

# Incorporating Climate Change into Utility Planning: A Southern California Example



Metropolitan Water District of  
Southern California

# Introduction: Metropolitan Water District of Southern California



- Regional water wholesaler to 6 counties covering 5,200 square miles
- Serves 18+ million people= 50% of the state's population with projected population growth ~170,000 people/year
  - Regional economy \$800+ billion
  - Supplies about half of all regional retail demands
  - Includes 26 member agencies

# Sources of Water for Southern California



## MWD Supplies 2009:

SWP: 857,000 AF

CRA: 1,120,000 AF

## Other Supplies 2009:

LA Aqueduct: 189,000 AF

Local: 1.6 Million AF



# Current Water Supply Challenges



Lowest rainfall and deliveries on record: continuing 8 – year drought



Court – ordered cutbacks due to fishery conflicts



## Climate Changes:

- Temperature increases
- Precipitation pattern changes
- Changes in runoff patterns
- Ecosystem effects
- Sea level rises



# Metropolitan's Three-Tiered Climate Change Adaptation Strategy

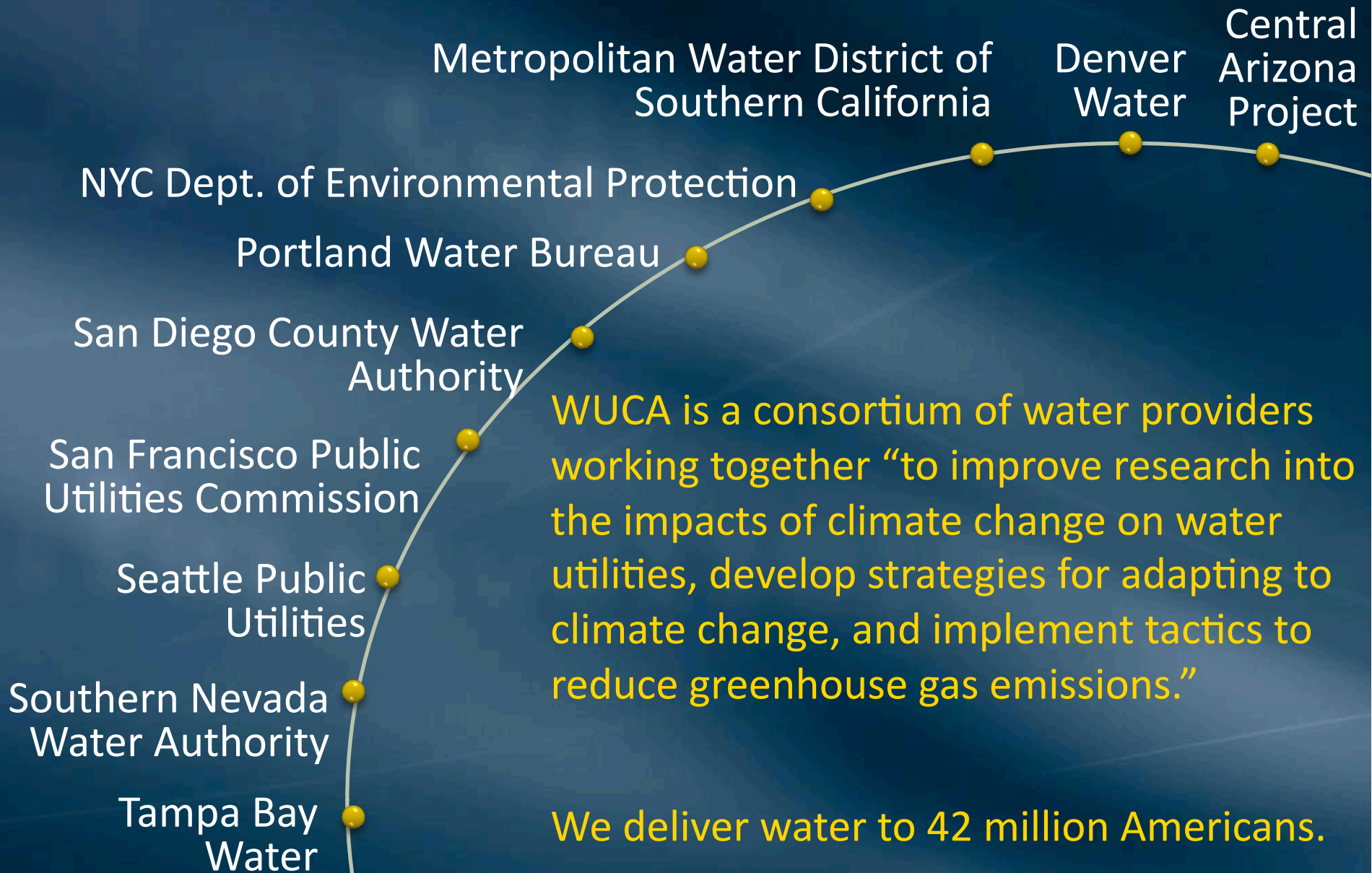
Knowledge sharing  
and research support

Quantification of  
current research

Implementation of  
Programs/Policies

Collaboration with  
other water utilities  
(WUCA)

# Water Utility Climate Alliance



WUCA is a consortium of water providers working together “to improve research into the impacts of climate change on water utilities, develop strategies for adapting to climate change, and implement tactics to reduce greenhouse gas emissions.”

