This meeting will start at 1:00pm

Please ensure you have the latest version of Zoom

Wednesday, May 11, 2022
Making Conservation a California a Way of Life:
How forthcoming efficiency standards may impact local wastewater management
Agenda

1:00 – 1:10 PM  Introduction and background
1:10 – 1:25 PM  Presentation on residential indoor water use*
1:30 – 2:15 PM  Review of methods & presentation of results
2:15 – 2:25 PM  Break
2:25 – 2:45 PM  Comments and questions
2:45 – 3:25 PM  Panel discussion on adaptation methods*
3:25 – 3:40 PM  SWRCB DFA presentation on funding opportunities*
3:40 – 4:00 PM  Comments, questions, and wrap-up *

After presentation, 5-10 minutes will be allotted for questions and comments
Logistics

• Ensure your screen name reflects name and affiliation
• Chat is disabled
• To ask a question: use Q&A box or speaker card form: bit.ly/ww_qs
• Participants will be invited to unmute once called upon
• For phone callers: *9 to raise hand, *6 to speak
• Meeting is being recorded
  • Recording will be posted to the Water Efficiency Legislation program page: bit.ly/we_leg
Making Conservation a CA way of life: Implementing AB 1668 and SB 606

- Standards
- Variances (If applicable)
- Bonus Incentive (If applicable)

Indoor, Outdoor, Water loss

Residential Landscapes, Commercial, Industrial and Institutional (CII) landscapes with dedicated irrigation meters
Wastewater, Parklands, and Trees

CWC Section 10609.2(c)

• (c) When adopting the standards under this section, the board shall consider the policies of this chapter and the proposed efficiency standards’ effects on local wastewater management, developed and natural parklands, and urban tree health. The standards and potential effects shall be identified by May 30, 2022. The board shall allow for public comment on potential effects identified by the board under this subdivision.
Trends in Residential Indoor Use

Results of the Indoor Residential Water Use Study
Charlotte Ely, Conservation Supervisor, State Water Board

Examining California's Residential Indoor Water Use
Joe Fazio, Flume, and Peter Mayer, WaterDM

Office of Research, Planning, and Performance
Report on Residential Indoor Use: Findings

- Informed by:
  - 1 million customer accounts
  - Water deliveries from 157 URWS

- Findings, based '17- '19 data:
  - Statewide average was 51 GPCD
  - Statewide median was 48 GPCD

- Relevant Appendices:
  - Appendix I
  - Appendix J

https://water.ca.gov/-/media/DWR-Website/Web-Pages/Programs/Water-Use-And-Efficiency/AB-1668-and-SB-606-Conservation/Results-of-the-Indoor-Residential-Water-Use-Study.pdf
## Report on Residential Indoor Use: Recommendations

<table>
<thead>
<tr>
<th>Year</th>
<th>Statute</th>
<th>DWR-SWB Recommendation</th>
</tr>
</thead>
<tbody>
<tr>
<td>2020</td>
<td>55</td>
<td>No change</td>
</tr>
<tr>
<td>2025</td>
<td>52.5</td>
<td>47</td>
</tr>
<tr>
<td>2030</td>
<td>50</td>
<td>42</td>
</tr>
</tbody>
</table>
Examining US Residential Water Use

Our in-depth analysis utilizes a network of high-resolution sensors that are already deployed throughout the nation.
Indoor Water Use in California (Selected MSA's)
Indoor Water Use in California (all Flume Sensors)
Questions?

To ask a question: use Q&A box or speaker card form: bit.ly/ww_qs
For phone callers: *9 to raise hand, *6 to speak
Benefits of Efficient Indoor Use

- Water savings
- Energy savings
- Reduced water bill
- Protects water quality
- Reduced need for infrastructure investments
- Mitigated rate increases
## Analytical approach

<table>
<thead>
<tr>
<th>What we evaluated</th>
<th>What we did not evaluate</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Connected water service areas to sewer-sheds</td>
<td>• For collection systems, how influent composition might change for a specific facility</td>
</tr>
<tr>
<td>• Ran three different scenarios to identify systems that may be affected by 1668-606 implementation</td>
<td>• For treatment systems, how influent composition and chemical usage might change for a specific facility; capital upgrade needs with site-specific considerations</td>
</tr>
<tr>
<td>• Modeled how changes in influent flow rates may affect operations</td>
<td>• For reuse systems, how facility-specific changes in influent quality could affect operations</td>
</tr>
<tr>
<td>• Used survey results to scope analysis and benchmark findings</td>
<td></td>
</tr>
<tr>
<td>• Estimated prospective O&amp;M and capital costs</td>
<td></td>
</tr>
</tbody>
</table>
Across the state, annual dry-weather influent flow has declined in most regions.

