

Increasing ocean observation to serve society: *What does it take?*

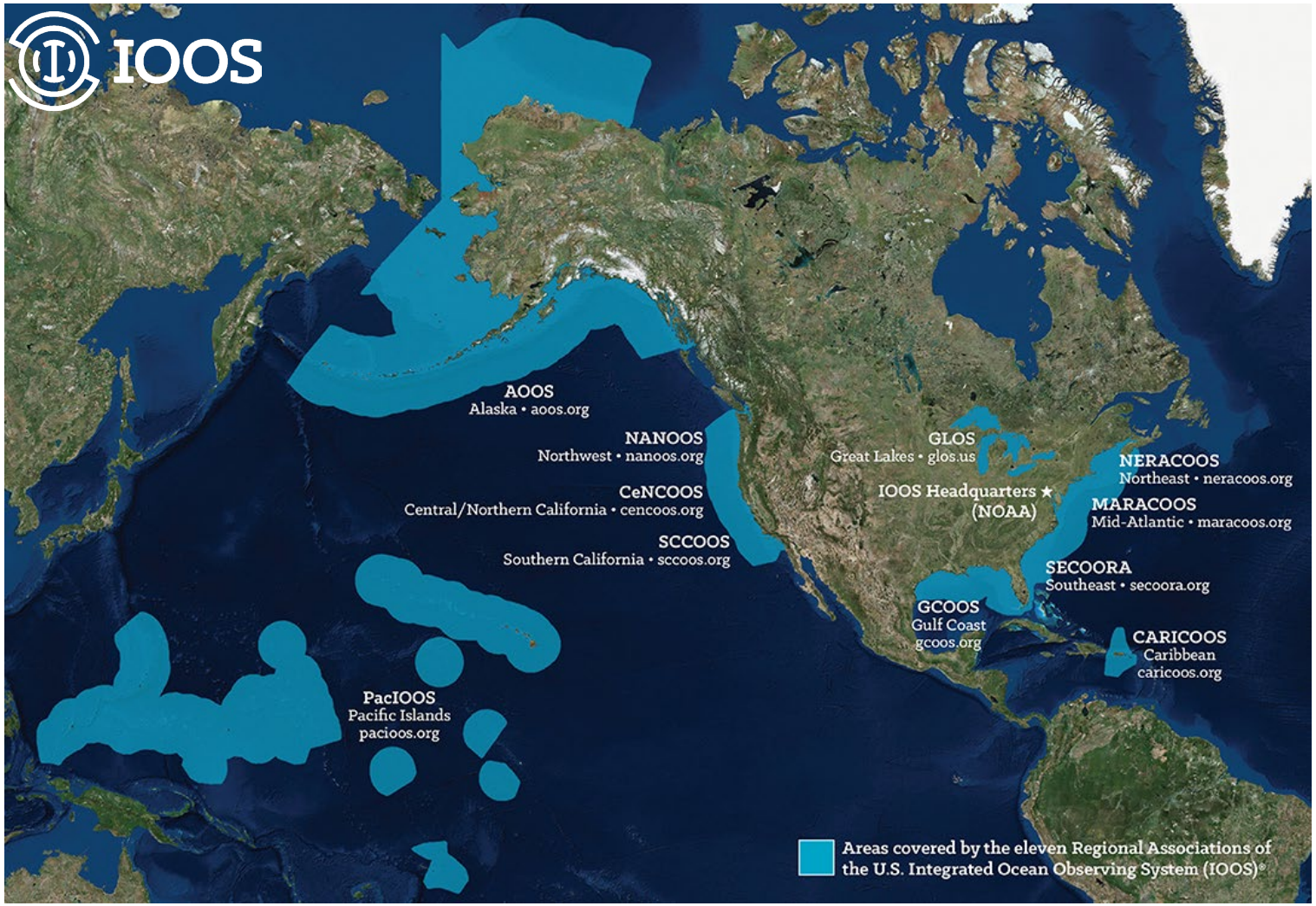
Jan Newton[1], Roxanne Carini[1], Sheyna Wisdom[2], and Melissa Iwamoto[3]

[1]University of Washington & NANOOS, Seattle, WA, USA
[2]University of Hawaii & PacIOOS, Honolulu, HI, USA
[3]Alaska Ocean Observing System, AOOS, Anchorage, AK, USA

U.S. Integrated Ocean Observing System (IOOS)

