Using Western Water Wisely:
The Built Environment

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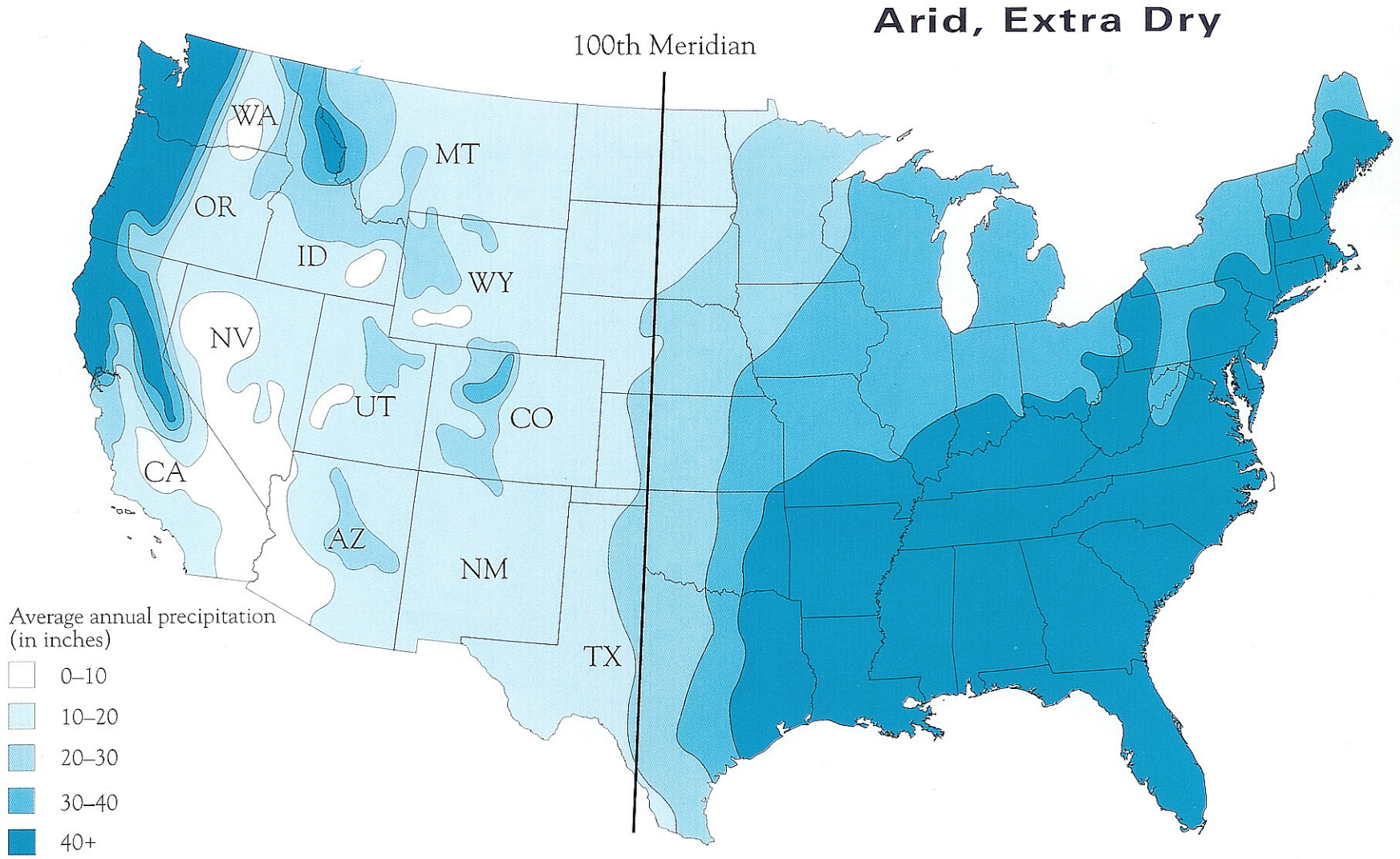
Urban Water Use in the West

- Context – variability and resilience
- Measure it to Manage It
- Focus on *Service* (not on gallons)

