Northwest Association of Networked Ocean Observing Systems

The Integrated Ocean Observing System (IOOS)
Regional Association for the Pacific NW

IOOS

www.nanoos.org

1. Call to Order
Welcome, Introductions, Charge for the Day

David Martin
NANOOS GC Board Chair

2. NANOOS update

Jan Newton
NANOOS Executive Director

Northwest Association of Networked Ocean Observing Systems

The Integrated Ocean Observing System (IOOS)
Regional Association for the Pacific NW

IOOS

www.nanoos.org

NANOOS Governing Council Members 8/2018

NORTHWEST ASSOCIATION OF NETWORKED OCEAN OBSERVING SYSTEMS

WASHINGTON - OREGON - NORTHERN CALIFORNIA

IOOS

1. Ocean Inquiry Project
2. OR Dept of Land Conservation & Development
3. Surfrider Foundation
4. The Boeing Company
5. Oregon State University
6. Oregon Sea Grant
7. Puget Sound Partnership
8. University of Washington
9. Washington Sea Grant
10. WET Labs, Inc.
11. Oregon Health and Science University
12. Quileute Indian Tribe
13. OR Dept of Geology and Mineral Industries
14. Humboldt State University
15. Marine Exchange of Puget Sound
16. WA Dept of Ecology
17. Pacific Northwest National Laboratory
18. Port of Newport
19. Puget Sound Harbor Safety Committee
20. Sound Ocean Systems, Inc.
21. Council of American Master Mariners
22. Pacific Northwest Salmon Center (& HCSEG)
23. Northwest Indian Fisheries Commission
24. Sea-Bird Electronics, Inc.
25. Western Association of Marine Laboratories
26. Science Applications International Corporation
27. OR Dept of Fish and Wildlife
28. King County Dept Natural Resources & Parks
29. Quinault Indian Nation
30. Western Resources and Applications
31. OR Dept of State Lands
32. Columbia River Crab Fisherman's Association
33. Port of Neah Bay
34. Northwest Research Associates
35. Pacific Ocean Shelf Tracking Project
36. WA Dept of Fish and Wildlife
37. Northwest Aquatic and Marine Educators
38. Seattle Aquarium
39. NOAA Northwest Fisheries Science Center
40. Port Gamble S'Klallam Tribe
41. The Nature Conservancy
42. Portland State University
43. NOAA Olympic Coast National Marine Sanctuary
44. University of Victoria
45. University of Oregon
46. Port Townsend Marine Science Center
47. Intellicheck-Mobilisa
48. NortekUSA
49. Grays Harbor Historical Seaport Authority
50. Pacific Coast Shellfish Growers Association
51. US Army Corps Engineers
52. Olympic National Park
53. Oak Harbor Middle School
54. Vancouver Island University
55. Ocean Networks Canada
56. Lower Columbia Estuary Partnership
57. Western Washington University
58. Raincoast GeoResarch
59. WA Dept of Health
60. Say Yes to Life Swims
61. NOAA PMEL
62. Hakai Institute
63. Salish Sea Expeditions
64. Aquatic Innovations Research
65. Long Live the Kings
66. Rockland Scientific

KEY: Tribes Industry NGO Academia/Research Federal/State/Local Government

New NANOOS members

- **Rockland Scientific**
- **Salish Sea Institute, WWU**

Welcome !

Coastal ocean:

Northern extent of California Current

Winds, topography, freshwater input, ENSO & other climate cycles

Major inland basins:

Puget Sound-Georgia Basin, Columbia River

Urban centers, nearshore development, climate variation

Coastal estuaries:

Willapa Bay, Grays Harbor, Yaquina Bay, Coos Bay, +20

Resource extraction, development, climate

Shorelines:

Rocky to sandy, dynamic: storms, erosion

Winds, development, climate

Major rivers:

Columbia River (~75% FW input to Pacific from US WC)

many rivers (e.g., Fraser, Skagit) via Strait Juan de Fuca

Dredging, water regulation, climate change

NANOOS Region User Groups:

Maritime: shipping, oil transport/spill remediation

Fisheries: salmon, shellfish, crab, groundfish, aquaculture

Environmental management: HABs, hypoxia

Shoreline: erosion, inundation

Hazards: Search and rescue, national security

Educators: formal, informal, research

Marine recreation: boating, surfing, diving

NANOOS "Effort versus Application" Map for Observing and Modeling

KEY:

Italicized efforts indicate new investment

- Currently directly supports
- Currently indirectly supports
- Proposed to directly support
- Proposed to indirectly support
- Not applicable
- *no ...* — Text explains the current gap the proposed activites fill

NANOOS Objectives for FY2018

1) Maintain **NANOOS as the U.S. IOOS PNW Regional Association**

2) Maintain **surface current and wave mapping** capability.

3) Sustain **existing buoys and gliders in the PNW coastal ocean**, in coordination with other national programs.

4) Maintain **observation capabilities in PNW estuaries**, in coordination with local and regional programs.

5) Maintain **core elements of beach and shoreline observing** programs, in coordination with state programs.

6) Provide sustained support to a **community of complementary regional numerical models**.

7) Maintain NANOOS' Data Management and Communications (DMAC) system for **routine operational distribution of data and information**.

8) Continue to **deliver existing and, to the extent possible, create innovative and transformative user-defined products and services** for PNW stakeholders.

9) Sustain **NANOOS outreach, engagement and education** efforts.

NANOOS budget:

FY07-09: $1.4M + 0.4M = $1,800,000

Year 1, 2, 3

FY10: $1.7M + 0.4M = $2,100,000

Year 4

FY11: $2,087,500 *(w/ new start date)*

Year 5 or 1 of new 5-y award

FY12: $2,428,291 ($2,288,000 base; ~$140K for DMAC, OA workshops)

Year 6 or 2

FY13: $3,089,477 ($2,392,136 base; ~$700K for OTT on OA plus OAP)

Year 7 or 3

FY14: $2,818,441 ($2,442,136 base; $109K HF; $217K OAP; $50K glider)

Year 8 or 4

FY15: $2,771,890 ($2,462,136 base; $309K OAP)

Year 9 or 5

FY16: $2,848,900 ($2,452,552 base; $317K OAP; $79K adds)

Year 10 or 1 of new 5-y award

FY17: $3,216,463 ($2,457,136 base; $360K HFR; $282K OAP; $117K adds)

Year 11 or 2

FY18: $3,264,472 ($2,462,136 base; $180K HFR; $330K OAP; $291K adds)

Year 12 or 3

NANOOS budget:

FY18: $3,264,472 ($2,462,136 base; $180K HFR; $330K OAP; $291K adds)
Year 12 or 3

HFR

- $180,000 for the installation and O&M of two Washington coast HF radars

OTT

- $60,000 for the Ocean Technology Transfer to continue OA experts for growers observations (40/20)
- $90,700 for the Ocean Technology Transfer to continue HAB forecasting via ESP (62.2/28.5)
- $70,000 for new Ocean Technology Transfer to test a novel AUV technology for HAB sampling

OAP

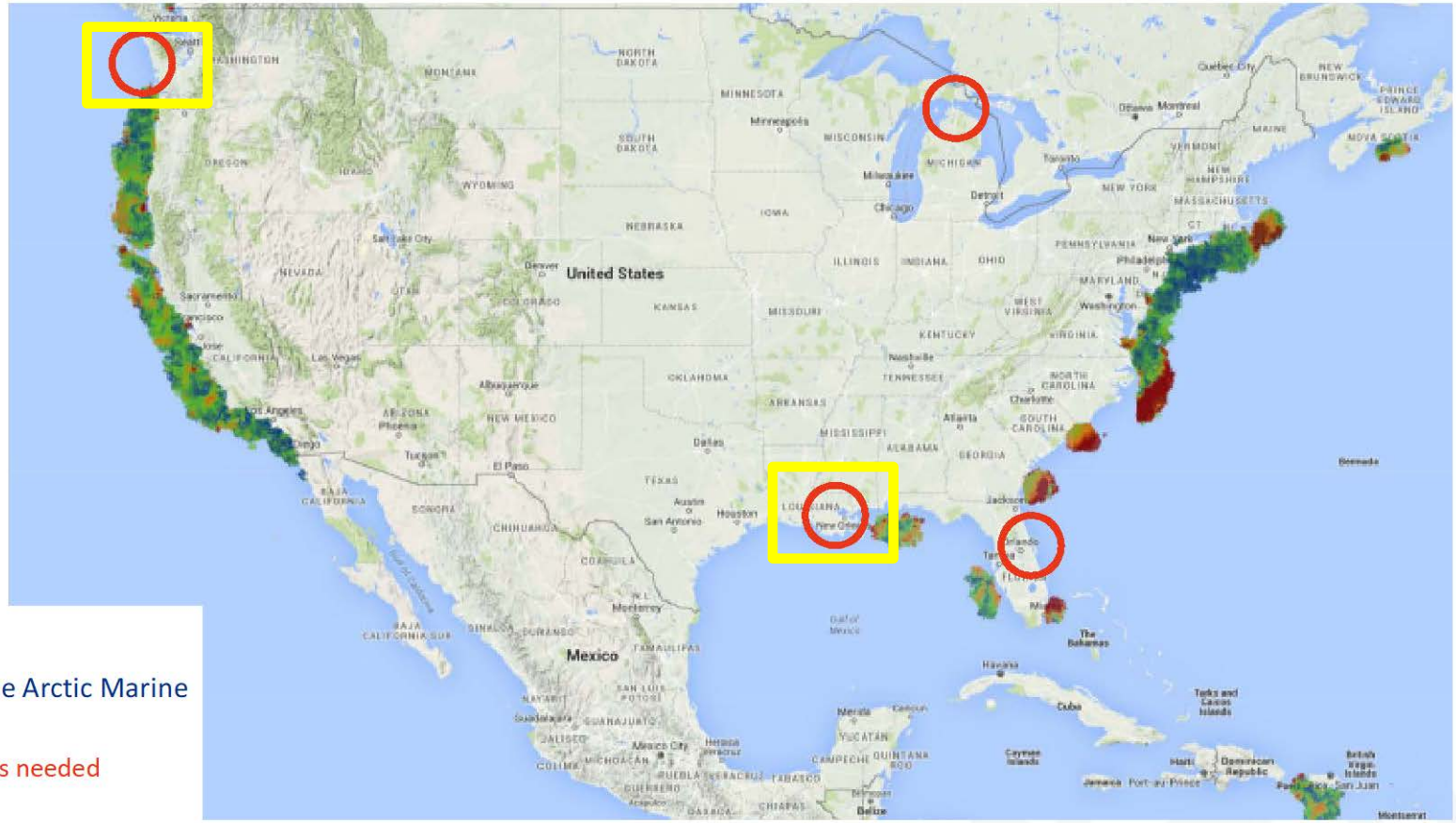
- $125,845 for NANOOS Ocean Acidification observations in Oregon Coastal Waters (OSU)
- $66,291 for NANOOS Ocean Acidification observations in Washington Coastal Waters (UW)
- $51,500 to enhance the GOA-ON data portal as an OA dashboard to the World (Newton)
- $68,000 to support GOA-ON workshops for three purposes: global #4, N. American hub, timeseries

Other IOOS

- $75,000 for OSU to test data assimilation for modeling (COMT)
- $15,000 for NANOOS to incorporate priority biological data (Biology)

US IOOS FY 17 High Frequency Radar Request

$3.1 million to install 12 high frequency radar systems



Safeguarding the Arctic Marine Highway

2 remote radars needed

Protecting Lives and Public Health in the Pacific Northwest

3 radars needed

Cleaning up the Great Lakes

3 radars needed

Saving Lives off Florida's Coast

2 radars needed

Saving Millions in the Gulf of Mexico

3 radars needed

IOOS | EYES ON THE OCEAN

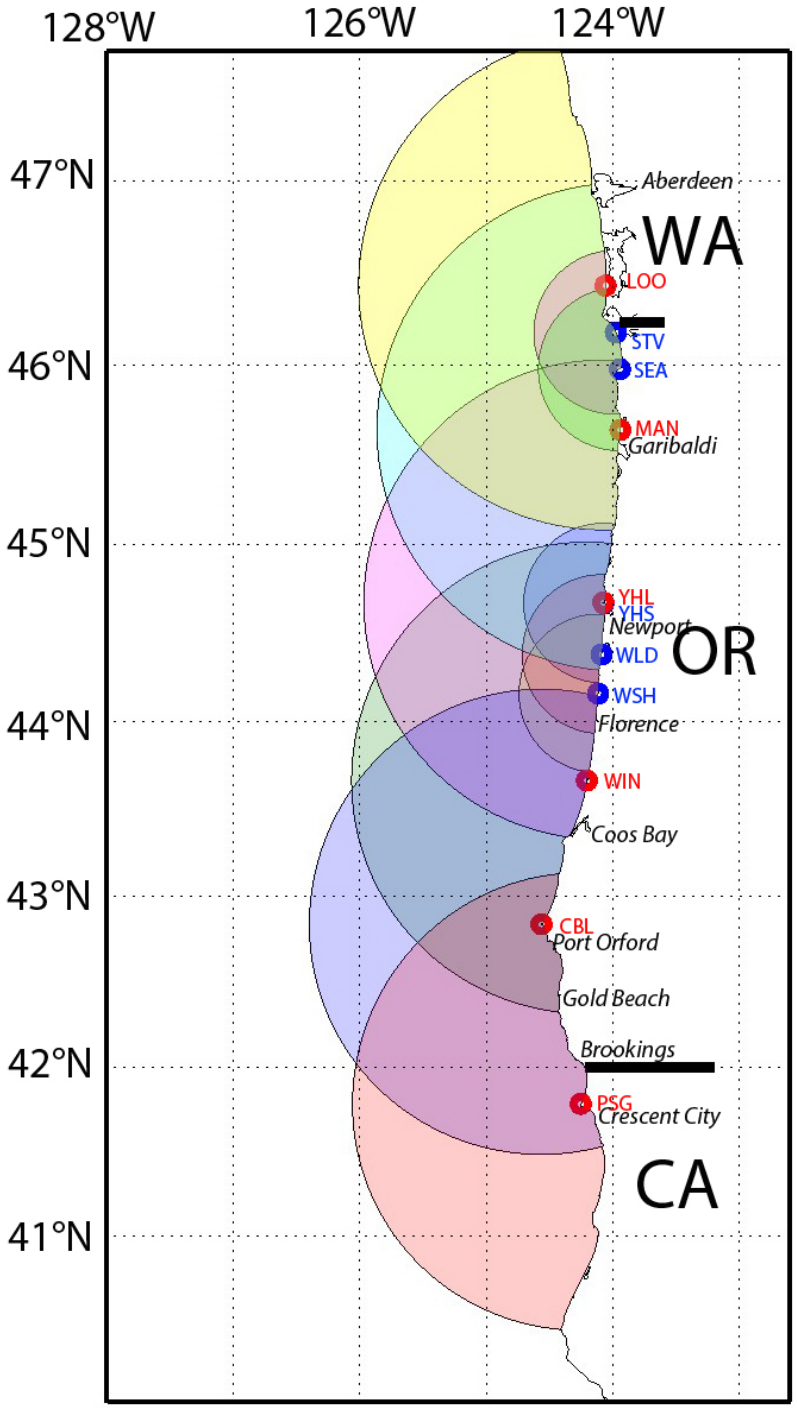
NANOOS HF surface current mapping

Mike Kosro, PI
Anne Dorkins, Erik Arnesen

11 HF surface current mapping sites (Codar Seasondes).
6 Long-Range (4.785 MHz, 150km range, 6km range resolution)
5 Standard-Range (12-13 MHz, 50km range, 2km range resolution)

Each site measures “radial” currents in a semi-circular region (1-D currents toward/away from site)

Where measurements from 2 separate sites are available, can determine the 2D surface current.



NANOOS HF system consistently ranks highly in operational "up-time"

24/7/365: how well do we do?
80% "uptime" is the target.

Location	Q1	Q2	Q3	Q4	FY
CariCOOS	50%	68%	69%	84%	73%
CENCOOS	84%	82%	81%	80%	82%
GCOOS	58%	75%	76%	63%	68%
MARACOOS	85%	75%	79%	83%	79%
NANOOS	94%	90%	87%	88%	90%
NERACOOS	82%	78%	39%	52%	63%
PACIOOS	82%	73%	63%	83%	74%
SCCOOS	82%	77%	84%	84%	82%
SECOORA	95%	94%	90%	83%	91%
All	**79%**	**79%**	**74%**	**78%**	**78%**

https://hfrnet.ucsd.edu/diagnostics/

Goals for WA HF for (national) Closing the Gaps:

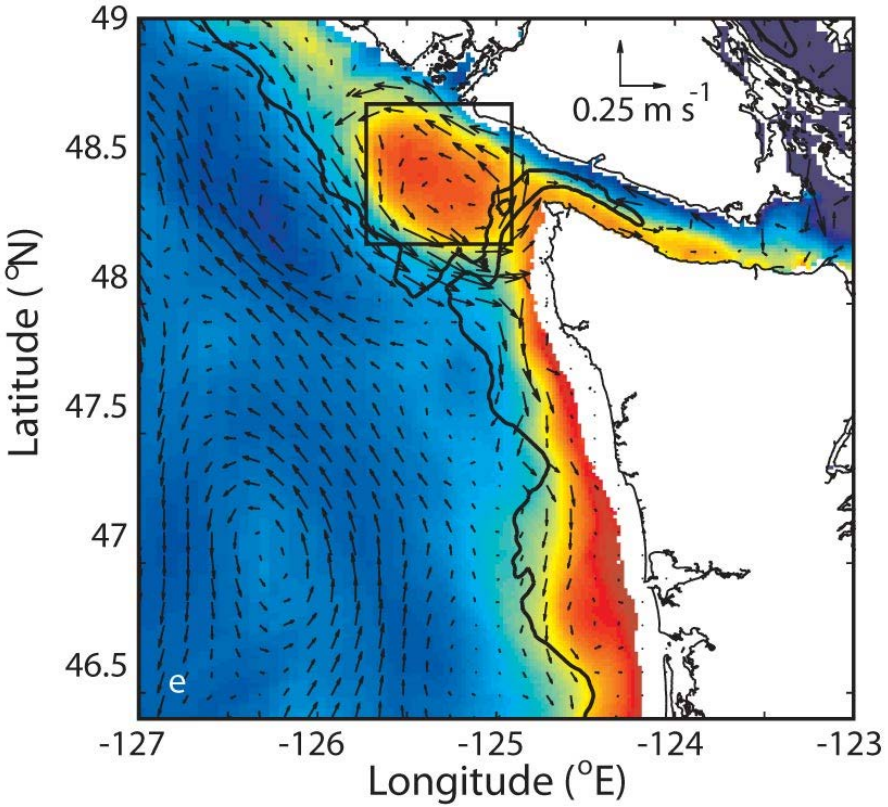
Complete the US west coast map

Meet and join with Canadian system in S.J.F.

Expose full path of coastal currents

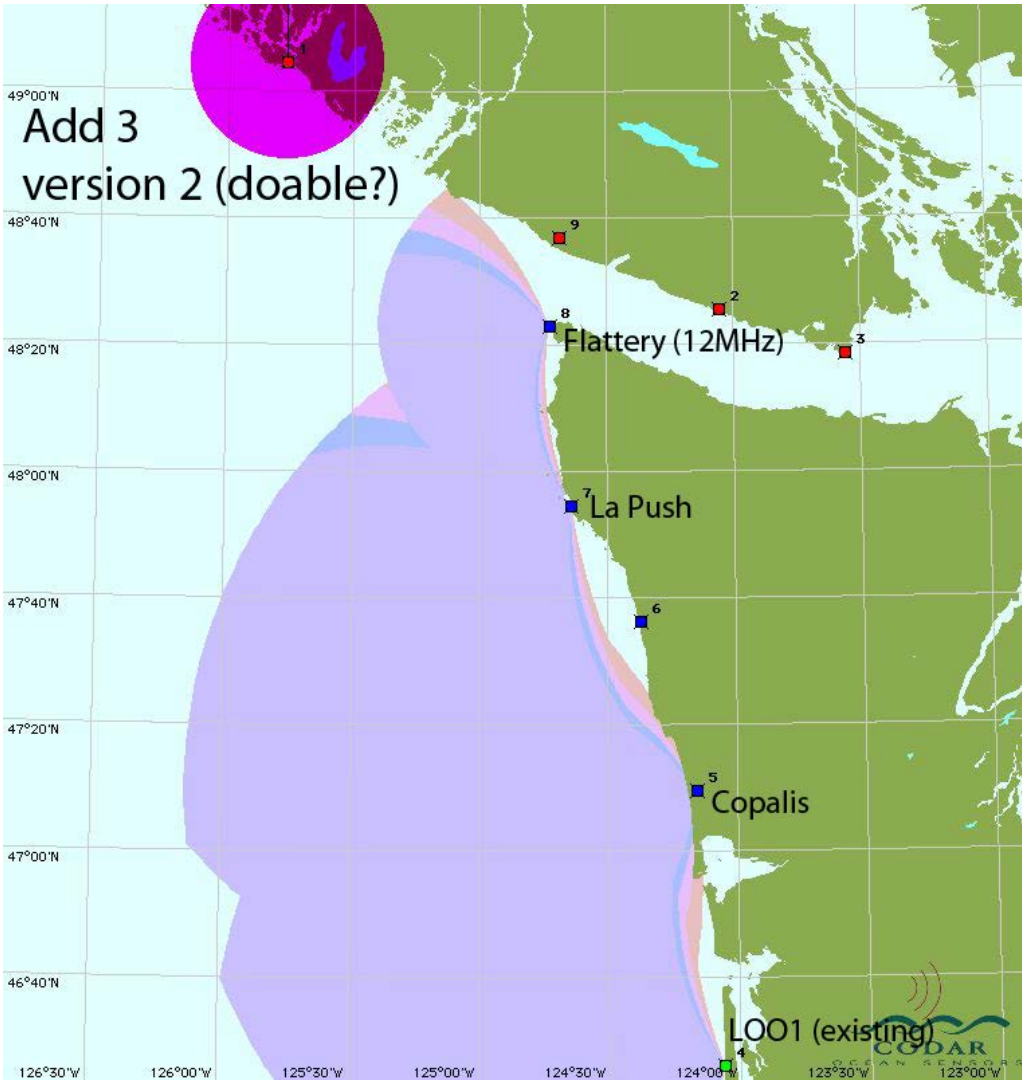
Illuminate processes in the JdF Eddy, a HAB incubator

As the first project in the IOOS "Closing the Gaps" campaign, NANOOS proposed to add 3 additional HF radars on the Washington outer coast, completing HF mapping along the US West Coast.
Funded for 2 new radars!



** NANOOS was one of the 5 regions funded under Closing the Gaps to add HF radars. Two new radars.

Initial strawman for new coverage:



Initial plan: add sites in
S. Wash: Copalis area
C. Wash: La Push
N. Wash: Cape Flattery

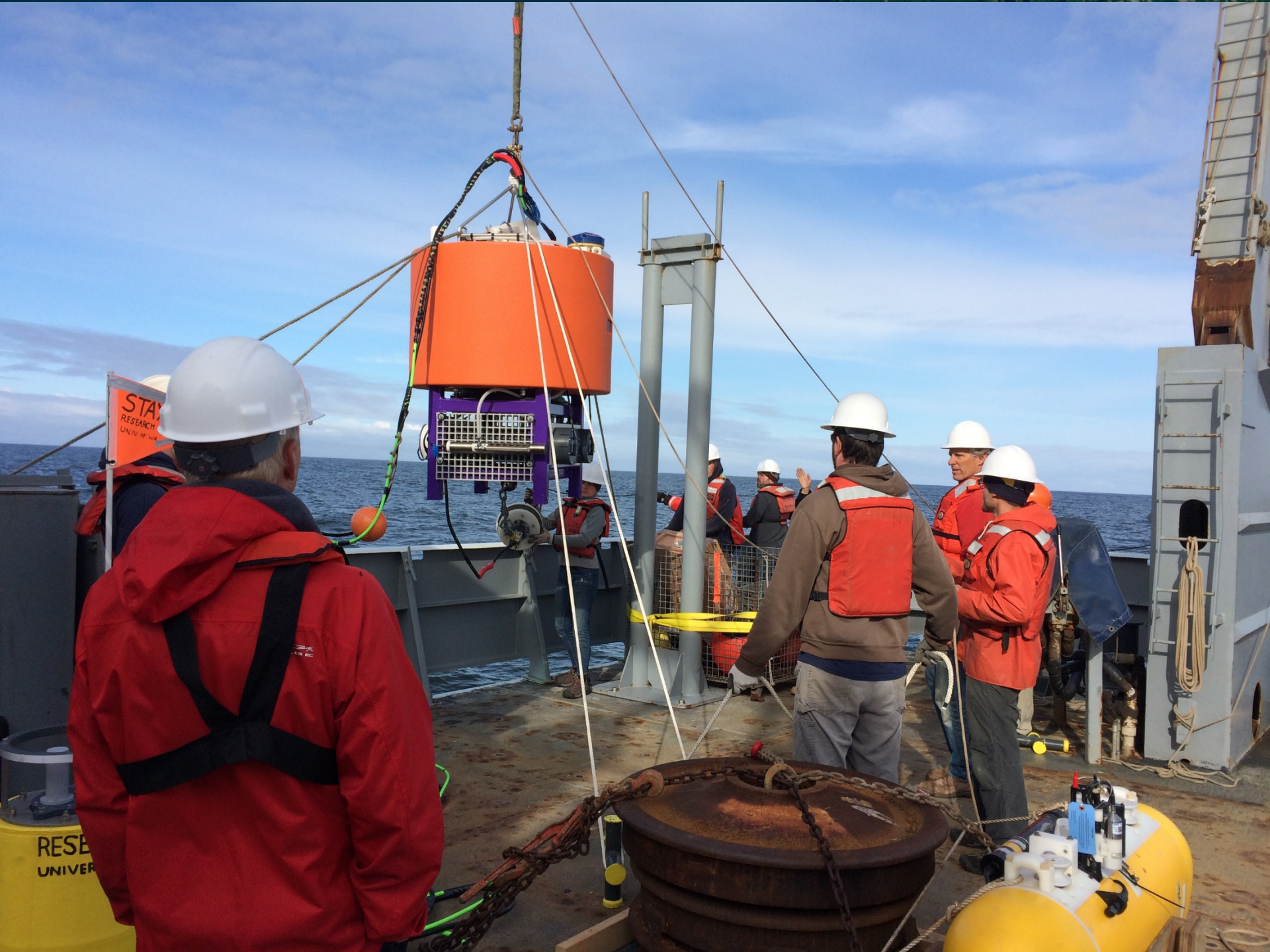
Difficulties:

- Remote coast
- Lack of power
- Obstructing headlands
- Wide beaches
- Cars on beaches

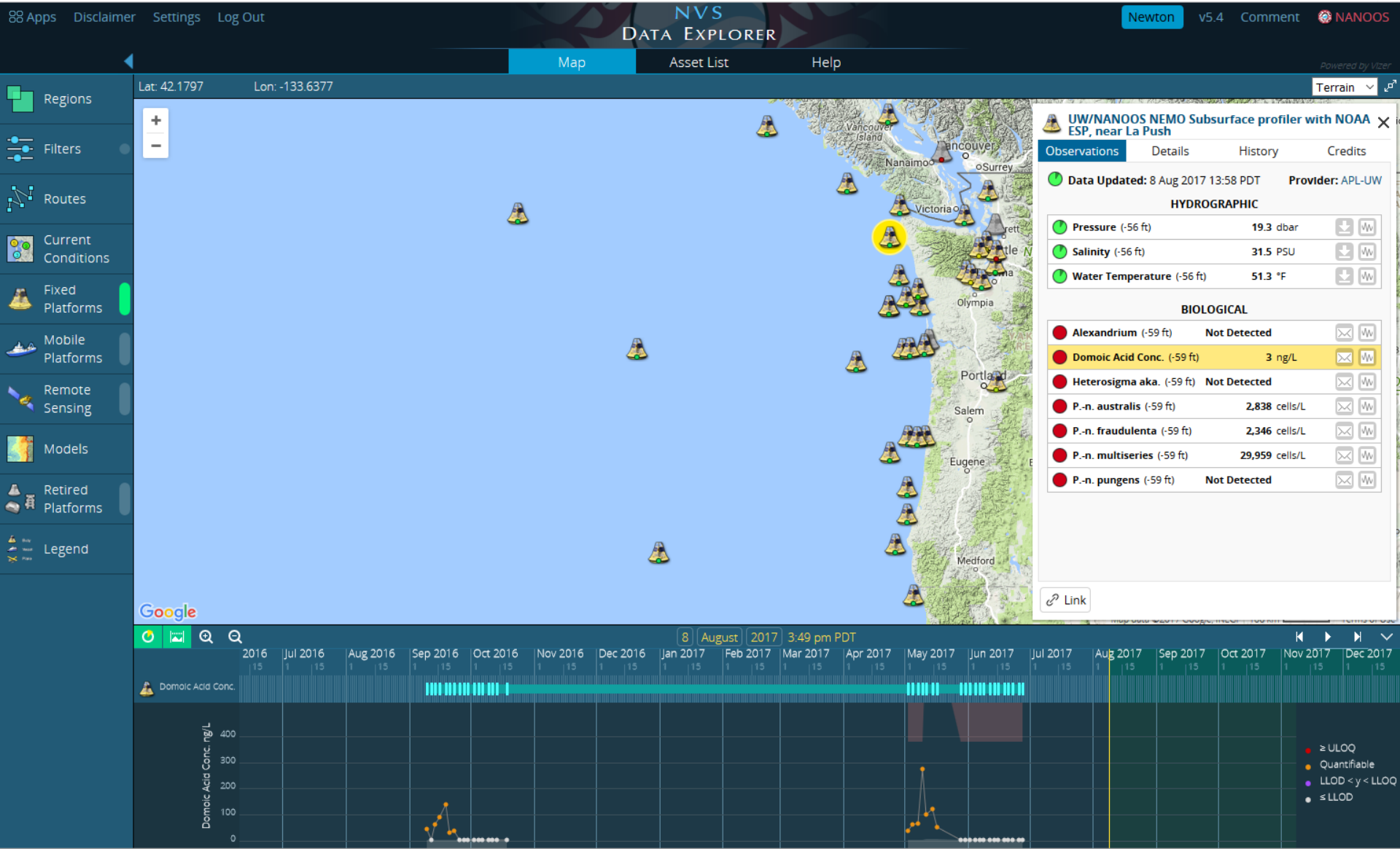
OTT: HABs

"Operational ecological forecasting of harmful algal blooms in the Pacific Northwest using an environmental sample processor"

