Drought Response and Recycled Water Outlook for 2016

Hossein Ashktorab, Ph.D.
Recycled and Purified Water Unit Manager

February 26th, 2016
Who we serve

2,000,000 people
15 cities
4,700 direct well owners
13 local water providers
Economic Impact of Water Shortage

Water reduction 10%-30%

Decrease in local sales losses of $900 million to $10 billion !!!!
Risks to Water Supply Reliability

- Ongoing/severe droughts
- Climate change
- Reduced import of water
- Population growth
February 2, 2016
(Released Thursday, Feb. 4, 2016)
Valid 7 a.m. EST

Drought Conditions (Percent Area)

<table>
<thead>
<tr>
<th></th>
<th>None</th>
<th>D0-D4</th>
<th>D1-D4</th>
<th>D2-D4</th>
<th>D3-D4</th>
<th>D4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Current</td>
<td>0.00</td>
<td>100.00</td>
<td>95.26</td>
<td>86.13</td>
<td>63.90</td>
<td>39.41</td>
</tr>
<tr>
<td>Last Week</td>
<td>0.00</td>
<td>100.00</td>
<td>95.35</td>
<td>86.13</td>
<td>63.96</td>
<td>40.21</td>
</tr>
<tr>
<td>3 Months Ago</td>
<td>0.14</td>
<td>99.86</td>
<td>97.33</td>
<td>92.27</td>
<td>70.55</td>
<td>44.84</td>
</tr>
<tr>
<td>Start of</td>
<td>0.00</td>
<td>100.00</td>
<td>97.33</td>
<td>87.55</td>
<td>69.07</td>
<td>44.84</td>
</tr>
<tr>
<td>Calendar Year</td>
<td>12/29/2015</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Start of</td>
<td>0.14</td>
<td>99.86</td>
<td>97.33</td>
<td>92.36</td>
<td>71.08</td>
<td>46.00</td>
</tr>
<tr>
<td>Water Year</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9/29/2015</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>One Year Ago</td>
<td>0.16</td>
<td>99.84</td>
<td>98.13</td>
<td>93.57</td>
<td>77.46</td>
<td>39.99</td>
</tr>
<tr>
<td>2/3/2015</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Intensity:
- D0 Abnormally Dry
- D1 Moderate Drought
- D2 Severe Drought
- D3 Extreme Drought
- D4 Exceptional Drought

The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. See accompanying text summary for forecast statements.

Author:
Anthony Artusa
NOAA/NWS/NCEP/CPC

http://droughtmonitor.unl.edu/
<table>
<thead>
<tr>
<th>Supply and Operations</th>
<th>Water Use Reduction</th>
<th>Drought Response Opportunities</th>
<th>Administrative and Financial Management</th>
</tr>
</thead>
<tbody>
<tr>
<td>2. Manage surface water and groundwater supplies</td>
<td>5. District facilities model water conservation</td>
<td>8. Accelerate recycled water program</td>
<td>13. Leverage EOC to assist drought efforts</td>
</tr>
<tr>
<td></td>
<td></td>
<td>10. Further develop the District’s workforce</td>
<td>15. Support the Board</td>
</tr>
<tr>
<td></td>
<td></td>
<td>11. Advance knowledge of District services</td>
<td></td>
</tr>
</tbody>
</table>
Precipitation as of Feb 16, 2016

- **Snow Water Equivalent (SWE) (Northern Sierra)**: 22.2 inches (Normal to Date), 22.0 inches (Current to Date, 99%)
- **Northern Sierra Precipitation (PPT) 8-Station Index**: 31.3 inches (105%)
- **Rainfall in Santa Clara County (San Jose Station)**: 9.1 inches (Normal to Date), 8.3 inches (Current to Date, 91%)
Recycled Water Can Fill the Gap

- Reusable source
- Locally-controlled source
- Purified through treatment
- Drought-proof
- Replicates natural water cycle
District Recycled and Purified Water Goals

- 20,000 AFY by 2020 (Potable Reuse)
- 45,000 AFY by 2025 (Potable Reuse)
- Sustain 22,000 AFY by 2020 (Non-Potable)

Recycled Water Use (acre-ft/year)

Calendar Year

Potable Reuse

Non-Potable Recycled Water
(irrigation, industrial and dual-plumbing)
Current Recycled Water Use

Wastewater Treated vs. Recycled Water

- San Jose/Santa Clara Regional Wastewater Facility: 110,000 AF
- South County Regional Wastewater Authority: 15,858 AF, 8,000 AF
- Sunnyvale Water Pollution Control Plant: 19,000 AF, 2,015 AF, 947 AF
- Palo Alto Regional Water Quality Control Plant: 30,000 AF, 3,243 AF

Legend:
- Blue: Wastewater Treated (AF)
- Green: CY 2014 Recycled Water (AF)
Proposed Projects for Purified Water Expansion

- Palo Alto WPCP
- Sunnyvale WPCP
- SJ/SC Regional Wastewater Facility
- Expanded SVAWPC
- Mid-Basin Injection Wells IPR
- DPR to Raw Water Central Pipeline
- Sunnyvale IPR
- Apple Campus 2
- Westside Injection Wells IPR
- Los Gatos Recharge Ponds IPR
- Ford Recharge Pond IPR

Legend:
- IPR/DPR Purified Water Pipeline
- Future Wolfe Road Pipeline
- Existing Recycled Water Pipeline
- District Raw Water Pipeline
- Expanded SVAWPC
- Water Pollution Control Plant
- Water Treatment Plant
- Pump Station
## Proposed Projects for Purified Water Expansion

<table>
<thead>
<tr>
<th>Description</th>
<th>Capacity (AFY)</th>
<th>Est. Capital Costs ($M)</th>
<th>Est. Total O&amp;M Costs ($M/Year)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ford Recharge Ponds IPR</td>
<td>4,200</td>
<td>$70</td>
<td>$4.0</td>
</tr>
<tr>
<td>Mid-Basin Injection Wells IPR</td>
<td>5,600</td>
<td>$140</td>
<td>$3.5</td>
</tr>
<tr>
<td>Los Gatos Recharge Ponds IPR</td>
<td>20,200</td>
<td>$260</td>
<td>$10.0</td>
</tr>
<tr>
<td>Westside Injection Wells IPR (or Central Pipeline DPR)</td>
<td>5,000 (5,000)</td>
<td>$120 ($65)</td>
<td>$4.0 ($4.5)</td>
</tr>
<tr>
<td>Sunnyvale IPR</td>
<td>10,000</td>
<td>$210</td>
<td>$2.0</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>45,000</strong></td>
<td><strong>$800</strong></td>
<td><strong>$23.5</strong></td>
</tr>
</tbody>
</table>
DPR Could Be Future Complement to IPR

How would DPR work?
- Purified water pumped into raw water line
- Treated at drinking water treatment plants

Program Benefits
- Less infrastructure required:
  - Pipelines shorter
  - No injection wells or ponds
  - Capitalizes on drinking water treatment plant ozonation/BAF
- Simpler operations
RO Concentrate Management Options

- Discharge to existing shallow water Bay outfall with dilution water
- Treatment wetlands, then discharge to the Bay
- Pre-treatment to produce a brackish supply for wetlands restoration
- Discharge to a sewer line that goes to a regional wastewater treatment plant
- Discharge to deep Bay outfall
Silicon Valley Advanced Water Purification Center
Path to Potable Reuse

- Demonstrate technology at Silicon Valley Advanced Water Purification Center
- Conduct potable reuse studies
- Collaboration with recycled water producers
- Engage the public
- Select & build project
Questions