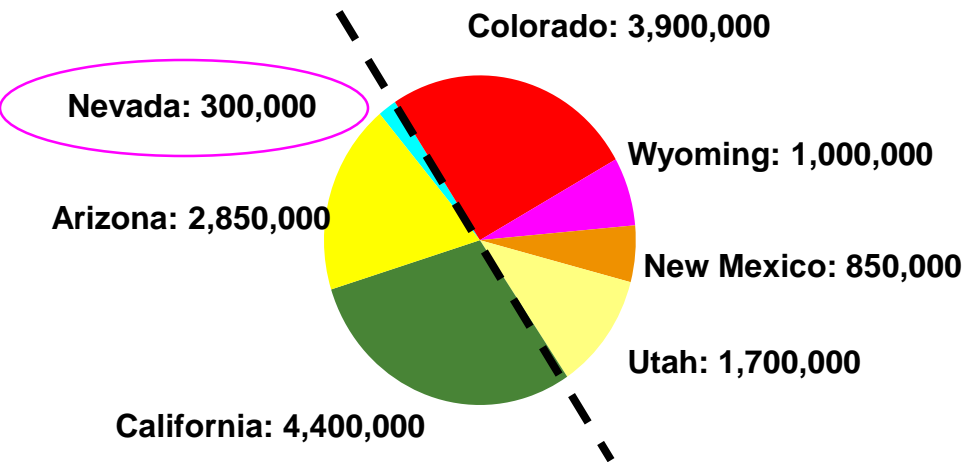
Facility construction



Operate Major Regional Facilities

Colorado River System

UPPER DIVISION
7.5 million afy

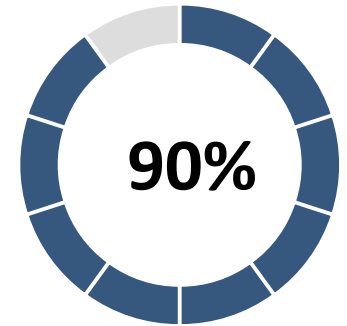
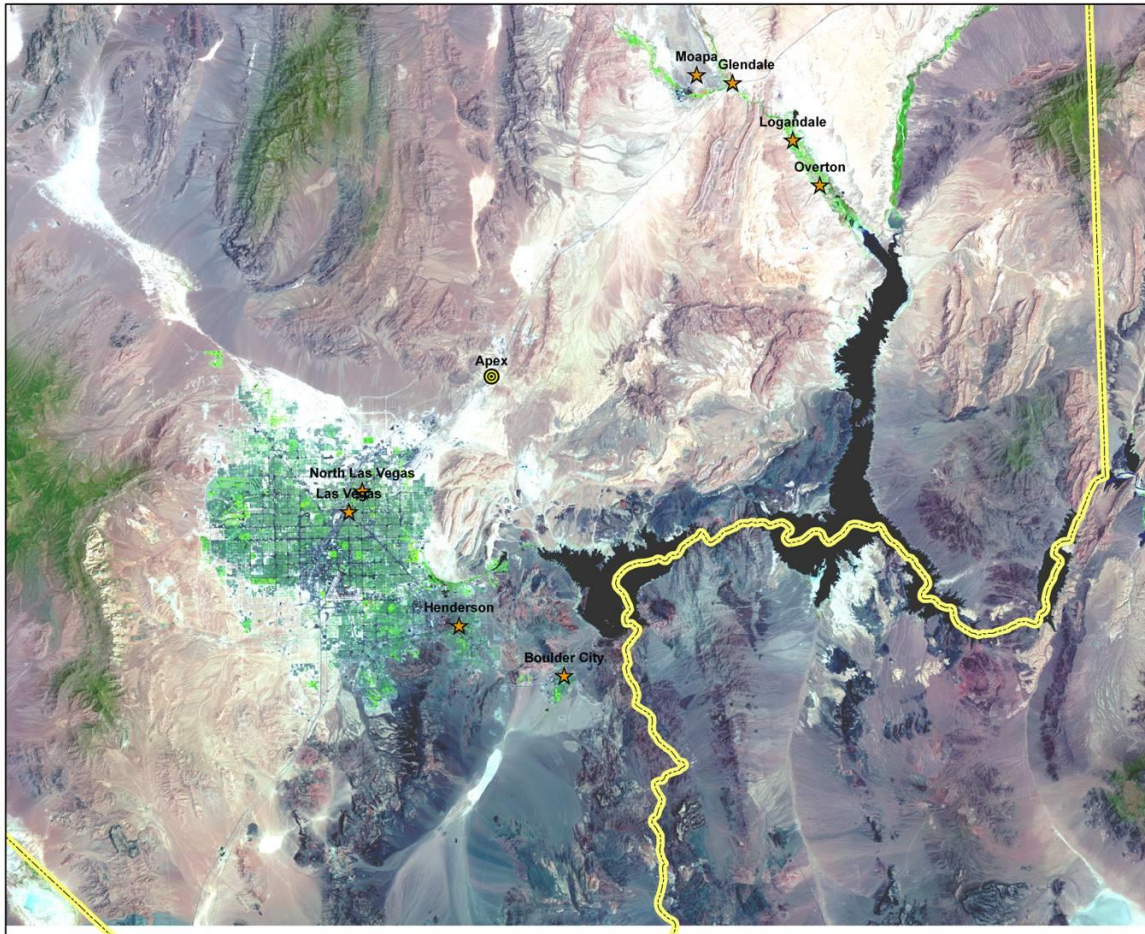