We deliver water to 42 million Americans.

# WUCA Objectives

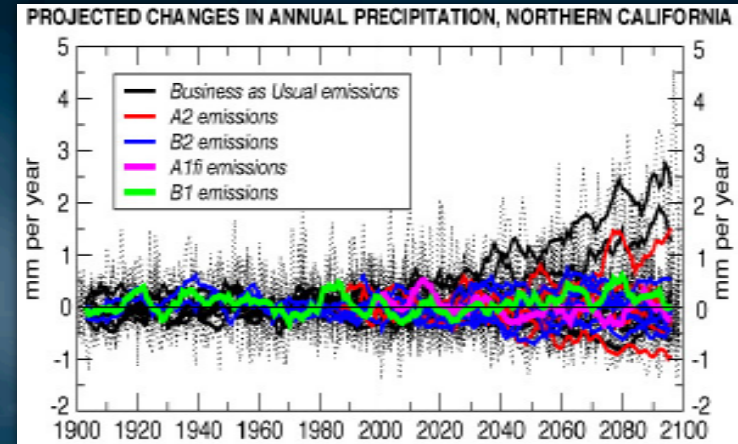
- Develop interdisciplinary awareness of climate change impacts
- Identify system vulnerabilities
- Integrate climate change risk assessment into strategic and capital planning
- Influence societal response to adaptation challenges





# WUCA Actions: Climate Modeling White Paper

- GCM and downscaling survey
- What improvements are underway? Needed?
- Correctly translating GCM output to hydrologic and operations levels
- Where can we further invest and collaborate with climate scientists?



# Metropolitan's Three-Tiered Climate Change Adaptation Strategy

Knowledge sharing and research support

Collaboration with other water utilities (WUCA)

