



Chicago Metropolitan
Agency for Planning

Conservation Pricing

Presentation to the NE IL RWSPG

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Presentation Content

- Water Pricing
 - Background
 - Water Prices in US Cities
- Water Rate Structures (WRS)
 - Definition, Types, Design
- Conservation Pricing (CP)
 - When WRS promotes conservation result is CP
 - CP & WRS: conservation goals, evaluation
 - What the region does
 - What others do
- Recommendations

Water Supply Planning

Includes:

- Amount of additional water to develop
- Timing and cost of development
- Design, financial and legal issues



Water Pricing

- Historically, water has been under-priced to foster objectives of public health & safety, and economic development



Water Pricing (contin.)

- Price that Municipal Water Utilities charge their customers.
- Costs cover:
 - Utility O & M
 - Costs to procure & develop additional water supplies to meet growing demands
 - Social & environmental opportunity costs of losing other benefits of the water & natural waterways, e.g. ecological & recreational values of river basins



Utility Total Budget (I)



Source: Johns, G. (2007)

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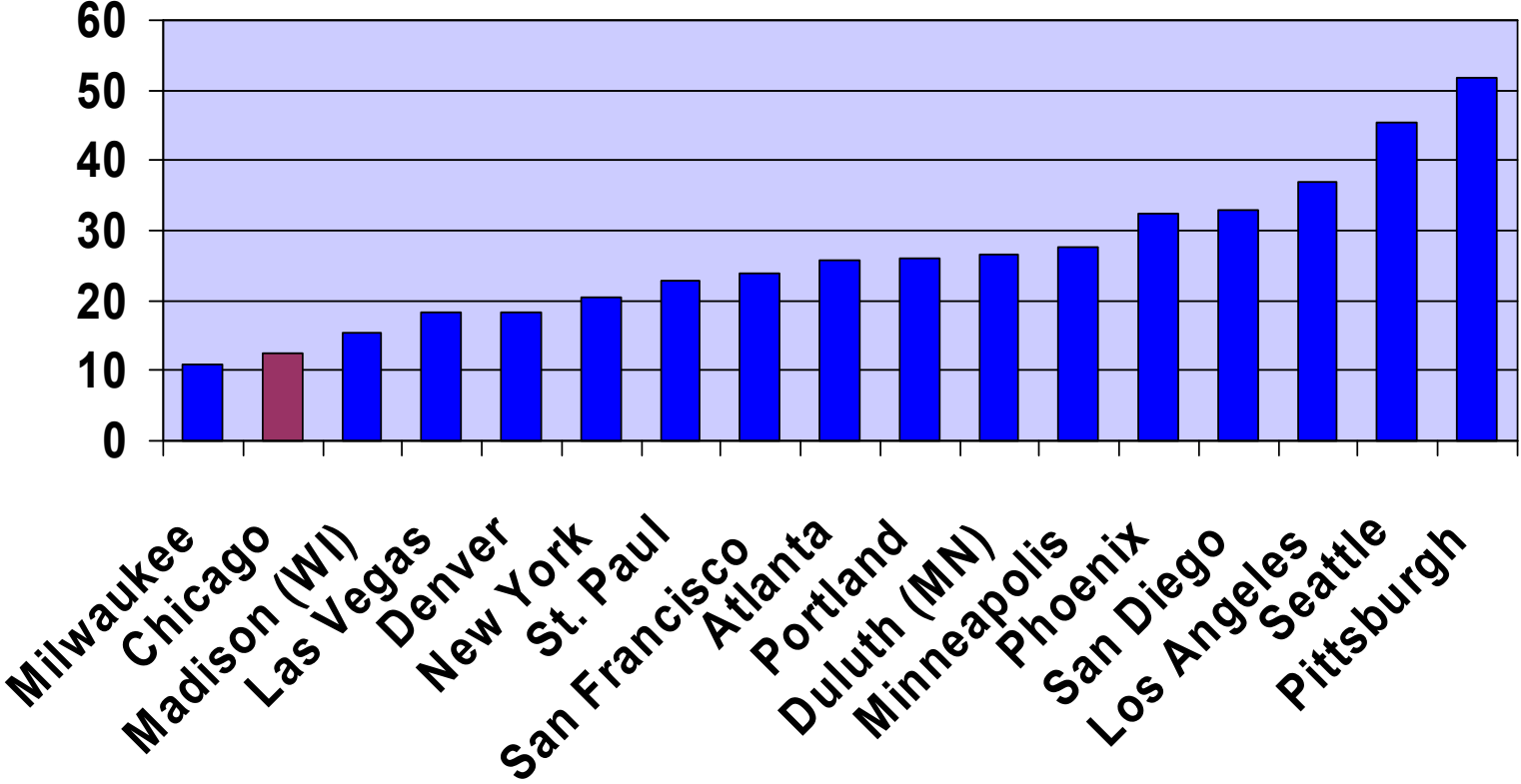
Key Points (Part I)

Water Utilities are designed to meet the maximum/peak demand

It is in the best interests of utilities to reduce/manage this peak demand to reduce investment in capital assets

Demand Management can be achieved by Water Conservation- a cost effective substitute for water supply development

Water Prices in US Cities (\$/10,000 gallons)