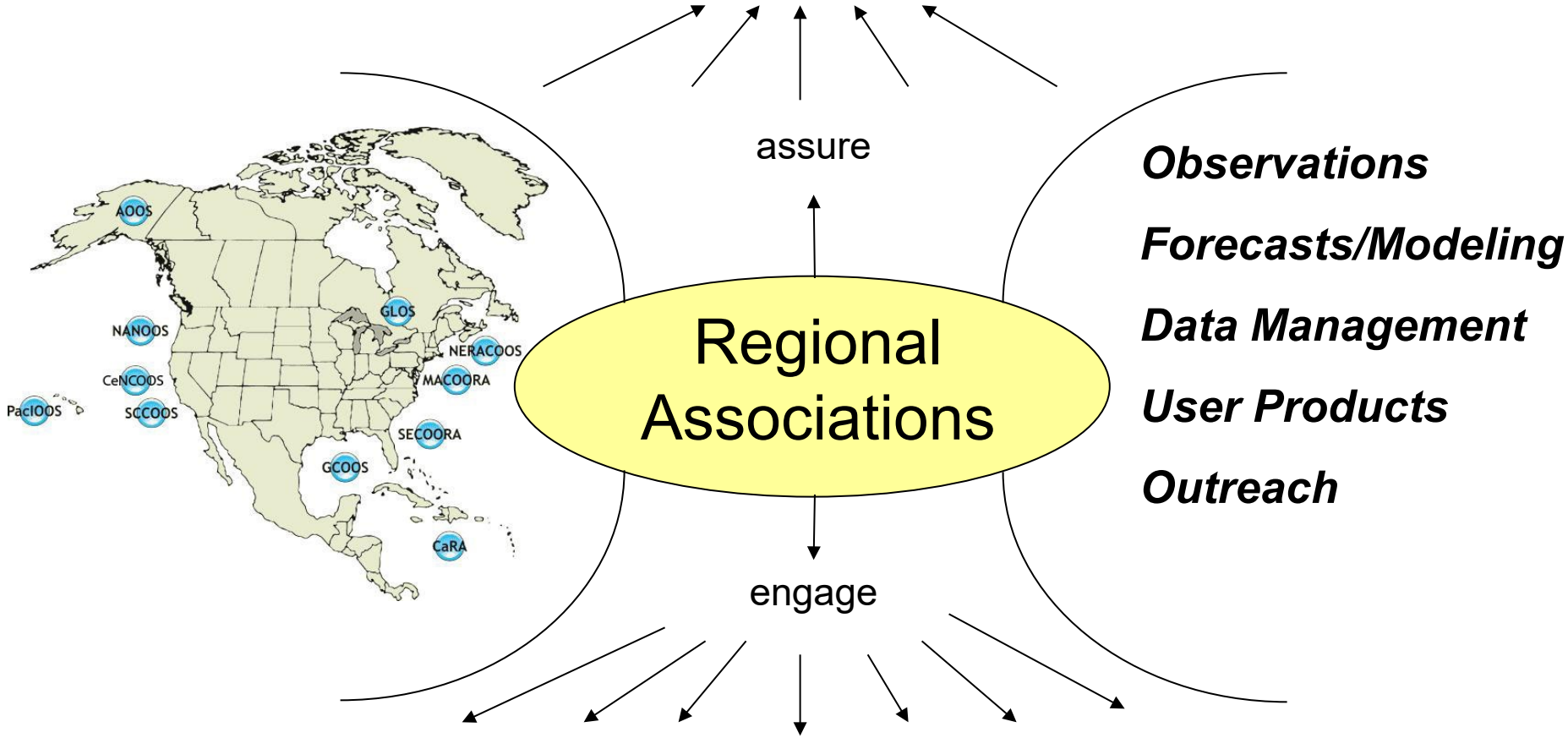
The U.S. Integrated Ocean Observing System (IOOS) is a **national-regional** partnership to provide **ocean data, curated tools, and forecasts** to improve safety, enhance the economy, and protect health.

- Federal-non-federal partnership
- ICOOS Act Authorization
- NOAA IOOS Program Office within National Ocean Service, other federal agencies contribute
- 11 Regional Associations housed at universities or are non-profits



