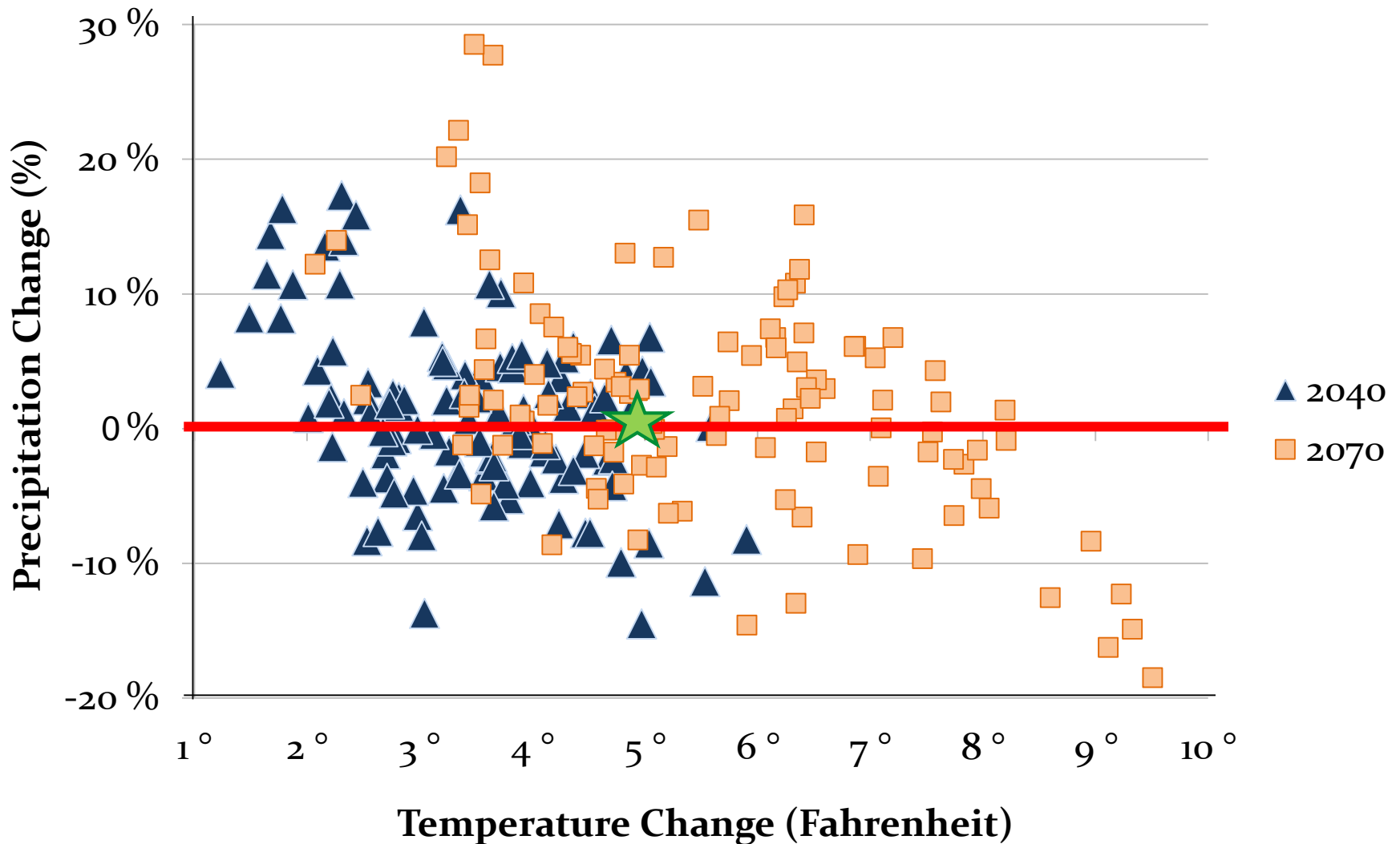


Climate Adaptation Planning: A Utility Perspective

**Upper Colorado River Basin Forum
November 5, 2014**

Laurina Kaatz
Climate Policy and Adaptation
Denver Water

Projected Changes for North Central Colorado



Climate Adaptation Challenges

- **What information should we use?**
 - Simple vs sophisticated?
- **How do we use it?**
 - Conversion?
- **Probabilities? Scenarios?**
- **New science?**
- **Messaging?**





