California Water Plan Update 2009

Review of Statewide Scenario Demand Preliminary Results

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Statewide Scenario Demand Analysis is Only the Beginning

<table>
<thead>
<tr>
<th>Uncertain Factors (X) and Scenarios</th>
<th>Management Actions (L) &amp; Response Packages</th>
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</thead>
<tbody>
<tr>
<td>Population</td>
<td>Current management (no response)</td>
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<tr>
<td>Household factors</td>
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<td>Employment factors</td>
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<td>Irrigated Crop Area</td>
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<tr>
<td>Temperature</td>
<td>Response packages evaluated</td>
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<tr>
<td>Precipitation</td>
<td>using Planning Area model for</td>
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<td></td>
<td>select Hydrologic Regions</td>
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<td></td>
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<tr>
<td>3 land use/</td>
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<td>demographic</td>
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<tr>
<td>scenarios</td>
<td></td>
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<tr>
<td>12 climate sequences</td>
<td></td>
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<tr>
<td>+ historical</td>
<td></td>
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<tr>
<td>Model (R)</td>
<td>Performance Measures (M)</td>
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<td>WEAP model by Hydrologic Region</td>
<td>Demand (historical climate)</td>
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<tr>
<td>New!</td>
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<td></td>
<td>Demand (projected climate)</td>
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<td>Supply and environmental flows</td>
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<td>addressed using Planning Area model</td>
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Analysis Considers Possible Climate Change Impacts

• Global circulation models produce numerous projections of future temperature and precipitation patterns
  • Six GCMs
  • Two global emissions scenarios

• Statistical downscaling methods produce local weather sequences*

• Weather sequences drive hydrologic models to calculate:
  – irrigation demand (HR and PA)
  – hydrologic flows (PA analysis, only)

* Using the World Climate Research Programme's (WCRP's) Coupled Model Intercomparison Project phase 3 (CMIP3) multi-model dataset
Change in statewide water demand (assuming historic climate) vary widely across narrative scenarios and sector.

**Urban Sector**

Change in Statewide Urban Demand

- Historical climate, Current Trends
- Blueprint Growth
- Expansive Growth

**Agricultural Sector**

Change in Statewide Agricultural Demand

- Current Trends
- Blueprint Growth
- Expansive Growth

**Environmental Sector**

Change in Statewide Environmental Demand

- Current Trends
- Blueprint Growth
- Expansive Growth

Results assume a repeat of 1998-2005 hydrology in 2043-2050.
Total statewide water demand may increase or decrease depending on land use and demographic changes (assuming historic climate)

Change in Total Statewide Demand

Wide range of demand changes due to land use and demographic uncertainty
Climate change increases variability and range of future statewide water demands

- Current Trends narrative scenario only
- Each colored line represents 1 of 12 climate scenarios
- Historical period shows actual demand (blue) and model calculated demand (gray line)
- Climate impacts outdoor urban demand only
- Ag demand changes do not imply declines in production
Inclusion of potential climate impacts increases change in demand.

### Change in Statewide Urban Demand
- **Historical climate, Current Trends**
- **Range for future climate conditions, Current Trends**

### Change in Statewide Agricultural Demand
- **Current Trends**
- **Blueprint Growth**
- **Expansive Growth**

### Change in Statewide Environmental Demand
- **Current Trends**
- **Blueprint Growth**
- **Expansive Growth**
Potentially-significant climate impact on total statewide demands possible

Change in Total Statewide Demand
1998-2005 to 2043-2050

Range of potential impact of climate change for EG narrative scenario

- Current Trends
- Blueprint Growth
- Expansive Growth
Significant regional differences in scenario water demand changes

KEY:
Demand change, Historical climate
Demand change range, Future climate
Narrative Scenarios
Discussion

- Results
- Presentation of results
Water supply, environmental flows, and response packages to be addressed using Planning Area Model

Over to Brian Joyce of SEI....