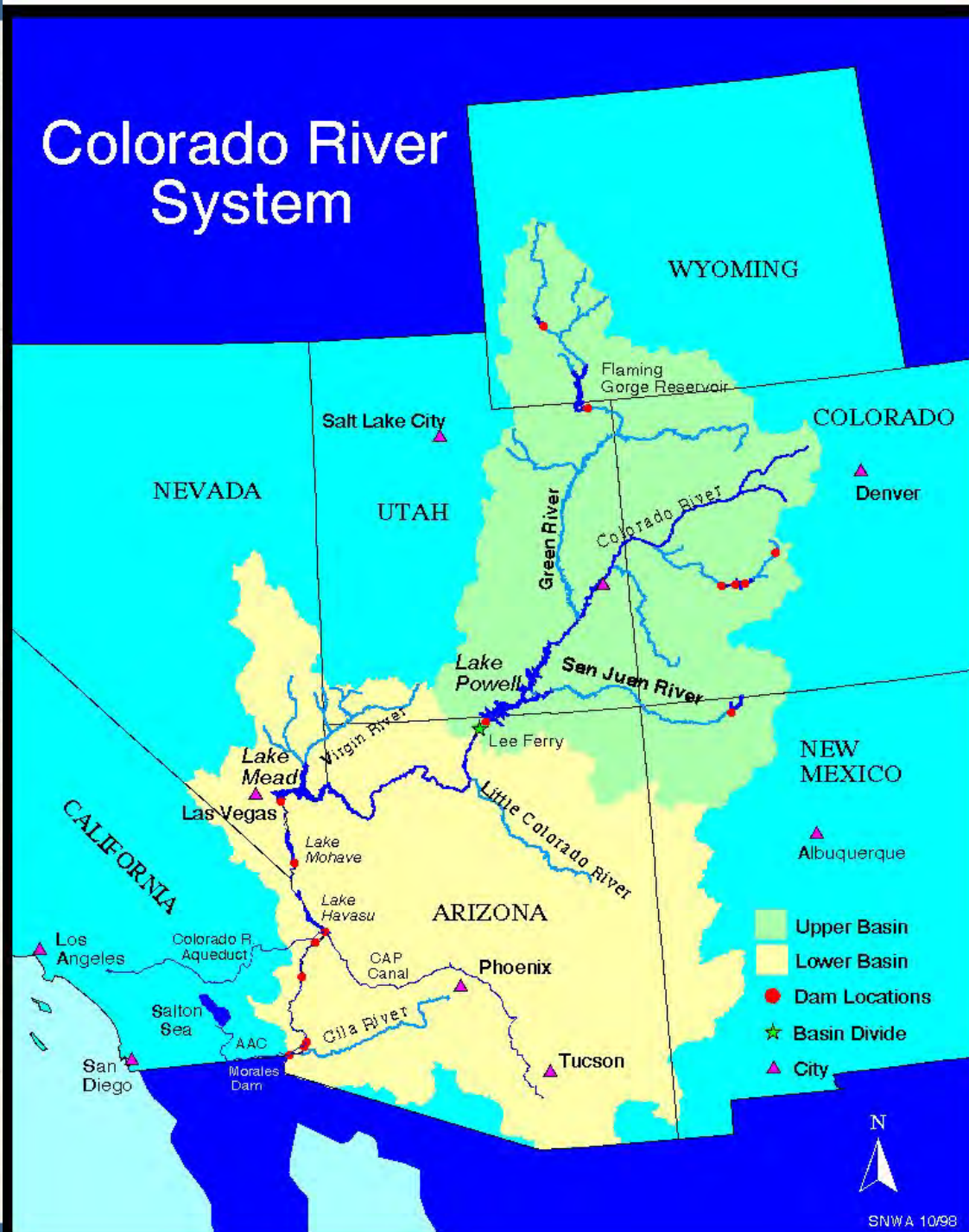




Lean and Green: Water Efficiency in the Southern Nevada Golf Industry

Colorado River

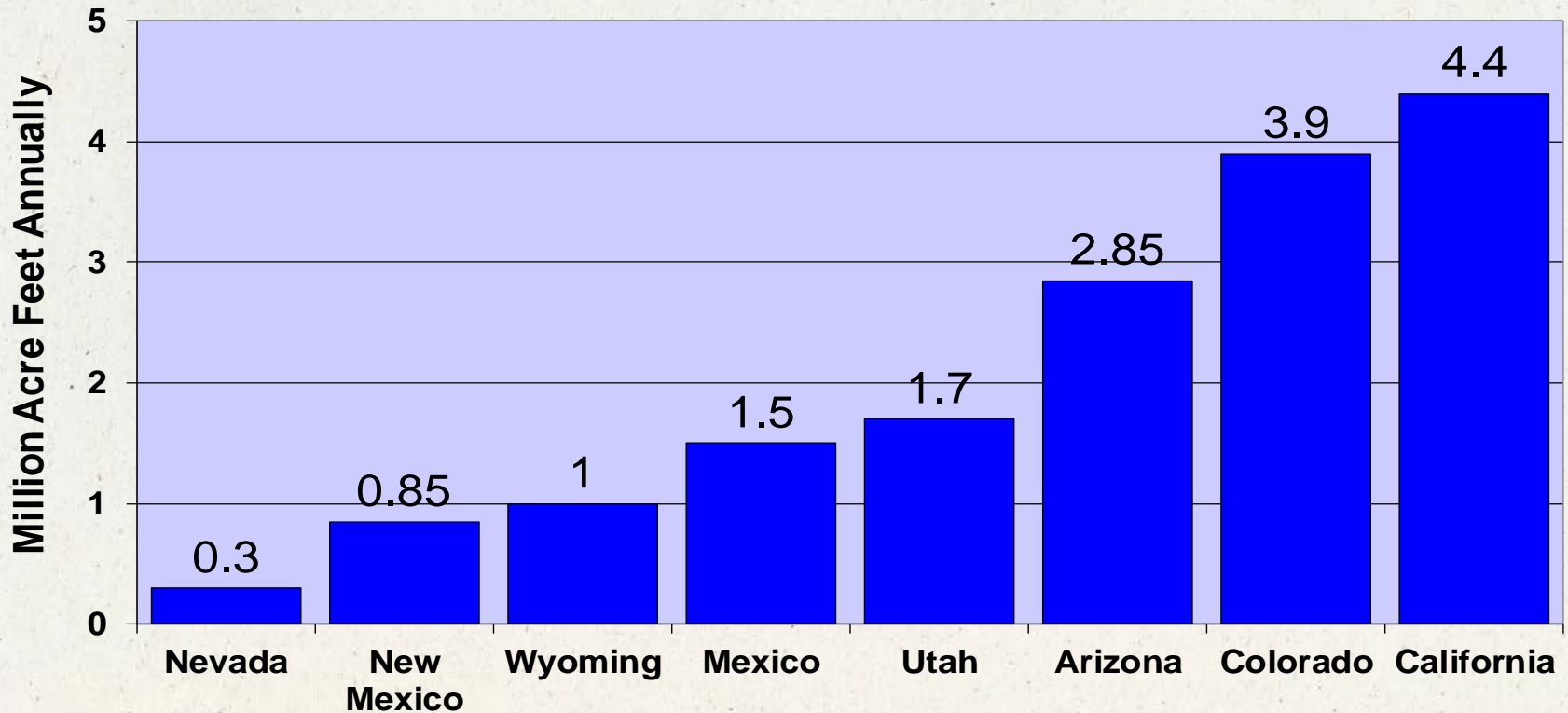
- Serves about 30 million people in 7 states and Mexico
- Irrigates over 3 million acres of farmland (over 70% of water use)
- Allocations exceed average flow by 15-20%
- Drought and climate change impacts
- Current storage about 50% of capacity
- Provides 90% of Southern Nevada's Water





