ASBPA-Hohonu Partnership to Inform Community Flooding Threats

Brian Glazer, Ph.D.
Oceanography Professor, Univ. of Hawaii
CEO, Hohonu, Inc.

Hohonu

asbpa
American Shore & Beach Preservation Association
Advocating for healthy coastlines.
Established 1926

Academic DNA, Public-Private Intent, Commercial Efficiency

Hohonu

2014

Born at University of Hawai'i Research Lab

Monitoring tools to aid in restoration of ancient Hawaiian fishponds

2015-2018

$2M in NOAA, NSF, Philanthropic R&D

"Democratize access to ocean observing technologies"

2019

Hohonu, Inc Commercialized

To meet demand that a research lab couldn't meet

2021

SECOORA Work Begins

In partnership with American Shore & Beach Preservation Association

2025

Nationwide Deployments

200+ deployed locations across 16 states and 2.5 million hours of monitoring

The Team is Growing

- Software Engineering
- Data Science
- Customer Support
- Manufacturing

Powered by Academic and Climate Tech Funding

NSF

University of Hawai'i

Schmidt Marine Technology Partners

Elemental Excelerator

TELUS Pollinator Fund for Good

SOA Sustainable Ocean Alliance

Article | Published: 26 June 2024

Unintended consequences of using maps to communicate sea-level rise

Matto Mildenberger ✉, Alexander Sahn, Chris Miljanich, Michelle A. Hummel, Mark Lubell & Jennifer R. Marlon

Nature Sustainability **7**, 1018–1026 (2024) | Cite this article

Hohonu

- **Flood maps can backfire: Coastal residents, even those facing future flooding, can become *less concerned when shown sea-level rise projections* for the distant future.**

- **Coastal residents became more worried about flood risks**
- **when told *how sea-level rise will affect their daily commute*.**

- **Test before scaling: Risk communicators should *test different data visualization* strategies before launching climate communication campaigns.**

The Only Full-Stack Flood Insights Platform

Hohonu

Proprietary data across
2.5 million hours from 200+ sites
Powers smarter forecasting

Modular Hardware Design
Integrate any off-the-shelf water sensor

Full-Stack Software Platform
Data QA/QC

Urban Real-Time Monitoring
Satellites cannot monitor dense environments

Data Ownership
Customers own data, Hohonu curates & analyzes

Expansion Opportunities
Proprietary dataset = competitive advantage for forecasting and other services

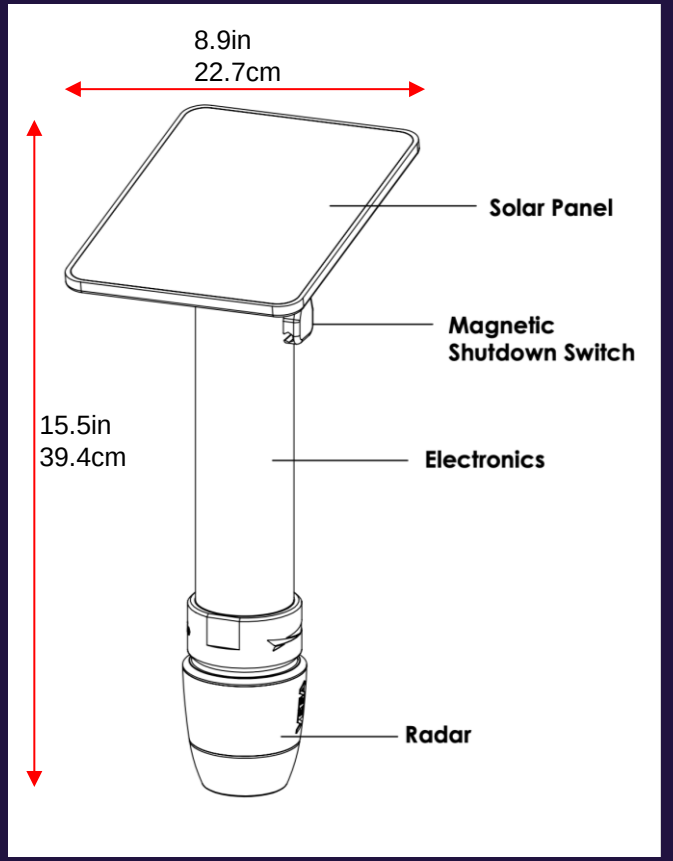
Combined With Mobile App and Robust API

TideCast™ for iOS

- Live tide data from 400 Hohonu sensors and NOAA stations that refreshes every 6 minutes
- TideCast proprietary prediction algorithm that uses machine learning and refreshes every 6 hours based on live sensor data
- Weather conditions - view wind, sun and moon phase, temperature, and rain at each station (data source: NOAA).

Example Installations

Hohonu



NOAA IOOS SECOORA

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American Shore & Beach Preservation Association
Advocating for healthy coastlines.
Established 1926

Hohonu

Dr. Nicole Elko & Dr. Brian Glazer

Georgia Tech

Dr. Russell Clark

FIU Sea Level Solutions Center
Florida International University

Dr. Tiffany Troxler

Burroughs & Chapin Center for Marine & Wetland Studies
Coastal Carolina University

FAU I-SENSE
Division of Research
Florida Atlantic University

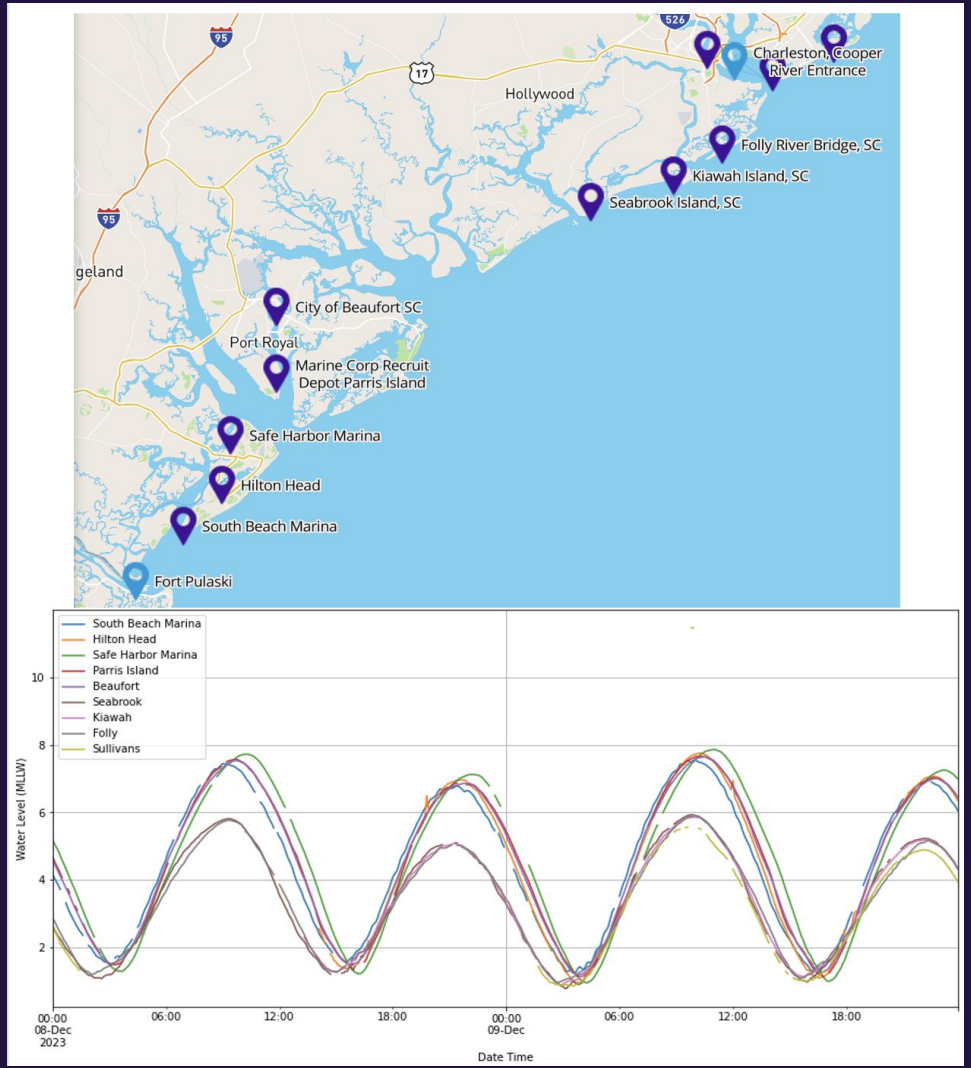
Dr. Paul Gayes & Dr. Jason Halstrom

NC Highlights

Value of quantifying and predicting variability in spatial impacts are beginning to match value of 30-year records at sparse locations