Provide input for local and national legislation

Collaboration with state and federal agencies and NGOs on planning issues

Quantification of current research

Support flexible "no regret" solutions to water supply and quality decisions

Support reasonable, economically viable, technologically feasible management

Internal planning analyses, studies

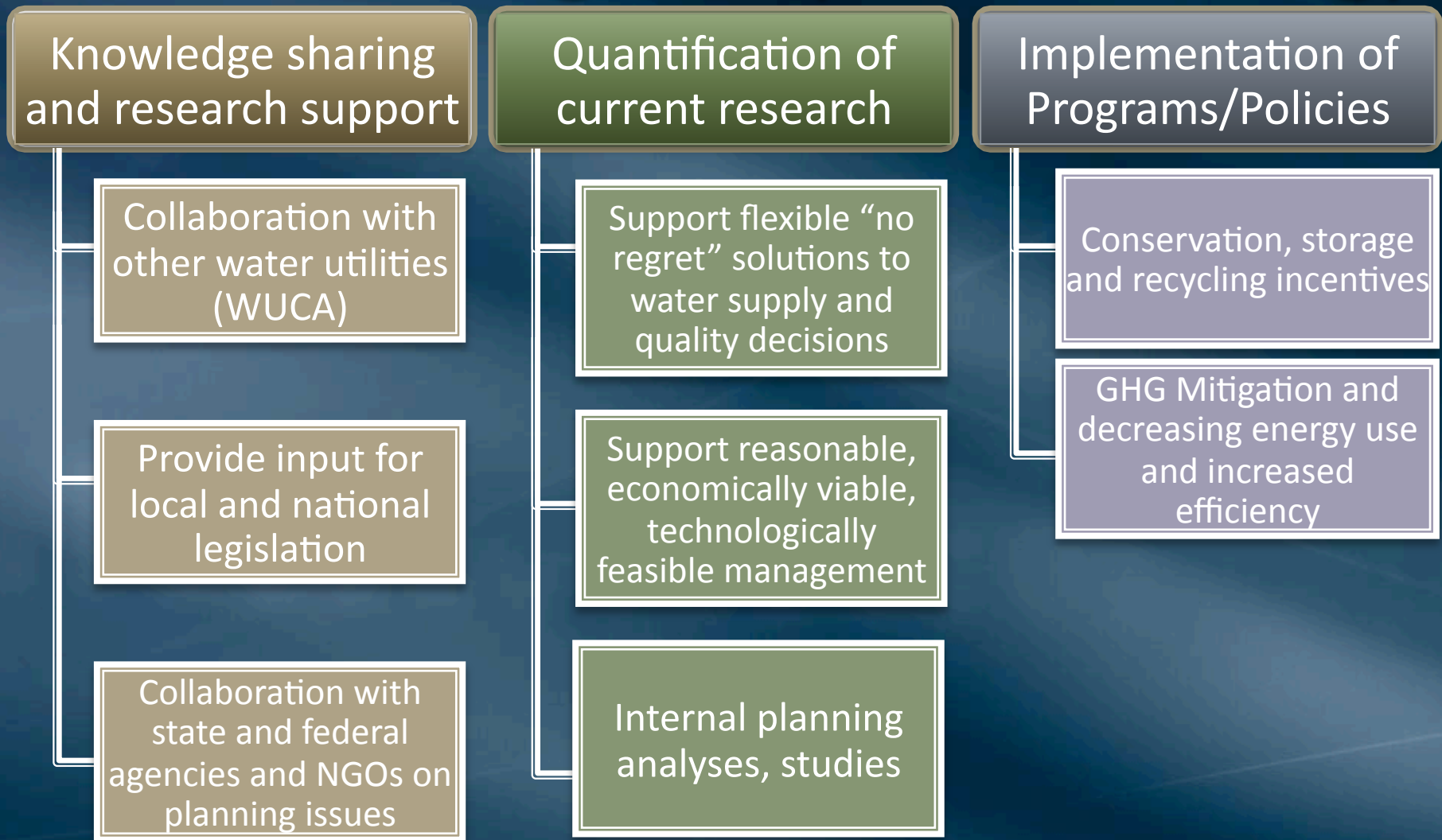
Implementation of Programs/Policies

# Internal Planning Analyses and Studies





# Metropolitan's Three-Tiered Climate Change Adaptation Strategy



# GHG Mitigation and Increased Efficiency



Hydroelectricity



Solar Energy



Wind power



Energy Audits



Plumbing retrofits and landscaping

# Metropolitan's Three-Tiered Climate Change Adaptation Strategy

## Knowledge sharing and research support

Collaboration with other water utilities (WUCA)

Provide input for local and national legislation

Collaboration with state and federal agencies and NGOs on planning issues

## Quantification of current research

Support flexible "no regret" solutions to water supply and quality decisions

Support reasonable, economically viable, technologically feasible management

Internal planning analyses, studies

## Implementation of Programs/Policies

Conservation, storage and recycling incentives

GHG Mitigation and decreasing energy use and increased efficiency

Delta levee flood preparedness

Integrated Water Resource Plan



# Incorporating Climate Change Uncertainty into IRP Planning

## Increased diversification of water supply

- Conservation
- Local water resources – Recycling and Groundwater Recovery
- Storage

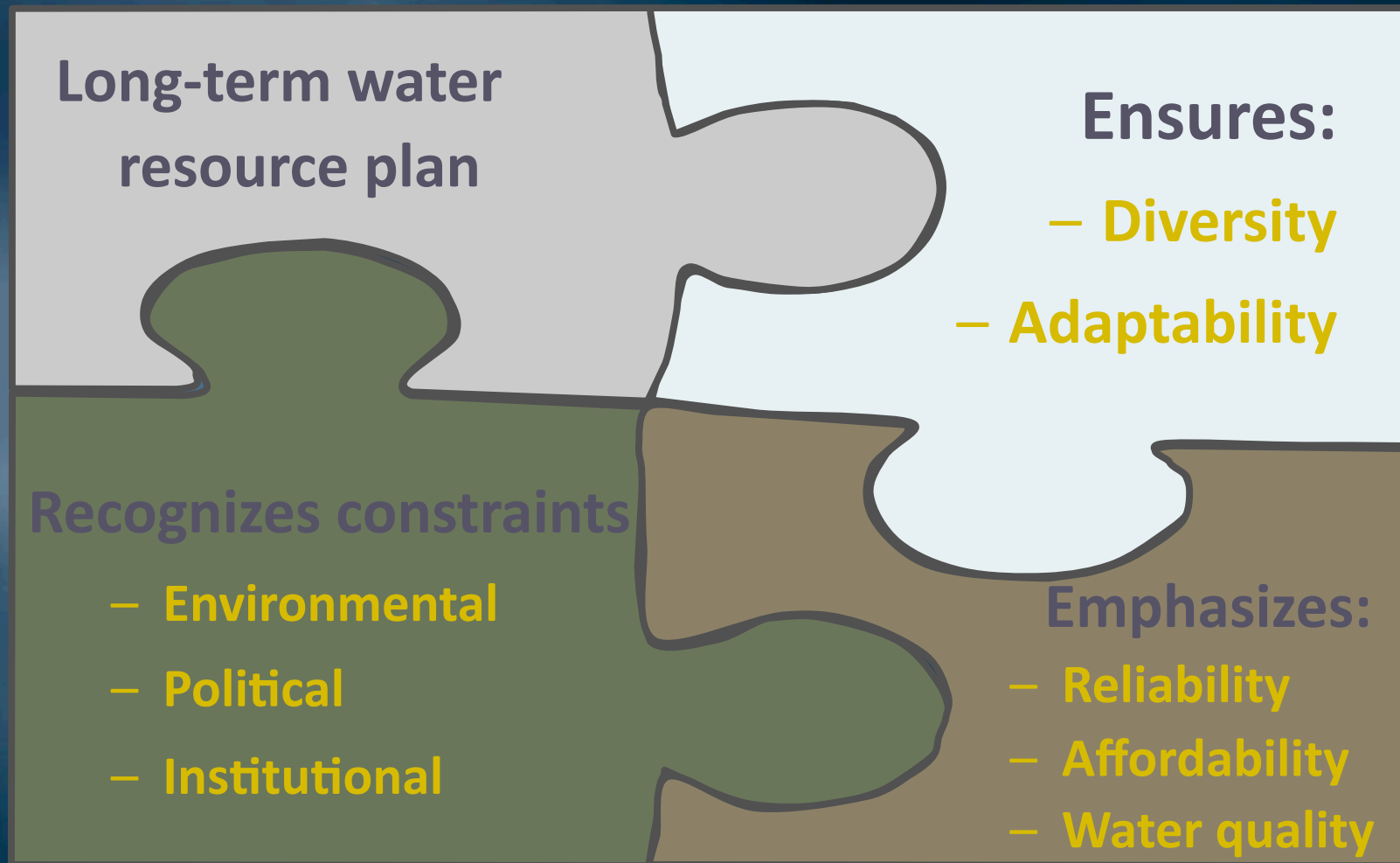
# What is an Integrated Water Resources Plan (IRP)?