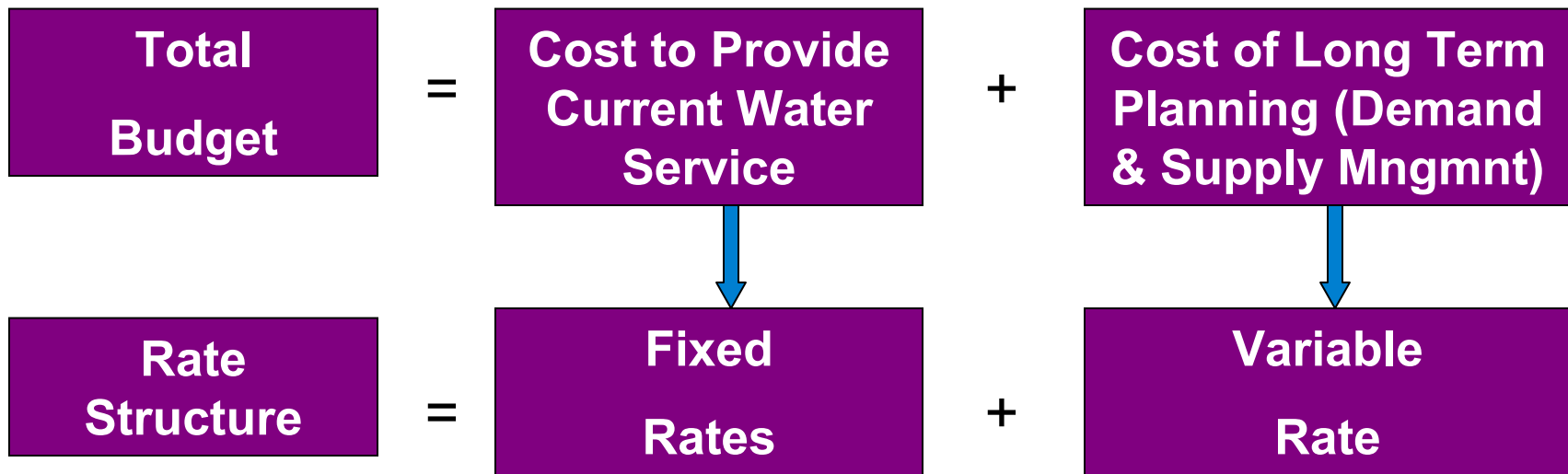
Source: *Water Demand & Planning Report*- Twin Cities MN; May 2004

Water Rate Structures (WRS)

- Made up of 2 charges:
 - Service Charge: fixed service fee per billing period regardless of consumption level
 - Consumption/Commodity Charge: price for each unit of water consumed
- **Utilities decide what to achieve, promote or discourage with WRS**



Utility Total Budget (II)



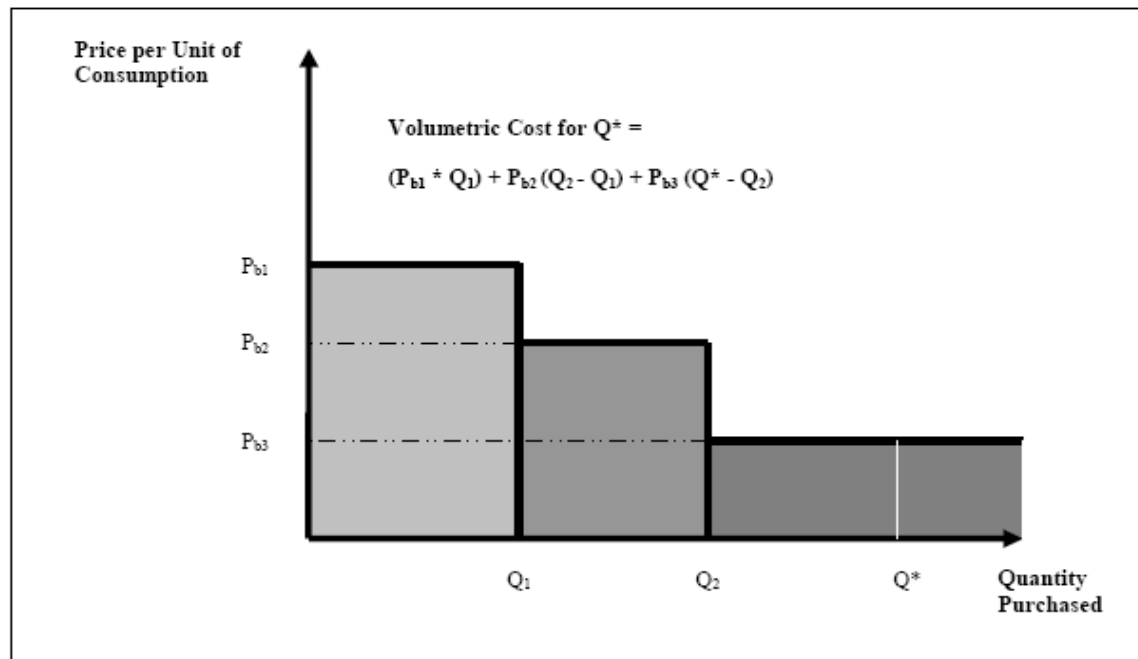
Source: Johns, G. (2007)