- ESP on Cha'ba at La Push
- UW, NOAA NWFSC, MBARI, NOAA CCEHBR, NWIC, Spyglass, WHOI
- Detects *Pseudo-nitzschia* cells, species, toxicity
- Strong support from coastal tribes, WA managers
- Tested in PS 2015; NANOOS served data: "Real-Time HABs"
- Deployed off coast May-July'16, Sep-Oct '16, May-July '17, and Sep '17



HABs on NVS


Apps
Disclaimer
Settings
Log Out
NVS
Data Explorer
Newton
v5.4
Comment
NANOOS
Map
Asset List
Help
Regions
Filters
Routes
Current Conditions
Fixed Platforms
Mobile Platforms
Remote Sensing
Models
Retired Platforms
Legend
Lat: 42.1797
Lon: -133.6377
Terrain
Vancouver Island
Nanaimo
Victoria
Olympia
Portland
Salem
Eugene
Medford
Google
UW/NANOOS NEMO Subsurface profiler with NOAA ESP, near La Push
Observations
Details
History
Credits
Data Updated: 8 Aug 2017 13:58 PDT
Provider: APL-UW
HYDROGRAPHIC
Pressure (-56 ft) 19.3 dbar
Salinity (-56 ft) 31.5 PSU
Water Temperature (-56 ft) 51.3 °F
BIOLOGICAL
Alexandrium (-59 ft) Not Detected
Domoic Acid Conc. (-59 ft) 3 ng/L
Heterosigma aka. (-59 ft) Not Detected
P.-n. australis (-59 ft) 2,838 cells/L
P.-n. fraudulenta (-59 ft) 2,346 cells/L
P.-n. multiseries (-59 ft) 29,959 cells/L
P.-n. pungens (-59 ft) Not Detected
Link
8 August 2017 3:49 pm PDT
2016
Jul 2016
Aug 2016
Sep 2016
Oct 2016
Nov 2016
Dec 2016
Jan 2017
Feb 2017
Mar 2017
Apr 2017
May 2017
Jun 2017
Jul 2017
Aug 2017
Sep 2017
Oct 2017
Nov 2017
Dec 2017
Domoic Acid Conc.
Domoic Acid Conc. ng/L
400
300
200
100
0
≥ ULOQ
Quantifiable
LLOD < y < LLOQ
≤ LLOD

Real-time HABs

REALTIME HABs

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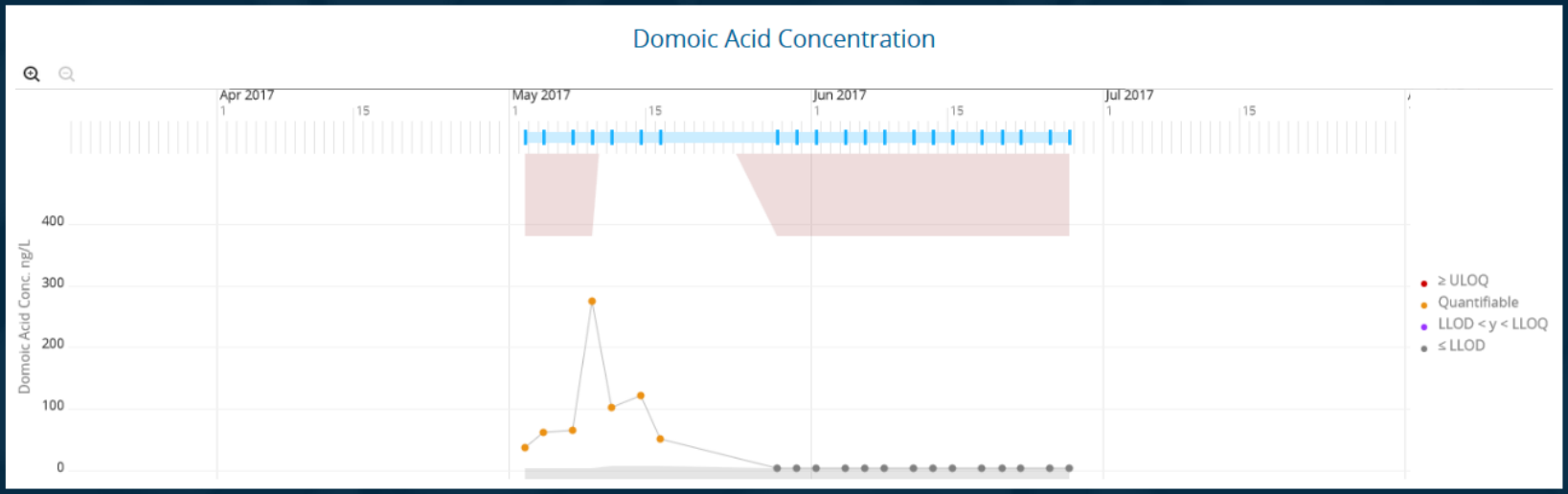
HAB Measurements | Water Measurements | HABs in NVS

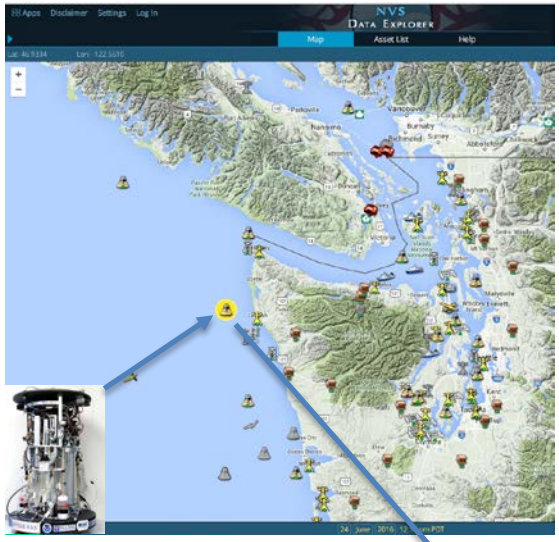
The latest water measurements at the NEMO Observatory site where the Environmental Sample Processor is located 13 miles off La Push, Washington. Data are updated in near-real time. These products are provided to help understand where toxic algae may be moving and the conditions that may influence toxic blooms.

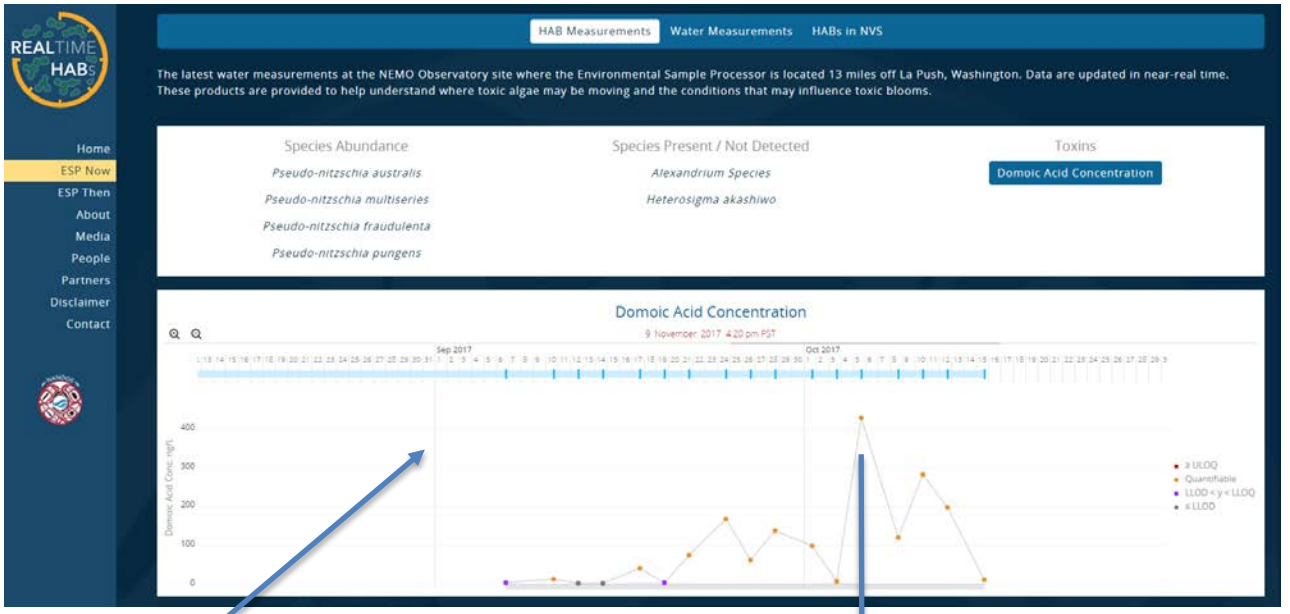
Species Abundance	Species Present / Not Detected	Toxins
Pseudo-nitzschia australis	*Alexandrium Species*	Domoic Acid Concentration
Pseudo-nitzschia multiseries	*Heterosigma akashiwo*	
Pseudo-nitzschia fraudulenta		
Pseudo-nitzschia pungens		

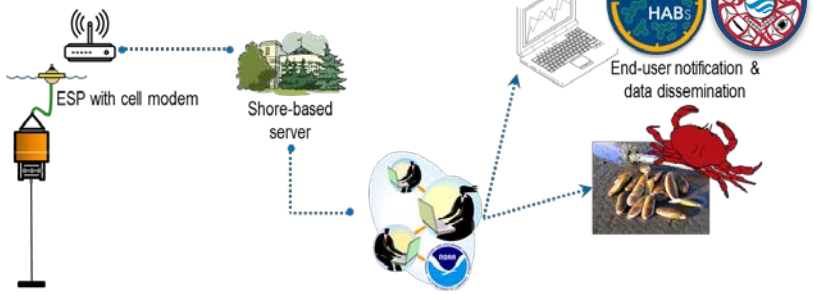


Concentration of particulate domoic acid in seawater. Domoic acid is a toxin produced by some species of phytoplankton in the genus *Pseudo-nitzschia*. If domoic acid concentrations are detected above the Lower Limit Of Quantification (LLOQ, see description below), this means that one or more *Pseudo-nitzschia* species are producing the toxin. There is no regulatory threshold for domoic acid in seawater, rather the toxin is regulated based on its concentration in the tissues of shellfish where 20 ppm is a "no-harvest" limit (see the Washington State Department of Health Beach Closures site). However, a high seawater domoic acid concentration may provide an early warning of a HAB event.

Can we protect against HABs?







Spike in domoic acid detected eve of razor clam opening weekend

**triggered analysis of additional razor clam samples that were determined to be safe*

Slide from Stephanie Moore, NWFSC, NOAA

State and tribal fisheries managers:

- *“Having the ESP as a tool should really help us understand what is going on in the off-shore and how it relates to what we are seeing near-shore…"* – Dan Ayres, WDFW
- *“Great information! We’re on our way to this being what we envision!”* – Joe Schumacker, Quinault Indian Nation
- *“So glad for the update...we are about to announce 3 months of razor clam harvesting dates...it is very comforting to know (ESP) Eddy is on the job!”* – Dan Ayres, WDFW

New HAB Forecast System to be Developed for PNW

NOAA's National Centers for Coastal Ocean Science (NCCOS) are funding development of a harmful algal bloom (HAB) forecast in the Pacific Northwest to support management of shellfisheries, clamming beaches, and human health. The experimental monitoring and forecasting system will launch in 2017, with forecast bulletins predicting bloom location and concentration several days in advance. This new development is a joint effort between NOAA, members of the Makah Tribe, the University of Washington, the University of Strathclyde, the Oregon Department of Fish and Wildlife, and NANOOS.

30 Sep 2016

View the NCCOS Article | Visit NANOOS' New Real-Time HAB Website

NOAA Funds Harmful Algal Bloom Forecast System Development in Pacific Northwest

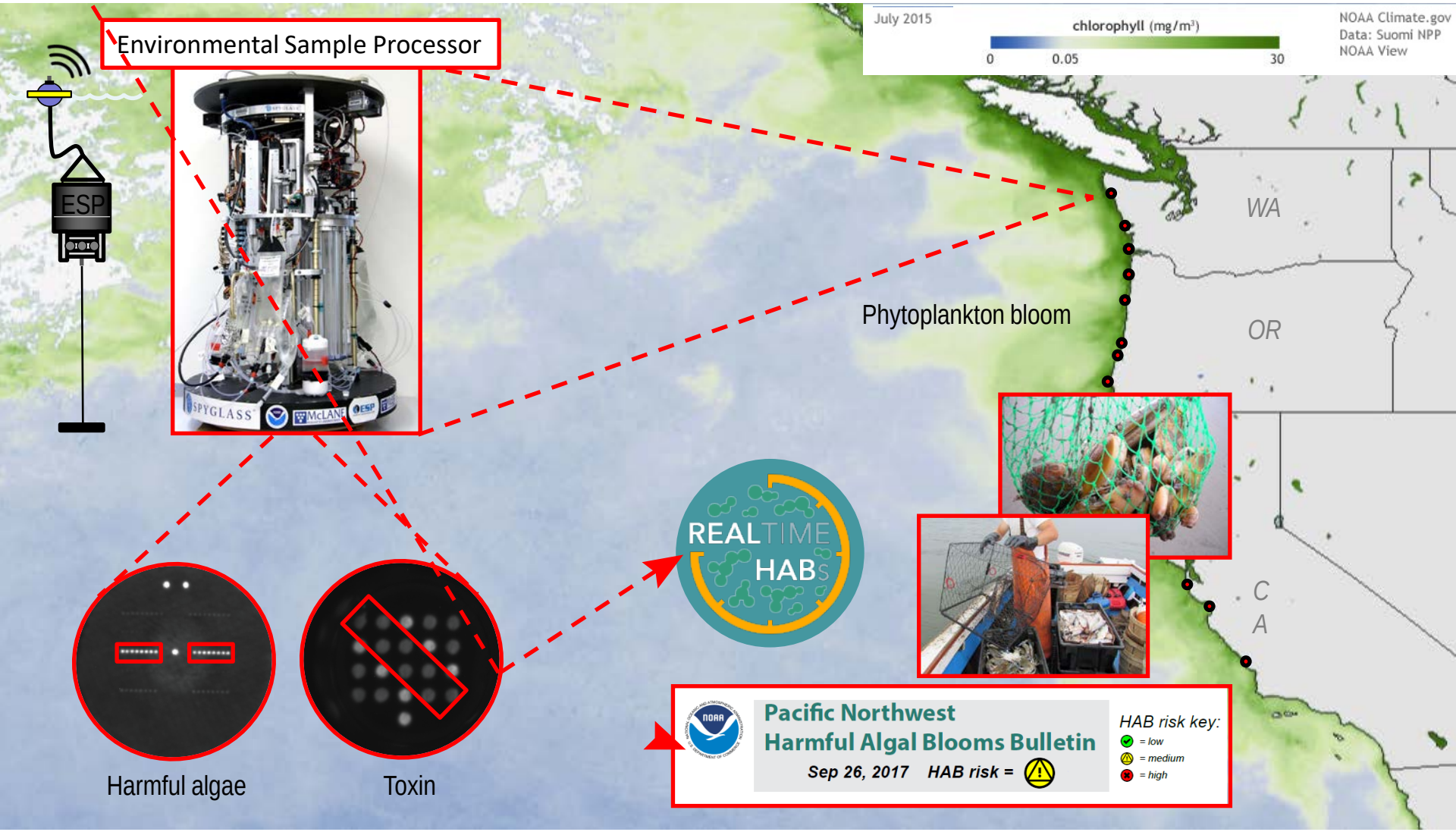
Posted on September 29th, 2016 (10 months ago) in Ecology & Oceanography, Forecasting, Harmful Algal Blooms, Marine Biotoxin Impacts, Monitoring & Event Response, Water Quality

NOAA's National Centers for Coastal Ocean Science (NCCOS) are funding development of a harmful algal bloom (HAB) forecast in the Pacific Northwest to support management of shellfisheries, clamming beaches, and human health. The experimental monitoring and forecasting system will launch in 2017, with forecast bulletins predicting bloom location and concentration several days in advance.

Annual outbreaks of the toxic algae Pseudo-nitzschia produce the neurotoxin domoic acid, which builds up in exposed shellfish and can cause amnesic shellfish poisoning (ASP) in humans. Commercial and recreational shellfisheries are therefore monitored for HAB toxins, and closed to prevent outbreaks of ASP. These closures can result in millions of dollars in lost harvests. For

Razor clams are an economically important shellfish harvest off the coasts of Oregon and Washington. Closures due to *Pseudo-nitzschia* exposure in 2015 led to $22.7 million in losses. Credit: Washington Department of Fish and Wildlife.

Real-time detection and Risk projection



Slide from Stephanie Moore, NWFSC, NOAA

FY18 funding:

- will fund the ESP for another fall deployment to inform tribal and state managers

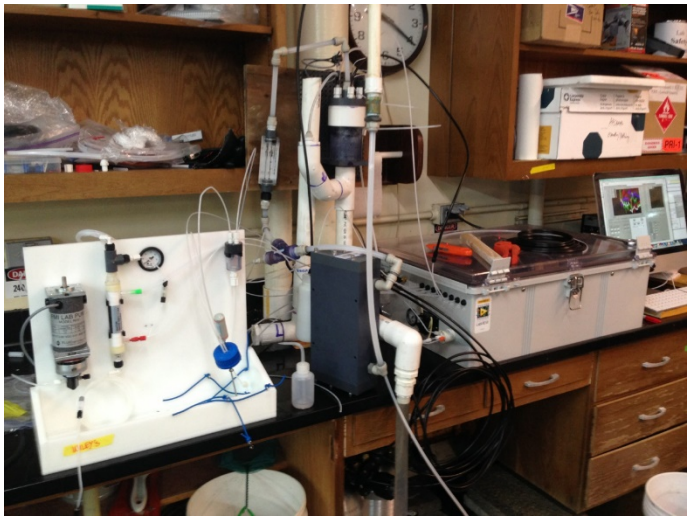
- will test a novel platform to sample water within the Juan de Fuca eddy to test for domoic acid and *P-n* cells

OTT: OA

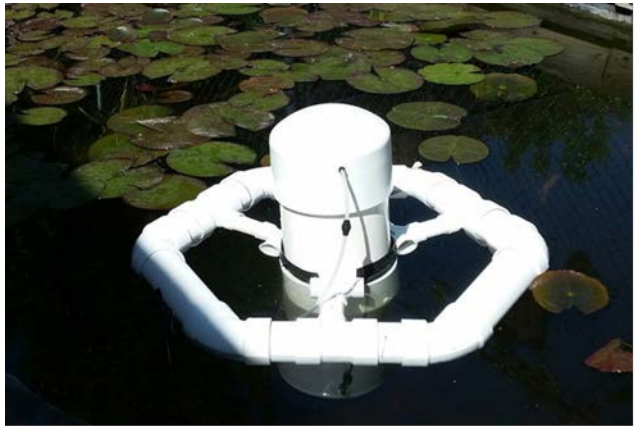
“Turning the headlight on 'high': Improving an ocean acidification observation system in support of Pacific coast shellfish growers.”

- New “ACDC” pCO_2 sensor
- UW, OSU, Sunburst, AOOS, CeNCOOS, SCCOOS, NOAA PMEL, PCSGA
- Lower cost pCO_2 for “weather” grade data
- Strong support from shellfish industry
- Builds on existing Burke-o-lators in hatcheries and the IPACOA portal

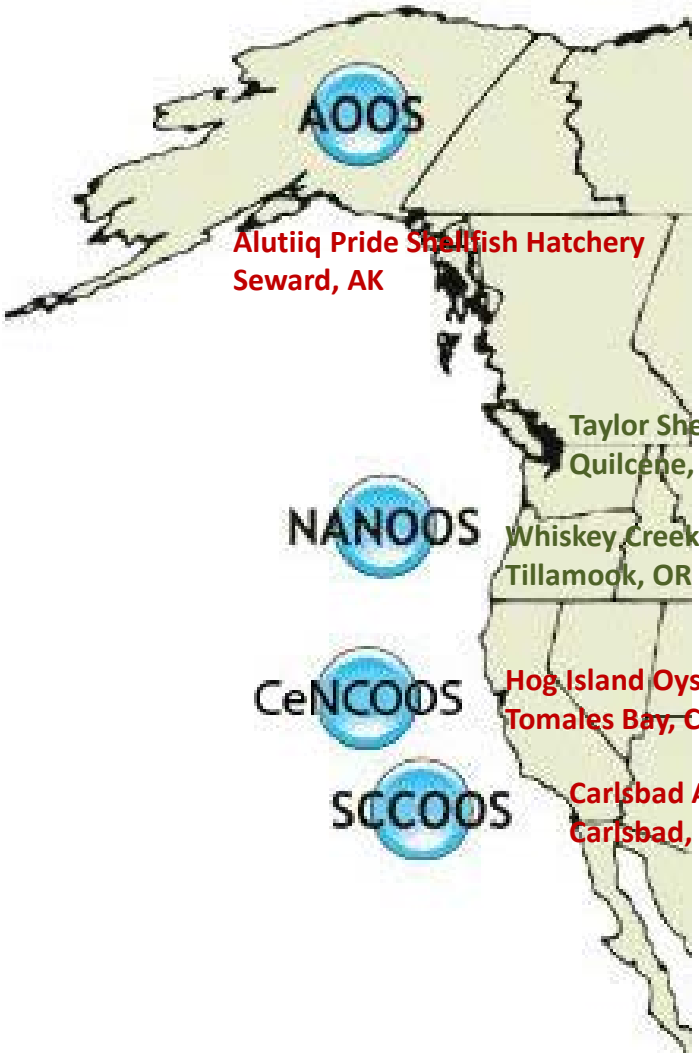
Burkeolator



ACDC



Partnerships



OAP
OCEAN ACIDIFICATION PROGRAM

IOOS
INTEGRATED OCEAN OBSERVING SYSTEM

Science-Grower Partnerships

Wiley Evans,
Hakai Institute

Simone Alin,
NOAA PMEL

QA

AOOS
Alaska Ocean Observing System

Alutiiq Pride Shellfish Hatchery
Seward, AK

Tessa Hill,
UC Davis

NANOOS

Taylor Shellfish Hatchery
Quilcene, WA

Whiskey Creek Shellfish Hatchery
Tillamook, OR

CeNCOOS

Hog Island Oyster Company
Tomales Bay, CA

Carlsbad Aquafarm
Carlsbad, CA

Burke Hales,
OSU

Todd Martz,
SIO

SOUTHERN CALIFORNIA COASTAL OCEAN OBSERVING SYSTEM

STATE OF OREGON 1859

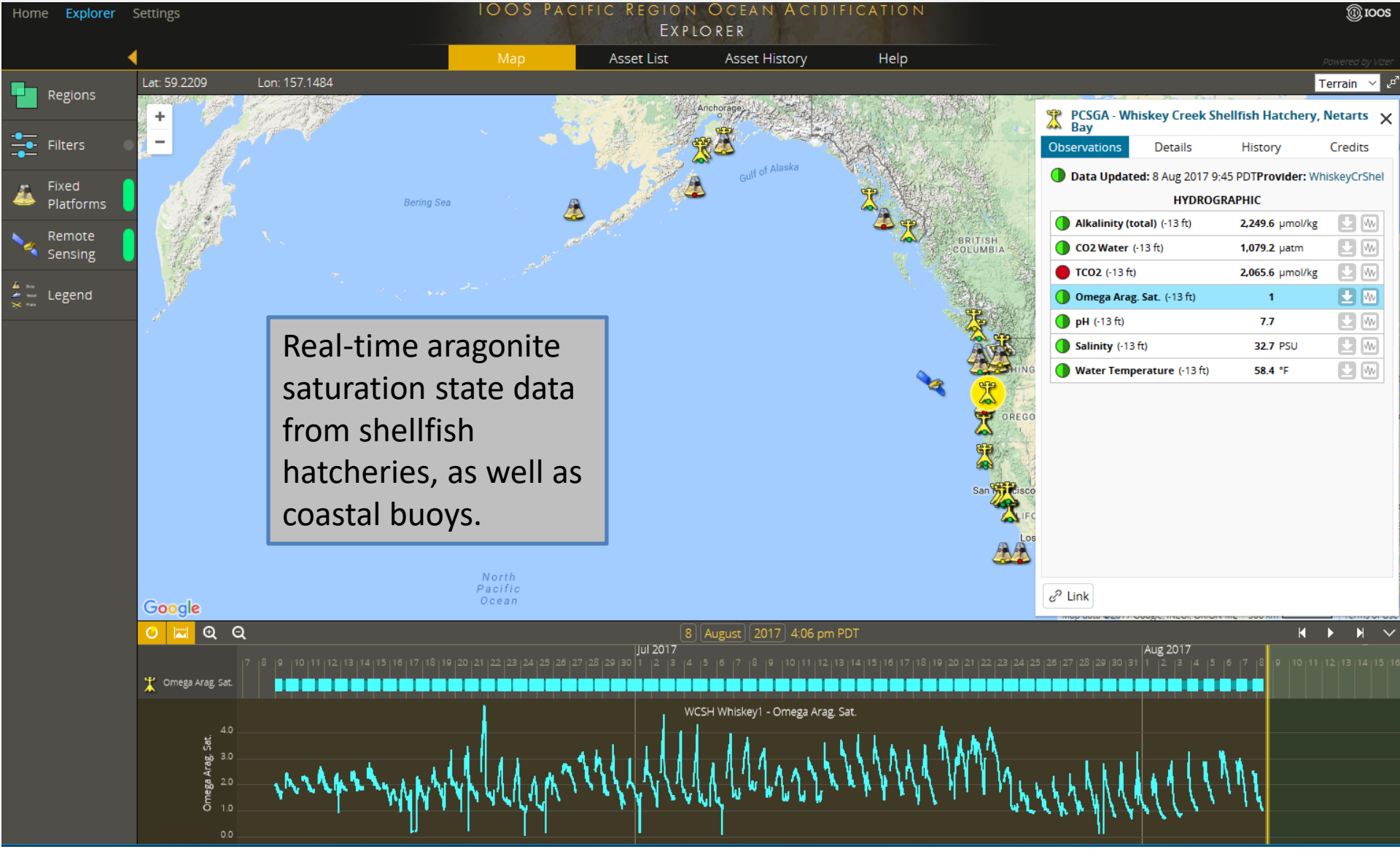
OAP
OCEAN ACIDIFICATION PROGRAM

IOOS®
INTEGRATED OCEAN OBSERVING SYSTEM

Shellfish growers:

- *"Fantastic job Wiley. At the OceansAlaska hatchery,* ***we learned more about our water quality in 7 hours of Burke-O-Lator data than we did in 7 years of monitoring with off the shelf instrumentation****. We have adjusted our soda ash injections upward and are going forward with expanded kelp bioconditioning."* Ron Zebel, OceansAlaska
- *"This* ***current generation of shellfish farmer is reliant upon data and services from NANOOS****. Checking the NANOOS app before seeding a beach or filling a setting tank has become standard practice."* Margaret Barrette, Director, Pacific Coast Shellfish Growers Association
- *"The* ***services NANOOS provides are critical*** *to understanding current and predicting future marine conditions."*
  Paul Williams, Shellfish Program Advisor, Suquamish Tribe Fisheries Department

IPACOA: IOOS Pacific Region ocean acidification data portal



FY18 funding:

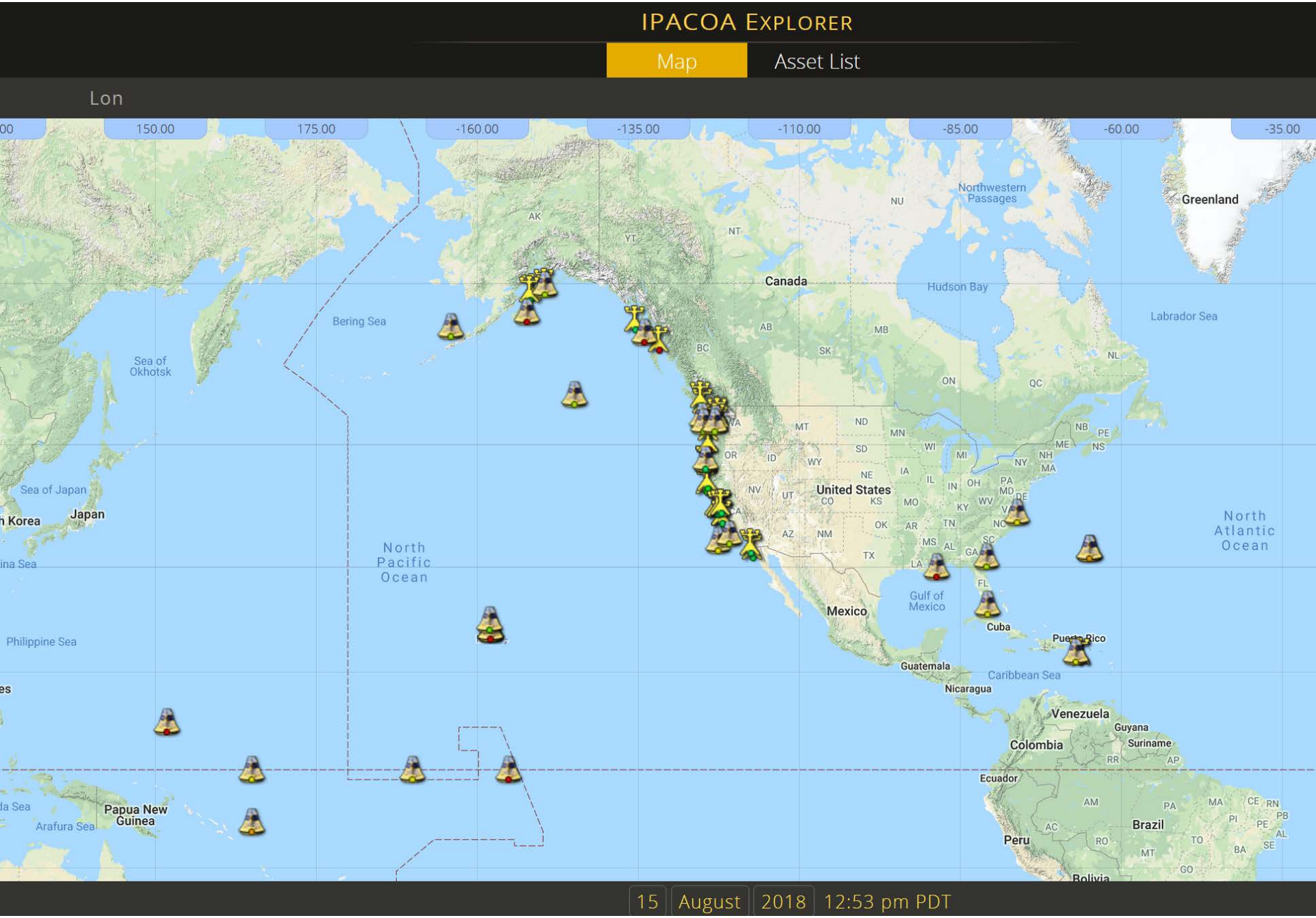
- will fund the continuation of the experts in the NANOOS region (as well as awards to the three other regions)
- will fund the overall QA/QC evaluation and data management
- will fund data analysis by the regional experts

IPACOA

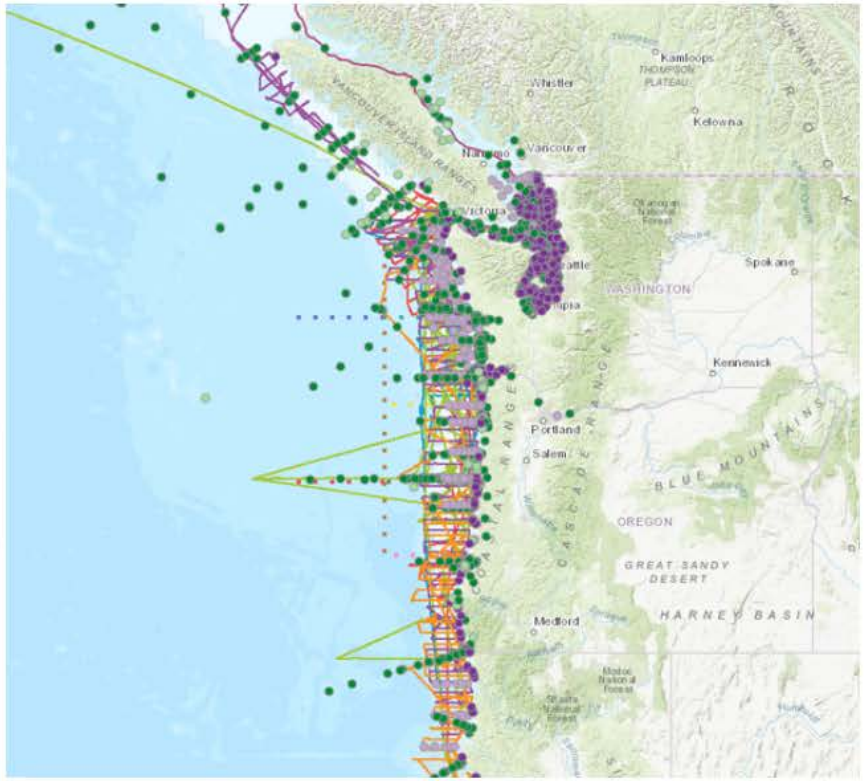
- IOOS Pacific Region OA

  HAS *turned into*

- IOOS Partners Across Coasts OA


IPACOA Explorer
Map
Asset List
Lon
00
150.00
175.00
-160.00
-135.00
-110.00
-85.00
-60.00
-35.00
Northwestern Passages
Greenland
Canada
Hudson Bay
Labrador Sea
Bering Sea
Sea of Okhotsk
Sea of Japan
Japan
North Korea
North Pacific Ocean
North Atlantic Ocean
United States
Gulf of Mexico
Mexico
Cuba
Puerto Rico
Guatemala
Nicaragua
Caribbean Sea
Venezuela
Guyana
Suriname
Colombia
Ecuador
Peru
Brazil
Bolivia
Philippine Sea
Papua New Guinea
Arafura Sea
15
August
2018
12:53 pm PDT

Pacific Coast Collaborative and Interagency Working Group Task Force on OAH assets



West Coast OA and Hypoxia Asset Inventory

NANOOS has been asked to assist in the QA/QC step for an inventory of observing assets, chemical and biological, along the West Coast produced by the Joint Pacific Coast Collaborative/Interagency Working Group "Integrated Ocean Acidification and Hypoxia Monitoring Task Force." Please consult the inventory and submit any corrections following the instructions below.

Visit the Inventory Web App

Web App Instructions (PDF)

GOA-ON

Global Ocean Acidification Observing Network

Select Language

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- Data Portal
- Add a Platform

GOA-ON

Global Ocean Acidification Observing Network

GOA-ON is a collaborative international approach to document the status and progress of ocean acidification in open-ocean, coastal, and estuarine environments, to understand the drivers and impacts of ocean acidification on marine ecosystems, and to provide spatially and temporally resolved biogeochemical data necessary to optimize modeling for ocean acidification.

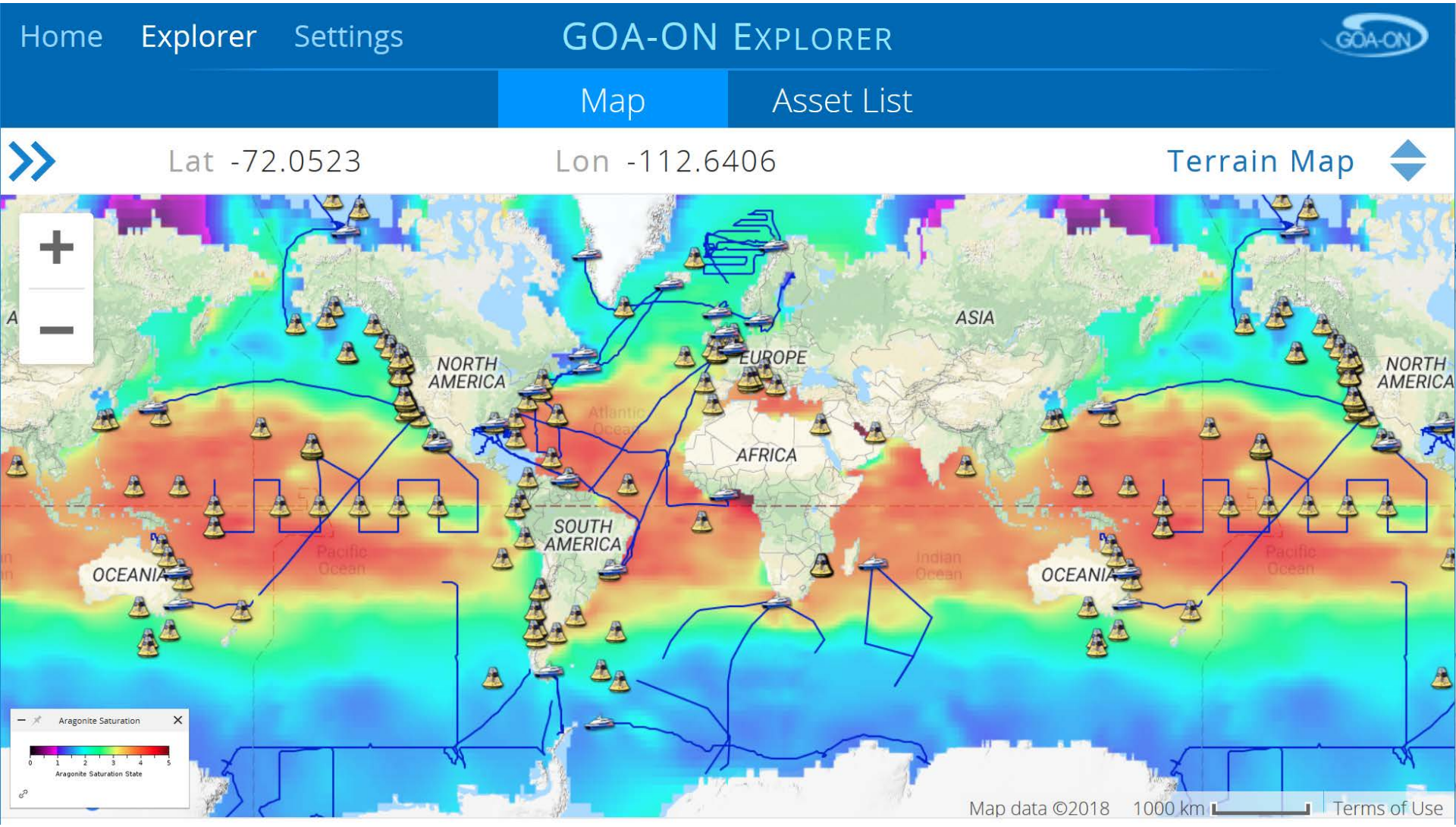
GOA-ON Data Portal

The GOA-ON data portal provides easy access to data and visualizations.

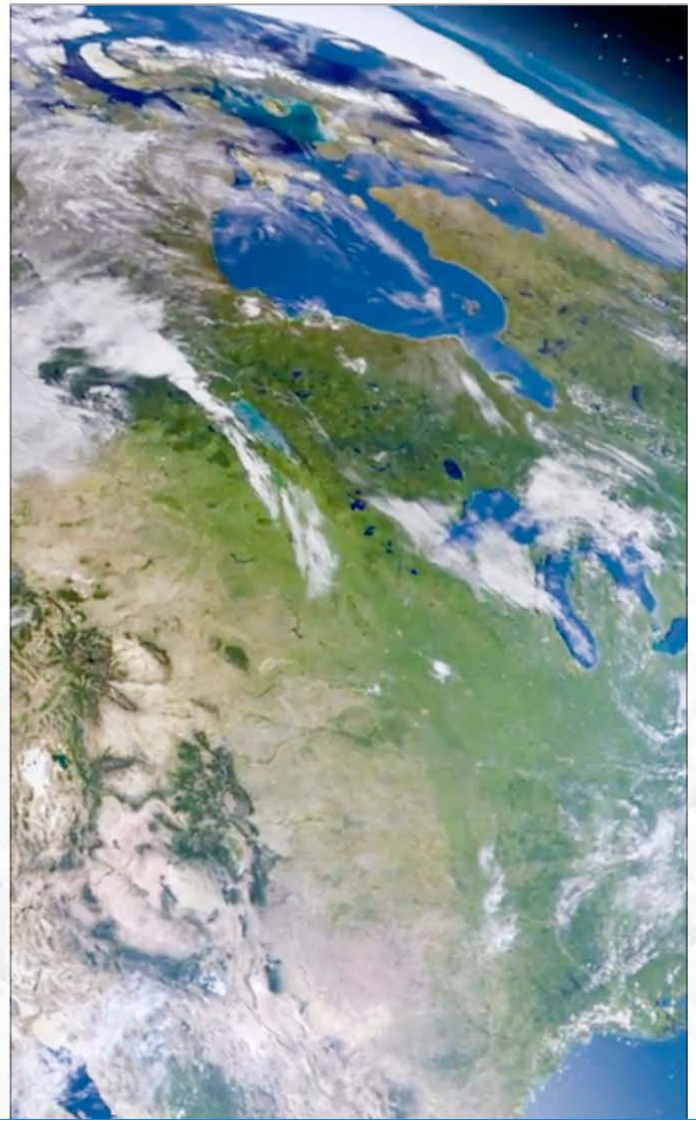
IOC-UNESCO Executive Council Welcomes SDG Indicator 14.3.1 Methodology

During its 51st Executive Council Meeting from 3-6 July

Supporting UNESCO SDG 14.3



North American Ocean Acidification Network



The North American Ocean Acidification Hub is being established to serve the countries of Canada, United States, and Mexico. The Global Ocean Acidification Observing Network (GOA-ON) has encouraged grass-roots formation of regional hubs to foster communities of practice for the efficient collection of comparable and geographically distributed data to

Science Workshop

17-18 October 2018

Hakai Institute

Victoria, British Columbia, Canada

Venue | Accomodations | Getting to Victoria | Information

Venue

The GOA-ON North American Ocean Acidification Hub Workshop will be held at the Hakai Institute Victoria Office

FY18 funding:

- will fund continued development and expansion of the GOA-ON portal

- will fund three workshops
  - 4th GOA-ON international workshop
  - 1st North American Hub workshop
  - Coastal time-series procedure workshop

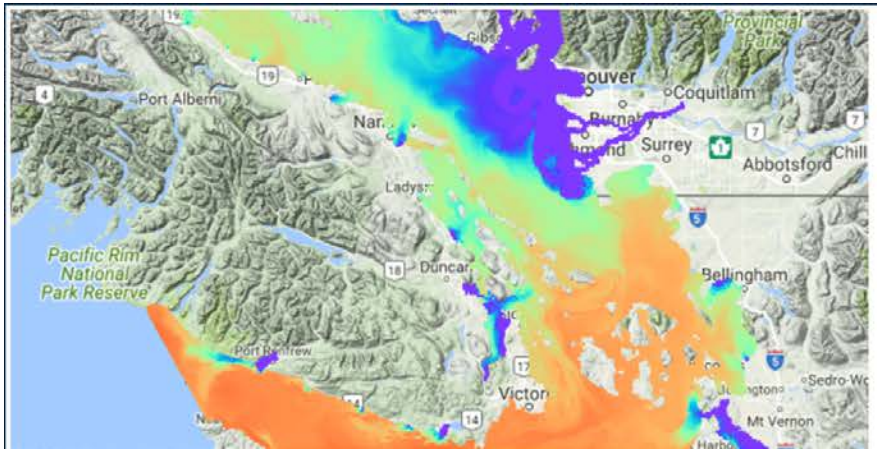
A major FY17 NANOOS activity:

NANOOS Certified!!

Celebration at 11:45 ☺

NANOOS
Northwest Association of Networked Ocean Observing Systems
Washington - Oregon - Northern California
IOOS

Other FY 17 NANOOS activity:



University of British Columbia Salish Sea Model Live on NVS

The high-resolution "SalishSeaCast" University of British Columbia (UBC) model, funded by the Marine Environmental Observation Prediction and Response Network (MEOPAR), can be accessed on the NVS Data Explorer App. This model includes temperature and salinity now-casts from the surface to 415m depth, covering the Strait of Georgia and Salish Sea.

View the SalishSeaCast Model in NVS | More Information About the Project

New Surfers App on NVS!

Ready to hit the waves? Check out our new "Surfers" app! Here you will find webcams, observations, forecasts for eight different measures of wave conditions, Surfrider's water quality data, and other useful information. A big thanks to Oregon and Washington Surfrider for helping develop the app!

22 Jun 2018

NVS Surfers App | WA Surfrider | OR Surfrider

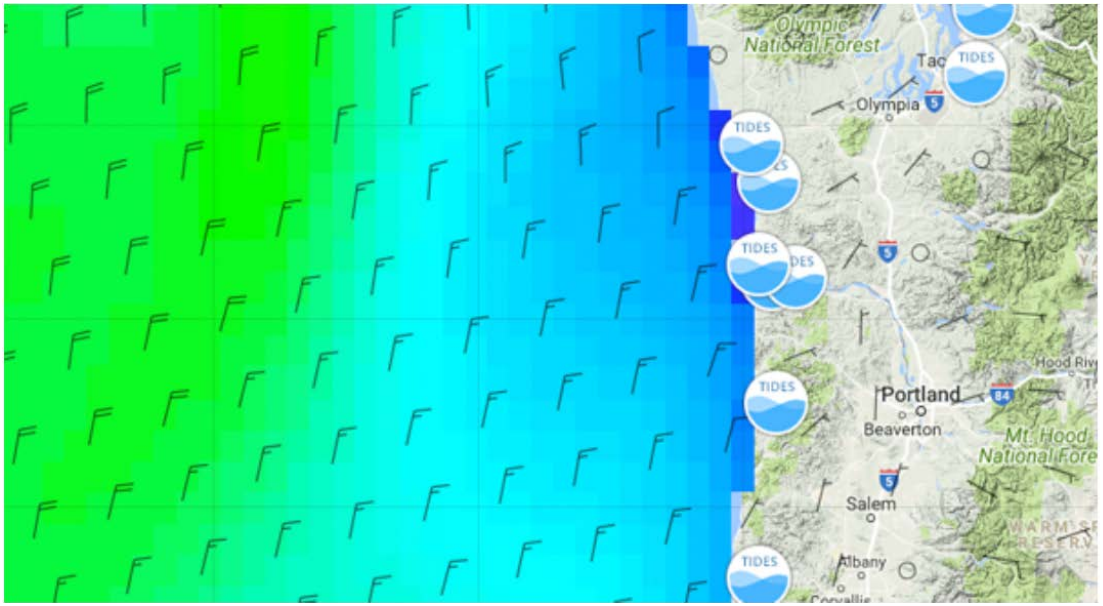
NANOOS Presentation for NOAA West Watch

NOAA's Western Regional Collaboration Team brought back its popular webinar series again and will present every other month. The July 2018 webinar summarized coastal environmental conditions and impacts in the Western Region. The webinar included contributed slides from the NANOOS, CeNCOOS, and SCCOOS regions, who regularly report on their local coastal ocean conditions. The next webinar will be 25 September 2018 at 1 pm. Contact us at NANOOS if you want to participate.

26 Jul 2018

View the Webinar Slide Set (PDF)

Seacast transition to NVS



Seacast comes to NVS!

The new NVS "Seacast" app was designed for the coastal fishing community, allowing users to see forecasts for a variety of ocean conditions up to three days out for any location in the region. Building on the web app that Oregon State University PIs have been designing and testing since 2012 via Oregon Sea Grant funding, the app has now been transitioned to NVS, with new features we added based on requests by users at our NANOOS community workshop last summer. See the article below for the fascinating story of Seacast's development, and be sure to check out Seacast on NVS!

NVS Seacast App | View the OSU Article

NANOOS

NORTHWEST ASSOCIATION OF NETWORKED OCEAN OBSERVING SYSTEMS

IOOS

http://ceoas.oregonstate.edu/features/seacast/

In 2018, the data and design from Seacast.org found a new home on the NANOOS website. Seacast.org will eventually be taken offline as more fishermen get accustomed to the NANOOS site, said Ted Strub, a CEOAS oceanographer who was the lead on the project.

“Without more funding, Seacast.org can’t be maintained,” he said. “It was always the plan for the experimental site to be transitioned to a more permanent site. We just didn’t know who would actually do that. It is a measure of her forward vision that Jan Newton, the executive director of NANOOS, was willing to use her resources to support the conversion of the experimen¬tal site to the more operational system.”

Lessons learned from the years of work informed the creation of the new tool on the NANOOS site, Strub said. Those lessons included the results of Kuonen’s research. Kuonen aimed to understand how fishermen use ocean forecasts to make decisions, why scientists provide the data they do in fore¬casts, and how both groups perceive risk and uncertainty regarding ocean conditions.

- IOOS and NANOOS need more biology data!

NANOOS Hosts U.S. IOOS Biological Data Training Workshop

NANOOS hosted the first U.S. Integrated Ocean Observing System (IOOS) Biological Data Training Workshop, co-sponsored by the Ocean Biogeographical Information System (OBIS), on February 8-9 at the University of Washington in Seattle. The workshop provided discussion and hands-on training for analyzing and managing marine biological data with the goal to make this information accessible on an international scale.

3 Apr 2018

View the OBIS Article About the Workshop

Matt Howard

FY18 funding:

- Will fund the biological data stewardship activities, to identify priority biological data
- Will fund, as possible, incorporation of such priority regional data into NANOOS accessible portals.

NANOOS

Northwest Association of Networked Ocean Observing Systems

Washington - Oregon - Northern California

IOOS

Biological Observations Workshop:

7-9 Nov, 2018, Santa Cruz, CA

Save the Date for Biology!

NANOOS, CeNCOOS, and SCCOOS are teaming up for a Biological Observations Workshop on Nov 7-9 in Santa Cruz, CA, focusing on animal movement and marine biodiversity. The goal is to identify priority stakeholder needs for regional telemetry and other types of observations of aquatic species that could be served by an Animal Telemetry Network/Marine Biodiversity Observing Network/Ocean Tracking Network baseline network and evaluate current capabilities. We invite both stakeholders with biological information needs and scientists working in this field.

View Announcement (PDF) Registration

Accomplishments:

NANOOS sets bar high

NANOOS is supporting the region

NANOOS is relevant nationally

NANOOS leadership visible internationally

NANOOS uses its governance

Challenges

- Sustaining infrastructure on ~level funding
- Avoiding NANOOS being the best kept secret

NORTHWEST ASSOCIATION OF NETWORKED OCEAN OBSERVING SYSTEMS (NANOOS)

The eye on the Pacific Northwest's ocean and coast

> *"NANOOS provides critical life safety information to the public, aiding coastal communities to reduce risk."*
>
> - Jonathan Allan, Coastal Geomorphologist
> Oregon Department of Geology and Mineral Industries

NANOOS is the Regional Association of the national Integrated Ocean Observing System (IOOS) in the Pacific Northwest, primarily Washington and Oregon. Investments in NANOOS have resulted in high-technology jobs, better-informed decisions, and new innovation.

We help improve:

HEALTH Decision-making to protect human health

SAFETY Enabling preparedness and security

ECONOMY Preserving economic benefits of the ocean

NANOOS Increases Efficiency

The NANOOS Visualization System (NVS) integrates data from a wide variety of sources, and makes that data available in one online data portal, saving substantial time and money. Real-time observations and forecasts from a range of assets including buoys, shore and tidal stations, high-frequency radar, wave and current forecasts, and satellites are available in user-friendly data displays. NVS provides sophisticated yet accessible capabilities such as comparisons of forecasts with real-time observations, and customized presentations based on community feedback .

nanoos.org

IOOS in the Pacific Northwest

IOOS Integrated Ocean Observing System

Benefits for People and Businesses in the Pacific Northwest

Innovative Technology for Safe & Profitable Resource Use

NANOOS detects toxins from harmful algal blooms (HABs) from an undersea robot at La Push.

"Having the NANOOS automated HAB sampler, with toxin assessment capability, offshore between our harvest beaches and the HAB generation sites will give tribes the forewarning they need to adjust sampling protocols and better protect the health of coastal residents, tribal and non-tribal." - Joe Schumacker, Department of Fisheries, Quinault Indian Nation

NANOOS partners with industry to develop a lower cost sensor for effective shellfish growing.

"This current generation of shellfish farmer is reliant upon data and services from NANOOS. Checking the NANOOS app before seeding a beach or filling a settling tank has become standard practice." - Margaret Barrette, Pacific Coast Shellfish Growers Association Director

Support for Maritime Operations, Safety & Fishing Commerce

NANOOS data products allow mariners to choose safe and efficient routing. High frequency radars in Oregon provide real-time data on surface currents, which decrease the size of search and rescue areas by two-thirds. We need to extend this radar system to the Washington Coast to fill the gap in coverage.

"Ships crossing the Columbia River Bar face one of the most dangerous harbor entrances in the world. The Columbia River Bar Pilots rely on weather forecasts, real time buoy data along with wave and current models when determining safe times for ships to cross the bar. NANOOS provides an excellent location for us to see and compare all the available data sources."
- Captain Dan Jordan, Columbia River Bar Pilots

Information for Coastal Hazard Risk Reduction

NANOOS products help coastal communities minimize impacts from coastal hazards and keep the public safe. NANOOS data are used by the Oregon Department of Geology and Mineral Industries (DOGAMI) for coastal flood hazard maps; together NANOOS and DOGAMI provide tsunami hazard evacuation information to coastal populations. Both products aid risk reduction and increase coastal preparedness.

NANOOS support has "...provided us with invaluable information concerning our ongoing erosion problems. Without such assistance, we are operating blind."
- Mayor Crystal Dingler, City of Ocean Shores

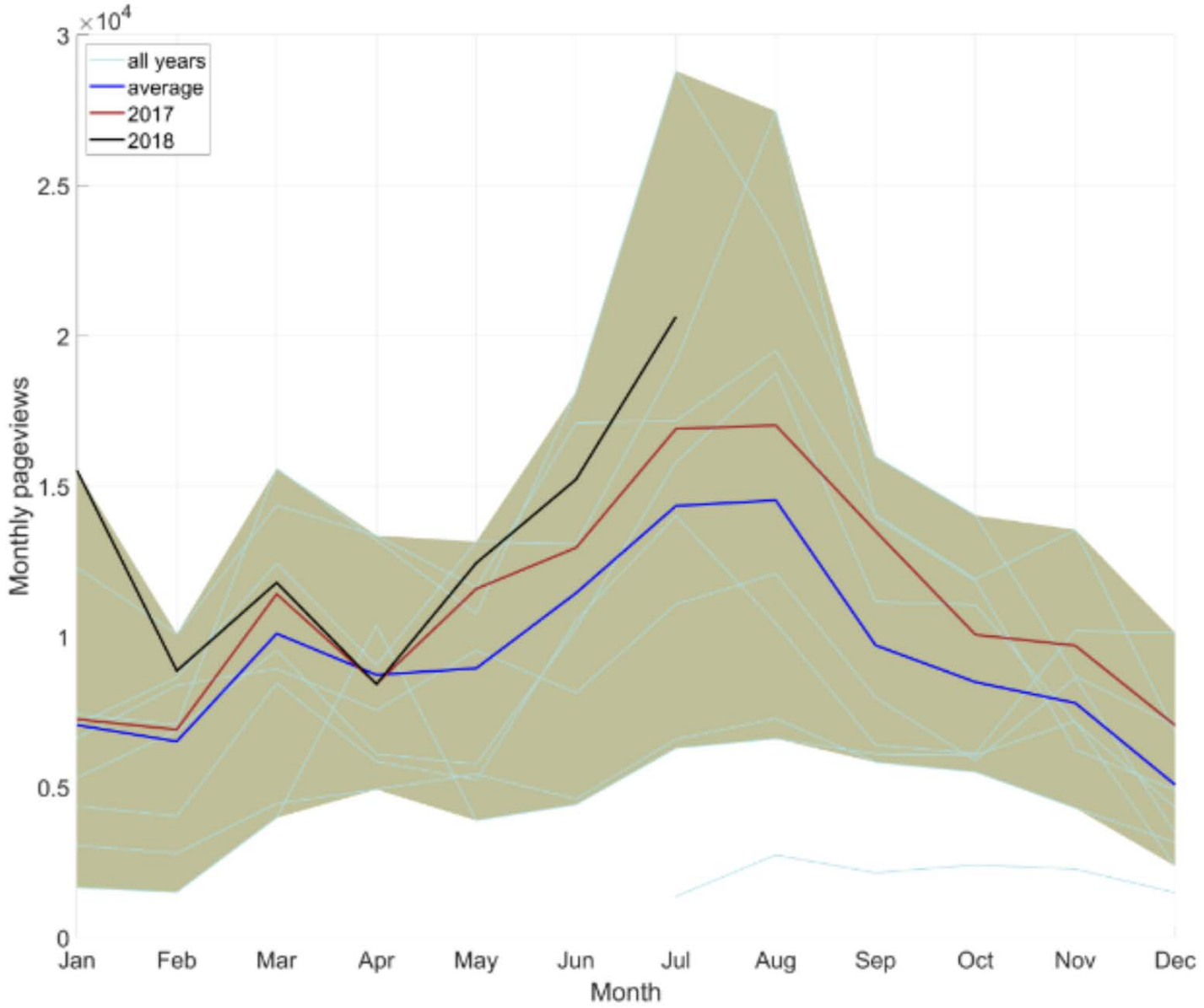
"The Oregon Office of Emergency Management (OEM) appreciates the tools that NANOOS provides. The online tsunami evacuation route viewer is especially useful in helping coastal residents and visitors understand and respond to the tsunami hazards."
- Althea Rizzo, Oregon OEM Geologic Hazards Program Coordinator

nanoos.org

For More Information

Contact us if you have any questions, or to learn more about our program:

Jan Newton, NANOOS Executive Director
Tel: (206) 543-9152 | janewton@uw.edu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NANOOS

NORTHWEST ASSOCIATION OF NETWORKED OCEAN OBSERVING SYSTEMS

WASHINGTON - OREGON - NORTHERN CALIFORNIA

IOOS

NANOOS Data Portal Survey

We are soliciting input from our community on usage of the NANOOS data portal (NVS), and its associated products and tools.