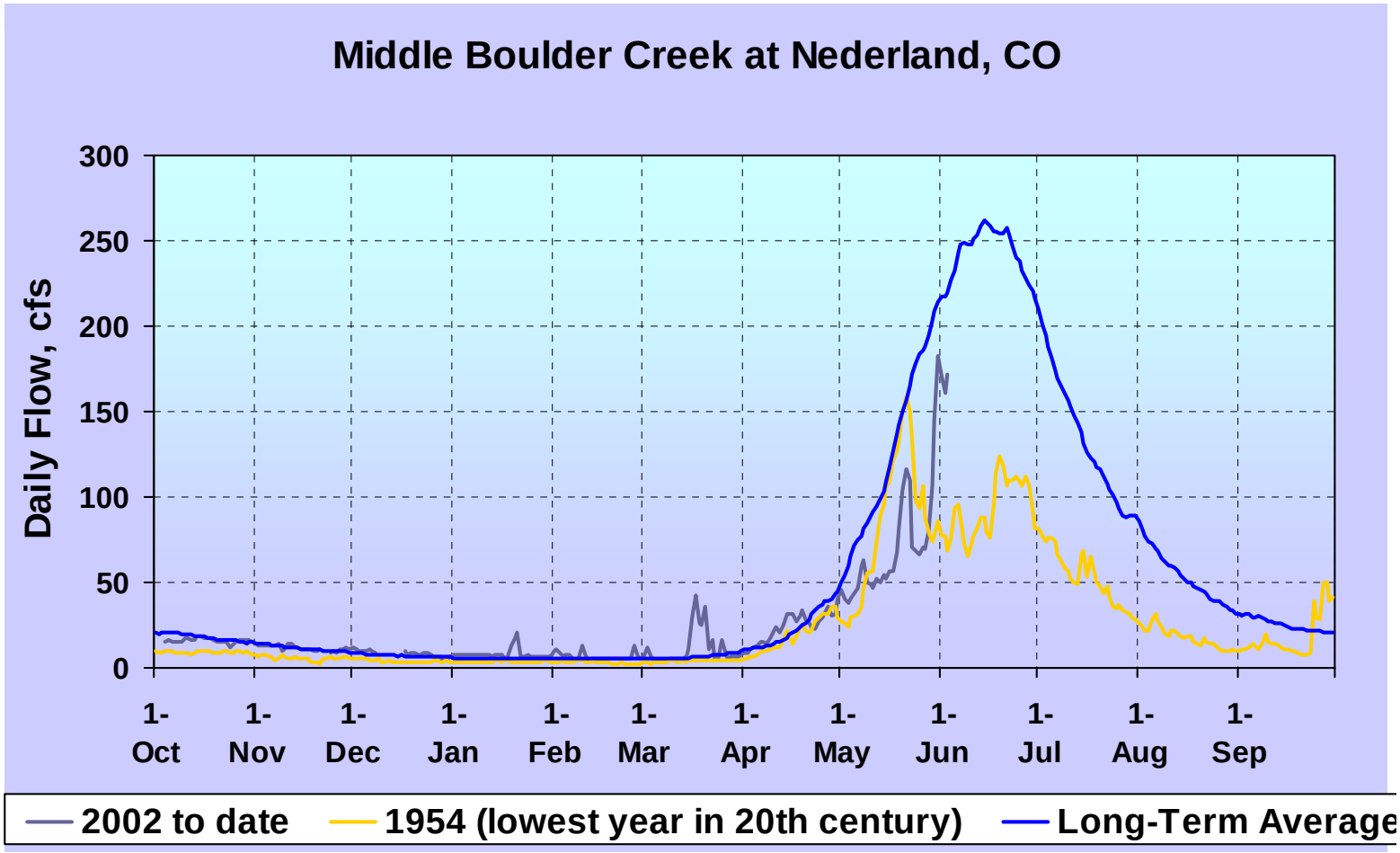


Atlas of the New West, Univ. of Colorado, 1997

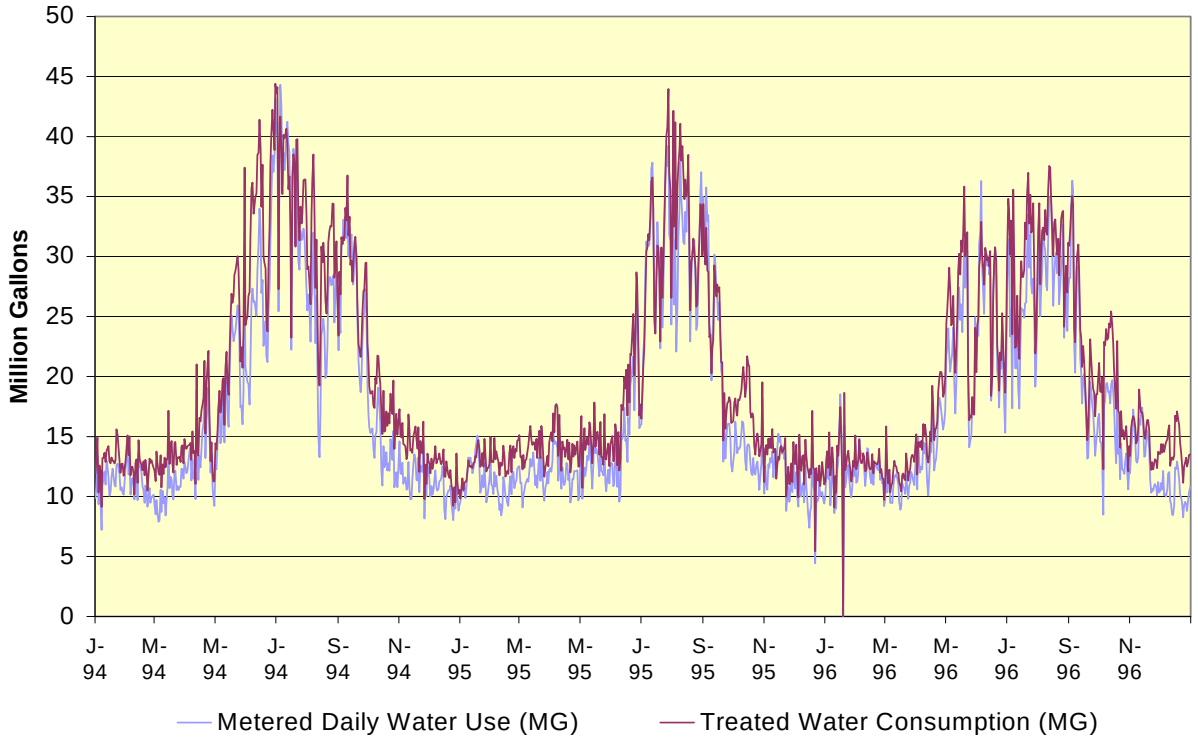
C O N T E X T

Boulder, Colorado ~1860