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Rate-setting Objectives

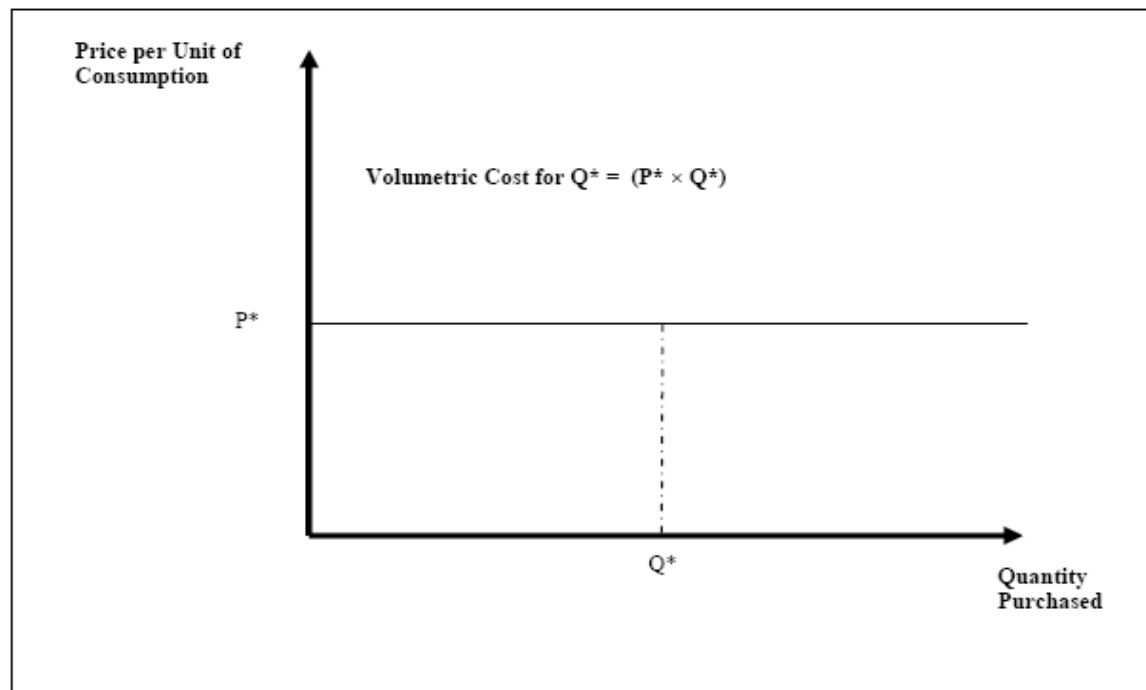
- Revenue Sufficiency/Adequacy: cost recovery
- Net Revenue Stability: for contingencies
- Rate Stability: continuity
- Equity and Fairness: cost of service
- Affordability: the 4% rule
- Efficiency & Conservation: wise use
- Political Acceptability: “offsetting squack”
- **Demand Reduction & Cost Deferral: postponement**
- Others: ease, simplicity, legality

WRS Types: Decreasing Block Rate



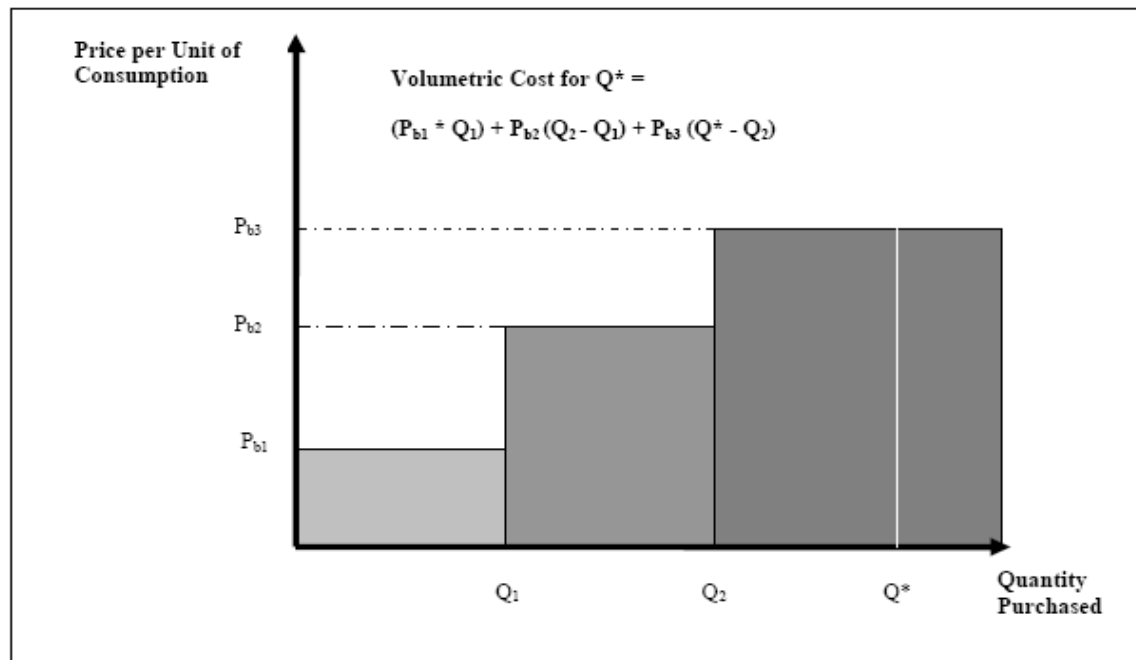
Source: *Evaluation of Water Ratemaking Practices and Rate Structure Complexity in Illinois Water Systems*. 2004. J. Kiefer. Doctoral dissertation. Copyright 2004, Jack C. Kiefer.