LOWER DIVISION
7.5 million afy

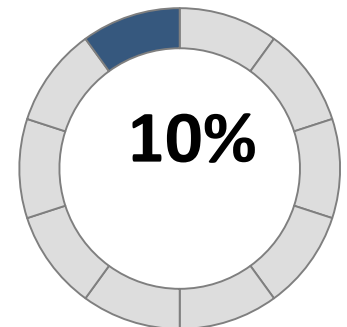
Country of Mexico: 1,500,000 afy



Current Water Supplies

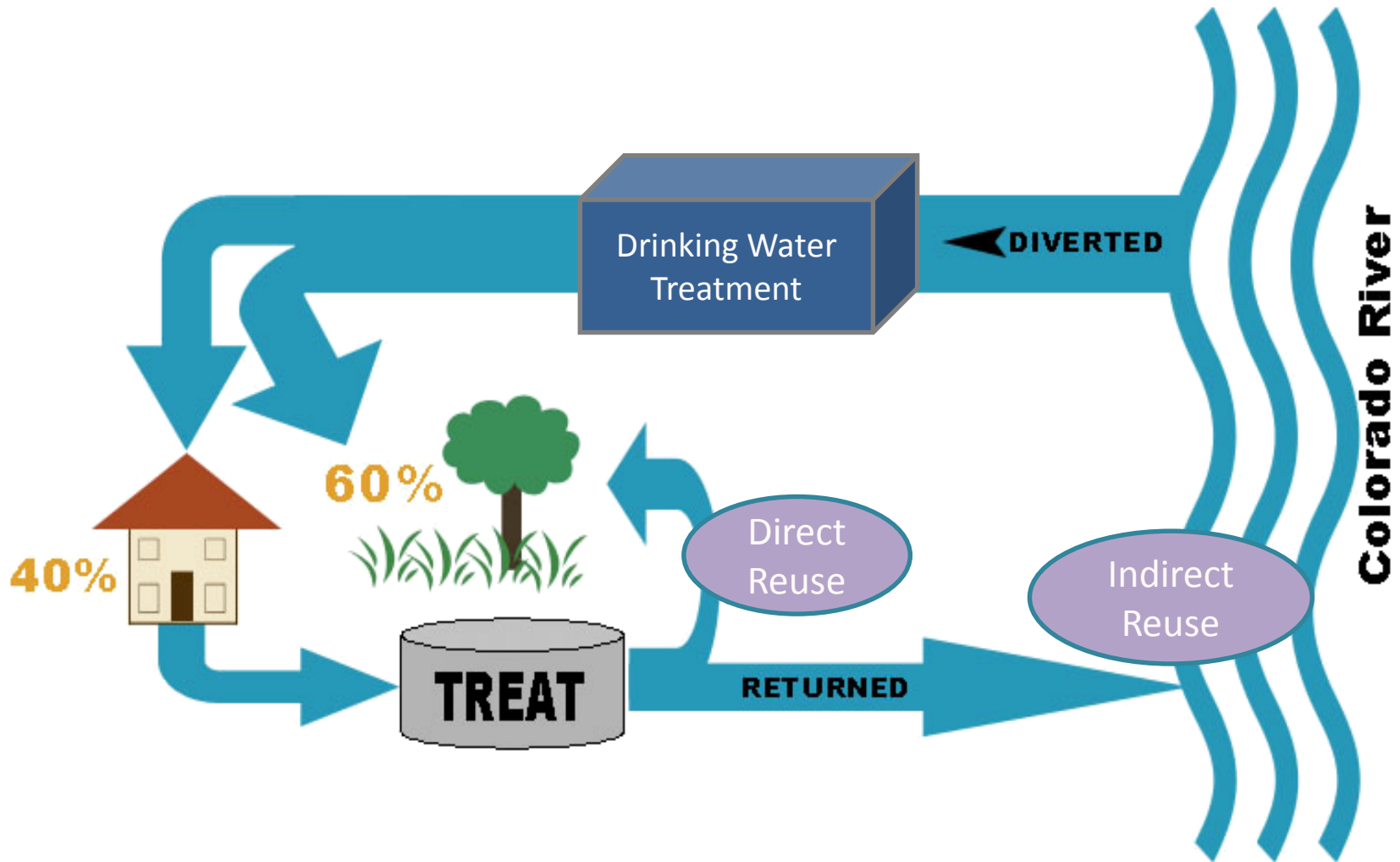


Colorado River Resources

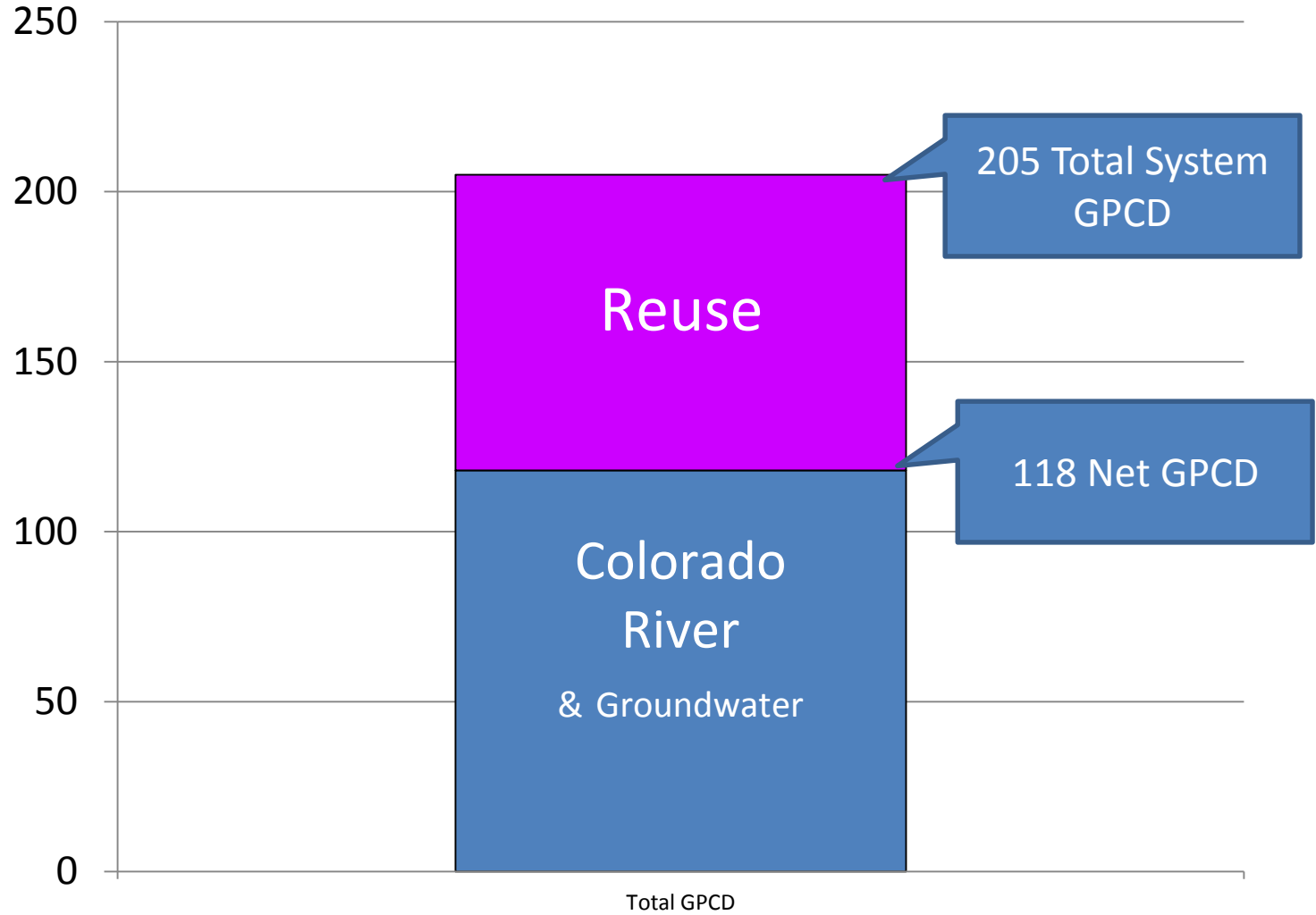


Las Vegas Valley Groundwater

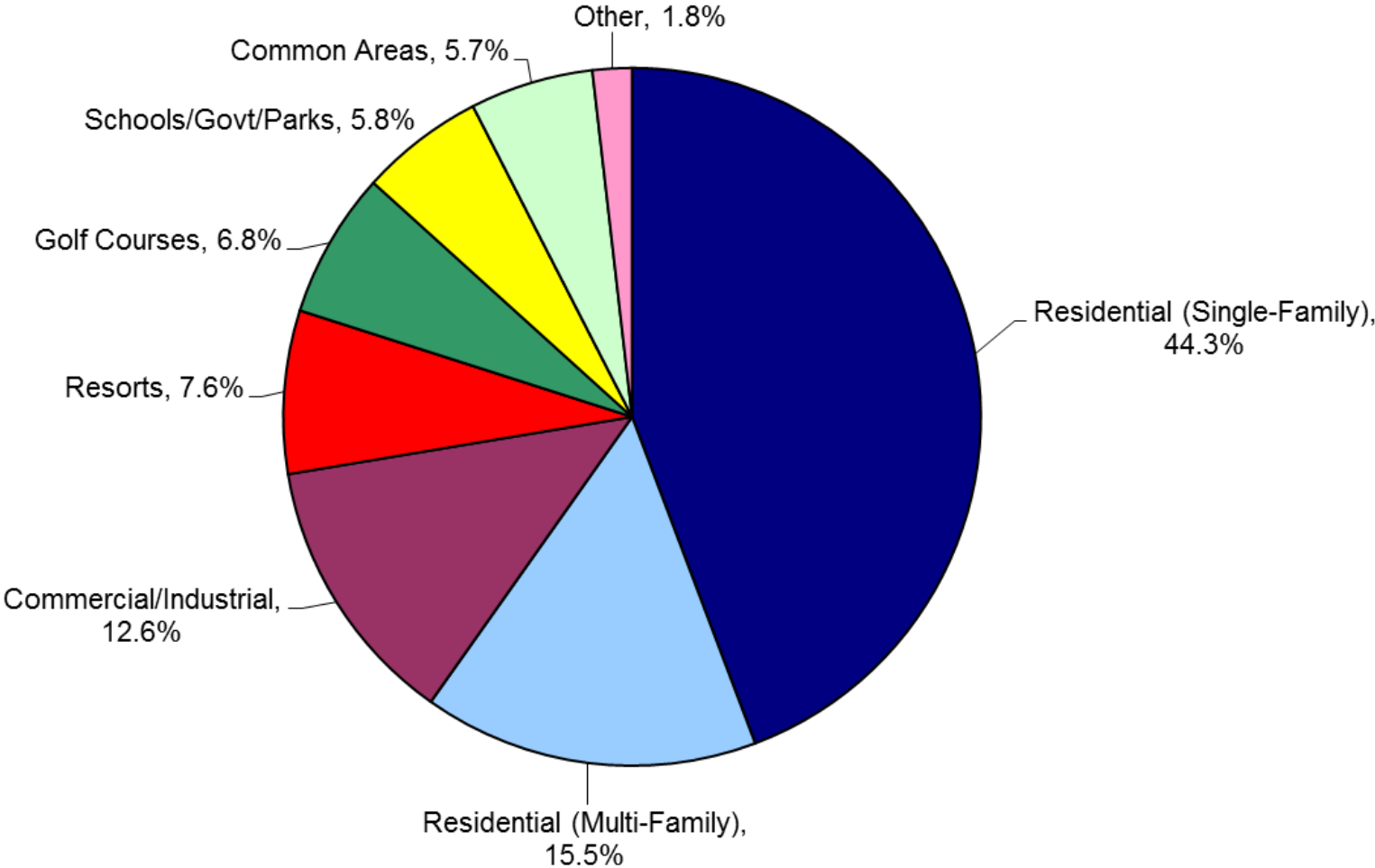
Direct reuse and return-flow credits allow Southern Nevada to reuse 99 percent of treated wastewater flows.