Different tools for different applications

Lack of empirical granularity limits leveraging emergent AI capabilities



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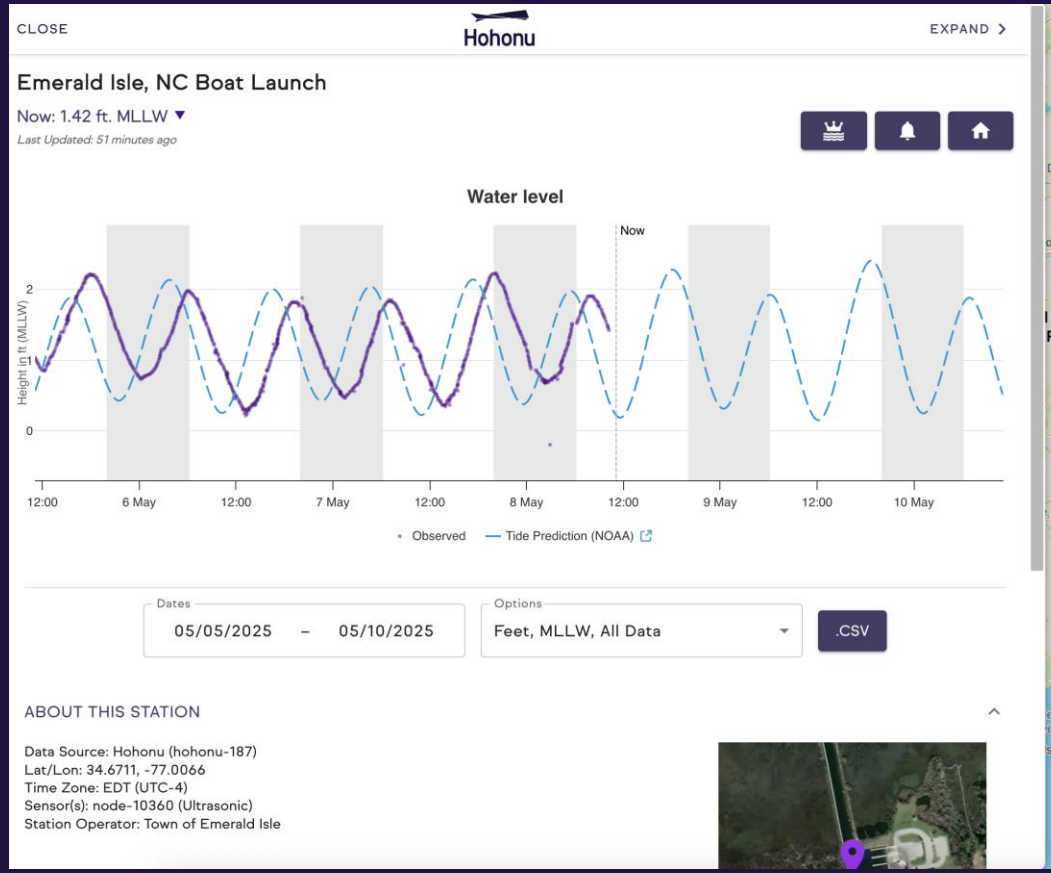
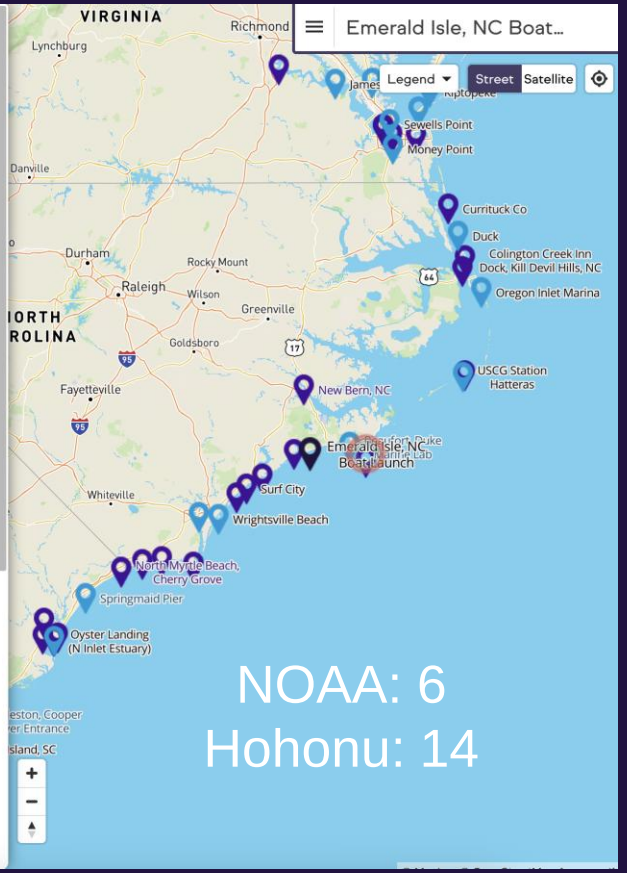
NOAA IOOS: Southeast Regional Association

Hohonu

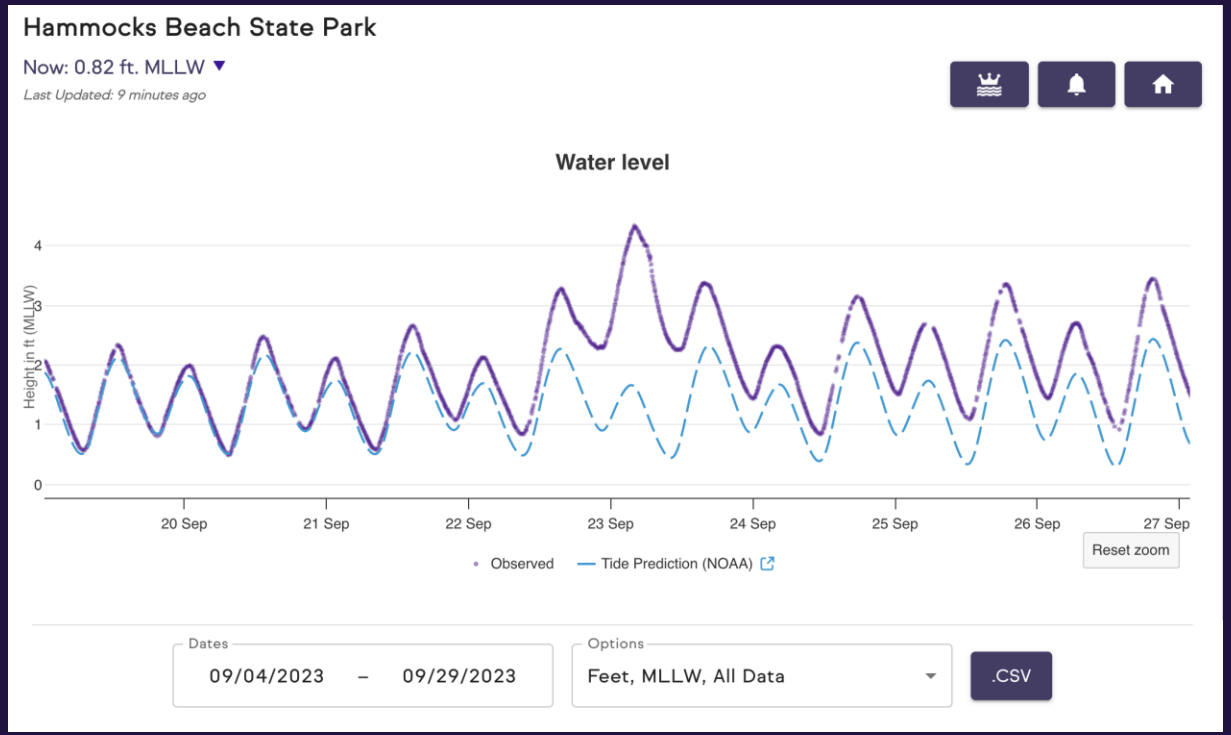


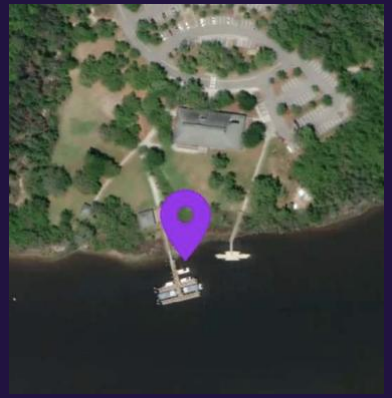


dashboard.hohonu.io

Hurricane Ophelia – Sep 23, 2023

Hohonu





ABOUT THIS STATION

Data Source: Hohonu (hohonu-143)
Lat/Lon: 34.6696, -77.1433
Time Zone: EDT (UTC-4)
Sensor(s): node-10292 (Ultrasonic)
Station Operator: NC State Parks

INSTALLATION HISTORY

sensorID	Beginning Date	Ending Date	NAVD88 (ft)
node-10116	07/21/2022	02/18/2024	6.640
node-10292	02/18/2024	Active	6.640

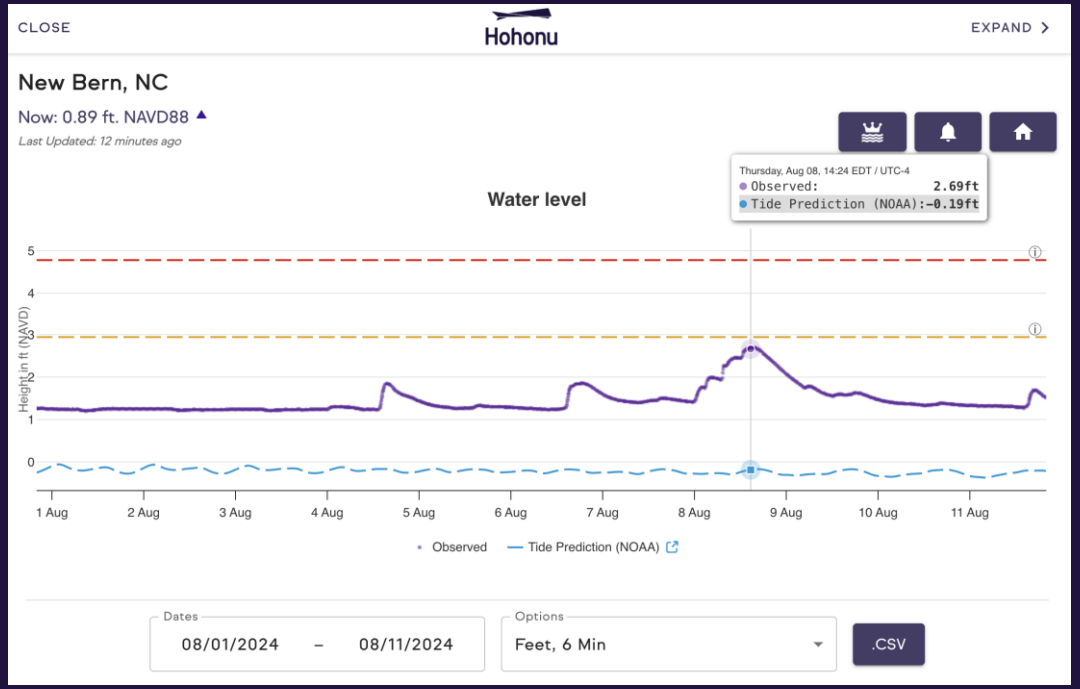
NOAA CO-OPS REFERENCE TIDAL STATIONS

Observed: Beaufort, Duke Marine Lab (8656483) [27.1 miles]
Predicted: Swansboro, East Corbett Ave. Bridge (8656613) [1.9 miles]