Dividing the Waters: Who shares the Colorado?

Colorado River Appropriations



The Colorado River: Imperiled?



Southern Nevada uses just 1.8 percent of the water allocated from the Colorado River, but it constitutes 90% of our supply.

Las Vegas Bay Looking Northwest

April 11, 2002, elevation 1170

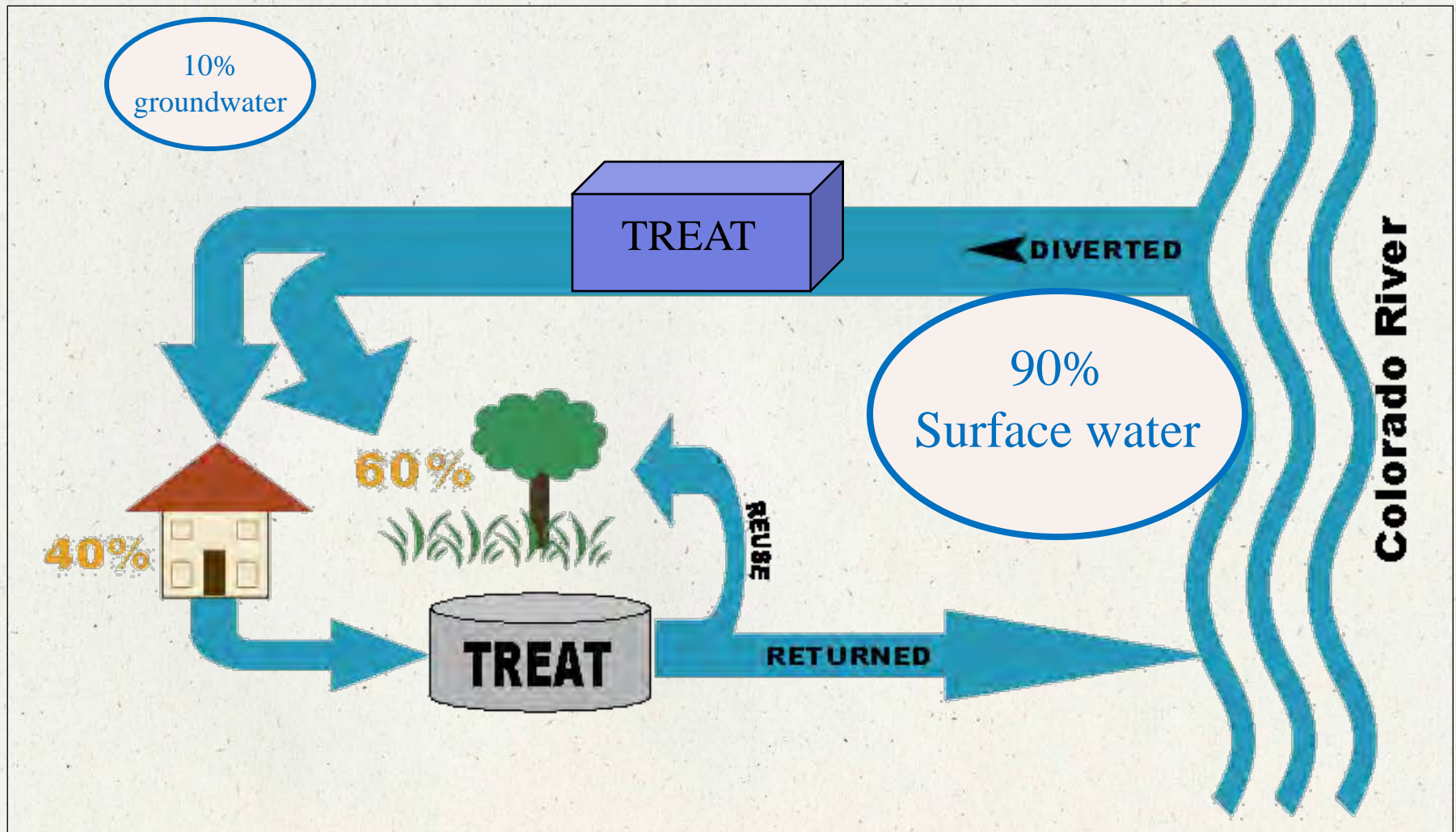


Outdoor Water Use

In Southern Nevada, the greatest opportunity for water conservation lies in improved efficiency of outdoor uses.