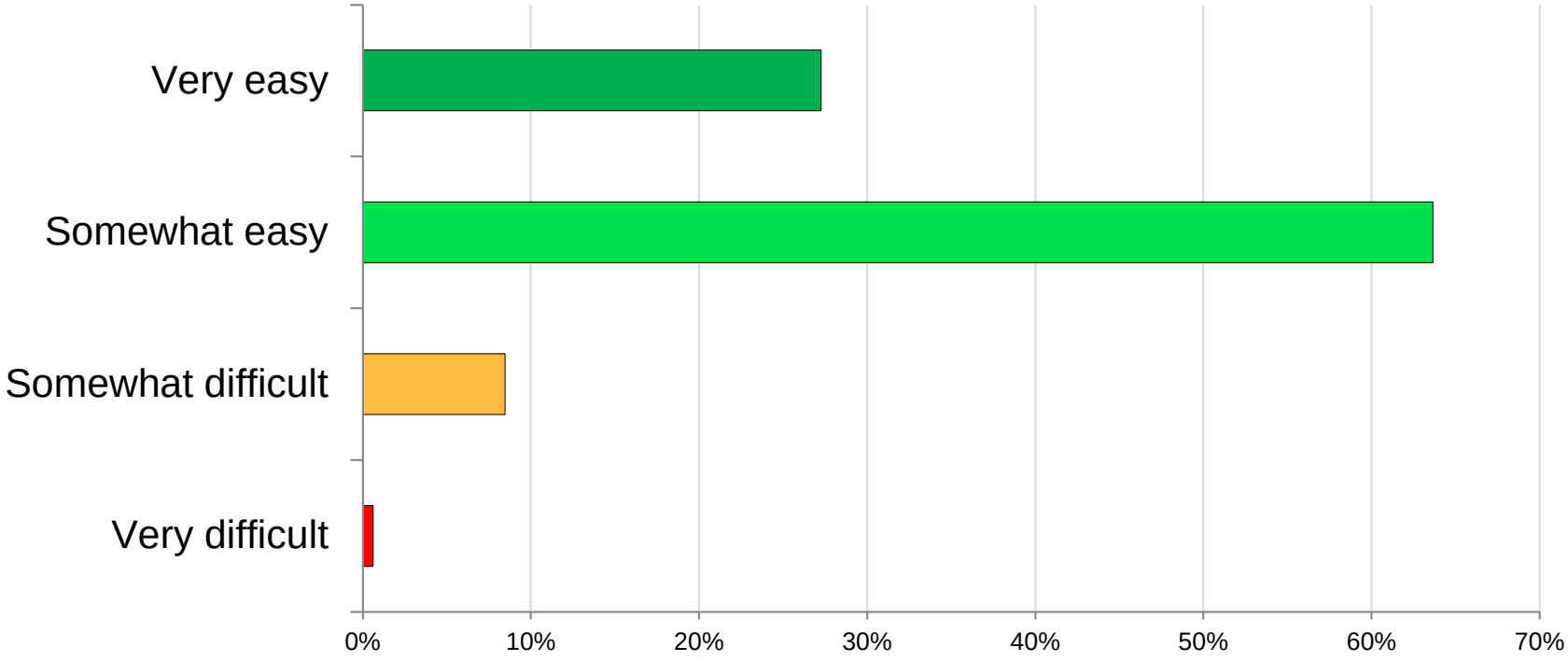
Please take this 5 minute survey to better inform us. Thank you!

Participate in Survey

- Survey Response:
  - First 48 h: 76
  - Two weeks: 140
  - Reminder: >40 more

  Total: 185

‘How easy is it to use the NANOOS data portal and its associated products and tools?’



We thank you
We need you !

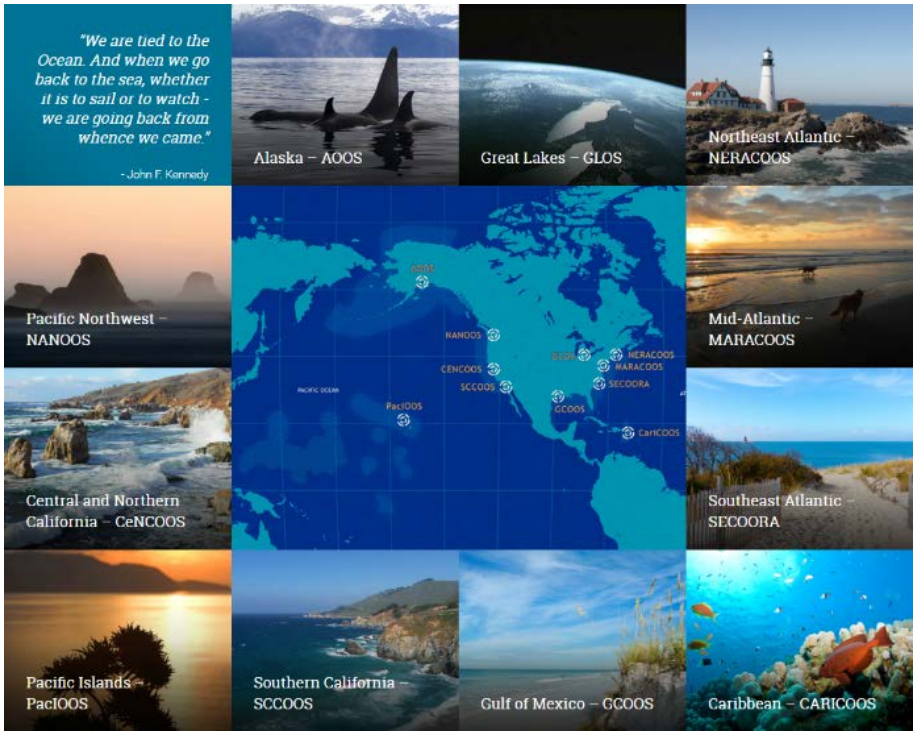
3. IOOS Association update

Josie Quintrell
IOOS Assn Executive Director

NANOOS GC Meeting

Josie Quintrell, Director
IOOS Association
August 2018

IOOS | EYES ON THE OCEAN™



IOOS ASSOCIATION

- Advocacy
- Common Issues
- IOOS federal/non-federal partnership
  - Administration
  - Congress
  - National Partners
- Emerging Issues
- Special Projects

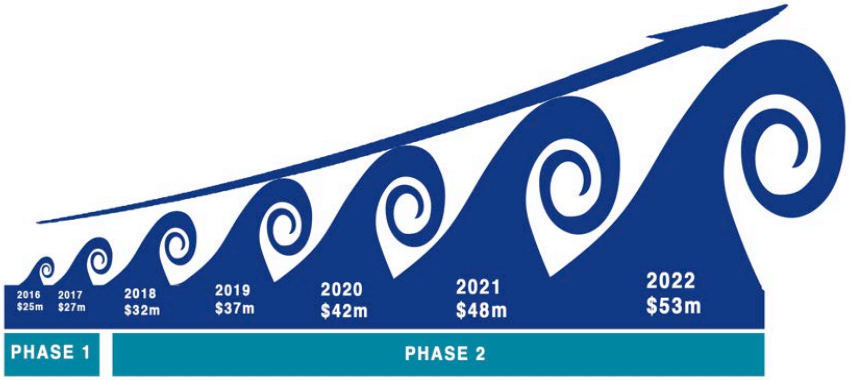
Observing our oceans, coasts and Great Lakes

Providing information to those who need it, when they need it

Advocacy

IOOS | EYES ON THE OCEAN

Closing the Gaps: 5 yr Campaign

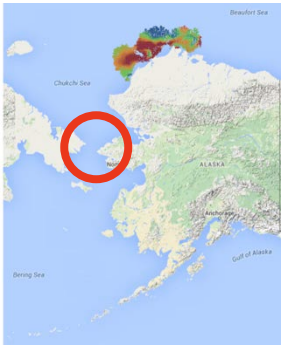


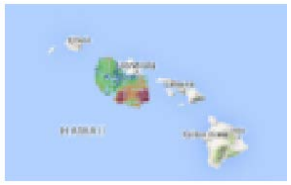
- Scalable campaign
- Tangible outcomes

- Align with Administration Priorities
- Filling targeted gaps in:
  - HR Radars
  - Gliders
  - And Moorings?

US IOOS FY 17 High Frequency Radar Request

$3.1 million to install 12 high frequency radar systems





Safeguarding the Arctic Marine Highway

2 remote radars needed

Protecting Lives and Public Health in the Pacific Northwest

3 radars needed

Cleaning up the Great Lakes

3 radars needed

Saving Lives off Florida's Coast

2 radars needed

Saving Millions in the Gulf of Mexico

3 radars needed

IOOS | EYES ON THE OCEAN

FY 18 Request: HFR and Gliders

Search and rescue, oil spill response, harmful algal bloom tracking and forecasting, water quality monitoring, and port and harbor navigation all depend on real-time surface current mapping. IOOS operates our nation's only network of **high-frequency radars (HF radars)** providing this information.

Despite the far-ranging use of this data, there are critical gaps in coverage.

IOOS Integrated Ocean Observing System

An interagency Federal-regional partnership in NOAA's National Ocean Service

WHAT ARE HIGH-FREQUENCY RADARS?

Land-based HF radar uses radio-wave backscatter to map the speed and direction of surface currents in real time. Because of the large coverage area, HF radar data are also valuable input for ocean models and for assisting with search and rescue operations and oil spill response.

Map of IOOS high-frequency radars that provide real-time surface currents.

For more information, contact
Josie Quintrell, Executive Director, IOOS Association
207-798-0857 | Josie@ioosassociation.org

IOOS ASSOCIATION

IOOS gliders provide data to support a range of operations including improving hurricane warnings, detecting harmful algal blooms, ensuring safe navigation, supporting offshore energy operations, fishermen and fisheries management and enhancing public health and safety.

IOOS Integrated Ocean Observing System

An interagency Federal-regional partnership in NOAA's National Ocean Service

Gliders are underwater robots that relay information about subsurface conditions. The U.S. Navy estimates gliders are 1/100th of the cost of ship-collected data. Gliders are revolutionizing ocean observing by being cost effective, safe and flexible.

IOOS FY 18 GLIDER REQUEST: $3.3m

Where our nation needs gliders to support safe navigation, public health and safety, and the economy:

Great Lakes: Protecting Drinking Water

Over 35 million people depend on the Great Lakes for their drinking water. Gliders provide the flexibility to focus on issues impacting local areas and to better predict the risk of harmful algal blooms (HABs).

Northeast: Enhancing Maritime Industry By Reducing Endangered Right Whale Collisions

Ship strikes and fishing gear entanglements threaten the endangered right whales. Gliders equipped with acoustic sensors can detect the whales and alert mariners and fishermen in real time about the location of the whales, thus minimizing impacts.

Mid-Atlantic: Protecting Lives and Property From Hurricanes

Gliders are a safe method for seeing below the surface of the coastal ocean, where strong winds stir cold water upwards, affecting the intensity of the storm. Such information improves warnings that can protect lives and property.

Southeast: Saving Lives, Supporting Fisheries and Detecting HABs

Information gathered from gliders along the Southeast coast is critical for predicting riptides, optimizing fisheries management models, improving hurricane intensity forecasts and detecting marine mammals and HABs.

EYES ON THE OCEAN™

Appropriations

	FY 12 Spend Plan	FY 13 Spend Plan	FY 14 Enacted	FY 15 Enacted	FY 16 Enacted	FY 17 Enacted	FY 18 Omnibus Enacted	FY 19 Pres Budget	FY 19 IA Request	FY 19 House	FY 19 Senate
Regional IOOS Total	**$23 m**	**$26.5m**	**$28.5m**	**$29.5m**	**$29.5m**	**$30.7 m**	**$35m**	**$19m**	**$37.7m**	**$37.5m**	**$37m**
National network of regional observing systems, gaps in radars and gliders	*$22m*	*$23.5m*	*$24.3m*	*$24.5 m*	*$24.5m*	*$25.2m*	$29.5m *$25.2m RAs $4.3m HFR and gliders*		$32.2m *$25.2m RAs $3.7m HFR $3.3m Glider*		
Marine Sensor Innovation Grants, Modeling Testbed, Sensor Verification	*$1m*	*$3m*	*$4.2m*	*$5 m*	*$5m*	*$5.5m*	$5.5m		$5.5m		
U.S. IOOS Program Office*	**$6.4m**	**$5.9m**	***$6.6m***	***$6.6m***	***$6.6m***	**$6.6m**	**$6.7m**		**$6.6m**		
Total U.S. IOOS	$29.4m	$32.4m	$35.1m	$ 36.1m	$36.1 m	$37.3 m	$41.7 m		$44.3m		

 Starting in FY 14 included in the Navigation, Observations and Predictions budget line

"Within funds provided for IOOS grants, cooperative agreements, or contracts, the Committee directs **each regional entity** to assess current spending practices for resources that become damaged or unworkable as a result of hurricanes or other significant storms, including continually replacing damaged assets instead of repairing them or seeking to use hardened designs, and provide a cost-benefit analysis to the Committee on such practices within 120 days of this Act (e.g., July 20, 2018)"

FY 20 Request - Continue Gaps Campaign

Mapping Surface Currents

Seeing Underwater with Coastal Gliders

IOOS | EYES ON THE OCEAN

Reauthorization

SENATE

Senators Wicker and Cantwell sponsored S 1425

PASSED

115TH CONGRESS
1ST SESSION

H. R. 237

To reauthorize the Integrated Coastal and Ocean Observation System Act of 2009, and for other purposes.

IN THE HOUSE OF REPRESENTATIVES

JANUARY 3, 2017

Mr. YOUNG of Alaska introduced the following bill; which was referred to the Committee on Natural Resources, and in addition to the Committee on Science, Space, and Technology, for a period to be subsequently determined by the Speaker, in each case for consideration of such provisions as fall within the jurisdiction of the committee concerned

House

Water, Power and Ocean Subcommittee

Weather Research and Forecasting Innovation Act of 2017

HABHRCA - HAB Reauthorization

IOOS | EYES ON THE OCEAN

Building Support in DC

Major Milestone: Certified National Network

Integrated Ocean Observing System (IOOS) Supports a National Network of Certified Regional Observing Systems

IOOS is essentially the weather service for the coastal ocean and Great Lakes, providing the ability to "see" what is happening above and below the water surface and making these insights readily available.

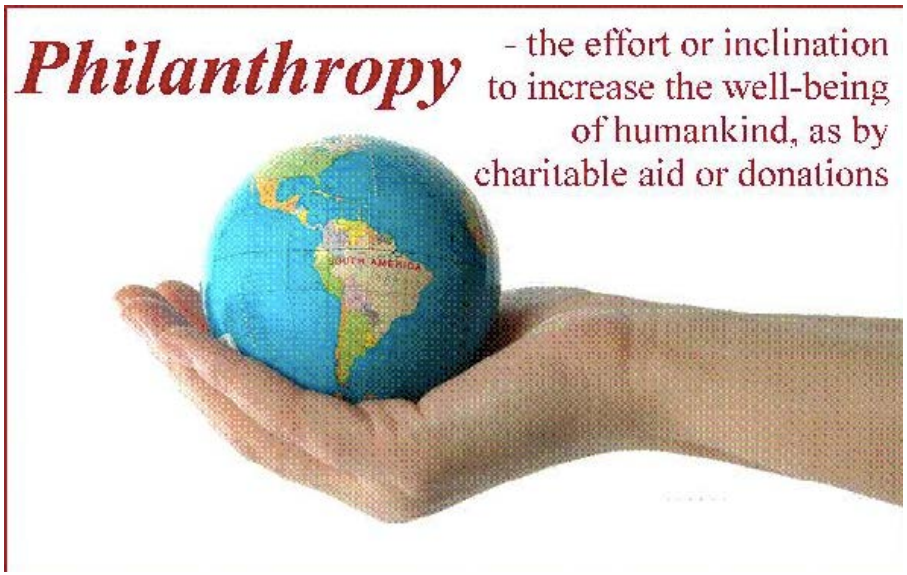
IOOS consists of 17 federal agencies with 11 regional observing systems.

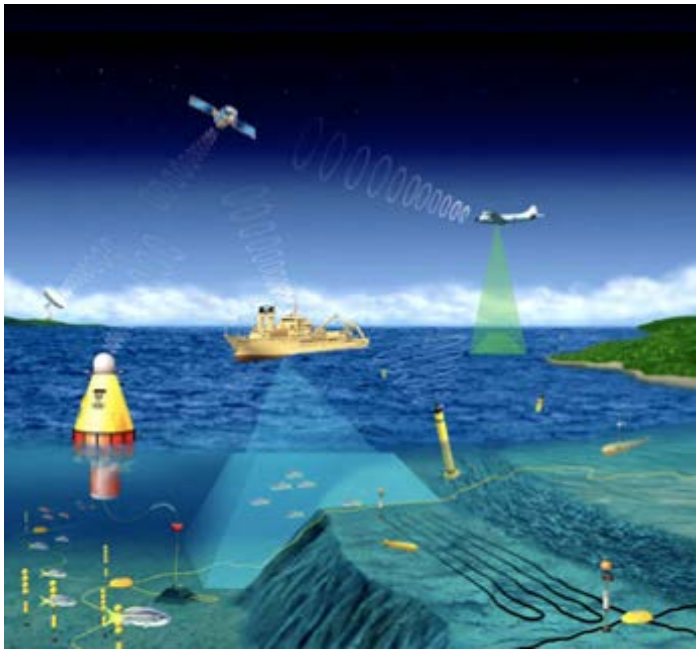
All 11 regional observing systems meet rigorous federal standards for governance and data management.

Why Certification Matters

- IOOS provides national consistency while addressing unique and diverse regional needs.
- IOOS provides ready access and preserves data with transparency and documentation.
- Certification enhances efficient interagency coordination at the regional and national level.

Special Projects





Economic Value of IOOS

RA User Survey

IOOS | EYES ON THE OCEAN

Activities

- Policy Meetings
  - IOOS Ex Comm and Program Office Leadership Discussions
    - Gaps Campaign and beyond
    - Funding decisions, building the network
- Fall/Spring Meetings -
  - Annapolis Sept 2018
    - Biology
  - Washington March 2019
    - Congressional
- Honorary Directors
- Federal Advisory Committee
- Strategic Partnerships
- Outreach Committee - Web survey, data portals, newsletter

Thank you

IOOS | EYES ON THE OCEAN

4. U.S. IOOS update

Carl Gouldman
U.S. IOOS Program Director

NANOOS Governing Council

August 16, 2018 | NANOOS GC/PIs | Carl Gouldman

IOOS | EYES ON THE OCEAN™

U.S. IOOS: Program Overview

Partnership effort that leverages dispersed national investments to deliver ocean, coastal and Great Lakes data relevant to decision-makers.

Global Component

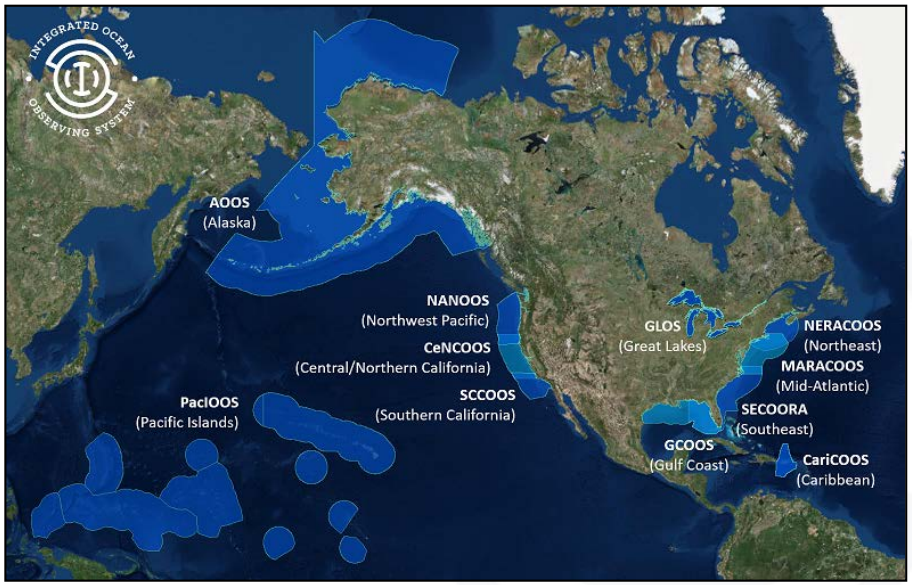
- US contribution to Global Ocean Observing System (GOOS)
- 1 of 15 Regional Alliances of GOOS

National Component

- 17 Federal agencies

Regional Component

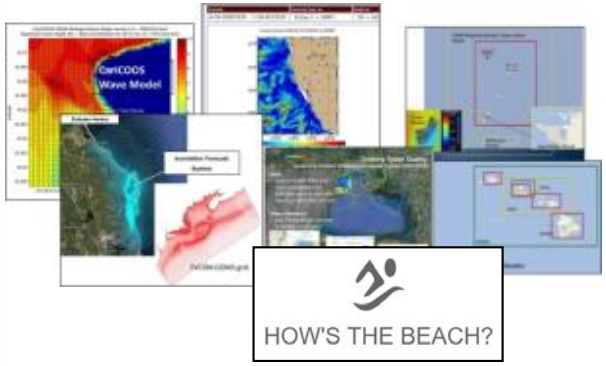
- 11 Regional Associations
  - Stakeholder driven
  - Academia, state/local/tribal government, private industry



IOOS Regions meet societal needs

Stakeholder outreach

Information products



Observations

Data Management

WMO

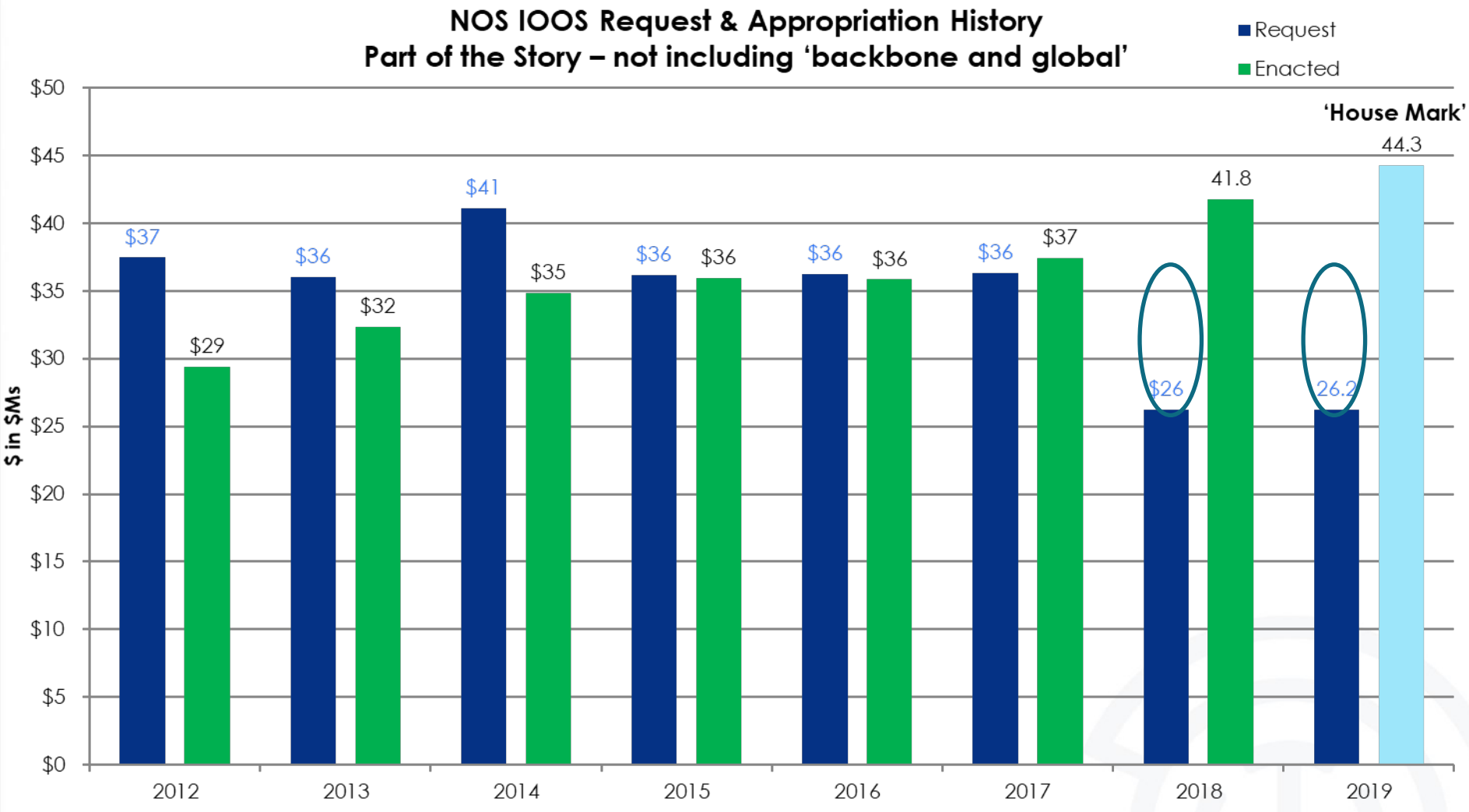
Global Telecommunication System (GTS)

NATIONAL WEATHER SERVICE

REGIONAL INFORMATION COORDINATION ENTITY CERTIFIED 2017

IOOS | EYES ON THE OCEAN

U.S. IOOS Enacted and President's Budgets FY12-19



NOAA National Ocean Service
Navigation, Observations, and Positioning: 'National IOOS' component FY18 Omnibus $6.8M & 'Regional IOOS Observations' $35M
Estimated Enacted levels are 'post rescission' totals for each year
'Request' = the President's Budget Request
FY19 House Mark is $44.3, Senate is $43.8M, Conference next …

IOOS | EYES ON THE OCEAN

New IOOS Strategic Plan

Vision - Improve lives and livelihoods with ocean, coastal, and Great Lakes information

Mission - To produce, integrate, and communicate high quality ocean, coastal and Great Lakes information that meets the **safety, economic, and stewardship needs** of the nation.

https://cdn.ioos.noaa.gov/media/2018/02/US-IOOS-Enterprise-Strategic-Plan_v101_secure.pdf

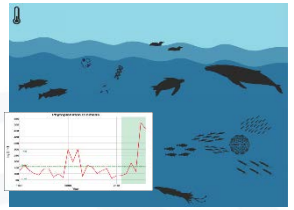
FY2018 IOOS Priorities & Highlights

- **NOAA Weather Act –** weather and water prediction
- **Blue Economy –** innovation and growth (fisheries, navigation, health)
- **NOAA Water Initiative** (NOS/IOOS modeling and decision support) http://www.noaa.gov/water
- **NOS Modeling Strategy** – Upgrades to Coastal Ocean modeling

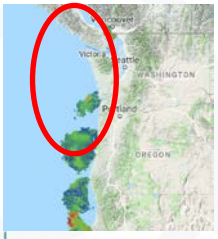
IOOS Delivering Benefits ***#customerfocus***

- ICOOS Act / Strategic Plan / IOOC Metrics Task Team
- IOOS R&D (R_2O)- Coastal and Ocean Modeling Testbed / Ocean Technology Transition / Alliance for Coastal Technologies

- Animal Telemetry Network and Marine Biodiversity Observation Network (towards 'operations')
- Data and Data Assembly Centers – 'Metocean', Gliders, ATN, HF Radar, & Waves



- **Filling IOOS gaps** –
  - FY17 + $1.2M installing HF radars in LA/mouth of Mississippi River and Pacific northwest outer coast.
  - FY18 + $5.5M filling gaps in HF radars and enhancing and deploying gliders for multiple missions



IOOS | EYES ON THE OCEAN

BLUE ECONOMY

The Blue Economy is sustainable use of ocean resources for economic growth, improved livelihoods and jobs, and ocean ecosystem health.

