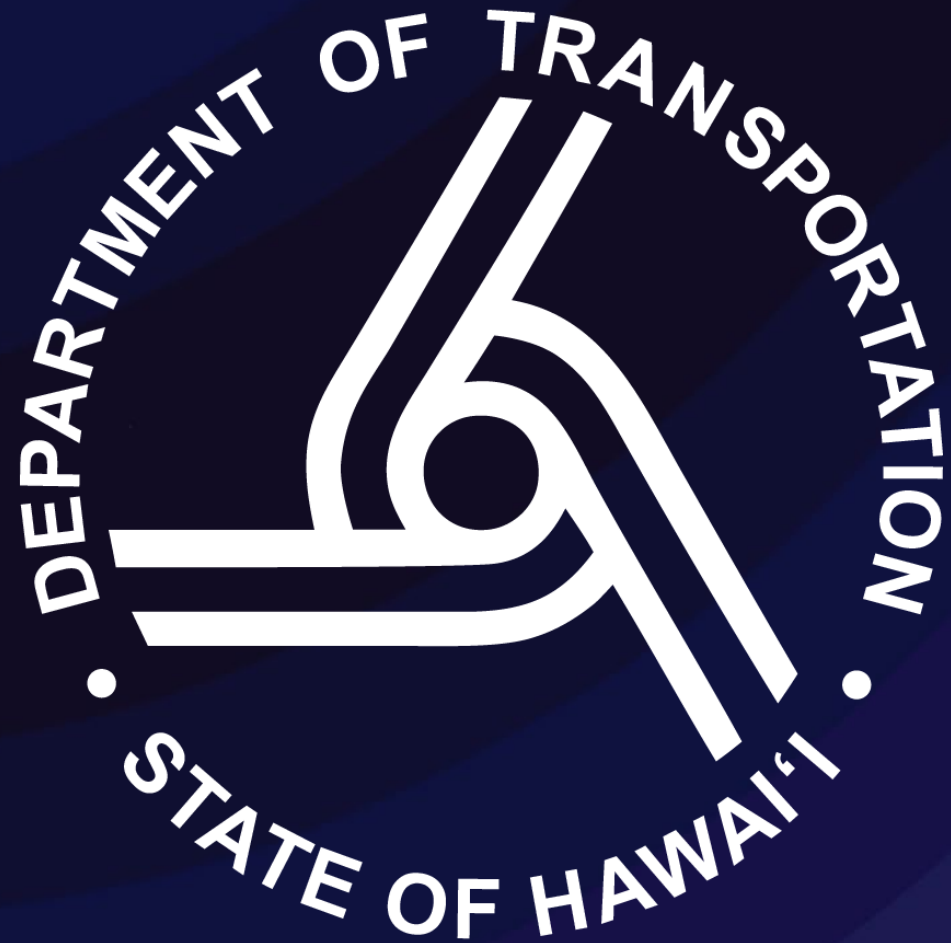


**PREPARING
FOR
EL NIÑO AND
OTHER
WEATHER
EVENTS**



HDOT Prep

What we do when we can prepare for an event expected within days:

- Coordination with the Hawai'i Emergency Management Agency (HIEMA)
- Presence in the State and County Emergency Operations Centers (EOCs)



Airports

- Emergency Plan Manuals
- Triennial exercises
- Preparedness actions such as runway checks, checking generators, and fueling/charging vehicles and equipment



Ports

- Coordination with U.S. Coast Guard on port closures
- Coordination with harbor users and tenants
- Preparation for vessel evacuations
- Securing of construction sites
- Prepare baseyards
- Fuel response vehicles



Highways

- Planning out alternative emergency routes
- Preemptively closing routes with known concerns
- Clearing culverts and drains
- Pre stationing equipment and fueling/charging

HDOT Response

Coordinated response actions to restore critical infrastructure



Airports

- Terminals do not shut down because in many emergencies they provide aid to stranded passengers
- Each airport has an Emergency Operations Center for centralized communications with airport stakeholders such as:
 - Maintenance
 - Medical
 - Crash Fire
 - Airport Sheriffs
 - Airport Security
 - Air Carriers
 - Airport Tenants
 - Administration



Ports

- Actions based on port conditions set by COTP
- Post disaster underwater assessments



Highways

- Crews to clear roads if conditions permit
- Post event:
 - Disaster assessments
 - Reopening routes based on prioritization (e.g., roads to hospitals, harbors, etc.)