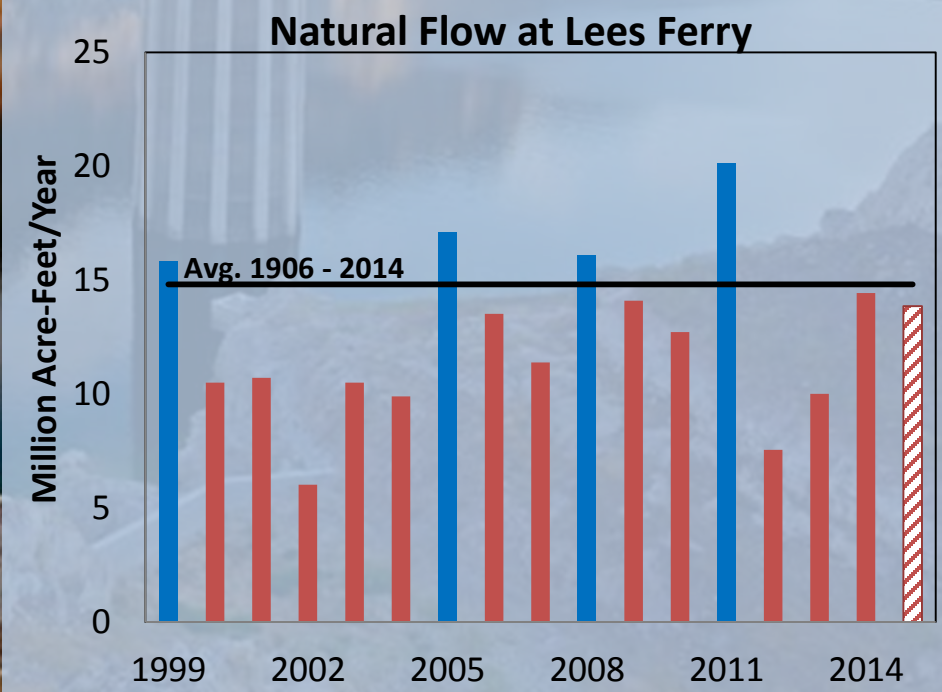
Reuse Extends Water Resources by 70 percent



Municipal Metered Use (2014)



The Colorado River Basin is facing one of the worst droughts in recorded history.



The SNWA is taking a series of actions to address long-term drought and provide a sustainable supply for Southern Nevada.



Conservation



Planning and Water Resources



Infrastructure



CONSERVATION

Through regional collaboration we've adopted plans and policies to reduce water use and change the way water is used in Southern Nevada.

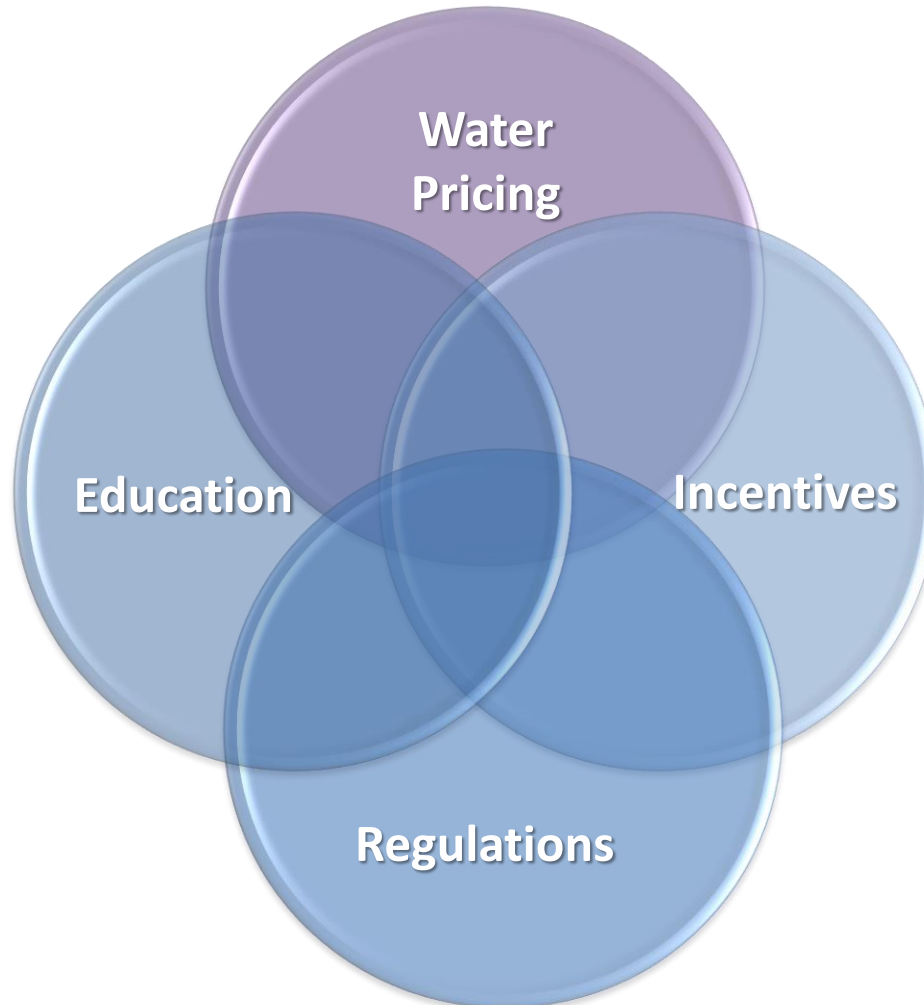
Key efforts:

- **Land development codes**
- **Increased incentives for the Water Smart Landscape program**
- **Mandatory Watering restrictions**
- **Golf course water budgets**
- **Community Outreach**
- **Infrastructure improvements**
- **More robust conservation program offerings**



CONSERVATION

Southern Nevada has one of the nation's most aggressive and comprehensive water conservation programs.



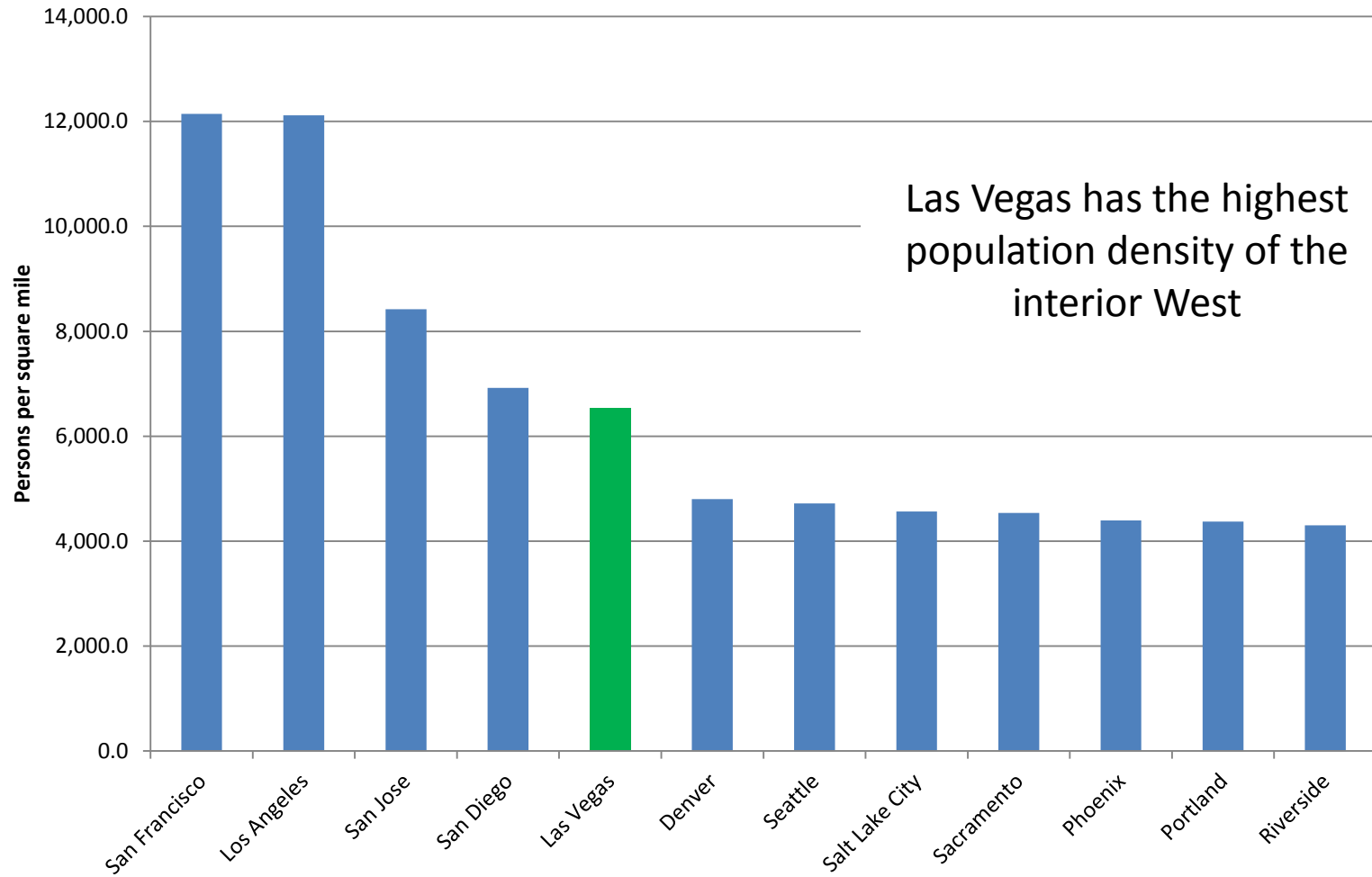


Land Development Codes

- **No turf in residential front yards**
- **Turf limited to 50% in back yard**
- **Multi-family properties' turf limited**
- **No turf installations in new commercial properties**
- **Fountain restrictions**

Population Density

Major Western MSA's over 1 Million Population





CONSERVATION



WATER SMART LANDSCAPES

PROGRAM FACTS

1,625 hectares

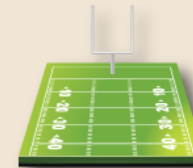
175 MILLION

Square feet of grass that has been removed since the WSL program began in 1999

THAT'S EQUIVALENT TO:

Enough grass to cover more than

Rolling an 18" wide strip of sod nearly



OR



3,000
FOOTBALL FIELDS

90%
AROUND THE EARTH

88 BILLION

Gallons of water saved to date.

