Water Management Scenarios and Response Packages for the CWP Update 2009

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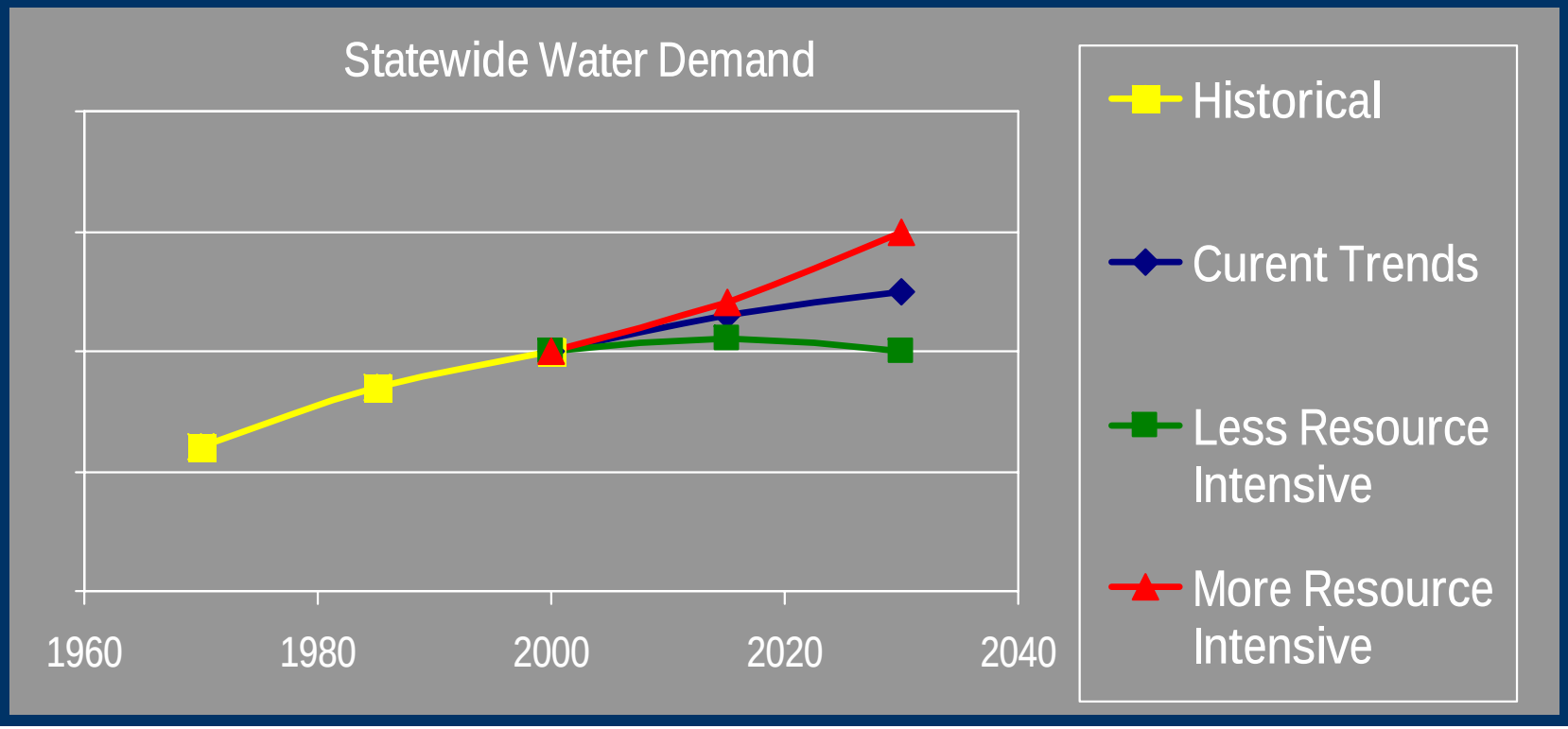
California Water Plan Update 2005 Developed Hand-Crafted Scenarios

- **Identified drivers affecting future water demand and supply**
  - **“Table 1”**
- **Focused on water demand parameters**
- **Defined three storylines based on alternative assumptions for key drivers**
  - **“Current trends”**
  - **“Less resource intensive”**
  - **“More resource intensive”**