Water Planning Challenges

Population Growth

Pine Beetle Epidemic

Endangered Species



Drought

Economic Woes

Water Quality



Wildfire

Colorado River Compact Call

Climate Change

Aging Infrastructure

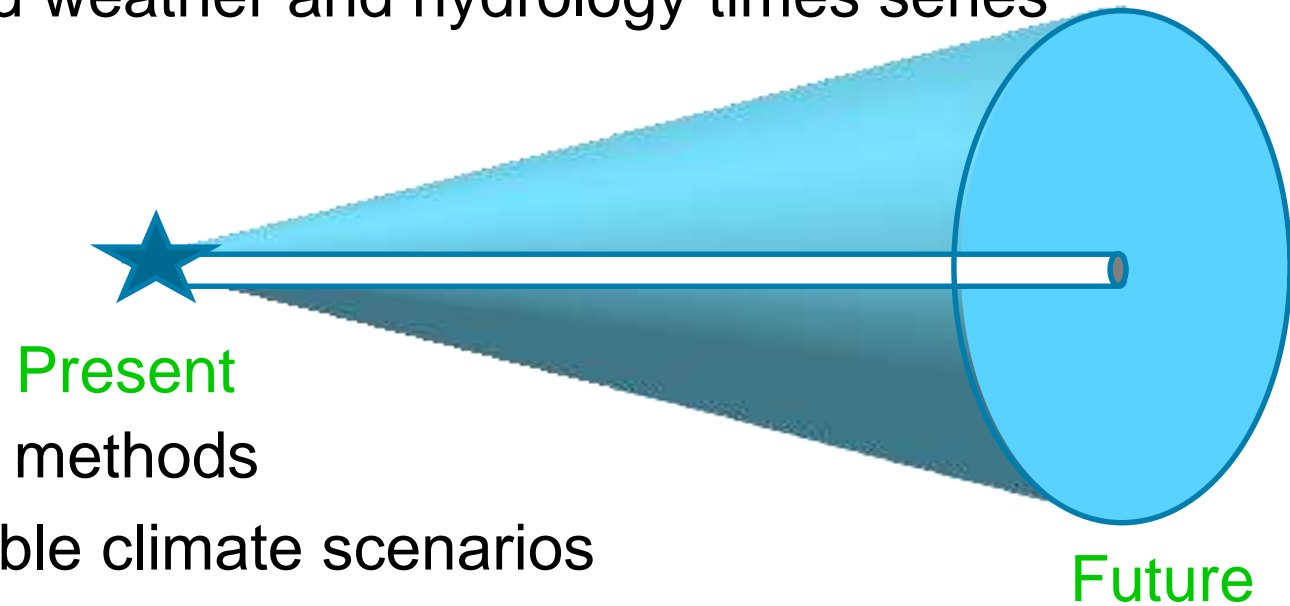
Long-term planning

- Traditional long-term planning
- Assumes stationary systems (climate, watershed)
- Uses recorded weather and hydrology times series



