



# STAKEHOLDER ADVISORY GROUP

Board of Water Supply, City & County of Honolulu  
April 17, 2025  
Meeting 54

# WELCOME & INTRODUCTIONS

DAVE EBERSOLD, FACILITATOR

STAKEHOLDER ADVISORY GROUP MEETING 54

APRIL 17, 2025

[WWW.BOARDOFWATERSUPPLY.COM](http://WWW.BOARDOFWATERSUPPLY.COM)



# MEETING OBJECTIVES

- Welcome and public comment
- Provide BWS updates
- Review water quality regulatory updates
- Discuss condition assessment plan
- Learn more about wildfire mapping
- Accept notes from meeting #53
- Review 2025 meeting dates



# PUBLIC COMMENT ON AGENDA ITEMS







# BWS UPDATES

Ernest Lau, PE  
Manager and Chief Engineer  
April 17, 2025  
[boardofwatersupply.com](http://boardofwatersupply.com)





# WATER QUALITY REGULATIONS

Jon Lowry, PE  
CDM Smith  
April 17, 2025

# Water Quality Regulations Assessment and Updates



Safe Drinking Water Act



U.S. Environmental Protection Agency

- National Drinking Water Standards set by EPA



Hawai'i Department of Health  
Safe Drinking Water Branch

- Hawai'i Department of Health Safe Drinking Water Branch Enforces Standards



## Water Quality Regulations Assessment and Updates

### No Revisions Since 2016 WMP

- Groundwater Rule
- Disinfection Byproducts Rule

### Revised Since 2016 WMP

- Revised Total Coliform Rule
- Lead and Copper Rule

### Emerging Contaminants / New Regulations

- Hexavalent Chromium
- Per- and polyfluoroalkyl substances (PFAS)
- Unregulated Contaminant Monitoring Rule
- Contaminant Candidate List



## Regulations with No Revisions

### Groundwater Rule

- Last Revised in 2006
- Targets Pathogens
  - e.g., E. coli

### Disinfection Byproducts Rule

- Last Revised in 2005
- Targets Treatment Byproducts
  - e.g., haloacetic acids





## Regulations with Revisions

### Total Coliform Rule (RTCR)

Effective April 1, 2016

---

- Total coliforms used as an indicator of potential pathogens
- 
- Focus on E. coli as a direct health risk



## Regulations with Revisions

### Total Coliform Rule (RTCR)

Effective April 1, 2016

---

- |   |   |  |
|---|---|--|
| ■ Total coliforms used as an indicator of potential pathogens | ➡ | ■ Focus on E. coli as a direct health risk   |
| ■ Compliance required for all public water systems            | ➡ | ■ Expanded monitoring and corrective actions |



## Regulations with Revisions

### Total Coliform Rule (RTCR)

Effective April 1, 2016

---

- |   |   |   |
|---|---|---|
| ■ Total coliforms used as an indicator of potential pathogens           | ➡ | ■ Focus on E. coli as a direct health risk                |
| ■ Compliance required for all public water systems                      | ➡ | ■ Expanded monitoring and corrective actions              |
| ■ Maximum contaminant levels (MCLs) and treatment techniques set by EPA | ➡ | ■ Refined MCLs & treatment techniques for improved safety |



## Regulations with Revisions

### Revised Total Coliform Rule (RTCR)

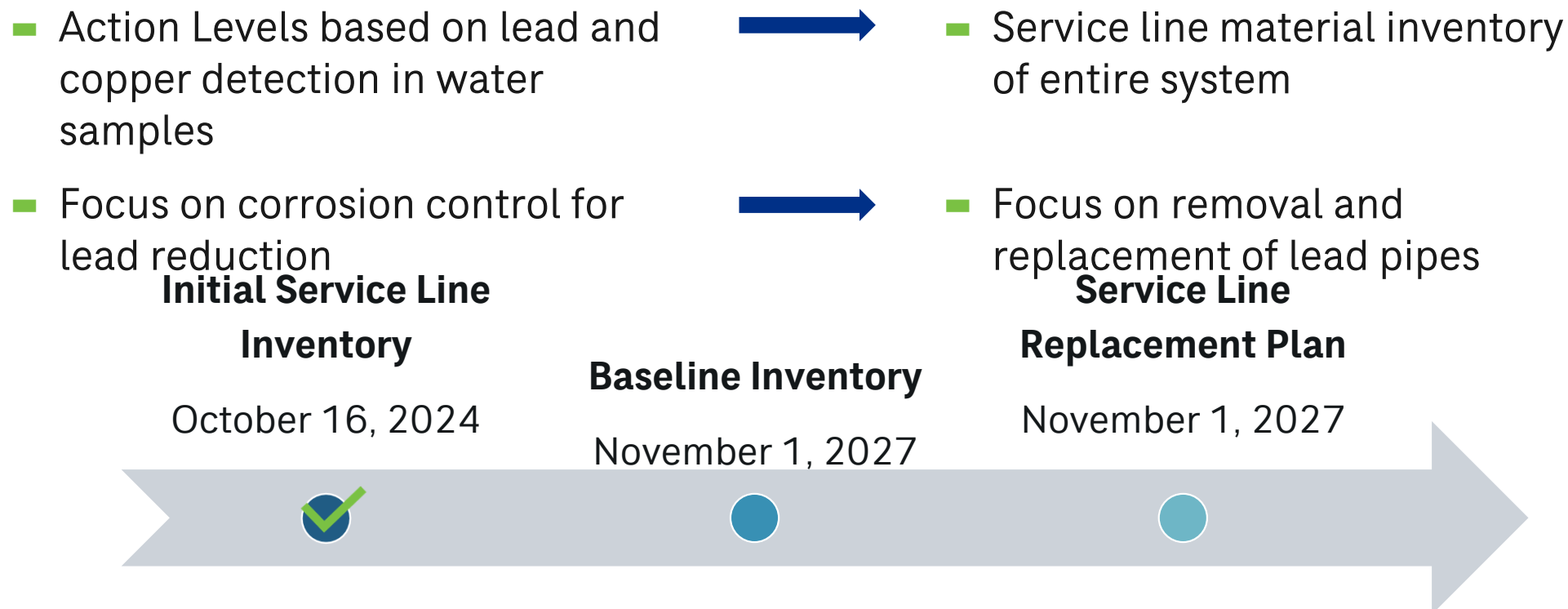
Effective April 1, 2016

---

- |   |   |   |
|---|---|---|
| ■ Total coliforms used as an indicator of potential pathogens           | ➡ | ■ Focus on E. coli as a direct health risk                |
| ■ Compliance required for all public water systems                      | ➡ | ■ Expanded monitoring and corrective actions              |
| ■ Maximum contaminant levels (MCLs) and treatment techniques set by EPA | ➡ | ■ Refined MCLs & treatment techniques for improved safety |
| ■ Assessment and corrective action required if contamination detected   | ➡ | ■ New Sample Siting Plan requirements                     |