The West: Land of Variability



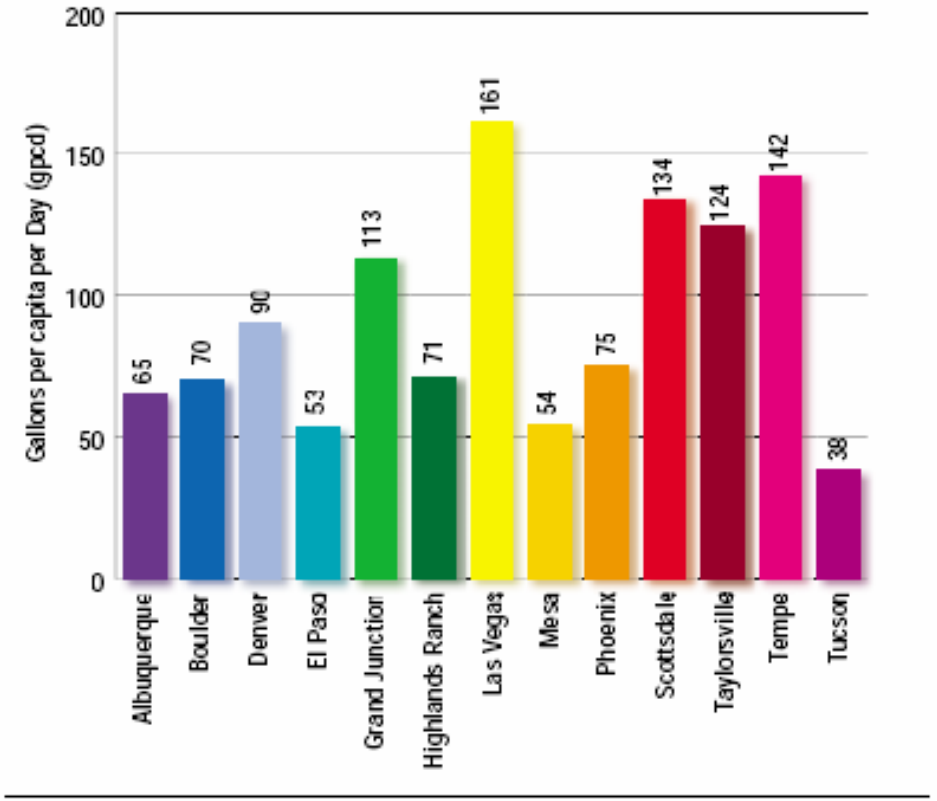
Peak Expectations



City of Boulder 1994-1996

Figure 3.5

2001 Estimated Single-Family Residential Outdoor