HDOT Mitigation

What we do for our transportation system to make it more likely to bounce back following an event



Airports

- Safety Management System to identify and quantify potential hazards and risks and adopt processes to manage risk
- Fuel Fire Safety program with regular inspections for facilities



Ports

- Harden and elevate piers
- Remove derelict vessels
- Tabletop exercises
- Agreements and plans for post-event port re-opening and restoration of operations
- Legislation and policy development
- Improvements designed for redundancy and resilience



Highways

- Exposure assessments
- Resilience Policy
- Vegetation management
- Evacuation route planning



Airport Projects - HNL



HNL 8L PH2 (SM)

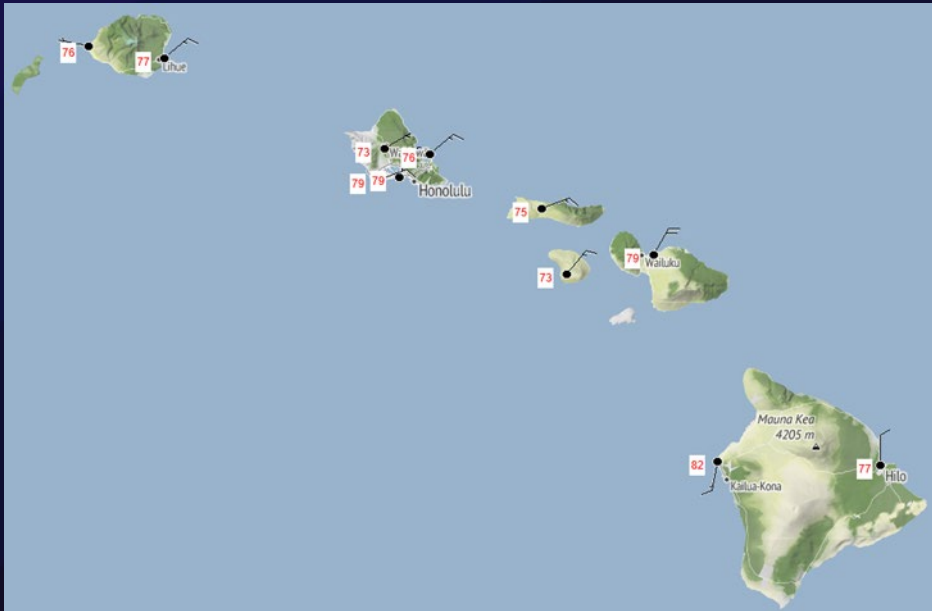
- Permanent roofing repairs to enhance long-term resilience.
- Expansion joint modifications to better handle heavy rains.
- Drain structure repairs to ensure proper water flow and prevent flooding.
- Airfield pavement repairs to maintain safe operations throughout the statewide airport system.
- High wind protection measures.

Harbor Projects – Port Digital Twin



- Project created real-time virtual replicas of commercial ports to:
 - Simulate sea level rise, flooding and storm surge scenarios
 - Facilitate assessment of impacts on infrastructure, logistics and supply chains
 - Support data-drive decisions for prioritization of capital improvement and emergency response
- Phase II - (Began Q3 2025)
 - Utility Z-values - storm drain, sewer, water, electrical
 - LiDAR of pier structures
 - Improving accuracy to survey grade

Highway Projects



- Purchasing 10 flood monitoring devices that will provide real-time data and imagery. These will be installed at our most critical flood locations.
- Clearing streams outside of our right of way to prevent overtopping at our bridges – Kaukonahoa Stream, Waikane Stream, Waiahole Stream and various streams on Molokai.
- Adding rockfall fencing at Waimea Bay.
- Repaired rockfall fencing and slope protection at various locations.

H-1 Resurfacing Miller St to Kapiolani Blvd

- Resurfacing of the H-1 Freeway between the Miller Street pedestrian overpass and the Kapiolani Boulevard interchange was completed between October 2023 - October 2024 in two phases (eastbound and westbound)
- Final phase of this project will resurface the associated cross and frontage streets
 - Ward Ave Overpass
 - Lunalilo Street
 - Keeaumoku Street Overpass
 - Punahou Street Overpass
 - Bingham Street between Punahou Street and Isenberg Street
 - McCully Street Overpass
 - Waiaka Road between Kapiolani Boulevard and Waiaka Place
- Est. completion is Fall 2027



Mahalo

HIEMA - Hurricane Home Retrofit Programs

COMMUNITY FORUM

JUNE 17, 2026



GREEN FEE: Residential Retrofit Pilot Program (HB1800 CD1)

- This Green Fee project is a statewide home retrofit and resilience initiative supported by a \$4.0 million Green Fee appropriation to reduce the risk of hurricane and high wind damage



Program Development

Develop Hawai'i-adapted wind retrofit program that meets national protective standards.



Household Assessments and Retrofits

Assess homes, identify priority mitigation measures, and support low-income households through retrofit and resilience upgrades.



Community Partners

Work with community-based organizations to expand outreach, improve participation, and implement multi-hazard risk reduction.



HIEMA

House Bill 2498 CD1

- **HIEMA-administered pilot program to help licensed care homes in central and leeward O‘ahu improve resilience against disasters, climate hazards, and prolonged outages**

Summary:

- Creates a pilot program to help eligible licensed care homes improve safety and continuity of care.
- Focuses on residents who may face the greatest risk during disasters, including kūpuna, people with disabilities, and medically fragile residents.
- Addresses threats identified during disasters: wind, heat, wildfire, and extended power disruptions.