Uniform Rate



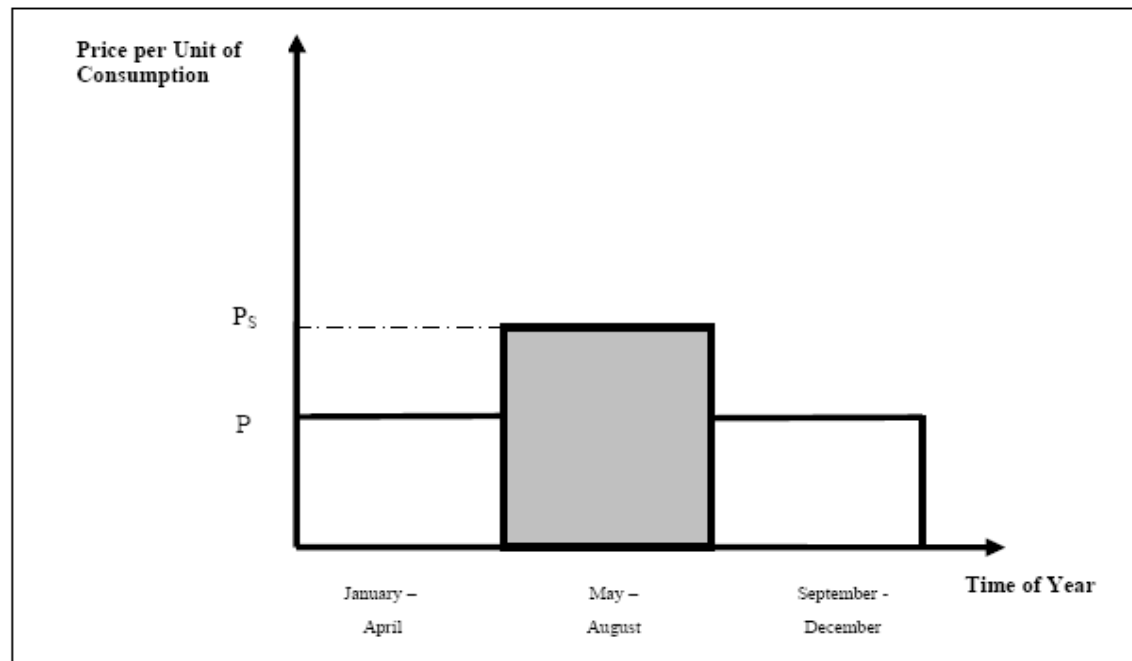
Source: Kiefer, J. (2004)

Increasing Block Rate



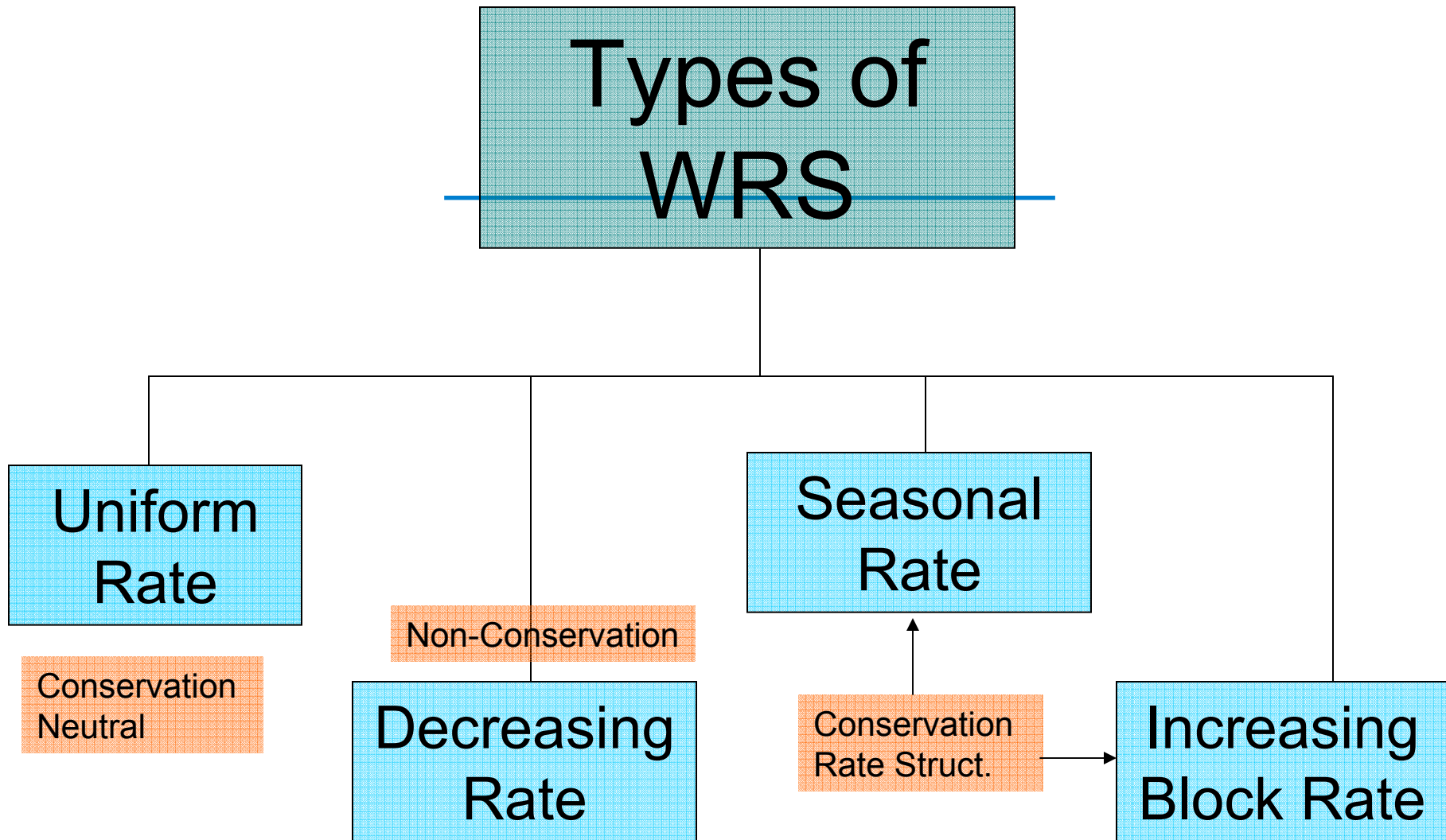
Source: Kiefer, J. (2004)