Linear fit indicates decreasing trend in influent volume.

Linear fit indicates increasing trend in influent volume.
Future scenarios evaluated

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Scenario 1</th>
<th>Scenario 2</th>
<th>Scenario 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Indoor residential</td>
<td>Until 2025: 55 GPCD</td>
<td>Until 2025: 55 GPCD</td>
<td>Until 2025: 50 GPCD</td>
</tr>
<tr>
<td></td>
<td>2025 to 2030: 52.5 GPCD</td>
<td>2025 to 2030, 47 GPCD</td>
<td>2025 to 2030, 42.5 GPCD</td>
</tr>
<tr>
<td></td>
<td>After 2030: 50 GPCD</td>
<td>After 2030, 42 GPCD</td>
<td>After 2030, 35 GPCD</td>
</tr>
<tr>
<td>Outdoor Residential</td>
<td>100% of Irrigable Irrigated (II) area @ 70% of ETo (II @ 70%).</td>
<td>Until 2030: II @ 70%</td>
<td>Through 2025: II @ 70%</td>
</tr>
<tr>
<td></td>
<td>(II @ 70%).</td>
<td>After 2030: II @ 62%</td>
<td>Through 2030: II @ 62%</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>After 2030: II @ 55%</td>
</tr>
</tbody>
</table>

20% of Irrigable Not Irrigated (INI) area included
Scenario 2: WWTFs that may be impacted

Scenario 2, assumed that, in 2030, the residential indoor standard would be 42 GPCD and the residential outdoor standard would be an ETF of 62%, applied to 100% of II and 20% of INI area.
Scenario 2: Collection systems that may be impacted

Scenario 2, assumed that, in 2030, the residential indoor standard would be 42 GPCD and the residential outdoor standard would be an ETF of 62%, applied to 100% of II and 20% of INI area.
Comparing annual average historic influent flows (2011-2019 CWIQS data) to theoretical flows under Scenario 2:

*How many times has influent historically dropped below the volume forecasted under Scenario 2?*

67% have experienced annual average influent flows akin to those under Scenario 2.
Scenario 2: 42 GPCD and an ETF of 62%, applied to 100% of II area + 20% of INI area
**Scenario 2** (42 GPCD for r-indoor; 62% ETF for r-outdoor applied to 100 of II area + 20% of INI area)

<table>
<thead>
<tr>
<th>Percentage of systems that may experience lower/more concentrated flows</th>
<th>61%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Percentage of systems that may experience lower flows</td>
<td>38%</td>
</tr>
</tbody>
</table>

---

**Scenario 2: Percent influent flow reductions WWTFs may experience**

- 0-5%: 10%
- 5-10%: 22%
- 10-15%: 19%
- 15-20%: 21%
- 20-25%: 12%
- 25-30%: 5%
- More than 30%: 10%
Percent change from Future Baseline: 5.8%
Scenario 2: 42 GPCD and an ETF of 62%, applied to 100% of II area + 20% of INI area

Percent change from Future Baseline: -16.8%
Percent change from Future Baseline: 21.9%
Economic and Environmental Effects of AB 1668-SB 606

Effects on wastewater management systems

May 11, 2022

Erik Porse, PhD, OWP at Sacramento State | UCLA
Caitlyn Leo, OWP at Sacramento State
Harold Leverenz, PhD, OWP at Sacramento State | UC Davis
Full Project Scope

Key sectors:

• **Urban Retail Water Suppliers**: costs & benefits, low-income communities

• **Wastewater**: conveyance, treatment, and reuse
  • Odor & corrosion, water quality, recycled water production potential

• **Developed and natural parklands** within service areas
  • Effects of irrigation regimes on vegetation

• **Urban trees**
  • Effects of irrigation regimes on health and number of trees
Full Project Team

Expertise in urban water supply, wastewater management, urban ecology, and economics related to AB 1668-SB 606

- Erik Porse, PhD
- Jonathan Kaplan, PhD
- Maureen Kerner, PE
- John Johnston, PhD, PE
- Harold Leverenz, PhD, PE
- Caitlyn Leo
- Khalil Lezzaik, PhD
- Dakota Keene
- David Babchanik
- Patrick Maloney
- Scott Meyer
- Samira Moradi
- Ramzi Mahmood, PhD

- Stephanie Pincetl, PhD
- Lawren Sack, PhD
- Felicia Federico, PhD
- Robert Cudd
- Julia Skrovan
- Hannah Gustafson
- Marvin Browne
- Lauren Strug