Examples: roof strengthening, hurricane shutters, backup power, cooling, and air filtration.

1

Assess

Review each participating facility for structural, operational, and hazard risks.

2

Retrofit

Complete HIEMA-approved resilience upgrades that improve resident safety and continuity of care.

3

Prepare

Support preparedness measures, including continuity planning and evacuation planning for residents and employees.

4

Report

Track results so HIEMA can report the pilot program’s outcomes to the Legislature.

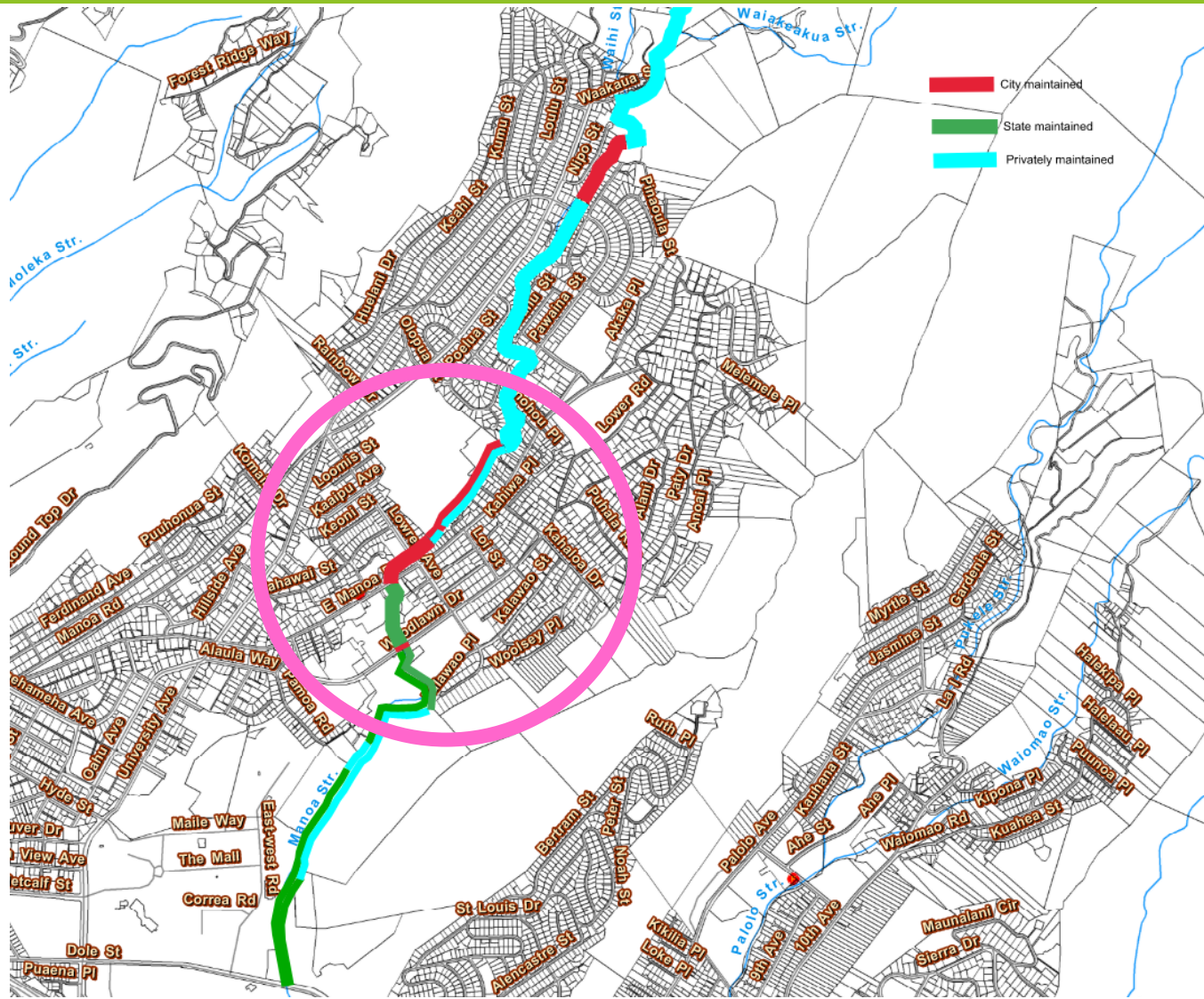
- **\$1,000,000 is appropriated from the general revenues of the State of Hawai‘i**
- **96797 (Waipahu), 96792 (Wai‘anae), and 96786 (Wahiawā)**