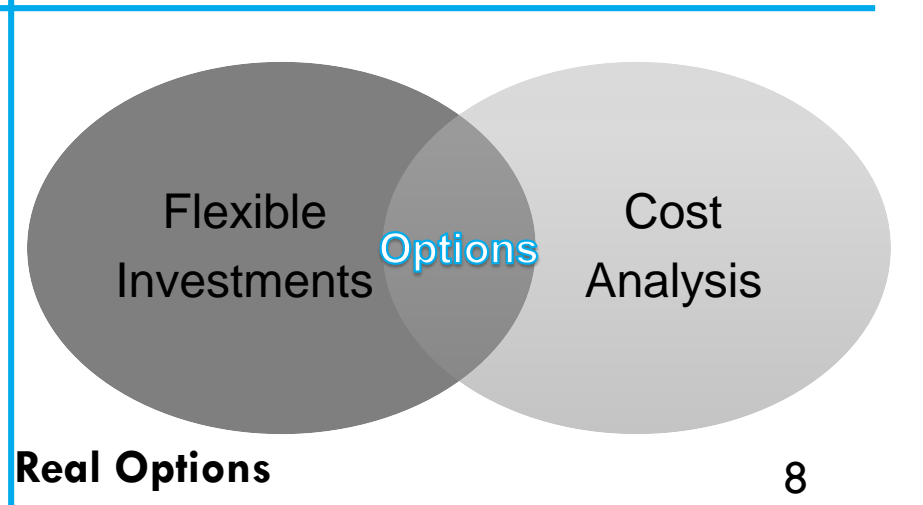
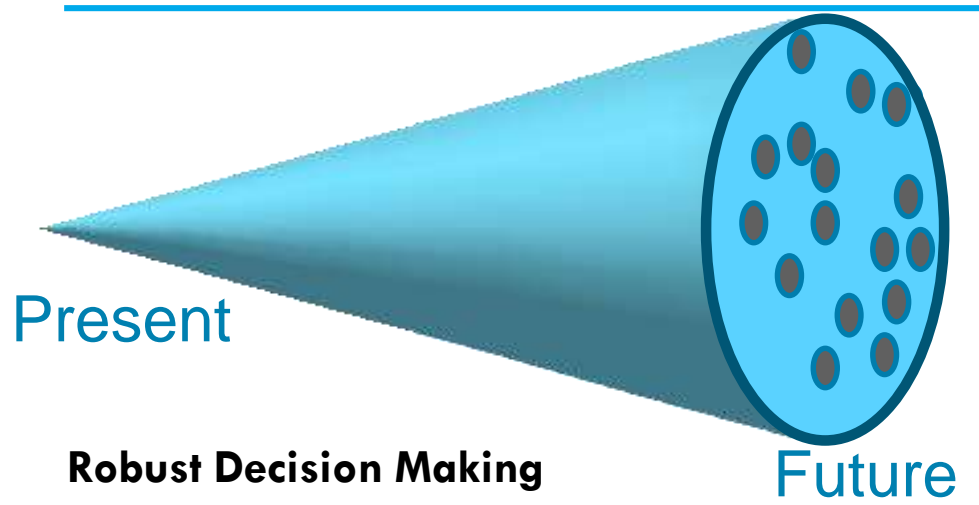
