



San Diego County
Water Authority

The Relationship Between the Retail Price of Water and Water Demands

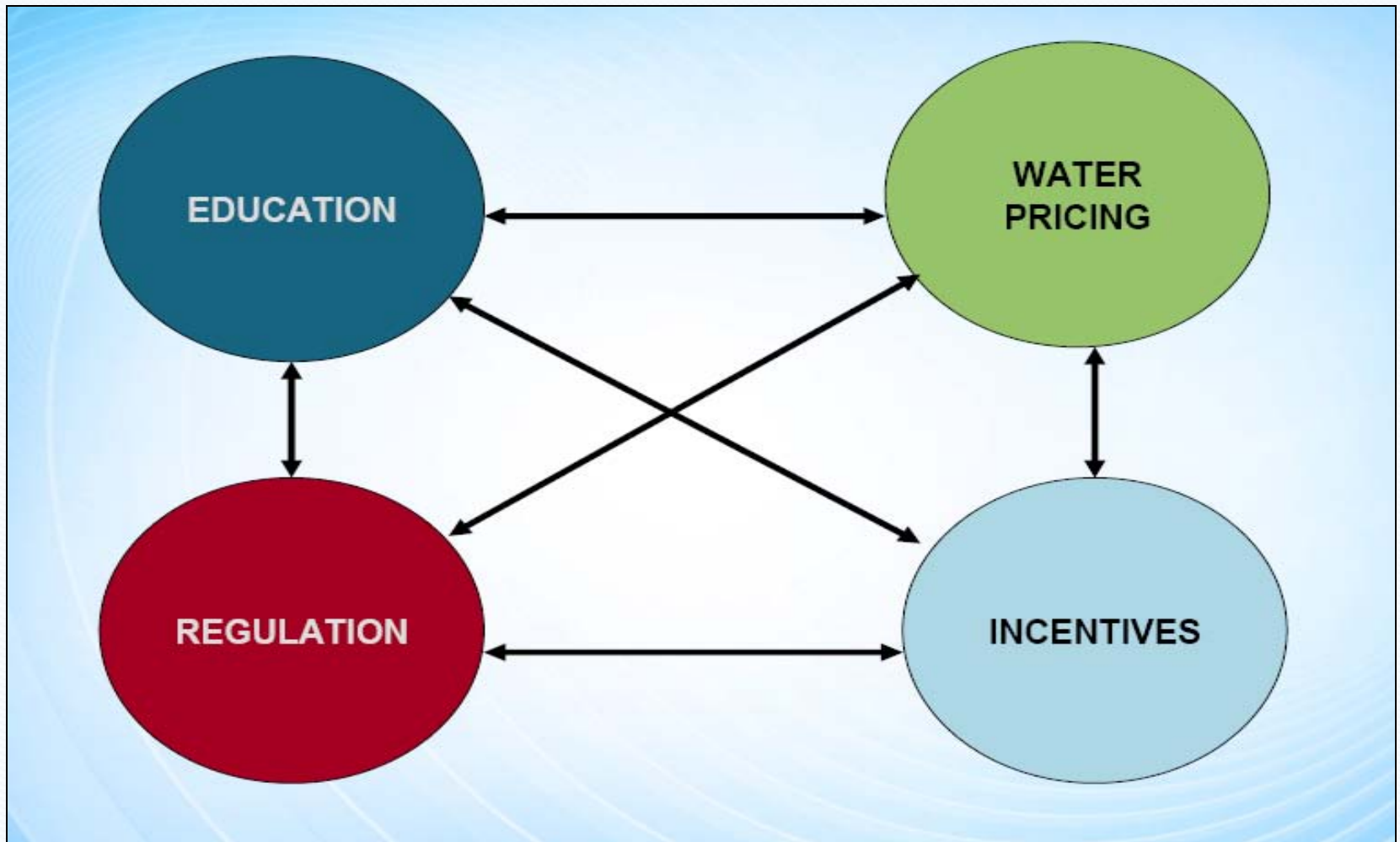
Water Conservation Action Committee

January 10, 2011

Agenda

- Discuss factors that influence water demands
 - Historic 30-year period
- Expected impact on demands from recent price increases
 - Fiscal year 2007-2010 period