HIEMA



MANOA STREAM JURISDICTION





WOODLAWN AREA



-  City maintained
-  State maintained
-  Privately maintained

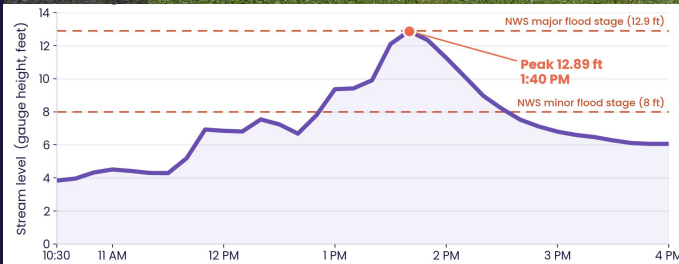


MĀNOA COMMUNITY FORUM

From Storm Lessons to Neighborhood Readiness

How local flood data can support Mānoa

Hohonu · Founded in Honolulu, Hawai'i



Source: USGS gauge 16241600 and NWS flood stages (NWS, gauge MNWH). Provisional data. Times HST.

What we'll cover

- 01** What we saw in the Kona Low
- 02** What local sensors add
- 03** Other real-world flood lessons
- 04** What it could mean for Mānoa, the island, and the state

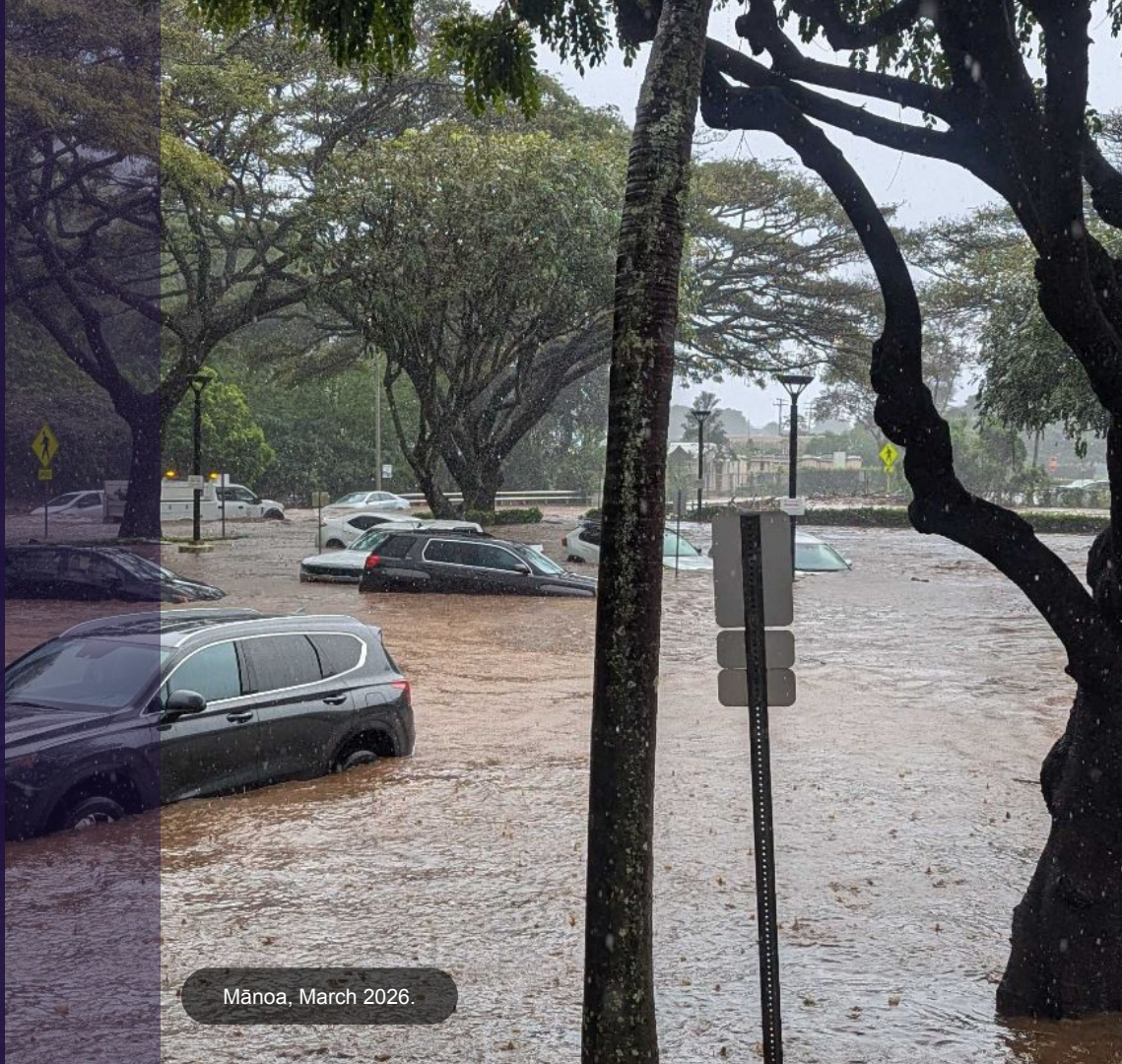


MĀNOA · MARCH 2026

Our parking lot during the Kona Lows

Two Kona Low storms flooded Mānoa and communities across O'ahu in a highly localized manner.