- Mary Cadenasso, PhD
- Joanna Solins, PhD
- Bogumila Backiel

- Erick Eschker, PhD
- Jonathan Sander
Baseline: Future Indoor and Outdoor Demand

- Estimated a “baseline” of what would happen in the absence of regulations through 2030
  - Parcel data
  - Evaluate existing conservation and estimated saturation rates of efficient indoor fixtures
  - Code-based & enhanced replacement of indoor fixtures
  - Turf replacement

- Integrate Spatial Data
  - Link parcels, agencies, and regions

- Estimate Fixture Efficiencies
  - Collect from literature

- Link Fixtures and Buildings
  - Attribute fixture efficiencies to buildings for each retailer based on parcel attributes
  - Residential
  - Commercial
  - Industrial
  - Dates of construction and sale

- Project Water Use
  - Use parameters to project demand (indoor & outdoor), compare to objectives

- Evaluate Population Change
  - Evaluate projected population changes from available data sources

- Code-based & Enhanced Replacement
  - Track changes in fixture efficiency, code-based & enhanced upgrades
  - Track changes in % of buildings falling into bins of fixture efficiency, and use weighted average to evaluate Supplier-wide per capita demand
Evaluating Mitigation and Adaptation Actions

**Baseline Conditions**
- On-going efficiency
- Population change
- Climate and drought

**Baseline Future Demand**

**Effects of Regulations:**
- Suppliers Needing Reductions for Compliance and Effects on Downstream Systems, where $D_{future} > \text{Objective}$

**Objective Parameters**
- Indoor standard
- Outdoor standard
- Other volumes (variances, recycled bonus, etc)

**Scenarios of Objectives (water use targets)**

**Mitigation & Adaptation**
- Rebates & incentives
- Codes & restrictions
- Education & outreach
- Water rates

**Saturation rates of efficient fixtures in residential buildings**

**Community constraints (income, size, etc)**

**Outreach with suppliers, wastewater managers, landscape managers**

**Demand Management**
- Costs & Benefits
No statewide tool(s) existed to estimate quantitative impacts on wastewater facilities from water demand changes.

Recent Evaluations

**Study to Evaluate Long-Term Trends and Variations in the Average Total Dissolved Solids Concentration in Wastewater and Recycled Water**

Funding Agency: Southern California Salinity Control Program

**Adapting to Change: Utility Systems and Declining Flows**

**Managing Wastewater in a Changing Climate**

**CASE STUDY // Potential Impacts of Reduced Flows**

**MESSY DATA**

California Integrated Water Quality System Project (CIWQS)

CIWQS HELP CENTER - NPDES

Support for the National Pollutant Discharge Elimination System
Effects on Wastewater Management

How will demand reductions affect wastewater management systems and facilities?

Indoor demand reductions in Suppliers lead to reduced wastewater generation and influent flows

Network modeling to evaluate flow changes for collection and treatment systems

Reductions for AB 1668-SB 606 Compliance

Baseline indoor reductions

Water Use Efficiency Objective Impact Factor:

\[ WEO_{wwtf} = \frac{\sum_r V_{wwtf, future}}{\sum_r V_{wwtf, actual}} \]

Network Modeling to Project Effects

Retail Water Suppliers

Collection System

Retail Water Supplier

WWTF = Wastewater Treatment Facility
Integrating Historical Operations Data

- Data does not exist for all facilities. Must use percentages and extrapolations
Lower Flows and Concentrations

• To project effects in wastewater management, we must incorporate changes in flow, population, and concentration over 10 years.

Influent Changes & Per Capita Use

Influent Concentrations at WWTFs
Outreach with the Wastewater Management Community
# Outreach Results: Uncertainty In Impacts

## Wastewater Collection Systems

<table>
<thead>
<tr>
<th>Change in Operations and Maintenance</th>
<th>Responses</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Used more labor – increased hours, additional staff</td>
<td>25</td>
<td>61%</td>
</tr>
<tr>
<td>Employed more outside technical help (engineering consultants or specialized services)</td>
<td>11</td>
<td>37%</td>
</tr>
<tr>
<td>Increased frequency of inspections</td>
<td>20</td>
<td>67%</td>
</tr>
<tr>
<td>Increased frequency of preventative cleaning services (i.e., cleaning every pipe route)</td>
<td>24</td>
<td>59%</td>
</tr>
<tr>
<td>Purchased more or different chemicals</td>
<td>8</td>
<td>27%</td>
</tr>
</tbody>
</table>

In the future, given current capacity of your systems, over what range would low influent flows require remediation actions?