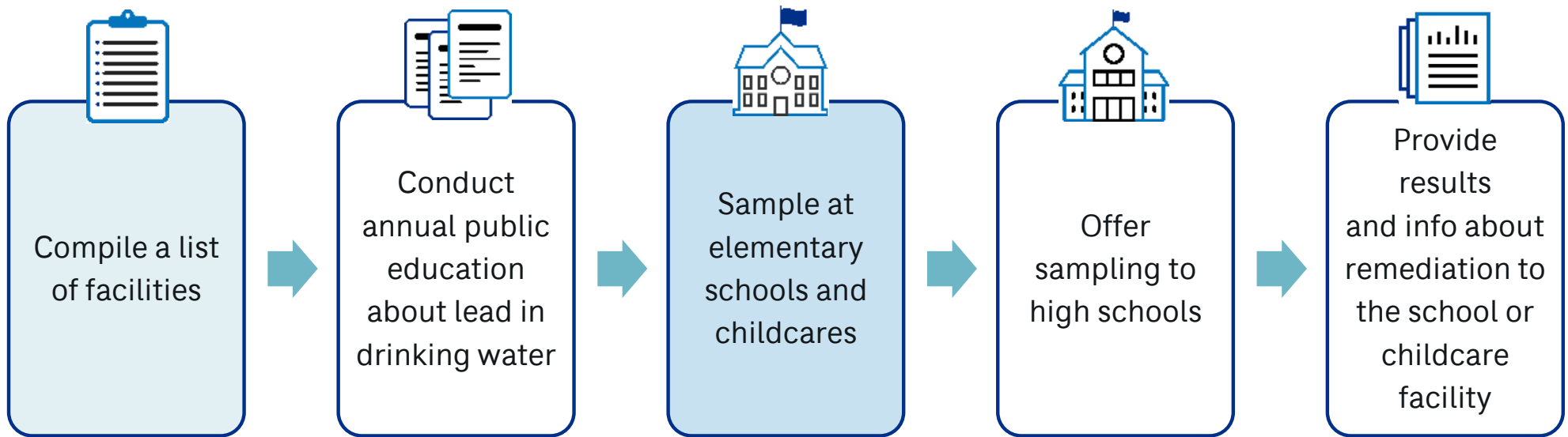
## Regulations with Revisions

### Lead and Copper Rule Revisions (LCRR) Lead and Copper Rule Improvements (LCRI)





## Revised: LCRR/LCRI Schools and Childcare Facilities



### Compile a Facility List by October 2027

- All schools and licensed childcare facilities served by the community water system and constructed before January 1, 2014

### Required Sample Frequency

- Minimum 20% of elementary schools and 20% of childcare facilities annually
- All elementary schools and childcare facilities must be sampled at least once by 2032

## Emerging Contaminants / New Regulations

### Hexavalent Chromium (Chromium-6)

#### Potential for New Regulation



Hexavalent Chromium occurs naturally from the erosion of natural chromium deposits and can also be produced by industrial processes.



The maximum contaminant level (MGL) for **total** chromium is 0.1 mg/l or 100 ppb.



Currently there is no MCL for **hexavalent chromium**, however:

EPA is currently developing an Integrated Risk Information System (IRIS) assessment

California has set an MCL of 0.010 mg/l, effective October 1, 2024

# Emerging Contaminants / New Regulations

## Per- and polyfluoroalkyl substances (PFAS)

Emerging Contaminant / New Regulation



PFAS are long lasting chemicals that break down very slowly over time.

**Aka. “Forever chemicals”**



PFAS has been found in the blood of humans and animals, many food products, and the environment.



EPA has established the first-ever nationwide, legally enforceable drinking water PFAS standards.



The 2026 WMP discuss how BWS is addressing and testing for PFAS, and a summary of BWS sampling results.

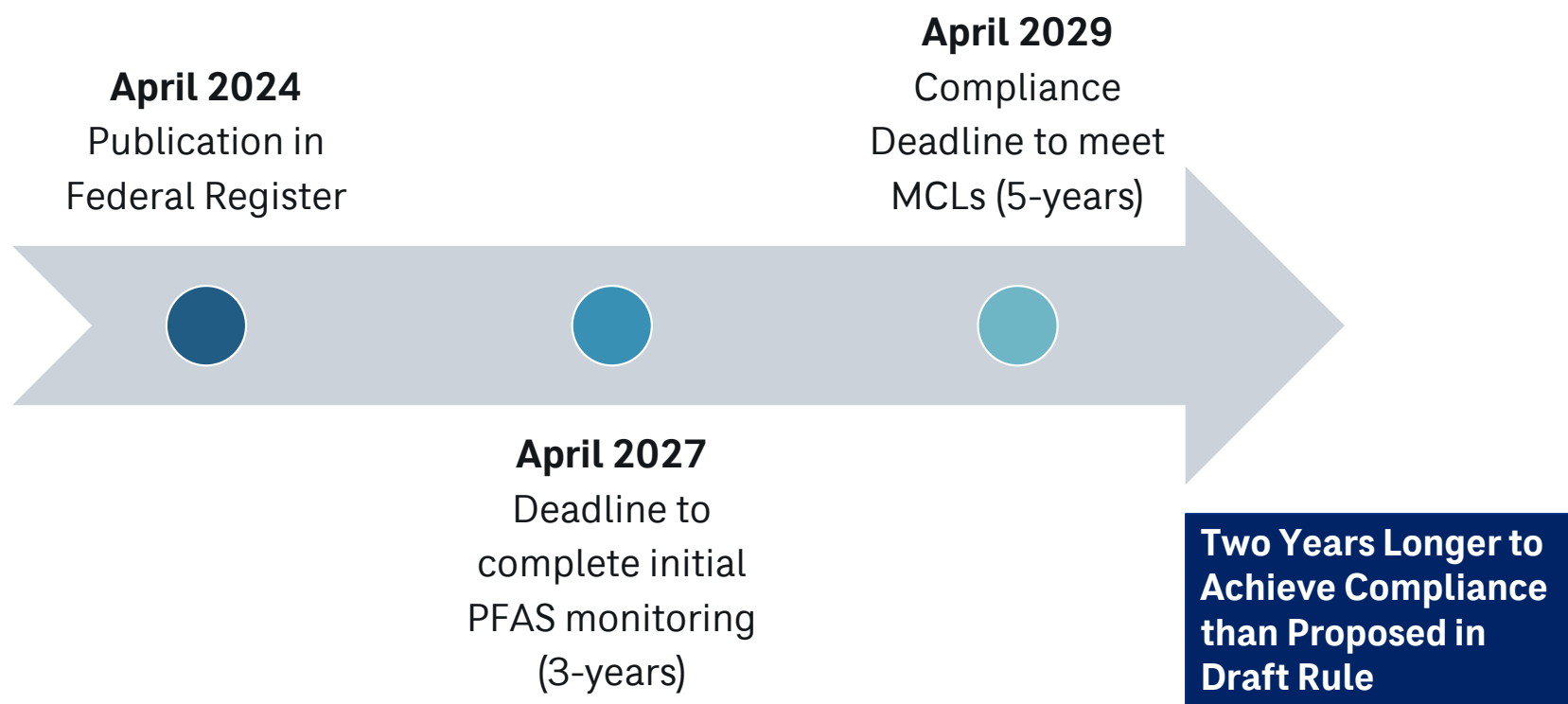


<https://a2independent.com/wp-content/uploads/Products-Containing-PFAS.jpeg>

# Emerging Contaminants / New Regulations

## Per- and polyfluoroalkyl substances (PFAS)

Final EPA National Primary Drinking Water Regulations





## Emerging Contaminants / New Regulations

### Per- and polyfluoroalkyl substances (PFAS)

#### Final EPA National Primary Drinking Water Regulations

---

Parameter	Maximum Contaminant Level Goal (MCLG)	Maximum Contaminant Level (MCL)
PFOA	0	4.0 ppt
PFOS	0	4.0 ppt
PFNA	10 ppt	10 ppt
PFHxS	10 ppt	10 ppt
GenX (HFPO-DA)	10 ppt	10 ppt
Mixture of 2 or more: PFNA, PFHxS, GenX, PFBS	Hazard Index (HI) of 1	HI of 1

ppt: part per trillion





## Emerging Contaminants / New Regulations

### Per- and polyfluoroalkyl substances (PFAS)

#### Final EPA National Primary Drinking Water Regulations

---

#### Initial PFAS Monitoring Required within Three Years of Rule

- Quarterly samples at all points of entry to distribution system
- Previous monitoring results may be used (e.g., UCMR5 monitoring)