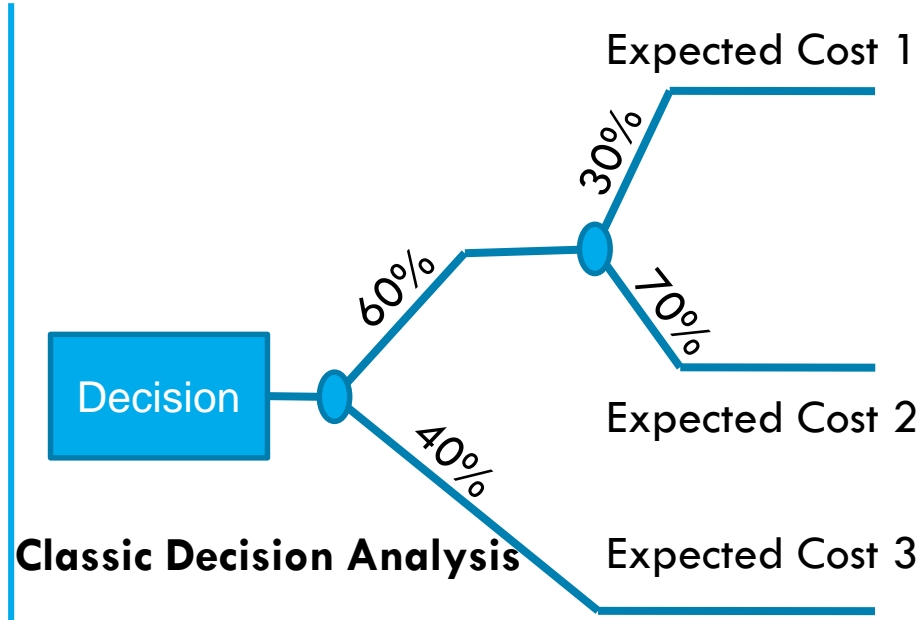
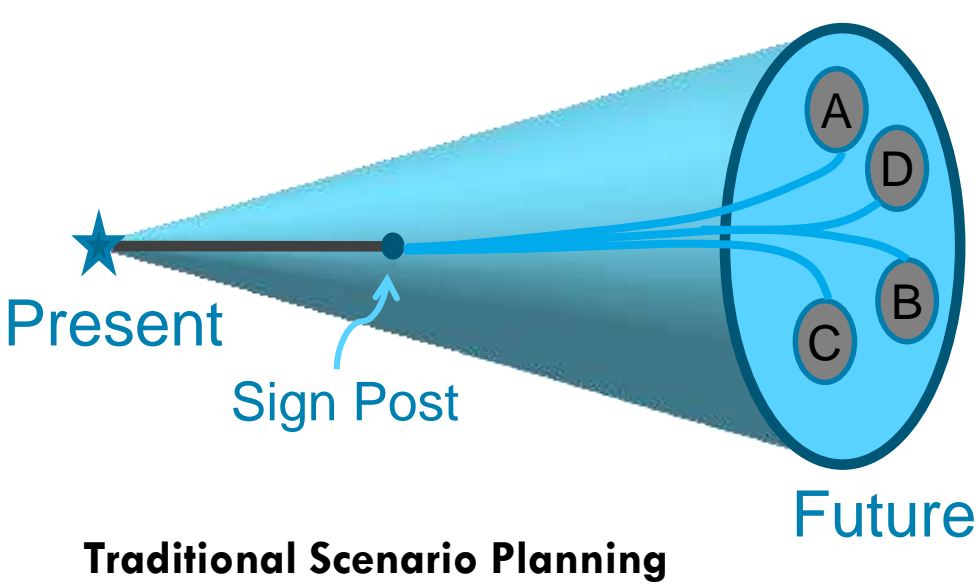
Cone of Uncertainty