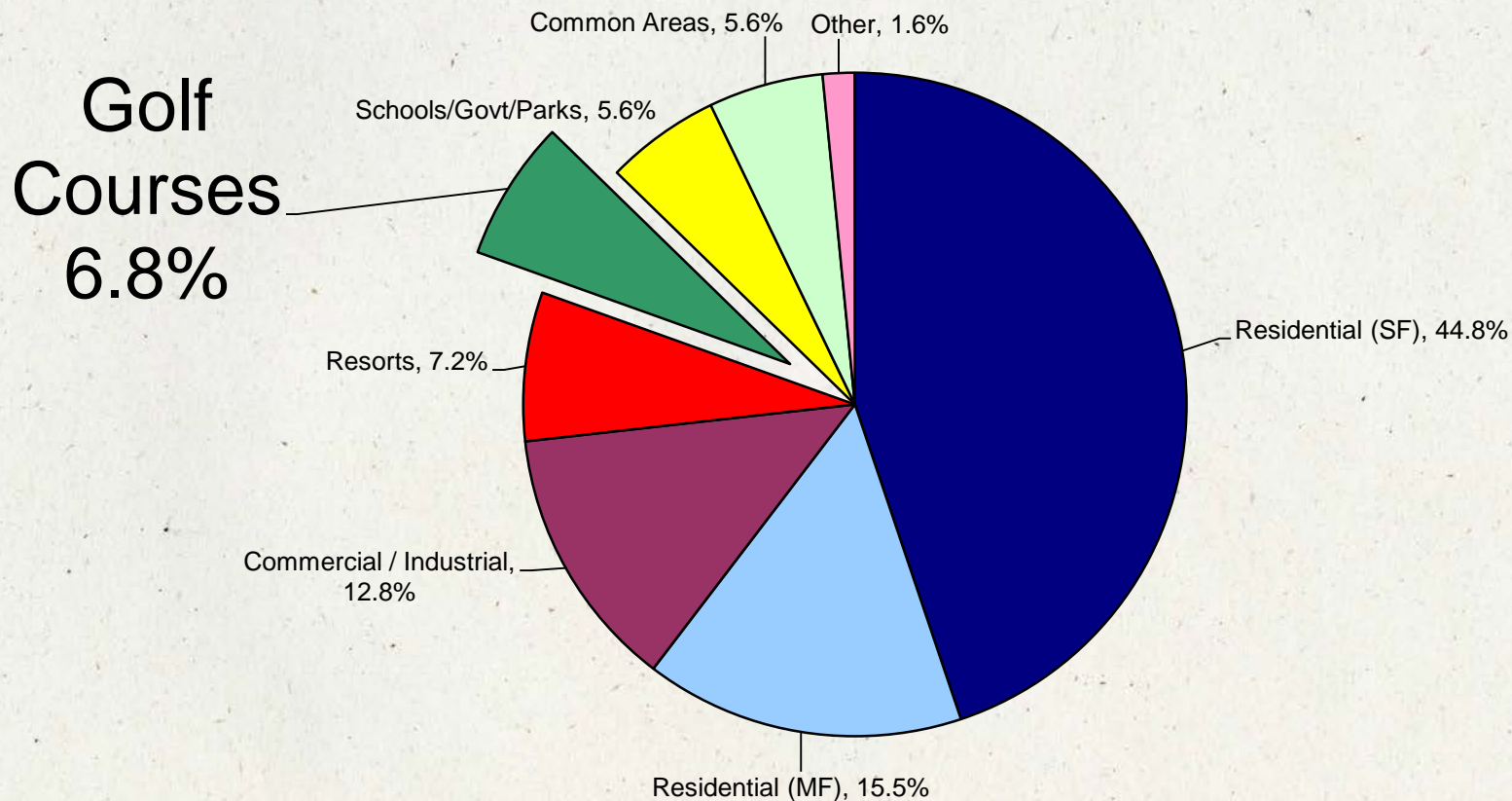


Reclaimed Water IS NOT the Solution!



All water used indoors is already recovered for direct or indirect reuse.

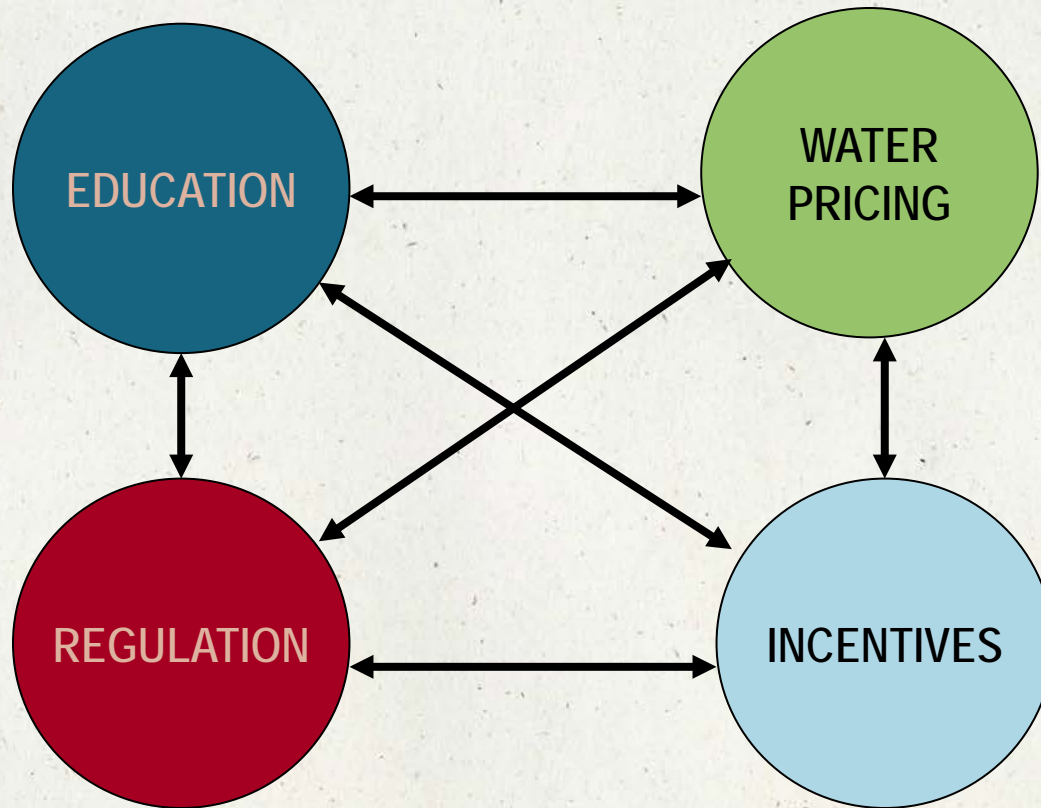
2010 Municipal Metered Water Consumption Use By Customer Type



