

# This presentation premiered at WaterSmart Innovations

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# Golf Course Response to Drought Induced Recycled Water Budgets

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# The Mojave Desert

- 25,000 Square Miles
- Low Rainfall
- Temperature Extremes
- Low Humidity
- High Winds
- Intense Sunshine
- Salty Soils



# Unique Environment?

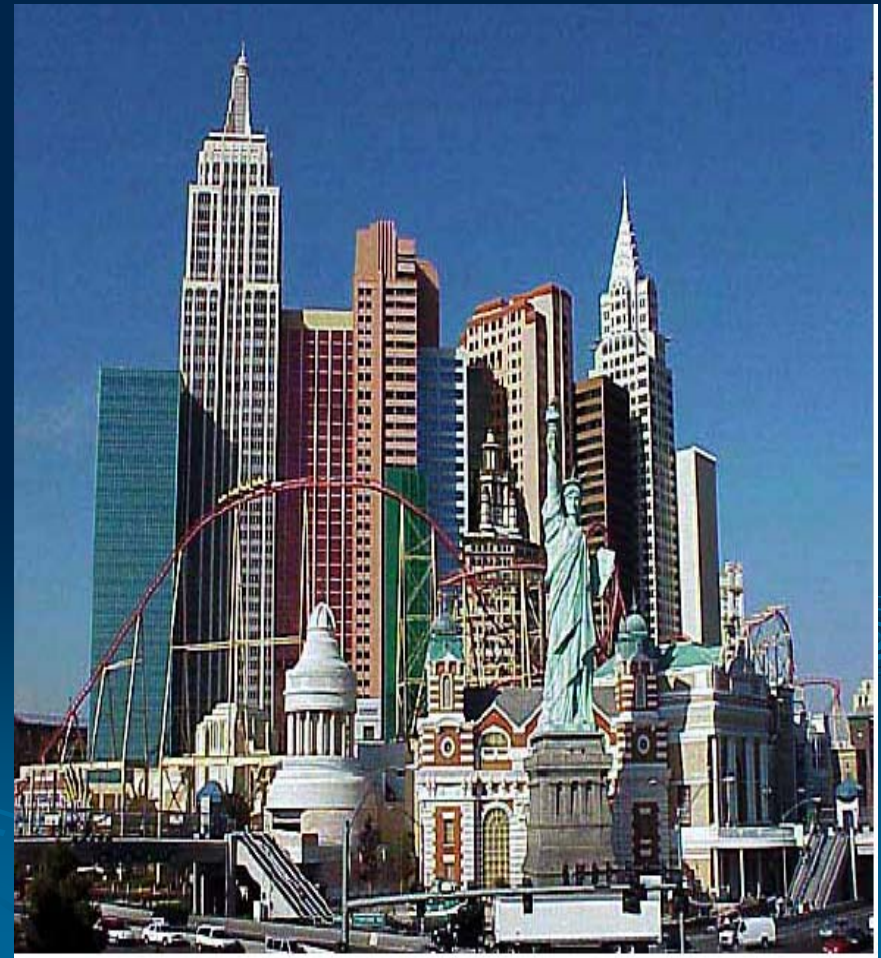


- Specialized Plants
- Specialized Animals
  - So Specialized that they Survive on 4 inches or less of Rain per year



# Southern Nevada

- Situated in the Mojave Desert
- One of the fastest growing areas in the United States
- 90% of the Water used in Southern Nevada comes from the Colorado River.