Seasonal Block Rate



Source: Kiefer, J. (2004)

Types of WRS



Conservation Pricing

- AWWA stated that Conservation Pricing is among the best management practices for urban water conservation
- Concerns the elimination of non-conserving pricing policies & adoption of a structure that provides incentives to customers to reduce average or peak usage and use surcharges to encourage conservation

Conservation Pricing & WRS

- Utility's Perspective
 - Revenue requirement, ROI, Long-term Planning
- Customer's Perspective
 - Equitable, Affordable, Understandable
- Society's Perspective
 - Economic Efficiency, Resource Conservation, Priority Uses of Water, “Just & Reasonable”



Key Points (Part II)

- **Customers determine quantity of service utility must provide**
- **Water Customers react to water prices**
 - Restrictions in water use reduce demand
 - Lower water rates tend to produce higher per capita use
- **Benefits of conservation = avoided costs of H2O development**
- **Avoided cost is present value of new H2O project without conservation less present value of project with conservation**

Avoided Cost Savings- Example

- If a water supply project that costs \$200,000/year to operate is delayed by 6 years:

Savings = \$5.8 million

Source: Johns, G. (2007)

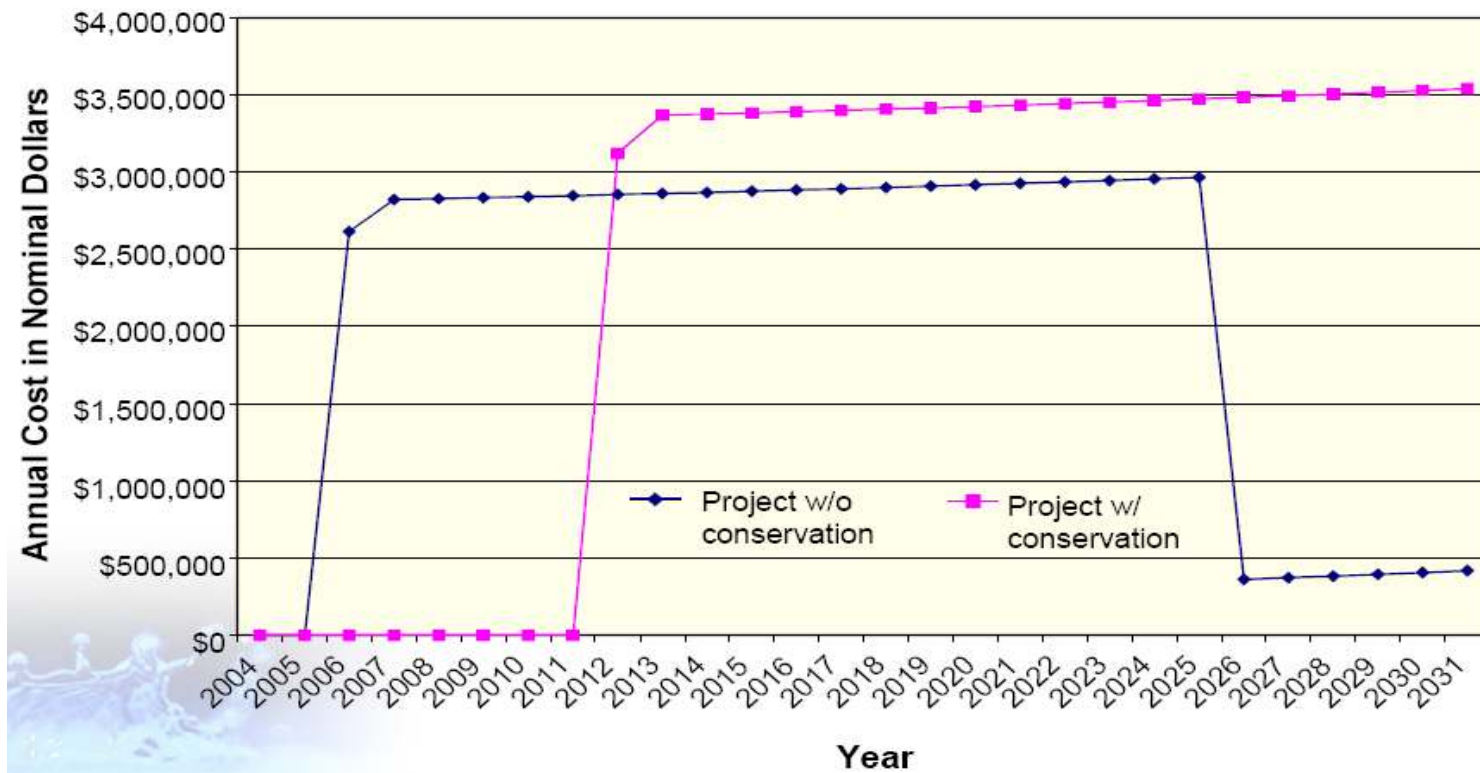
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Avoided Cost Savings- Example



