SAFER
Methodologies for Determining “At-risk” Public Water Systems and Domestic Wells
Webinar
April 17, 2020
Welcome and Meeting Logistics

Amanda Ford, Office of Public Participation, SWRCB
Meeting Guidelines

• Webcast: video.calepa.ca.gov/

• For technical assistance during the meeting:
  • Email safer@waterboards.ca.gov

Questions or comments

• Email SAFER@waterboards.ca.gov
  • Subject: At Risk Webinar
  • Name
  • Org/affiliation
  • Your question or a sentence describing the topic of your comment or question
METHODS FOR DETERMINING “AT-RISK” PUBLIC WATER SYSTEMS, DOMESTIC WELLS, & STATE SMALL WATER SYSTEMS

Safe and Affordable Funding for Equity and Resilience (SAFER) Webinar
April 17, 2020

Darrin Polhemus, P.E.
Deputy Director, Division of Drinking Water
HUMAN RIGHT TO WATER (HR2W)

- September 25, 2012, Governor Brown signed Assembly Bill 685 making California the first state to recognize the human right to water

- Over 7,400 Public Water Systems

- Approximately 3,000 Community Water Systems and School Systems

- Red stars represent water systems with violations of drinking water standards

- 90% of violations occur in water systems serving less than 500 connections
SAFE AND AFFORDABLE DRINKING WATER FUND

- July 2019, Governor Newsom signed Senate Bill 200 (SB-200) creating the Safe and Affordable Drinking Water Fund

- Appropriates approximately $130 million annually for ten years to the State Water Board from the Greenhouse Gas Reduction Fund

- Requires development of Fund Expenditure Policy and Plan in consultation with an Advisory Group

- State Water Board will consider adoption of the Policy for Developing the Fund Expenditure Plan at the May 5, 2020 Board Meeting
SB-200 REQUIRES ADDITIONAL ACTIONS

- The “fund expenditure plan shall be based on data and analysis drawn from the drinking water needs assessment”

- Requires development of a map of aquifers at high risk of containing contaminants that exceed drinking water standards
Organized three workshops in early 2019 to inform the State Water Board’s Needs Assessment

**Key Participants**: Rural Community Assistance Corporation; CA Rural Water Association; UC Davis, UCLA; UC Berkeley; Pacific Institute; Office of Environmental Health Hazard Assessment; and many more

Participants identified key risk factors

State Water Board used these recommendations to shape Needs Assessment contract with UCLA

http://www.waterboards.ca.gov/drinking_water/certlic/drinkingwater/needs
The Drinking Water Needs Assessment is being conducted by:

- UCLA Contract through March 2021
- State Water Board Division of Water Quality (DWQ), Groundwater Ambient Monitoring and Assessment Team (GAMA)
- NEW State Water Board Needs Analysis Unit
- Collaboration with other State, institutional and non-profit partners
NEEDS ASSESSMENT ELEMENTS

- **Element 1**: Identification of Public Water Systems in Violation or At-Risk
- **Element 2**: Identification of Domestic Wells and State Small Water Systems At-Risk
- **Element 3**: Cost analysis for Interim and Long-Term Solutions
DRINKING WATER NEEDS ASSESSMENT

We want your suggestions

- The Needs Assessment methodology will improve and evolve over the coming years

- Better data collection and improved understanding of risk factors will improve the methodology

- We want to work with key stakeholders to refine our approach
THANK YOU

Darrin Polhemus
Needs Assessment 1.0 Update:
Risk Screening Methods and Results

April 17, 2020

UCLA Luskin Center for Innovation
University of North Carolina, Environmental Finance Center
Corona Environmental Consulting
Sacramento State University, Office of Water Programs
Pacific Institute
Focus of the UCLA Needs Assessment

**Why?**

Smaller systems, state smalls and well owners have higher risks (90% of MCL violations in systems <500 connections)

**What?**

To assist the Board in prioritizing targeted technical and financial assistance to ensure the Human Right to Water

**Who?**

Smaller water systems, state smalls and well owners

– The State Water Board will be incorporating Federally recognized tribes
• UCLA is leading the contracted Version 1.0 of the Needs Assessment through March 2021

• The Board’s new Needs Analysis Unit in the Division of Drinking Water will lead the long-term on-going Needs Assessment mandated by SB 200
Overview of Presentation

• Identifying “At-Risk” Systems
• Version 1.0: A Starting Place
• Version 2.0+: We need your input
• How to move forward
First-Stage Needs Assessment Analysis Elements