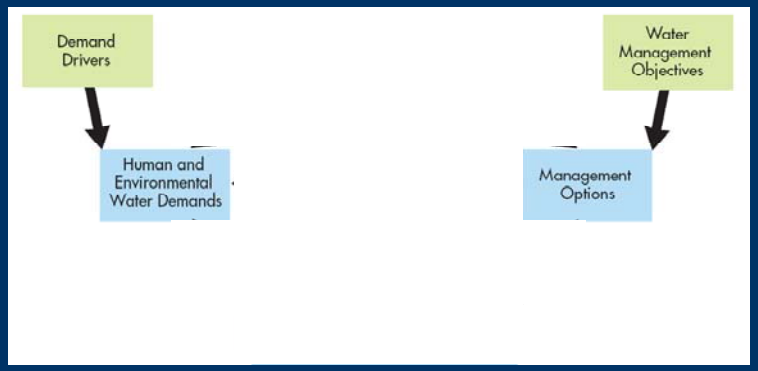
…and Then Quantified Them

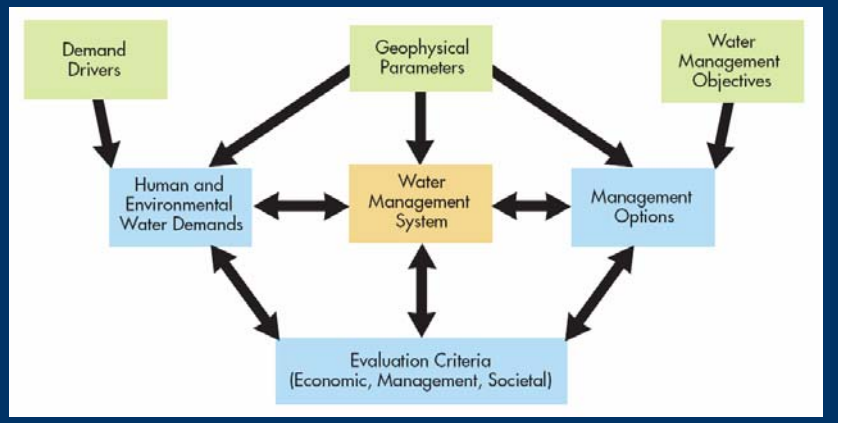
- **Used a simple model of water demand by Hydrologic Region**
- **Defined parameter values consistent with narratives**
- **Evaluated model for each scenario**



CWP Update 2009 Will Build On This Analysis

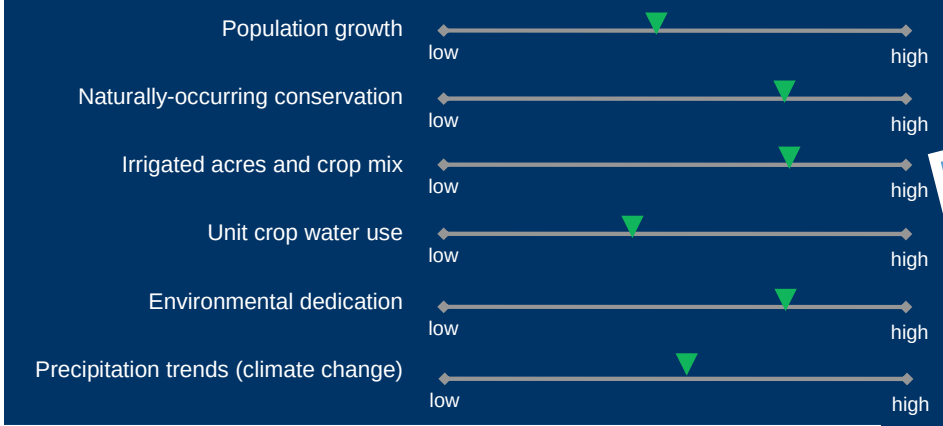
- **Expand scenarios to consider:**
  - **water supply**
  - **weather and hydrologic variability**
  - **climate change**
  - **flood issues**
- **Use an integrated modeling framework to evaluate possible water management responses**





Simulation Models Will Estimate Outcomes for Scenario – Response Package Combinations