IOOS
Integrated Ocean Observing System

CONSISTENT NATIONAL CAPABILITY



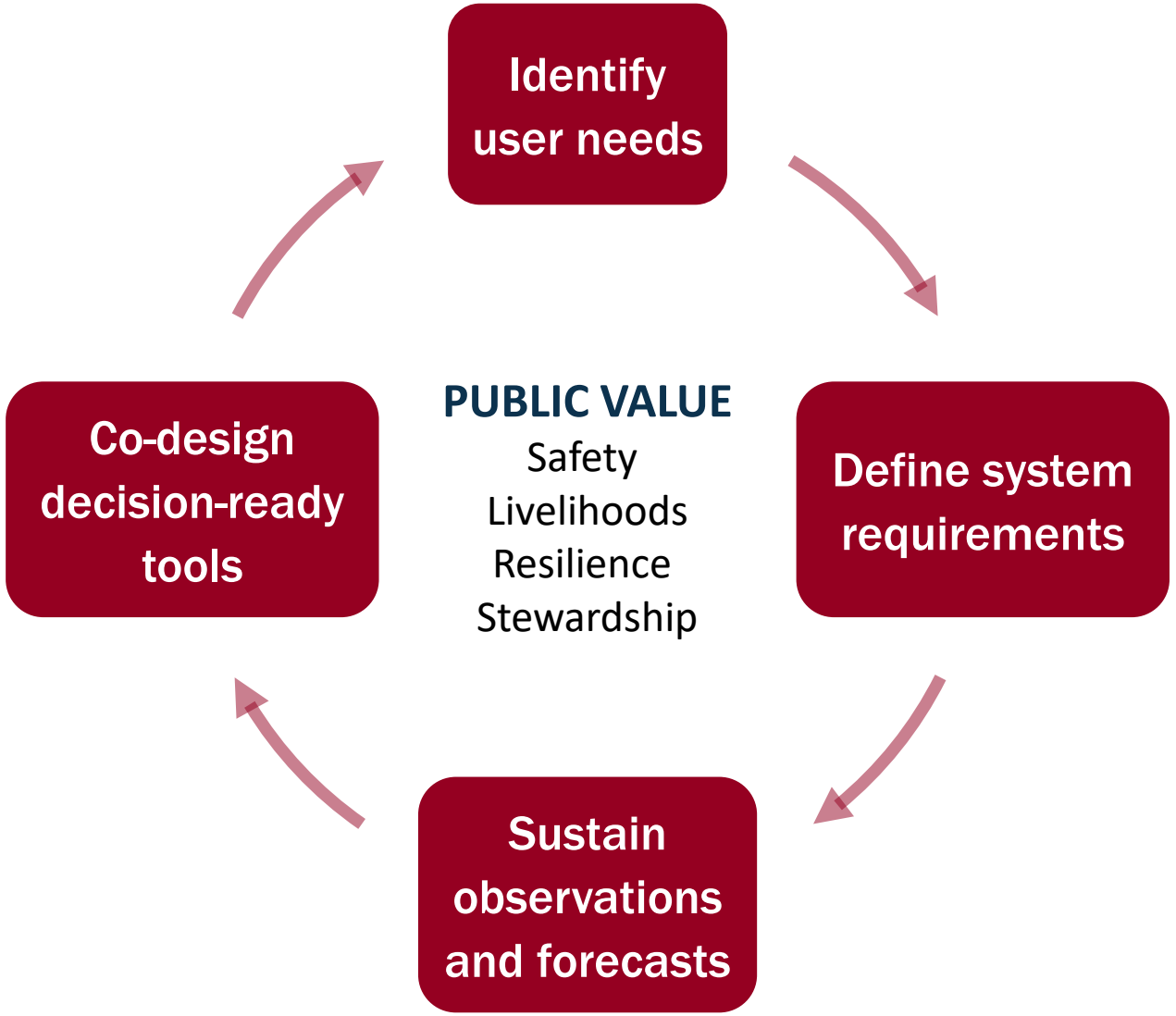
DIVERSE LOCAL STAKEHOLDERS

IOOS & NANOOS value proposition

Build, sustain, and evolve regional ocean observing systems to meet user needs

Regionally relevant, nationally coordinated

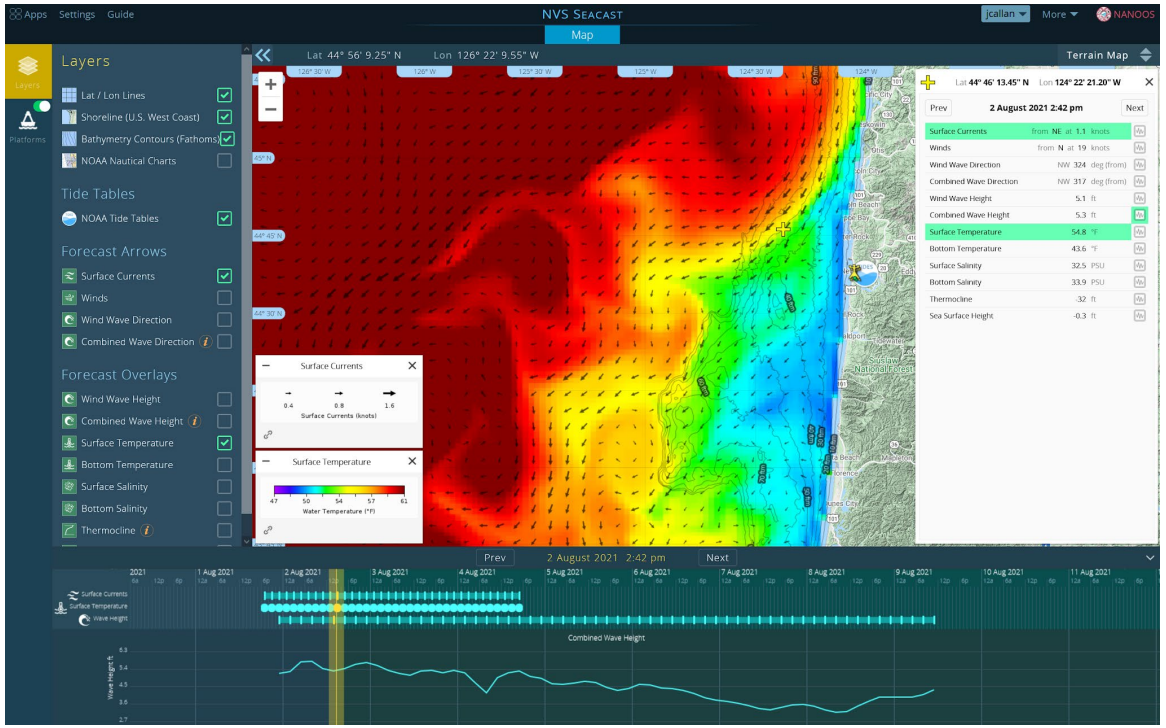
IOOS 26 y; NANOOS 23 y



Safety at Sea

NANOOS funds coastal radars tracking surface currents that can increase the efficiency and accuracy of search and rescue operations as well as identify and guide safe routes for navigation.

"I look at it every time I go out and depend on the information to get me where I need to go and get me back safely."

