



Landscape Conversion Rebate Program to Encourage LID

Monisha Banerjee¹, Mike Milczarek¹, Thomas Runyon²

¹GeoSystems Analysis, Inc., Tucson, Arizona (monisha@gsanalysis.com)

²Environmental and Natural Resources Division, US Army Garrison, Fort Huachuca

Landscape Conversion



Benefits of Landscape Conversion

- Reduction in consumptive water use reduces:
 - Groundwater overdraft
 - Need to develop alternative water supply systems
 - Stormwater runoff, soil erosion, and costs for stormwater management
 - Landscape maintenance
 - Use of lawn chemicals
- Increase native plant diversity
- Rebate program encourages landscape conversion

Background

- Groundwater overdraft in Sierra Vista area
- Conserve water to protect critical habitat on the San Pedro River
- How much water use could be reduced and at what cost with landscape conversion?
- Landscape irrigation estimated to be up to 40-60% of potable water use in single family homes in the Southwest

Feasibility Study Tasks

- Landscape conversion rebate program review
- Assessment of conditions in Sierra Vista area
e.g. turf grass area, water codes/ rates
- Recommendations for implementing a program

Landscape Conversion Rebate Program Review

Program Evaluation Criteria

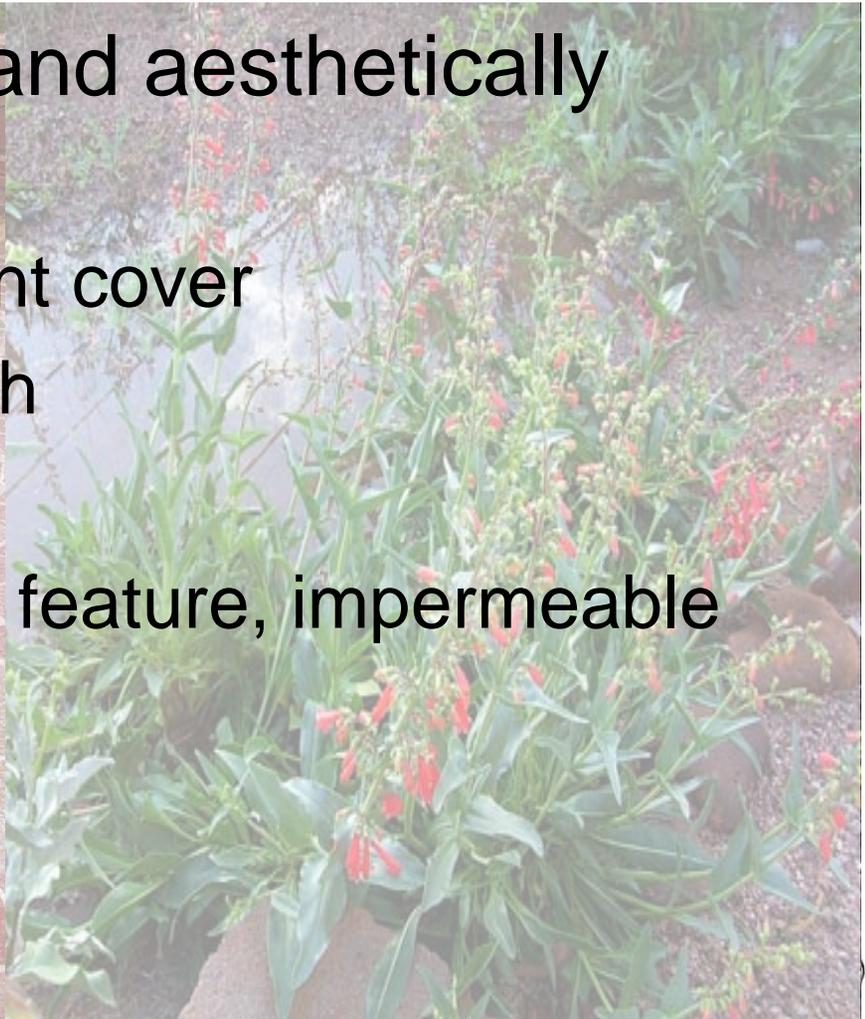
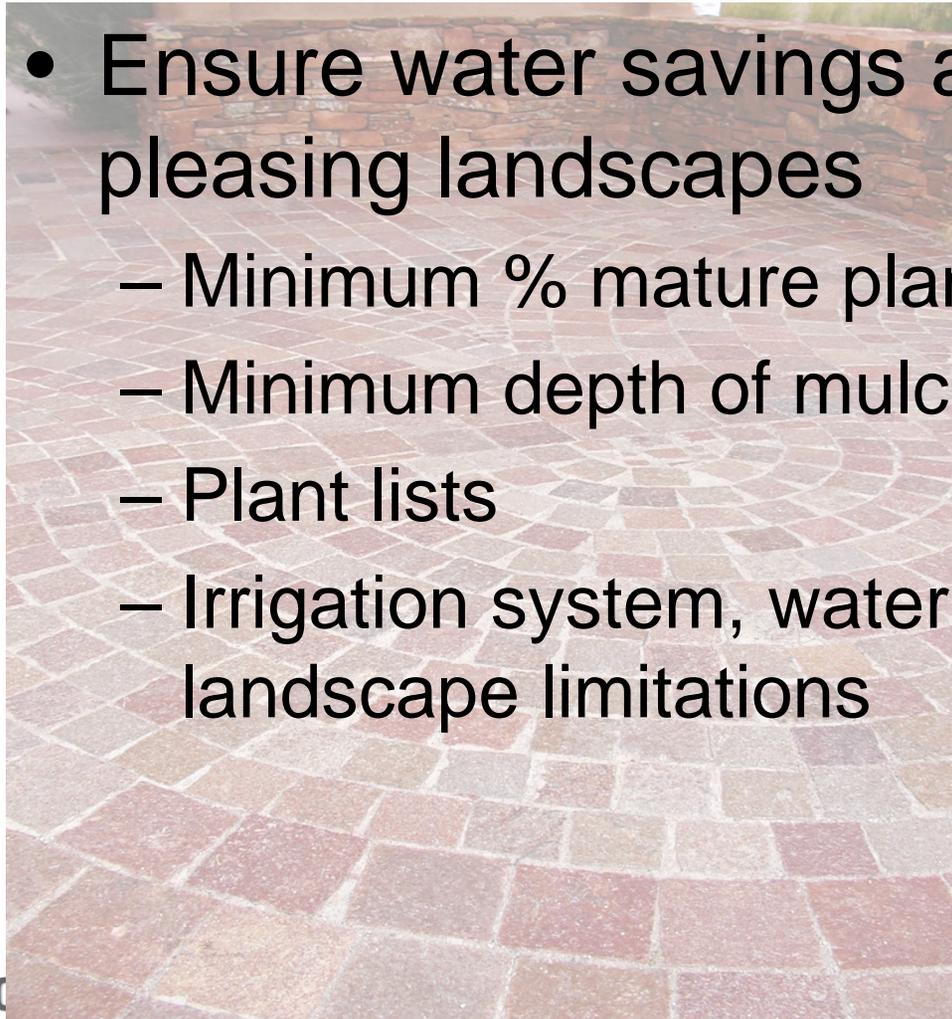
- Reviewed 36 landscape conversion rebate programs in Arizona, California, New Mexico, Nevada, and Texas for:
 - Participant qualifications
 - Program specifications
 - Costs and water savings