- Traditional long-term planning
- Assumes stationary systems (climate, watershed)
- Uses recorded weather and hydrology times series



- New planning methods
- 100's of possible climate scenarios
- Many other sources of uncertainty

Four Promising Planning Methods



Planning Futures

1. **Traditional Future** - The future is extrapolated from past trends.
2. **Water Quality Rules** - Contaminant removal and other drinking water requirements are extremely stringent.
3. **Hot Water** - A warmer climate accompanied by more frequent and more severe droughts.
4. **Economic Woes** - An ongoing energy crisis and deep economic downturn.
5. **Green Revolution** - Environmental values and sustainable living become dominant social norms.

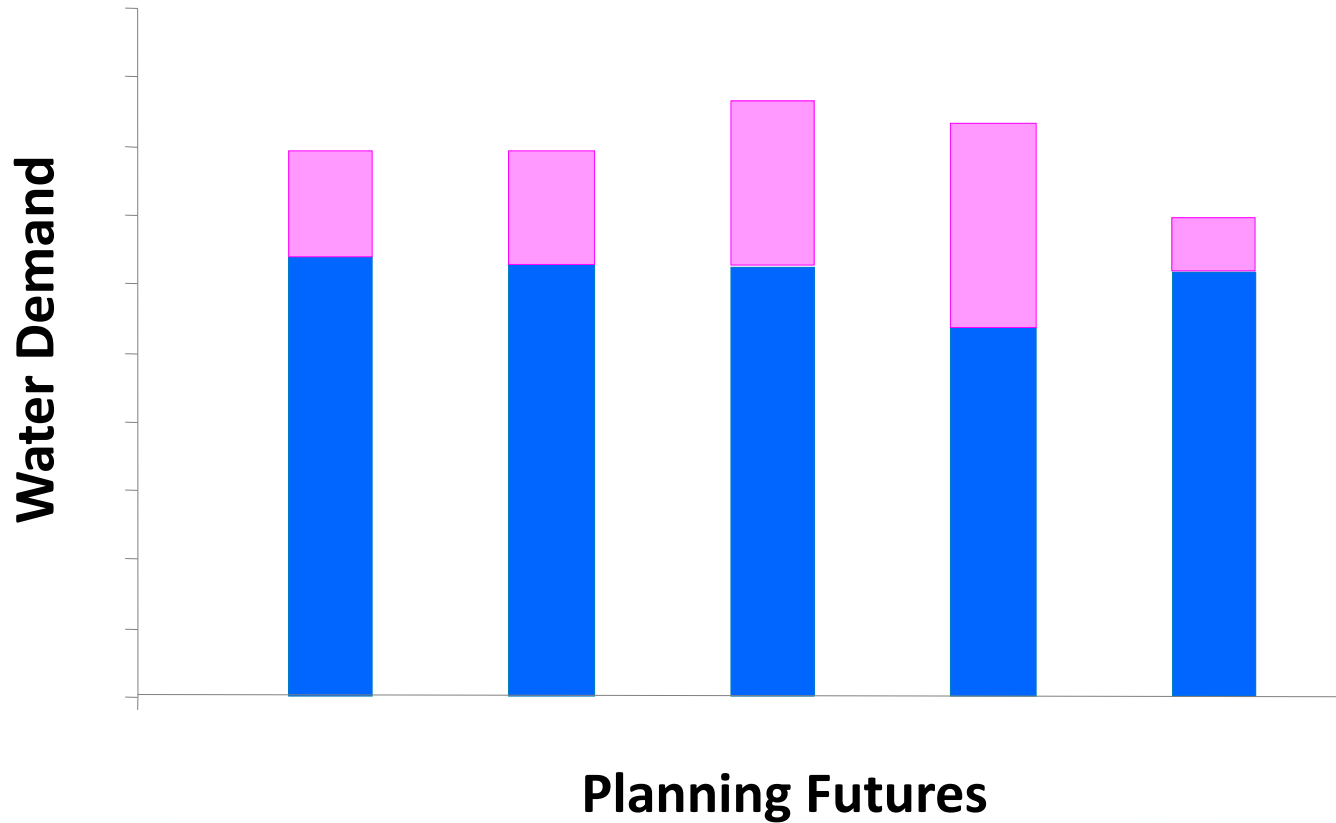
Denver Water's Simple Assessments

2009	2° F		5° F	
	Colorado	South Platte	Colorado	South Platte
Precipitation increase to offset warming	5%	5%	8%	12%