Notes:

- (a) Municipal metered water consumption billed to customers from all sources (potable and non-potable).
- (b) Potable includes ground water and Colorado River water
- (c) Non-Potable includes raw Colorado River water, reclaimed and reused water
- (d) Reflects the service areas of all SNWA agencies providing potable and/or reclaimed water.

Demand Management Tools



The SNWA & its member agencies utilize a variety of tools to promote conservation and reduce overall water use.

Regulation: Landscape Development Codes

Lawns are prohibited in new residential front yards and limited to 50 percent of the landscape area in new backyards.



Regulation: Landscape Development Codes

Lawn is prohibited in new non-residential developments.



Clark County Operations Building

Regulation: Landscape Development Codes

**Maximum of 50 acres of turf allowed on a new golf course
– Essentially a barrier to development**



Regulation: Watering Restrictions

SNWA member agencies implement day-of-week and time-of-day watering restrictions.



Watering
Group

DROUGHT WATERING RESTRICTIONS

All water users have been assigned a watering group. **Mandatory** restrictions mean you may only run sprinklers on your group's allowed watering day(s). To locate your group, check your bill, visit snwa.com or call your water provider.

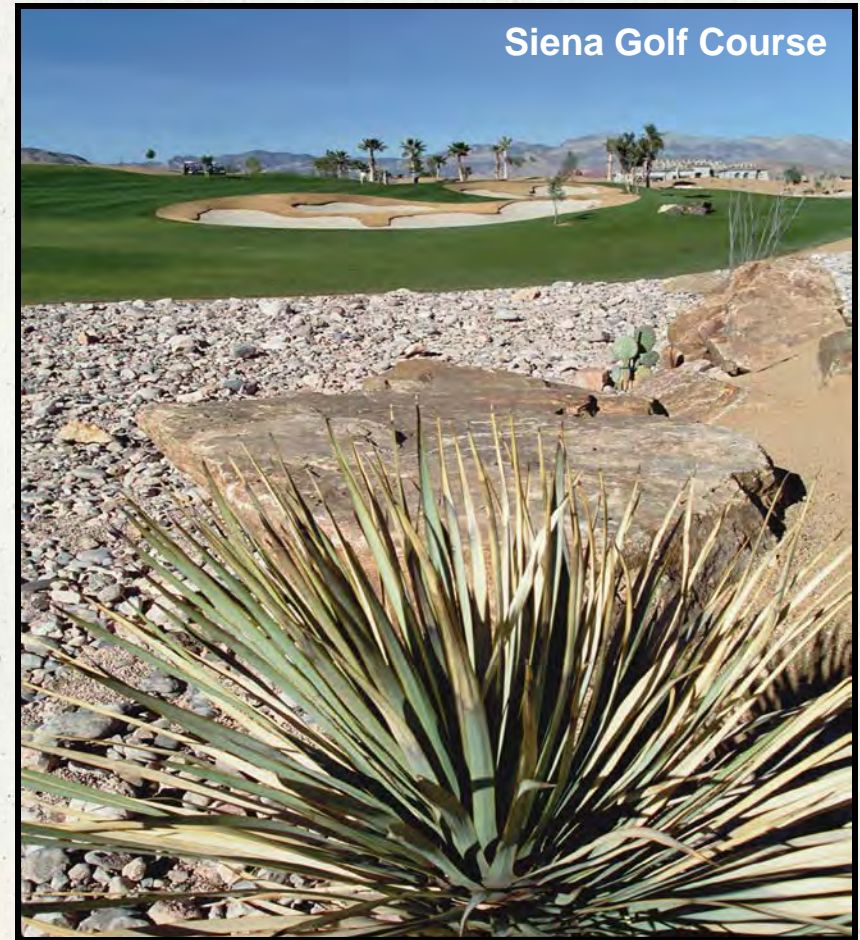
My assigned
group:

Watering Group	Winter	Spring / Fall	Summer
	November - February	March - April / September - October	May - August
A	Monday	Monday, Wednesday, Friday	Any day
B	Tuesday	Tuesday, Thursday, Saturday	Any day
C	Wednesday	Monday, Wednesday, Friday	Any day
D	Thursday	Tuesday, Thursday, Saturday	Any day
E	Friday	Monday, Wednesday, Friday	Any day
F	Saturday	Tuesday, Thursday, Saturday	Any day

For watering instructions, see inside panel.

Regulation – Golf Courses

In lieu of mandatory watering restrictions, golf courses are subject to water budgets based on irrigated acreage.