Someone on our team lost their car during the flooding.



Mānoa, March 2026.

The hard question during a storm

Forecasts answer one question. Response depends on another.

WHAT FORECASTS TELL US

“Heavy rain is possible.”

Important, but it does not tell you where water is on the ground.

WHAT RESPONDERS NEED TO KNOW IN THE MOMENT



Where is water rising right now?



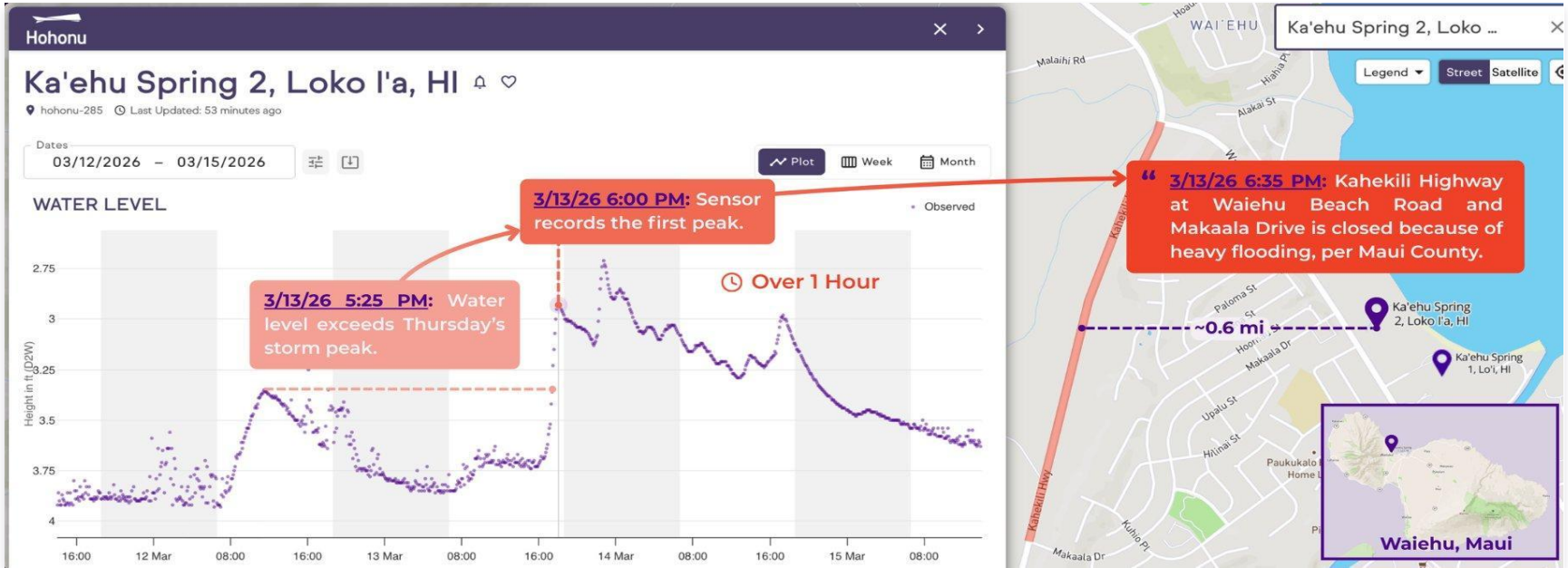
How fast is it rising?



When does it start to matter?

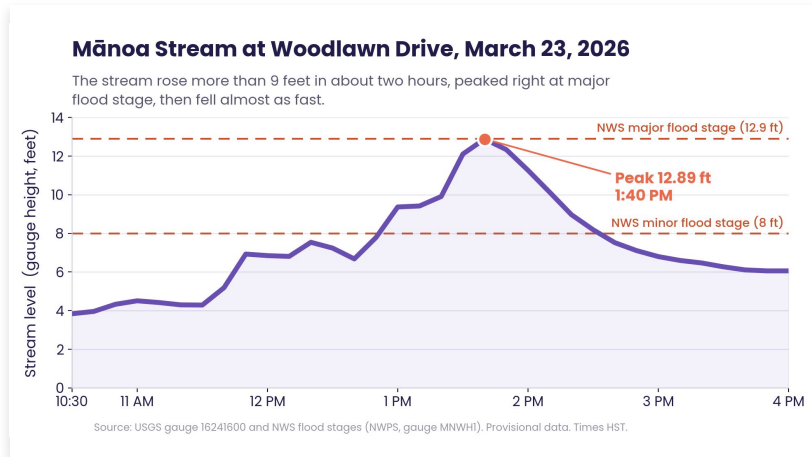
Local sensor on Maui detected rising waters

Ka'ehu, Maui — during the same March storms, water rose at the sensor over an hour before a nearby highway was closed for flooding.