Source: Johns, G. (2007)

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Marginal Cost & Variable Rate Structure

Basic Rate Structure: $Bill_{n,t} = F + p \times w_{n,t}$

More Elaborate: $Bill_{n,t} = F + p_1 \times w_{n,t} + p_2 \times (\Delta w_{n,t})$

$Bill_{n,t}$: water bill of nth customer in month t

F: fixed charge

p: water rate (varies with amount of water use)

p_1 : current costs per 1,000 gallons of water used

p_2 : avoided costs per 1,000 gallons associated w/reduced water use

$w_{n,t}$: water use of nth customer in month t

$\Delta w_{n,t}$: water use- meant to approximate discretionary water use

Source: Johns, G. (2007)

Avoided Costs

- Included in rate structures
- Can be placed in a trust account to fund:
 - conservation programs that allow for plant delay and
 - capital investments as needed

WRS Effectiveness In CP



- Fixed Service Charge
- Price Sensitivity
- Billing Frequency & Ease of Communication

CP Benefits for Utilities

Water Utility	Pop Served	Net Benefit
Massachusetts Water Resources Authority	2,200,000	\$111- 153 mil
Houston, TX	1,700,000	\$262 mil
Albuquerque, NM	483,000	Avoided water shortages
Irvine Ranch, CA	150,000	\$28.2 mil
Santa Monica, CA	85,000	\$9.5 mil
Cary, NC	80,000	Delayed 2 plant expansions by 2 years
Ashland, OR	20,000	\$6.9- 10.1 mil
Gallitzin, PA	2,000	\$25,000/year

Source: USEPA, *Cases in Water Conservation*, July 2002.