Scenario Factors



Resource Management Strategies

- Response Package #1
- Response Package #2
- Response Package #3
- Response Package #4
- Response Package #5

Water Evaluation and Planning Model

Outcomes
(metrics)

- Demand
- Reliability
- Shortages
- Environmental flows
- Flood performance
- Economic measures

Two Levels of Analysis Will Be Performed

- **By Hydrologic Region**
  - **Monthly, climate-driven demands to 2050**
    - **reflect global climate change projections**
  - **Inventory current supplies by source**
  - **Coarse representation of response packages**

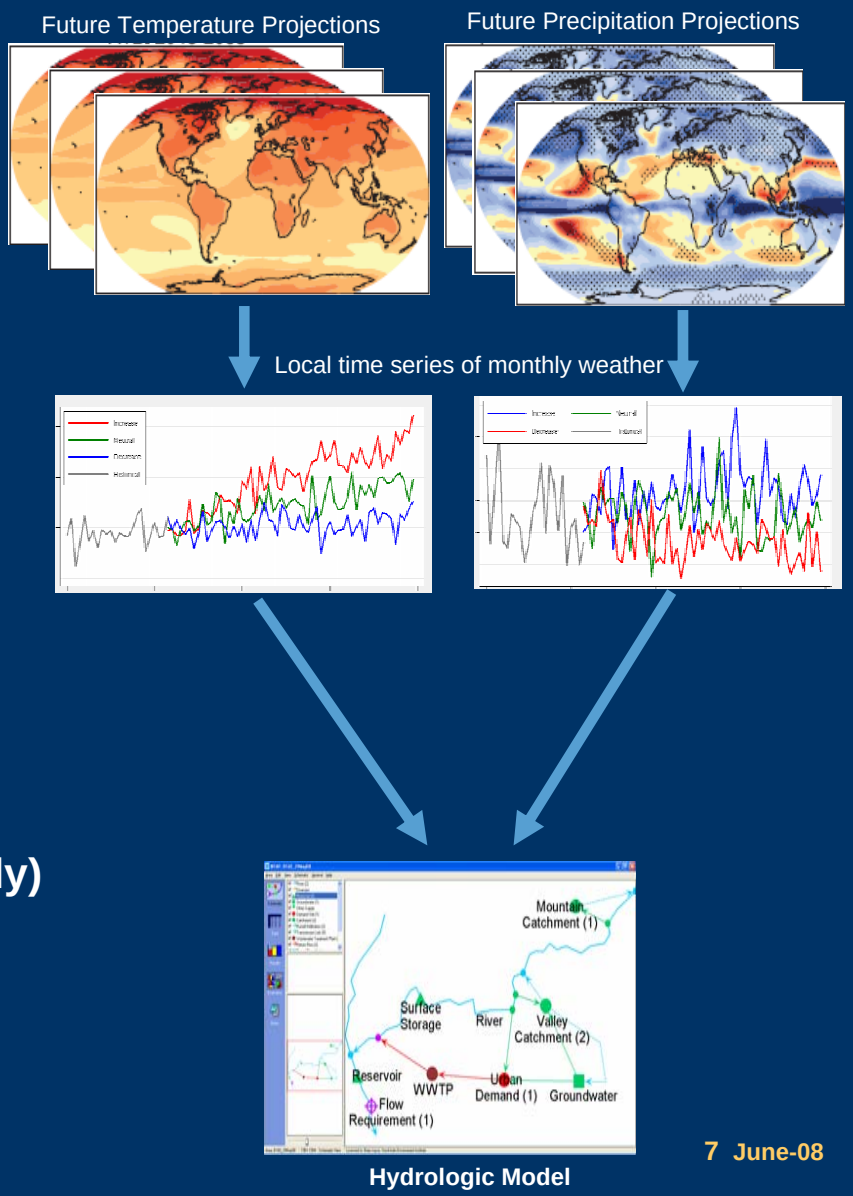
All 10 Hydrologic Regions, including mountain counties

- **By Planning Area for Sacramento and San Joaquin River regions**
  - **Hydrologically-based water system simulation by month to 2050**
    - **reflect global climate change**
  - **Estimate environmental flows, system operations, deliveries, and reliability**
  - **More direct representation of response packages**