dashboard.hohonu.io

Tropical Storm Debby – Aug 8, 2024

Hohonu



dashboard.hohonu.io

Potential Tropical Cyclone Eight – Sep 16, 2024

Hohonu

CLOSE

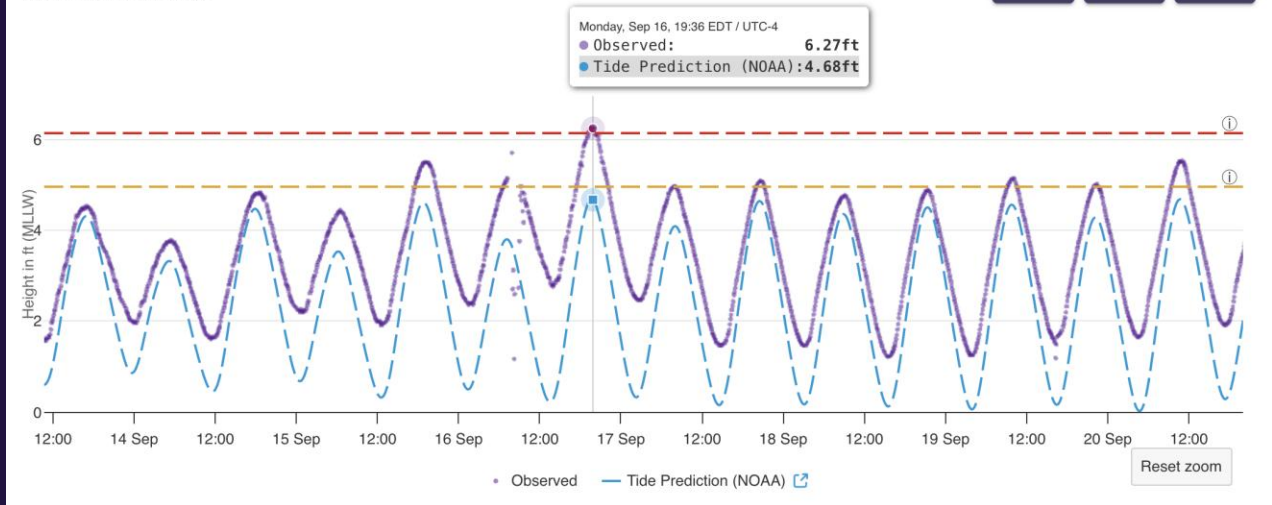
Hohonu

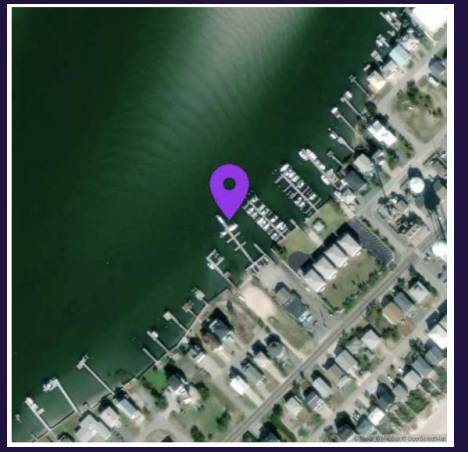
EXPAND >

Topsail Beach, NC

Now: 2.46 ft. MLLW ▼

Last Updated: 9 minutes ago





ABOUT THIS STATION

Data Source: Hohonu (hohonu-63)
Lat/Lon: 34.3656, -77.632
Time Zone: EDT (UTC-4)
Sensor(s): node-10313 (Ultrasonic)
Station Operator: Town of Topsail Beach

INSTALLATION HISTORY

sensorID	Beginning Date	Ending Date	NAVD88 (ft)
node-10032	08/20/2021	08/18/2024	12.740
node-10313	08/19/2024	Active	12.740

NOAA CO-OPS REFERENCE TIDAL STATIONS

Observed: Wrightsville Beach (8658163) [13.7 miles]
Predicted: Hampstead (8657813) [4.6 miles]

dashboard.hohonu.io

King Tides – …last week

CLOSE

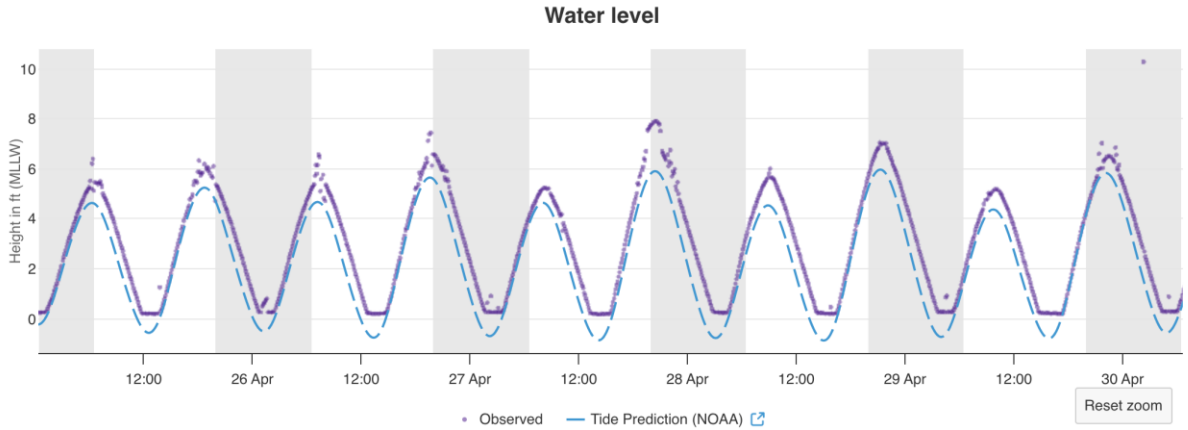
Hohonu

EXPAND >

Ocean Isle Beach

Now: 2.55 ft. MLLW ▼

Last Updated: 2 hours, 22 minutes ago

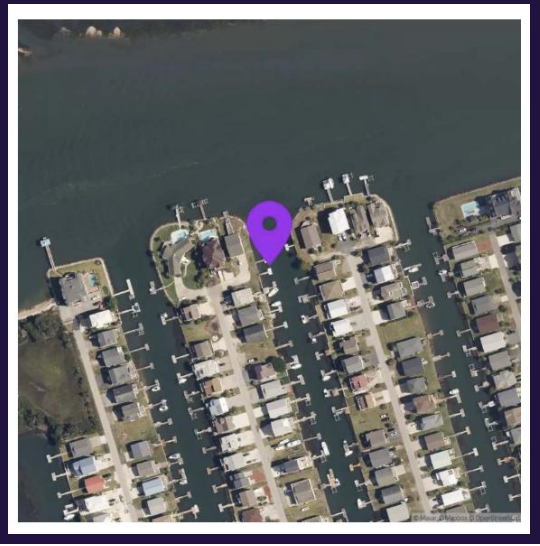


Dates 04/23/2025 – 05/01/2025

Options Feet, MLLW, Clean

.CSV

dashboard.hohonu.io



ABOUT THIS STATION

Data Source: Hohonu (hohonu-91)
Lat/Lon: 33.8955, -78.435
Time Zone: EDT (UTC-4)
Sensor(s): node-10293 (Ultrasonic)
Station Operator: Town of Ocean Island Beach

INSTALLATION HISTORY

sensorID	Beginning Date	Ending Date	NAVD88 (ft)
node-10060	11/13/2021	02/15/2024	8.176
node-10293	02/15/2024	Active	8.176

NOAA CO-OPS REFERENCE TIDAL STATIONS

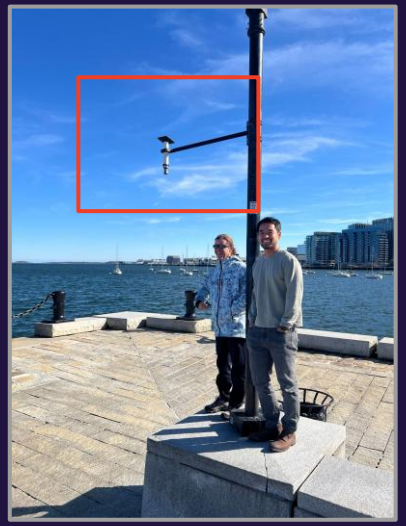
Observed: Springmaid Pier, Myrtle beach (8661070) [32.4 miles]
Predicted: Bowen Point, Shallotte Inlet (8659665) [3.8 miles]

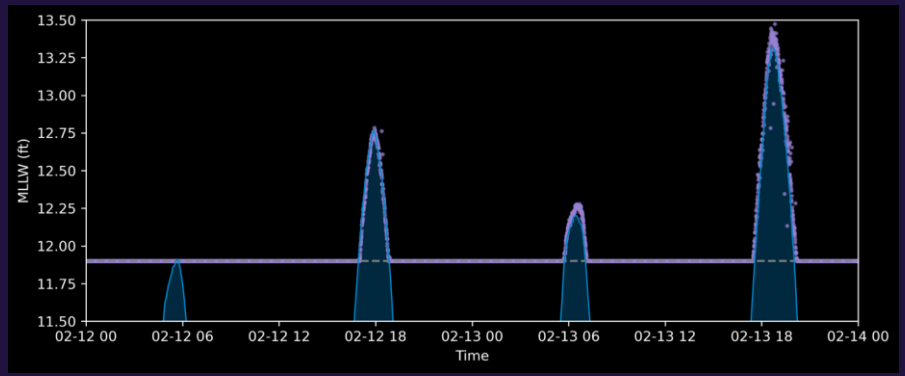
Hohonu

Spatial Variability & Inundation Prediction & Alerting

...getting more creative...

