The Cost of Conservation:

Are Municipal Utilities Being Cost Effective in their Conservation Implementation?

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WestWater Research
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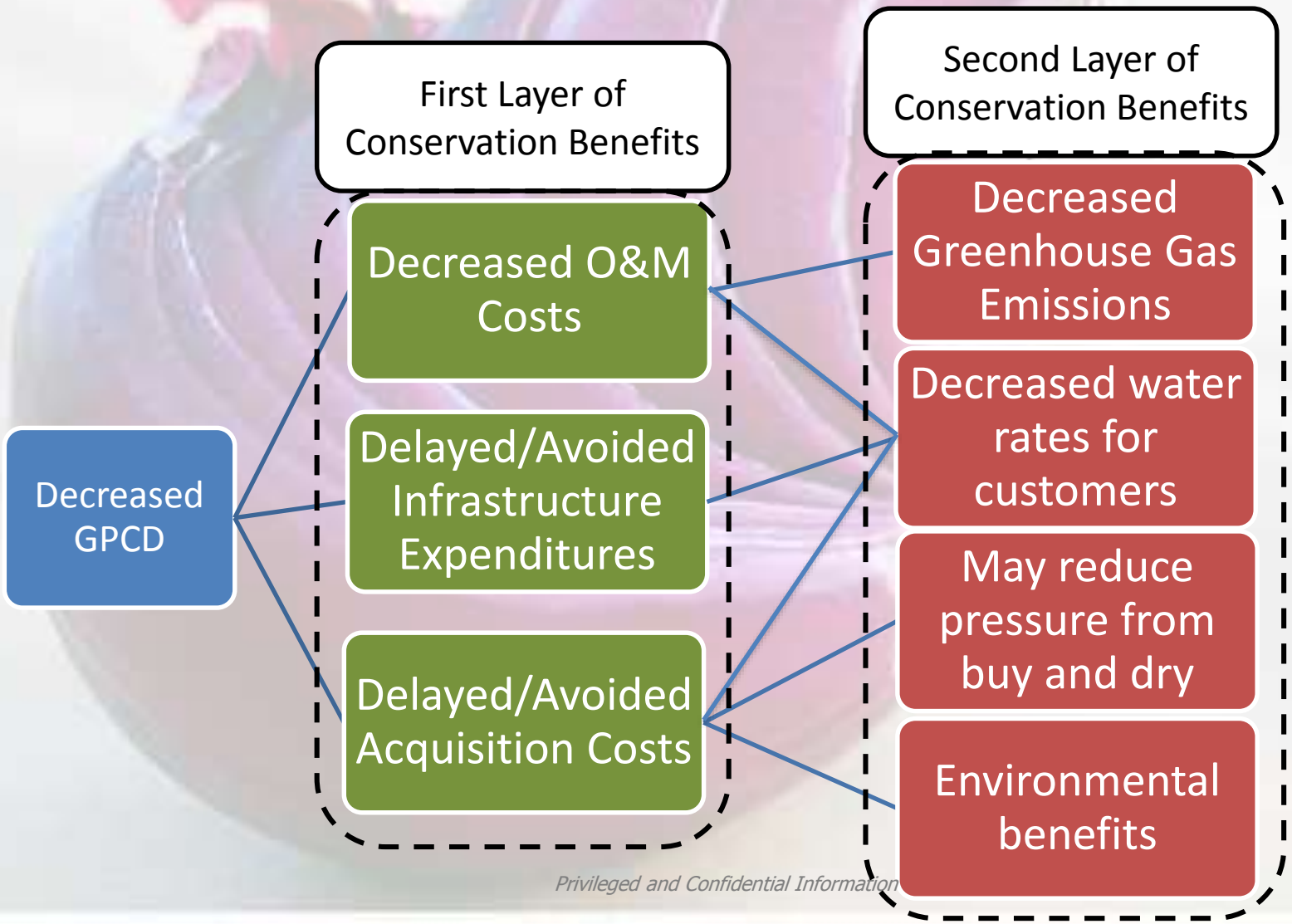
- Conservation Overview
- Previous Research
- Cost-Benefit Across Municipalities
- Case Studies
- Conclusions

Overview of Conservation Benefits



Previous Research

- **Alliance for Water Efficiency**:
  - Westminster Conservation: Helps Limit Rate Increases for a Colorado Utility
  - Tucson Arizona: Water Conservation Keeps Rates Low in Tucson, Arizona
- **Western Resource Advocates**:
  - Arizona Water Meter
  - Most Water Utilities Missing an Opportunity to Stretch Water Supplies: Water Connection Charges Can Encourage Conservation
  - A Guide to Designing Conservation-Oriented Water System Development Charges
  - Filling the Gap: Commonsense Solutions for Meeting Front Range Water Needs
- **Pacific Institute:**
  - Waste Not, Want Not: The Potential for Urban Water Conservation in California
  - The Cost of Alternative Water Supply and Efficiency Options in California
  - Hidden Oasis: Water Conservation and Efficiency in Las Vegas