<table>
<thead>
<tr>
<th>Range of Flow Reduction</th>
<th>Responses</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less than 5% flow reduction</td>
<td>*</td>
<td></td>
</tr>
<tr>
<td>Between 5% and 10% flow reduction</td>
<td>*</td>
<td></td>
</tr>
<tr>
<td>Between 10% and 20% flow reduction</td>
<td>6</td>
<td>8%</td>
</tr>
<tr>
<td>Greater than 20% flow reduction</td>
<td>29</td>
<td>37%</td>
</tr>
<tr>
<td>Not Sure</td>
<td>39</td>
<td>49%</td>
</tr>
</tbody>
</table>

* Asterisk denotes four or fewer responses

## Wastewater Treatment Facilities

<table>
<thead>
<tr>
<th>Change in Operations and Maintenance</th>
<th>Responses</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Purchased more or different chemicals</td>
<td>17</td>
<td>41%</td>
</tr>
<tr>
<td>Used more electricity (or other energy sources)</td>
<td>25</td>
<td>61%</td>
</tr>
<tr>
<td>Used more staff/hired labor</td>
<td>7</td>
<td>17%</td>
</tr>
<tr>
<td>Employed more outside technical consultants or specialized services</td>
<td>14</td>
<td>34%</td>
</tr>
<tr>
<td>Purchased replacement equipment sooner than expected</td>
<td>11</td>
<td>27%</td>
</tr>
</tbody>
</table>

In the future, given current capacity of your systems, over what range would low influent flows require remediation actions?

<table>
<thead>
<tr>
<th>Range of Flow Reduction</th>
<th>Responses</th>
<th>Percentage</th>
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<td>29</td>
<td>37%</td>
</tr>
<tr>
<td>Not Sure</td>
<td>39</td>
<td>49%</td>
</tr>
</tbody>
</table>

* Asterisk denotes four or fewer responses
Wastewater Collection Systems:

Estimating Impacts
Summary of Effects on Wastewater Collection

**Low Flow Effects**
- Increased deposition of solids
- Blockages in pipes and lift stations
- Increased hydrogen sulfide production
- Increased generation of odors and methane
- Increased corrosion
- Increased root intrusion
- Reduction in pumping efficiency

**Responses**
- Increased labor
- Increased chemical usage
- Changes in energy use
- Additional equipment needs
- Increased repair and replacement (especially due to corrosion)
Modeling Collection System Effects

Model Inputs:
- Population
- Per Capita Influent Flow
- Miles of Sewer Network
- Pipe Size Distribution
- Temperature

Model Inputs:
- Flow velocities
- Sediment deposition
- Reaeration
- H₂S production and emissions
- CH₄ production
- NH₃ production
- Chemical addition
- Pumping energy requirements

Modeled Processes:
- BOD concentration
- COD transformation
- Corrosion rate

<table>
<thead>
<tr>
<th>System Inputs:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sewer System Characteristics:</td>
</tr>
<tr>
<td>Population</td>
</tr>
<tr>
<td>Per Capita Use</td>
</tr>
<tr>
<td>Average Flow</td>
</tr>
<tr>
<td>Miles of Sewer</td>
</tr>
<tr>
<td>Time b/w Flushing Events</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Collection System Influent:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Temperature</td>
</tr>
<tr>
<td>TSS Concentration</td>
</tr>
<tr>
<td>Total COD Concentration</td>
</tr>
<tr>
<td>Biodegradable COD</td>
</tr>
<tr>
<td>Readily Biodegradable</td>
</tr>
<tr>
<td>Slowly Biodegradable</td>
</tr>
<tr>
<td>Inert COD</td>
</tr>
<tr>
<td>BOD Concentration</td>
</tr>
<tr>
<td>Total Kjeldahl Nitrogen as N</td>
</tr>
<tr>
<td>Ammonia as N</td>
</tr>
<tr>
<td>Total Sulfur</td>
</tr>
<tr>
<td>Sulfate Concentration</td>
</tr>
<tr>
<td>Sulfide Concentration</td>
</tr>
</tbody>
</table>
Model Outputs

Outputs:
• Average sediment depth
• Average corrosion rate
• H₂S emissions per mile
• Annual chemical costs
• Annual pipe replacement costs
• Pumping energy costs

• Ran model for 50 collection systems using data from SSO questionnaire reducing current per capita flow by 25% in increments of 5%
Estimating Effects of Reduced Flows