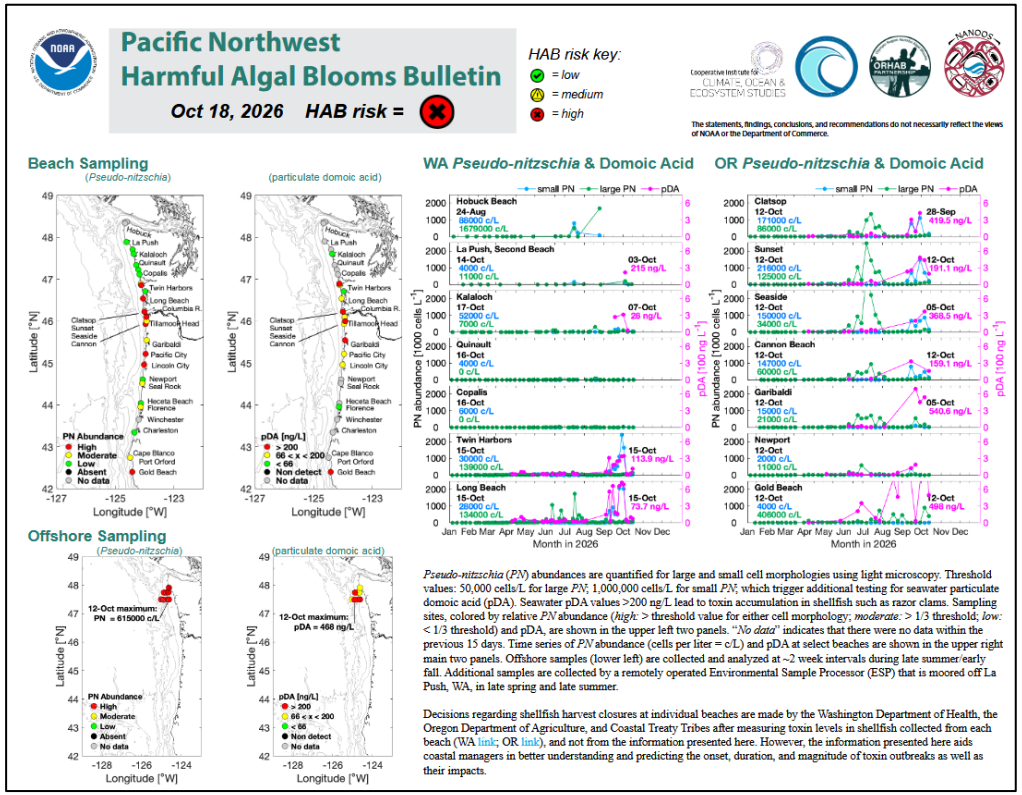




Public Health Safeguarding

NANOOS partners with and funds networks to sample, analyze for algal toxins, and post a bulletin to warn managers and public health officials who are responsible for issuing shellfish harvesting closures. Accuracy is vital: a non-closure can cost lives; a closure costs economic vitality.

"Early warning of risk allows us to adjust sampling and better protect the health of coastal residents."

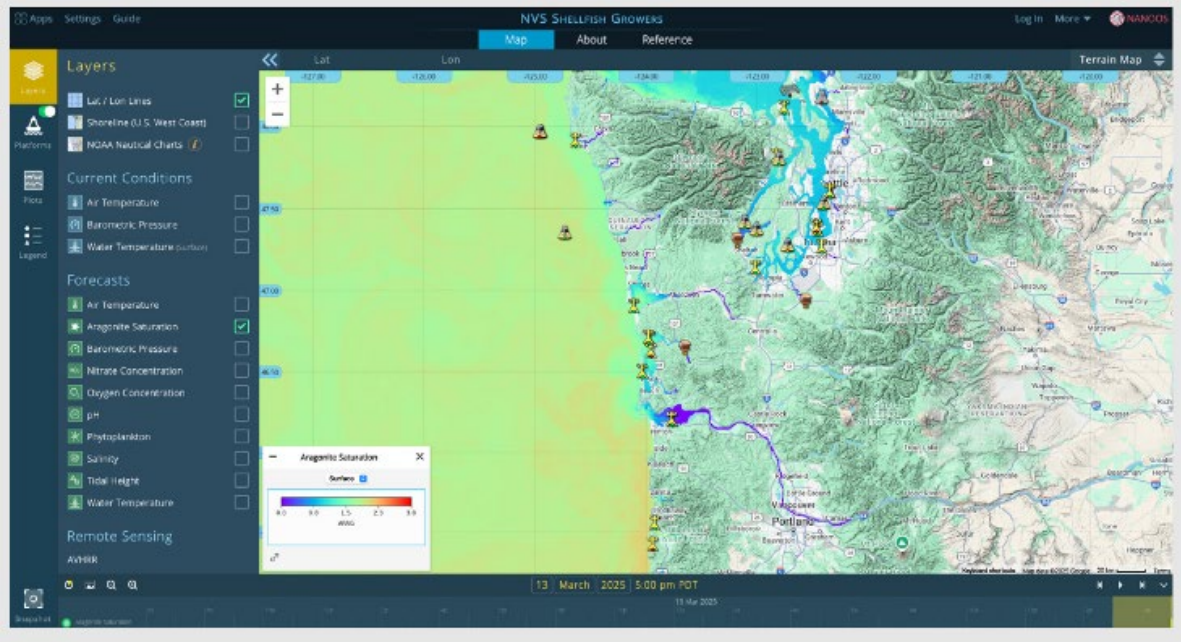




Seafood Competitiveness

NANOOS' network of real-time sensors and forecast models informs shellfish growers when most favorable growing conditions occur, working with the industry to get them the data they need. This protects jobs and hardens U.S. seafood markets from international competition.

"This current generation of shellfish farmer is reliant upon data and services from NANOOS."