Water Budget

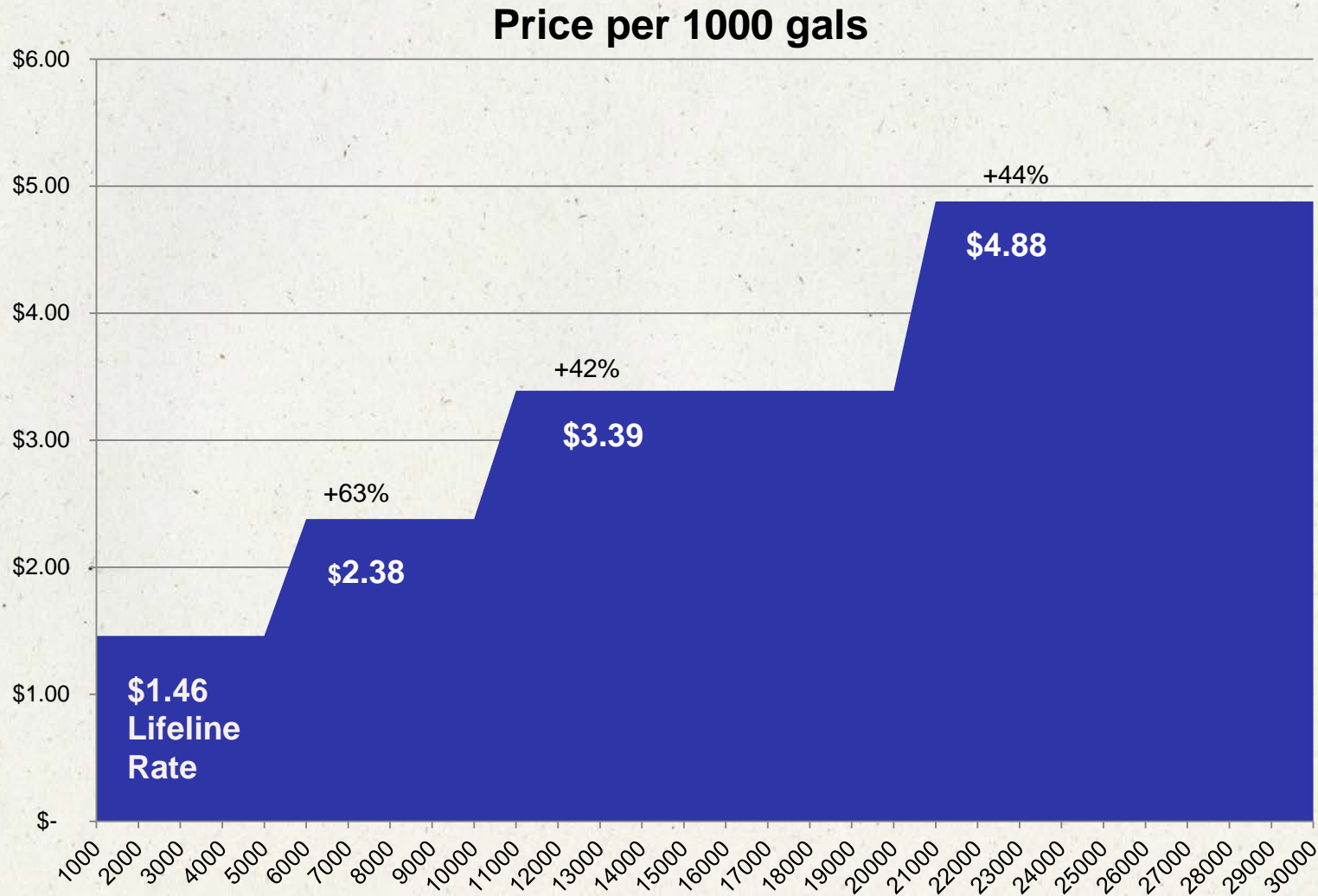
In 2004 golf courses with municipal supply were subject to an annual budget of 6.5 acre-feet per irrigated acre

Adjusted to 6.3 acre-feet in 2005

Punitive pricing applied to water use in excess of the budget.

Percent of Budget	101 – 120%	121 – 140%	>140%
Current	2 x Top Rate	5 x Top Rate	9 x Top Rate