*An IRP is a planning process that examines all types of water supplies and conservation in a holistic and interconnected manner.*

Characteristics of a good IRP include:

- Incorporates stakeholder values and ideas
- Takes a long-term view
- Meets multiple objectives
- Addresses uncertainty and risk

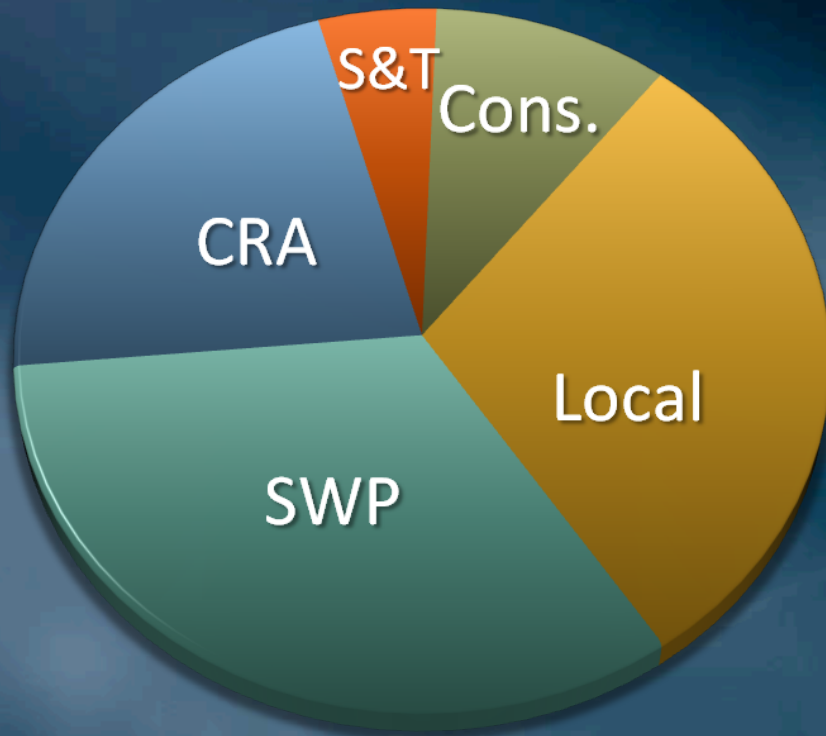
# Integrated Resources Plan (IRP) Update



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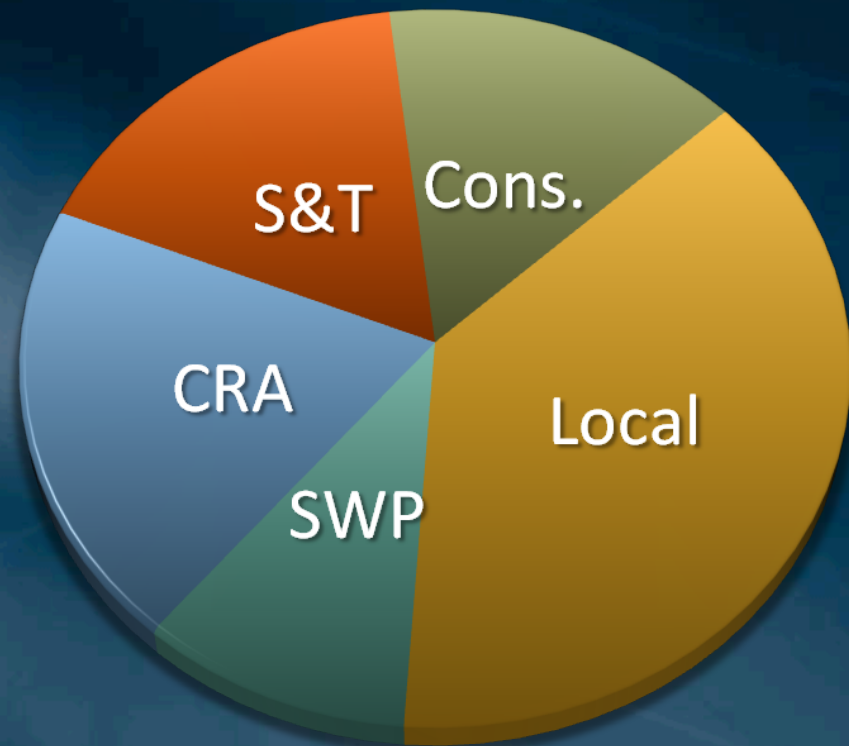