Use, Represented as a Daily per capita Use



SMART WATER, Western Resource Advocates, 2003

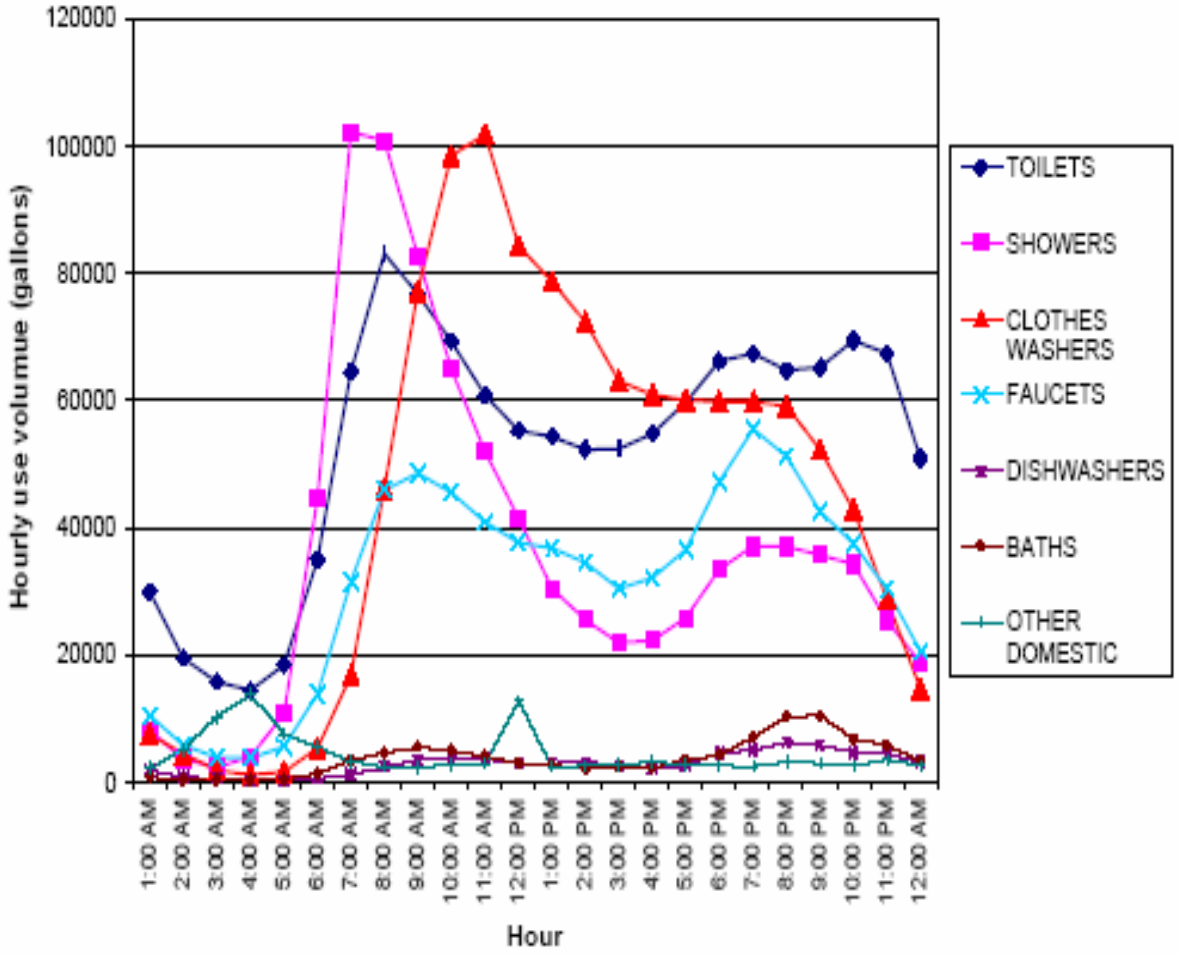
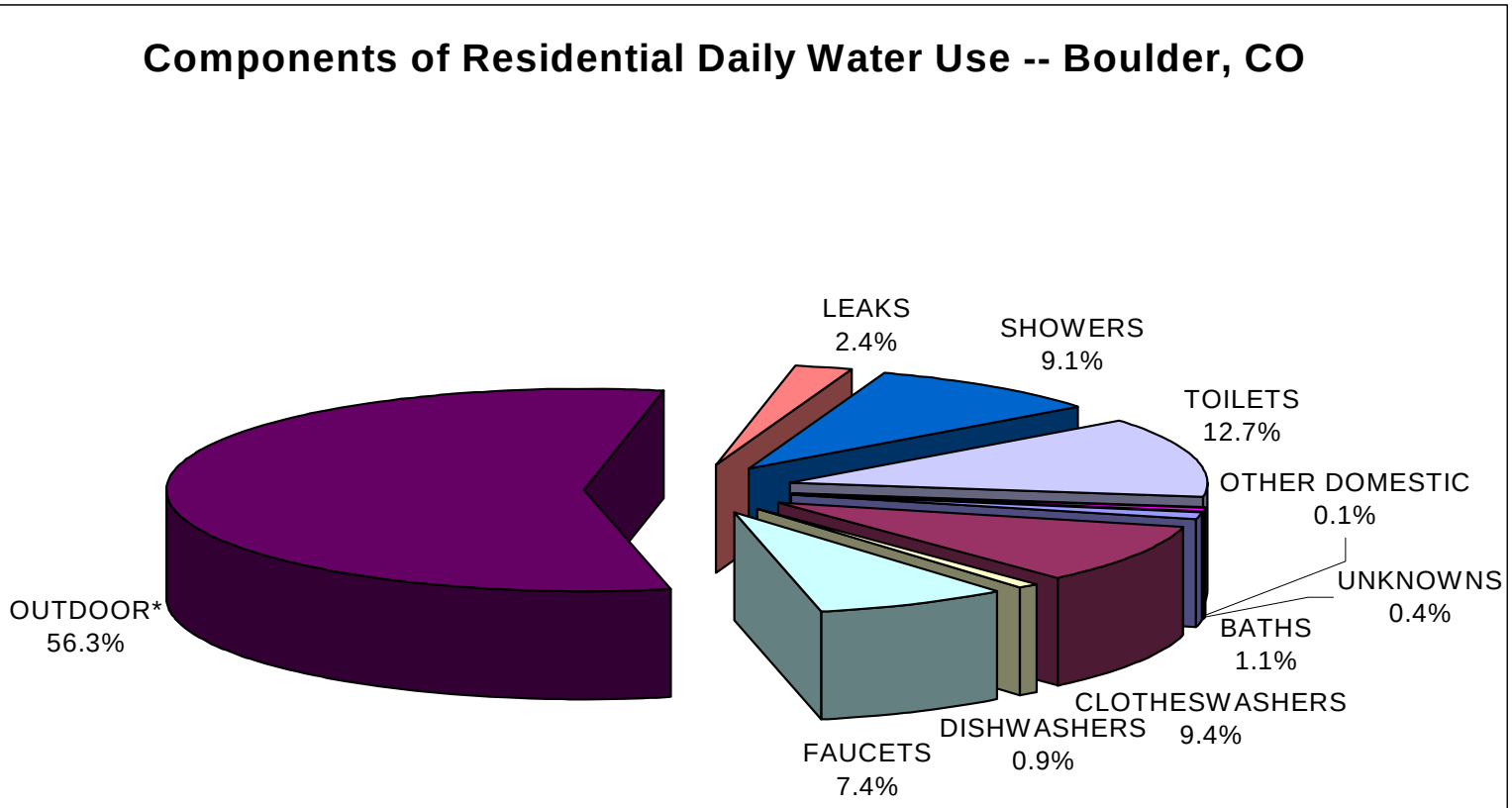