4- Tier Water Rate Structure

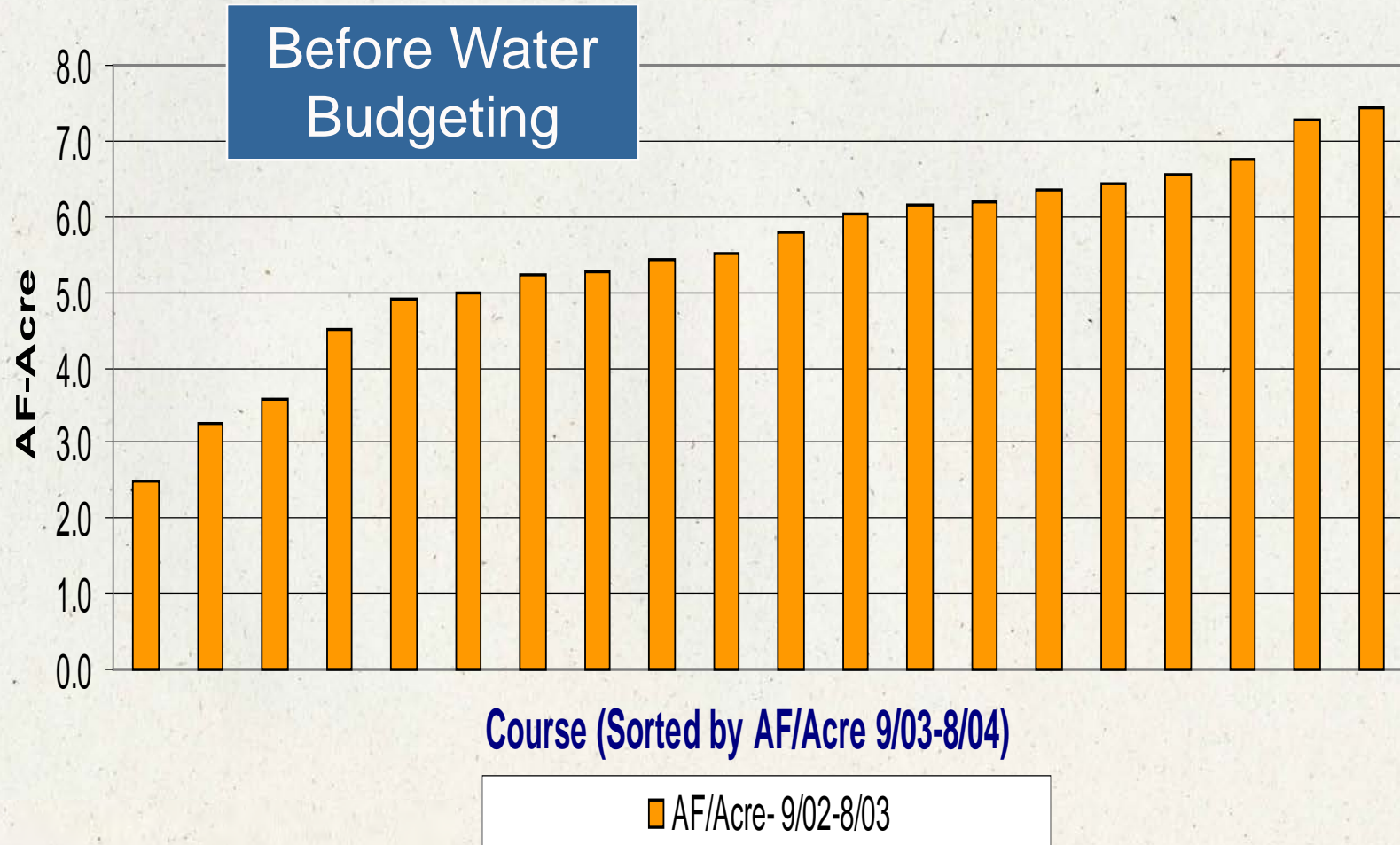


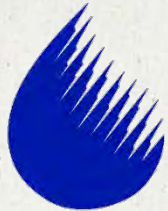
LVVWD rates Jan 2011 for 5/8 inch residential meter. Includes \$0.30 per kgal SNWA regional commodity charge.