Typical Agency Approach to Managing Water Demand

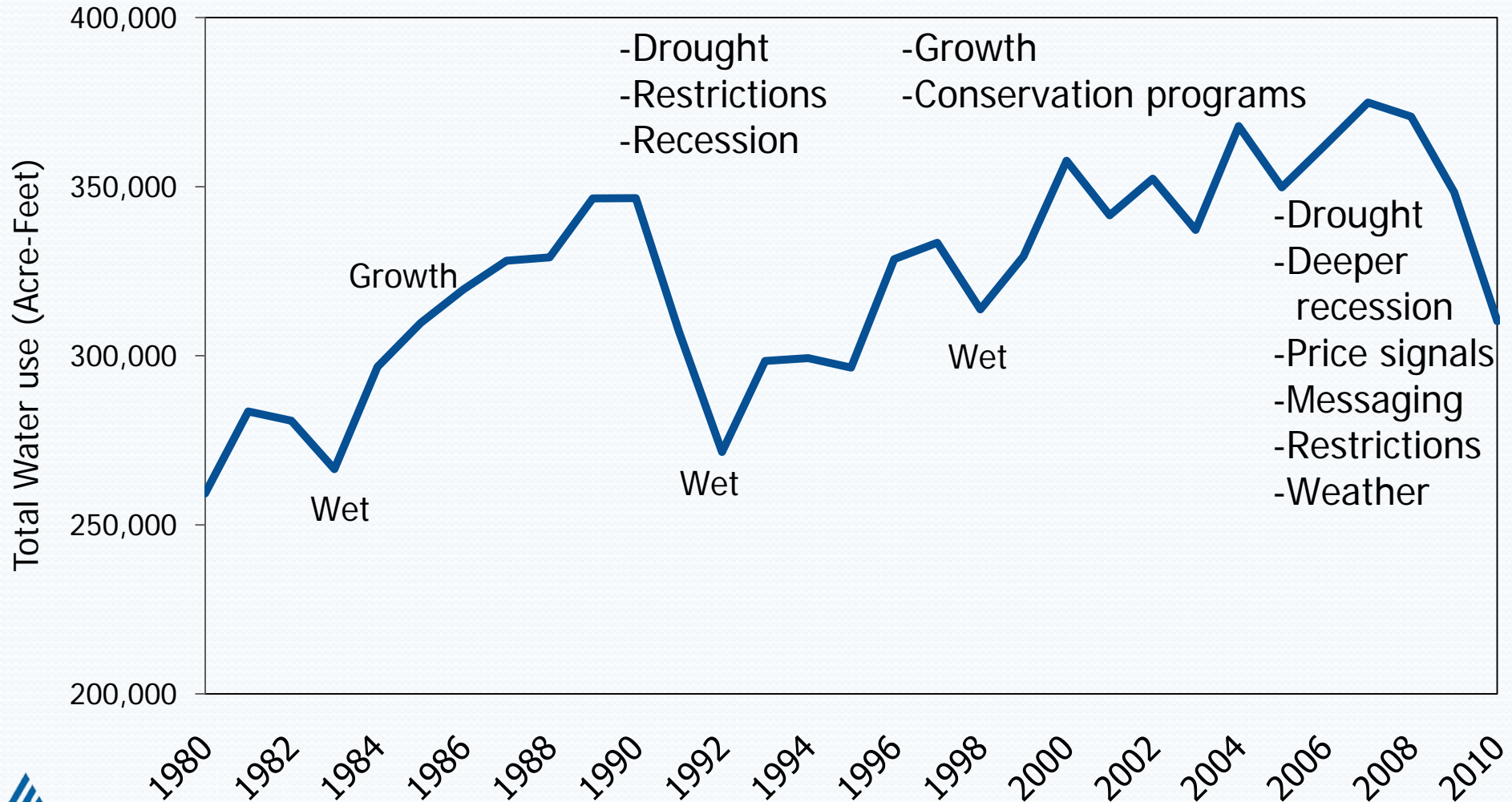


Primary Factors Influencing Water Demands

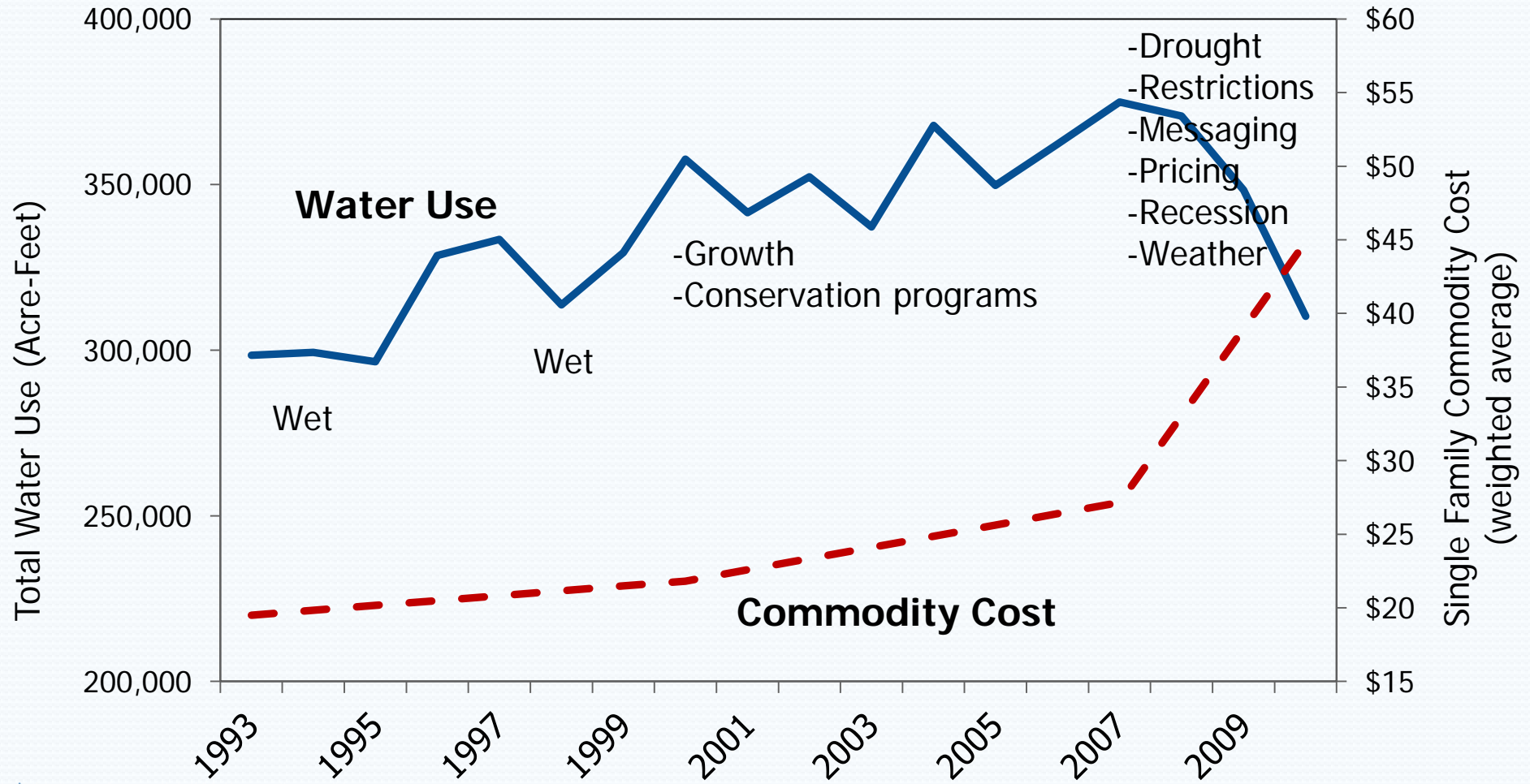
Factors under Control of Water Agency	Factors beyond Control of Water Agency
Public Education and Outreach	Weather and Climate
Shortage Response Actions (water-use restrictions)	Household Characteristics (income, persons per household)
Price of Water	Housing Characteristics (lot size, density)
Rate Structure	Economy (employment, housing growth)
Long-term Conservation Programs	