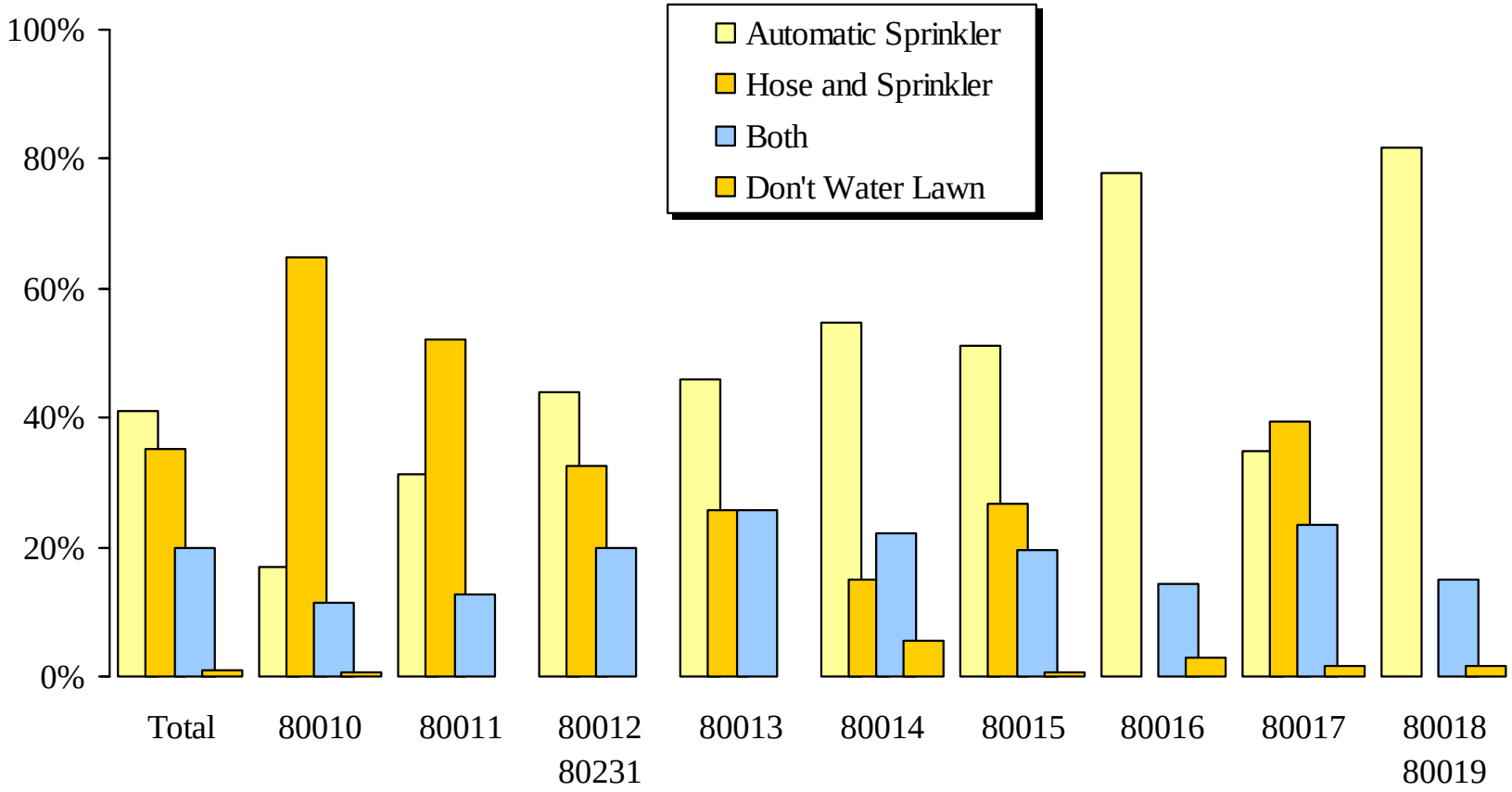
Figure ES.7.4 Indoor hourly use patterns, 12 study sites

Water use in the western home



City of Boulder, 2000

How do you water your lawn? (response by Zip Code)