Boston, Massachusetts





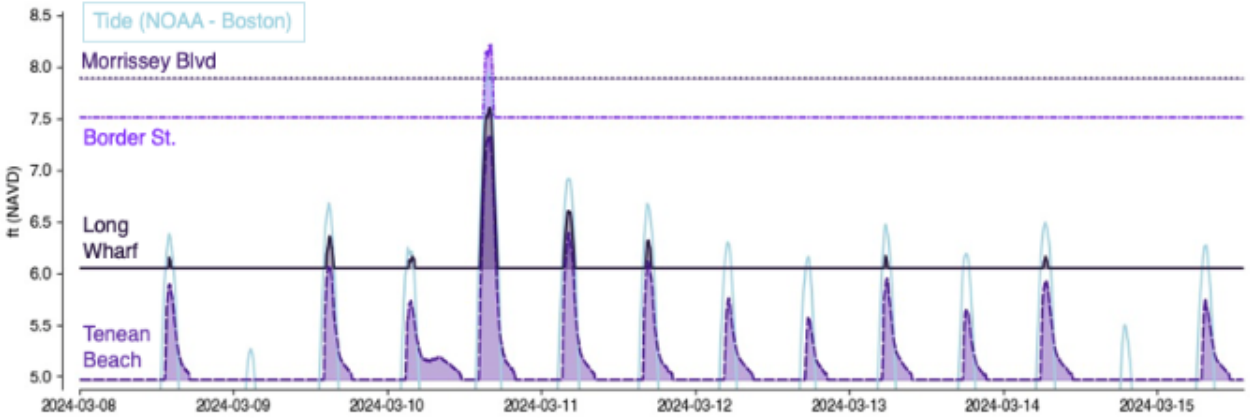
CITY of BOSTON

6 Sensors

"Really excited about this work and what Hohonu is already doing in Boston and how we might have pathways to expand the network

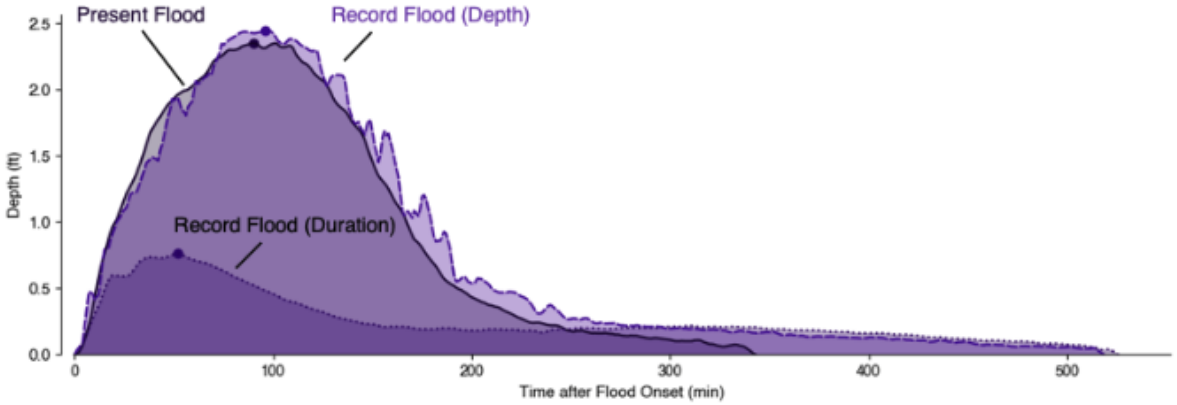
- Deputy Chief, Office of Emergency Management

Flood Analyses – Real-time spatial variability

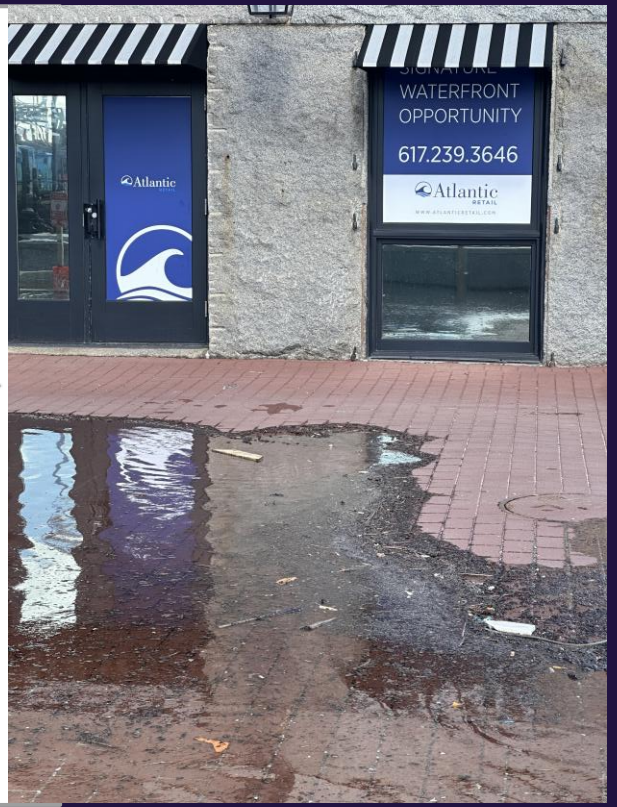


Station	Individual Floods	Max Inundation (ft)	Total Duration (min)	Avg. Time to Peak (min)	Avg. Time to Drain (min)	Avg. Tide at Onset (ft NAVD)
Tenean Beach	12	2.35 (3/10)	3512	50	242	6.01
Long Wharf	8	1.55 (3/10)	574	35	36	6.40
Border St.	1	0.70 (3/10)	106	77	29	7.28
Morrissey Blvd.	0	-	-	-	-	-

Flood Analyses – No two floods are the same

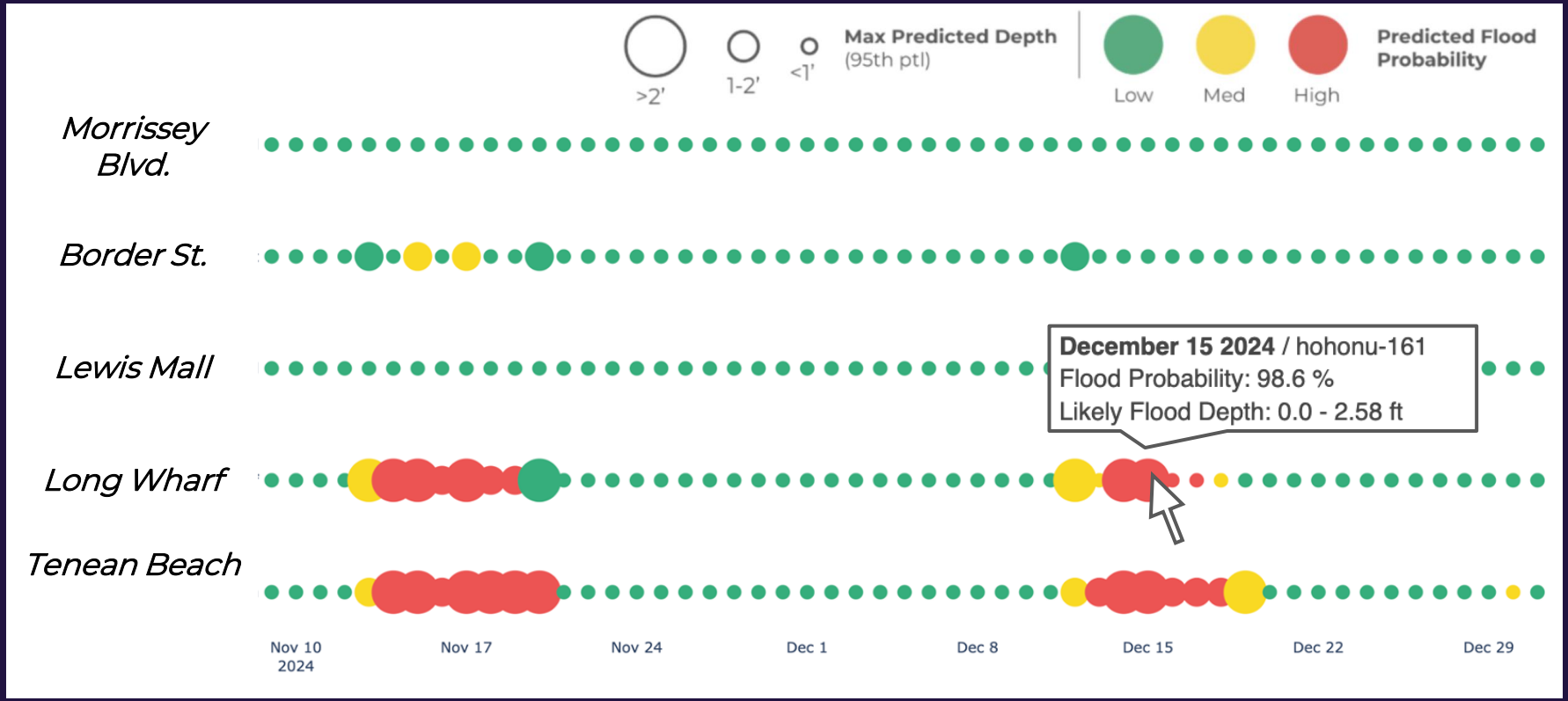


Flood	Peak Inundation (ft)	Flood Duration (min)	Time to Peak (min)	Time to Drain (min)	Tide at Onset (ft NAVD)
Present	2.35	343	90	253	6.21
Record Flood (Depth)	2.45	519	96	423	7.23
Record Flood (Duration)	0.76	526	52	474	5.99
Average (N=20)	1.15	297	54	243	6.09