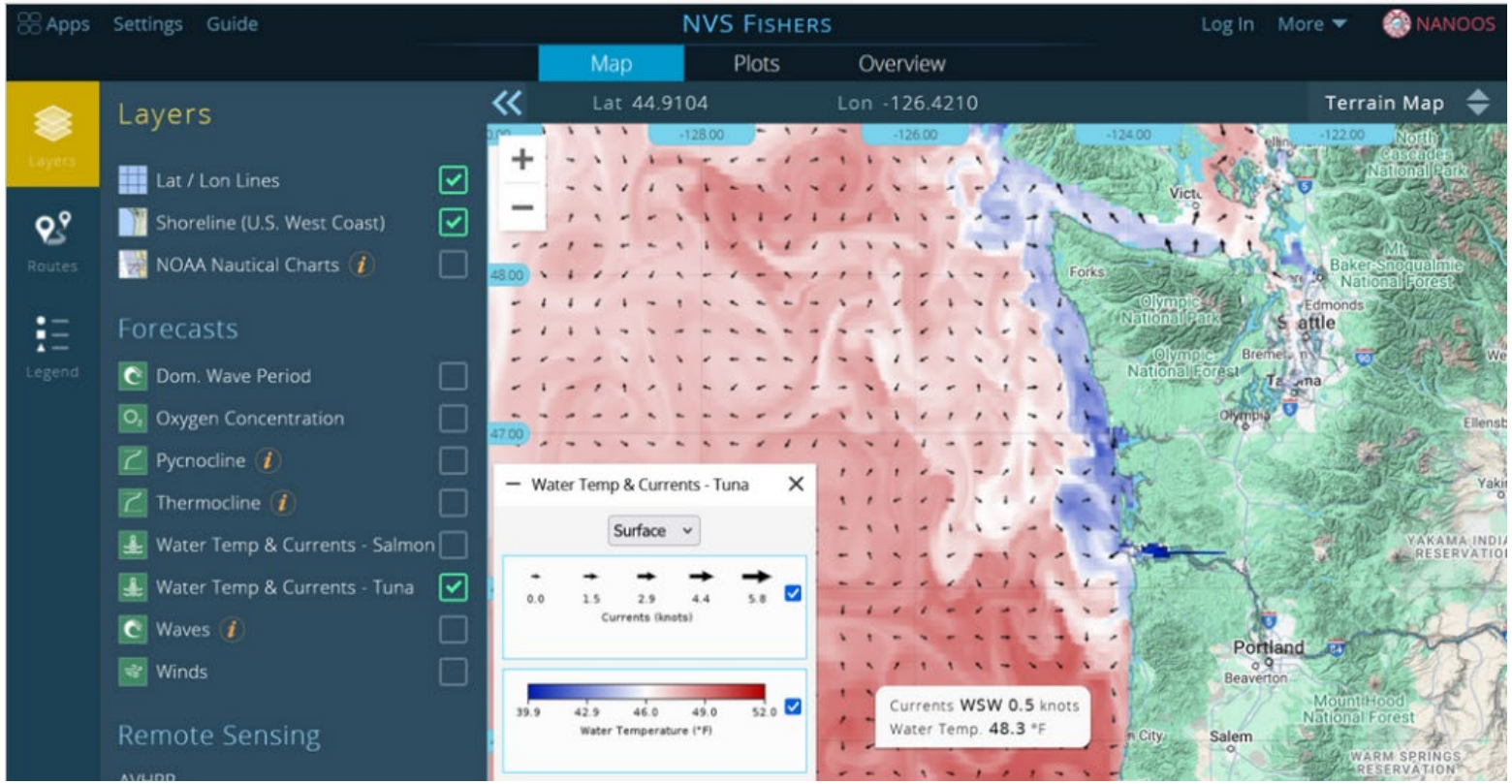




Fishing Commerce Support

NANOOS funded models and real-time buoy data are combined into an app that easily shows information for both vessel safety and favorable fish conditions.

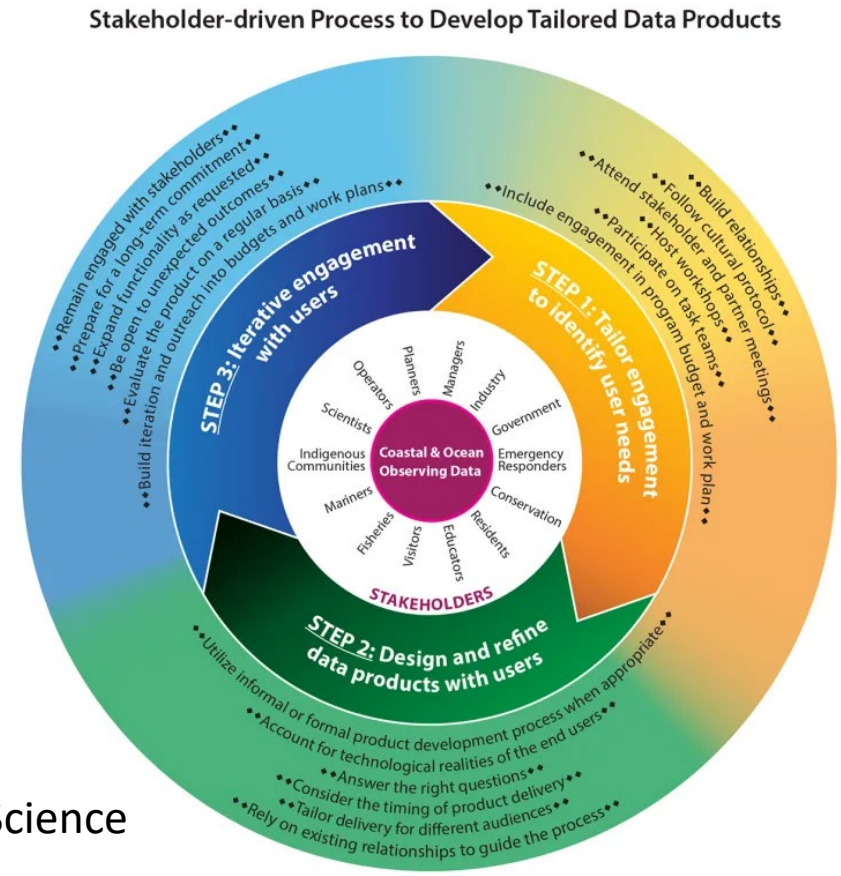
"This excellent product benefits sport and commercial anglers directly, letting us be more effective and safe at the same time. This is what good government looks like and we need to protect these services."





Keys to success:

- Value proposition that starts with needs and audience
- Iterative communication to build trust
- Sustained services
- Interoperability



Iwamoto et al., 2019, Frontiers Marine Science (OceanObs'19 edition)

NSF's Convergence Accelerator

IOOS Integrated Ocean Observing System



Support collection, stewardship, and use of wave data that complements existing knowledge and **enhances safety at sea** in a changing ocean.