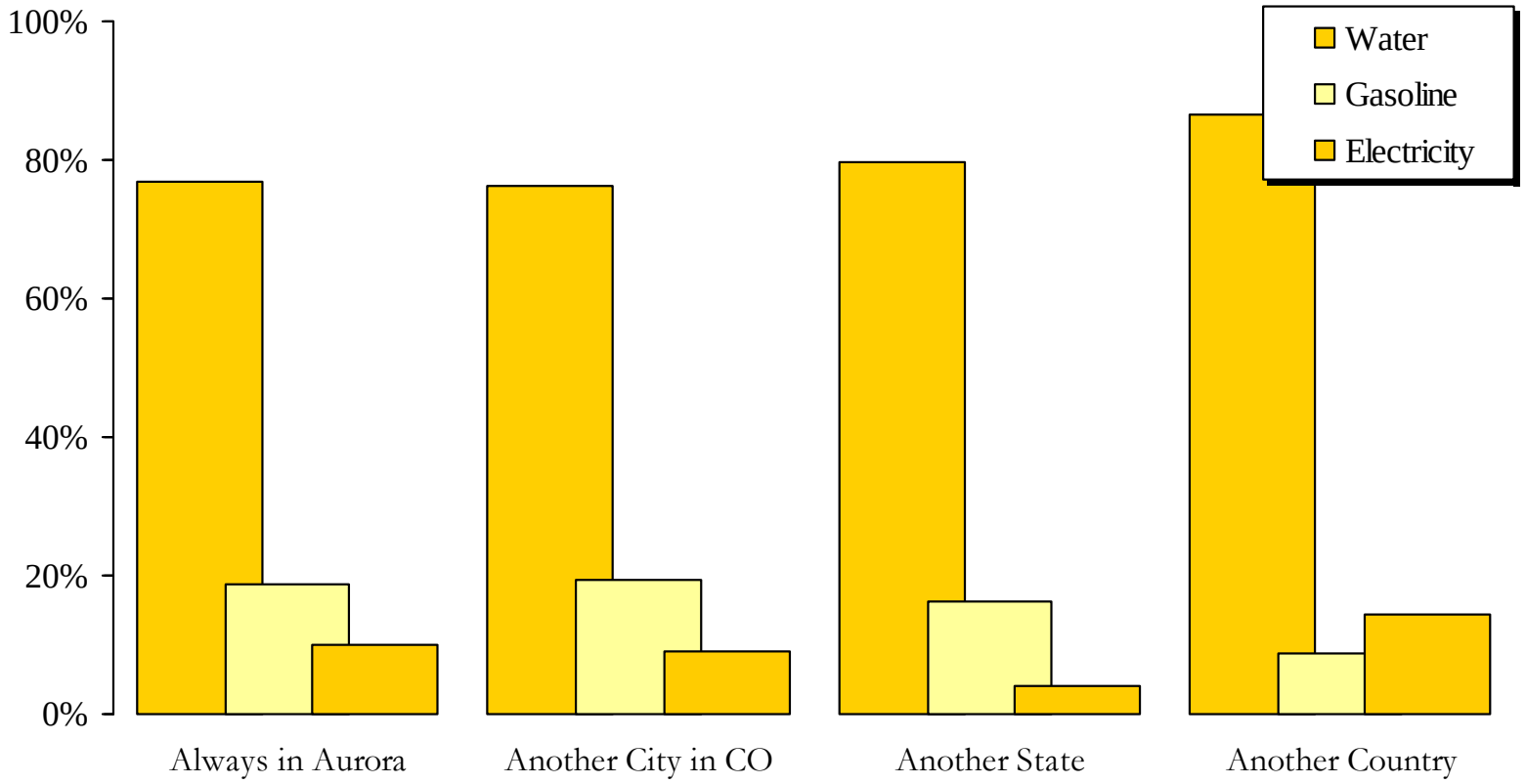


City of Aurora, 2003

Perspectives on Conservation

Think about Electricity, Water and Gasoline. Please rank these resources according to their importance in conservation.

Percent Ranked "Need MOST Conservation" by Past Place of Residence



City of Aurora, 2003

Why does it matter?

Because the western united states has the fastest growing populations in the country-