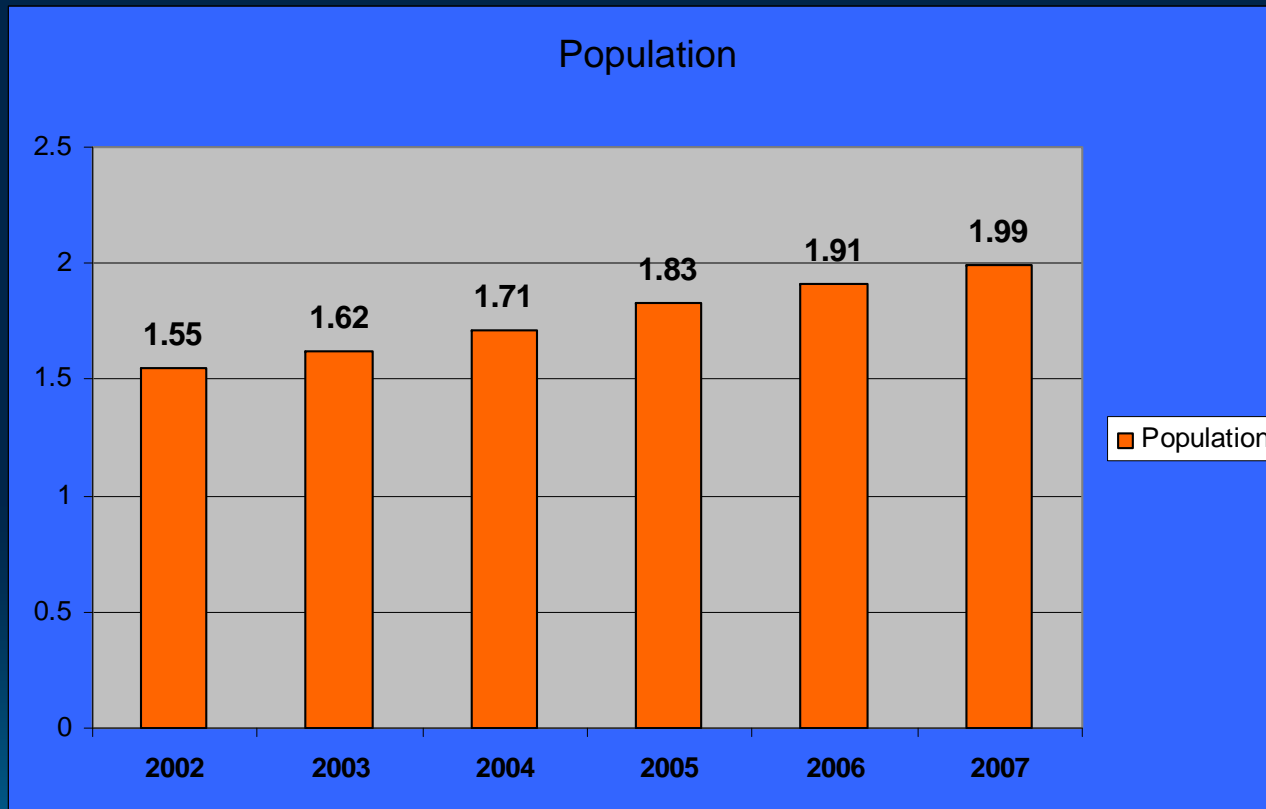


# Colorado River

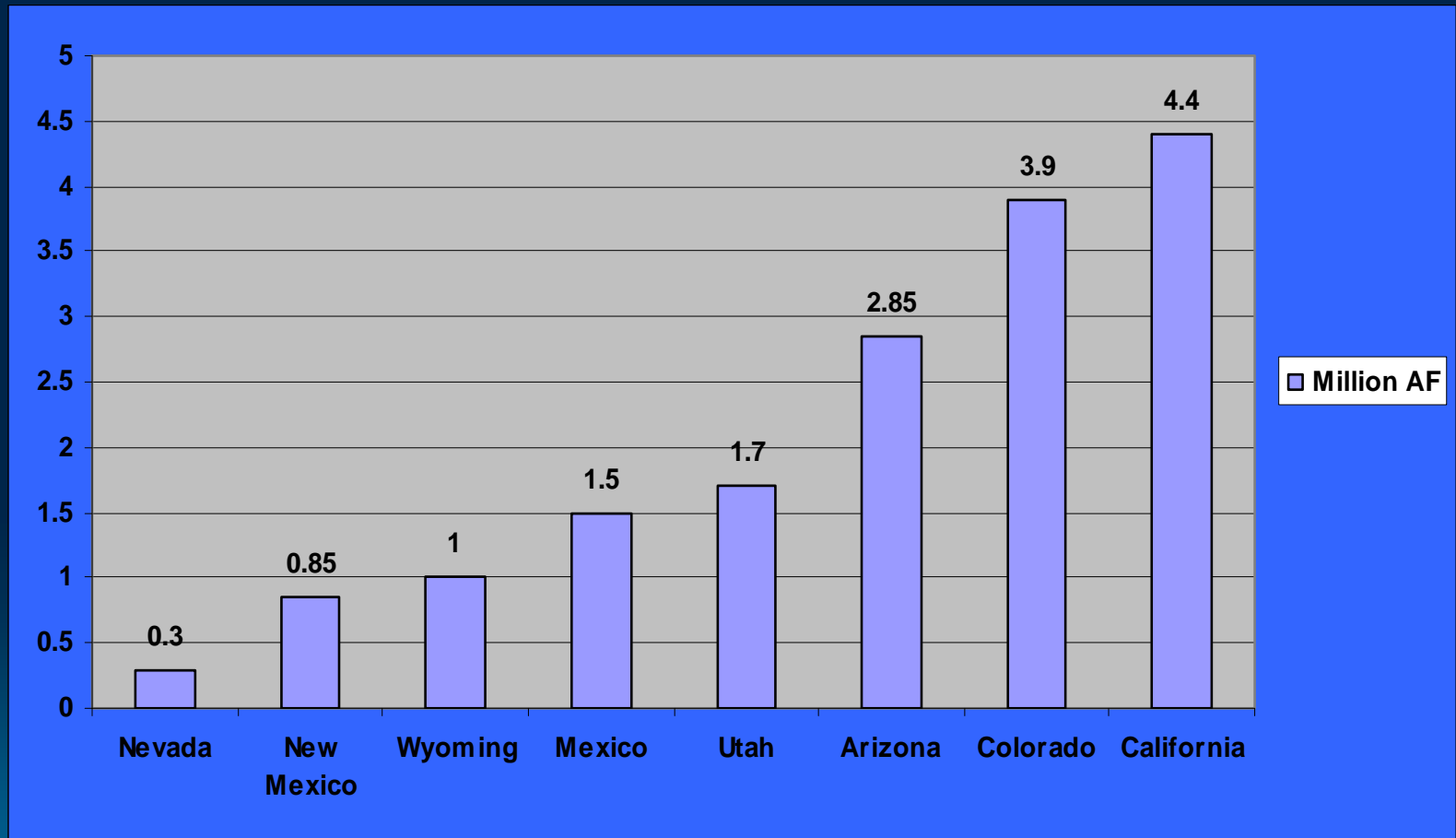
- Sustains over 25 million people in 7 states and Mexico
- Support the west's most productive Agriculture
- The most Regulated river in the World
- Has two of the largest man made lake in the world on it
- Subject to Droughts