BACKYARD BUOYS



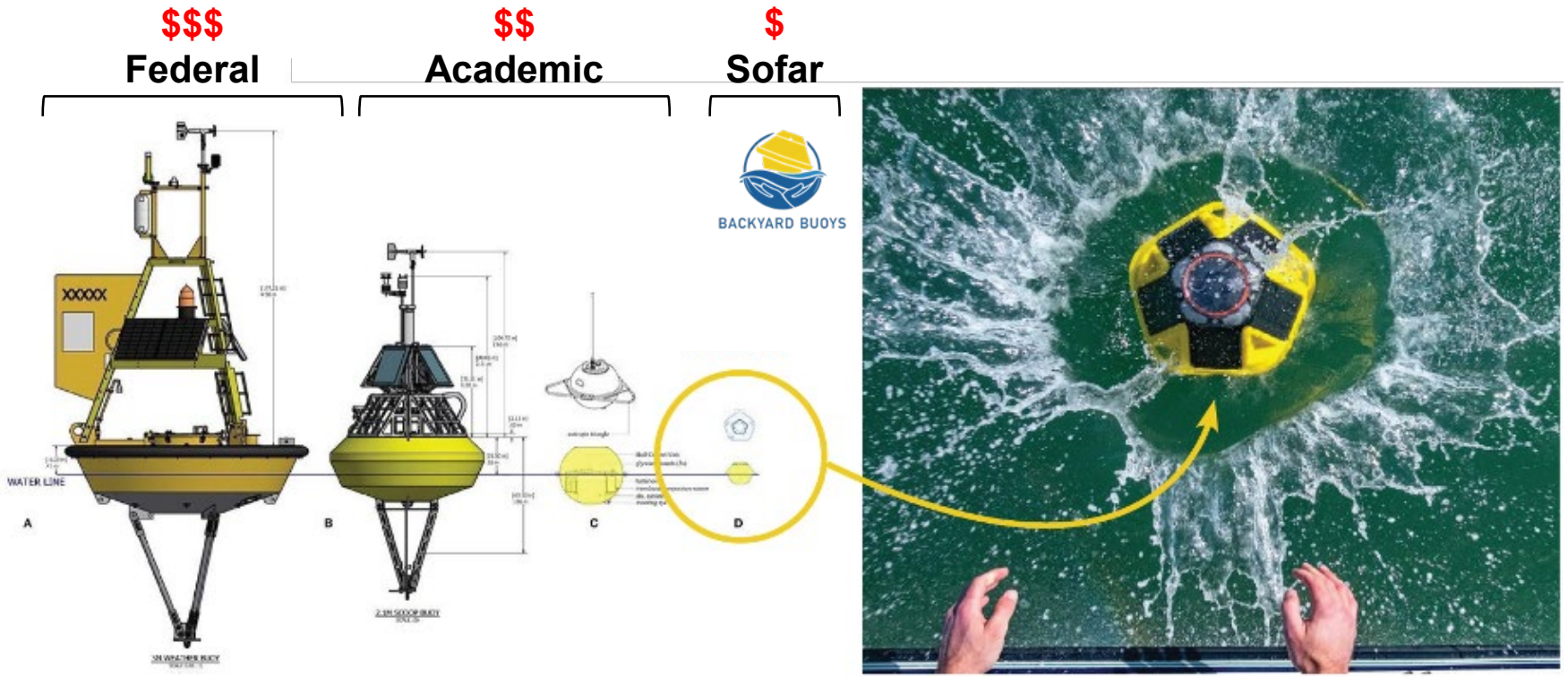




LOWER-COST TECH

BACKYARD BUOYS

Insufficient wave data to support safety at sea



[Scale comparison of buoys]

TRUST AND CO-DESIGN

BACKYARD BUOYS

Co-designing from the start; co-producing throughout…



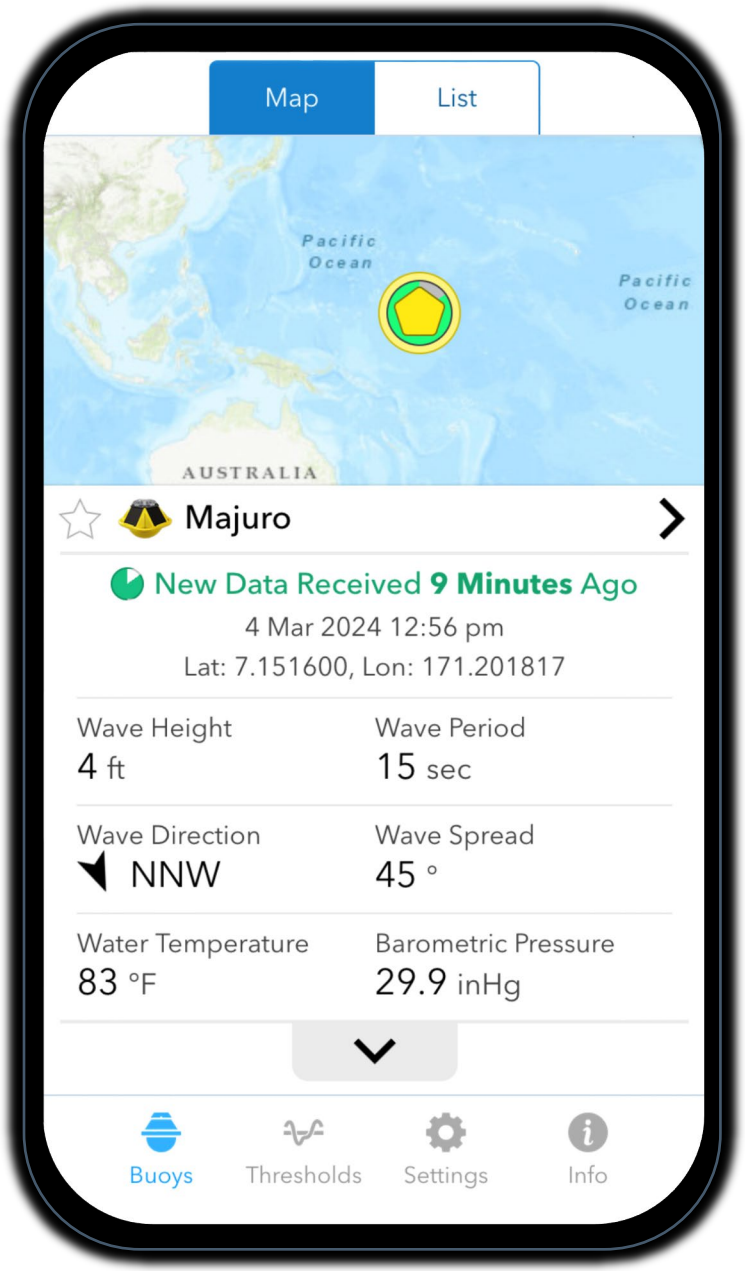
Working Groups:

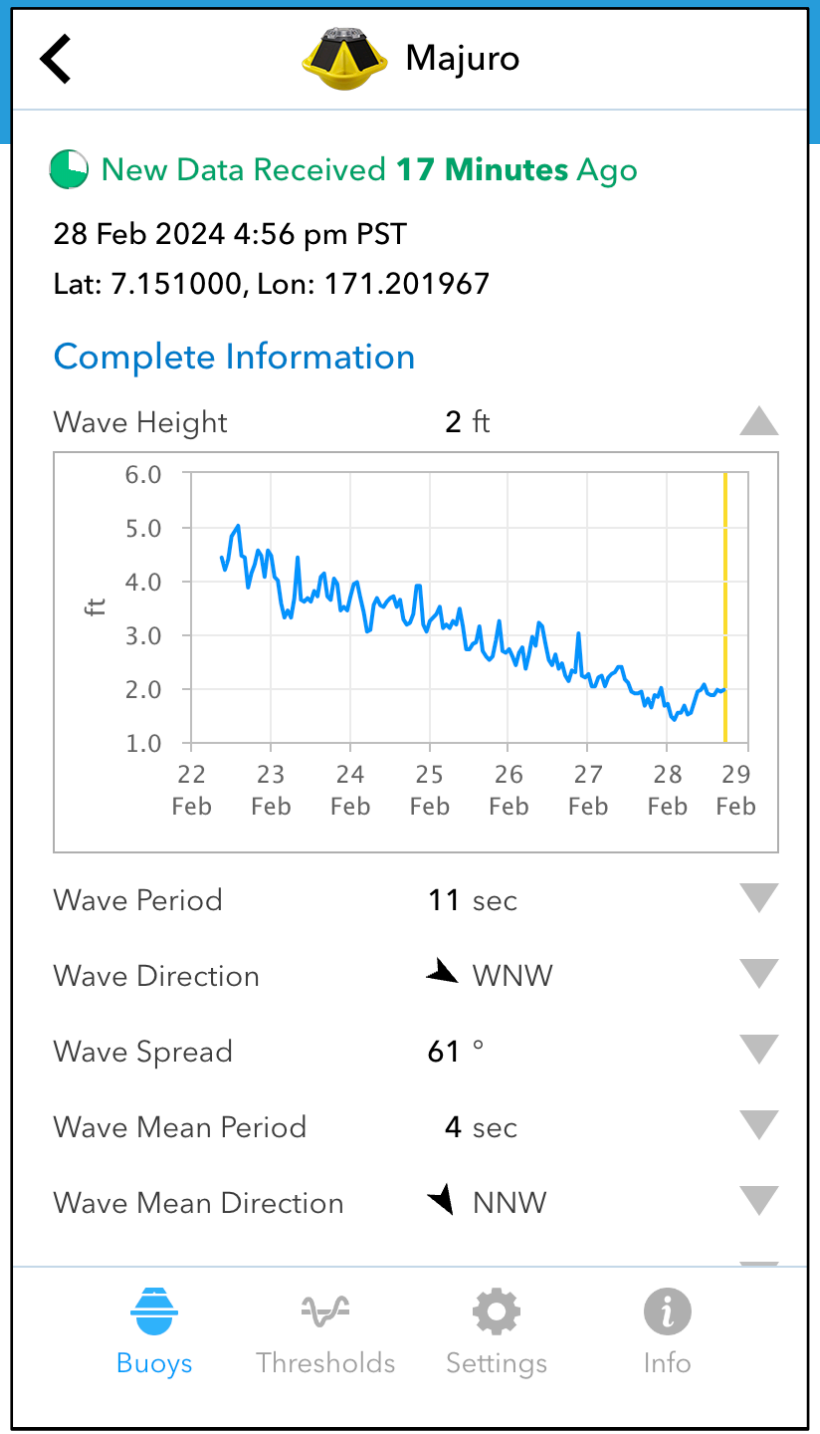
✓ Everyone is a full partner

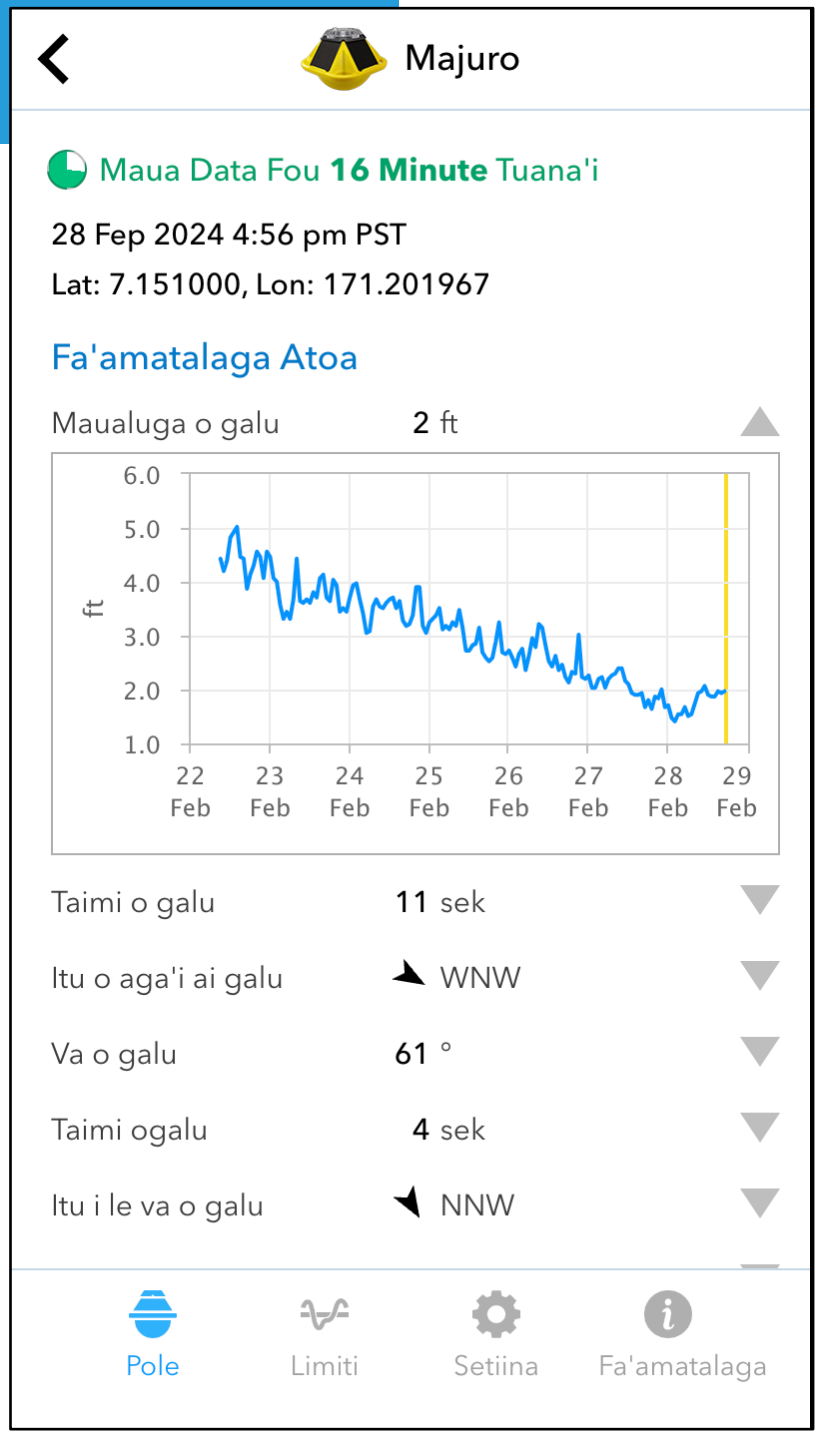
✓ Room for critical feedback



USEABILITY


Map
List
Pacific Ocean
Pacific Ocean
AUSTRALIA
Majuro
New Data Received 9 Minutes Ago
4 Mar 2024 12:56 pm
Lat: 7.151600, Lon: 171.201817
Wave Height
4 ft
Wave Period
15 sec
Wave Direction
NNW
Wave Spread
45 °
Water Temperature
83 °F
Barometric Pressure
29.9 inHg
Buoys
Thresholds
Settings
Info


Majuro
New Data Received 17 Minutes Ago
28 Feb 2024 4:56 pm PST
Lat: 7.151000, Lon: 171.201967
Complete Information
Wave Height 2 ft
6.0
5.0
4.0
3.0
2.0
1.0
ft
22 Feb
23 Feb
24 Feb
25 Feb
26 Feb
27 Feb
28 Feb
29 Feb
Wave Period 11 sec
Wave Direction WNW
Wave Spread 61 °
Wave Mean Period 4 sec
Wave Mean Direction NNW
Buoys
Thresholds
Settings
Info


Majuro
Maua Data Fou 16 Minute Tuana'i
28 Fep 2024 4:56 pm PST
Lat: 7.151000, Lon: 171.201967
Fa'amatalaga Atoa
Maualuga o galu 2 ft
6.0
5.0
4.0
3.0
2.0
1.0
ft
22 Feb
23 Feb
24 Feb
25 Feb
26 Feb
27 Feb
28 Feb
29 Feb
Taimi o galu 11 sek
Itu o aga'i ai galu WNW
Va o galu 61 °
Taimi ogalu 4 sek
Itu i le va o galu NNW
Pole
Limiti
Setiina
Fa'amatalaga



www.backyardbuoys.org

BACKYARD BUOYS

BACKYARD BUOYS

Alaska (AOOS)



Pacific Northwest (NANOOS)



Pacific Islands (PacIOOS)



Photo credit: (left to right) Lloyd Pikok, Jr., UIC Science; Dennis Wise, UW; Marshall Islands Conservation Society.