# Diversification in IRP Update



**Early 1990's**

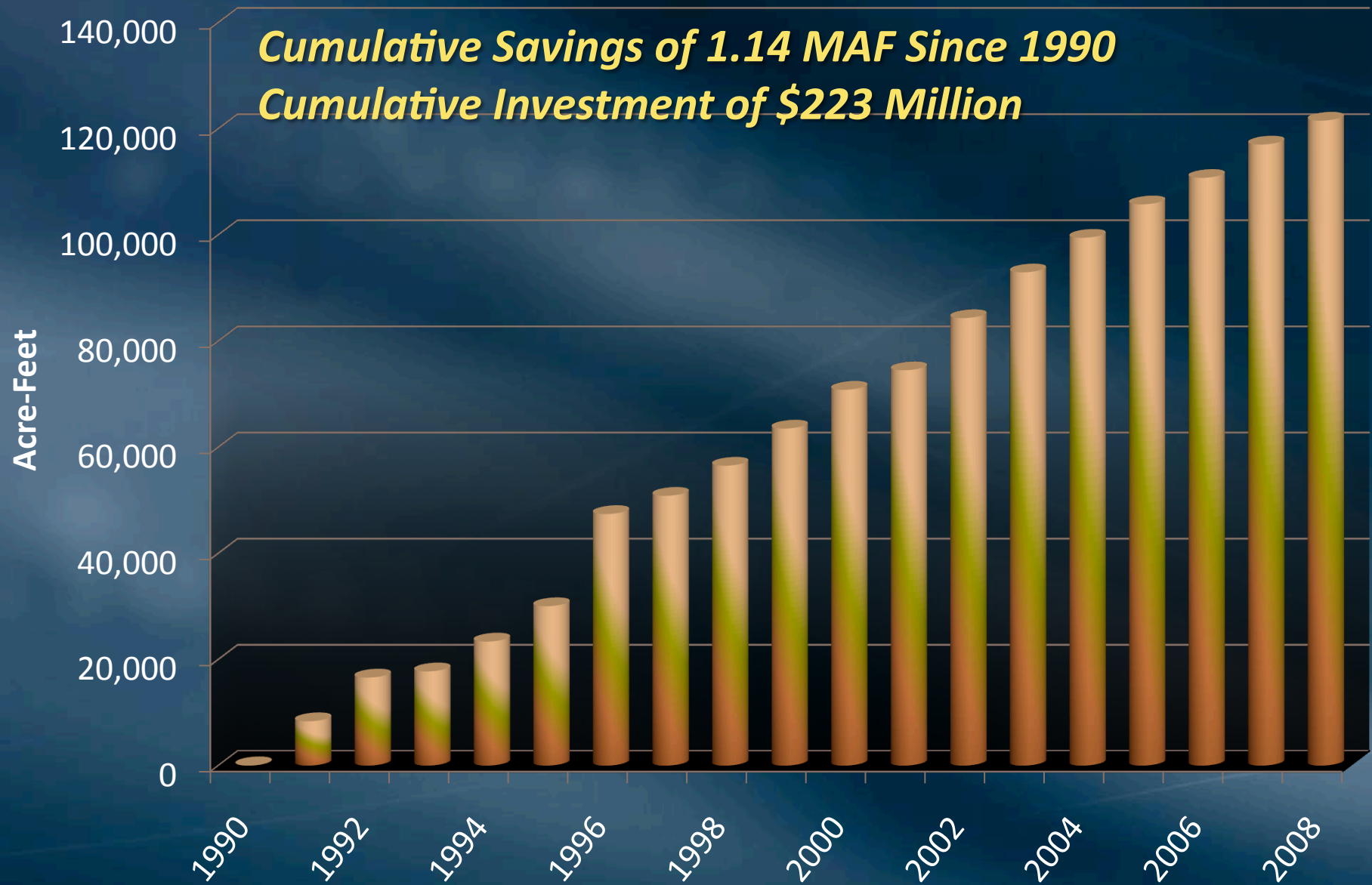
*Heavy dependence on imported supply and SWP Diversions*



**Current Strategy**

*Emphasis on Conservation, Local Supplies, and Storage & Transfers*

# Active Conservation



# Transfer and Storage Programs

Sacramento Valley  
Optional  
Transfers

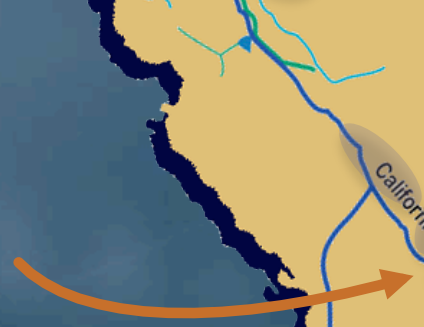


San Joaquin Valley  
Transfers



Total Storage  
Capacity:  
4.9 MAF

SWP – 6  
Storage  
Programs



Regional Storage:  
-3 Reservoirs  
-10 Groundwater Programs  
-DWR State Project Reservoirs