1. Identification of Public Water Systems with <3,300 connections in Violation or “At-Risk”
   a. Groups Involved: UCLA and UNC-Chapel Hill

2. Identification of Domestic Wells and State Smalls “At-Risk”
   a. Groups Involved: Board’s Groundwater Ambient Monitoring and Assessment (GAMA) Team and other organizations

3. Cost-analysis for Interim and Long-term Solutions for “At-Risk” Systems and Wells
   a. Groups Involved: Corona Environmental, Sacramento State, Pacific Institute and UCLA
“Risk” for a system is an outcome of:

- Exposure to hazards (ex: drought, contamination) +

- Vulnerability
  - Sensitivity (ex: DAC status)
  - Adaptive capacity (eg: TMF capacity)

See Intergovernmental Panel on Climate Change framework for Climate Change Adaptation
Audience Poll Question 1

Which aspect of the Risk Screening are you most interested in?

A. How a specific system(s) will be assessed in the screening
B. How the risk screening can support funding decisions
C. How the risk screening will inform broader state policy
D. Use of risk screening data for research purposes
E. Other
### Version 1.0 Water Quality Risk Screening Factors

<table>
<thead>
<tr>
<th>Factors for Water Systems in Violation</th>
<th>“At-Risk” Factors for Water Systems</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Non-compliant with the Human Right to Water (HR2W) Criteria</td>
<td>• Water outages</td>
</tr>
<tr>
<td>• Current waterborne illness</td>
<td>• Historical waterborne disease</td>
</tr>
<tr>
<td>• Above action level (Lead and Copper)</td>
<td>• Extensive treatment</td>
</tr>
<tr>
<td></td>
<td>• No active governance</td>
</tr>
<tr>
<td></td>
<td>• Single groundwater well source;</td>
</tr>
<tr>
<td></td>
<td>• Absence of individual water meters;</td>
</tr>
<tr>
<td></td>
<td>• Monitoring and reporting violation in the past three years;</td>
</tr>
<tr>
<td></td>
<td>• Bacteriological violation in the past three years or evidence of <em>E. coli</em>;</td>
</tr>
<tr>
<td></td>
<td>• No appropriately certified water treatment or distribution operator;</td>
</tr>
<tr>
<td></td>
<td>• Located within a disadvantaged community</td>
</tr>
<tr>
<td></td>
<td>• Located within a high priority groundwater basin</td>
</tr>
<tr>
<td></td>
<td>• Treatment technique violation</td>
</tr>
</tbody>
</table>
## Version 1.0 Risk Screening Method

### Weight of risk factors for water systems under 500 connections or schools

<table>
<thead>
<tr>
<th>Risk Factor</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>In Violation</td>
<td>Non-compliant on the HR2W List, current waterborne disease, or above an action level</td>
</tr>
<tr>
<td>At-Risk</td>
<td>Water outages, historical waterborne disease, extensive treatment, no active governance entity, or any two other risk factors</td>
</tr>
<tr>
<td>Potentially At-Risk</td>
<td>Any one other risk factor</td>
</tr>
</tbody>
</table>

### Weight of risk factors for water systems up to 3,300 connections but greater than 501 connections

<table>
<thead>
<tr>
<th>Risk Factor</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>In Violation</td>
<td>Non-compliant on the HR2W list, current waterborne disease, or above an action level</td>
</tr>
<tr>
<td>At-Risk</td>
<td>Water outages, historical waterborne disease, extensive treatment, no active governance entity, or any three other risk factors</td>
</tr>
<tr>
<td>Potentially At-Risk</td>
<td>Any two risk factors, extensive treatment required, or in a high priority basin</td>
</tr>
</tbody>
</table>
Version 1.0 Risk Screening Results

- Healthy, 17%
- Potentially at Risk, 27%
- At Risk, 45%
- In Violation, 12%
## Breakdown of Version 1.0 Results