That's enough water to fill the Luxor Hotel Pyramid

244
TIMES



Stop Chasing your Tail...



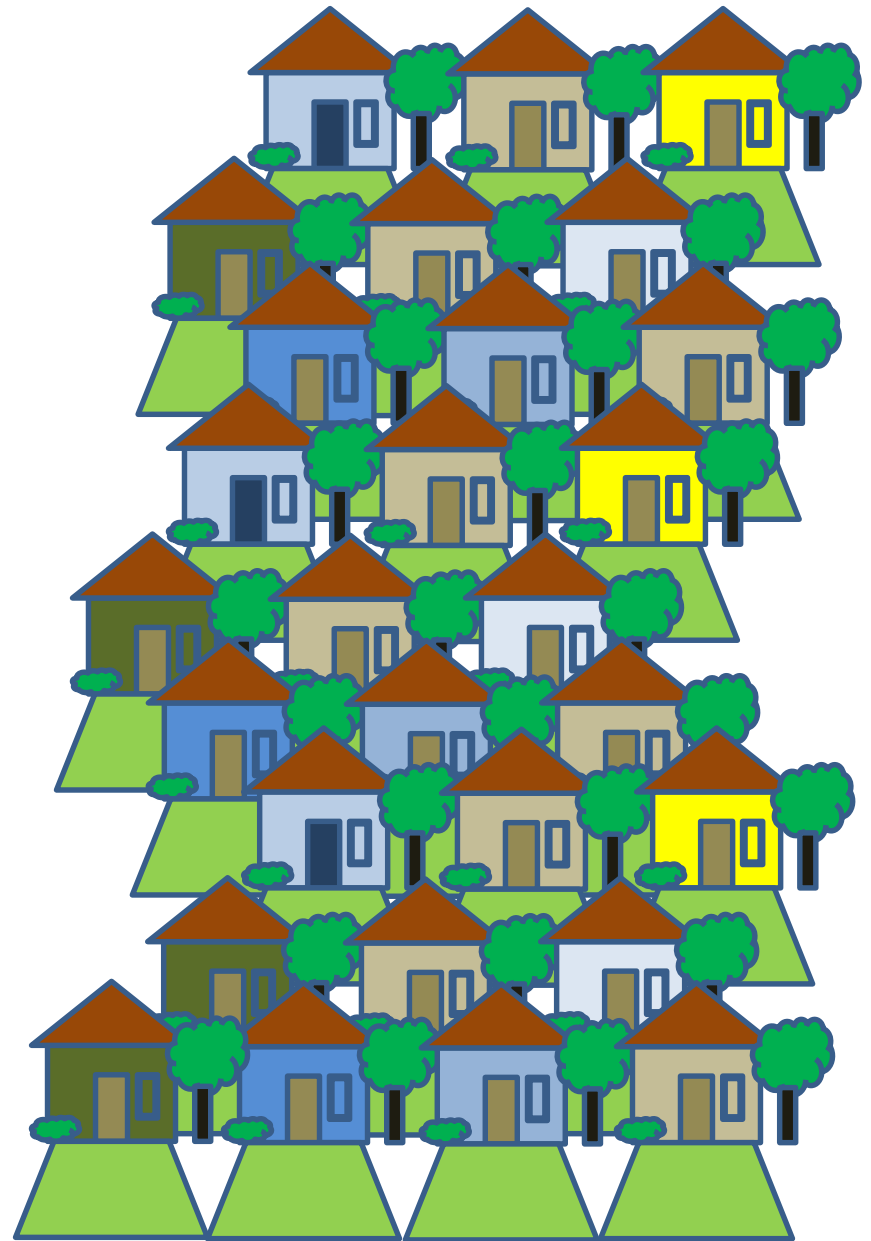


CONSERVATION

**2000 through 2003: For
Every Home Voluntarily
Converted ...**



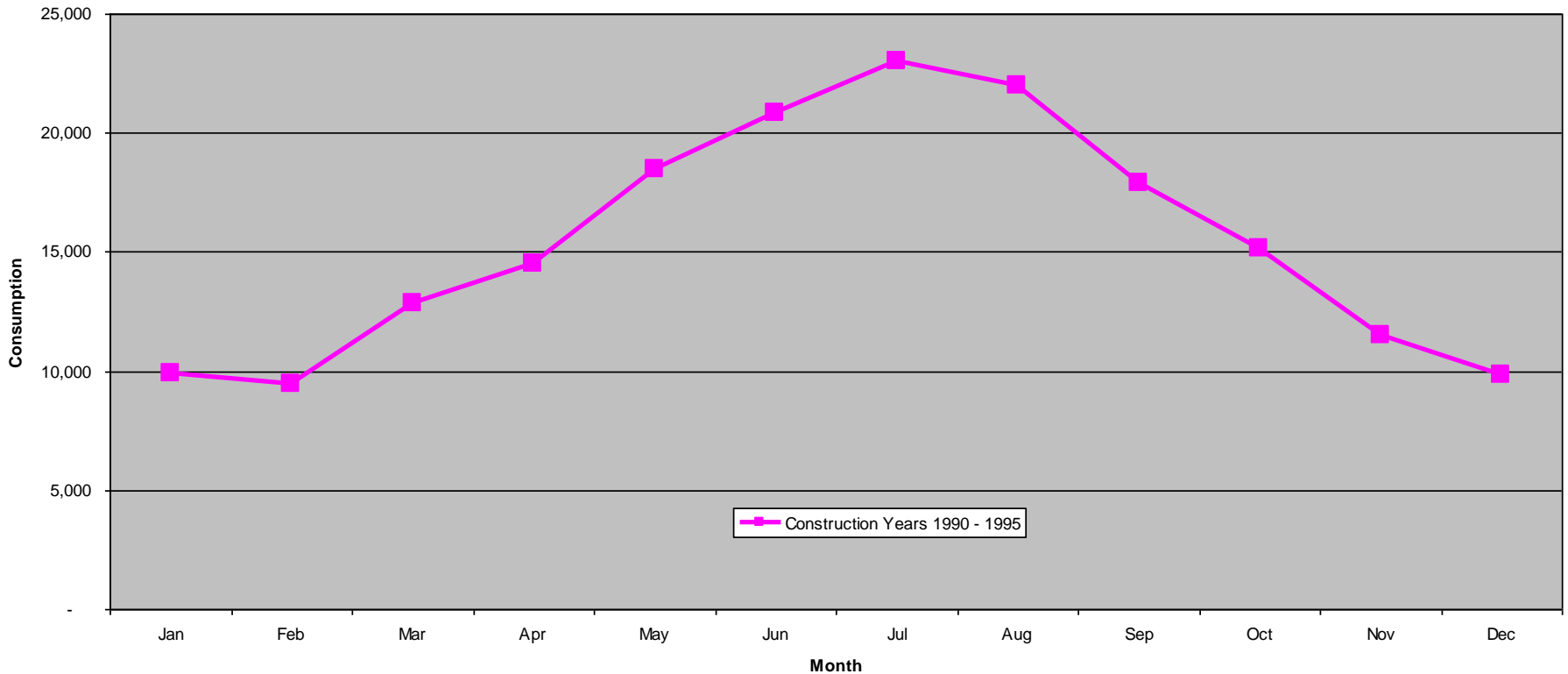
**Twenty-eight New
Homes were built,
most with front
lawns**