Use existing data to cluster collections systems

### System Characteristics, by Cluster

<table>
<thead>
<tr>
<th>Cluster</th>
<th>Average System Characteristics</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>• Percent Pipes &lt; 8&quot;: 63.2%</td>
</tr>
<tr>
<td></td>
<td>• Climate Zone Score: 2.3</td>
</tr>
<tr>
<td></td>
<td>• Estimated Flow: 139.7 gpd</td>
</tr>
<tr>
<td></td>
<td>• Avg. Summer Temp: 22.7°C</td>
</tr>
<tr>
<td>2</td>
<td>• Percent Pipes &lt; 8&quot;: 73.3%</td>
</tr>
<tr>
<td></td>
<td>• Climate Zone Score: 2.9</td>
</tr>
<tr>
<td></td>
<td>• Estimated Flow: 74.2 gpd</td>
</tr>
<tr>
<td></td>
<td>• Avg. Summer Temp: 27.4°C</td>
</tr>
<tr>
<td>3</td>
<td>• Percent Pipes &lt; 8&quot;: 74.9%</td>
</tr>
<tr>
<td></td>
<td>• Climate Zone Score: 4.1</td>
</tr>
<tr>
<td></td>
<td>• Estimated Flow: 84.6 gpd</td>
</tr>
<tr>
<td></td>
<td>• Avg. Summer Temp: 36.8°C</td>
</tr>
</tbody>
</table>

SSO Database and other sources
Estimating Effects of Reduced Flows

Use model outputs to assign characteristics to clusters

Model Outputs (50 systems)

<table>
<thead>
<tr>
<th>Collection System</th>
<th>% Increase per % Decrease in Per Capita Use</th>
<th>H₂S Emissions</th>
<th>Corrosion Rate</th>
<th>Sedimentation</th>
<th>Chemical Addition</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1.98</td>
<td>0.34</td>
<td>0.31</td>
<td>0.38</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>2.00</td>
<td>2.52</td>
<td>0.24</td>
<td>0.61</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>3.20</td>
<td>0.46</td>
<td>0.19</td>
<td>0.76</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>1.98</td>
<td>1.67</td>
<td>0.30</td>
<td>0.35</td>
<td></td>
</tr>
<tr>
<td>... 50</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Assign modeled systems to clusters

Develop cluster characteristics

<table>
<thead>
<tr>
<th>Cluster</th>
<th>% Increase per % Decrease in Per Capita Use</th>
<th>H₂S Emissions</th>
<th>Corrosion Rate</th>
<th>Sedimentation</th>
<th>Chemical Addition</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td></td>
<td>1.29</td>
<td>2.15</td>
<td>0.22</td>
<td>0.42</td>
</tr>
<tr>
<td>2</td>
<td></td>
<td>2.01</td>
<td>1.88</td>
<td>0.26</td>
<td>0.37</td>
</tr>
<tr>
<td>3</td>
<td></td>
<td>2.05</td>
<td>2.01</td>
<td>0.25</td>
<td>0.49</td>
</tr>
</tbody>
</table>
Estimating Effects of Reduced Flows

Extrapolate effects statewide

<table>
<thead>
<tr>
<th>Cluster characteristics</th>
<th>% Increase per % Decrease in Per Capita Use</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>H₂S Emissions</td>
</tr>
<tr>
<td>1</td>
<td>1.29%</td>
</tr>
<tr>
<td>2</td>
<td>2.01%</td>
</tr>
<tr>
<td>3</td>
<td>2.05%</td>
</tr>
</tbody>
</table>

Modeled Impacts, by Cluster

<table>
<thead>
<tr>
<th>Output (Average % Increase)</th>
<th>Cluster</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1</td>
</tr>
<tr>
<td>H₂S Emissions</td>
<td>14.5%</td>
</tr>
<tr>
<td>Corrosion Rate</td>
<td>24.2%</td>
</tr>
<tr>
<td>Sedimentation</td>
<td>2.5%</td>
</tr>
<tr>
<td>Chemical Addition</td>
<td>7.7%</td>
</tr>
<tr>
<td>Pipe Replacement Costs</td>
<td>24.1%</td>
</tr>
<tr>
<td>Pumping Costs</td>
<td>-11.3%</td>
</tr>
</tbody>
</table>
Wastewater Treatment and Reuse Systems

Estimating Impacts
## Summary of Effects on Wastewater Treatment

### Low Flow Effects
- Grit removal problems
- Increased hydrogen sulfide at headworks
- Process deterioration of activated sludge and trickling filters
- Increased ammonia concentrations for some WWTPs
- Disinfection problems
- Increased TDS in effluent
- Decreased volumes for recycling

### Responses
- Increased energy use
- Increased labor
- Increased chemical usage
- Increased repair and replacement (especially due to corrosion)
- Increased need for process upgrades
- Revenue losses (lower recycling flows)
Modeling Process Operations