Program Implementation

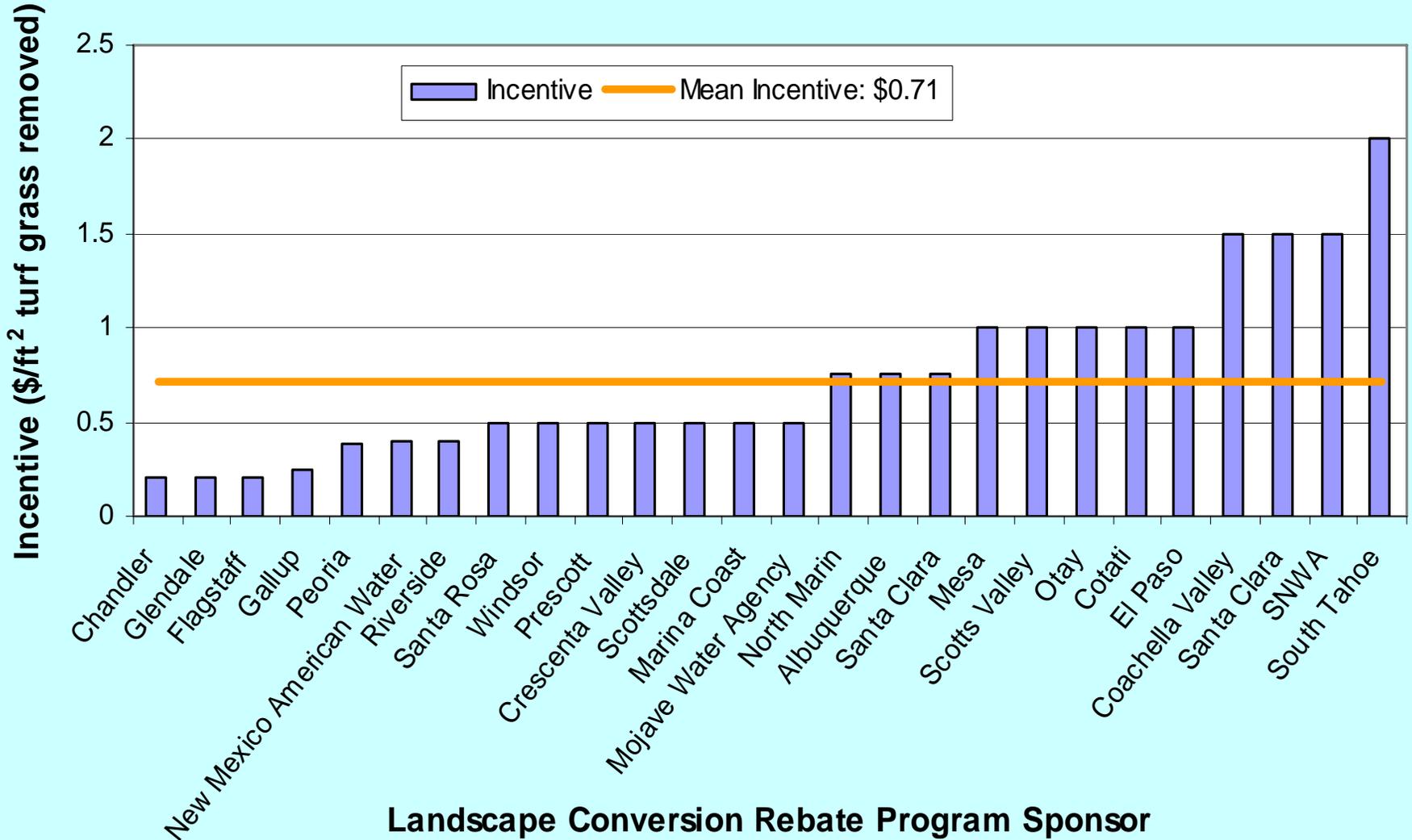
- Effective landscape conversion needs to provide educational materials and resources:
 - Pictures and template design plans for xeriscapes
 - Community demonstration gardens
 - Recommended plant lists
 - “How-to” classes
 - Illustrated manuals
 - Recommend, train, certify landscape professionals