The Blue Economy encompasses many activities...

RENEWABLE ENERGY

Sustainable marine energy can play a vital role in social and economic development.

FISHERIES

Marine fisheries contribute more than US$270 billion annually to global GDP. More sustainable fisheries can generate more revenue, more fish and help restore fish stocks.

MARITIME TRANSPORT

Over 80% of international goods traded are transported by sea, and the volume of seaborne trade is expected to double by 2030 and quadruple by 2050.

TOURISM

Ocean and coastal tourism can bring jobs and economic growth. Coastal Least Developed Countries and Small Island Developing States receive more than 41 million visitors per year.

CLIMATE CHANGE

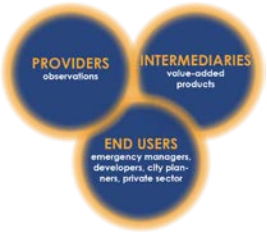
The impacts of climate change on oceans—rising sea-levels, costal erosion, changing ocean current patterns, and acidification—are staggering. At the same time, oceans are an important carbon sink and help mitigate climate change.

WASTE MANAGEMENT

80% of litter in the ocean is from land-based sources. Better waste management on land can help oceans recover.

To learn about other aspects of the blue economy, visit www.worldbank.org/oceans

WORLD BANK GROUP



... & in 2015 US IOOS Ocean Enterprise = $7B per year

IOOS | EYES ON THE OCEAN

OECD Ocean Economy 2030

Organisation of Economic Cooperation and Development

- Ocean based industries generated USD $1.5T in 2010 & 31M FTE in 2010
- 2030 Ocean industry projected to $3 Trillion & 40M FTE

IOOS supports this growing ocean economy by providing

- Collaboration
- Economic valuation
- Boosting innovation

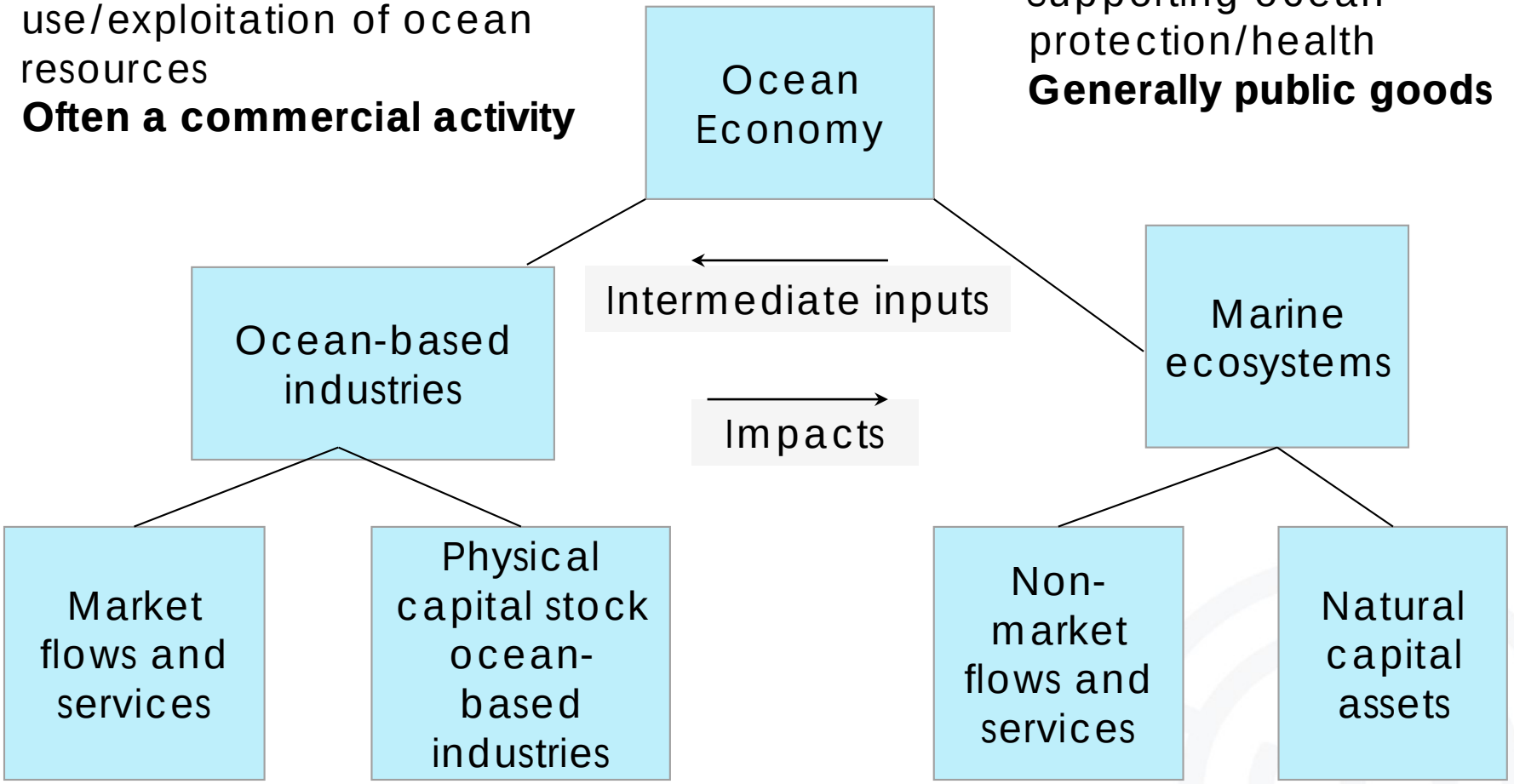
http://www.oecd.org/futures/oceaneconomy.htm

IOOS | EYES ON THE OCEAN

The benefits

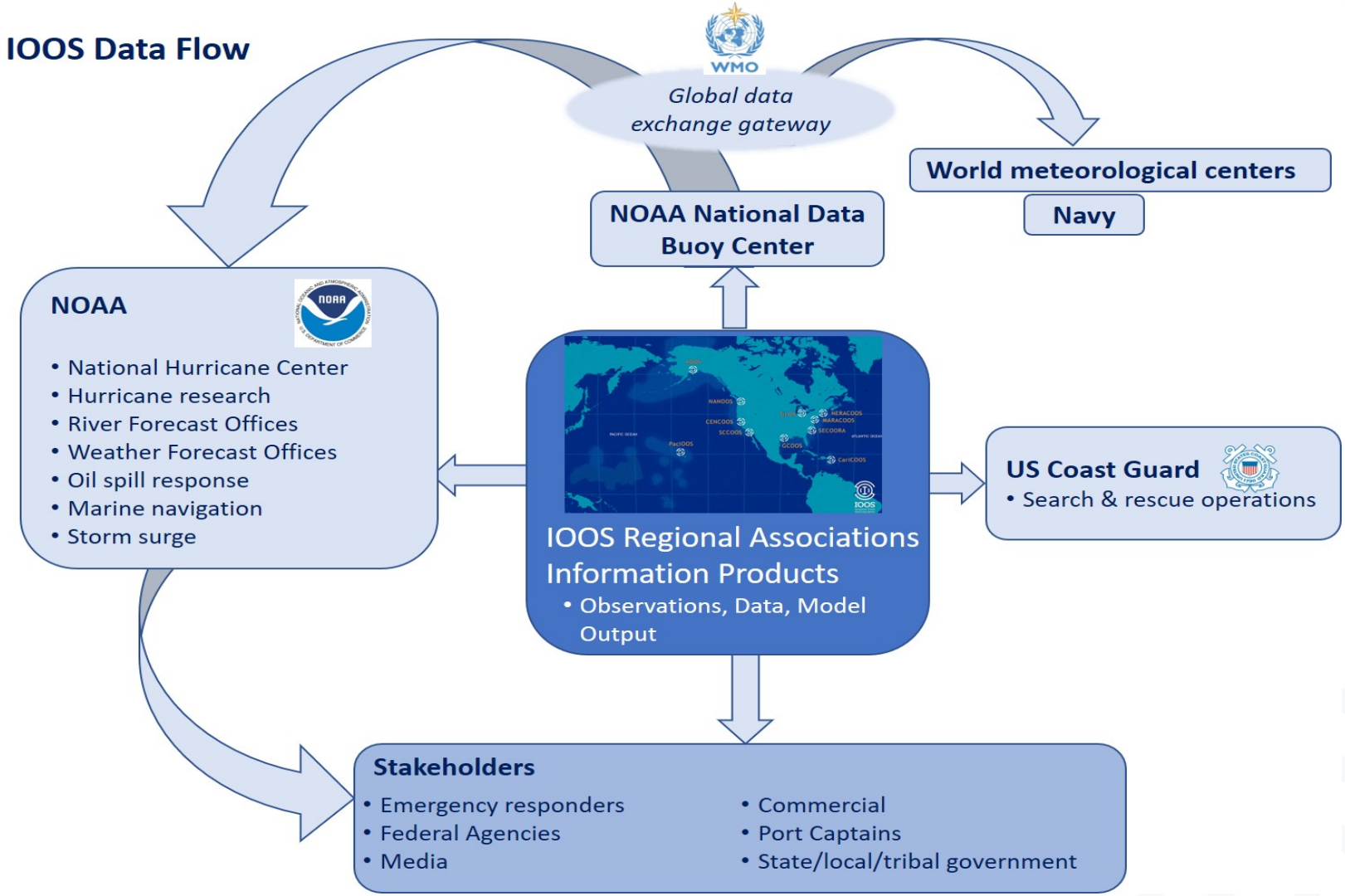
Supporting ocean use/exploitation of ocean resources
Often a commercial activity

Supporting ocean protection/health
Generally public goods



Source: OECD (2016)

IOOS meteorological and oceanographic data



IOOS RAs data is seamlessly integrated Nationally and Internationally

NOAA Water Initiative

Overarching Goal: to transform water resources prediction and information service delivery to better mee and support evolving societal needs.

Objective 1 **Service Delivery**: Build Strategic Partnerships for Water Information Services

Objective 2 **Decision Support Tools**: Strengthen Water Decision Support Tools and Networks

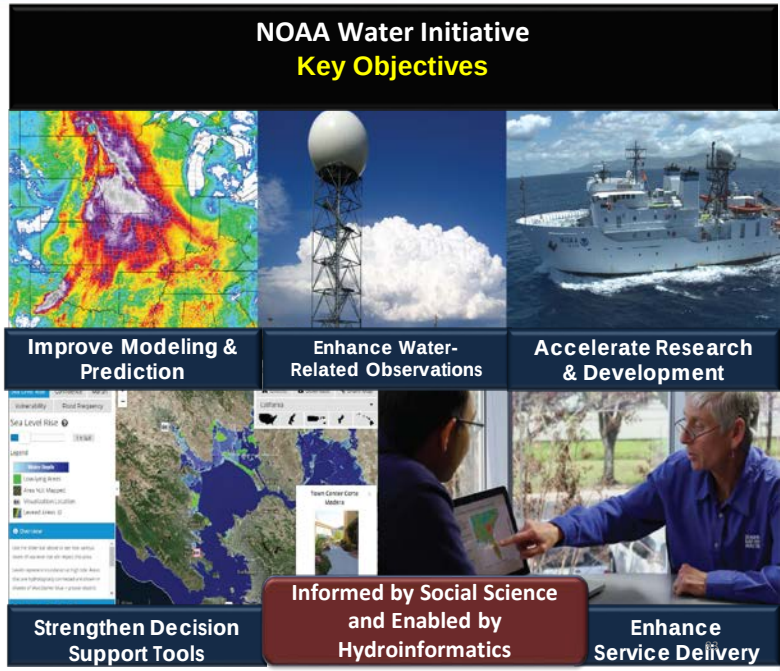
Objective 3 **Modeling**: Revolutionize Water Modeling, Forecasting, and Precipitation Prediction

Objective 4 **R&D**: Accelerate Water Information Research and Development and Research Transitions

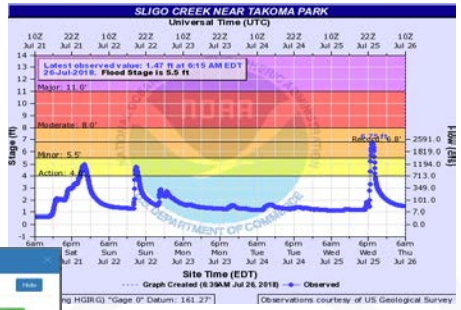
Objective 5 **Obs**: Enhance and Sustain Water-related Observations

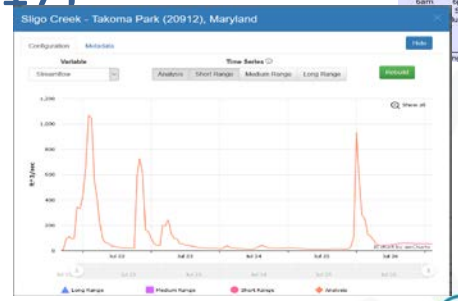
National Ocean Service/IOOS & the NOAA Water Initiative

- Cross NOAA culture change for water services
  - NOS/IOOS leading roles in coastal objectives – Services, Decision Support, Observing, Modeling
- Water team as a model for other teams under Weather, Water, and Climate Board
  - NOS Modeling and Analysis Board refresh & Portfolio Mgr FTE
- NOS $2.5M Water initiative funds in FY17, FY18, & FY19 Senate Mark
- IOOS Director is NOS lead for water initiative



Obs to right
Model below

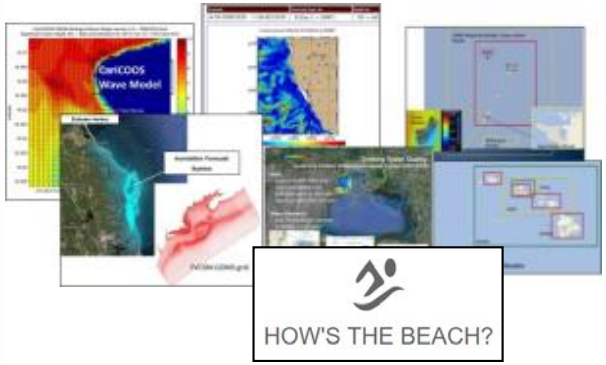




IOOS Regions meet societal needs

Stakeholder outreach

Information products



REGIONAL INFORMATION COORDINATION ENTITY
CERTIFIED
2017

Observations

Data Management

WMO

Global Telecommunication System (GTS)

NATIONAL WEATHER SERVICE

#customerfocus

IOOS | EYES ON THE OCEAN

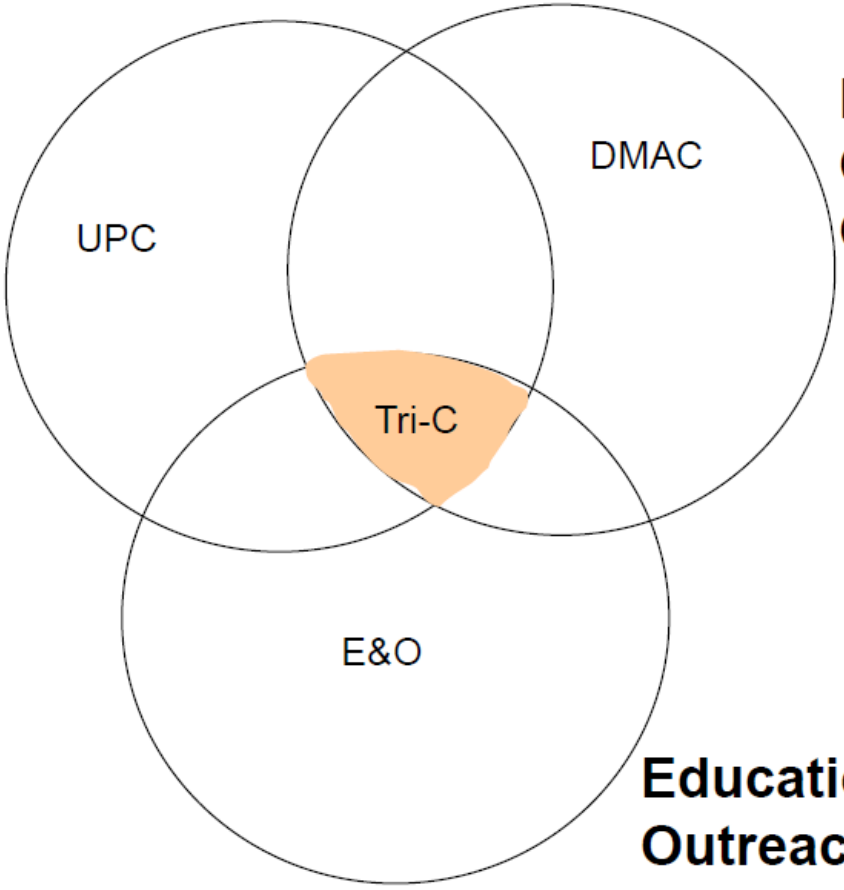
Questions?

Thank you

5. NANOOS Certification signing ceremony

6. NANOOS Standing Committees reports

User Products Committee

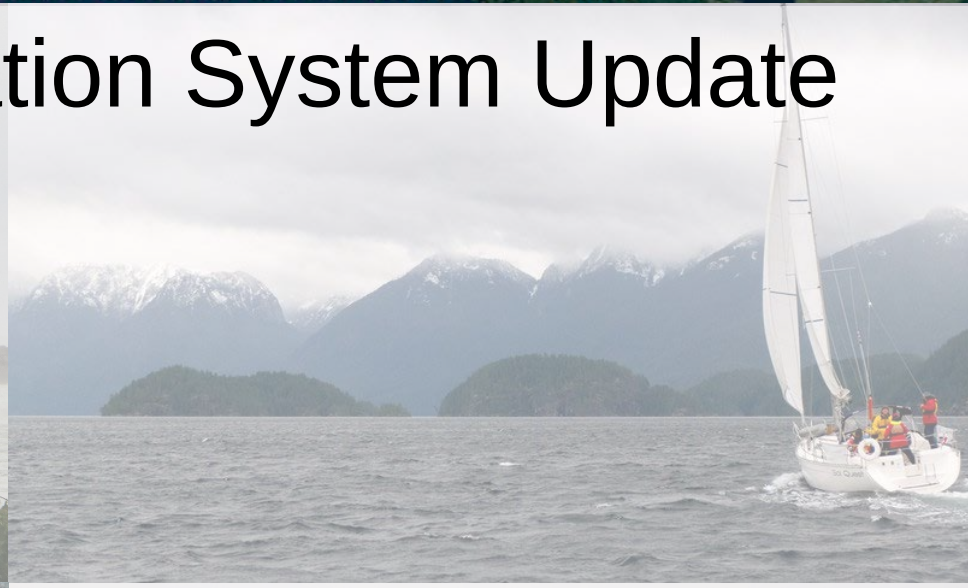


Data Management and Communication Committee

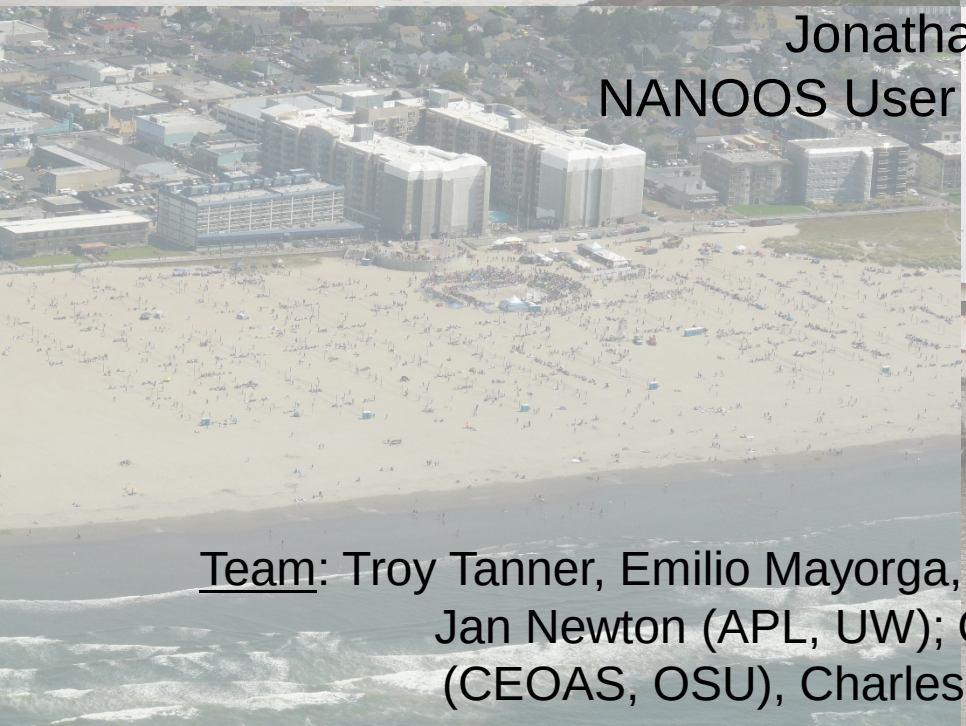
Education and Outreach Committee

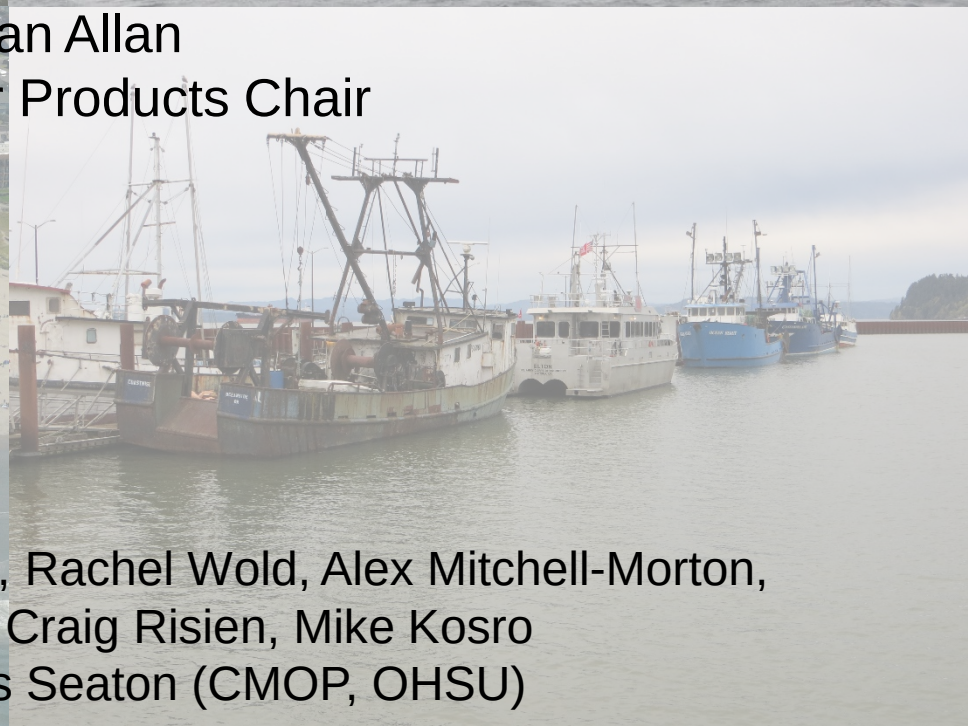
NANOOS
Northwest Association of Networked Ocean Observing Systems
IOOS

NANOOS Visualization System Update



Jonathan Allan
NANOOS User Products Chair





Team: Troy Tanner, Emilio Mayorga, Rachel Wold, Alex Mitchell-Morton, Jan Newton (APL, UW); Craig Risien, Mike Kosro (CEOAS, OSU), Charles Seaton (CMOP, OHSU)

NANOOS visualization system

Objective: to aid our understanding of **climate variability**, **safety**, **operations**, and lead to **improved resource management** and **regional productivity** throughout the region.

Goal is the seamless delivery of coastal, estuarine and ocean data to stakeholders within the NANOOS domain (+external partners, other RCOOS, and national/international programs).

Enabling :

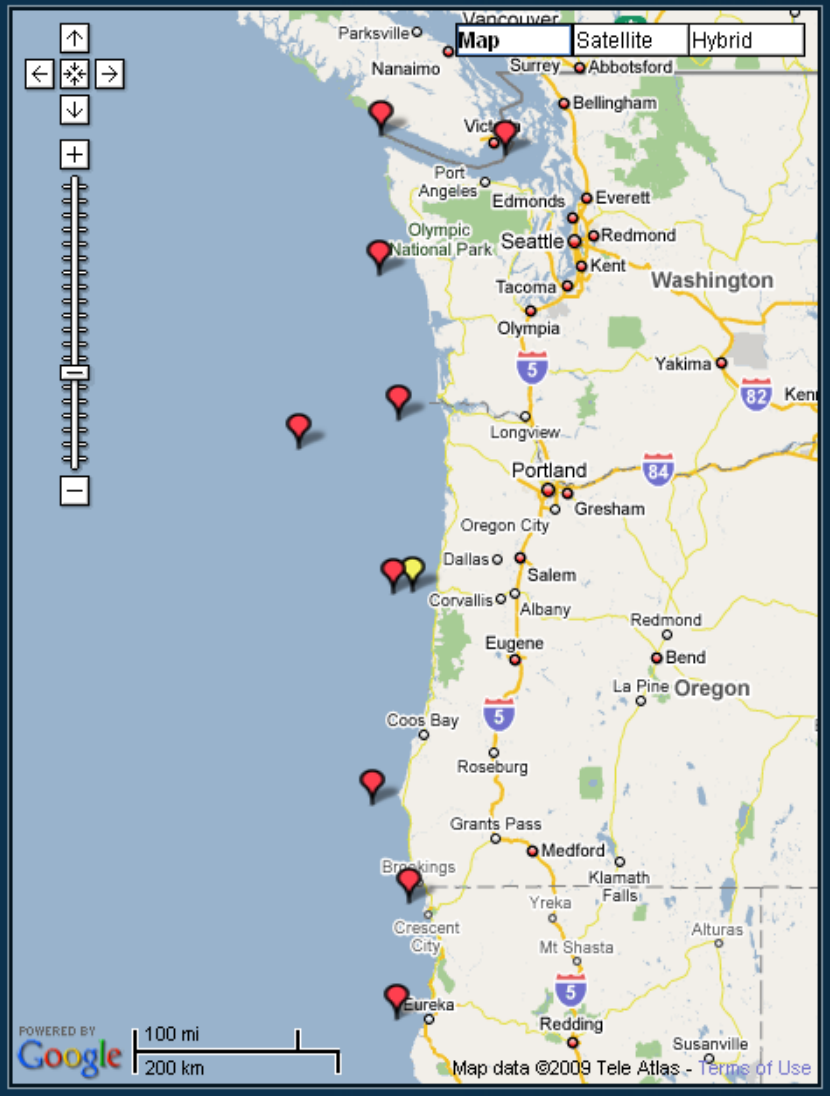
- greater situational awareness (local and regional scales);
- improved access to and understanding of environmental variables/conditions; and,
- enable development and access to short- and long-term time-series.