Municipal Conservation Toolbox

Municipal Water Efficiency Activities and Drought Strategies-CWCB

– Considered as Municipal Conservation Strategy (Voluntary Conservation):

- Irrigation audits for parks and open spaces
- Install water saving fixtures, toilets, and/or appliances
- Replace turf with xeriscape landscape
- Conversion of sprinkler to low volume irrigation where appropriate
- Identify high water use customers and develop water saving target

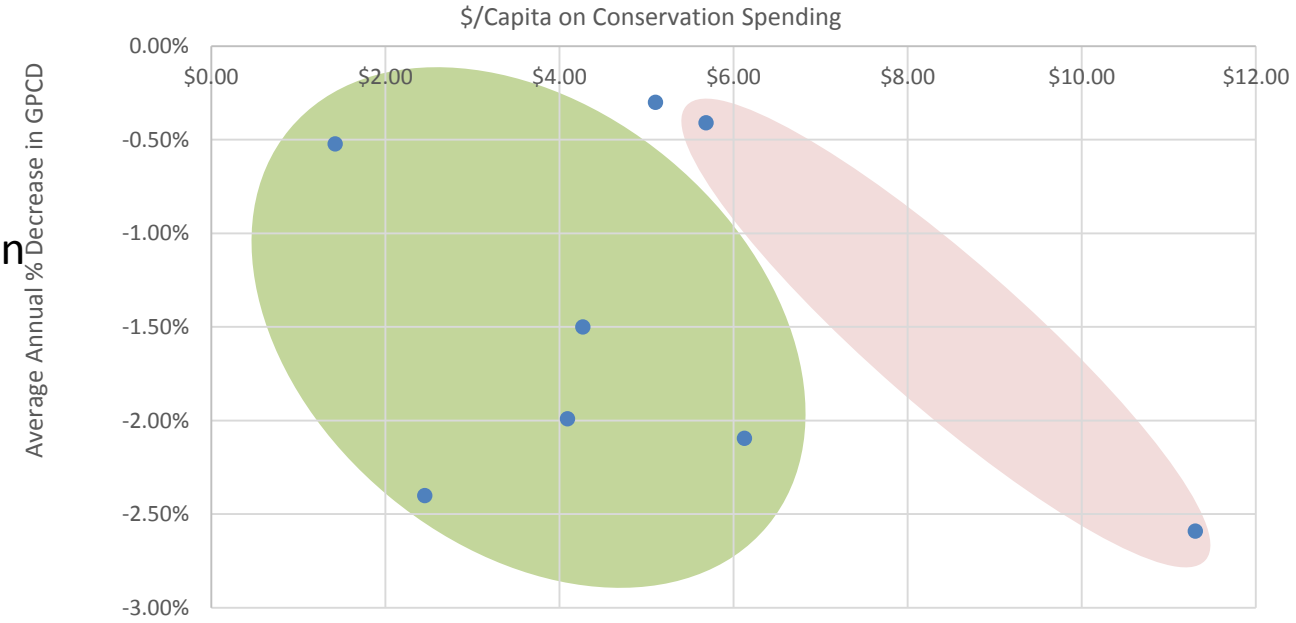
– Not Considered as Municipal Conservation Strategy (Drought Regulations):

- Limit landscape irrigation to certain days of week during drought
- Limit landscape irrigation to certain days of week to manage peak flows
- Reduce irrigation on parks and landscaping
- Limit outdoor watering to specific times of the day
- Set time limit for water (5:00 pm to 8:00 am)
- Prohibit water from November to March

- **Common in the literature to attribute some conservation results to drought program and regulations.**