#### Compliance

- Compliance required within **five years** of the rule
- Compliance based upon running annual average of quarterly samples
- Demonstrated low PFAS concentrations qualify for reduced monitoring

## Environmental Investigation of Emerging Contaminants (EIEC) Project

### BWS is addressing High Priority Issues to meet EPA's 2029 Enforcement Date:

- Currently, no known sites with PFAS compound detection above the EPA MCL
- BWS is taking a proactive approach by initiating treatment system implementation



Temporary water treatment at sites with elevated risk of PFAS contamination



Pilot testing of treatment media



Design of permanent water treatment



Evaluating residuals management needs and options



## Environmental Investigation of Emerging Contaminants (EIEC) Project

### Island-wide PFAS Management Plan:



Developing a framework for strategic decision making around PFAS and other emerging contaminants



Performing initial island-wide risk screening based on known PFAS “Potential Contaminating Activity” sites and the potential to impact BWS well sources



Researching and identifying potential Federal funding sources for EIEC activities to offset BWS costs

## Contaminant Candidate List (CCL)

- Lists contaminants known or likely to occur in public water systems but not currently regulated by the EPA
- Available on the EPA website, updated every 5 years
- EPA currently working on draft CCL 6, expected to be published in 2027

## Unregulated Contaminant Monitoring Rule (UCMR)

- Used by the EPA to collect data on contaminants in drinking water not covered by the Safe Drinking Water Act
- Contaminants are selected based on scientific consultation and public input
- EPA collaborates with public water systems to test for unregulated contaminants and determine if these need regulatory action