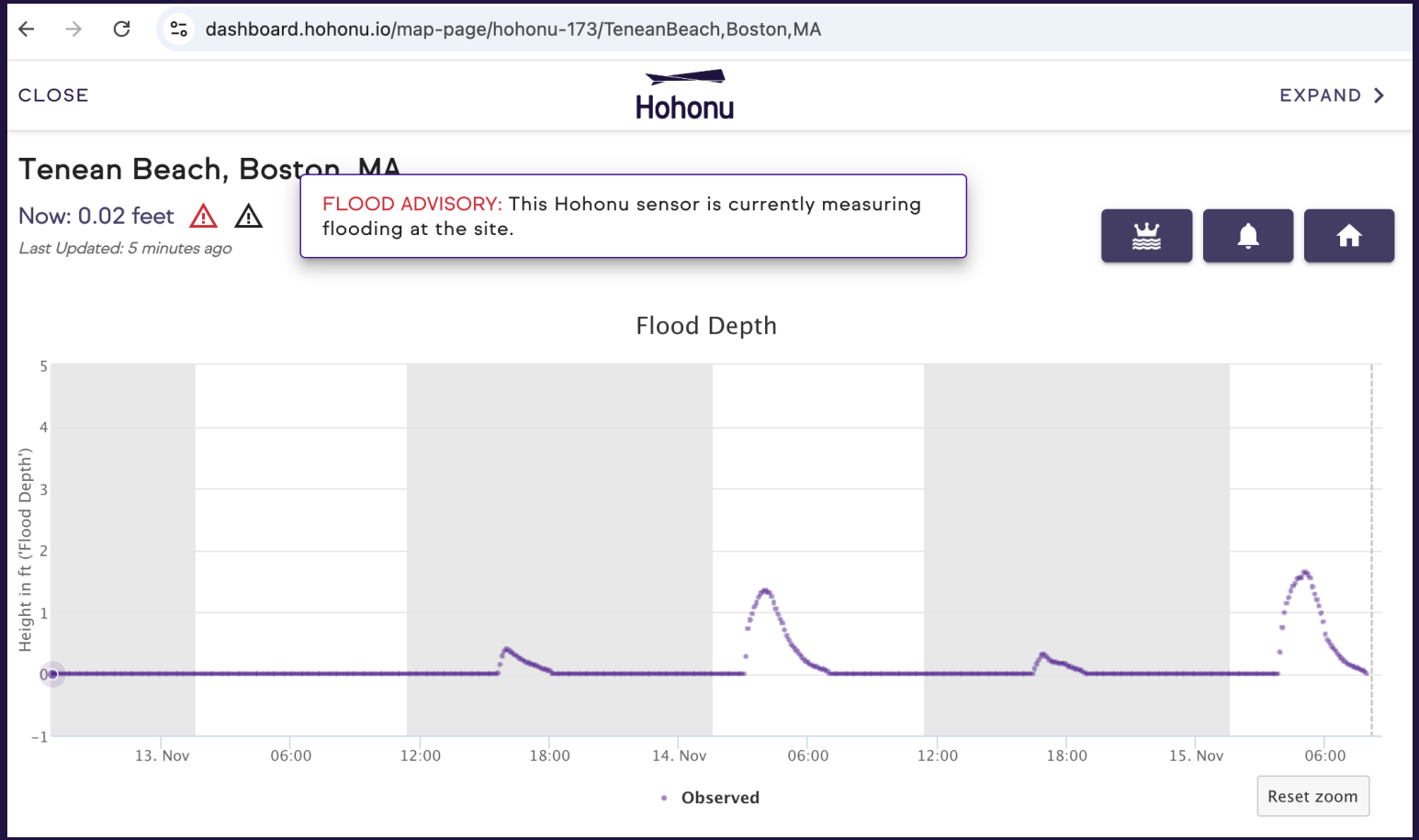


Improved Predictive Analytics

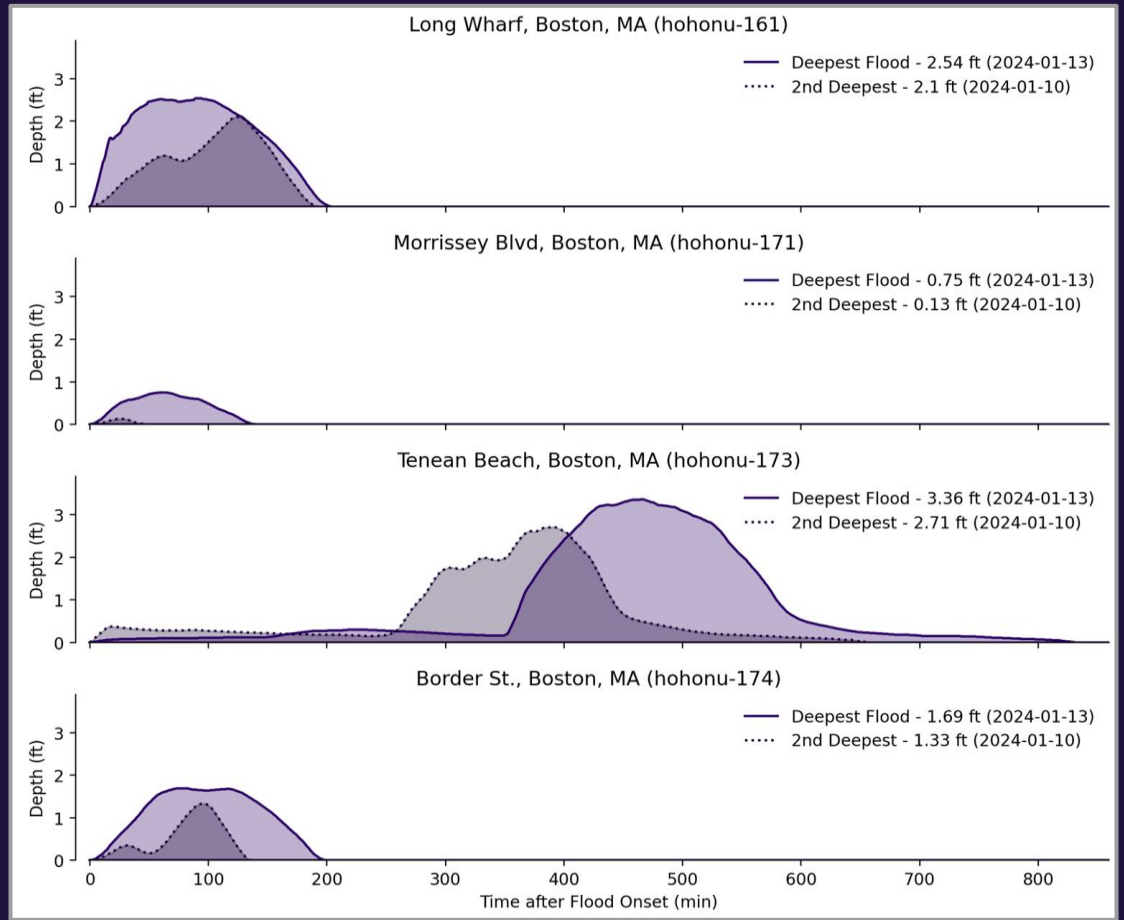
Hohonu



How did we do? Nailed it.



Flood Profiles



The most significant flood of the year at Tenean Beach lasted over 13 hours and approached a flood depth of 3.5'

Flood profiles appear different between sites, and different within sites for different floods - making heuristic modeling of flooding based on tide level alone difficult

Cost-effective Sensor Networks

...granularity, durability, analytics...

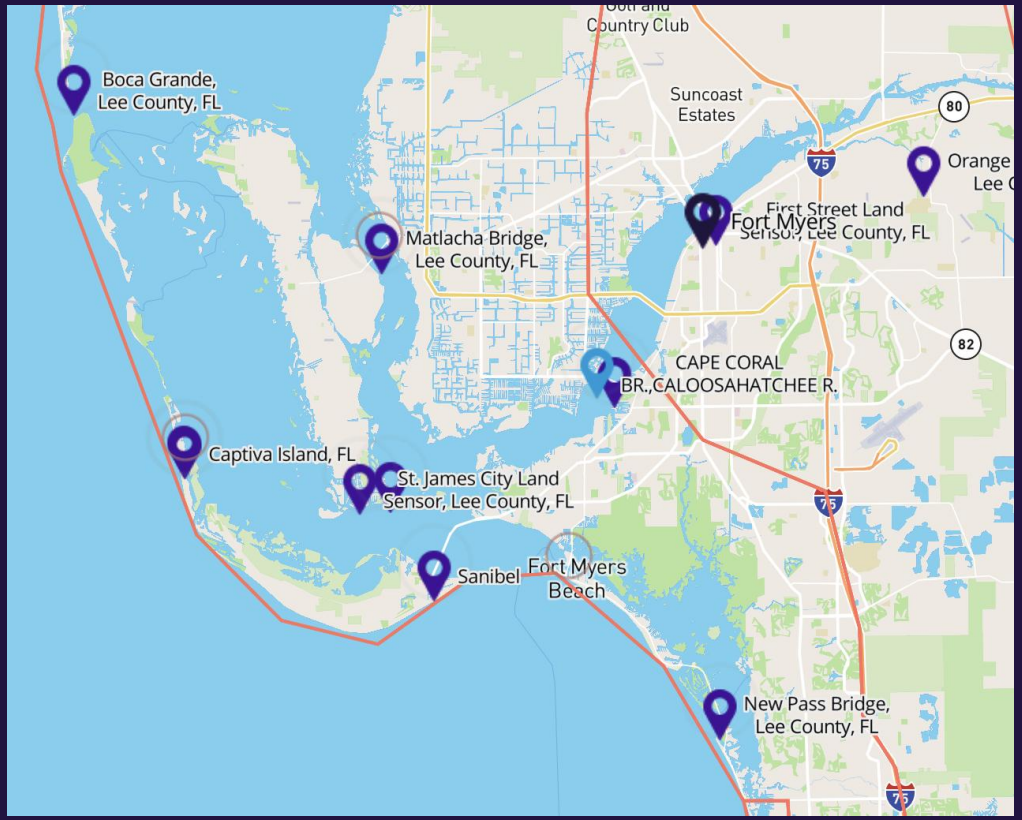
Hohonu <> Lee County deployments

Hohonu

11 new Hohonu gauges

Installed summer 2024

(+9 more this month)