Backyard Buoys is creating momentum and demonstrating how the network can co-develop ocean knowledge with coastal communities to support decisions affecting lives everyday.

Dedicated Issue on Capacity Sharing

BACKYARD BUOYS



Oceanography THE OFFICIAL MAGAZINE OF THE OCEANOGRAPHY SOCIETY

HOME | ABOUT | VIEW ISSUES | SUBSCRIBE

ORDER ISSUES | AUTHOR GUIDELINES | PERMISSIONS | ADVERTISING

Early Release

OPEN ACCESS

SPOTLIGHT • Backyard Buoys: Meeting Needs of Coastal, Indigenous Communities Through Co-Design and Co-Production

By Jan Newton, Sheyna Wisdom, Melissa Iwamoto, Roxanne Carini, Jordan Watson, Sebastien Boulay, Duncan Mactavish, Jennifer Hagen, Joe Schumacker, Dua Rudolph, Dolores deBrum-Kattil, Pua Tuaua, Eric Brown, Scott Burch, John Hopson Jr., and Jenny Evans

- Published Online: September 23, 2024
- https://doi.org/10.5670/oceanog.2025.105
- Full Article: PDF

Newton et al. 2024, Oceanography

Many "Wins"

- Communities get useful data
- Scientists engage in real-life applicability of their knowledge
- Communities have autonomy over data
  - All to date are sharing to improve forecasts
- Creation of hyperlocal wave data

But…

- What about in urban areas?
- What about globally?
- “Increasing ocean observation to serve society: *What does it take*?”

- What model holds?
  - Place-based
  - Connection





Increasing ocean observation to serve society: *What does it take?*