- Typical facility processes modeled
- Simulations run for selected flow and concentration ranges (based on design capacity and gpcd)
- Used Biowin modeling to estimate chemical and energy use for different flow scenarios

Biowin model example for Nitrification/denitrification process
Model Results

- Operational impacts estimated for 133 facilities for Scenario 2, based on data availability

Normalized Changes in Operations & Costs

<table>
<thead>
<tr>
<th>Facilities</th>
<th>Number</th>
<th>Average Change</th>
<th>Median Change</th>
<th>Population-Weighted Average Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>All</td>
<td>133</td>
<td>3.1%</td>
<td>-0.8%</td>
<td>2.2%</td>
</tr>
<tr>
<td>WWTFs with energy use increases</td>
<td>63</td>
<td>11.1%</td>
<td>8.7%</td>
<td>7.6%</td>
</tr>
<tr>
<td>WWTFs with energy use decreases</td>
<td>70</td>
<td>-7.5%</td>
<td>-4.9%</td>
<td>-5.4%</td>
</tr>
</tbody>
</table>

Capital Improvement Needs

<table>
<thead>
<tr>
<th>Facilities</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of Facilities Needing Upgrades*</td>
<td>36/133</td>
</tr>
<tr>
<td>Affected Population</td>
<td>1,500,000</td>
</tr>
<tr>
<td>Affected % of Population That Was Modeled</td>
<td>5%</td>
</tr>
</tbody>
</table>

* Based on a threshold of a 15% reduction in influent volume through 2030

Assumes 7% population increase through 2030 per Department of Finance, but not facility-specific
What Capital Improvements are Needed?

Facilities are reaching end-of-life faster and need upgrades:

• Older aeration systems need to be upgraded or replaced
• Trickling filters need to be upgraded or replaced
• Nitrogen removal systems cannot meet effluent standard without chemical addition and increased pumping
• Operations and capital needs increase proportional to gpcd reductions
• Shorter lifespan >> Increased life-cycle costs
Effects on Water Reuse Facilities

In Scenarios 2 and 3, the potential available wastewater for recycling is reduced

<table>
<thead>
<tr>
<th>Scenario</th>
<th>Baseline**</th>
<th>Scenario 1</th>
<th>Scenario 2</th>
<th>Scenario 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Indoor standard: 2030 Final</td>
<td>-</td>
<td>50</td>
<td>42</td>
<td>35</td>
</tr>
<tr>
<td>Outdoor standard: 2030 Final</td>
<td>-</td>
<td>0.7</td>
<td>0.6</td>
<td>0.55</td>
</tr>
<tr>
<td>% of Reuse Facilities Affected (out of 138)</td>
<td>-</td>
<td>49%</td>
<td>68%</td>
<td>75%</td>
</tr>
<tr>
<td>Change in Potential Influent Volume to Reuse Facilities vs. Current (ac-ft)</td>
<td>21,000</td>
<td>51,000</td>
<td>-24,000</td>
<td>-41,000</td>
</tr>
<tr>
<td>Net Change* in Influent Flow from Baseline (ac-ft)</td>
<td>-</td>
<td>N/A</td>
<td>-45,000</td>
<td>-62,000</td>
</tr>
</tbody>
</table>

* Net change = Baseline change – Objective-based change
** Median indoor per capita demand is 44-45 gpd in Baseline

In Scenario 1, potential influent is greater if Suppliers use water up to the objective values
Comparing savings to influent flow reductions at reuse facilities

<table>
<thead>
<tr>
<th>Scenario</th>
<th>Scenario 1</th>
<th>Scenario 2</th>
<th>Scenario 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Indoor standard: 2030 Final</td>
<td>50</td>
<td>42</td>
<td>35</td>
</tr>
<tr>
<td>Outdoor standard: 2030 Final</td>
<td>0.7</td>
<td>0.6</td>
<td>0.55</td>
</tr>
<tr>
<td>Anticipated total statewide water savings through 2030 (ac-ft)</td>
<td>240,000</td>
<td>500,000</td>
<td>830,000</td>
</tr>
<tr>
<td>Assumed indoor-related water savings through 2030 (ac-ft)</td>
<td>36,000</td>
<td>75,000</td>
<td>124,000</td>
</tr>
<tr>
<td>Change in Potential Influent Volume to Reuse Facilities vs. Current (ac-ft)</td>
<td>51,000</td>
<td>-24,000</td>
<td>-41,000</td>
</tr>
</tbody>
</table>
Key Themes