Monthly Consumption

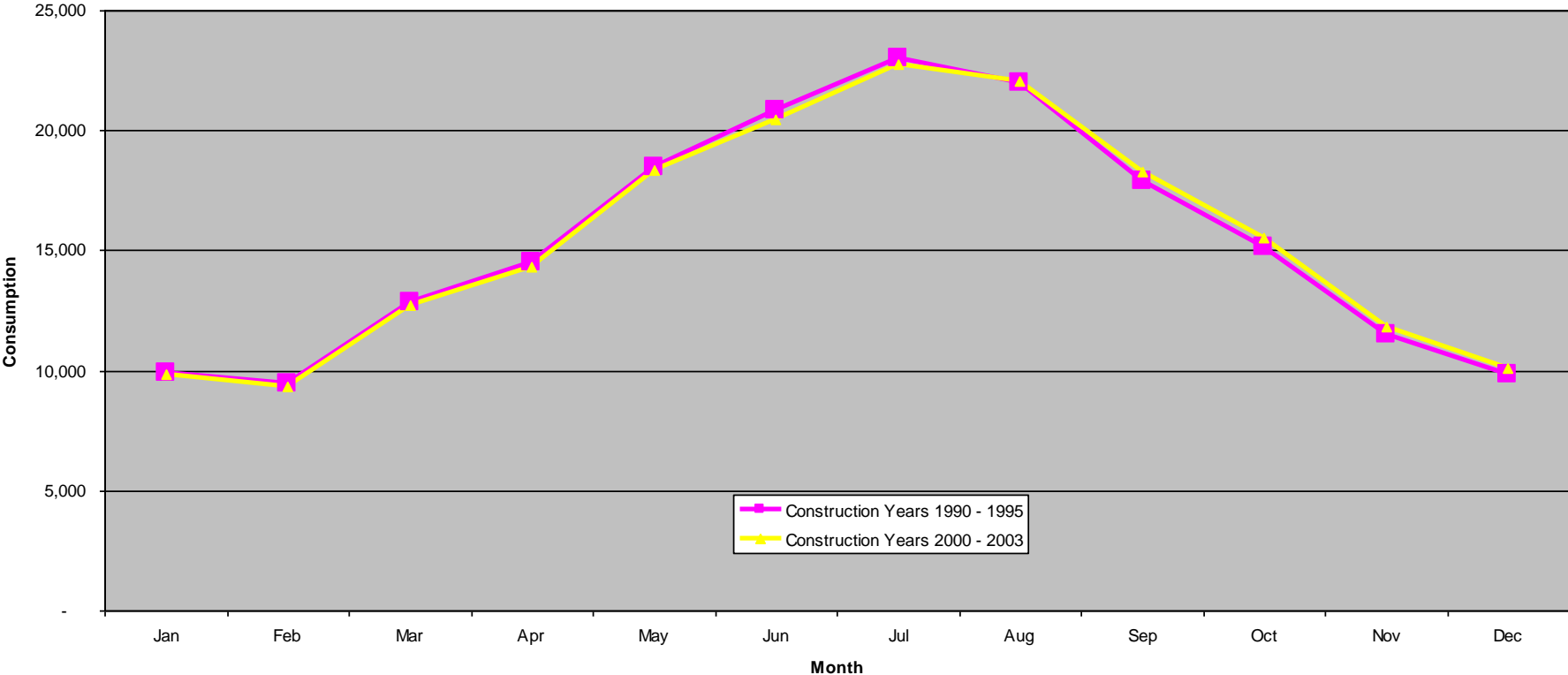
Standing Homes Built 1990-1995

Average Monthly Consumption
Two calendar years of 2007-2008



Monthly Consumption 1990-1995 v. 1995-2003

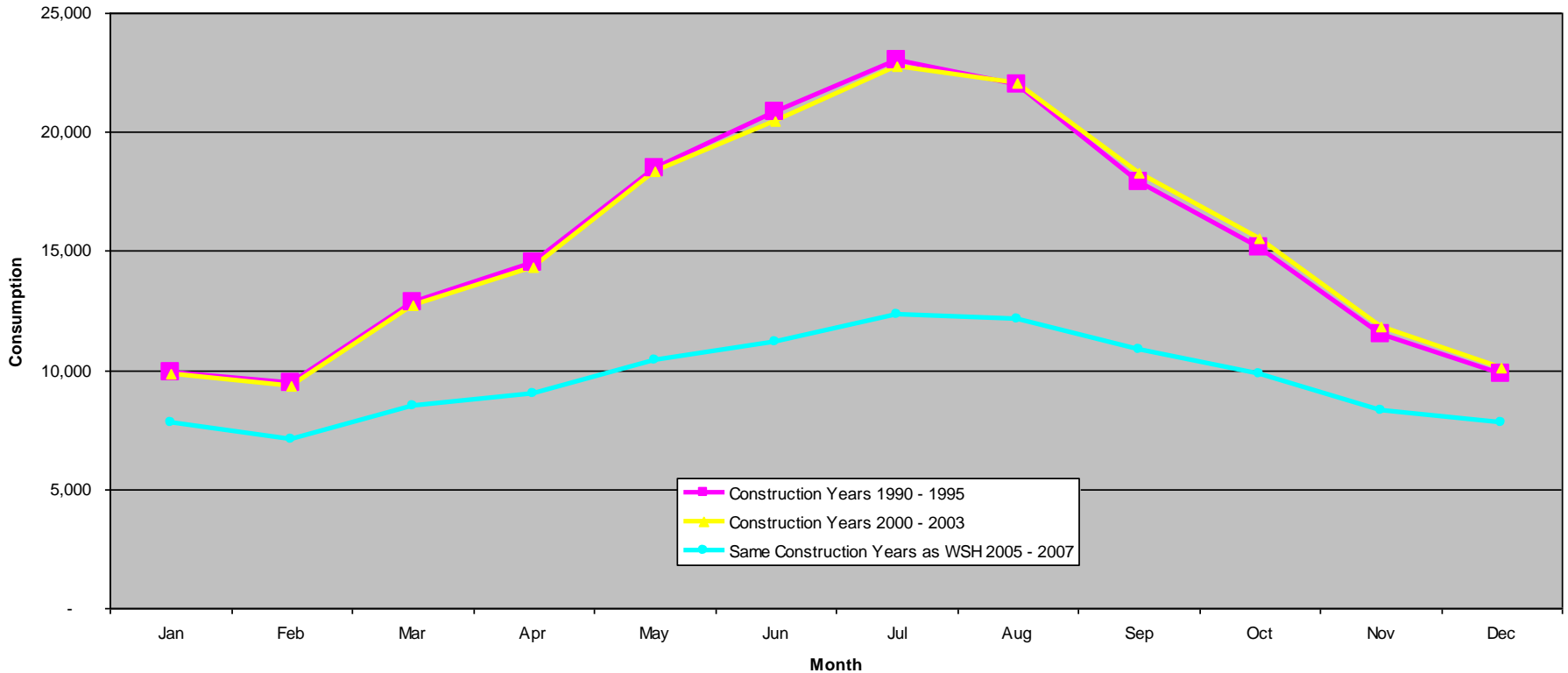
Average Monthly Consumption
Two calendar years of 2007-2008



Monthly Consumption

Post 2003 Homes Comparison

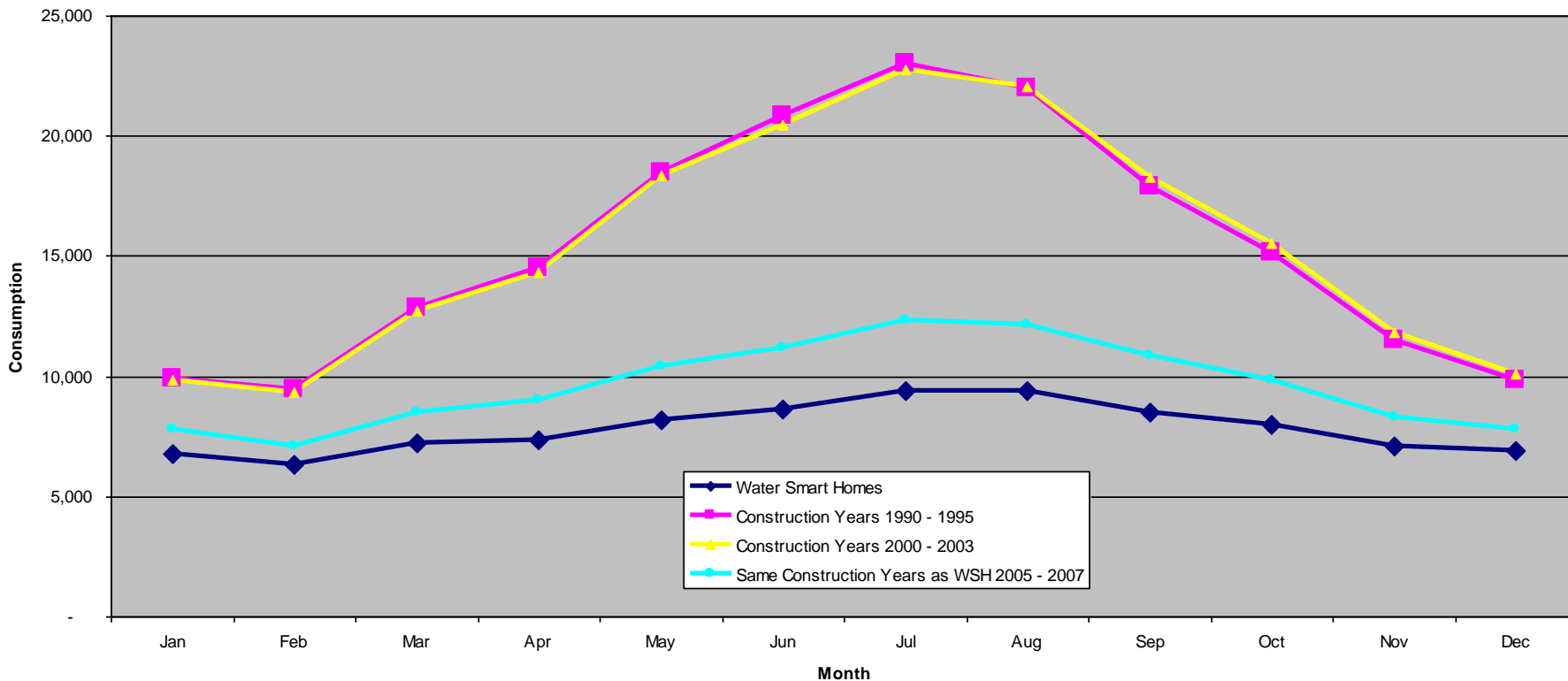
Average Monthly Consumption
Two calendar years of 2007-2008