L.A.  
Aqueduct

Aqueduct

Colorado  
River  
Aqueduct

CRA Storage and  
Agricultural  
Transfers

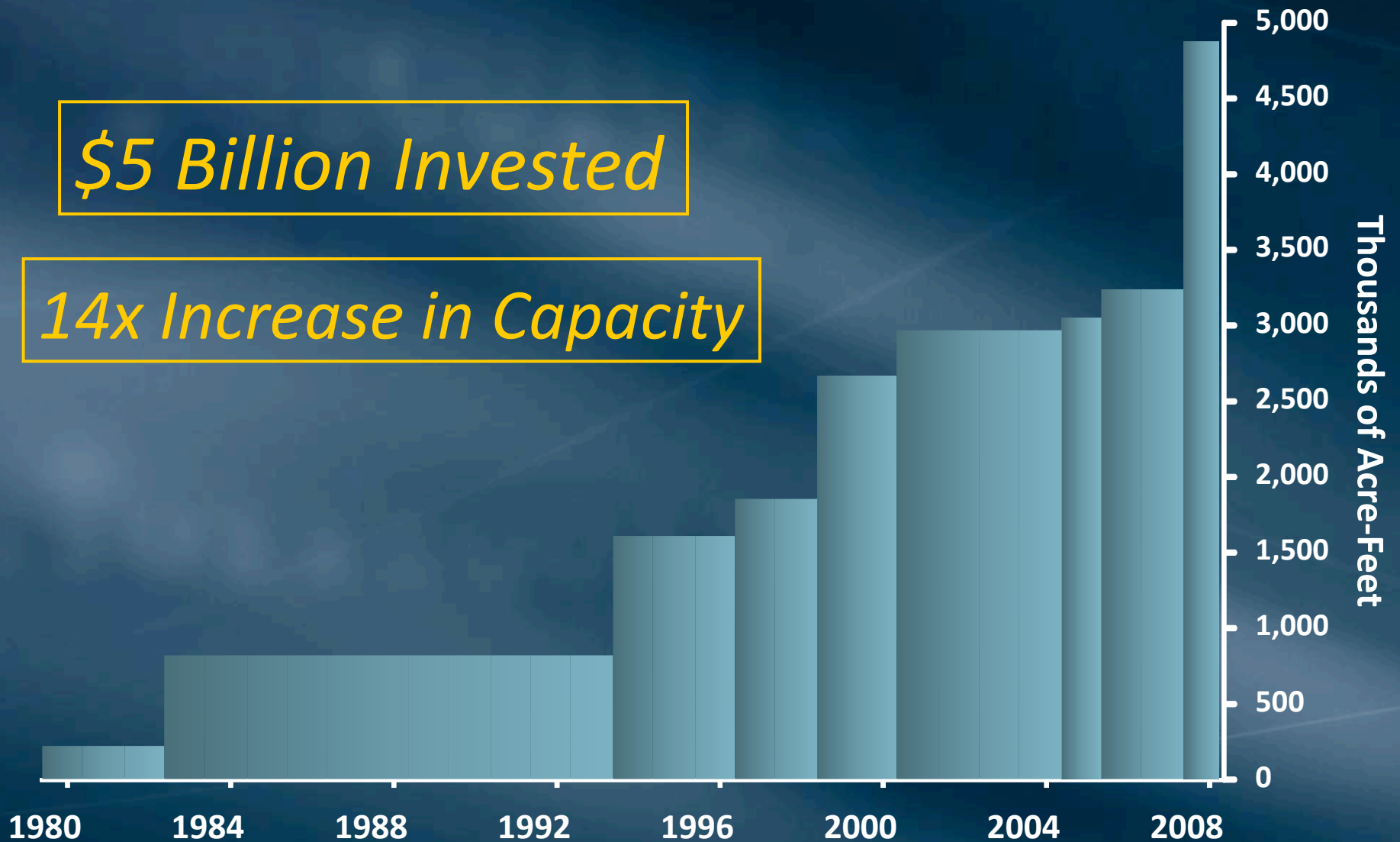




# Metropolitan's Storage Capacity

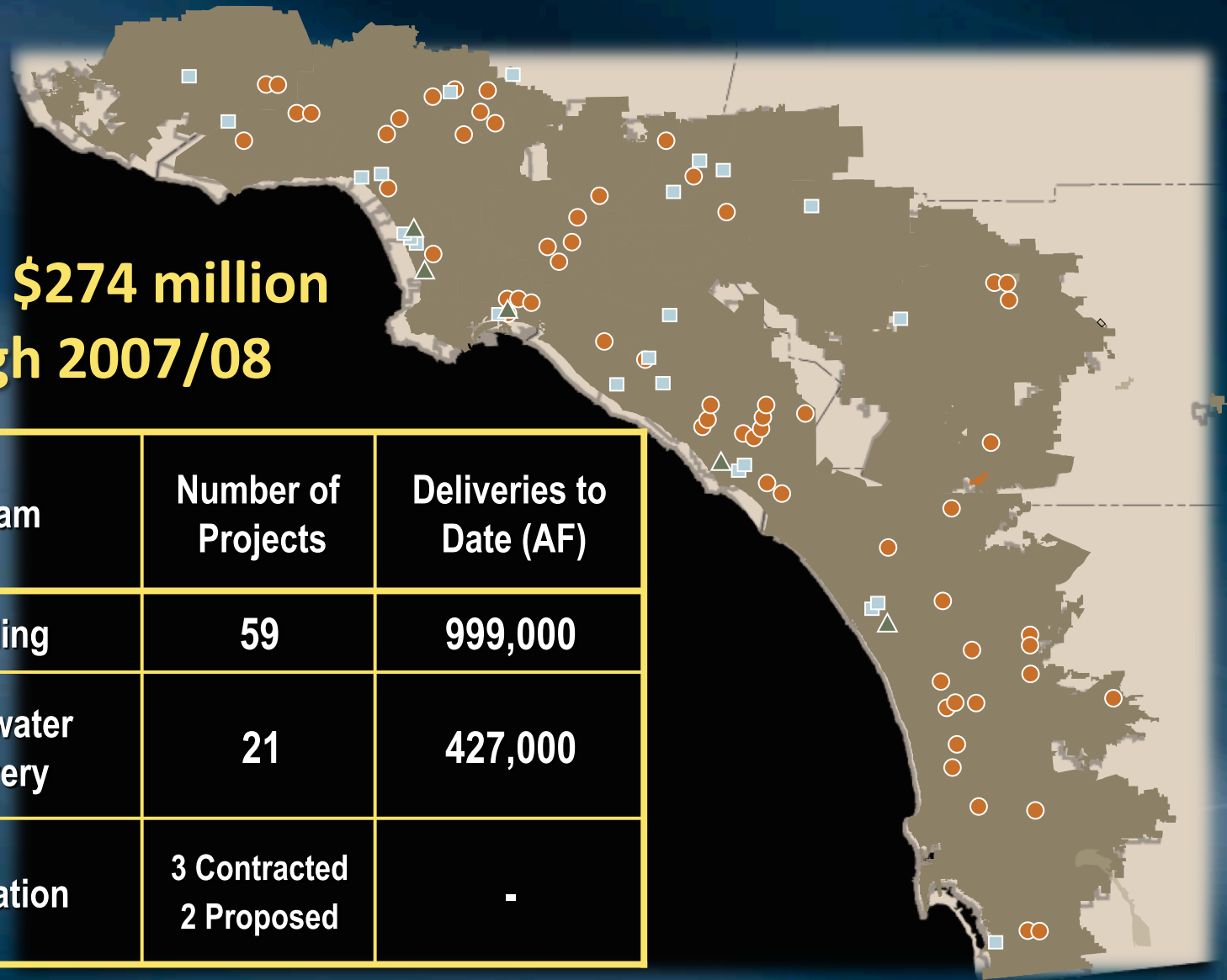
*\$5 Billion Invested*

*14x Increase in Capacity*



# Investment in Local Water Projects

**Invested \$274 million  
through 2007/08**



	Program	Number of Projects	Deliveries to Date (AF)
●	Recycling	59	999,000
■	Groundwater Recovery	21	427,000
▲	Desalination	3 Contracted 2 Proposed	-

# Incorporating Climate Change Uncertainty into IRP Planning

## Increased diversification of water supply

- Conservation