- **Wastewater data**
  - Data availability and quality is a challenge

- **Impacts from lower flows**
  - Many WWTFs already experience low flow impacts; many others are unsure of future conditions
  - Impacts on collection systems and underground infrastructure is a significant concern and costly to mitigate

- **Adaptation**
  - Treating more concentrated wastewater requires more energy
  - Many WWTFs are reaching the end of their design life faster than expected

- **Recycled water**
  - Some recycled water programs cannot meet peak demands for effluent
  - Salt buildup makes recycled water less suitable for irrigation
Modeling how much adapting to lower or more concentrated influent flows might cost

Statewide average annual wastewater costs may increase by 4%*

<table>
<thead>
<tr>
<th>Wastewater sector</th>
<th>Annual O&amp;M Costs*</th>
<th>Annual Capital Costs*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Statewide average annual treatment costs</td>
<td>$2.5 billion</td>
<td>$4.5 billion</td>
</tr>
<tr>
<td>Additional statewide costs due to Scenario 2</td>
<td>$61 million</td>
<td>$267 million</td>
</tr>
<tr>
<td>Statewide Average Annual Collection costs</td>
<td>$1.1 billion</td>
<td>$1.7 billion</td>
</tr>
<tr>
<td>Additional statewide costs due to Scenario 2</td>
<td>$5 million</td>
<td>$40 million</td>
</tr>
</tbody>
</table>

* These are nominal costs, based on “Class 5” estimates, that do not take inflation into consideration.
10 Minute Stretch Break
Questions?

To ask a question: use Q&A box or speaker card form: [bit.ly/ww_qs]
For phone callers: *9 to raise hand, *6 to speak
Impact of Conservation on Wastewater Treatment
Agenda

• Pulse check: https://www.menti.com/emwcet8qbg
  Go to www.menti.com & use code 1226 5043

• Wyatt Troxel, Process Specialist
  “Connecting the Dots and Pixelating the View”

• Matt Anderson, Lab Manager, City of San Luis Obispo

• Vince Ines, Wastewater Utility Manager, Ventura Water
Peak energy prices
Connecting the Dots
What are the major challenges you are facing?

What problems are you anticipating in the future?

What is likely not going to change?

What strategies are you using to deal with challenges?
Project Timeline

- **2015**: Development of the Program Charter as part of project planning. The Charter is the guiding document for project decisions.
- **2018**: Final design
- **2019**: Groundbreaking Ceremony
- **2023**: Project close-out

**PHASE 1**: Project Planning
**PHASE 2**: Preliminary Design
**PHASE 3**: Final Design
**PHASE 4**: Construction
**PHASE 5**: Close Out
Nitrate concentration from 2010-now
Hydraulic flow from 2010-now
Plant Health Dashboard

5/7/2022
91.4%
Opening checks:
- High NEFF avg. turbidity, RW is offline
- Low EQ level
- AIT 402 @ 10 NTU flatline spike:
  - Unit 3
- High NEFF Turbidity: 4.7 NTU
- Low NEFF pH 6.87su
- Unit 4
- High plant drain run time due to channel cleaning.
- No security report

See less.
Energy Dashboard

786 MWh
Ventura Water

Vince Ines, Wastewater Utility Manager

• What are the major challenges you are facing?
• What problems are you anticipating in the future?
• What is likely not going to change?
• What strategies are you using to deal with challenges?
Questions?

Jamie Ferro
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Wyatt Troxel
wtroxel@westyost.com
STATE WATER RESOURCES CONTROL BOARD
DIVISION OF FINANCIAL ASSISTANCE

Providing Financial Assistance to
Preserve, Enhance, and Restore California’s Water Resources
Division of Financial Assistance

- Clean Water State Revolving Fund (CWSRF)
  - Wastewater infrastructure and water quality projects
    - Typically $600M per year
    - Additional funds from 2021 State Budget and “Bipartisan Infrastructure Law”

- Drinking Water State Revolving Fund (DWSRF)
  - Drinking water projects with priority on public health
    - Typically $300M per year
    - Additional funds from 2021 State Budget and “Bipartisan Infrastructure Law”

- Water Recycling Funding Program (WRFP)
  - Recycled water treatment and distribution projects
    - Periodic state bond funds and CWSRF loans
    - Additional funds from 2021 State Budget ($350M shared with Groundwater Cleanup)
Division of Financial Assistance

• Safe and Affordable Drinking Water Fund
  – Interim water supplies, administrators, and infrastructure projects
    • $130M per year

• Drinking Water For Schools
  – $100,000 per school
  – $1,000,000 per Local Education Agency

• Backup Generator Funding Program
  – Backup generators to drinking water systems serving small disadvantaged communities susceptible to service interruptions from public safety power shutoffs
    • $6M authorized
Division of Financial Assistance