New Landscape Requirements

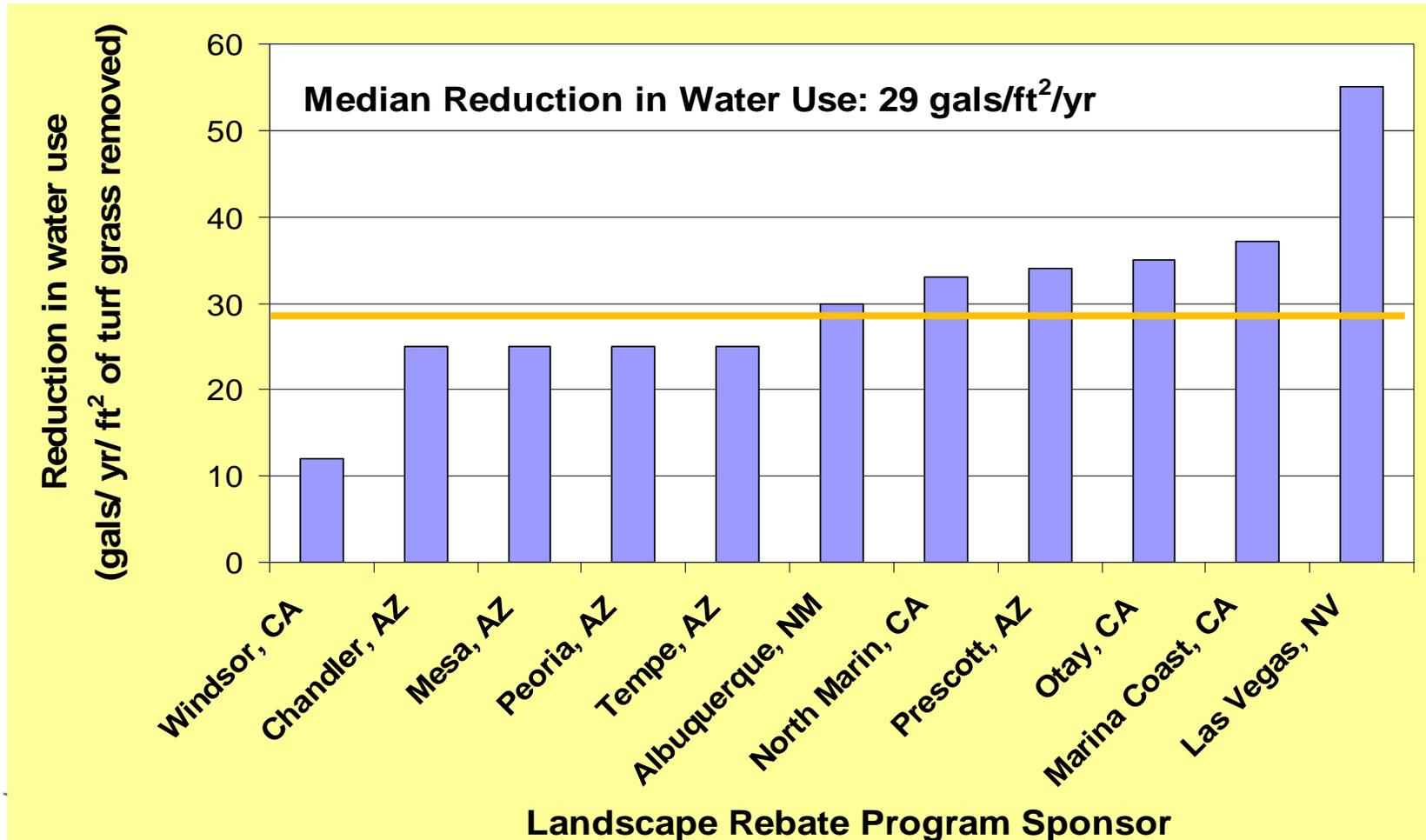
- Ensure water savings and aesthetically pleasing landscapes
 - Minimum % mature plant cover
 - Minimum depth of mulch
 - Plant lists
 - Irrigation system, water feature, impermeable landscape limitations