<table>
<thead>
<tr>
<th>Top 10 Risk Factors</th>
<th>% of Water Systems “At-Risk”</th>
<th>% of Water Systems “Potentially At-Risk”</th>
</tr>
</thead>
<tbody>
<tr>
<td>Absence of individual meters</td>
<td>63%</td>
<td>37%</td>
</tr>
<tr>
<td>Single groundwater well source</td>
<td>54%</td>
<td>37%</td>
</tr>
<tr>
<td>Located in high priority basin</td>
<td>40%</td>
<td>23%</td>
</tr>
<tr>
<td>Monitoring and reporting violation(s)</td>
<td>35%</td>
<td>14%</td>
</tr>
<tr>
<td>Bacteriological violation(s)</td>
<td>29%</td>
<td>5%</td>
</tr>
<tr>
<td>Water source requiring extensive treatment</td>
<td>22%</td>
<td>18%</td>
</tr>
<tr>
<td>Not in active standing with CSS</td>
<td>12%</td>
<td>0%</td>
</tr>
<tr>
<td>Located in Disadvantaged Community</td>
<td>11%</td>
<td>13%</td>
</tr>
<tr>
<td>Substantial unplanned water outages</td>
<td>4%</td>
<td>0%</td>
</tr>
<tr>
<td>Presence of E.Coli in the past 3 years</td>
<td>4%</td>
<td>0%</td>
</tr>
<tr>
<td><strong>Total number of water systems:</strong></td>
<td><strong>1,241</strong></td>
<td><strong>566</strong></td>
</tr>
</tbody>
</table>
Do these initial results align with your expectations?

A. Yes
B. No
C. Unsure
Version 2.0+

• We have ideas about how to expand and refine the risk screening...

• But we need your input

• Updating the screening will be a long-term process managed by the State Water Board
Version 2.0+ Process

1. Identify key risk factor metrics for determining “risk”

2. Setting “risk” thresholds for each metric identified

3. Determine the scoring/weighting of each metric to reflect criticality
Utilize a set of more comprehensive risk factors that directly correlate to HR2W outcomes:

– Safe, Clean (Water Quality)
– Affordable
– Accessible
Outcomes

• Incorporate duration, severity of violation

Additional Potential Metrics to Consider:

• trend toward water quality violations (>80% of MCL)
Outcomes: Open for discussion

Additional Potential Metrics to Consider:

• DWR Drought and Water Shortage Risk Scoring: California’s Small Water Suppliers and Self-Supplied Communities
  • 30+ factors including groundwater availability, precipitation, fire, heat, backup supply

• Board Electronic Annual Report data (production, shortages)
Ideas for 2.0+: Affordability

Additional factors for consideration:

• % MHI or hours of minimum wage
• Affordability metrics from AB401 effort
• Cost of living-adjusted metrics from the literature
Ideas for 2.0+: Financial Capacity Risk

• Pulled data from financial statements available for approximately 25% of 2,841 smaller systems

• 3 universal metrics + others for certain types of systems:
  – Adjusted Operating Ratio
  – Revenue per connection
  – Days Cash on Hand
## RISK PROFILE CATEGORIES

### Water Quality

<table>
<thead>
<tr>
<th>Risk Factor</th>
<th>Threshold</th>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lead and Copper</td>
<td>Above action level</td>
<td>.5</td>
</tr>
<tr>
<td># of known waterborne illness cases</td>
<td>Above 0 over last 3 years</td>
<td>1</td>
</tr>
<tr>
<td>Current waterborne illnesses</td>
<td>If Yes</td>
<td>1</td>
</tr>
<tr>
<td>More...</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>SUM</strong></td>
<td><strong>10</strong></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Risk Factor</th>
<th>Threshold</th>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>Groundwater source</td>
<td>Less than 1</td>
<td>1</td>
</tr>
<tr>
<td>Location in a high priority basin</td>
<td>If yes</td>
<td>0.5</td>
</tr>
<tr>
<td>Climate risk</td>
<td>Above 25 days of extreme heat</td>
<td>0.25</td>
</tr>
<tr>
<td>More...</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Low Risk</th>
<th>Medium Risk</th>
<th>High Risk</th>
</tr>
</thead>
<tbody>
<tr>
<td>Below 3</td>
<td>3-7</td>
<td>7 and above</td>
</tr>
</tbody>
</table>

### Accessibility

<table>
<thead>
<tr>
<th>Risk Factor</th>
<th>Threshold</th>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>Household Affordability</td>
<td></td>
<td></td>
</tr>
<tr>
<td>%MHI</td>
<td>1.5%</td>
<td>0.25</td>
</tr>
<tr>
<td>Annual Shut-Off</td>
<td>Above X% for 20th percentile</td>
<td>0.5</td>
</tr>
<tr>
<td>Hours of min. wage</td>
<td>X or above</td>
<td>1</td>
</tr>
</tbody>
</table>