SOUTHERN NEVADA
WATER AUTHORITY

Golf Water Budgets

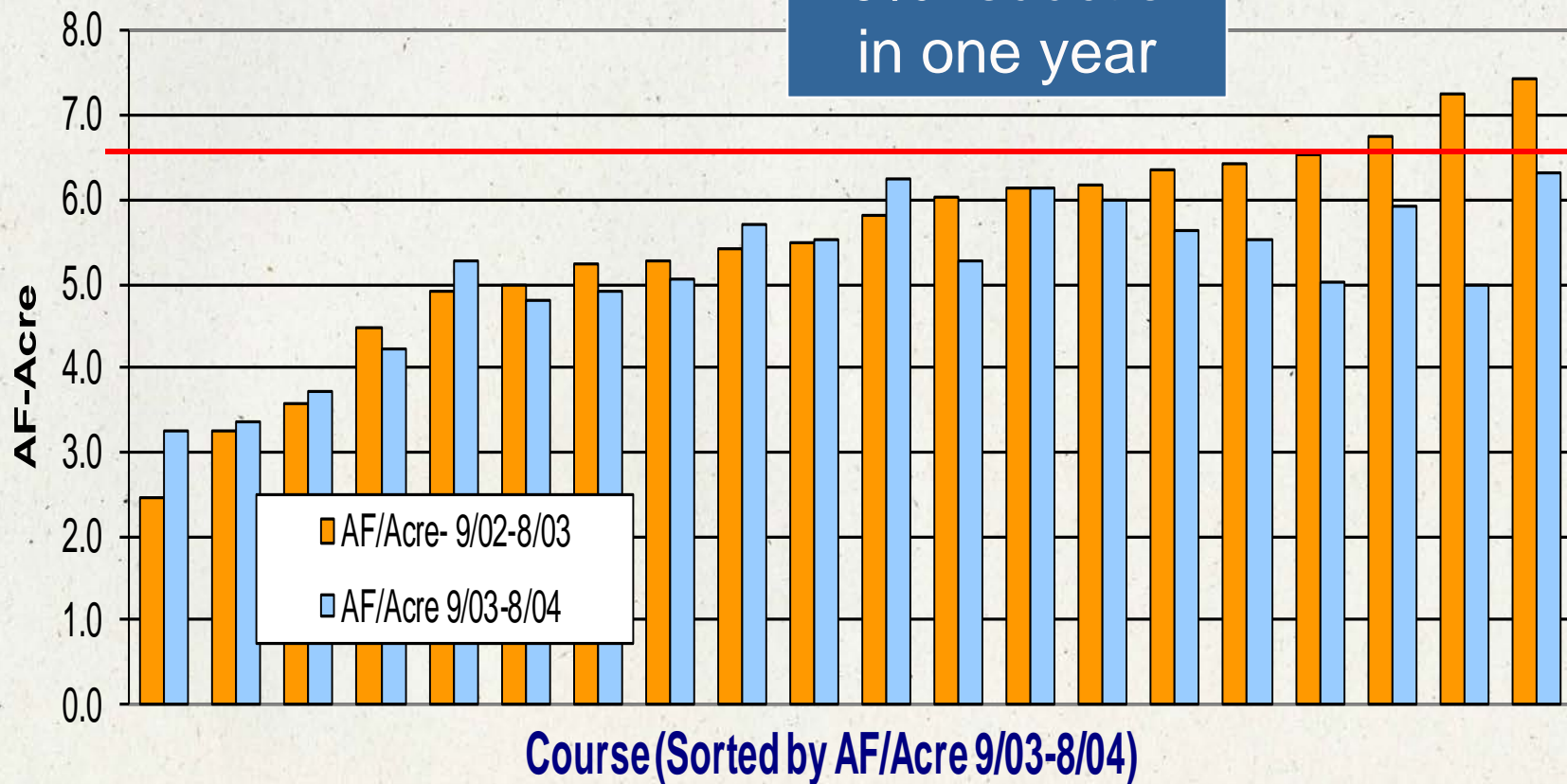




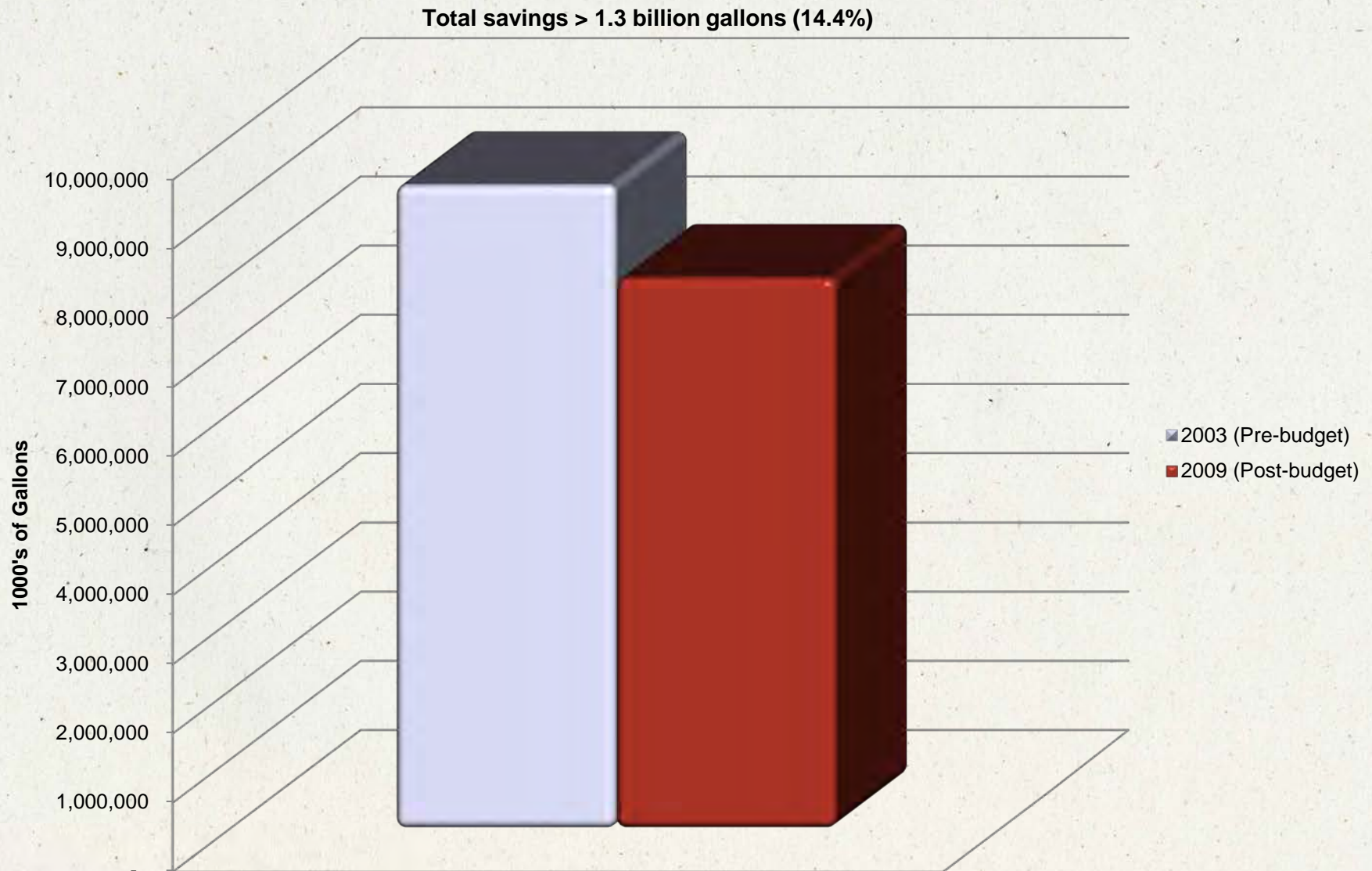
SOUTHERN NEVADA
WATER AUTHORITY

Golf Water Budgets

10% reduction
in one year



2009 Study of Water Budgeted Courses



Conversion of non-functional turf is a major strategy for coping with water budgets.



Before



After

Savings of 34 gallons per square foot, approximately 60-70 percent of turfgrass use