Range of Incentives

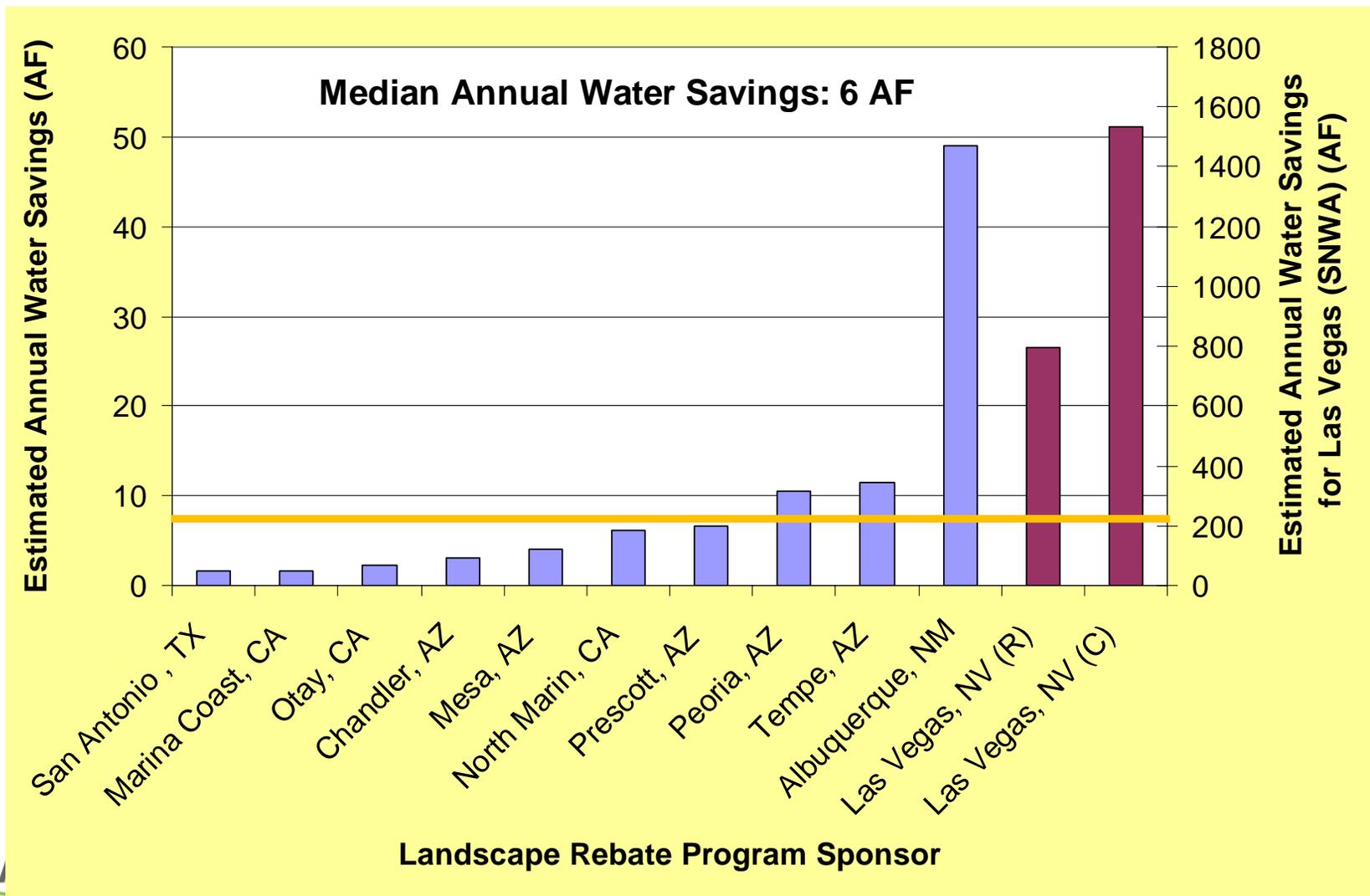


Estimated Reduction in Water Use



Estimated Annual Water Savings

(based on amount of turf grass removed)