### Affordability

<table>
<thead>
<tr>
<th>Risk Factor</th>
<th>Threshold</th>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>Water System Financial Capacity</td>
<td>Past 5-year population growth</td>
<td>Negative = below 0</td>
</tr>
<tr>
<td></td>
<td>Debt to revenue ratio of system</td>
<td>Above XX %</td>
</tr>
<tr>
<td></td>
<td>Individual water meters</td>
<td>If less than 50% of customers</td>
</tr>
</tbody>
</table>

### Note: This is an example, not a proposal. Numbers and metrics are placeholders
## Water Quality Risk Profile

<table>
<thead>
<tr>
<th>Risk Factor Metric</th>
<th>Score Range</th>
<th>Low Risk Threshold</th>
<th>Score</th>
<th>Medium Risk Threshold</th>
<th>Score</th>
<th>High Risk Threshold</th>
<th>Score</th>
<th>SUM</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lead and Copper</td>
<td>0-2</td>
<td>Below level X</td>
<td>0</td>
<td>Above level (X)</td>
<td>1</td>
<td>Above action level (X)</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td># of known waterborne illness cases</td>
<td>0-1</td>
<td>0 over last X years</td>
<td>0</td>
<td>Above 0 over last X years</td>
<td>.25</td>
<td>Above 0 over last X years</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Current waterborne illnesses</td>
<td>0-1</td>
<td>If No</td>
<td>0</td>
<td>If No</td>
<td>0</td>
<td>If Yes</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>SUM</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>3</td>
</tr>
</tbody>
</table>

### Water Quality Risk Summation

<table>
<thead>
<tr>
<th>Risk Threshold</th>
<th>Below X</th>
<th>X - X</th>
<th>X and above</th>
</tr>
</thead>
<tbody>
<tr>
<td>Level of Risk</td>
<td>Low Risk</td>
<td>Medium Risk</td>
<td>High Risk</td>
</tr>
</tbody>
</table>

Note: This is an example, not a proposal. Numbers and metrics are placeholders.
Which threshold approach do you prefer for risk factor metrics?

A. Single Threshold
B. Tiered Thresholds
C. Unsure
Risk Screening 1.0: Two-fold Weighting Illustration

Weighting individual metrics

<table>
<thead>
<tr>
<th>Risk Factor</th>
<th>Weight/Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Extensive Treatment</td>
<td>1</td>
</tr>
<tr>
<td>Single Violation</td>
<td>1</td>
</tr>
<tr>
<td>Single GW Source</td>
<td>0.5</td>
</tr>
<tr>
<td>Absence of Meter</td>
<td>0.5</td>
</tr>
<tr>
<td>DAC</td>
<td>0.25</td>
</tr>
<tr>
<td>High Priority Basin</td>
<td>0.25</td>
</tr>
</tbody>
</table>

Distribution of water systems with an overall risk score set at 2.5

Distribution of water systems with an overall risk score set at 1
Question – what is the weight of the “Water Quality” risk score compared to Accessibility and Affordability?
Audience Poll Question 4

How do you think the HR2W dimensions of water quality, accessibility, and affordability should be weighted in the risk screening?

A. Equally important
B. Water Quality is most important
C. Accessibility is most important
D. Affordability is most important
E. Unsure
• **Rationale**
  – Does the risk factor clearly influence a system’s ability to deliver clean and affordable water?

• **Measurable**
  – Is the risk factor a measurable metric?

• **Accessible**
  – Is this data readily available and currently collected for all systems types?
  – Does the State Water Board have the legal authority to collect this data?

• **Actionable**
  – Can this risk factor be influenced by policy or managerial decisions?
How to Build Version 2.0+: Other Considerations

- How do you measure risk for each metric?
  - Thresholds

- How do you compare metrics and overall risk categories?
  - Weighting
Next Steps

• Your feedback is critical

• The State Water Board will be organizing a series of webinars/workshops to dive in deeper

• Subscribe to SAFER mailing list for notifications: https://www.waterboards.ca.gov/safer
Send Risk Factor ideas to:

SAFER@waterboards.ca.gov

Questions/Discussion requests to:

Kristyn.Abhold@waterboards.ca.gov & gspierce@ucla.edu
Questions or comments

- Email SAFER@waterboards.ca.gov
  - Subject: At Risk Webinar
  - Name
  - Org/affiliation
  - Your question or a sentence describing the topic of your comment or question