- Local water resources – Recycling and Groundwater Recovery
- Storage

Investigating analytical techniques and models for more accurate determination of climate change impacts on our water resources

# WUCA Actions: Climate Change Uncertainties Into Planning

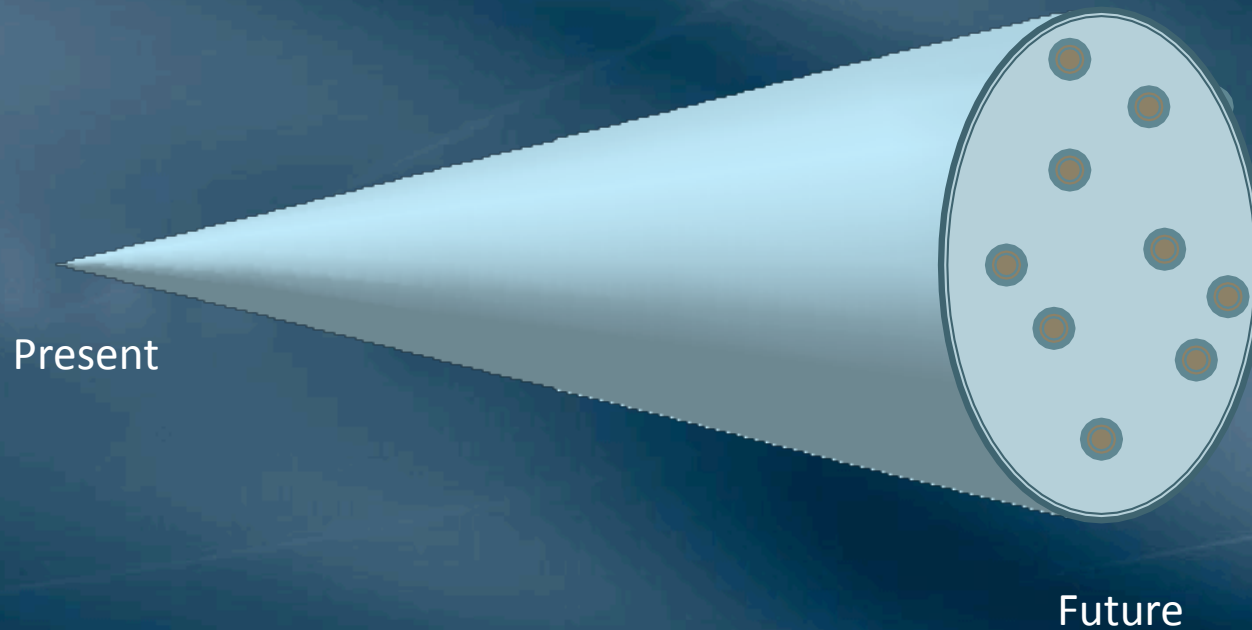
- Stationary to uncertainty based planning methods.
- Bridge the gap between projections and the need to make decisions.
- Identify, understand, and evaluate decision support methods to incorporate climate uncertainties into planning.
- Four promising planning methods emerge: Scenario Planning, **Robust Decision Making**, Decision Analysis, Real Options