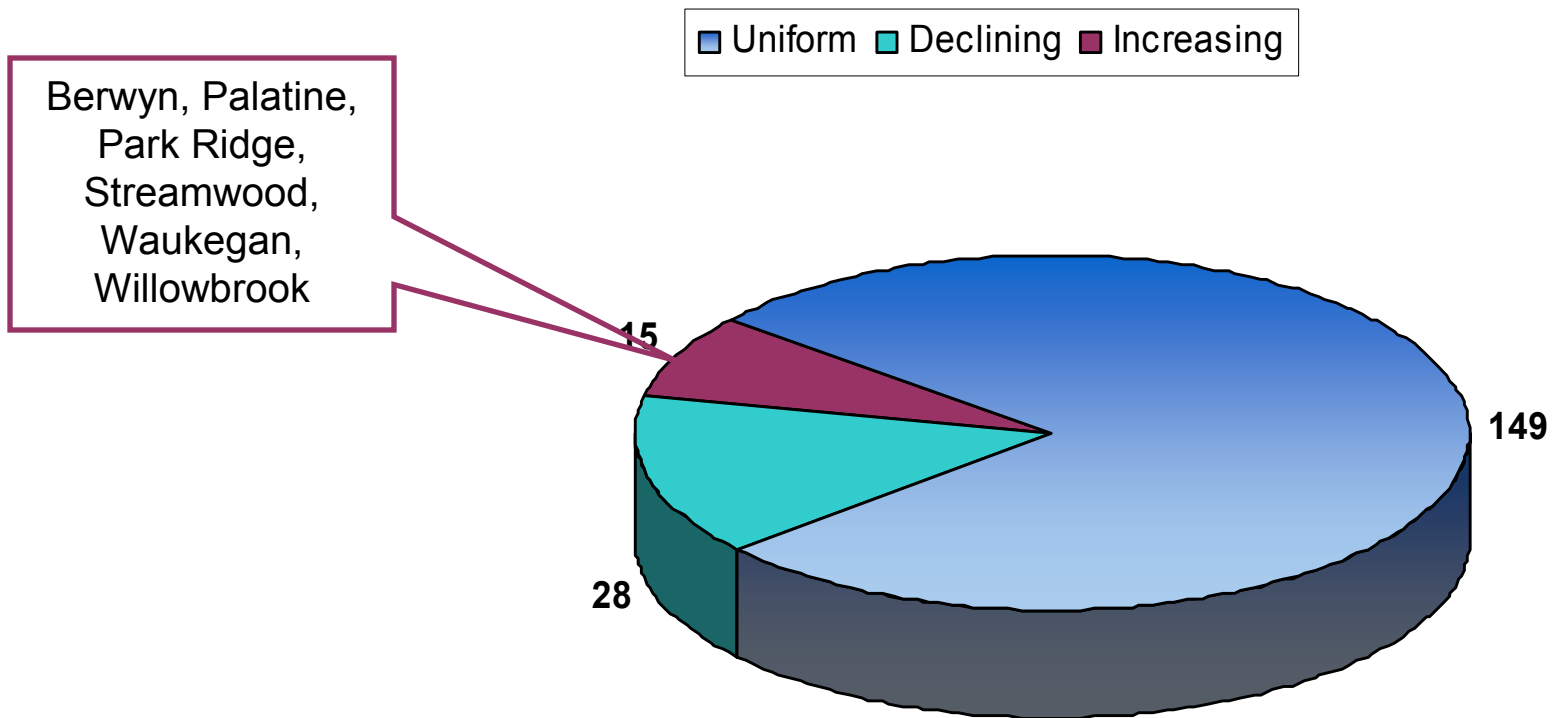
CP* Benefits for Individuals

Water Utility	Pop Served	Net Benefit Per Person#
Massachusetts Water Resources Authority	2,200,000	\$50- \$70
Houston, TX	1,700,000	\$154
Irvine Ranch, CA	150,000	\$188
Santa Monica, CA	85,000	\$112
Ashland, OR	20,000	\$345
Gallitzin, PA	2,000	\$13

*CP is included with other conservation programs e.g. public education & information
#Benefit varies with utility

Source: USEPA, 2002.

WRS in NE IL Communities (Lake Michigan-served Communities)

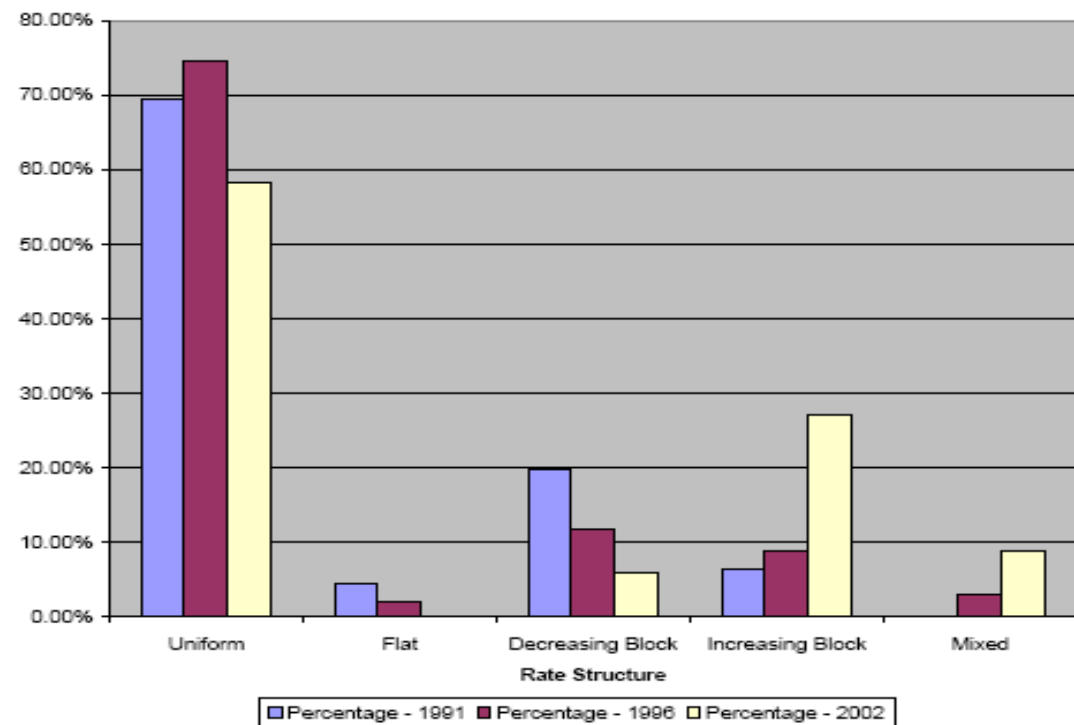


Source: *Lake Michigan Water Survey*- IL Dept. of Natural Resources; July 2005

WRS in Minnesota

1993: Amendments to MN statute requiring water suppliers to employ water-use demand reduction measures including evaluation of a conservation rate structure.