Ka'ehu Spring 2, Loko I'a, HI. The road closure ~0.6 miles away was reported to Maui County more than an hour after the sensor's first peak.

Federal gauges are the backbone. Local sensors add the neighborhood picture.



First surge ~11:45 AM, peaked at ~1:40 PM, and fell back below minor flood stage by about 2:30.

The future is about connecting federal gauges and local sensors for improved situational awareness



What a local network adds alongside existing systems

- Earlier visibility** — upstream or nearby sensors can show water building before the main problem location peaks.
- Infrastructure diagnosis** — show when water is backing up abnormally, which may indicate debris issues
- After-action evidence** — quantify how fast water rose, how long it stayed high, how that lined up with reports, closures, and field response.

THE SIMPLE IDEA



Forecasts

tell us what may happen



Local sensors

show what is happening



Thresholds

turn data into action

What this looks like in practice

Small, self-contained sensors deployed at known flood points



OVER WATER

Kāneʻohe, Oʻahu



OVER LAND

Boston, MA

- Installs in minutes on a rail, pole, or bridge, right where flooding shows up.
- Solar and cellular, so a new site needs no wiring or construction.
- Feeds the same dashboards and partner tools agencies already use.

All Sensors Built in Mānoa

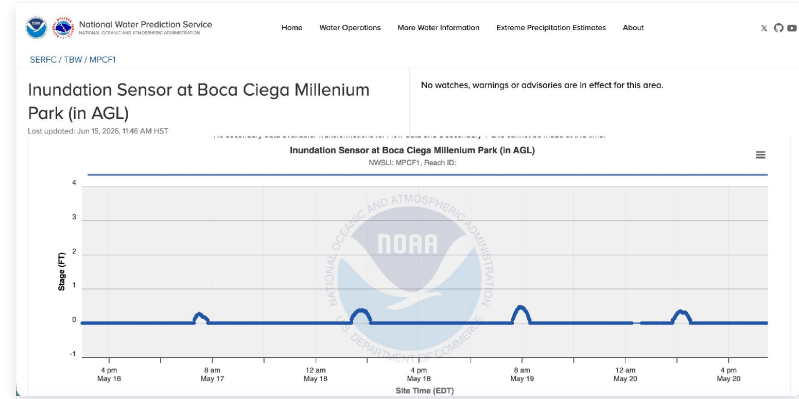
The same picture, on every screen.

One network, many views, so the right people can watch from wherever they already work.



IN HOHONU'S TOOLS

phone, web, and public map



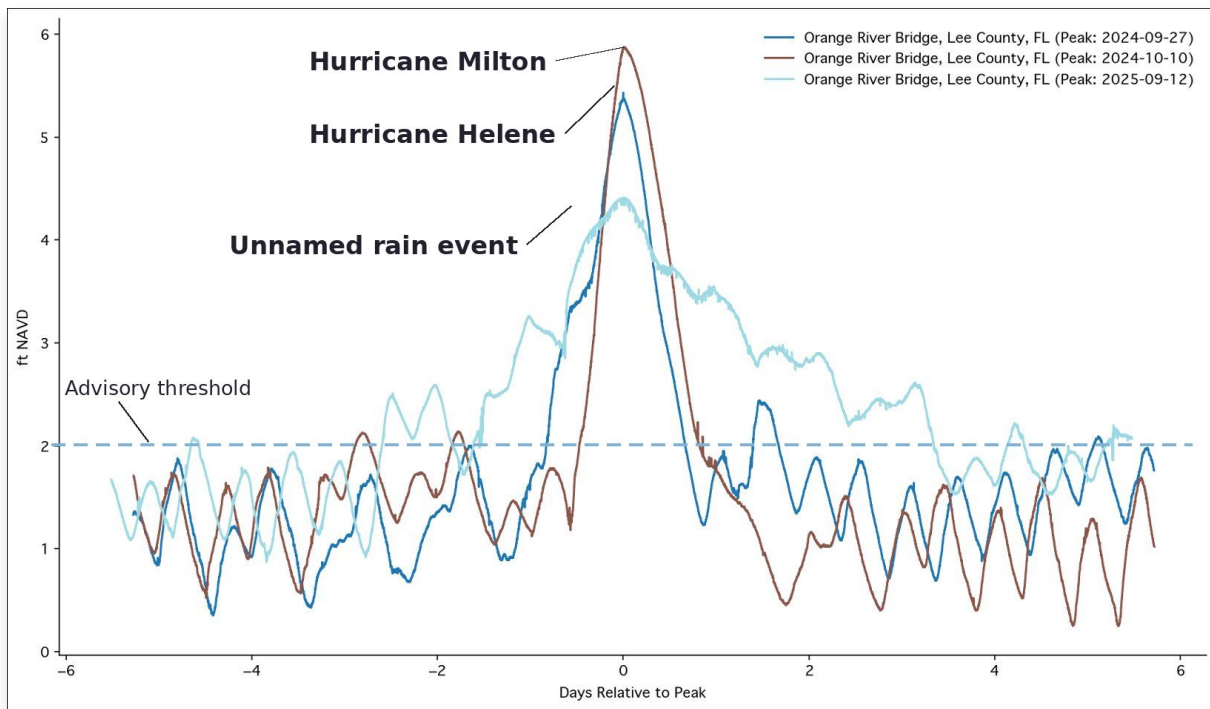
IN OTHER PLATFORMS

example: NOAA's National Water Prediction Service

- Phone, browser, or public map
- Ported into tools you already use
- **Defining thresholds that inform action**