# CONDITION ASSESSMENT

Carl Lundin, PE  
CDM Smith  
April 17, 2025





## Today's Discussion:

Review how condition assessment was conducted for 2016 WMP



Accomplishments and changes since 2016

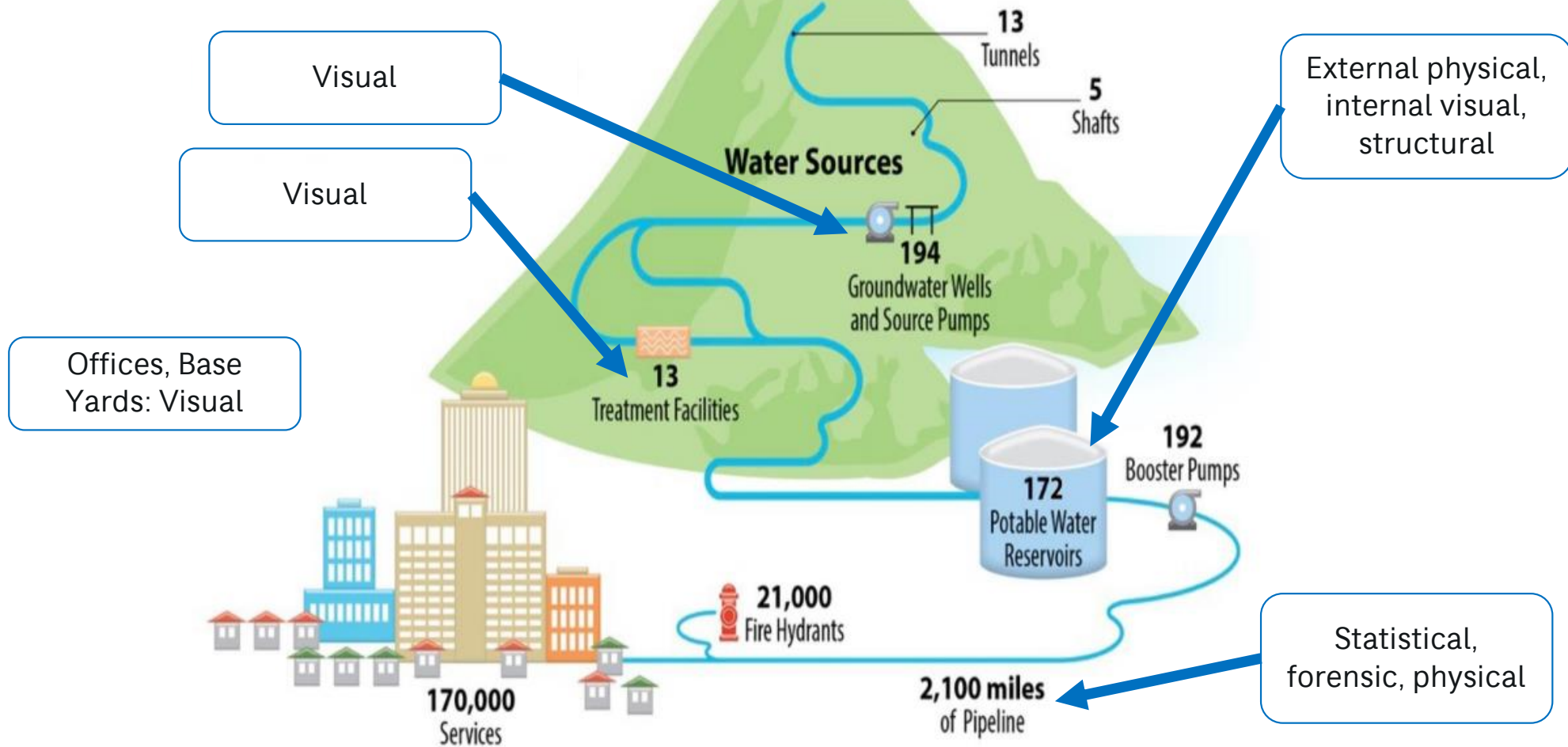


Our plan for condition assessment as part of the WMP Update



Timeline going forward

# 2016 Condition Assessment Inspections



## Pipelines – 2016 Inspection Methods

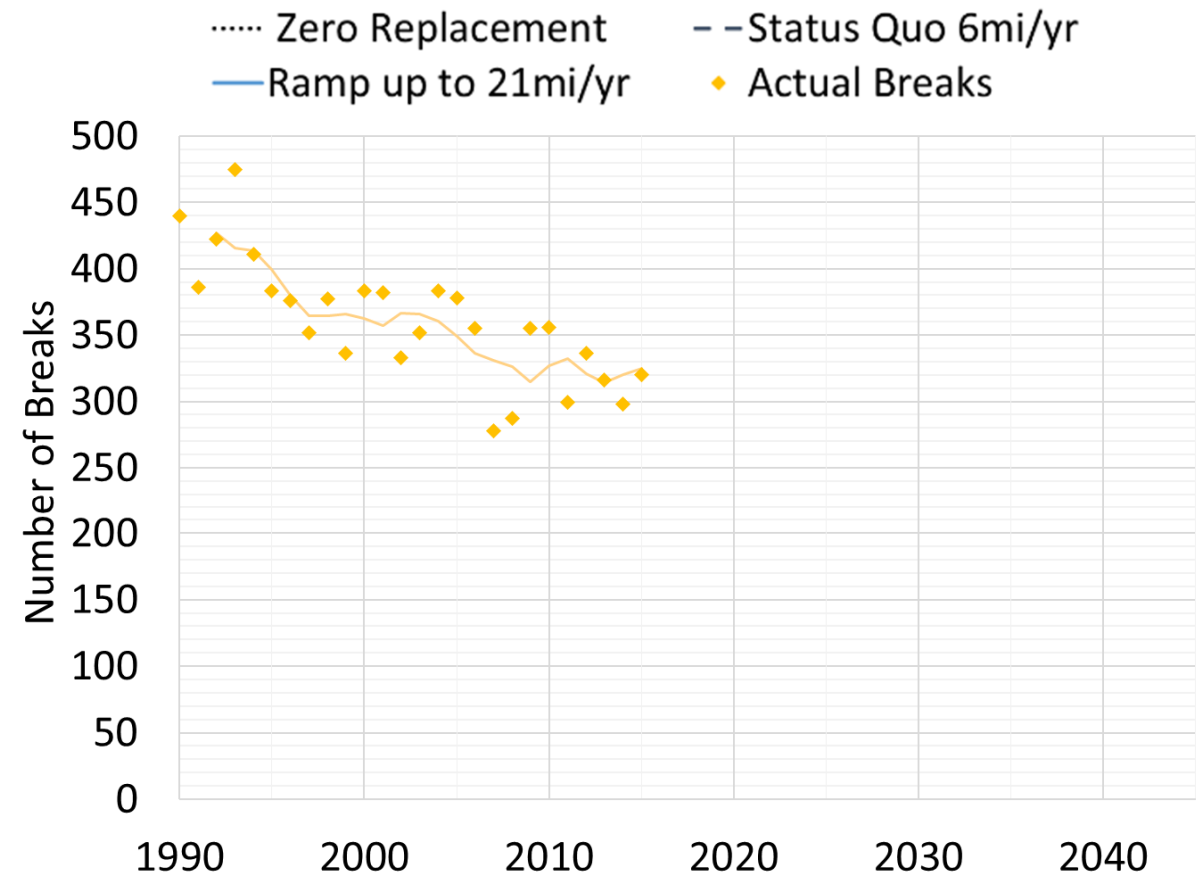
- Statistical: Data model predicting break likelihood
- Forensic: Sandblasted recovered pipes
- Physical: Pipe insertion/hydrophone inspection (SAHARA2, SmartBall, Ecologics)





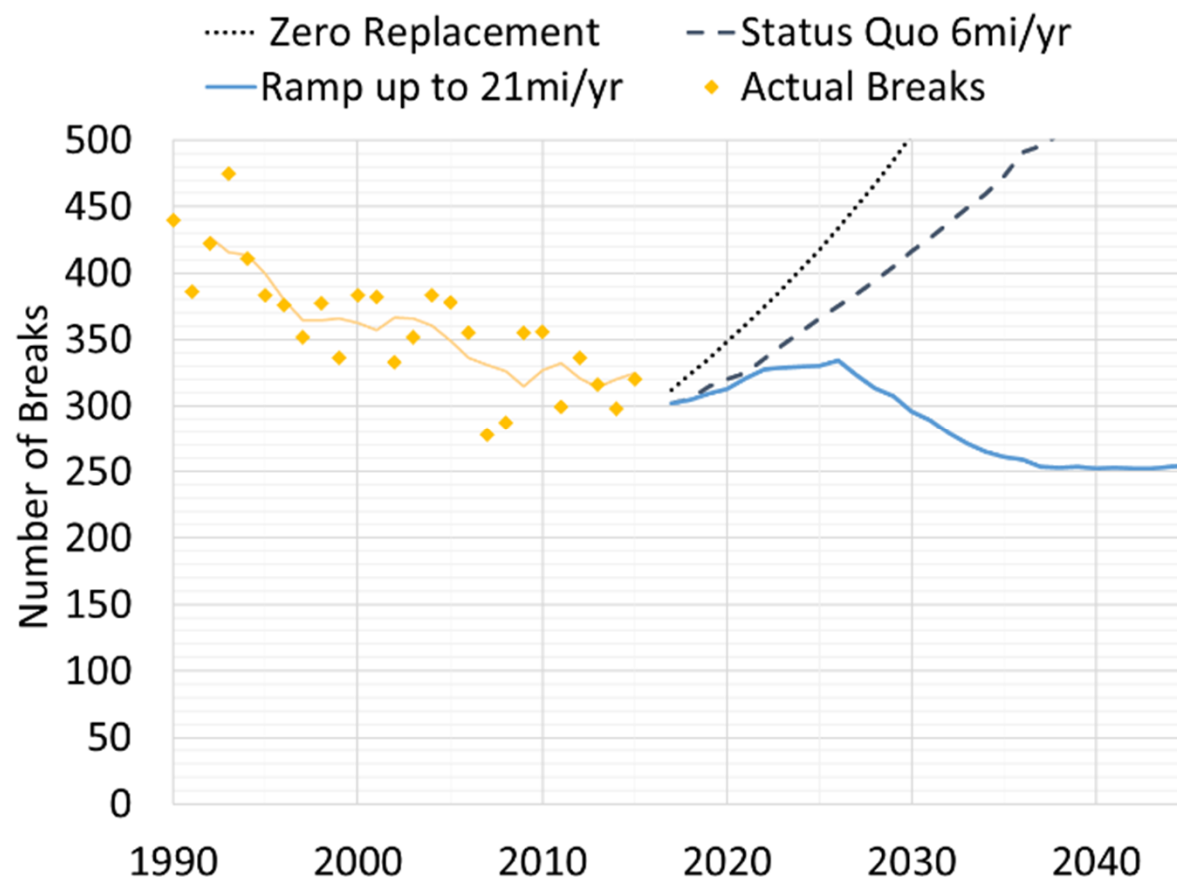
## Pipelines – 2016 WMP Findings

- Main breaks were on the decline
  - just over 300 per year (about half the national average)