NANOOS

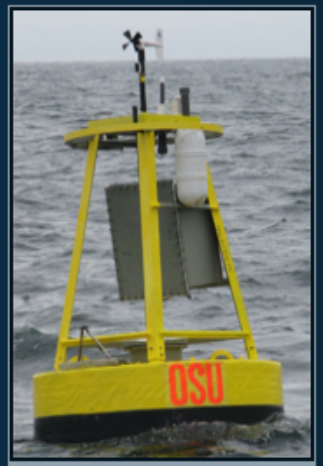
Northwest Association of Networked Ocean Observing Systems

Washington - Oregon - Northern California

NANOOS Buoy Locations



Lat: 48.4875, Lon: -127.5293

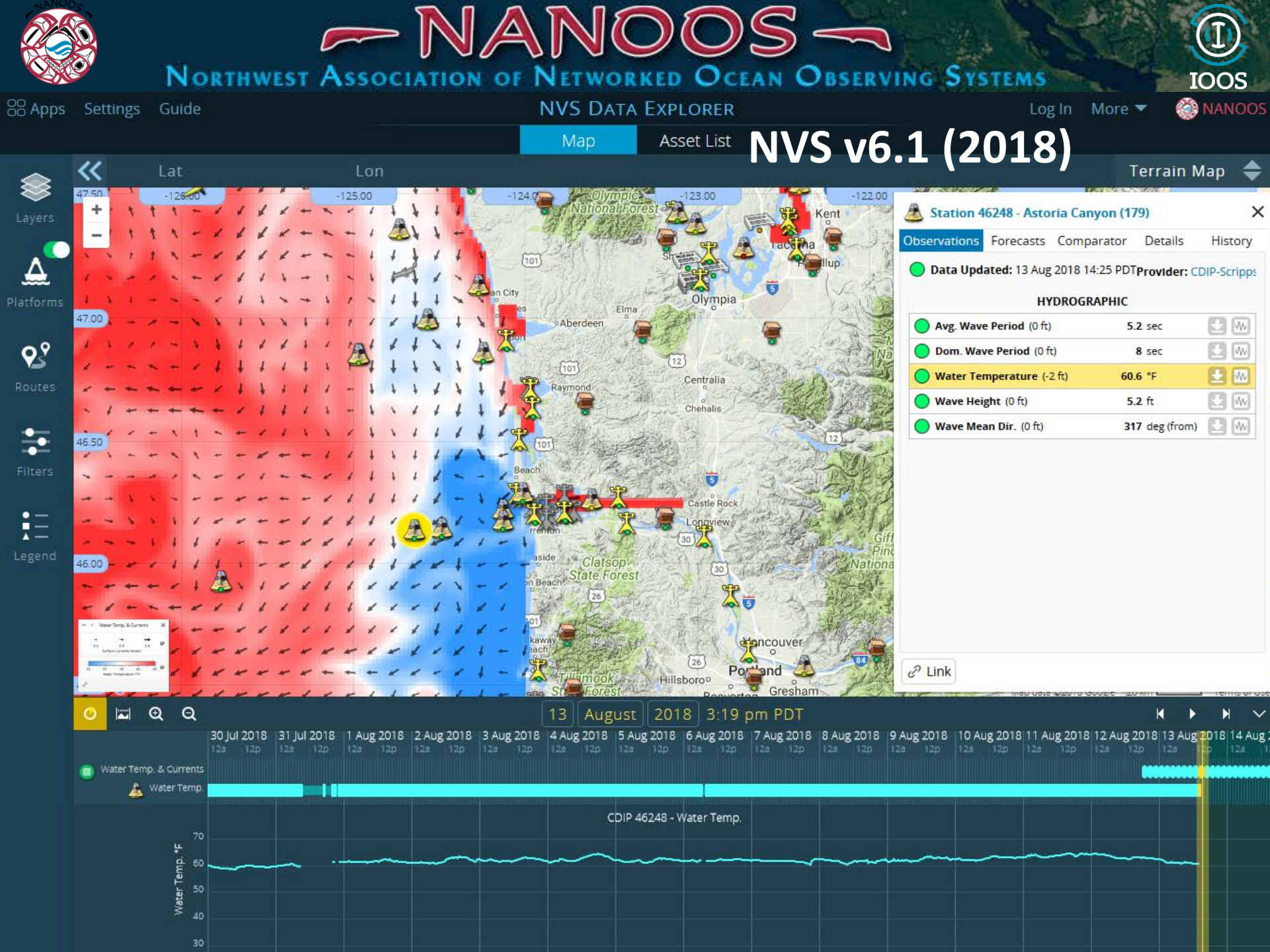


NH-10 Buoy

Map Legend

- NANOOS Buoy: NH-10
- NDBC Buoys

NVS v1.0 (2009)


NANOOS
Northwest Association of Networked Ocean Observing Systems
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NVS Data Explorer
Log In
More
NANOOS
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Asset List
NVS v6.1 (2018)
Lat
Lon
Terrain Map
Layers
Platforms
Routes
Filters
Legend
Station 46248 - Astoria Canyon (179)
Observations
Forecasts
Comparator
Details
History
Data Updated: 13 Aug 2018 14:25 PDT Provider: CDIP-Scripps
HYDROGRAPHIC
Avg. Wave Period (0 ft) 5.2 sec
Dom. Wave Period (0 ft) 8 sec
Water Temperature (-2 ft) 60.6 °F
Wave Height (0 ft) 5.2 ft
Wave Mean Dir. (0 ft) 317 deg (from)
Link
13 August 2018 3:19 pm PDT
Water Temp. & Currents
Water Temp.
CDIP 46248 - Water Temp.
Water Temp. °F

NVS History and Status:

Mar 2013 - v3.0 – Major overhaul of interface; move to Google Maps 3 API; move to dedicated web apps.
….
Oct 2014 – v3.8 – Climatology web app released
….

Jan 2017 – v5.2 – Added route feature (Tuna);
Feb 2017 – v5.3 – Updated Salish Cruise plots/interface. Modifications to tsunami evacuation portal (added safety destinations) (Explorer/Tsunami);
Jun 2017 - v. 4.0 iPhone/Android NVS rebuild released ← smartphone

Jul 2017 – v5.4 – Built HF radar plotting capability; Updated climatology indices; Updated Washington State tsunami evacuation zones (Explorer/Tsunami/Climatology);

Dec 2017 – v5.5 – Added map graticules (selectable);
May 2018 – v6.0 – Developed new web app for fishing community **(SEACAST, *unplanned*)**. New UI released (simplified format). Expanded Xtide to include Canadian tide stations **(BOATERS)**;

Jun 2017 – v6.1 – Added two new web apps: **BEACHVIEW & SURFERS**

July 2018 – Tsunami print-your-own brochure **(TSUNAMI)**

~ September 2018 – TsunamiEvac ← smartphone


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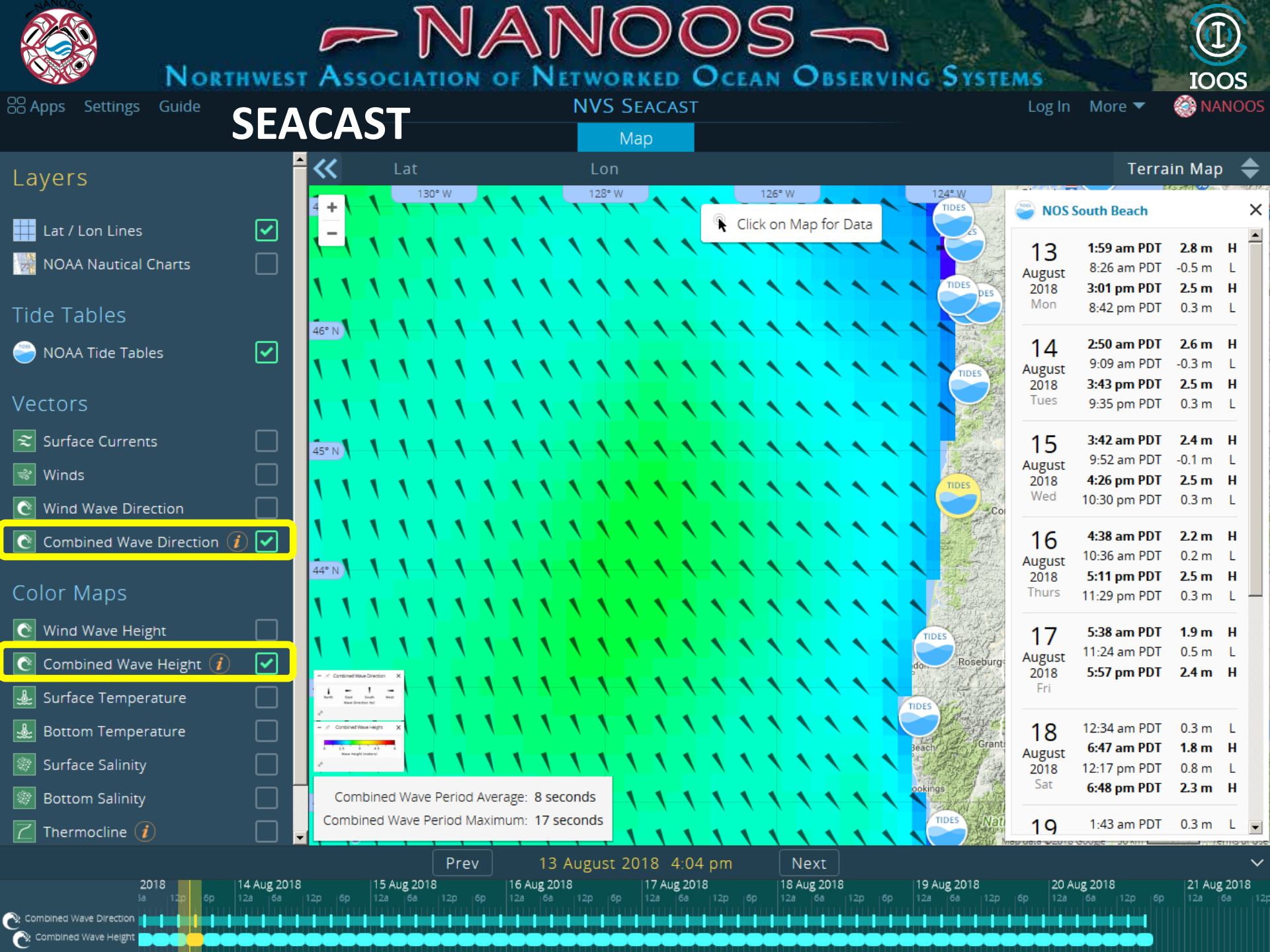
NANOO
NEW TOOL
NEW APP
NEW APP
NEW CAPABILITY
Data Explorer
Tsunami Evacuation Zones
Boaters
Tuna Fishers
Seacast
Surfers
Beach View
Shellfish Growers
Climatology
Beach and Shoreline Changes
Maritime Operations
Cruises
Gliders
High Frequency Radar
Comment
Help
Additions & Updates
View Last 3 Months
CMOP Saturn02
Mooring was redeployed June 28 and NVS harvesting is enabled.
Updated on 3 Jul 2018
CDIP Grays Harbor
Buoy was redeployed on Jun 28, at new location slightly shifted from old one (old: 46.8580N 124.2440W).
Updated on 2 Jul 2018
WADOH Peale Passage
Air & water temperature and conductivity sensor data from WA Dept. of Health (WADOH) now available for the 2018 season. Sensors deployed seasonally approx. Apr-Oct to monitor for high temperatures that increase Vibrio risk.
Updated on 26 Jun 2018
CDIP Grays Harbor
Updated on 25 Jun 2018


NANOOS
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NVS Seacast
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NANOOS
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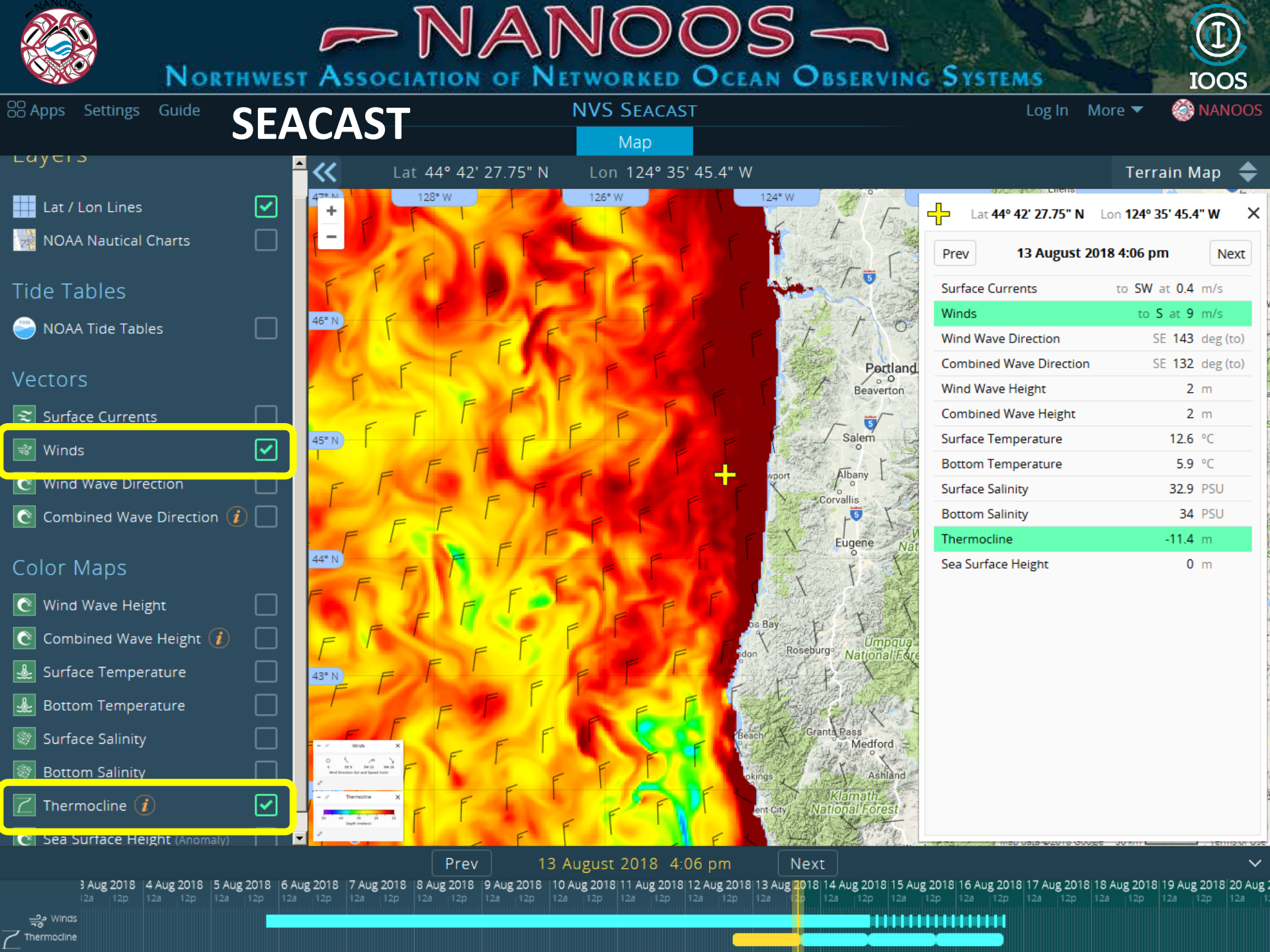
NOAA Nautical Charts
Tide Tables
NOAA Tide Tables
Vectors
Surface Currents
Winds
Wind Wave Direction
Combined Wave Direction
Color Maps
Wind Wave Height
Combined Wave Height
Surface Temperature
Bottom Temperature
Surface Salinity
Bottom Salinity
Thermocline
Lat
Lon
Terrain Map
130° W
128° W
126° W
124° W
46° N
45° N
44° N
Click on Map for Data
Combined Wave Period Average: 8 seconds
Combined Wave Period Maximum: 17 seconds
NOS South Beach
13 August 2018 Mon
1:59 am PDT 2.8 m H
8:26 am PDT -0.5 m L
3:01 pm PDT 2.5 m H
8:42 pm PDT 0.3 m L
14 August 2018 Tues
2:50 am PDT 2.6 m H
9:09 am PDT -0.3 m L
3:43 pm PDT 2.5 m H
9:35 pm PDT 0.3 m L
15 August 2018 Wed
3:42 am PDT 2.4 m H
9:52 am PDT -0.1 m L
4:26 pm PDT 2.5 m H
10:30 pm PDT 0.3 m L
16 August 2018 Thurs
4:38 am PDT 2.2 m H
10:36 am PDT 0.2 m L
5:11 pm PDT 2.5 m H
11:29 pm PDT 0.3 m L
17 August 2018 Fri
5:38 am PDT 1.9 m H
11:24 am PDT 0.5 m L
5:57 pm PDT 2.4 m H
18 August 2018 Sat
12:34 am PDT 0.3 m L
6:47 am PDT 1.8 m H
12:17 pm PDT 0.8 m L
6:48 pm PDT 2.3 m H
19
1:43 am PDT 0.3 m L
Roseburg
Prev
13 August 2018 4:04 pm
Next
2018
14 Aug 2018
15 Aug 2018
16 Aug 2018
17 Aug 2018
18 Aug 2018
19 Aug 2018
20 Aug 2018
21 Aug 2018
Combined Wave Direction
Combined Wave Height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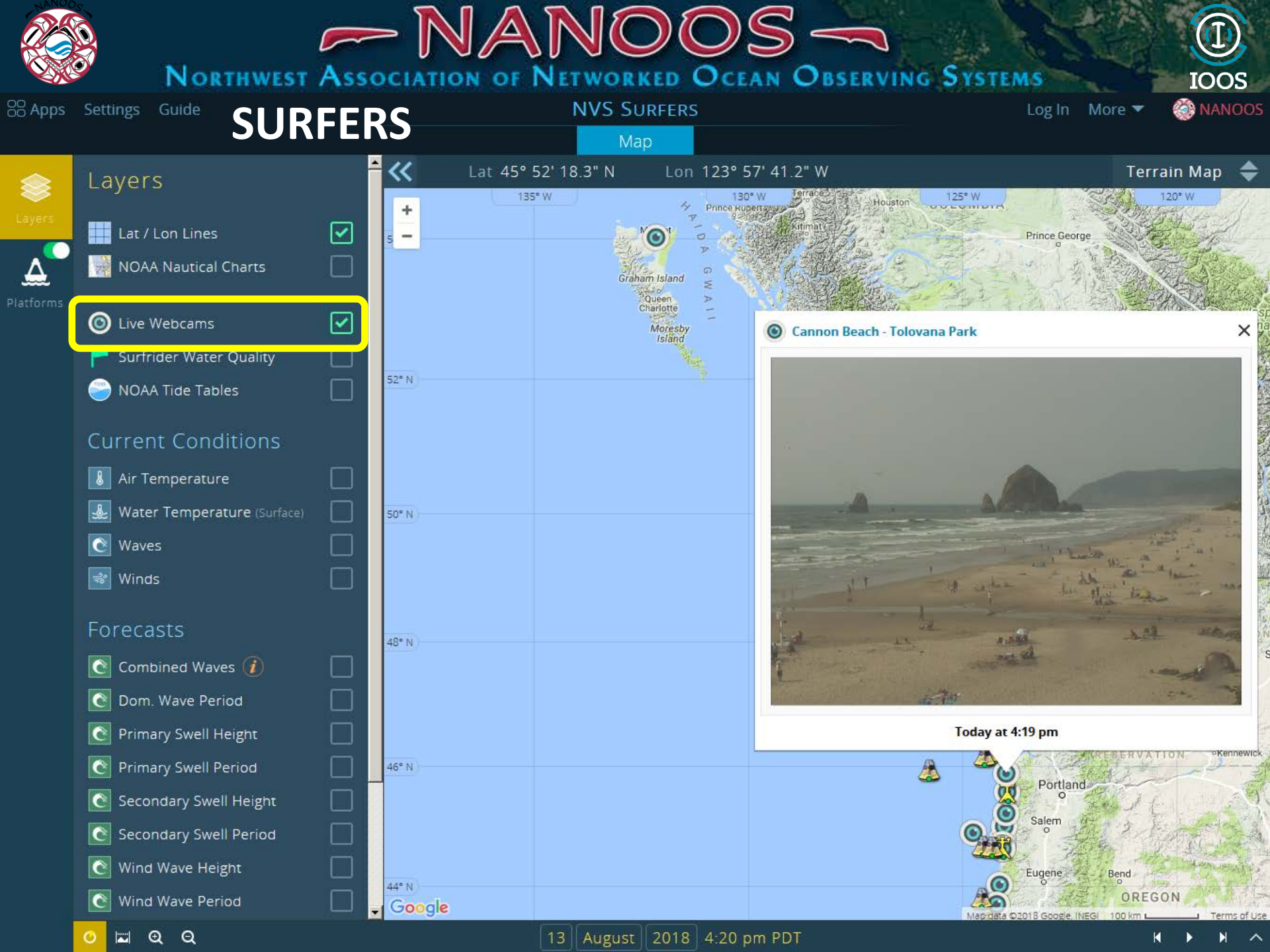
NOAA Tide Tables
Vectors
Surface Currents
Winds
Wind Wave Direction
Combined Wave Direction
Color Maps
Wind Wave Height
Combined Wave Height
Surface Temperature
Bottom Temperature
Surface Salinity
Bottom Salinity
Thermocline
Sea Surface Height (Anomaly)
Lat 44° 42' 27.75" N
Lon 124° 35' 45.4" W
Terrain Map
128° W
126° W
124° W
46° N
45° N
44° N
43° N
Portland
Beaverton
Salem
Albany
Corvallis
Eugene
Roseburg
Grants Pass
Medford
Ashland
Klamath National Forest
Umpqua National Fore
Lat 44° 42' 27.75" N
Lon 124° 35' 45.4" W
Prev
13 August 2018 4:06 pm
Next
Surface Currents to SW at 0.4 m/s
Winds to S at 9 m/s
Wind Wave Direction SE 143 deg (to)
Combined Wave Direction SE 132 deg (to)
Wind Wave Height 2 m
Combined Wave Height 2 m
Surface Temperature 12.6 °C
Bottom Temperature 5.9 °C
Surface Salinity 32.9 PSU
Bottom Salinity 34 PSU
Thermocline -11.4 m
Sea Surface Height 0 m
Prev
13 August 2018 4:06 pm
Next
3 Aug 2018
4 Aug 2018
5 Aug 2018
6 Aug 2018
7 Aug 2018
8 Aug 2018
9 Aug 2018
10 Aug 2018
11 Aug 2018
12 Aug 2018
13 Aug 2018
14 Aug 2018
15 Aug 2018
16 Aug 2018
17 Aug 2018
18 Aug 2018
19 Aug 2018
20 Aug
Winds
Thermocline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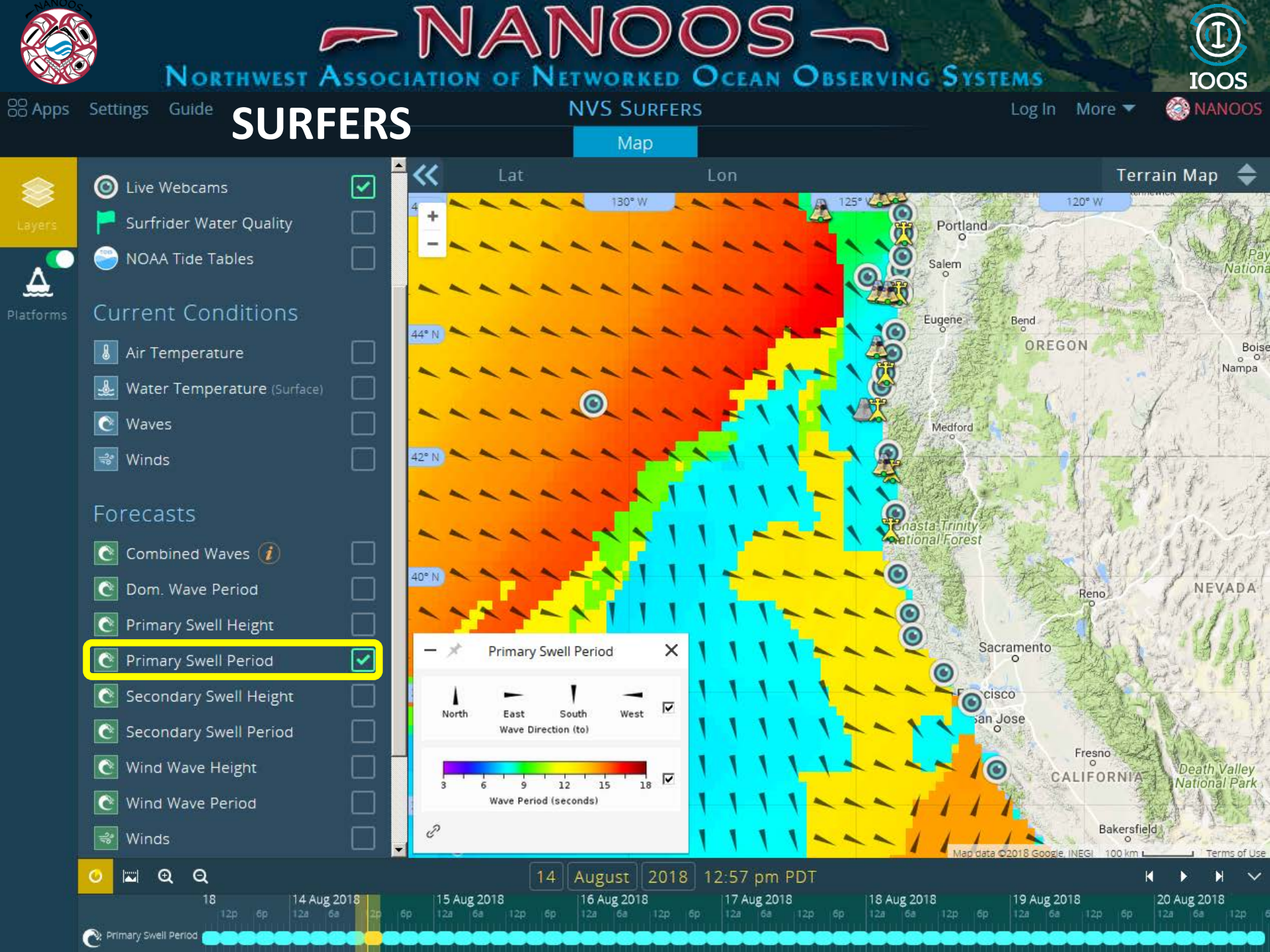
Surfrider Water Quality
NOAA Tide Tables
Current Conditions
Air Temperature
Water Temperature (Surface)
Waves
Winds
Forecasts
Combined Waves
Dom. Wave Period
Primary Swell Height
Primary Swell Period
Secondary Swell Height
Secondary Swell Period
Wind Wave Height
Wind Wave Period
Lat 45° 52' 18.3" N
Lon 123° 57' 41.2" W
Terrain Map
Cannon Beach - Tolovana Park
Today at 4:19 pm
Graham Island
Queen Charlotte
Moresby Island
Prince George
Portland
Salem
Eugene
Bend
OREGON
Google
13
August
2018
4:20 pm PDT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NOAA Tide Tables
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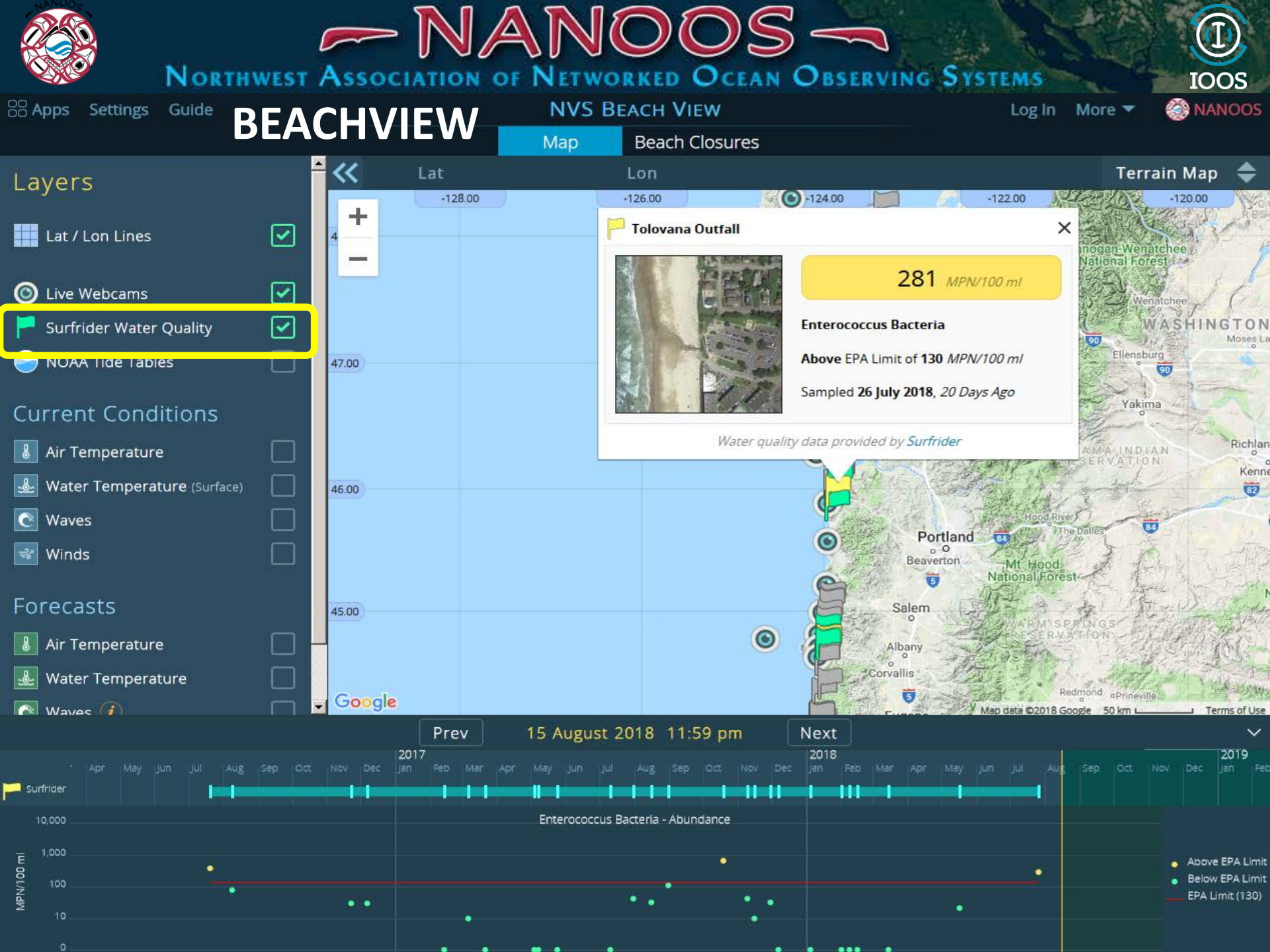
Dom. Wave Period
Primary Swell Height
Primary Swell Period
Secondary Swell Height
Secondary Swell Period
Wind Wave Height
Wind Wave Period
Winds
Lat
Lon
Terrain Map
130° W
125° W
120° W
44° N
42° N
40° N
Portland
Salem
Eugene
Bend
OREGON
Medford
Reno
NEVADA
Sacramento
San Jose
Fresno
CALIFORNIA
Bakersfield
Death Valley National Park
Primary Swell Period
North
East
South
West
Wave Direction (to)
3
6
9
12
15
18
Wave Period (seconds)
Map data ©2018 Google, INEGI
100 km
Terms of Use
14
August
2018
12:57 pm PDT
18
14 Aug 2018
15 Aug 2018
16 Aug 2018
17 Aug 2018
18 Aug 2018
19 Aug 2018
20 Aug 2018
Primary Swell Period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Water Temperature (Surface)
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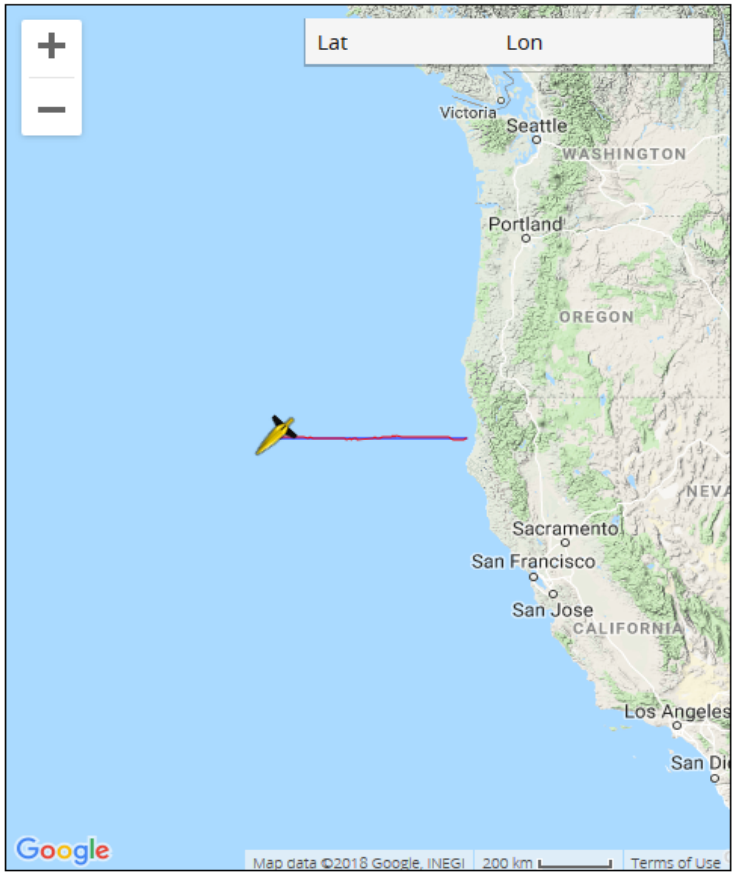
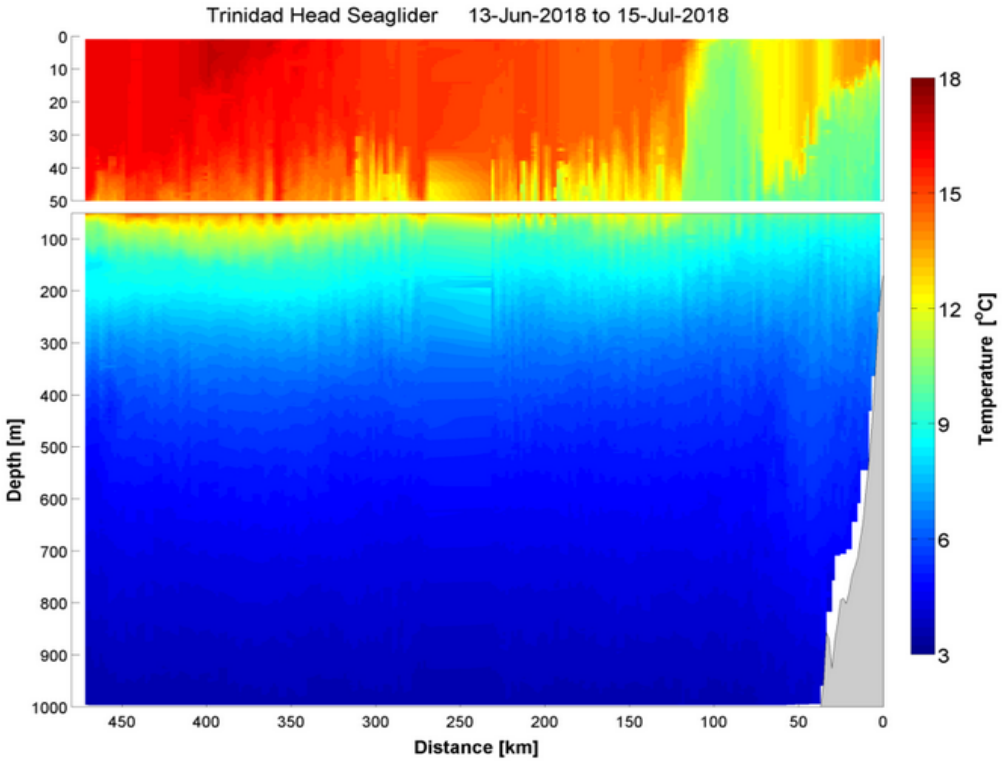
Forecasts
Air Temperature
Water Temperature
Waves
Lat
Lon
Terrain Map
-128.00
-126.00
-124.00
-122.00
-120.00
47.00
46.00
45.00
Tolovana Outfall
281 MPN/100 ml
Enterococcus Bacteria
Above EPA Limit of 130 MPN/100 ml
Sampled 26 July 2018, 20 Days Ago
Water quality data provided by Surfrider
Portland
Beaverton
Salem
Albany
Corvallis
Yakima
Wenatchee
Ellensburg
Redmond
Prineville
Google
Map data ©2018 Google
50 km
Terms of Use
Prev
15 August 2018 11:59 pm
Next
2017
2018
2019
Surfrider
Enterococcus Bacteria - Abundance
MPN/100 ml
10,000
1,000
100
10
0
Above EPA Limit
Below EPA Limit
EPA Limit (130)