Conservation Savings

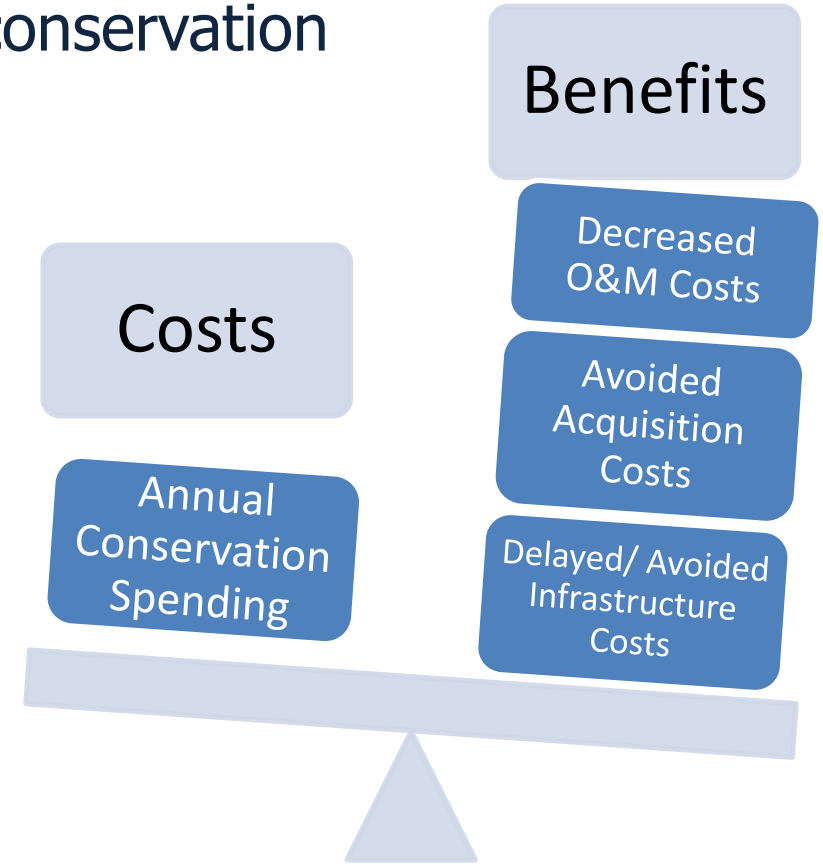
- Average annual conservation spending/year
- Resulting decrease in GPCD



Municipality	Years	Average Annual Spending/person	Annual Change in GPCD	Ratio
Fort Collins	8	$5.11	-0.30%	$1,702
Thornton	5	$5.68	-0.41%	$1,391
Denver	16	$11.30	-2.59%	$436
Aurora	13	$6.13	-2.09%	$293
Santa Fe	9	$4.27	-1.50%	$285
Colorado Springs	4	$1.42	-0.52%	$273
Boulder	12	$4.09	-1.99%	$206
ABCWUA	13	$2.45	-2.40%	$102

Cost Benefit Analysis of Conservation

- Compare conservation spending to annualized benefits provided by conservation



Case Study #1: Denver Water

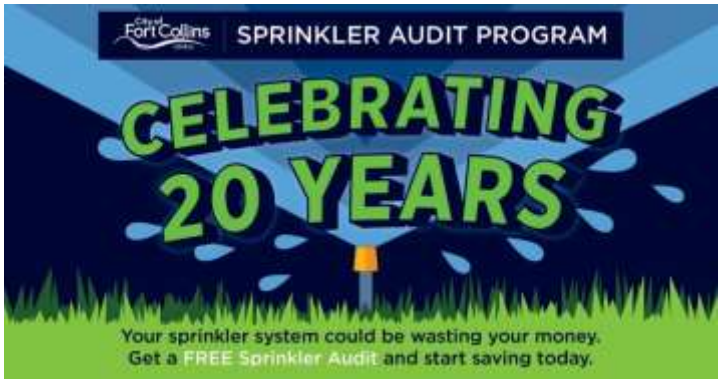
Average Annual Conservation Spending	Decrease in GPCD	Cost Savings		
			$/1000 gals	Total
$6,838,287	47	O&M Costs	$0.98	$11,969,241
		Avoided/ Decreased Acquisition Costs	$3.16	$38,551,721
		Avoided/ Decreased Infrastructure Costs	$3.55	$43,400,932
		Total		**$93,921,894**

- Annual savings of $124/customer
- Benefit-Cost Ratio of 13.74
- Assumes acquisition and infrastructure costs are avoided
  - Operating Benefit Cost Ratio: 1.75