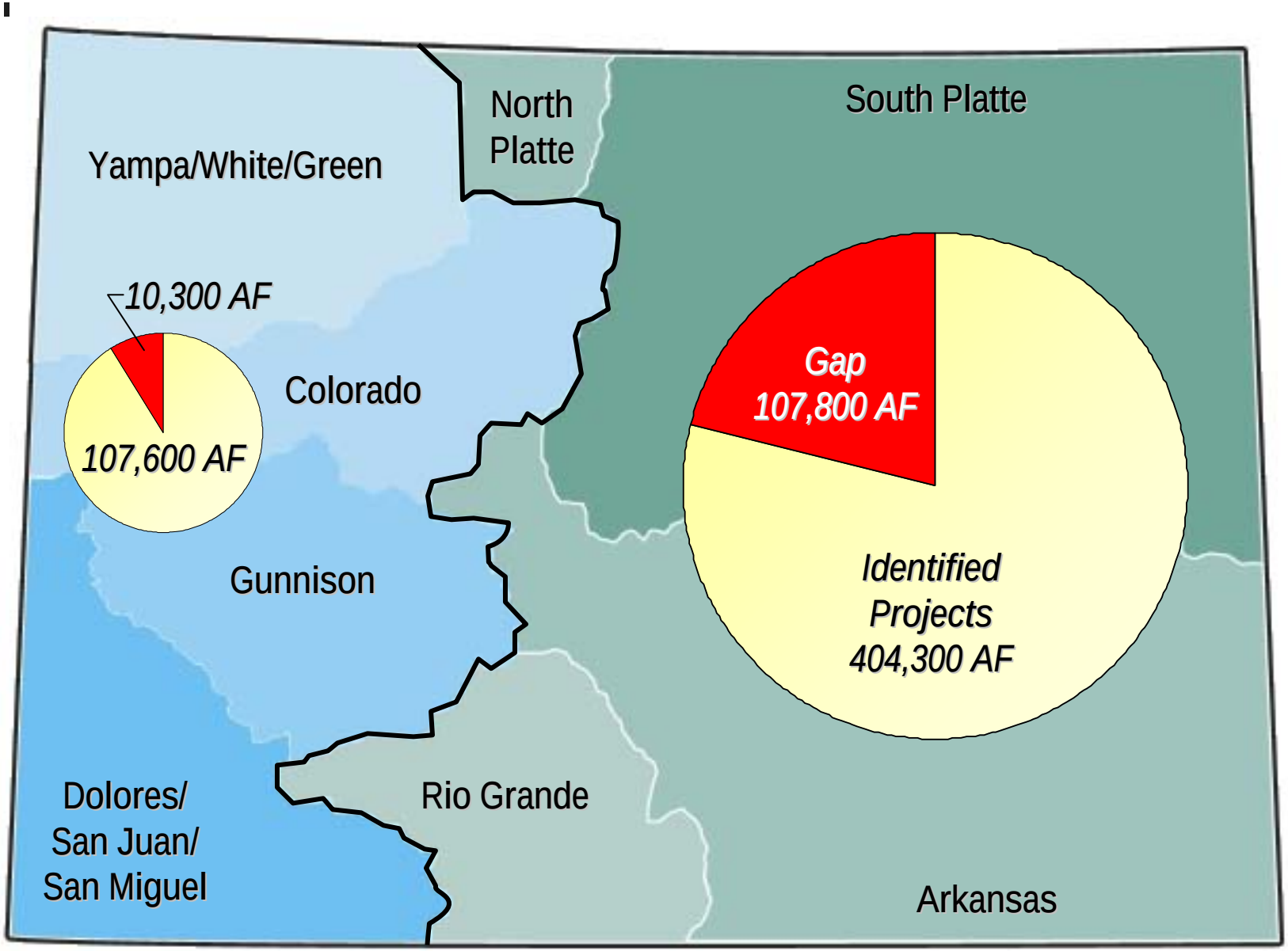
Population Growth in the Southwest

Top 12 States by Percent Population Growth, 1990-2000

		2000 Population	1990 Population	Growth 1990-2000	Percent Growth 1990-2000
1	Nevada	1,998,257	1,201,833	796,424	66.3
2	Arizona	5,130,632	3,665,228	1,465,404	40.0
3	Colorado	4,301,261	3,294,394	1,006,867	30.6
4	Utah	2,233,169	1,722,850	510,319	29.6
5	Idaho	1,293,953	1,006,749	287,204	28.5
6	Georgia	8,186,453	6,478,216	1,708,237	26.4
7	Florida	15,982,378	12,937,926	3,044,452	23.5
8	Texas	20,851,820	16,986,510	3,865,310	22.8
9	North Carolina	8,049,313	6,628,637	1,420,676	21.4
10	Washington	5,894,121	4,866,692	1,027,429	21.1
11	Oregon	3,421,399	2,842,321	579,078	20.4
12	New Mexico	1,819,046	1,515,069	303,977	20.1

Source: U.S. Census Bureau, "Census 2000 PHC-T-2. Ranking Tables for States: 1990 and 2000" (www.census.gov/population/cen2000/phc-t2/tab03.xls, accessed July 2003)