Missions 2014-Present Type: Seaglider Provider: OSU CEOAS GRG Contact: Jack Barth

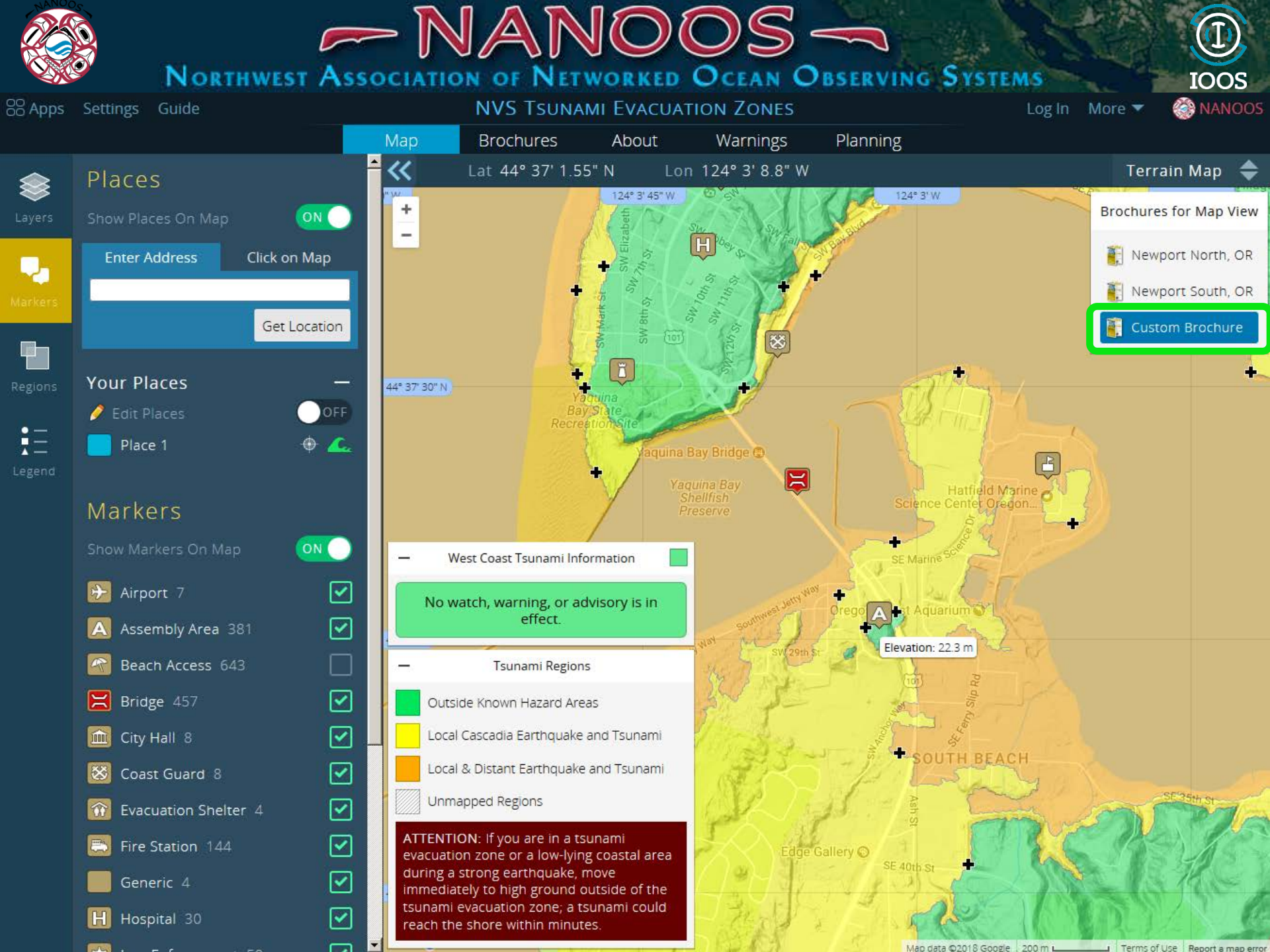
Temperature Salinity Density Dissolved Oxygen Fluorescence CDOM Backscatter





Prev 14 July 2018 11:36 pm Next

14 2015 2016 2017 2018 2019
F M A M J J A S O N D J F M A M J J A S O N D J F M A M J J A S O N D J F M A M J J A S O N D J F M A M J J A S O N D
2014-Present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Places
Show Places On Map
ON
Enter Address
Click on Map
Get Location
Your Places
Edit Places
OFF
Place 1
Markers
Show Markers On Map
ON
Airport 7
Assembly Area 381
Beach Access 643
Bridge 457
City Hall 8
Coast Guard 8
Evacuation Shelter 4
Fire Station 144
Generic 4
Hospital 30
Lat 44° 37' 1.55" N
Lon 124° 3' 8.8" W
Terrain Map
Brochures for Map View
Newport North, OR
Newport South, OR
Custom Brochure
West Coast Tsunami Information
No watch, warning, or advisory is in effect.
Tsunami Regions
Outside Known Hazard Areas
Local Cascadia Earthquake and Tsunami
Local & Distant Earthquake and Tsunami
Unmapped Regions
ATTENTION: If you are in a tsunami evacuation zone or a low-lying coastal area during a strong earthquake, move immediately to high ground outside of the tsunami evacuation zone; a tsunami could reach the shore within minutes.
Elevation: 22.3 m
Yaquina Bay Bridge
Yaquina Bay Shellfish Preserve
Hatfield Marine Science Center Oregon...
SOUTH BEACH
Edge Gallery
Map data ©2018 Google
200 m
Terms of Use
Report a map error

NANOOS

NORTHWEST ASSOCIATION OF NETWORKED OCEAN OBSERVING SYSTEMS

IOOS

Visit OregonTsunami.org to find more great resources!

TSUNAMI EVACUATION MAP

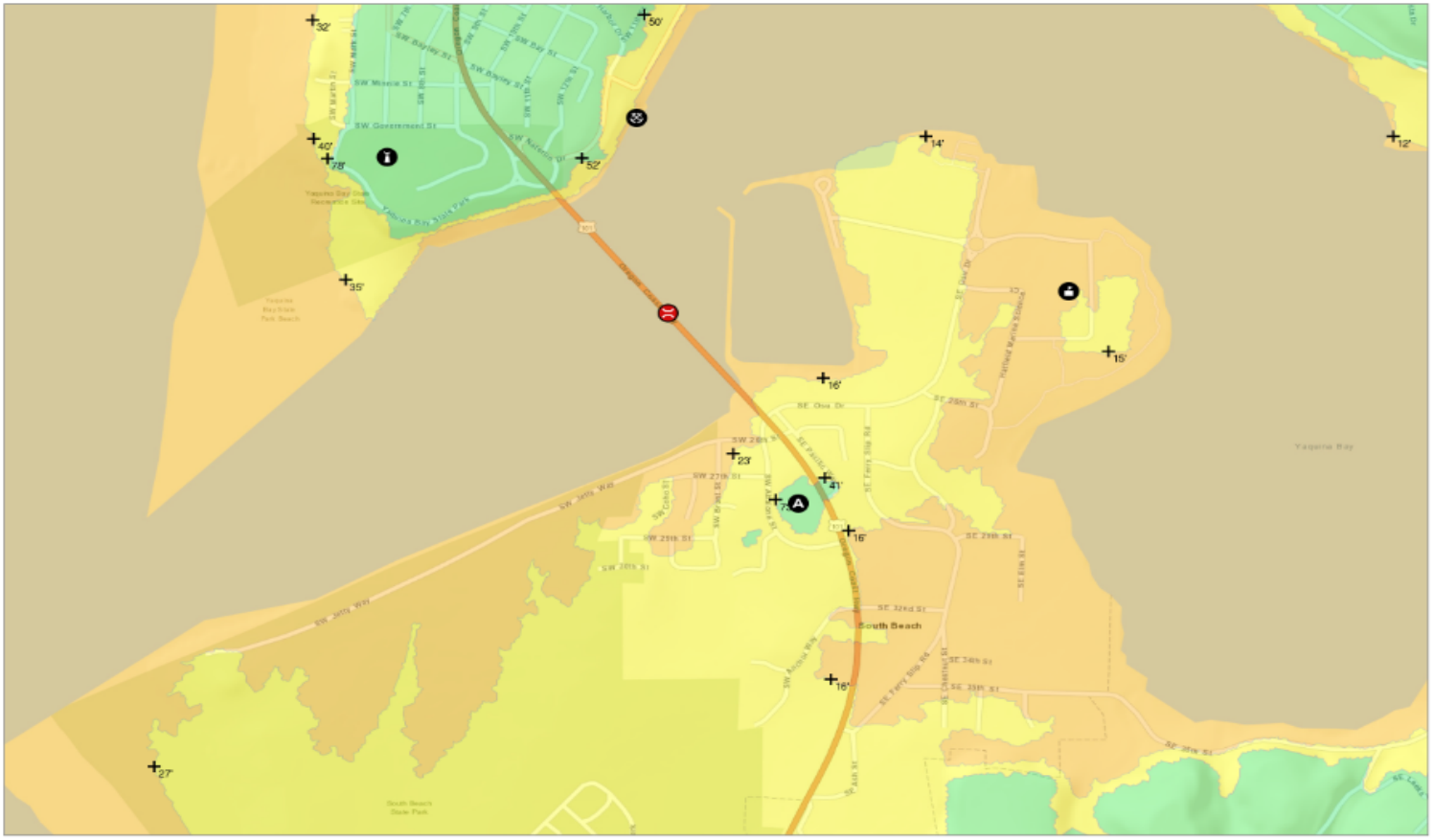
IF YOU FEEL AN EARTHQUAKE:
- Drop, cover and hold
- Move immediately inland to higher ground
- Do not wait for an official warning

SI USTED SIENTE EL TEMBLOR:
- Tirese al suelo, cúbrase, y espere
- Diríjase de inmediato a un lugar más alto que el nivel del mar
- No espere por un aviso oficial

ASSEMBLY AREA / ÁREA REUNIÓN

NOTICE: This tsunami evacuation zone map was developed by DOGAMI for the purpose of guiding the public out of the tsunami inundation zone in the event of a tsunami evacuation. This map adopts recommendations from the Oregon Tsunami Advisory Council. The evacuation routes were developed by DOGAMI, in consultation with local emergency officials and OEM.

OUTSIDE HAZARD AREA: Evacuate to this area for all tsunami warnings or if you feel an earthquake.	**ZONA DE PELIGRO EXTERIOR:** Evacue a esta área para todas las advertencias del maremoto o si usted siente un temblor.
LOCAL CASCADIA EARTHQUAKE AND TSUNAMI: Evacuation zone for a local tsunami from an earthquake at the Oregon coast.	**MAREMOTO LOCAL (terremoto de Cascadia):** Zona de evacuación para un tsunami local de un temblor cerca de la costa de Oregon.
DISTANT TSUNAMI: Evacuation zone for a distant tsunami from an earthquake far away from the Oregon coast.	**MAREMOTO DISTANTE:** Zona de evacuación para un tsunami distante de un temblor lejos de la costa de Oregon.



Map Symbols / Símbolos del Mapa

- Assembly Area / Área Reunion
- School / Escuela
- Bridge (May Fail) / Puente (Puede Fallar)
- Coast Guard / Guardacostas
- Lighthouse / Faro
- Evacuation Route / Ruta de Evacuación
- Safety Destination / Destino de Seguridad
- Elevation, in feet / Elevación, en pies

N

Scale / Escala

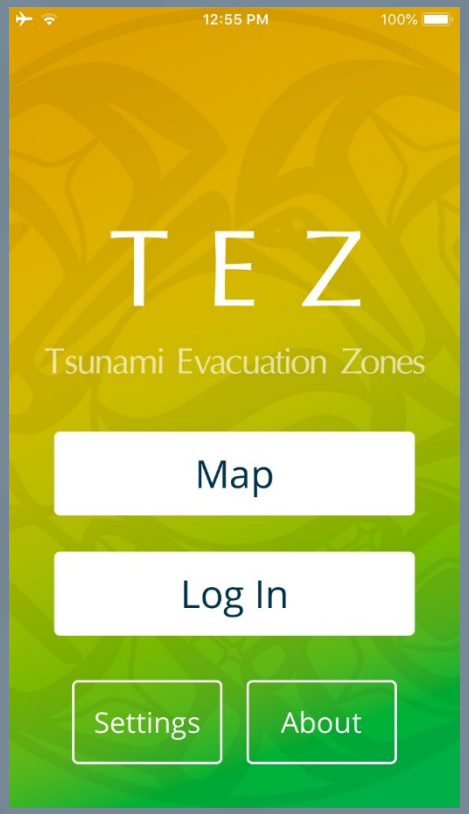
1/8 mile

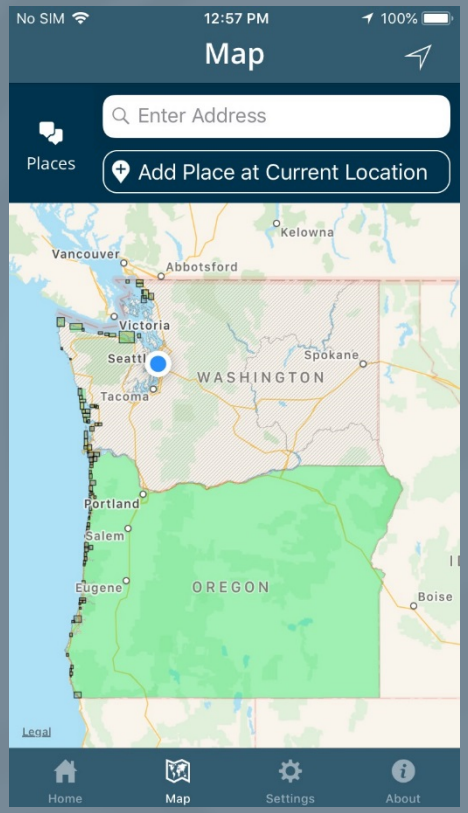
1/8 km

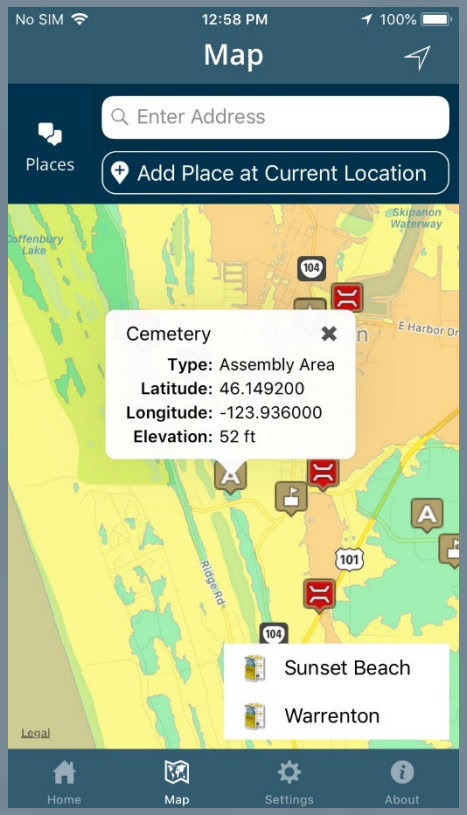
13 August 2018

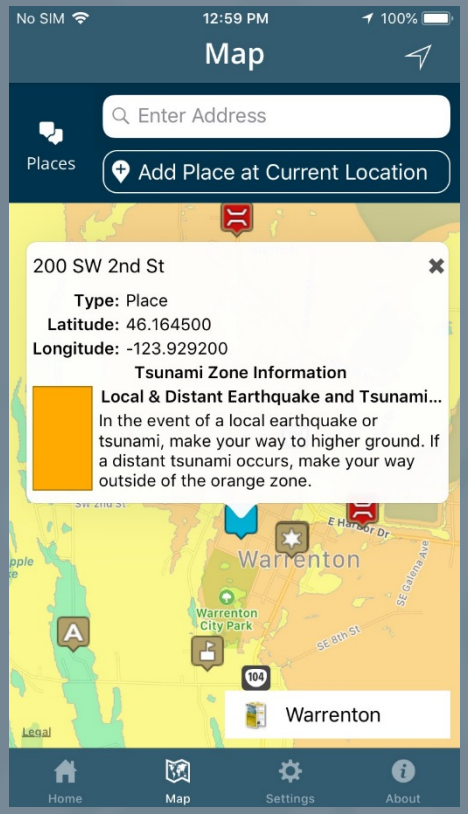
Contact: Oregon Department of Geology and Mineral Industries, 541-574-6658

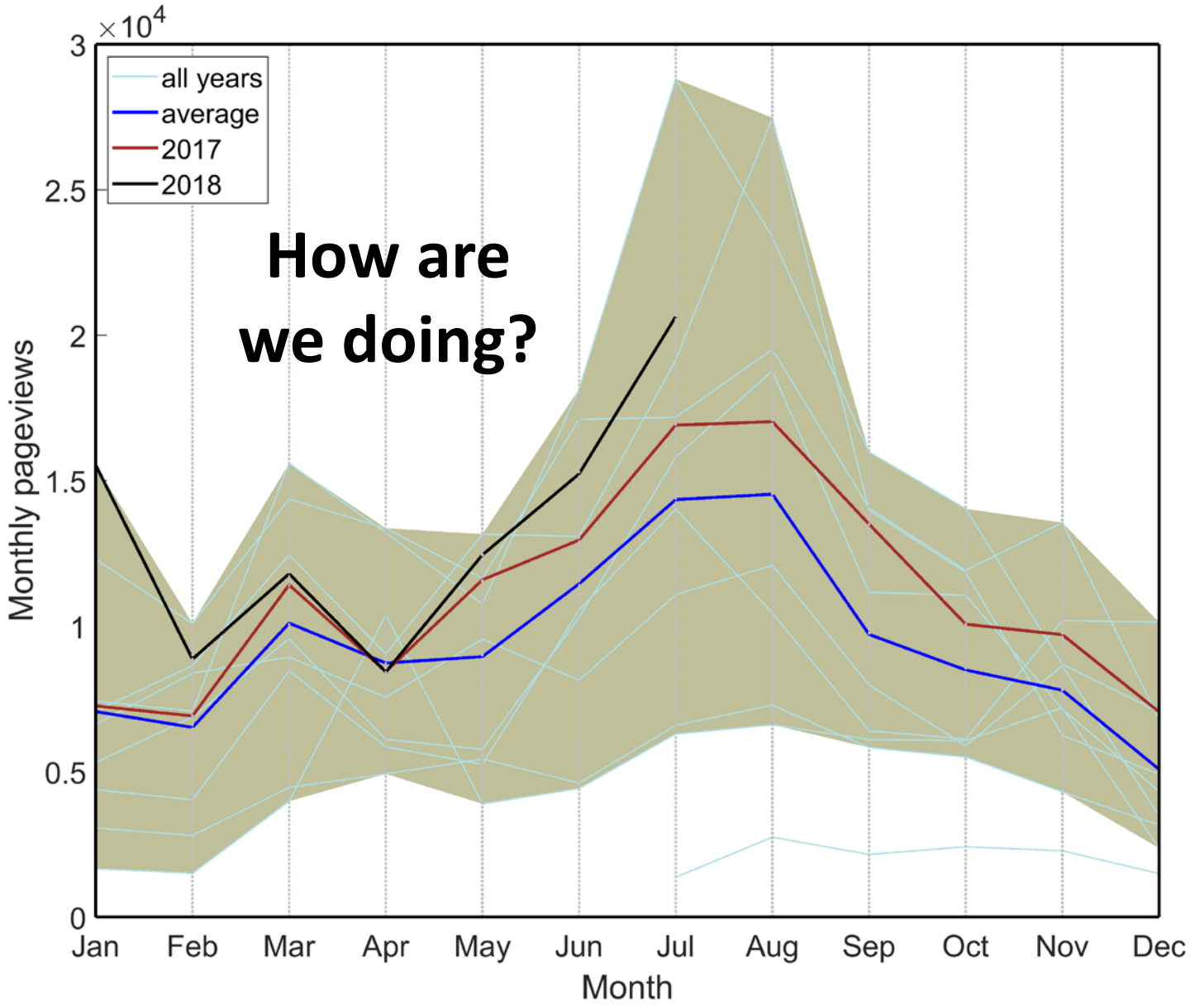
Coming soon… *TSUNAMIEVAC for smartphones*







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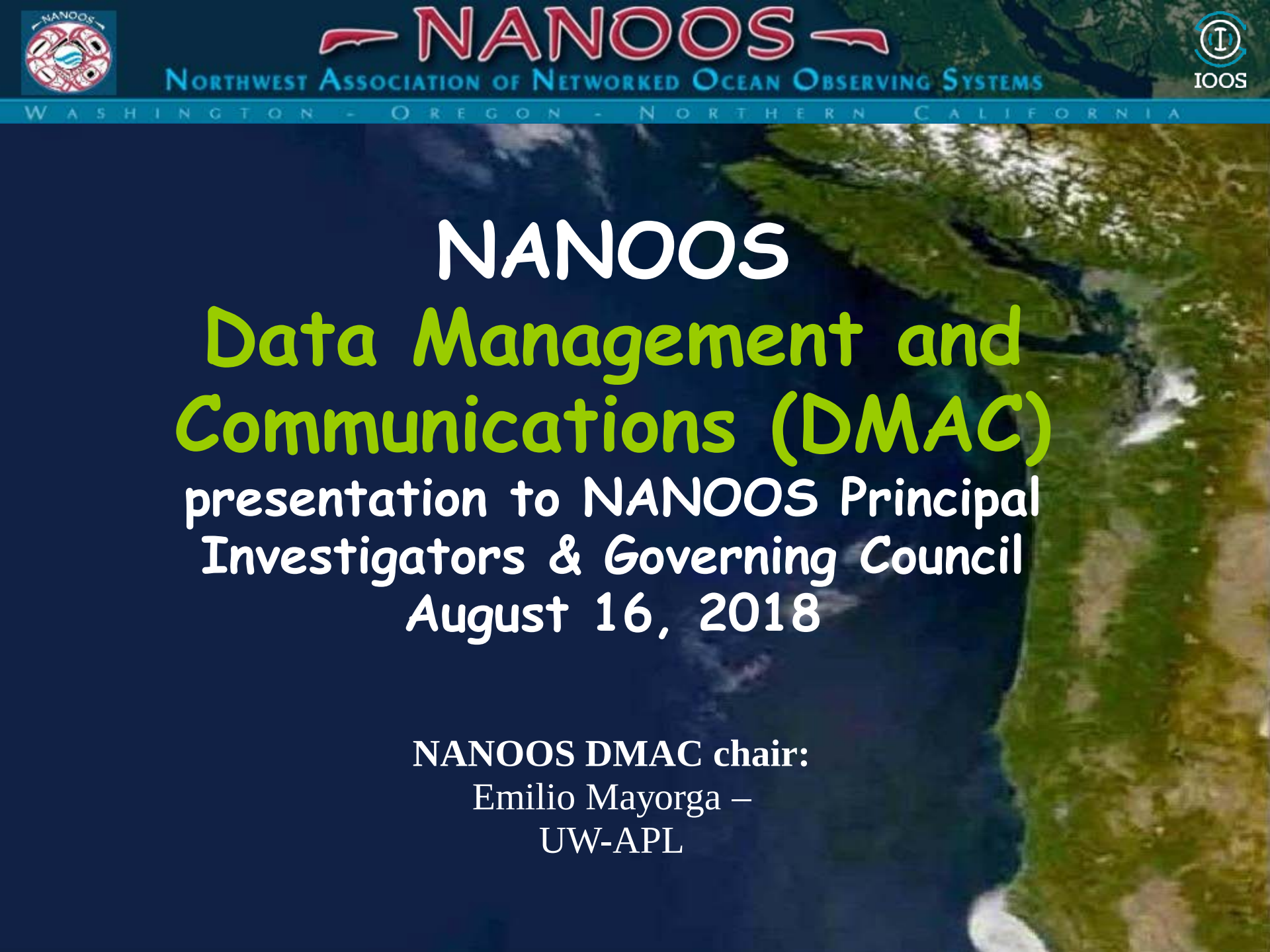
Monthly pageviews
all years
average
2017
2018
How are we doing?
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
Month

Web App / Page	Pageviews	%	Avg. Time on Page
/TunaFish	111,277	26.7	0:05:19
/TsunamiEvac	105,882	25.4	0:04:55
/Explorer	54,776	13.1	0:04:43
/Explorer NWIC_Bellinghambay	8,879	2.1	0:06:50
/Boaters	8,381	2.0	0:03:53
/Climatology	6,094	1.5	0:03:53
/ShellfishGrowers	5,803	1.4	0:03:55
/BeachMapping	3,657	0.9	0:03:02
/MaritimeOps	3,546	0.8	0:02:43
/Explorer HMSC_Newport:observations	2,462	0.6	0:04:18
/CruisePrism	2,455	0.6	0:04:31
/HFRadar	2,079	0.5	0:01:34
/GliderLaPush	1,560	0.4	0:02:22
/Seacast	1,269	0.3	0:03:46
NVS app landing page	90,609	21.7	0:00:31
LogIn, Settings, Disclaimer, ContactUs	7,682	1.8	0:00:49
/Help?section=Videos	923	0.2	0:01:42
	417,334		0:02:35

A Challenge going forward – Many Stakeholders

- State agencies (e.g. ODFW, WADOE, DSL, etc.)
- Federal agencies (NOAA, NWS, FEMA, US Coast Guard, etc.)
- Cities and Counties
- Ocean engineering (instruments, wave energy, telecommunication)
- NGO's
- Ports
- Bar pilots
- Fishers (recreational and commercial)
- Shellfish growers
- Recreational boaters
- Tribes
- Geotechnical consultants
- Universities/researchers
- Schools (K-12)
- Public-at-large
- Scientists
- and many others…

Questions?