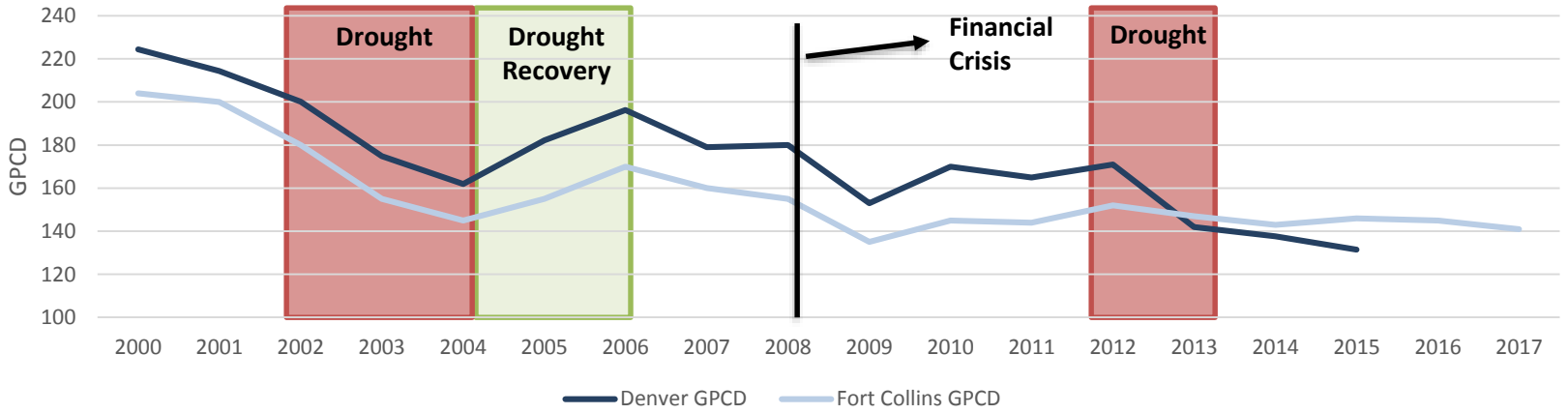
Case Study #2: Fort Collins

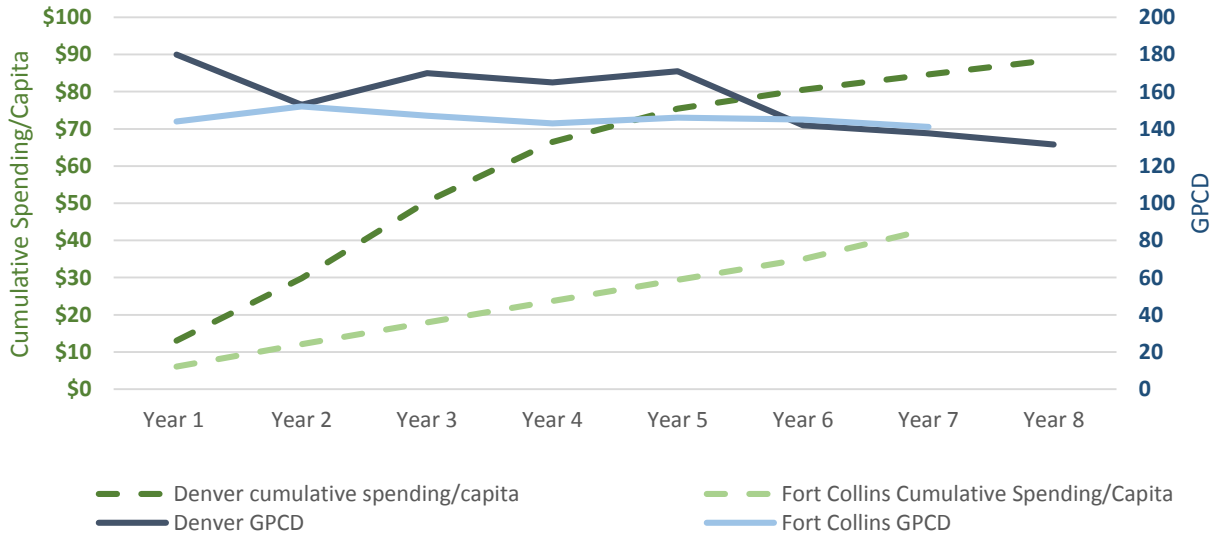
Annual Conservation Spending	Decrease in GPCD	Cost Savings		
			$/1000 gals	Total
$796,857	3	O&M Costs	$0.13	$17,951
		Avoided/ Decreased Acquisition Costs (Annualized)	$3.16	$450,016
		Avoided/ Decreased Infrastructure Costs (Annualized)	$1.87	$267,122
		Total		**$735,089**

- Annual cost of $0.47/customer
- Benefit-Cost Ratio: 0.92
  - Operating Benefit-Cost Ratio: 0.02



Decreasing GPCD





Conclusions

- Conservation is cost effective when it works
- Important to consider costs apart from water acquisition
- Conservation appears more beneficial to growing cities
  - If raw water and treatment capacity have already been acquired, there are less conservation benefits
- Results of conservation (gpcd) can be messy
  - Drought and the economy influence water use

Questions?

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