People are always at the center of decision-making

Lessons Learned: unnamed storms hit as hard



THE LESSON

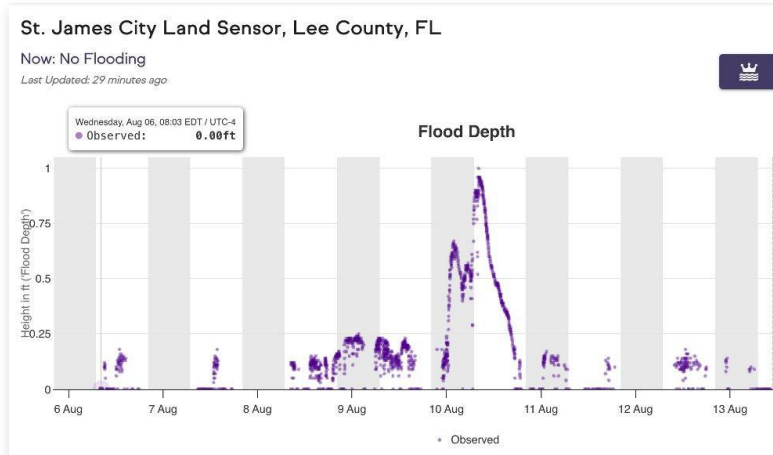
An unnamed rain event matched Helene and Milton, and stayed high for days.

The same pattern as our Kona Low: serious flooding can come from a storm, after people think the worst has passed.

Orange River Bridge gauge, Lee County, FL. Hurricanes Helene and Milton and a 2025 unnamed rain event, each lined up to its own peak.

Lessons Learned: when minutes matter

Local flooding can move quickly



St. James City land sensor, Lee County, FL — flood depth rising during August storms.

~6 in

of inundation in about 15 minutes

Useful for developing thresholds

Hohonu sets default advisory and warning levels for most stations. Agencies review, adjust, or replace them.



The St. James sensor sits on a utility pole, over land, not over water.

Lessons Learned: two-way coordination


National Weather Service and county emergency managers, working from the same Hohonu gauge as a storm unfolded.

Thread #wfo-tampa-fl

NWS - Tampa - Austen Flannery Yesterday at 6:21 AM
Hello everyone. While most folks are starting off quiet, rainfall rates on Sanibel and the southern section of Pine Island have been impressive overnight. There is most certainly flooding ongoing in that area. If you receive reports, pics. etc. please pass it along. Heavy rain will continue to be the primary threat today

15 replies

EM - Lee County, FL - Benjamin Abes Yesterday at 7:09 AM
No significant incidents to report, Austen. The St. James flooding sensor is at 0.3 ft. WeatherStem units on the Islands are showing significant accumulations, too. (edited)



EM - Lee County, FL - Benjamin Abes Yesterday at 7:27 AM
@NWS - Tampa - Austen Flannery , that sensor has just increased to 0.9 ft in the last 15 min. <https://dashboard.hohonu.io/map-page/?z=2f9dc7-8bd8-409b-842a-16013ad74f47/St.JamesCityLandSensor,LeeCounty,FL> (edited)

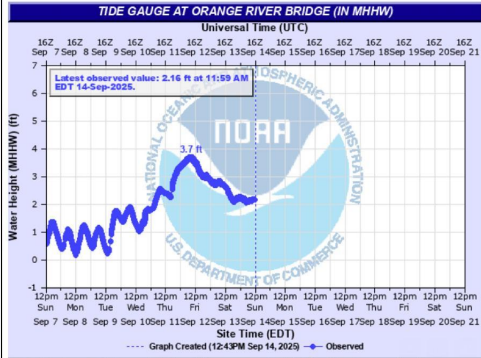
dashboard.hohonu.io
Hohonu
Tide and water level monitoring for responding to weather emergencies, building resilient communities, planning recreational activities, and more

The county sharing live sensor readings as water rose, 0.3 ft then 0.9 ft fifteen minutes later.