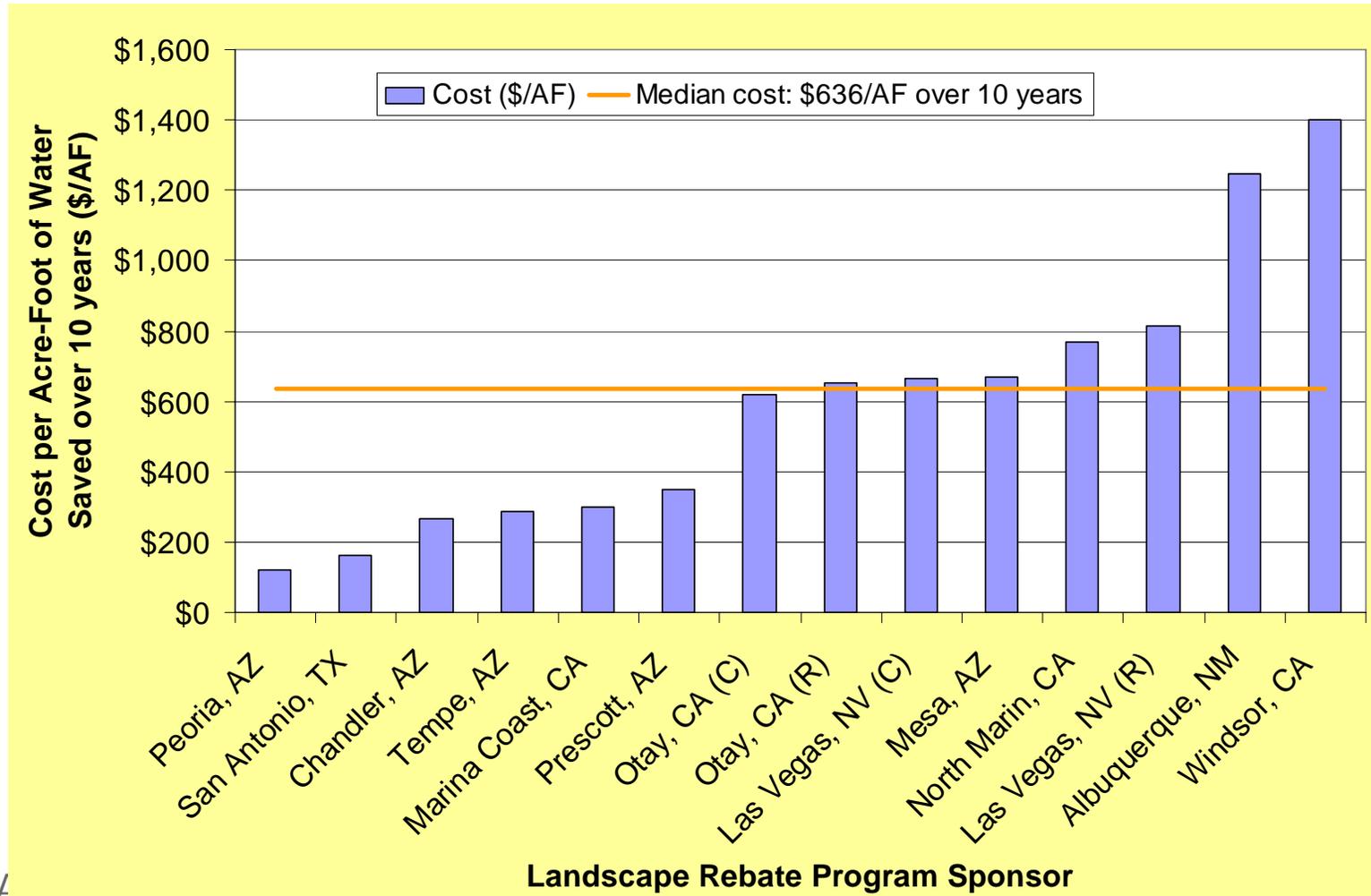


Landscape Rebate Program Sponsor



Estimated Program Costs

(per AF of water saved, estimated 10 year return period)