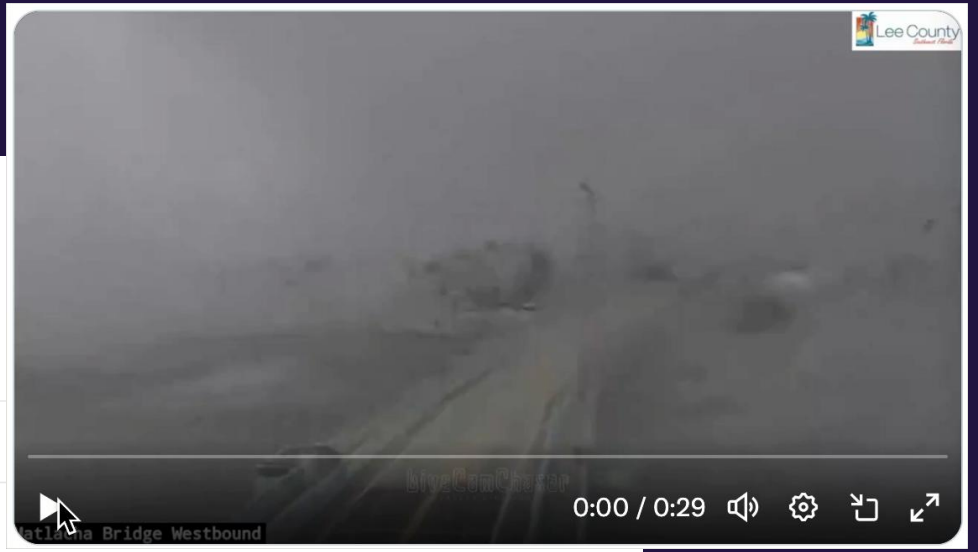


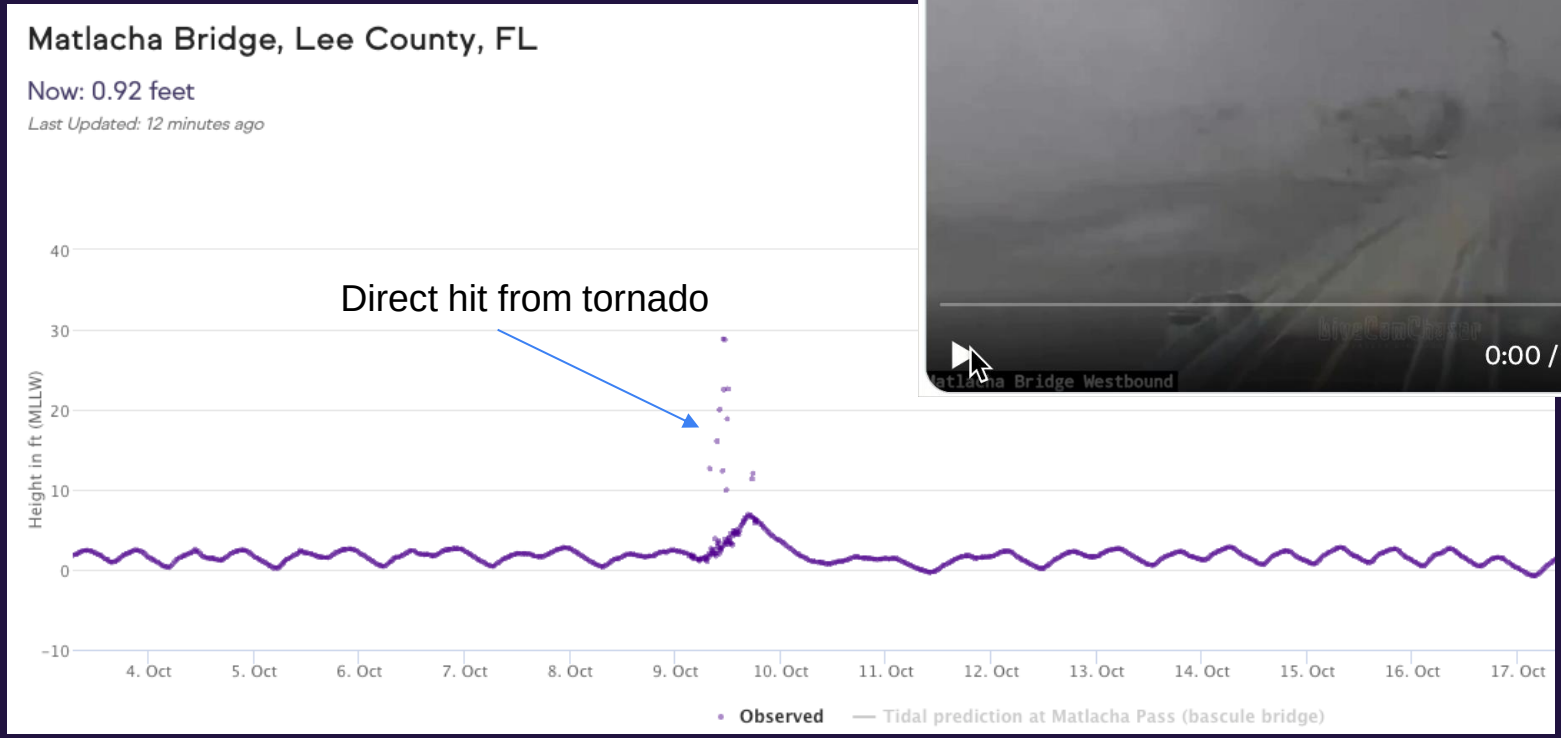
Maximum residual with the nearest NOAA observations was about 3.5’

Maximum residual with the NOAA harmonic prediction about 7’

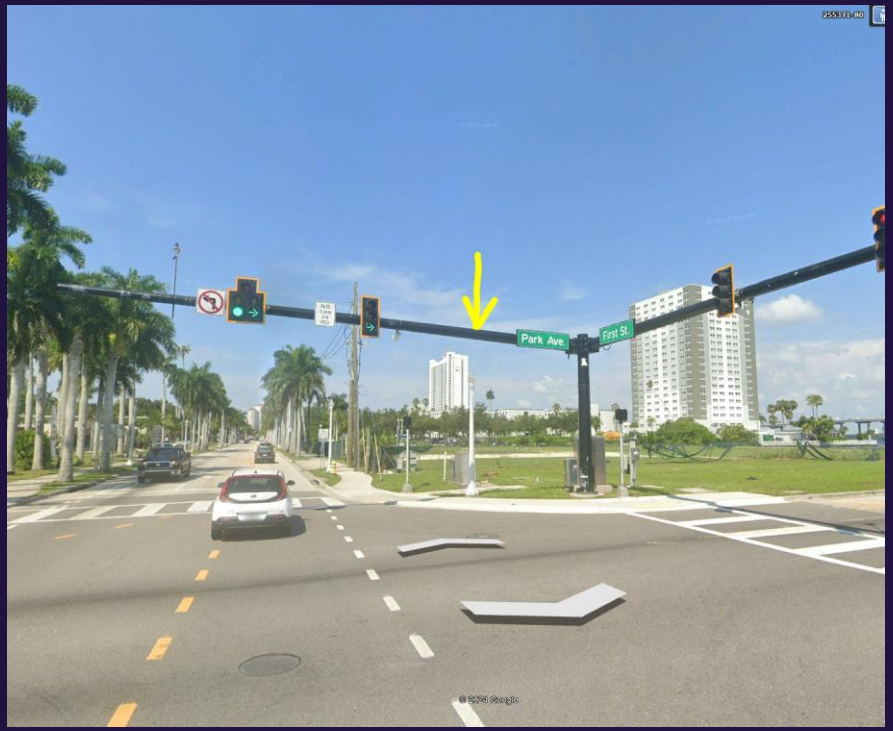
Hurricane Milton, Matlacha Bridge Tornado

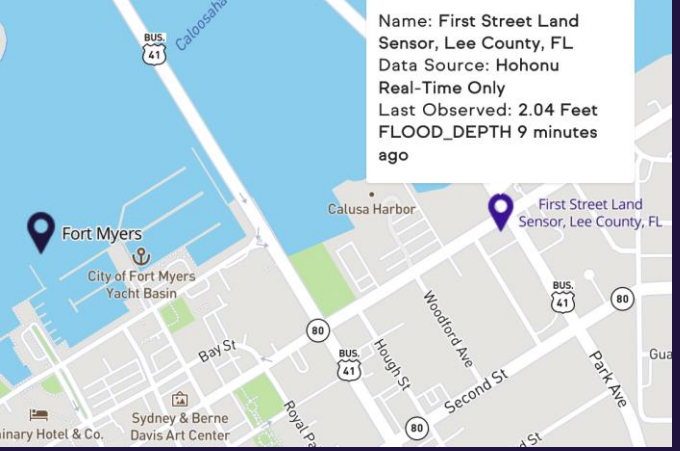
https://www.linkedin.com/feed/update/urn:li:activity:7254237348685590528/