Events Cause Fluctuations in Water Use

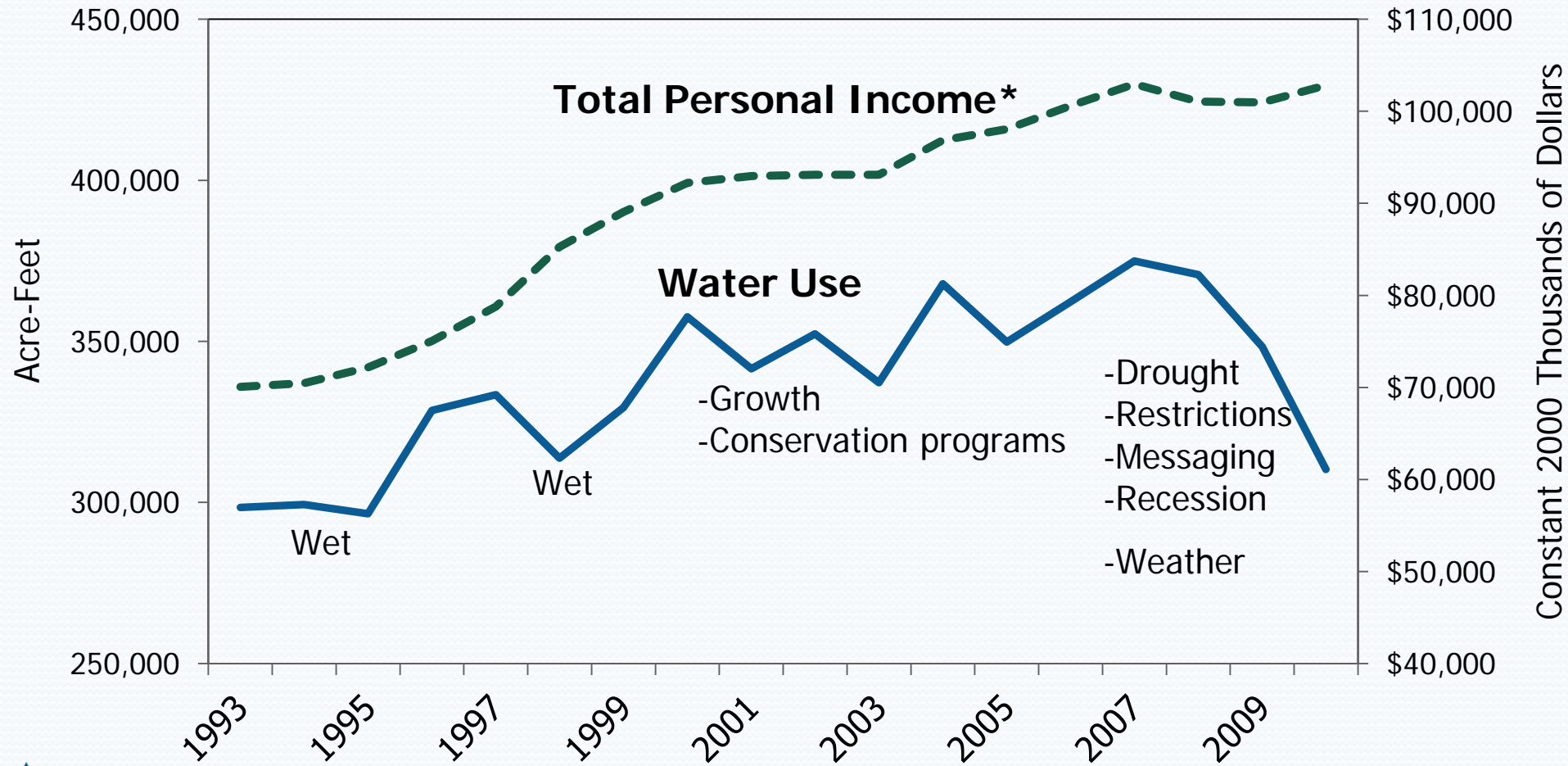
Five Large Urban Agencies from FYs 1980 - 2010