2000 to 2030 Increase in M&I Water Demands



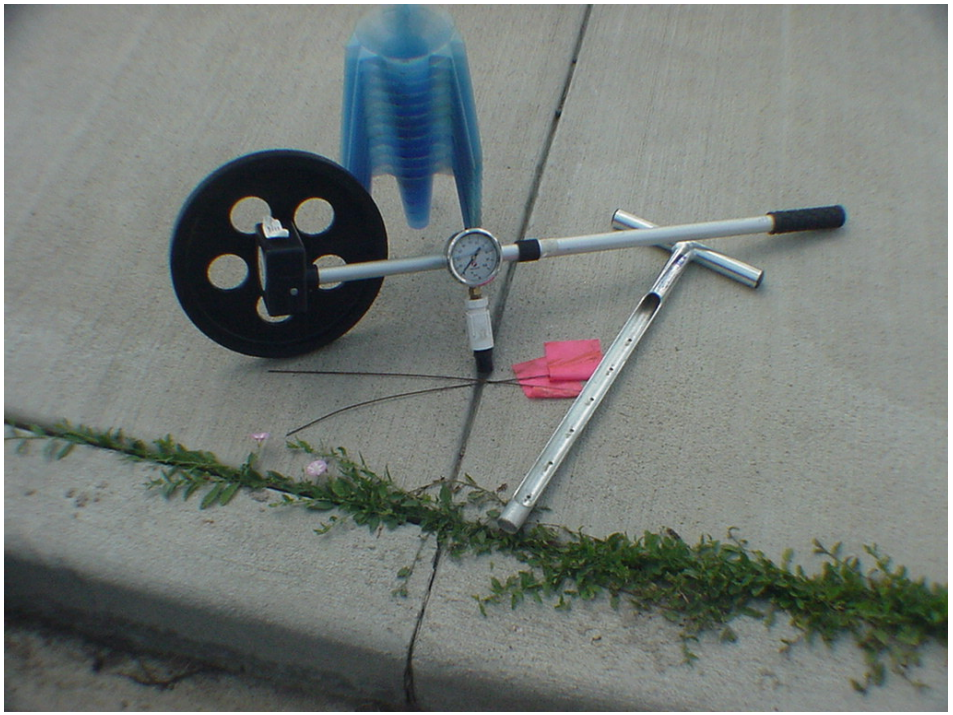
Changing social norms

Sprinkler Uniformity

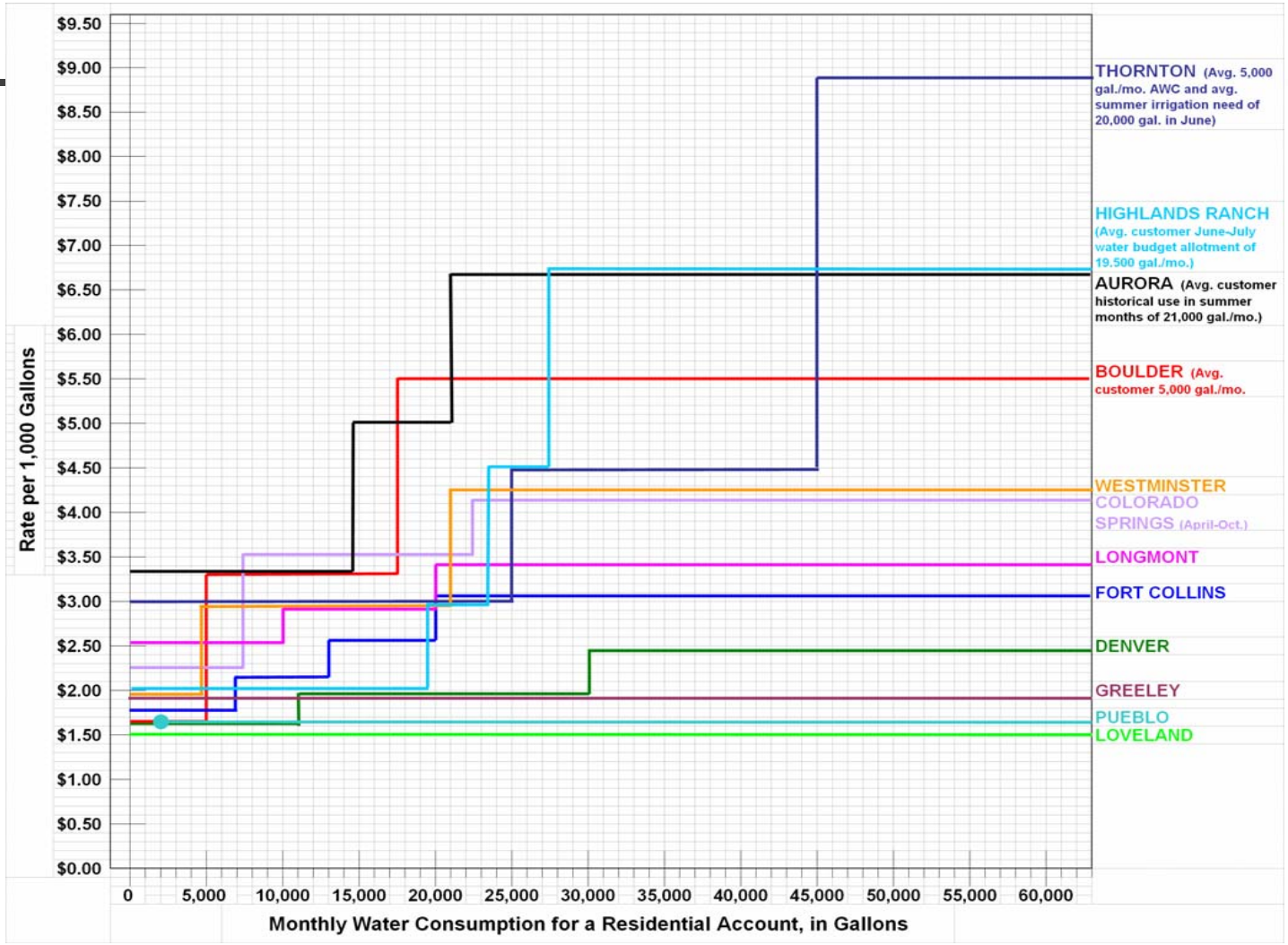
- Catch cups are placed on the lawn to measure uniformity of water distributed

Tools used to perform the water audit

- Catch cups
- Stop watch
- Flags
- Pressure gauge
- Measuring wheel
- Soil Probe



Consumption Prices - Front Range - 2004



Resilience- water quantity

The west: microclimates

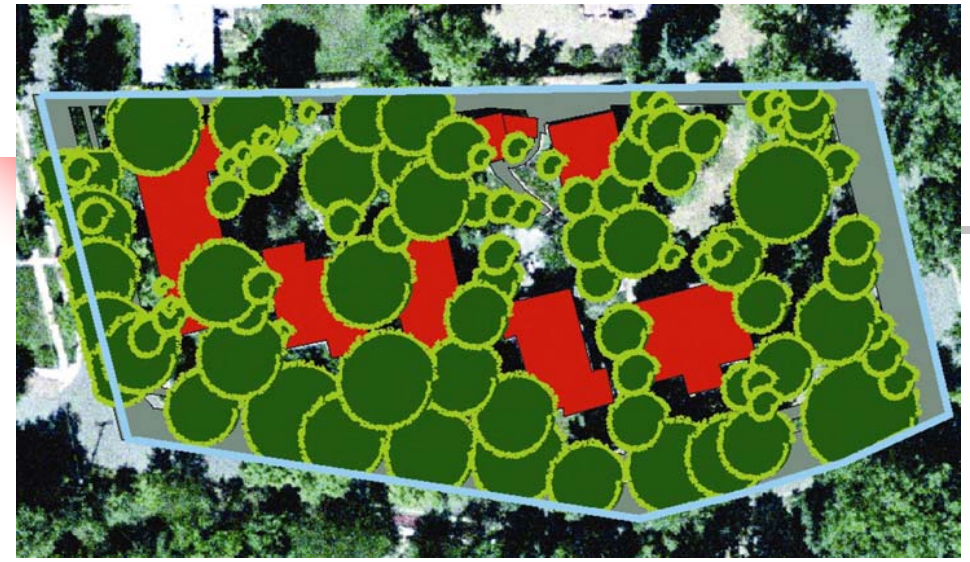
The Path of Stormwater Runoff

Resilience- water quality

Resilience- small changes

Resilience- softer responses

Example: Low Density Residential Site



Environmental Benefits: Site 3 Statistics

Size: 1.5 acres
Canopy Cover: 60%
Number of Homes: 5
Number of Trees: 110

Carbon

Carbon Storage: 29 tons
Carbon Sequestration: 0.7 tons/year

Air Pollution

Air Pollution Removal: $151/year
Air Pollution Removal: 52 lbs/year

Energy Benefits

Energy saved by site: $390/6400 kWh/year
Avoided carbon by site: 3660 tons/year

Stormwater

Avoided Runoff: 2813 cubic feet
Runoff Reduction: 55%
Time of Concentration Increase: 42%
Peak Flow Reduction: 62%

What are the projected long-term savings from conservation alternatives?

Measure	Potential Water Savings (AF/year)	Estimated Cost range of Savings ($/AF)
Rebates for Landscape Retrofits	3,067-18,402	$2,439-$10,678
Toilet Rebates	55,800 in 2030	$7,230 @ $150 rebate per toilet
Commercial Indoor Audits	767-3,834	$3,300-$16,300
Washer Rebates	17,025-40,198 in 2030	$4,000-$28,000
Turf Replacement	125,757-211,656	$7,000-$25,000 w/ diff rebate amounts