2010	5° F
	% Change
Yield	-22%
Demand	7%

Supply Gap in 2050

Gap Existing Supply

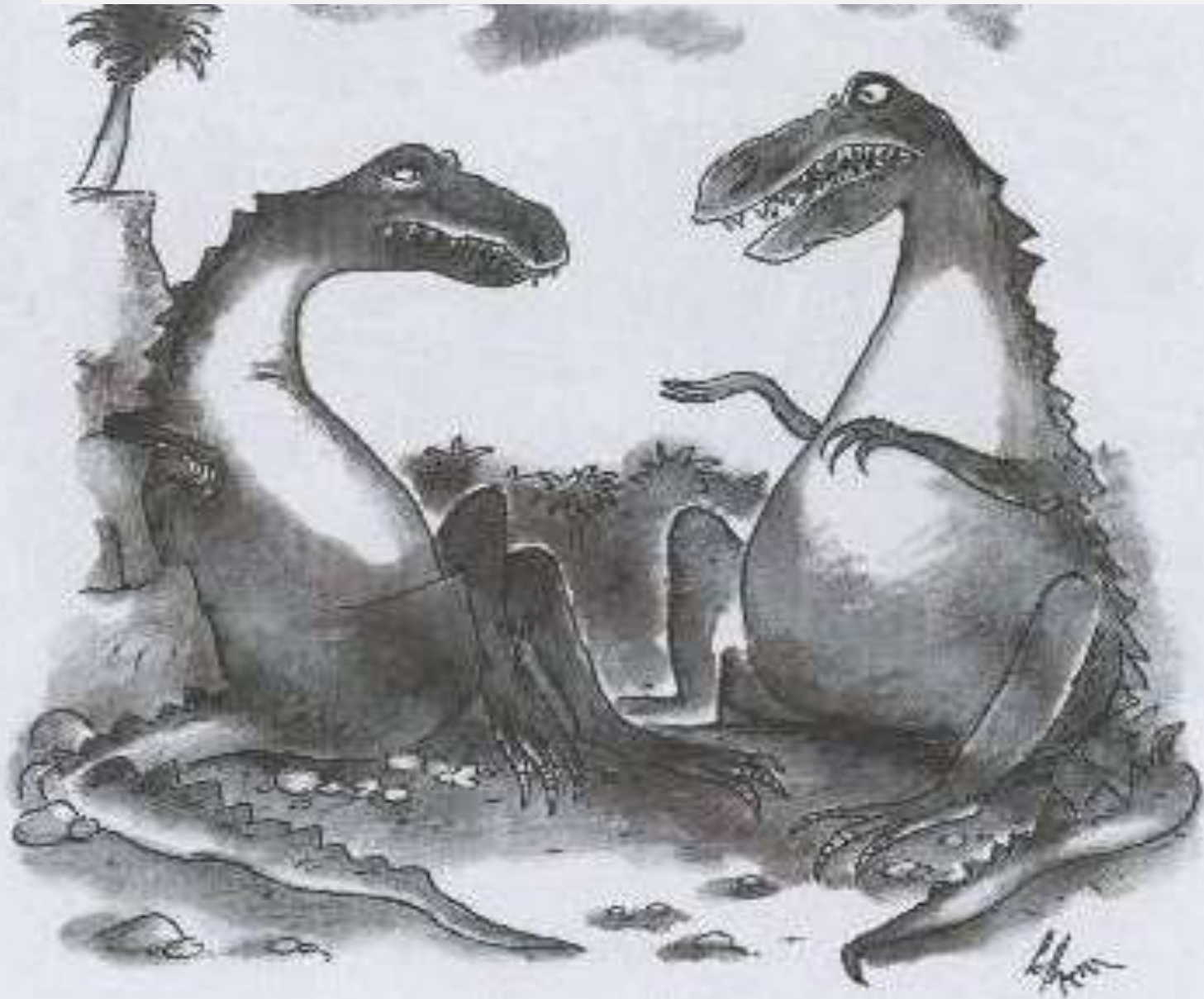


Outcomes

- Identify and preserve options
- Increase diversity and flexibility
- Build adaptive capacity



“All I’m saying is now is the time to develop a plan to deflect an asteroid.”