Monthly Consumption

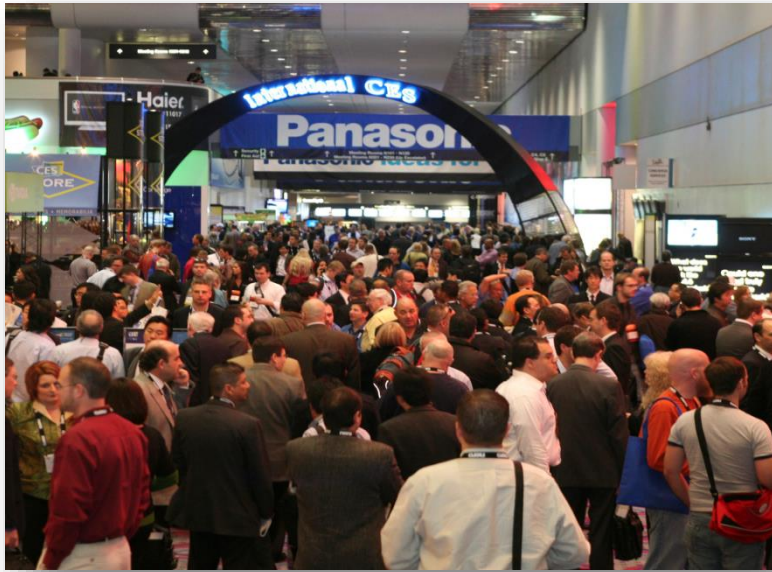
Water Smart Homes Comparison

Average Monthly Consumption
Two calendar years of 2007-2008





Tourism: A City Within a City



- 41 Million visitors
- Average stay 4.2 days
- Equivalent to 473,000 visitors per day*
- Vegas tourism produces \$50B annually, more than half of Nevada's GDP

* Equivalent to hosting the population of Long Beach, Sacramento, Atlanta or Kansas City



CONSERVATION

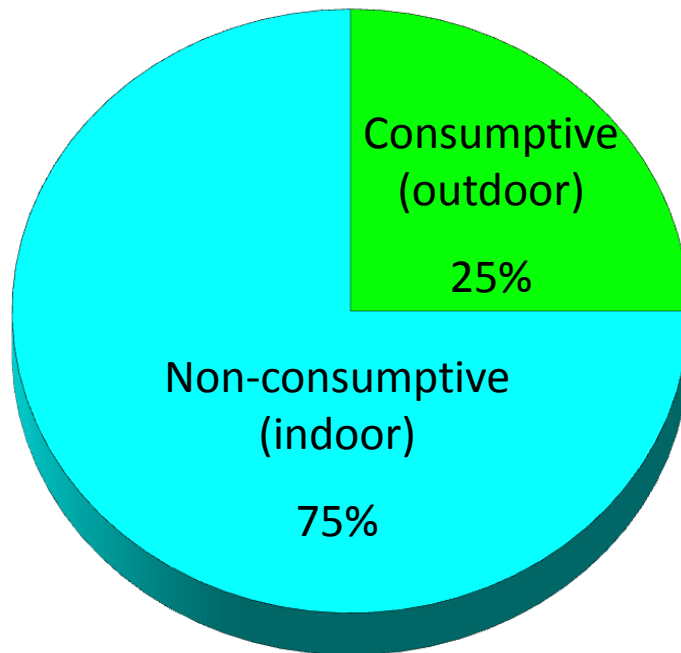


Most resort water is used indoors and intercepted for treatment and reuse.

As a result, Southern Nevada's Resorts consume less than 3% of the region's water resources.



Mega-Resort Water Use



Surprise! Evaporation from cooling systems exceeds the combined use of landscape, water features and pools.





CONSERVATION

On average, Las Vegas resort hotels host less than 10 square feet of pool area per guest room.

Residential pools average 160 square feet per person.

Pools comprise 0.5% of the average resort's land use.





Caesar's Palace to the Visitor's Eye



The gaming and entertainment industry thrives on a perception of abundance...



Caesar's Palace to the Bird's Eye



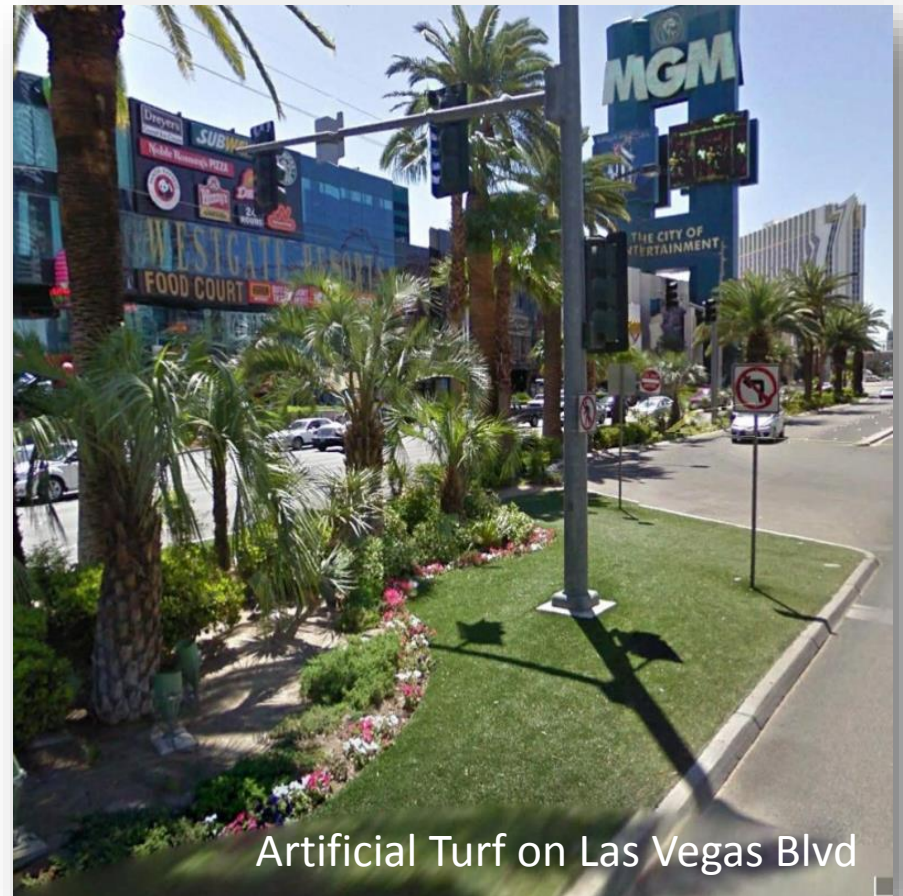
Water Features account for 1.5 percent of average resort land use.

Landscape accounts for less than 4% of resort land use.



Reinventing The Strip

Las Vegas Resorts converted nearly 1.4 million square feet of ornamental lawns, saving 75 million gallons per year



Artificial Turf on Las Vegas Blvd

Leading With Technology

SNWA has helped resorts complete 88 technology projects that save the region 700 million gallons each year



Worker updating a cooling tower



SIENA
GOLF CLUB

© 2012 Google

Google earth

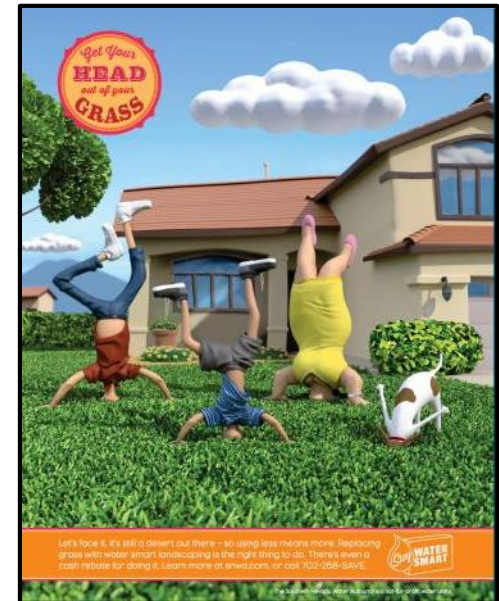
Date: 6/21/2012

36°06'18.82" N 115°19'21.20" W elev. 2784 ft

Eye alt 5686 ft



The community has adopted a “culture of conservation” through programs, rebates, policies and education.