# Southern Nevada's Population



# Colorado River Resource





# The Storage System



# Drought Conditions

- No drought
- Drought Watch
- Drought Alert
- Drought Critical



# Drought Stage Golf Course Water Budgets

- 6.5 acre-feet of water per acre during Drought Watch
- 6.3 acre-feet of water per acre during Drought Alert





# Golf Course Water Budgets

- Irrigated acres
  - Potable, Raw, Reclaimed and Recycled
  - Turf and Landscape
  - Lakes and Ponds



# Golf Course Management Considerations

- Limited Water
- Reuse Water
- Remain Competitive
  - Playability of the golf course
  - Additional maintenance costs
- Prepare for the Future
  - Potential water savings
  - Payback on capital expenditures



# Options Available

- No Overseeding
- Partial Overseeding
- Remove decorative lakes
- Plant out of play areas to drought tolerant or native grasses
- Reduce nonfunctional turf acreage



# New Water Smart Landscape Program Conditions

- \$ 1.50 pre square foot for all turf up graded to Water Smart Landscape.
- No Cap





























# Benefit to Turf Reduction

- Renewed interest in the golf course
- Handicaps are more realistic
- Golf course has more color and movement
- Focus on cultural practices
- Reduced maintenance costs
- Net water savings
- Leaching
- Position golf course for the future
- Partnership with the SNWA

# Las Vegas Golf Conversions

- 33 Southern Nevada Golf Courses have taken advantage of the incentive program (63%).
- 629 acres of non-functional turf have been removed
- Annual water saving of 1.5 billion gallons approximately 4600 ac.ft.



# Questions ?



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# Golf Course Management Challenges

## Reuse Water Challenges

- Sodium increase
- Plant sensitivity
- Increased nitrates
- Lake maintenance
- Overseeding
- Increased maintenance costs



# Golf Course Management Options

- Calcium applications
  - Increase frequency of aerification
  - Plant and turf selection
  - Use low salt fertilizers
  - Pre-treat water prior to irrigating.
  - Leaching
  - Reduction of maintained Area
- 

# Reduction of Acreage to Achieve 15% Leaching

Golf Course	Acres	Water AF/A	Leaching Required @ 15% in Acres	Irrigated Acre Reduction	Actual Acre Reduction
A.	120	756	134.67	14.67	2
B.	85	535.5	95.39	10.39	0
C.	240	1512	269.33	29.33	54
D.	110	693	123.44	13.44	0
E.	220	1386	246.89	26.89	12.4
F.	240	1512	269.33	29.33	11
G.	162	1020.6	181.80	19.80	12
H.	144	907.2	161.60	17.60	29.84