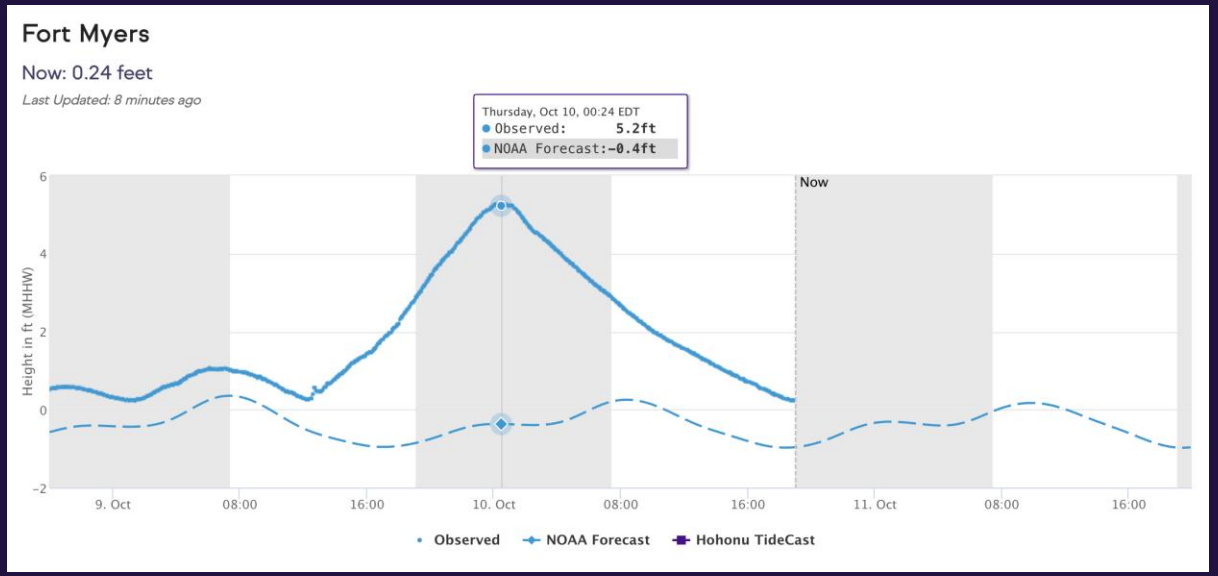




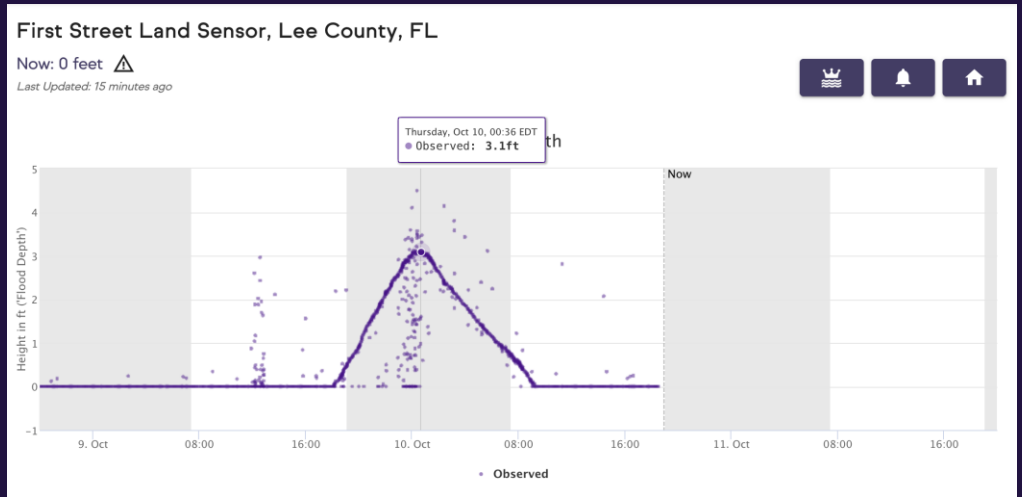
Hurricane Helene – 1st St. Fort Myers



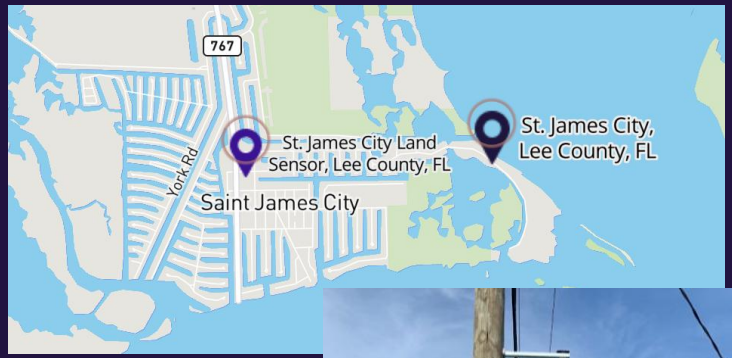

Name: First Street Land Sensor, Lee County, FL
Data Source: Hohonu Real-Time Only
Last Observed: 2.04 Feet FLOOD_DEPTH 9 minutes ago
Fort Myers
City of Fort Myers Yacht Basin
Calusa Harbor
First Street Land Sensor, Lee County, FL
Bay St
Hough St
Woodford Ave
Second St
Park Ave
Sydney & Berne Davis Art Center

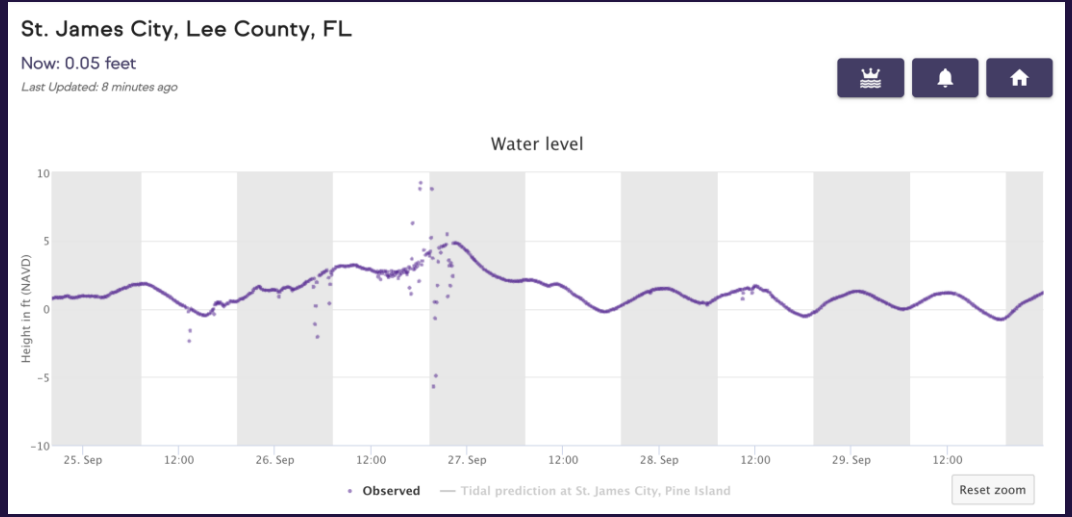

Fort Myers
Now: 0.24 feet
Last Updated: 8 minutes ago
Thursday, Oct 10, 00:24 EDT
Observed: 5.2ft
NOAA Forecast: -0.4ft
Now
Height in ft (MHHW)
9. Oct
08:00
16:00
10. Oct
08:00
16:00
11. Oct
08:00
16:00
Observed
NOAA Forecast
Hohonu TideCast

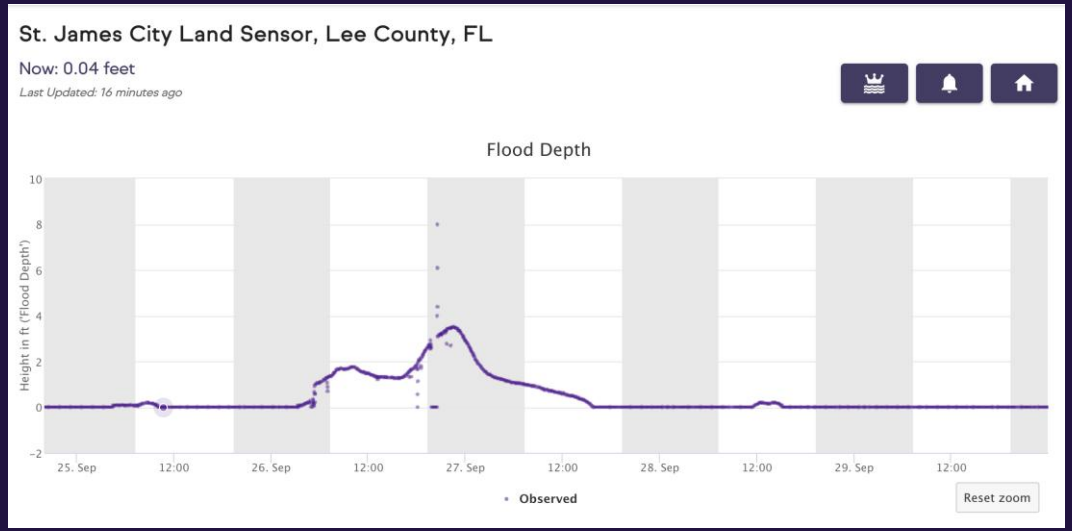

Park Ave at First St
DISTRICT 1
FDOT


First Street Land Sensor, Lee County, FL
Now: 0 feet
Last Updated: 15 minutes ago
Thursday, Oct 10, 00:36 EDT
Observed: 3.1ft
Now
Height in ft ('Flood Depth')
9. Oct
08:00
16:00
10. Oct
08:00
16:00
11. Oct
08:00
16:00
Observed