• Water and Wastewater Arrearage Program
  – Relief for bills that were not paid during pandemic
    • $985M allocated

• Stormwater
  – Green infrastructure, rainwater and stormwater capture, and stormwater treatment facilities

• Groundwater Treatment and Remediation
  – Projects to prevent and cleanup groundwater contamination
    • Proposition 68 ($28M)
    • 2021 State Budget ($350M shared with WRFP)
    • Site Cleanup Subaccount Program ($19.5M per year)
### 2021 State Budget Water Board Allocations

<table>
<thead>
<tr>
<th>Allocation (Millions)</th>
<th>Project Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>$650</td>
<td>Wastewater projects (CWSRF Application)</td>
</tr>
<tr>
<td></td>
<td>*priority to septic-to-sewer conversions</td>
</tr>
<tr>
<td>$650</td>
<td>Drinking water projects (DWSRF Application)</td>
</tr>
<tr>
<td></td>
<td>*priority to disadvantaged communities (DACs)</td>
</tr>
<tr>
<td>$100</td>
<td>Per-and polyfluoroalkyl substances (PFAS) support for water systems</td>
</tr>
<tr>
<td>$350</td>
<td>Groundwater cleanup and water recycling projects</td>
</tr>
<tr>
<td>$20</td>
<td>Mexico border rivers</td>
</tr>
</tbody>
</table>

- **Wastewater & Drinking Water Funds Rollout**
  - IUPs amended at March 15 Board Meeting
- **PFAS & GW/RW Funds Rollouts in development**
### Bipartisan Infrastructure Law (BIL) – CA SRF Estimates FY 22-26 (Millions)

<table>
<thead>
<tr>
<th>Project Description</th>
<th>DWSRF</th>
<th>CWSRF</th>
<th>Totals</th>
</tr>
</thead>
<tbody>
<tr>
<td>Any Project (Subject to Future Appropriation)</td>
<td>$1,318</td>
<td>$1,025</td>
<td>$2,344</td>
</tr>
<tr>
<td>Any Project (Appropriated)</td>
<td>$1,054</td>
<td>$819</td>
<td>$1,874</td>
</tr>
<tr>
<td>Emerging Contaminants (Appropriated)</td>
<td>$360</td>
<td>$70</td>
<td>$430</td>
</tr>
<tr>
<td>Lead Service Line Replacement (Appropriated)</td>
<td>$1,350</td>
<td></td>
<td>$1,350</td>
</tr>
<tr>
<td><strong>Totals</strong></td>
<td>$4,082</td>
<td>$1,915</td>
<td>$5,998</td>
</tr>
</tbody>
</table>

- **2022/23 Intended Use Plans**
  - Draft in May
  - Board Meeting July
How to Apply

• Financial Assistance Application Submittal Tool (FAAST)
  https://faast.waterboards.ca.gov/

• Technical Assistance Program
  https://www.waterboards.ca.gov/water_issues/programs/grants_loans/tech_asst_funding.html
STAY INFORMED

DFA Web Page
https://www.waterboards.ca.gov/water_issues/programs/grants_loans/

Email Subscription Lists
https://www.waterboards.ca.gov/resources/email_subscriptions/

Christopher Stevens
Assistant Deputy Director, DFA
Christopher.stevens@waterboards.ca.gov
(916) 716-9603
Questions?
Where to find more information

• **State Water Resources Control Board**
  • Water Conservation Portal
    • www.waterboards.ca.gov/water_issues/programs/conservation_portal/
  • About SB 606 & AB 1668:
    • www.waterboards.ca.gov/water_issues/programs/conservation_portal/california_statutes.html
  • **About the rulemaking process:**
    • www.waterboards.ca.gov/water_issues/programs/conservation_portal/regs/water_efficiency_legislation.html

• **Department of Water Resources**
  • Primer of 2018 Legislation on Water Conservation and Drought Planning
  • About urban water use efficiency, including SB 606 & AB 1668:
    • https://water.ca.gov/Programs/Water-Use-And-Efficiency/Urban-Water-Use-Efficiency
  • Sharepoint site with materials for DWR workgroup members only:
    • https://cawater.sharepoint.com/sites/dwr-wusw/SitePages/Home.aspx
Previous Workshops

Public Stakeholder Webinar: Wastewater, Urban Trees and Parklands
- Thursday, December 2nd, 2021 (Wastewater)
- Friday, December 3rd, 2021 (Urban Trees and Parklands)

State Water Resources Control Board
Thank you!

Contact: ORPP-WaterConservation@waterboards.ca.gov with questions