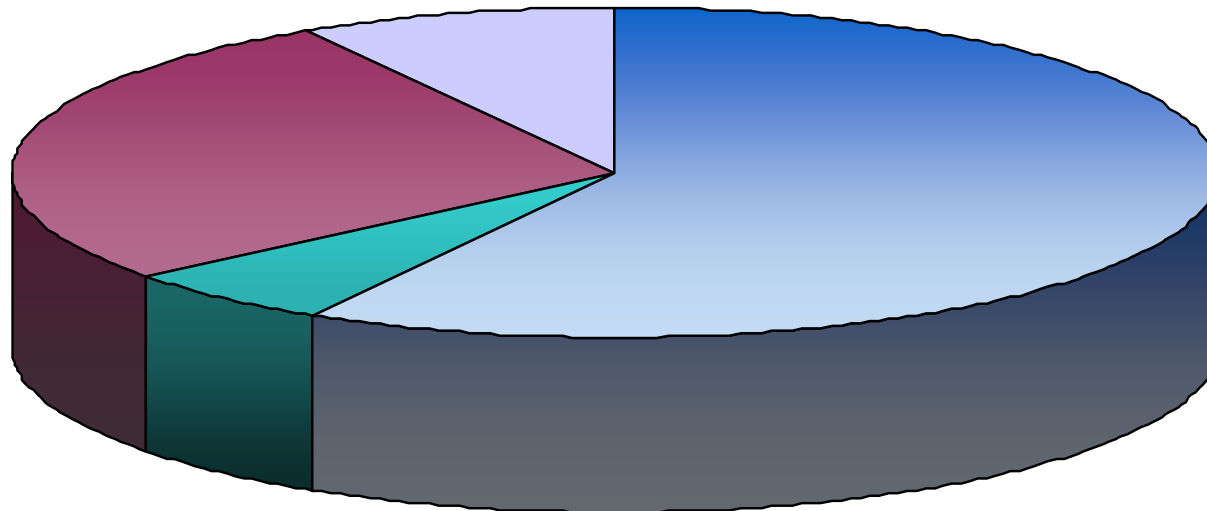
Graph 5 Metropolitan Area Water Pricing Structures



Source: *Water Demand & Planning Report- Twin Cities MN*; May 2004

WRS in Minnesota

Uniform Decreasing Increasing Mixed

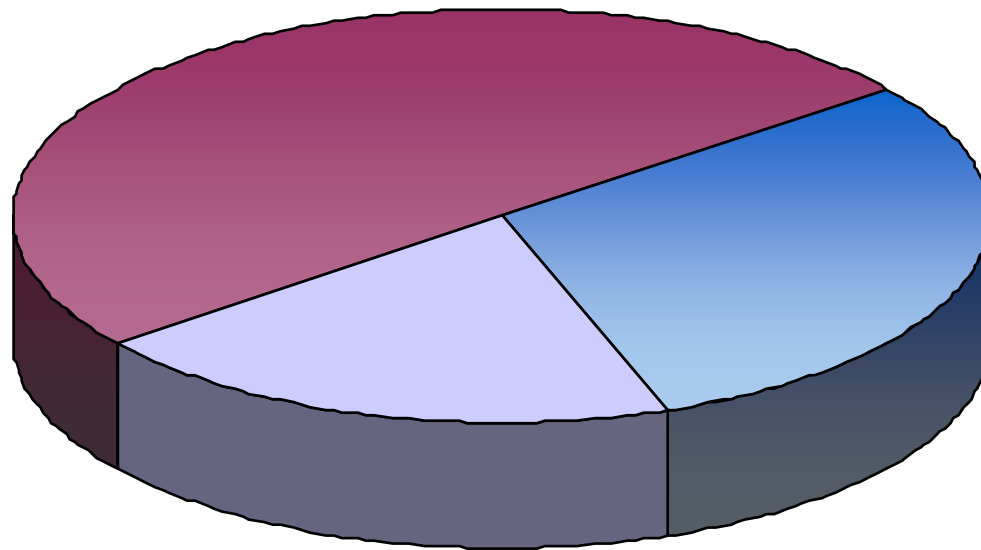


Source: *Water Demand & Planning Report- Twin Cities MN*; May 2004

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WRS in Utah

□ Seasonal/Increasing ■ Increasing □ Uniform



Source: *Water Rate Structure in Utah*- Western Resource Advocates; January 2005.

Conclusions

- CP gives the customer the option to choose the amount of water based on willingness to pay
- CP can result in delaying the development of new infrastructure to meet increasing demands
- Savings from CP are significant to both water utilities and customers

Recommendations- General

- NE IL communities/utilities should review their WRS to decide whether rates reflect the cost of water use
- Communities should study the modification of WRS to include CP in rate setting
- Public involvement should be solicited in any future rate setting that includes CP
- A strong public information campaign should insure that residents understand that CP is beneficial to them individually and to the community as a whole

Recommendations- General

- Combine and implement CP with other water conservation tools such as regulatory mechanisms (watering policies, erosion & sediment control, water conservation ordinances, native planting) and education programs.

Recommendations- Specific

- Tier I- State:
 - Review utility water rates and recommend the inclusion of Conservation Pricing within rate structure
- Tier II- Regional:
 - Provide Technical Assistance for utilities with various conservation programs
- Tier III- Water Utilities:
 - Model WRS to reflect regional goals and objectives as well as satisfy local revenue requirements

Questions for RWSPG

- Does CP serve conservation purposes?
- Do you agree that CP reduces costs?
- Will CP be a sustainable measure for water supply planning?
- Would the region benefit from CP policies?
- Should CP be a recommendation in the Plan for efficient water use?

Other Questions?

Thank you.

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