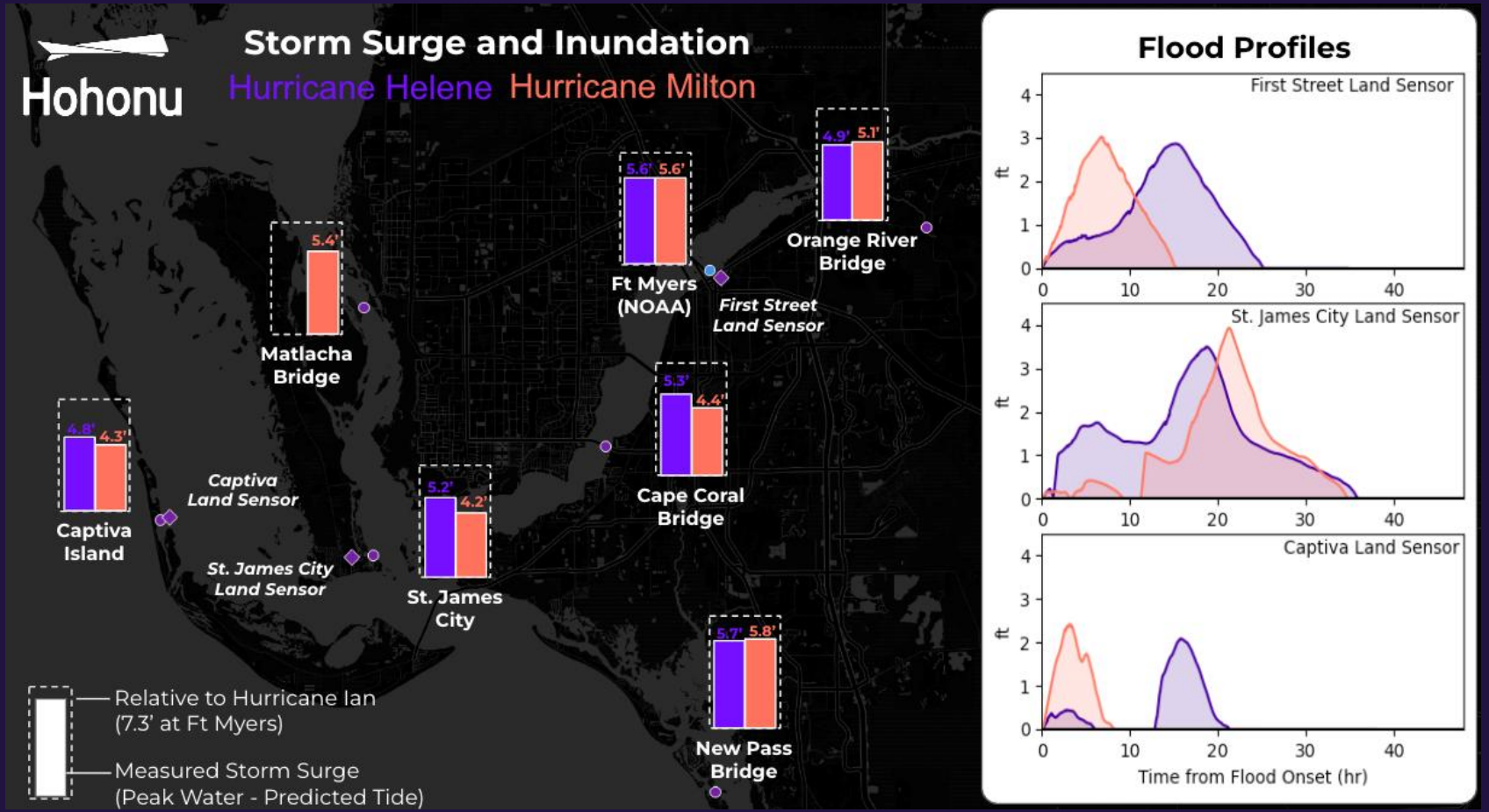
Paired Deployments, New Insights





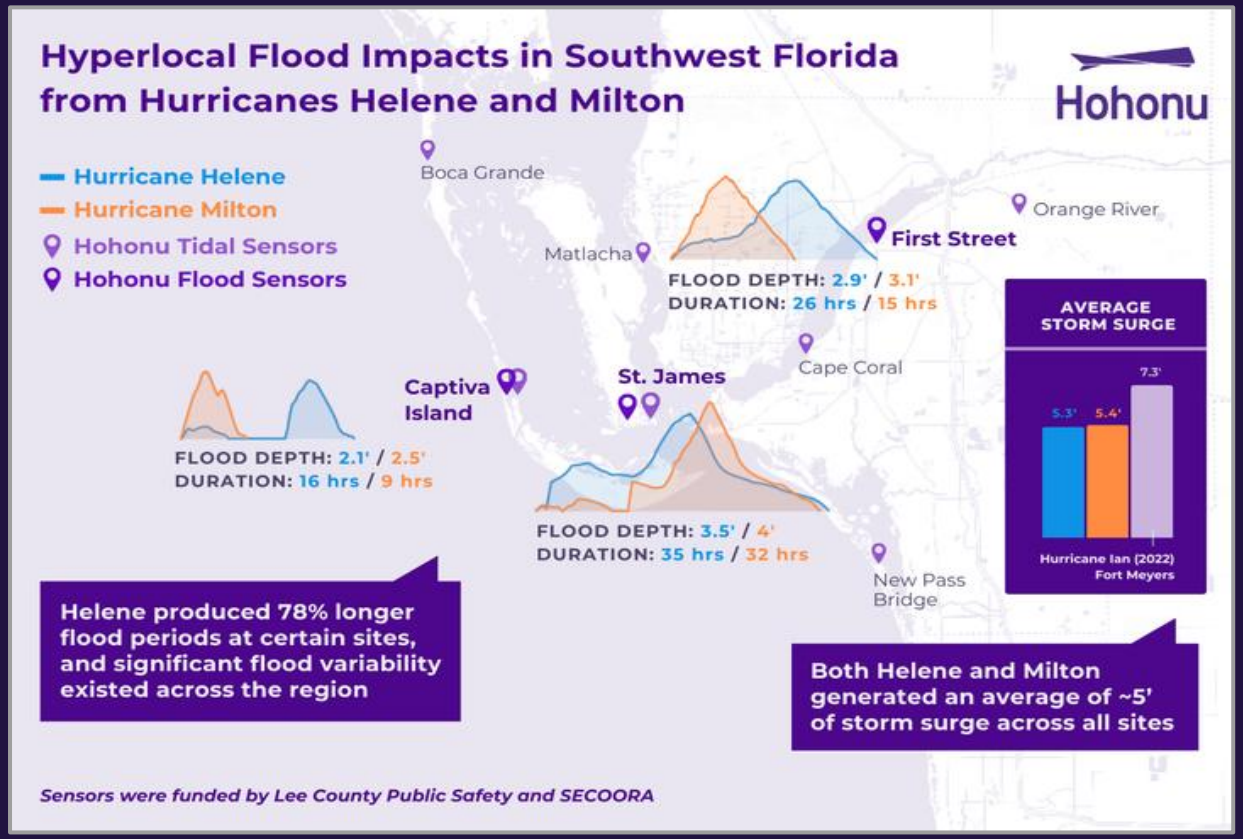


Helene & Milton: post-storm analyses



Hurricane Helene Emergency Response

Hohonu



Lee County
Southwest Florida

"For the first time, we are starting to get data that helps us understand how the water moves and impacts our community during storms. This is the first time we have had data with any degree of granularity — data which will lead to more resilient and better prepared communities, from the barrier islands to neighborhoods along our inland waterways.

We are proud to partner with Hohonu and their team to deploy this first set of devices in Florida. Many more to come!"

- Benjamin Abes,
Director of Emergency Management,
Lee County

Hohonu

Video Case Studies

NOAA IOOS: Southeast Regional Association

Hohonu

https://vimeo.com/798518252

Great Island, MA – Emergency Management

https://vimeo.com/1012456216

Gulf of Maine Research Institute and NOAA NWS

https://vimeo.com/824799905

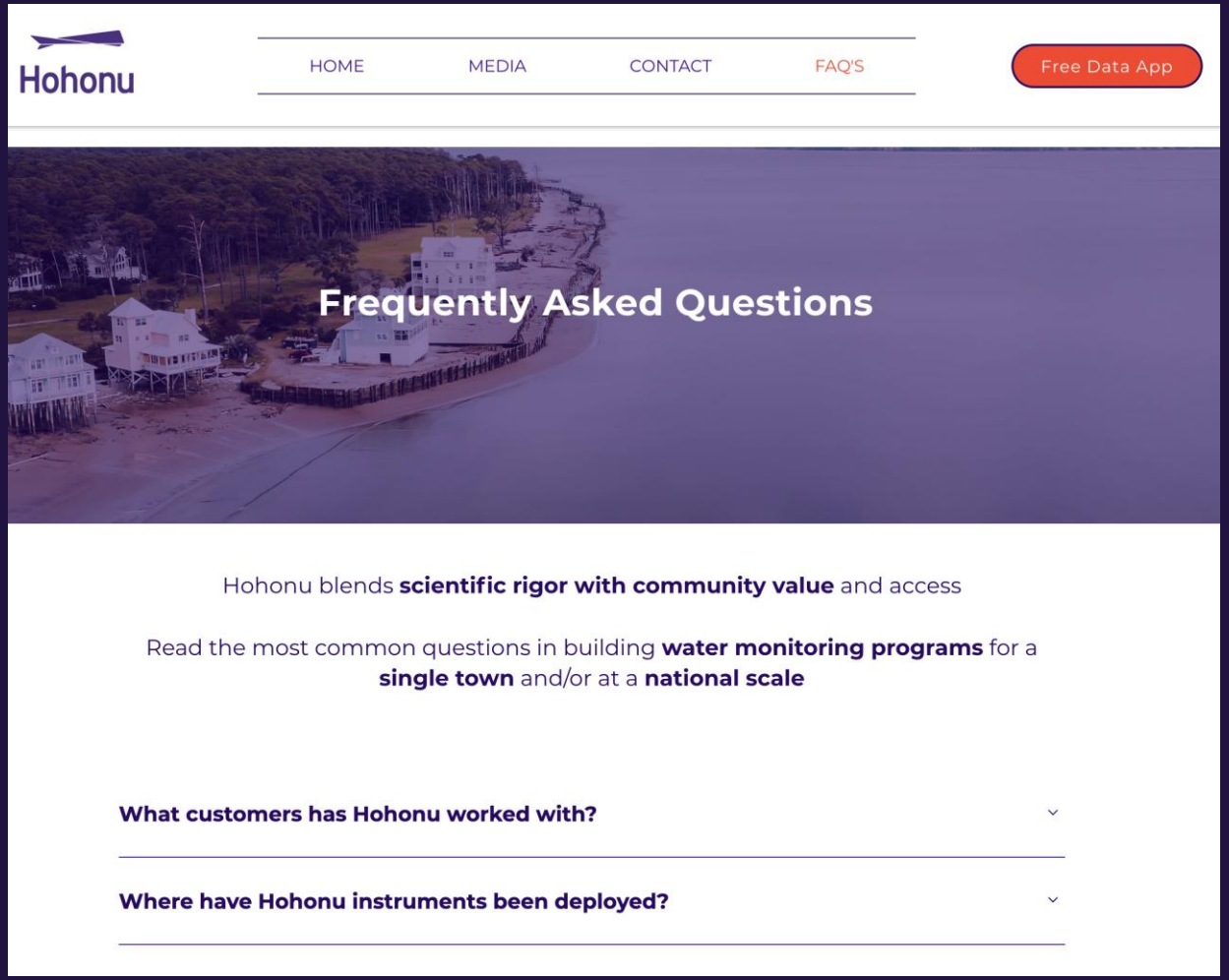
Hawaiian Traditional Coastal Aquaculture

https://vimeo.com/885828712

Deeper dive in-person discussion

Emerging Flooding Threats & How Communities Are Fast-Tracking Readiness

Pine Knoll Shores Town Hall
10:00 am Monday May 12



Hohonu FAQs

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glazer@hohonu.io


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HARBORWALK
Public Access