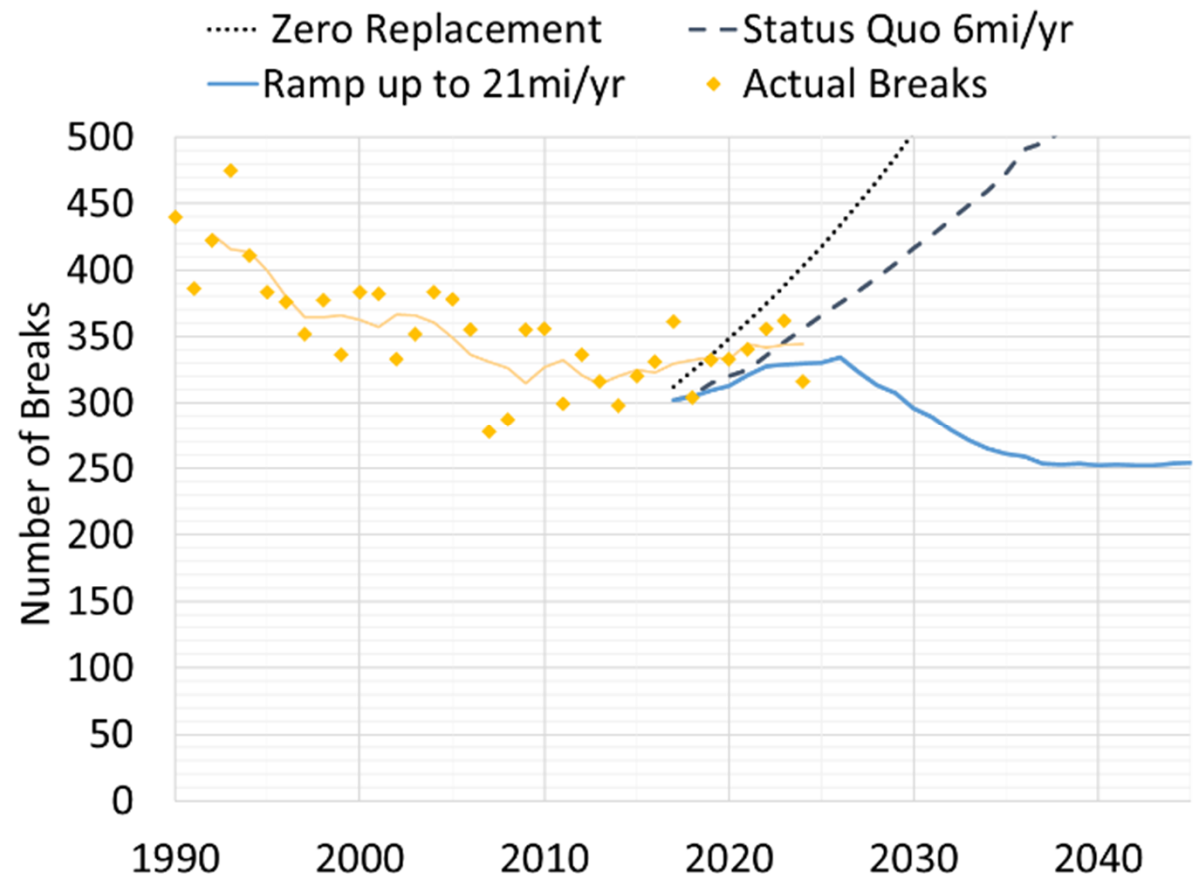
## Pipelines – 2016 WMP Findings

- Main breaks were on the decline
  - just over 300 per year (about half the national average)
- However, increasing the rate of pipe replacement would be necessary to prevent the number of main breaks from increasing.



## Pipelines – Since 2016...

- Driving to increase pipe replacement, however, has been difficult
- Updated and expanded statistical risk model
- Further developed pipe leak detection methods using Asterra Satellite leak detection





## Pipelines – WMP Update

- Ongoing updates to risk-based replacement prioritization
- Build in climate impact analysis



## Reservoirs – 2016 Methods and Findings

### ■ 2016 Methods:

- Non-destructive external physical inspection: 168 tanks
- Internal submersible ROV visual inspection: 30 tanks
- Structural analysis: Each type of tank

### ■ 2016 Findings:

- 94% of reservoirs needed no or minor work
- 7 high-priority projects based on inspections were added to the CIP





## Reservoirs – Where repairs were needed...

- Foundation Slab and Seals
  - Leaks, large cracks, concrete deterioration, and vegetation growth
- Walls
  - Leaks, spalled concrete, hollow sounding concrete, and large cracks
  - Condition of coating system
- Roof
  - Cracking, Ponding, Topping, Hatches, etc
- Reservoir Site
  - Vegetation/Landscaping, on site roadway, access roadway, perimeter fencing



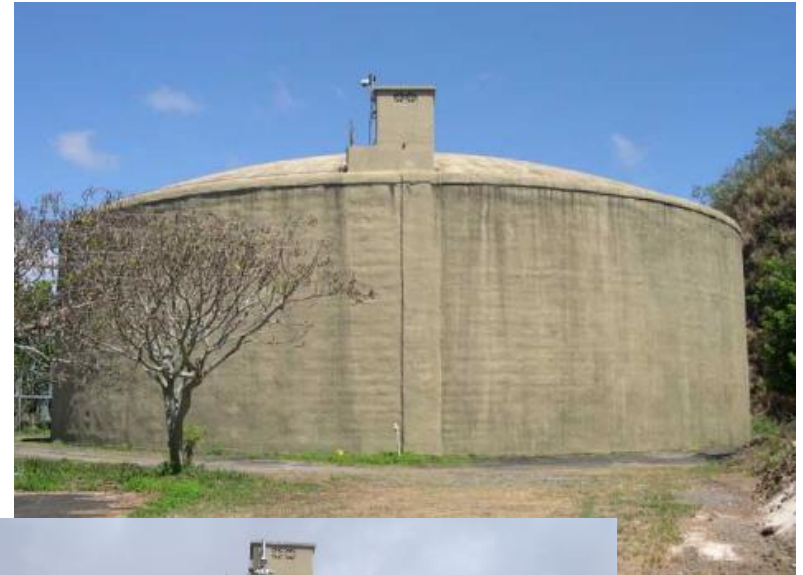
## Reservoirs – Since 2016

- All 7 tanks identified in the 2016 WMP with observable structural condition issues have been repaired or are currently undergoing repair.



## Reservoir – WMP Update Methods

- Recalibrate rate of decay for potable water storage tanks
- Evaluate the success of repairs identified in the 2016 Condition Assessment
  - Were repairs (methods and materials) successful?
  - What lessons learned can be obtained from inspecting the repairs?
  - Did the repairs “reset” the rate of decay?
- Evaluate innovative inspection methods



2005



2014

## Reservoir – Update Inspection Methods

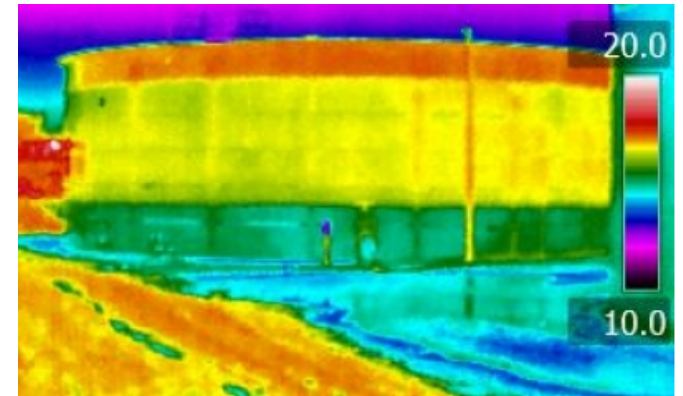
### ■ Visual Inspection

- Utilize ladders and bucket truck to inspect full wall heights and to provide access to the roof
- Sounding of concrete to identify delaminated areas or areas of deterioration

### ■ Cameras fitted with photogrammetry technology

### ■ Drone with visual and thermal cameras

- Determine if drones can be used to conduct future condition assessment inspections.



(pictures are not BWS infrastructure)



## Other Facilities - 2016 WMP Methods and Findings

- Pump Stations – Visual Inspection:
  - 82% of pumps were in good condition.
  - 18% needed repair and the goal was to get below 10% in need of repair.
- Treatment – Visual Inspection:
  - Some facilities were in need of maintenance due to corrosion, however they were functioning well.
- Facilities – SCADA, models, tools:
  - Robust planning and operational tools have been developed and should be maintained.