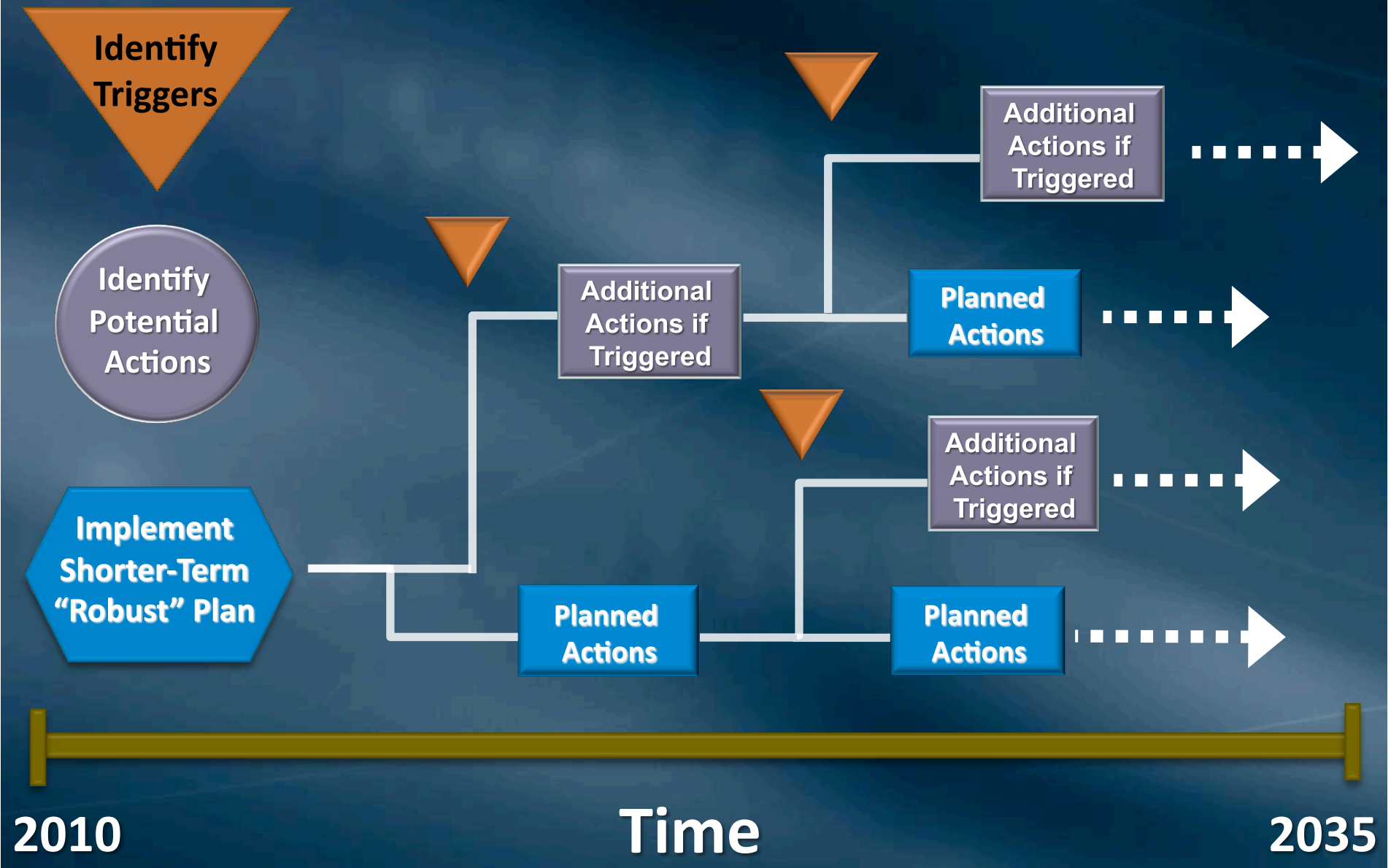
# IRP Decision Support Method

## *Robust Decision Making*

- Computer analysis of many scenarios
- Hedging and decision points



# Adaptive Plan Approach



# Final Thoughts

- Regional approach to future
- On-going planning and investment
- Resource diversity and shared responsibilities
- Smart Investments
- Pursue environmentally-friendly imported water supply reliability