From: Austen Flannery - NOAA Federal <austen.flannery@noaa.gov>
Sent: Sunday, September 14, 2025 1:05 PM
To: Schultz, John <JSchultz@leegov.com>; Abes, Benjamin <Benjamin.Abes@leegov.com>
Cc: Eric Oglesby - NOAA Federal <eric.oglesby@noaa.gov>; Kelly Godsey - NOAA Federal <kelly.godsey@noaa.gov>; Jennifer Hubbard - NOAA Federal <Jennifer.Hubbard@noaa.gov>
Subject: Orange River Hohonu Gauge Impacts

Hi Ben and John,

We noticed that the Hohonu gauge on the Orange River Bridge really jumped up over the last couple days. As we are working to integrate and better understand the data, have there been any impacts in the area?



TIDE GAUGE AT ORANGE RIVER BRIDGE (IN MHHW)
Universal Time (UTC)

Water Height (MHHW) (ft)

Latest observed value: 2.16 ft at 11:59 AM EDT 14-Sep-2025.

3.7 ft

Graph Created (12:43PM Sep 14, 2025) - Observed

ORCFI (plotting HCRIP) "Gauge 0" Data observations courtesy of Think link will lead you to Hohonu's gauge page

The forecast office, noticing the gauge spike, asking the county about impacts on the ground.

Why Hohonu can help

Built in Hawai'i, deployed nationally.



200+

monitoring sites



18

states

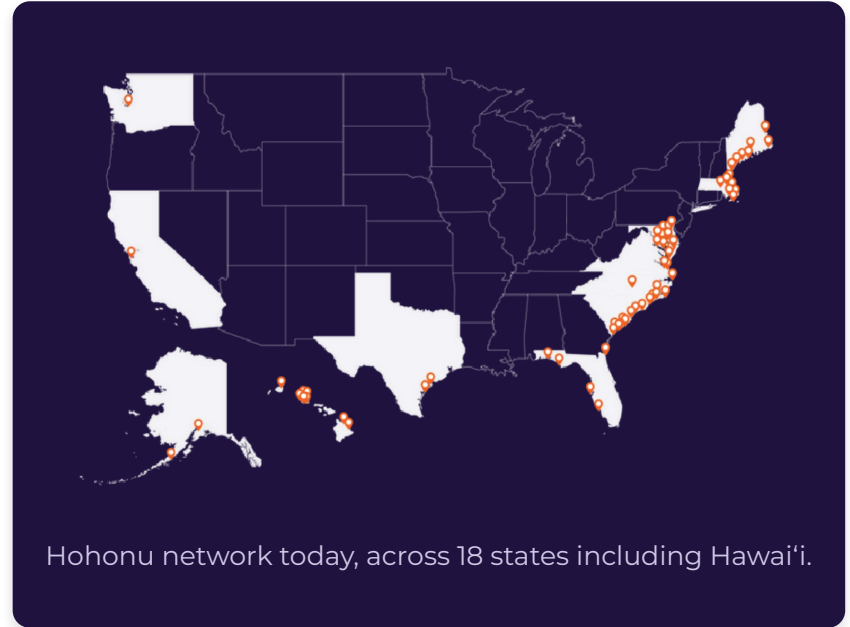


3M+

hours of water-level data

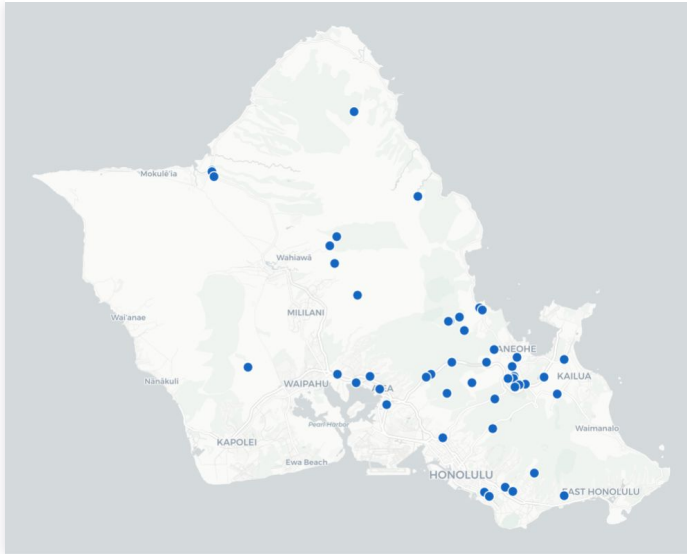
Founded at the University of Hawai'i, with a local team, local manufacturing, and local vendors.

Used across 18 states by emergency managers, DOTs, public works teams, scientists, and consultants, with data referenced by National Weather Service partners.



What this could mean for Mānoa

And the rest of Honolulu + state of Hawai'i



48 USGS sites are no longer capturing data

- **Build around the gauges we have**
Extend the federal network based on flood hotspots.
- **Agencies set the thresholds**
Local agencies decide what level matters, and when.
- **One shared picture**
Residents, agencies, and responders see the same live data.



Where should we start, and who needs to be at the table?

Hohonu is happy to support however useful.