## Other Facilities – Since 2016 and WMP Update

### Since 2016

- Pump Stations:
  - Maintaining sufficient pumps available for use (Scorecard update in progress)
- Treatment:
  - Sites with high-priority maintenance needs are being addressed
  - Treatment equipment condition assessment update is ongoing
- Facilities:
  - Tools have been maintained and improved

### WMP Update

- Pump Stations:
  - Evaluate for new risks due to climate impacts
- Treatment:
  - Evaluate with respect to changing conditions, regulations, and climate impacts
- Facilities:
  - Opportunities to maintain and improve the planning and analysis tools to guide effective decision-making

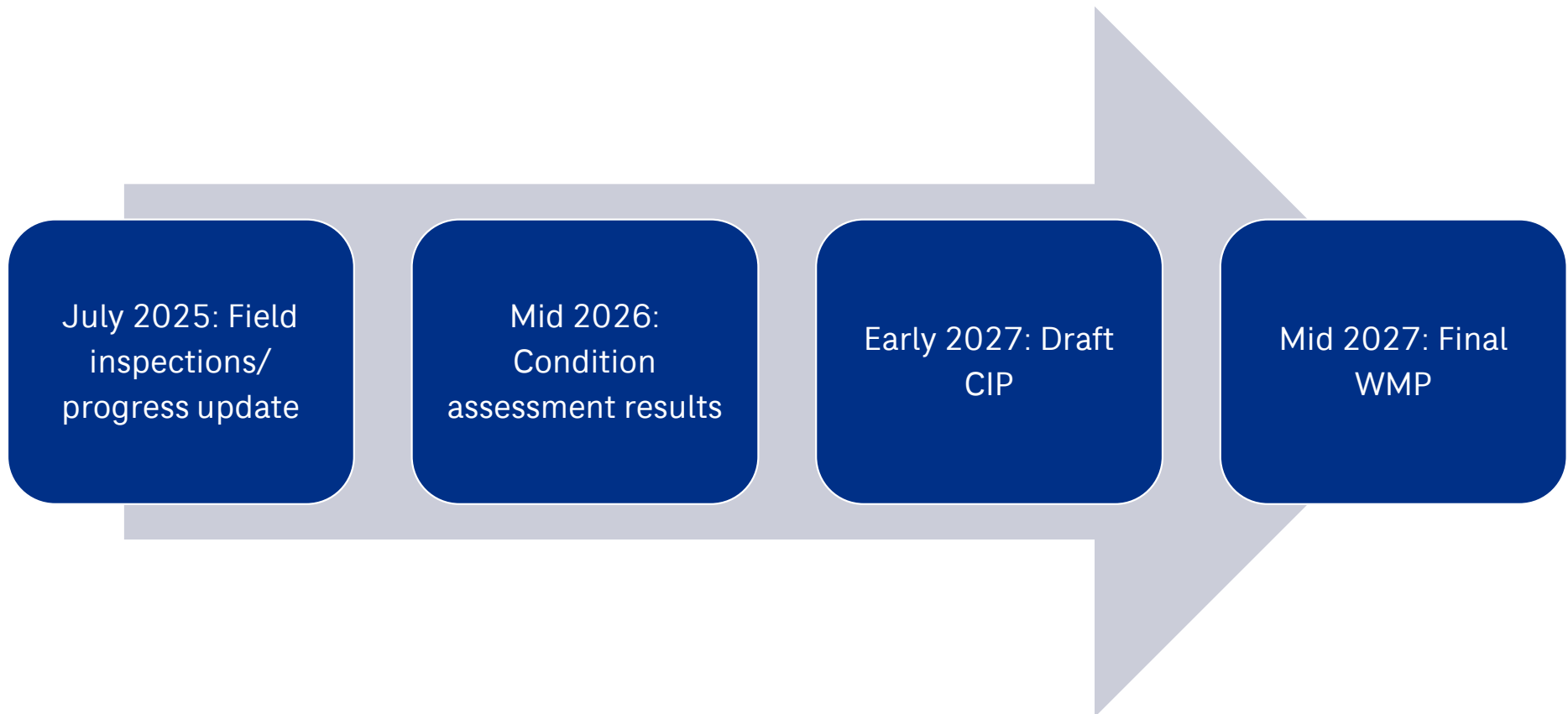
## Overlaying Condition, Climate, and Criticality for Inspections

- Climate models to identify vulnerable infrastructure
- Looking at sea level rise, inland flooding, hurricane/high wind, and wildfire vulnerabilities
- Climate Model results will be incorporated into a GIS Map with BWS facilities.
  - Use to identify vulnerable locations
  - Inspection at up to 20 locations
  - Develop preliminary design of mitigation for vulnerable facilities





## Timeline for Condition Assessment Stakeholder Group Updates



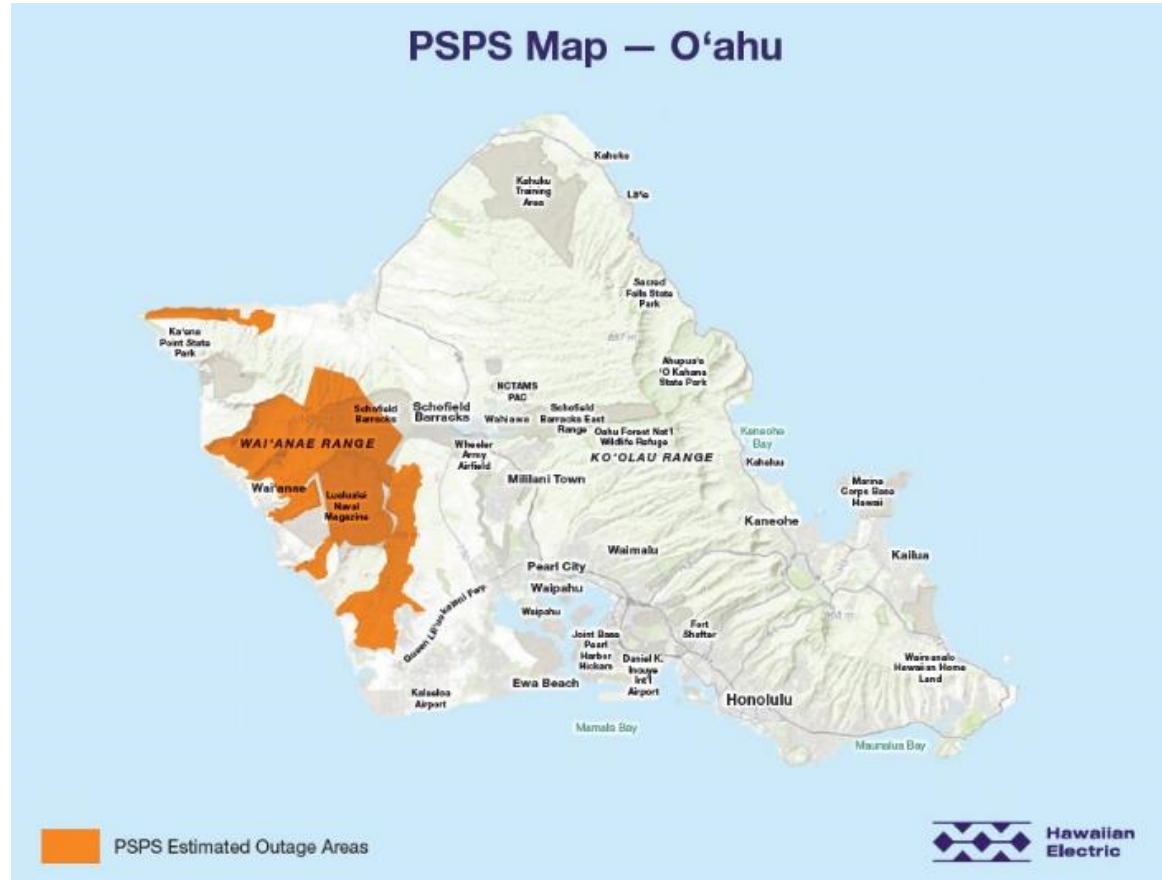




# WILDFIRE EMERGENCY PLANNING

Mike Cubas  
CDM Smith  
April 17, 2025

# Hawaiian Electric's Public Safety Power Shutoff



## Presentation from SAG Meeting 51 (July 2024)



# The Lahaina and LA Fires

## Lahaina Fire

- Deadliest U.S. Wildfire in more than 100 years
- 70+ mph winds, stoked by offshore hurricane
- 102 deaths with 2,207 structures destroyed