Cost to Purchase/ Lease New Water in the Southwest

Water Source		Average Purchase or Lease Price for Water Rights (\$/AF)
ARIZONA	CAP II non-irrigation water rights	\$1,300 - \$3000
CALIFORNIA	Alto and Centro sub-area	\$1,800-\$3,650
NEW MEXICO	Roswell Basin water rights	\$2,300-\$2,400
NEW MEXICO	Lower Rio Grande water rights	\$3,000-\$5,000
TEXAS	Edwards Aquifer water rights	\$5,000
NEVADA	Truckee River surface water rights	\$5,500 - \$45,000
NEVADA	Wet water rights	\$8,800
NEW MEXICO	Middle Rio Grande water rights	\$9,000-\$35,000
NEW MEXICO	Taos tributaries' water rights	\$10,000-\$12,000
NEVADA	Groundwater rights	\$10,000-\$30,000
NEW MEXICO	Rio Hondo water rights	\$10,500-\$14,000
ARIZONA	Effluent rights in Prescott AMA	\$24,650
NEW MEXICO	Santa Fe tributary water rights	\$35,000-\$45,000

Sierra Vista Feasibility Study

Study Components

- Turf grass analysis
- Water rates
- Landscape and Water Code
- Water augmentation costs
- Local resources
- Estimated water savings and costs
- Program Recommendations

Estimated Water Savings for Landscape Conversion

Landscape Conversion	Estimated Water Savings ^a	
	(gals/ft ² /yr)	AFA/acre
Cool season grass to non-irrigated landscape	30.75	4.1
Cool season grass to irrigated xeriscape	23.75	3.2
Warm season grass to non-irrigated landscape	19.5	2.6
Warm season grass to irrigated xeriscape	12.5	1.7
Cool season to warm season grass	11.25	1.5

Range of Recommended Rebates (\$/ft² of turf grass removed)

Estimated Water Savings Based on Landscape Conversion	Water Augmentation Cost (\$/AF over 10 years)			
	\$1,500	\$2,000	\$2,500	\$3,000
Cool season grass to non-irrigated landscape	\$1.18	\$1.57	\$1.97	\$2.36
Cool season grass to irrigated xeriscape	\$0.91	\$1.21	\$1.52	\$1.82
Warm season grass to non-irrigated landscape	\$0.75	\$1.00	\$1.25	\$1.50
Warm season grass to irrigated xeriscape	\$0.48	\$0.64	\$0.80	\$0.96
Cool season grass to warm season grass	\$0.43	\$0.58	\$0.72	\$0.86

Landscape Conversion Recommendations for Sierra Vista

- Tiered incentive system
 - Encourage rainwater harvesting
- No rebate maximum
 - Encourage large projects, which achieve high water savings
 - Pay out large projects over several years
- Minimum project size requirement
- Converted landscape requirements for max water savings
- Individual negotiations for large turf grass areas (golf course, schools, parks)

Potential Water Savings and Costs

Area Type	Pueblo del Sol Golf Course (PDS)	Residential and Commercial Properties	Parks and Schools	Fort Huachuca
Estimated Existing Turf Grass Area (acres)	103	387	99	97
Potential Reduction in Turf Grass Area (acres)	40: xeriscape; 50 to 60: warm season	150 to 200	variable: xeriscape; 99: warm season	Variable
Estimated Potential Water Savings (AFA)	165 to 270	350-700+	150+	25
Estimated Rebate Cost (\$)	\$1.7 – 4.5 million	\$8-10.5 million	\$2.5 million	N/A

Total Water Savings Potential: 500-1000+ AFA

Tucson Resources

- Pima County Cooperative Extension – WaterSmart
- Tucson Water
- Rebates/ Tax credits:
 - Residential Gray Water Irrigation System
 - Irrigation System Upgrade Rebate for Commercial and Multifamily Properties
 - State Tax Credit for Rainwater, Gray Water Harvesting Systems (Residential and Commercial)

Encourage more rainwater harvesting with removal of high water-use landscape

Summary

- Structure rebates to encourage rainwater harvesting
- New landscape requirements encourage LID practices
- Resources: Use existing city and county resources to bring program on-line
- Turf grass conversions save water at lower costs than importing new water supplies and support LID

Questions?