Historic Retail Commodity Cost (1993–2007) had Minimal Effect on Water Use



Personal Income is One of the Main Factors Influencing Water Use



*Personal income includes wages, dividends, interest, rent, transfer payments, etc.

Background – Current Shortage Period

- Significant reductions in retail water demand since fiscal year 2007
 - -20% Municipal and industrial
 - -56% certified agriculture
- Period between 2007-2010 was one of significant wholesale and retail price increases
- Concerted effort by water agencies to reduce demand
 - Concurrent with other external factors (eg: economic recession, cooler weather)
- Each factor contributed to demand reductions
 - Difficult to isolate individual effect
 - Interaction between variables

Factors Influencing Demands during Current Water Shortage and Expected Response

Variables	Expected Water Use Response	
	Decrease (↓)	Increase (↑)
Cool weather		↓
Income flattening		↓
Unemployment rate increase		↓
Housing unit vacancy rate increase		↓
Water price increases		↓
Conservation programs		↓
Mandatory restrictions		↓
Heightened public outreach		↓

Estimating Effect of Price on Demand Reduction FY 2007 to 2010

- Sample of five large urban member agencies
- Utilized single family water demands and commodity price
- Utilized concept of “price elasticity” to isolate expected price effect
 - Applied previous research to five agency sample
- Does not fully account for other factors at work during current shortage period
 - Greater accuracy requires more intensive short-term modeling of the specific time period and region

Concept of Price Elasticity of Demand

- Approach often used to measure extent to which demand is sensitive to change in price
- Percentage change in demand for one percent change in price
 - Price Elasticity = %change in demand/%change in price*
- Price elasticity of -0.2 means that a 10% rate increase produces a 2% decrease in demands
- Research is primarily on developing elasticity factor
 - Not applied to analyze past behavior
 - Typically focused on future forecasting