## LA Fires

- Severe drought in So-Cal (driest 9-month period on record), and a wind event with gusts up to 80 mph
- Palisades: 7 deaths and 6,837 structures destroyed (1,017 damaged)
- Eaton: 18 deaths and 9,418 structures destroyed (1,071 damaged)



Homes burned near Pacific Coast Hwy in Malibu

<https://www.azcentral.com/picture-gallery/news/nation/2025/01/09/greater-los-angeles-wildfires-palisades-fire-eaton-fire/77577189007/>

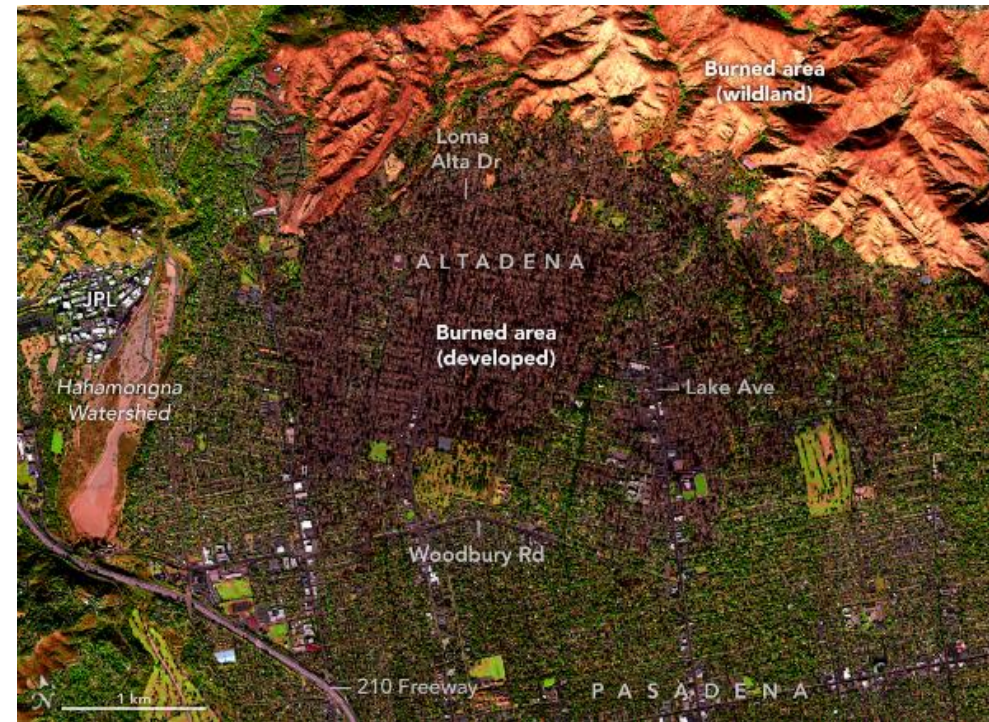
# The Lahaina and LA Fires

## Lahaina Fire

- Deadliest U.S. Wildfire in more than 100 years
- 70+ mph winds, stoked by offshore hurricane
- 102 deaths with 2,207 structures destroyed

## LA Fires

- Severe drought in So-Cal (driest 9-month period on record), and a wind event with gusts up to 80 mph
- Palisades: 7 deaths and 6,837 structures destroyed (1,017 damaged)
- Eaton: 18 deaths and 9,418 structures destroyed (1,071 damaged)



Areas burned by the Eaton Fire

By NASA Earth Observatory images annotated by Lauren Dauphin using data from Airborne Visible / Infrared Imaging Spectrometer-3 (AVIRIS-3) instrument, via NASA Earthdata Search. - <https://earthobservatory.nasa.gov/images/153821/eaton-fire-leaves-california-landscape-charred>, Public Domain, <https://commons.wikimedia.org/w/index.php?curid=158212381>

**Urban Conflagration** – Building to building spread through embers carried by extreme wind speeds



# Water System and Response Challenges

## Water System Challenges

- “The urban system was never designed for wildfires like Palisades or Eaton; It was designed for smaller problems, like house fires.”
- Pumps running but system depressurized
  - “Many properties...water was spewing out of their melting pipes”
  - “No power was lost to LADWP pump stations during the fire, and water supply remained strong to the area. Water pressure in the system was lost due to unprecedented and extreme water demand to fight the wildfire without aerial support.”
- “The need to maintain pumping capability has made it difficult to shut off power when high winds pose a fire risk”

<https://www.nytimes.com/2023/08/13/us/lahaina-water-failure.html>  
<https://www.npr.org/2025/01/18/nx-s1-5262563/radio-traffic-la-fires-first-responders-water-shortage>  
<https://www.ladwpnews.com/pacific-palisades-fire-correcting-misinformation-about-ladwps-water-system/>







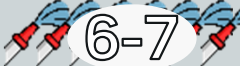






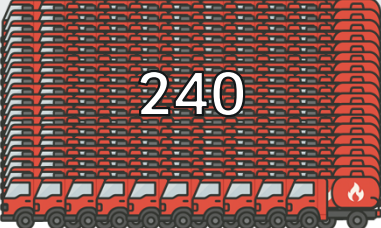
# Water System and Response Challenges

## Response Challenges

- “Not only did the wind fuel the blaze, it made it impossible...to launch helicopters...that drop water”
- When hydrants run dry, water tankers may have access issues – “As first responders tried to rush to the flames in Pacific Palisades, they had to fight through the throngs of people trying to use those same roads to evacuate.”
- “The firefighting crews were stretched thin as they battled three different conflagrations on the island”

<https://www.nytimes.com/2023/08/13/us/lahaina-water-failure.html>  
<https://www.npr.org/2025/01/18/nx-s1-5262563/radio-traffic-la-fires-first-responders-water-shortage>  
<https://www.ladwpnews.com/pacific-palisades-fire-correcting-misinformation-about-ladwps-water-system/>

# BWS Fire Fighting Infrastructure

Area	Fire Flow Criteria	 150 GPM  3,000 gallons
Residential – Single Family/Duplex	1,000 gallons per minute (GPM) for 1 hour	 6-7  20
Residential – Multi-family (townhouse/low-rise)	1,500 GPM for 1 hour	 10  30
Schools, neighborhood commercial, hotels, high-rise	2,000 GPM for 2 hours	 13  80
Light industrial, downtown, large commercial, hospital	4,000 GPM for 3 hours	 26  240

# BWS Fire Fighting Infrastructure

## Other Preparations:

- Emergency connections and pads for dip tanks
- Preparations for emergency shutoffs with Hawaii Wildfire Management Office and HECO



Ventura County, CA Dip Tank

**Professor Greg Pierce of UCLA: most water systems were designed for fighting urban fires, not fast-moving wildfires.\***

<https://www.nytimes.com/2025/01/09/us/los-angeles-fire-water-hydrant-failure.html>