PLANNING AND WATER RESOURCES

SNWA Maintains a 50-year Water Resource Plan that is reviewed annually and update as needed

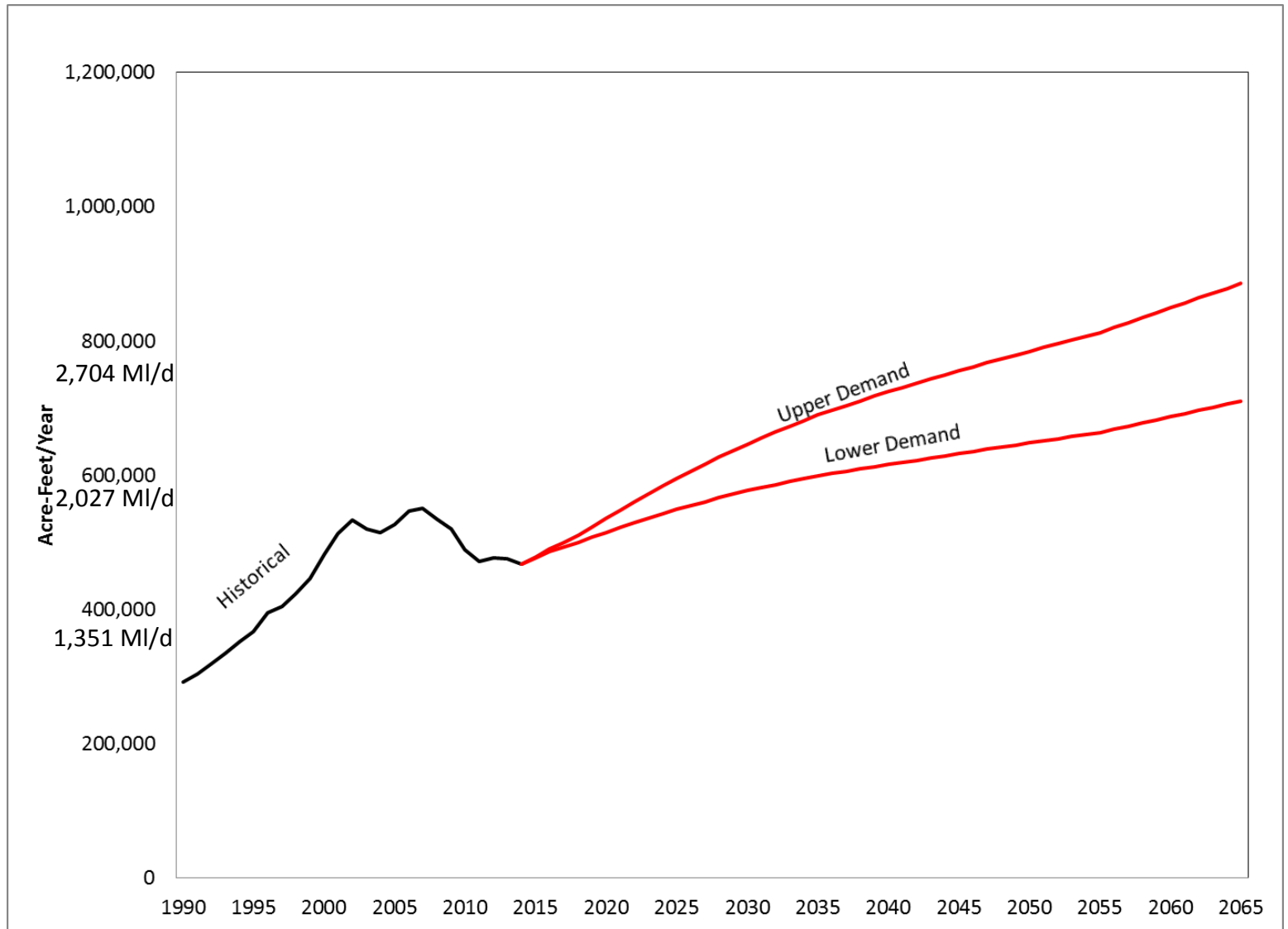
Key Considerations:

- Long-term water demands under varied economic conditions and water use patterns
- Potential impact of continued drought and climate change on water resource availability, particularly for Colorado River supplies



2015 Water Resource Plan

The SNWA Water Resource Plan considers two water demand projections





PLANNING AND WATER RESOURCES

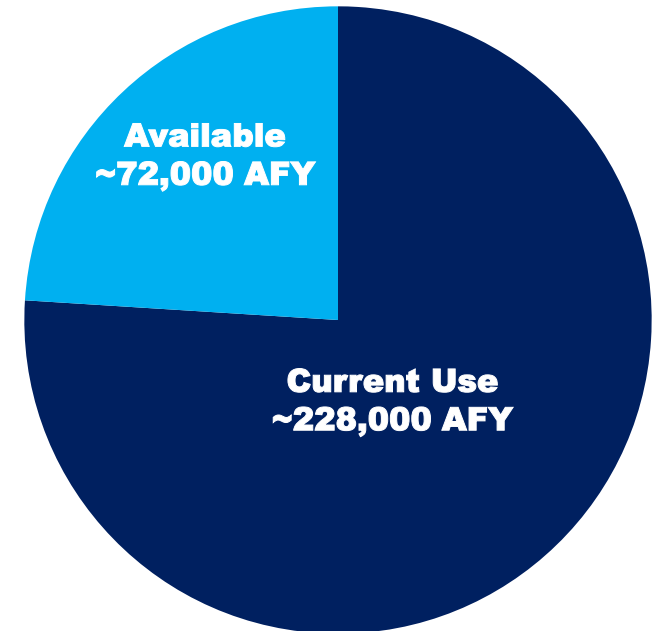
SNWA's Water Resource Portfolio includes a diverse set of resource options that will be used to reliably meet the community's current and future water resource needs

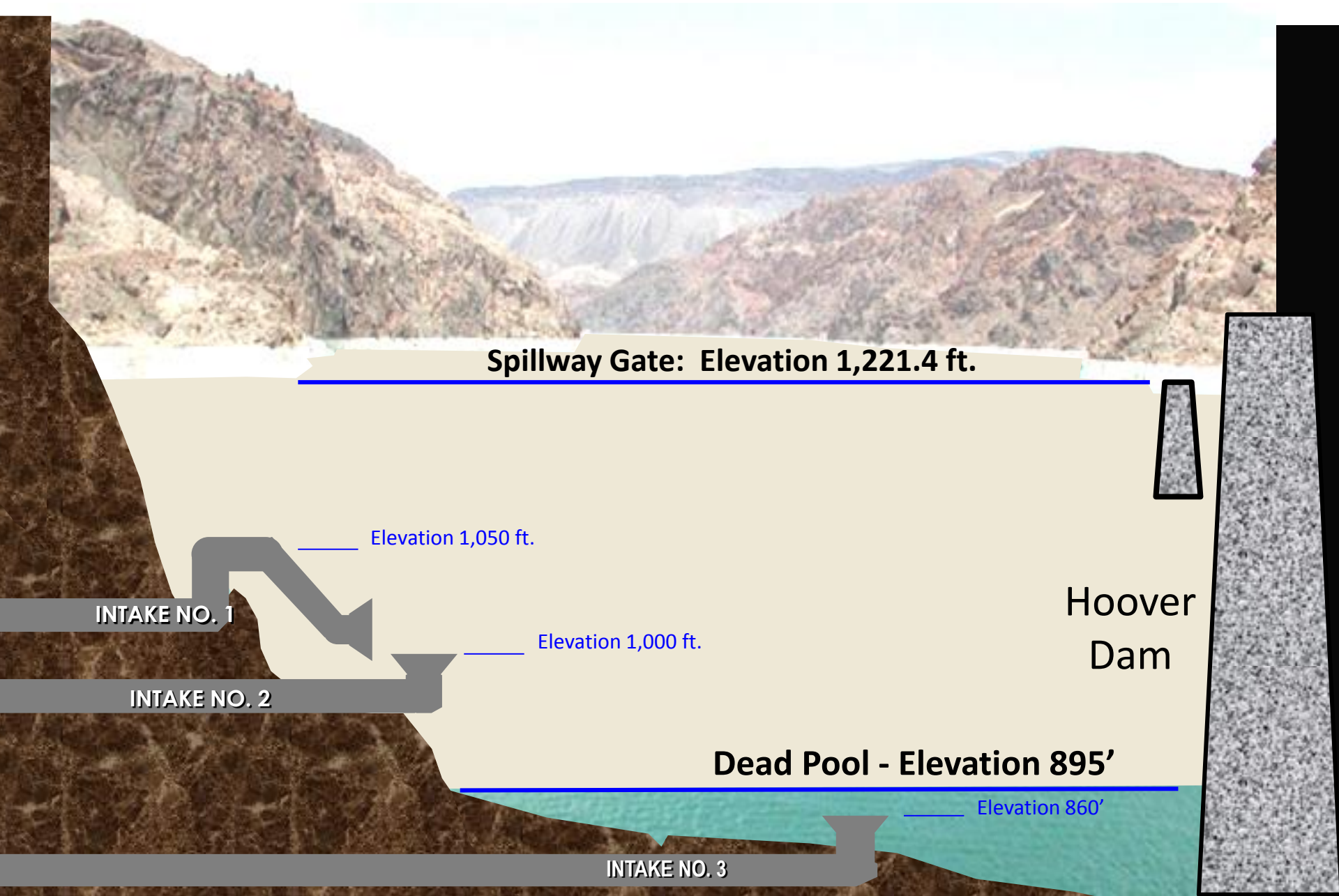
Permanent Resources	Temporary Resources	Future Resources
Colorado River	Southern Nevada Groundwater Bank	Desalination
Nevada Unused Colorado River (non-SNWA)	Interstate Banks (Arizona and California)	Virgin River / Colorado River Augmentation
Tributary Conservation/Imported ICS	Intentionally Created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

Conservation is Strengthening Future Supplies

- The community responded to drought with serious and sustained conservation efforts
- As a result, Nevada is not using its full 300,000 AFY Colorado River allocation
- Available (unused) supplies are being banked for future use. They are also being used to help stabilize Lake Mead water levels

**Southern Nevada Colorado River
Water Use & Availability**





Spillway Gate: Elevation 1,221.4 ft.