Sacramento River & San Joaquin River Hydrologic Regions

Climate Change Impacts Will Be Evaluated

- **Global climate models produce numerous projections of future temperature and precipitation patterns**
- **Statistical downscaling methods used to produce local weather sequences***
- **Weather sequences drive hydrologic models to calculate:**
  - **irrigation demand (HR and PA)**
  - **hydrologic flows (PA analysis, only)**



Hydrologic Model

* Will use World Climate Research Programme's (WCRP's) Coupled Model Intercomparison Project phase 3 (CMIP3) multi-model dataset

Summary of CWP 2009 Update Scenario Framework

Hydrologic Region Statewide Analysis

Scenario Factors	Management Strategies
Economic and Financial Institutional and Political Natural System (climate factors) Technological Social Practices	Water use efficiency Groundwater use New surface storage Recycled wastewater use Desalination
Models	**Outcomes**
Water Evaluation And Planning model by 10 Hydrologic Regions (monthly time step from 2005-2050)	Demand Available supply

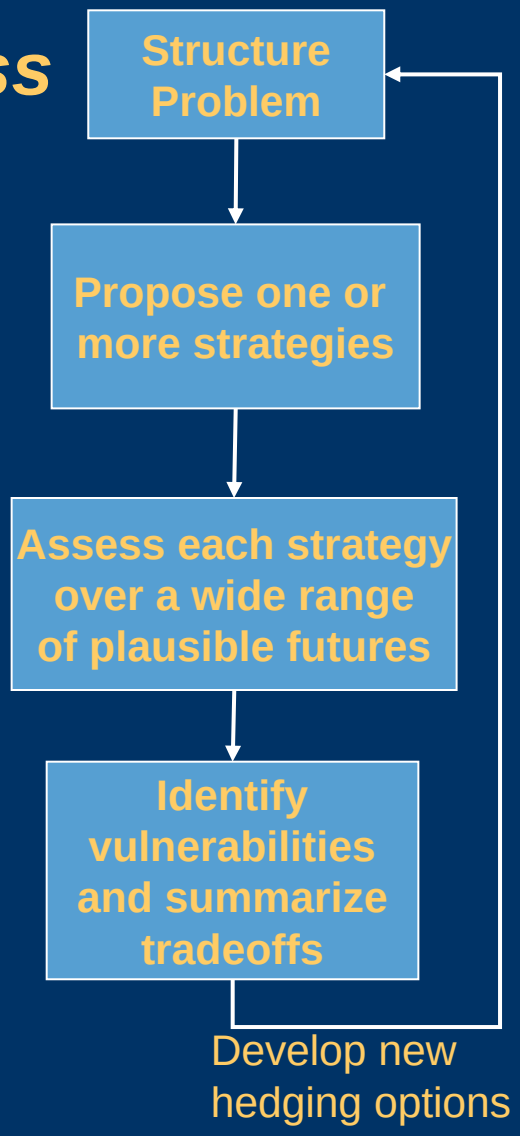
Summary of CWP 2009 Update Scenario Framework

Sacramento and San Joaquin River Region Analysis

Scenario Factors	Management Strategies
Economic and Financial Institutional and Political Natural System (climate factors) Technological Social Practices	Water use efficiency New surface storage Recycled wastewater use Desalination Conjunctive management Conveyance
Models	**Outcomes**
Water Evaluation And Planning model by Planning Area for Sacramento and San Joaquin River regions (monthly time step from 2005-2050)	Demand Available supply Shortage frequency and magnitude Reliability Delta salinity Hydro power and flood performance Economic measures

Robust Decisionmaking (RDM) Methodology Will Identify Robust Responses Through Iterative Process

- **Many scenarios reveal key risks**
- **Statistical tools characterize risks**
- **Alternative strategies tested to hedge against risks**
- **Numerous opportunities for stakeholder participation**



Approximate Project Schedule

- **Project scoping**
  - **Scenario factors (though August)**
  - **Response packages (though August)**
  - **Performance metrics (though August)**
- **Model development**
  - **Sacramento River model (through September)**
  - **San Joaquin River model (through September)**
- **Model calibration**
  - **October 2008**
- **Scenario analysis**
  - **December 2008 – February 2009**

Questions

- **Now on to the WEAP details….**