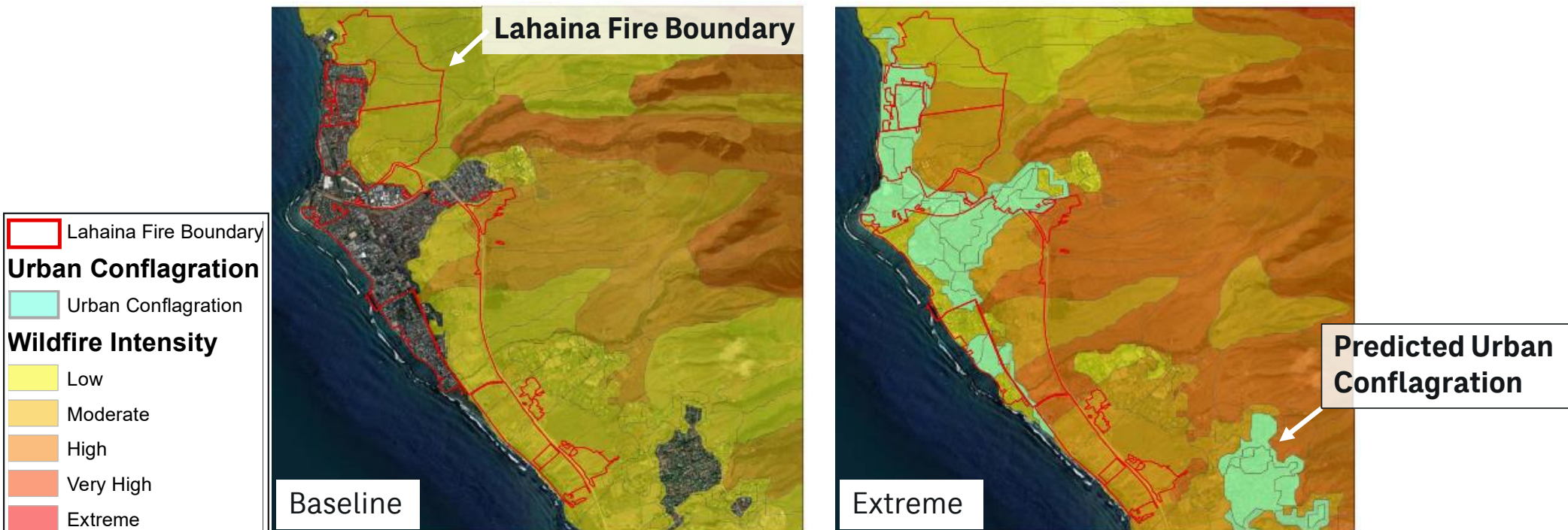


## Using Models to Evaluate Wildfire Risks

<b>Baseline Model</b> Typical wind and drought conditions when wildfires occur	<b>Extreme Model</b> Extreme drought and wind conditions (red flag advisory)
<b>Model Parameters</b>	
Frequency (likelihood) Community (infrastructure) Severity Damage (structures) Mitigation	
Suppression feasible	Suppression is overwhelmed

# Wildfire Extreme Model Predicts Urban Conflagration

## *Lahaina Fire, 2023*



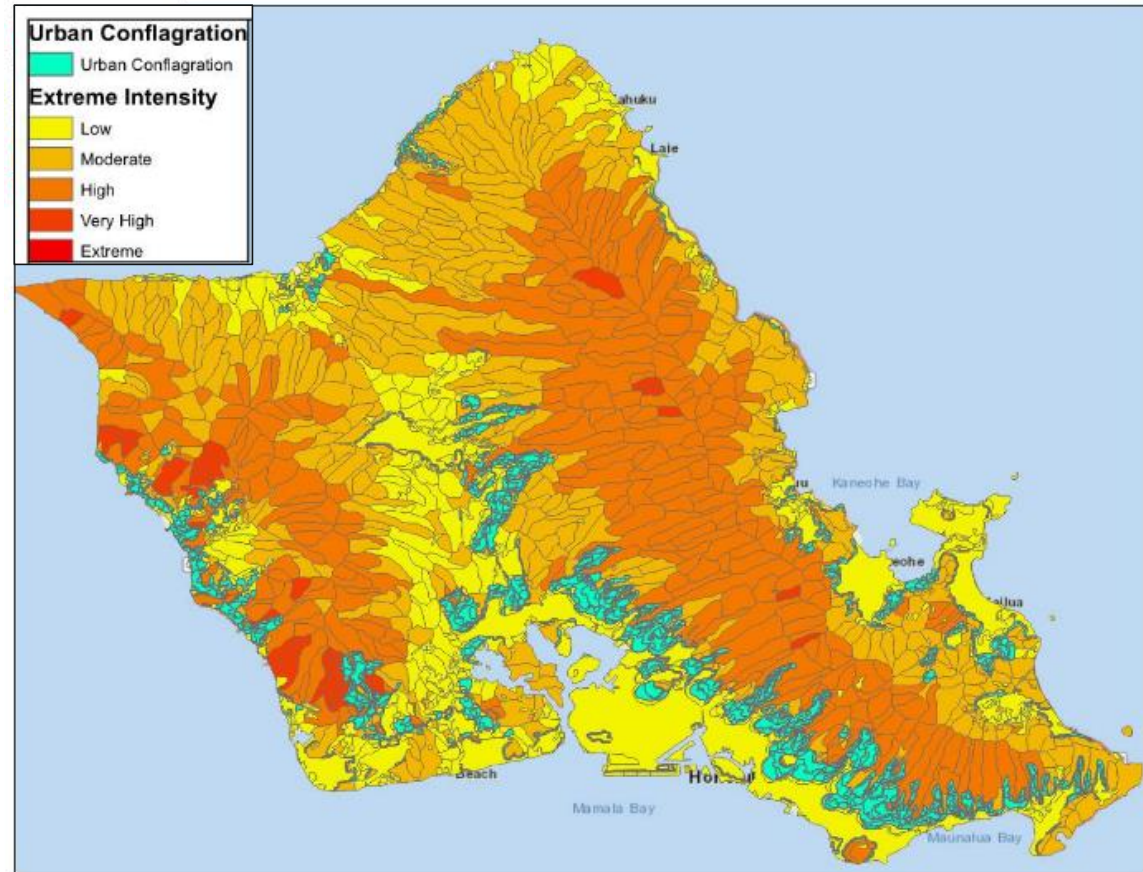
- Extreme fire weather: high winds, low relative humidity, and dry fuel (sustained drought)
- Fire is predicted to move faster and be more intense
- Embers will be more significant and fly further
- Urban Conflagration is possible



# Modeled Extreme Wildfire Event for O'ahu

- Polygons are firesheds
  - Areas with similar fire behavior (e.g., intensity, flame lengths)
- Model assumes a fire starts in every fireshed
  - Model shows extents of fire spread
- Blue is urban conflagration
  - Fire spread building to building via embers carried by wind

**We never know where a fire could start**



# Next Steps for Addressing Wildfire Risk

## Wildfire Response Plan

Meetings to prepare for planned HECO power shutoffs have been held

- Understand and coordinate with Honolulu Fire Department and Department of Emergency Management strategies
- Identify how BWS can support suppression of wildfire and urban conflagration events
- Identify response actions for:
  - Planned PSPS
  - Red flag advisories
  - Urban conflagration
- Pre-, during, and post- event actions



<https://www.npr.org/2025/01/18/nx-s1-5262563/radio-traffic-la-fires-first-responders-water-shortage>





# ACCEPT MEETING NOTES FROM MEETING 53

David Ebersold  
Facilitator

April 17, 2025

[www.boardofwatersupply.com](http://www.boardofwatersupply.com)

# UPCOMING STAKEHOLDER ADVISORY GROUP MEETINGS

- Thursday, July 17, 2025
- Thursday, October 16, 2025







# Mahalo!

Providing safe, dependable, and affordable  
drinking water, now and into the future.