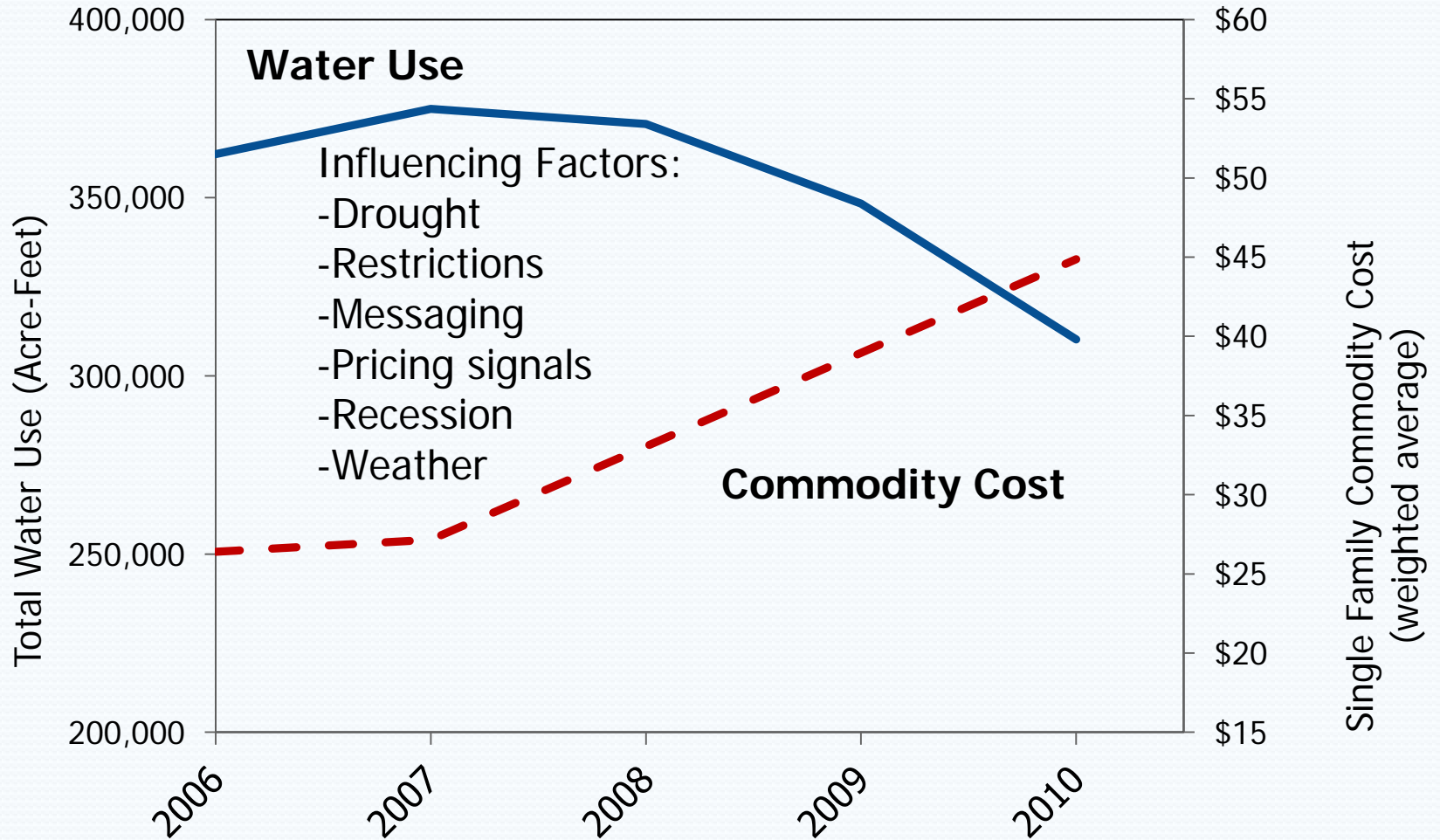
Estimated 2007-2010 Demand Price Response due to Increased Price

$$\text{Price Elasticity} \times \% \text{Change Price} = \% \text{Change Demand}$$

Short-Run Price Elasticity* (Used to determine response between 2007-2010)	-0.15
% Change Price (Weighted average price increase of five agencies)	64%
Estimated % Change Demand	-10%
Actual % Change Demand of Five Agencies	-20%

*Assumed elasticity based on literature review. Did not take into account actual member agency rates and water use data for time period. Short-term modeling effort is needed for greater accuracy.

FY 2006-2010 Water Use Decrease and Commodity Costs



Conclusions

- Customer demands can be responsive to retail price with correct pricing signals
- Evaluation based on current research literature
 - Greater accuracy requires short-term modeling
- Results unique to 2007-2010 period
 - Extrapolating continued price response over long-term would require similar conditions and retail rate increases
- Multi-faceted, comprehensive approach to long-term demand reduction is most effective strategy



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