Elevation 1,050 ft.

INTAKE NO. 1

Elevation 1,000 ft.

INTAKE NO. 2

**Hoover
Dam**

Dead Pool - Elevation 895'

Elevation 860'

INTAKE NO. 3



Major Project Components



- **3 shafts**
(Up to 30 ft. diameter and 600 ft deep)
- **4 miles (6.4 kilometers)**
of tunnel
(Up to 20 ft [6.1 meters] in diameter)
- **A 100-ft (30.5 meters)**
tall steel and concrete
intake structure on the
lake bottom



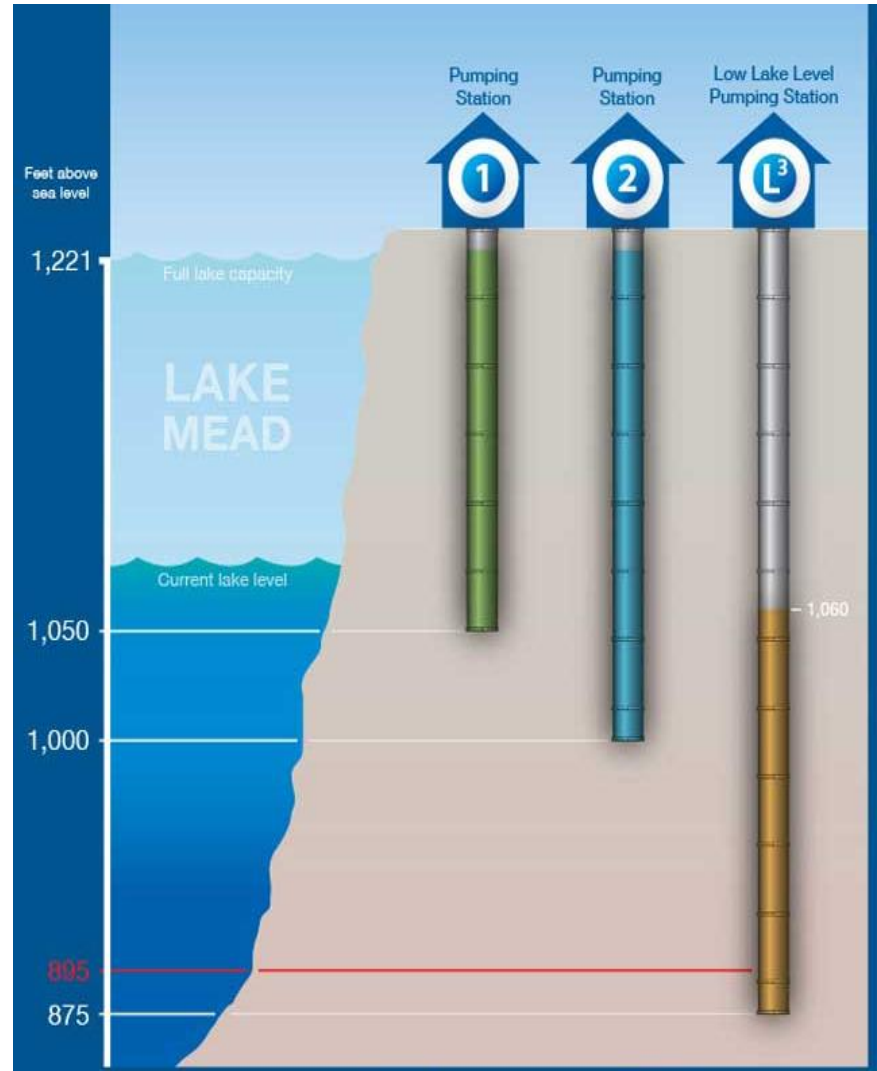
Cement trucks for intake structure placement



Intake structure

Construction has begun on a new Low Lake Level Pumping Station near Lake Mead

When completed, the pump station will ensure water deliveries down to 875 feet (Below 'dead pool' in Lake Mead)



The SNWA has weathered drought impacts through continuous assessment, flexible planning and action.

Adaptive Management:

- Reduced consumptive use of Colorado River supplies.
- Increased water banking and recharge.
- Retrofitted/constructed necessary facilities to ensure reliability.
- Initiated legal/environmental permitting work associated with future resources.
- Developed new supplies (banking, ICS).

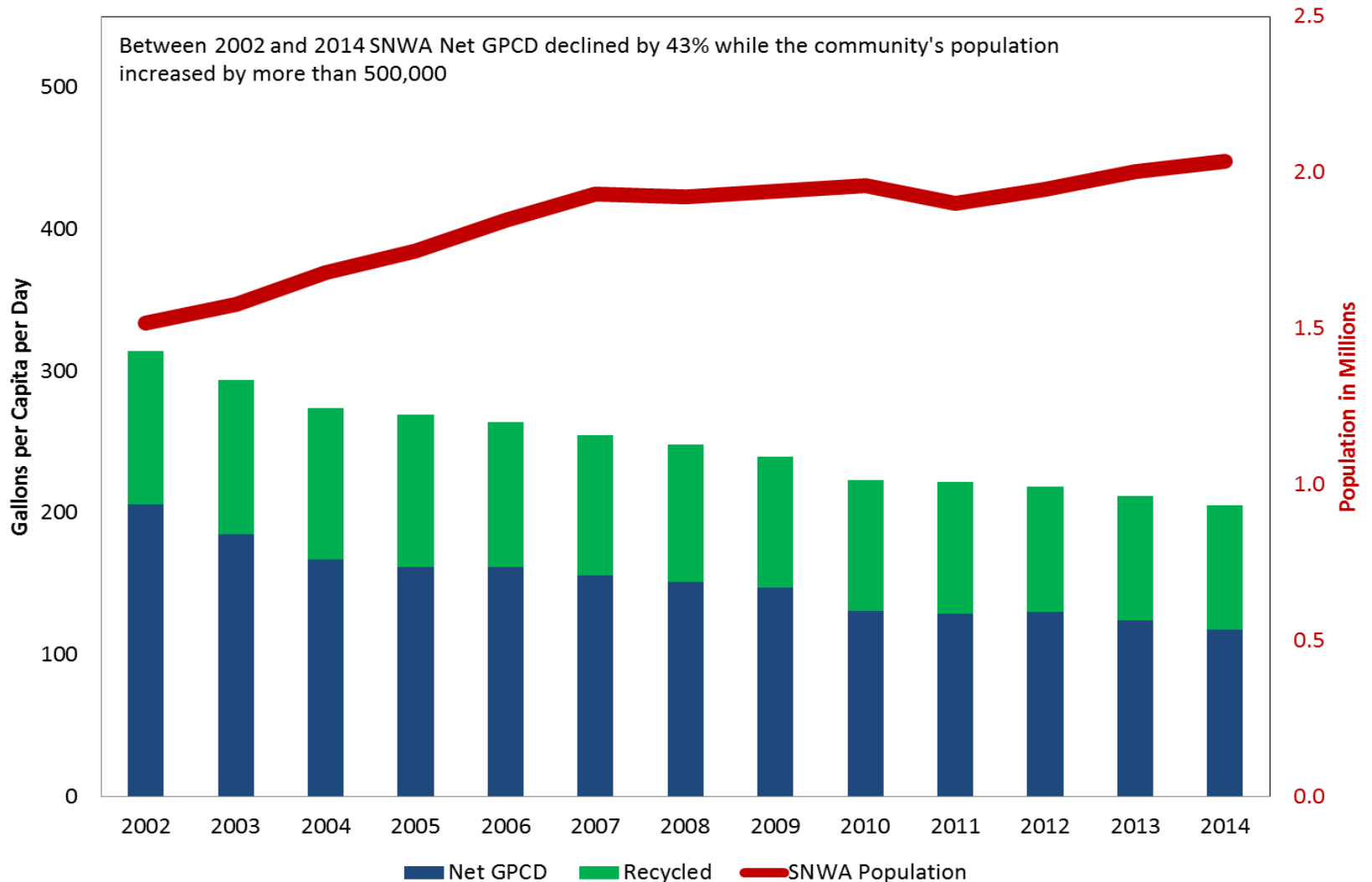




CONSERVATION

SNWA GPCD and Population

Between 2002 and 2014 SNWA Net GPCD declined by 43% while the community's population increased by more than 500,000





Doug Bennett
Conservation Manager
Doug.bennett@snwa.com