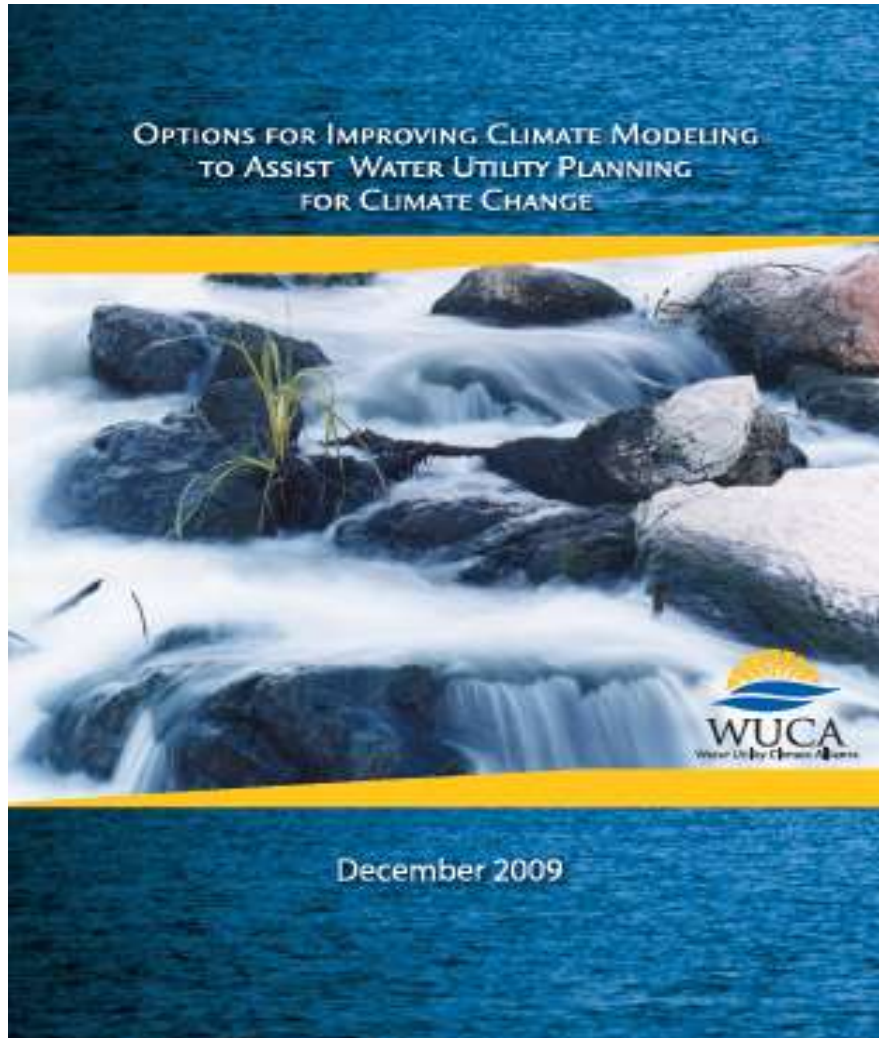
Four Adaptation Steps

- 1. Understand**
climate science and model projections – capabilities and limitations
- 2. Assess**
water system vulnerabilities to potential change
- 3. Plan**
incorporate climate change uncertainty into water utility planning
- 4. Implement**
adaptation strategies

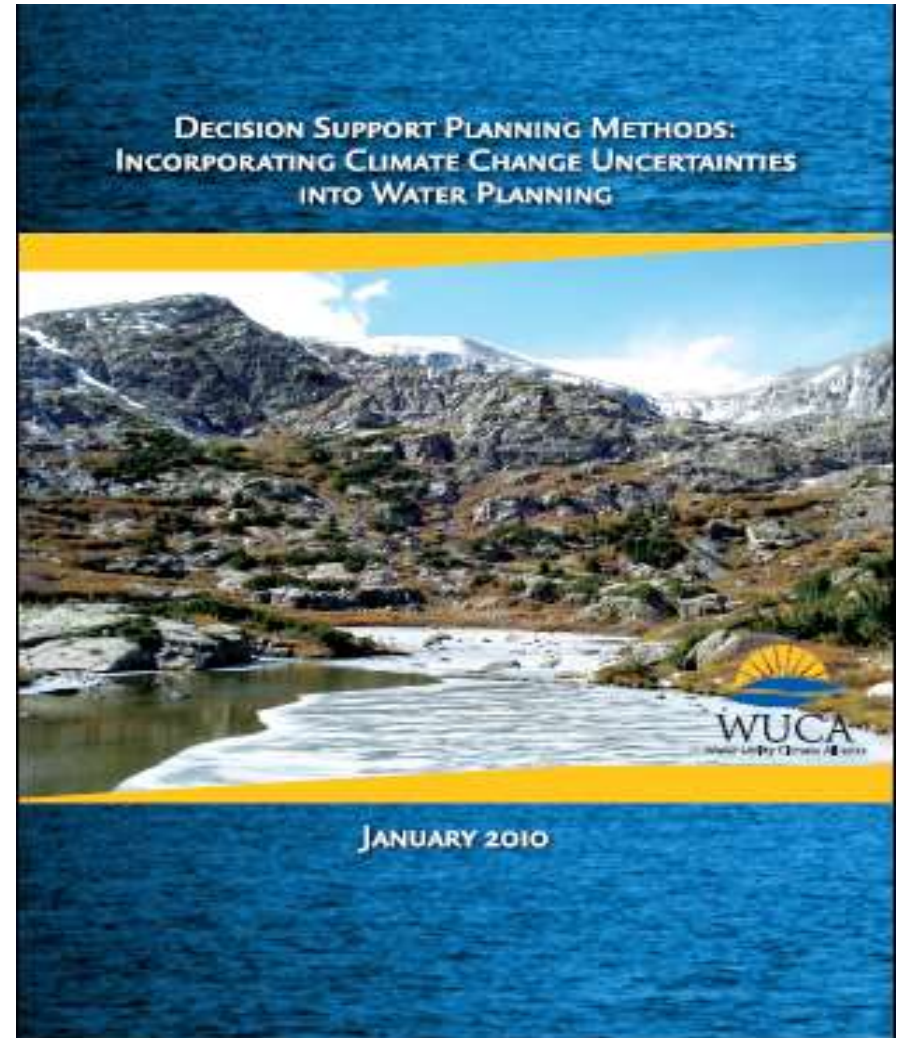
Resources at wucaonline.org



Understanding



Planning





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DENVER WATER