Conversions



Out of Bounds



**Near Surrounding
Residences**

Pre / Post Comparison



Before



After

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



SIENA
GOLF CLUB

© 2012 Google

Google earth

Date: 6/21/2012

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

Eyeball 5686 ft



© 2012 Google

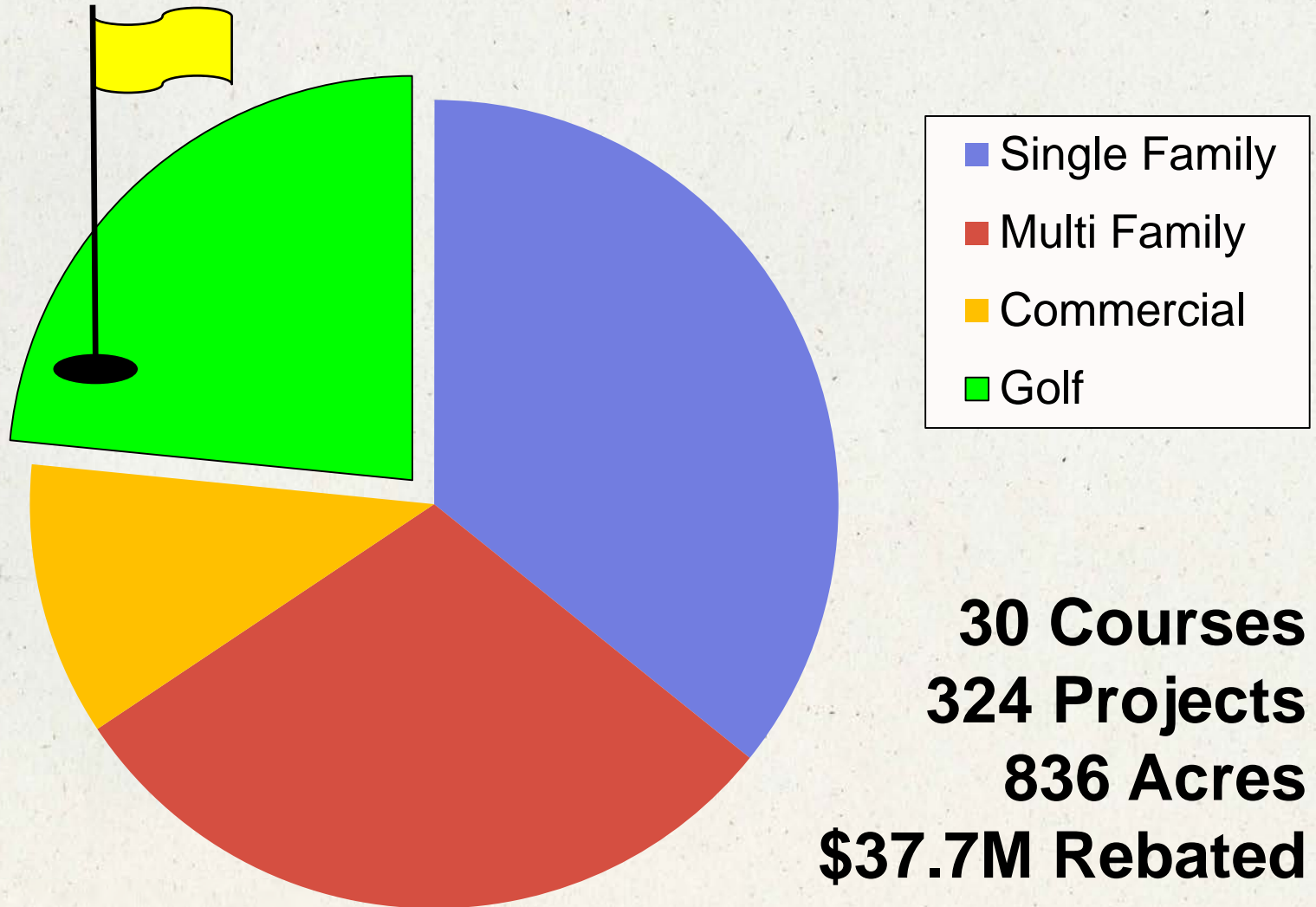
Google earth

2012

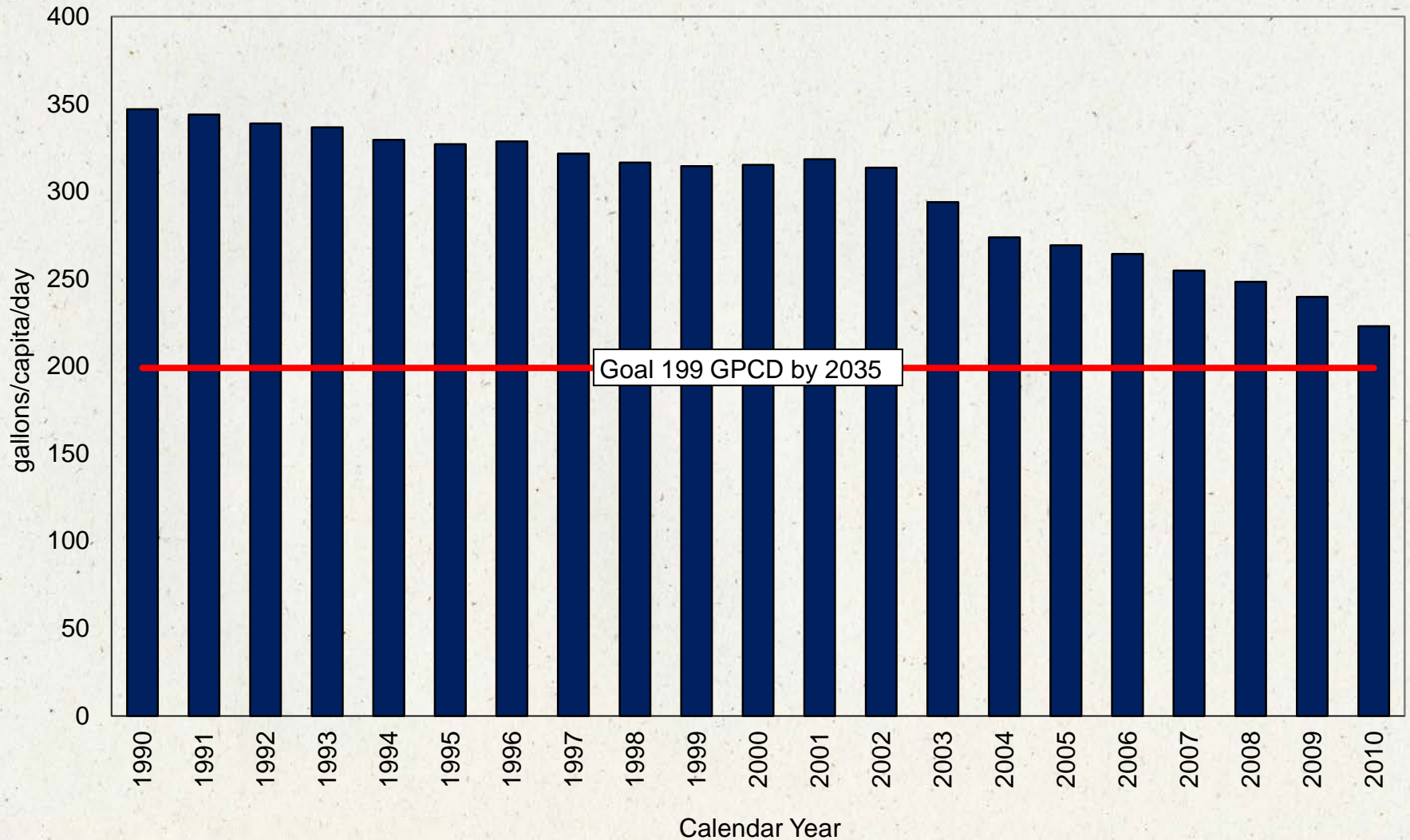
36°08'47.49" N 115°20'51.20" W elev. 3102 ft

Eye alt. 6435 ft

Percent of Total Landscape Conversions



SNWA Weather Normal GPCD 1990 - 2010



Conclusions

Water budgeted courses in the study population reduced annual use by 14.4 %.

Total golf water demand in Las Vegas has declined by 2.7 billion gallons (21%) annually through conservation and course closures.

Budgeting is considered an equitable and effective water conservation mechanism.



Questions?

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