NANOOS
Data Management and Communications (DMAC)

presentation to NANOOS Principal Investigators & Governing Council
August 16, 2018

NANOOS DMAC chair:
Emilio Mayorga –
UW-APL

NANOOS DMAC Focus Team:

Emilio Mayorga – UW/APL, Chair
Craig Risien – OSU
Charles Seaton – OHSU/CMOP
(Don Setiawan – UW/APL – Now with OOI)

Part of broader DMAC-UPC-Web-Outreach team. But with focused interactions to give sustained attention to "low-level" DMAC issues and IOOS DMAC compliance.

- Close interactions with: Jon Allan (DOGAMI) & Troy Tanner (UW/APL)
- Also: Alex Dioso – UW/APL (System Administration, software development support); and others, ad hoc

2017-2018 DMAC Activities

1. NVS asset data and metadata maintenance and additions
2. NANOOS Certification (Data Management Plan, etc.)
   a. Summary
   b. Commitments: QARTOD Quality Control flagging, NCEI Archiving, Data Sharing, etc.
3. Connection to IOOS systems
   a. Services and dataset registration with IOOS Registry & Catalog
   b. Connection to other IOOS systems (thematic DACs, applications, etc.)
4. Other activities
   a. Biological data
   b. Ocean Acidification data

NVS: New or Enhanced Assets

http://nvs.nanoos.org/AssetHistory

1. In-situ fixed
   a. New CMOP Elliott Bay mooring in the Columbia estuary
   b. New OOI Benthic Experiment Package data streams from two sites
   c. WADOH seasonal monitoring network (absent last year)
   d. Newish integration of CeNCOOS Humboldt and Trinidad Pier platforms in N. California
   e. (In development) CB-06 ADCP integration and visualization
2. Overlays (remote sensing, models, reanalysis)
   a. New University of British Columbia “SalishSeaCast” nowcast model
   b. New OSU ROMS products (thermocline and pycnocline depths, and bottom temperature and salinity) and LiveOcean products (bottom overlays)
   c. Updates of climatologies / anomalies, expansion of HYCOM and WAVEWATCH III
3. Others
   a. NVS Glider Apps: New NANOOS Trinidad Head and expanded NANOOS La Push
   b. NOAA tide gage table presentation, Xtide station expansion into Canada, web cams, and Surfrider water quality citizen science data

NANOOS Data Management Plan (NANOOS DMP)

Table of Contents

http://www.nanoos.org/about_nanoos/certification.php

Note: Certification does NOT cover models.
Data Management Plan mentions NANOOS models, but only sparsely.

Preparation of the DMAC components of the application, particularly the NANOOS DMP together with individual DMP's by NANOOS observing-asset PI's, led to important advancements in the maturity of the NANOOS DMAC effort and concrete system enhancements, including expanded documentation of operations, enhanced system monitoring, and more robust backup procedures. The NANOOS DMP is a new resource that brings more information and transparency about NANOOS data management and distribution processes for observational data.

NANOOS Data Management Plan

Table 1. Data Management summary for NANOOS-supported ("internal") assets; for additional, detailed information on each asset, see the corresponding Appendix Data Management Plan (DMP) file(s) listed for each asset.

	Operator	Asset Count	NVS Metadata Store	NVS Access*	52N SOS	GeoServer	NDBC / WMO GTS	National DAC	Archiving	Appendix DMP File
Surface Currents and Waves										
HF Radar (currents)	OSU	11#	X	All			X	X	NCEI	1.DMP.HFRadar.pdf
Port X-Band Radar (waves)	OSU	2#	X	Plots						2.DMP.PortsXBandRadar.pdf
Fixed-location Sensor Platforms										
Washington Shelf Buoys	UW	2	X	All	X	X	X			3.DMP.WAShelfBuoys.pdf
Oregon Shelf Buoy	OSU	1	X	All	X	X	X			4.DMP.ORShelfBuoy.pdf, 5.DMP.ORShelfBuoy_OA.pdf
Puget Sound, ORCA Buoy Program	UW	6	X	All	X	X	X			6.DMP.PugetSoundORCABuoys.pdf
Columbia River estuary and plume, SATURN network	OHSU	14+	X	All	X	X	X		NCEI	7.DMP.ColumbiaSATURNNetwork.pdf
South Slough Estuary Observations	SSNERR	6	X	All	X	X	X			8.DMP.SouthSloughNERR.pdf
Gliders and Ferries										
Northern California Shelf Glider	OSU	1	X	Plots			X	X	NCEI	9.DMP.NorthernCAGlider.pdf
SW WA Glider	OHSU	1x	X				X	X	NCEI	7.DMP.ColumbiaSATURNNetwork.pdf
Victoria Clipper Ferry	WDOE	1	X	All						10.DMP.VictoriaClipperFerry.pdf
Beach and Shoreline Observations										
Oregon Shoreline Observations	DOGAMI	-	X	Plots					State Agency	11.DMP.ORBeachShorelineObs.pdf
Washington Shoreline Observations	WDOE	-	X	Plots					State Agency	12.DMP.WABeachShorelineObs.pdf
Nearshore Bathymetry	OSU	-	X							13.DMP.NearshoreBathymetry.pdf

* For NVS Access, "All" represents both data download and graphic presentation, and "Plot" only includes graphic presentation; # Number of radar sites; + Several stations are currently inactive but may be redeployed as resources allow; x Not currently deployed, pending additional funding and servicing.

NANOOS Data Management Plan

Table 2. External, fixed-location in-situ data streams other than those from federal or Canadian federal agencies. These assets are integrated into the NANOOS DAC and NVS.

Provider Information						
Code	Name & URL	Type	Contact Name & Email	Asset Count	52N SOS	Notes
Hakai Institute	Hakai Institute	Academic	Wiley Evans, wiley.evans@hakai.org	2	X	Canadian. Burke-o-lator (OA)
HMSC	Hatfield Marine Science Center	Non-Profit	Dann Cutter, Dann.Cutter@oregonstate.edu	1	X	Offline due to sensor servicing
King County	King County	County	Stephanie Jaeger, Stephanie.Jaeger@kingcounty.gov	4	X	Implementing QARTOD-based QC flagging.
NWIC	Northwest Indian College	Academic	Beth Curry, beth4cu@uw.edu	1	X	Close partnership with NANOOS, UW
ONC	Ocean Networks Canada	Academic	Mike Morley, mmorley@uvic.ca	4		Canadian. Large, long-term observation system. Only seabed platforms currently integrated; will expand platform integration in 2017
OOI	Ocean Observatories Initiative	Academic	Jack Barth, barth@coas.oregonstate.edu	6		Large, long-term observation system. Using Endurance Array platforms. Will expand sensor and platform integration in 2017 and 2018
PennCoveShellfish	Penn Cove Shellfish	Industry	Jim Nagel, jim@penncoveshellfish.com	2	X	
PSI	Pacific Shellfish Institute	Non-Profit	Andy Suhrbier, suhrbier@pacshell.org	2	X	Includes one Burke-o-lator (OA). Close partnership with NANOOS.
TaylorShellfish	Taylor Shellfish	Industry	Benoit Eudeline, BenoitE@taylorshellfish.com	1	X	Burke-o-lator (OA). Close partnership with NANOOS.
WADOH	Washington Department of Health	State	Clara Hard, clara.hard@doh.wa.gov	18	X	Seasonal network (late Spring to early Fall). All but one site currently offline until Spring 2018.
WhiskeyCrShelfish	Whiskey Creek Shellfish Hatchery	Industry	Alan Barton, alan_barton22@yahoo.com	1	X	Burke-o-lator (OA). Close partnership with NANOOS.

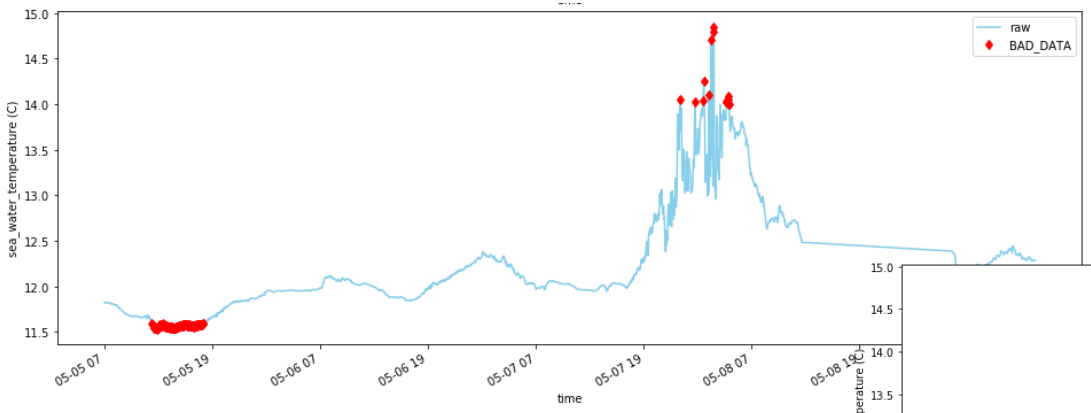
All assets are in the NVS Metadata Store and all provide data+graphic access on NVS. OA: Ocean Acidification, where the Burke-o-lator is a specialized OA sensor.

Certification DMAC Commitments

1. 5-year period.
    a. Phased implementation of requirements, where some are already fully met, others are in transition towards full implementation (demonstrated initial work and plans).
2. QARTOD Quality Control testing, flagging
    a. Current R&D, UW & CMOP
    b. See follow up slide.
3. Archiving with NCEI
    a. Initiate discussions with each NANOOS PI ASAP.
    b. Develop plans and time frame for each PI or dataset.
    c. Build on CMOP experience, procedures, conventions and code.
4. Data Sharing
    a. Mostly met, except for some unconventional data sets (X-Band radar, beach profiles, bathymetry)
5. “External” Datasets (partners not funded by NANOOS)
    a. Some requirements may not realistically apply, specially archiving. Next phase.

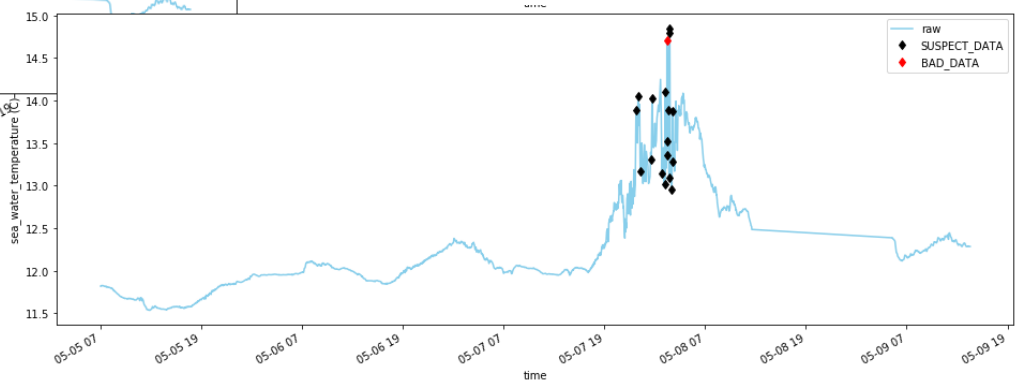
Certification: QARTOD

1. Implement published QC tests and flagging schemes for selected variables
   a. Core tests: Gross range, local range, spike, flat line, etc
2. Tasks ahead
   a. Selection of thresholds for each test, variable. In collaboration with PI's
   b. Flags applied centrally while accommodating QARTOD flags from providers
   c. Operationalization in data storage and services ("by January 2019"), and in NVS



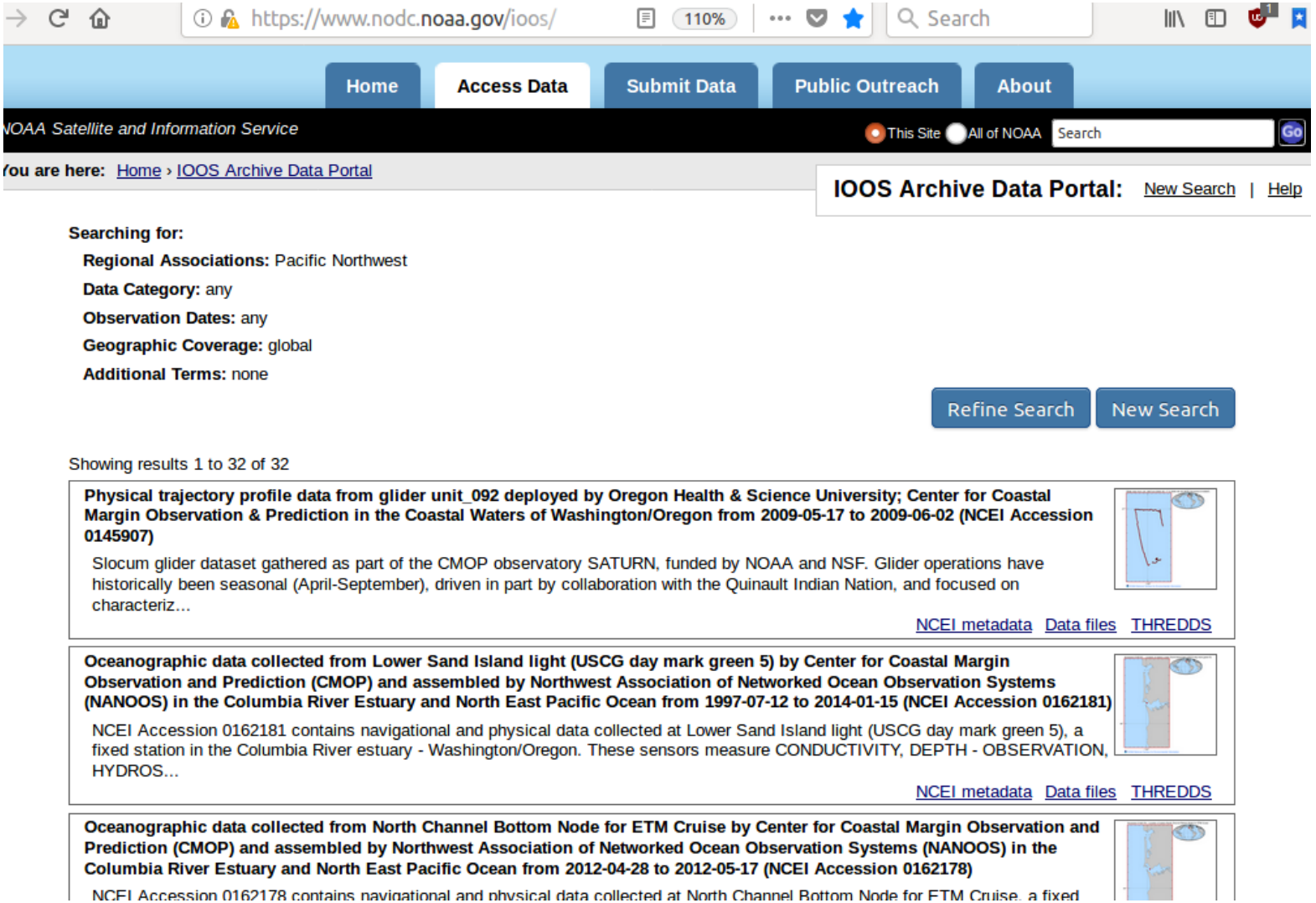
Gross Range Test

Spike Test

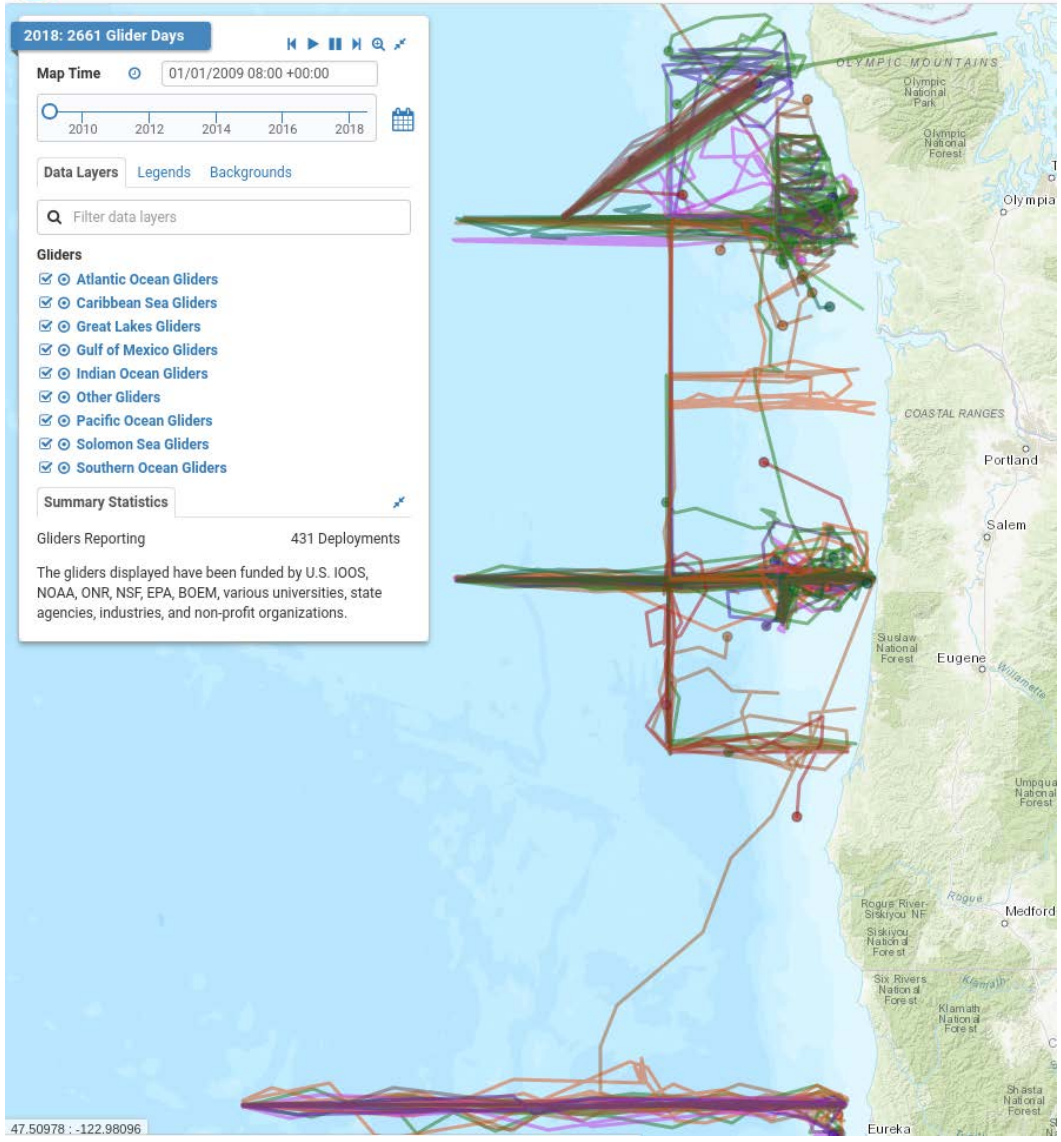


Certification: NANOOS archiving with NCEI:

- Complete CMOP fixed time series and largely automated monthly updates, plus some gliders.
- Other NANOOS assets: preparations and discussions with PI's, next ~ 6 months.



Glider DAC: NANOOS & OOI



NANOOS on Glider DAC:

- UW La Push, CMOP SW WA, OSU Trinidad Head.
- Only old Newport glider line (20xx – 2014) not available / submitted.

Other thematic DAC:

HF Radar DAC

NANOOS submission and archiving has been operational for ages, thanks to Mike Kosro and HFR community.


NANOOS
Northwest Association of Networked Ocean Observing Systems
Washington - Oregon - Northern California
IOOS
https://data.ioos.us/dataset?q=NANOOS&sort=metadata_
Search
THIS INSTANT!
IOOS
Integrated Ocean Observing System
Datasets
Organizations
Feedback
About
Search
/ Datasets
IOOS Catalog - 2017 screenshot
Filter by location
Clear
Map data © OpenStreetMap contributors
Tiles by Stamen Design (CC BY 3.0)
Organizations
NANOOS (80)
Glider DAC (12)
CeNCOOS (2)
IOOS (1)
NANOOS
95 datasets found for "NANOOS"
Order by:
Last Modified
SG108-20130923T1728
Seaglider La Push NANOOS line, Washington. Glider covering a 200km SW-NE transect off La Push (Olympic Peninsula), Washington, as part of the Northwest Association of Networked...
ERDDAP-TableDAP
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SG187-20100716T1208
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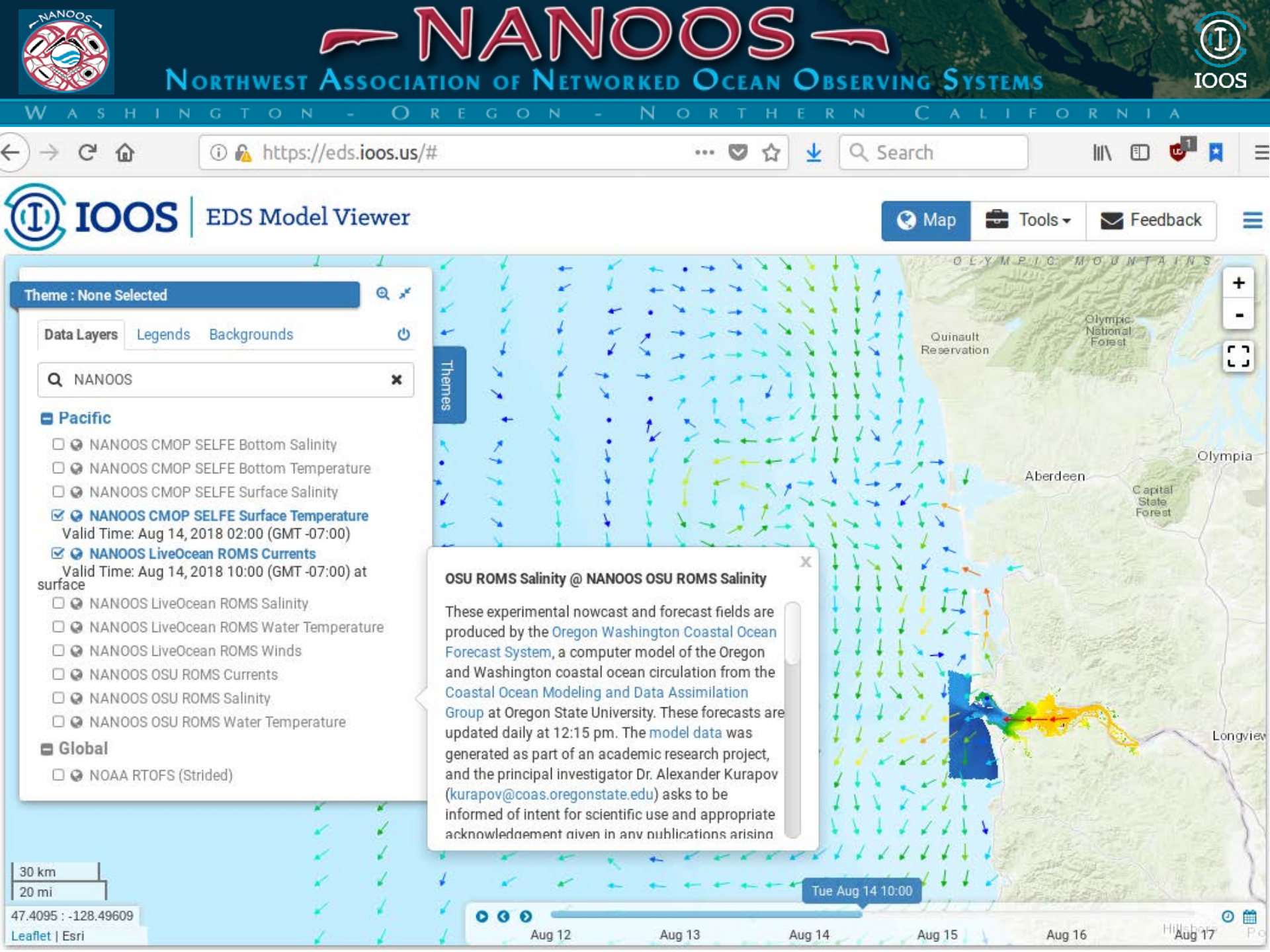
Seaglider La Push NANOOS line, Washington. Glider covering a 200km SW-NE transect off La Push


NANOOS
Northwest Association of Networked Ocean Observing Systems
Washington - Oregon - Northern California
IOOS
https://eds.ioos.us/#
Search
IOOS | EDS Model Viewer
Map
Tools
Feedback
Theme : None Selected
Data Layers
Legends
Backgrounds
NANOOS
Pacific
NANOOS CMOP SELFE Bottom Salinity
NANOOS CMOP SELFE Bottom Temperature
NANOOS CMOP SELFE Surface Salinity
NANOOS CMOP SELFE Surface Temperature
Valid Time: Aug 14, 2018 02:00 (GMT -07:00)
NANOOS LiveOcean ROMS Currents
Valid Time: Aug 14, 2018 10:00 (GMT -07:00) at surface
NANOOS LiveOcean ROMS Salinity
NANOOS LiveOcean ROMS Water Temperature
NANOOS LiveOcean ROMS Winds
NANOOS OSU ROMS Currents
NANOOS OSU ROMS Salinity
NANOOS OSU ROMS Water Temperature
Global
NOAA RTOFS (Strided)
Themes
OSU ROMS Salinity @ NANOOS OSU ROMS Salinity
These experimental nowcast and forecast fields are produced by the Oregon Washington Coastal Ocean Forecast System, a computer model of the Oregon and Washington coastal ocean circulation from the Coastal Ocean Modeling and Data Assimilation Group at Oregon State University. These forecasts are updated daily at 12:15 pm. The model data was generated as part of an academic research project, and the principal investigator Dr. Alexander Kurapov (kurapov@coas.oregonstate.edu) asks to be informed of intent for scientific use and appropriate acknowledgement given in any publications arising
Olympic Mountains
Quinault Reservation
Olympic National Forest
Aberdeen
Olympia
Capital State Forest
Longview
30 km
20 mi
47.4095 : -128.49609
Leaflet | Esri
Tue Aug 14 10:00
Aug 12
Aug 13
Aug 14
Aug 15
Aug 16
Aug 17

NANOOS

NORTHWEST ASSOCIATION OF NETWORKED OCEAN OBSERVING SYSTEMS

WASHINGTON - OREGON - NORTHERN CALIFORNIA

IOOS

https://ioos.us

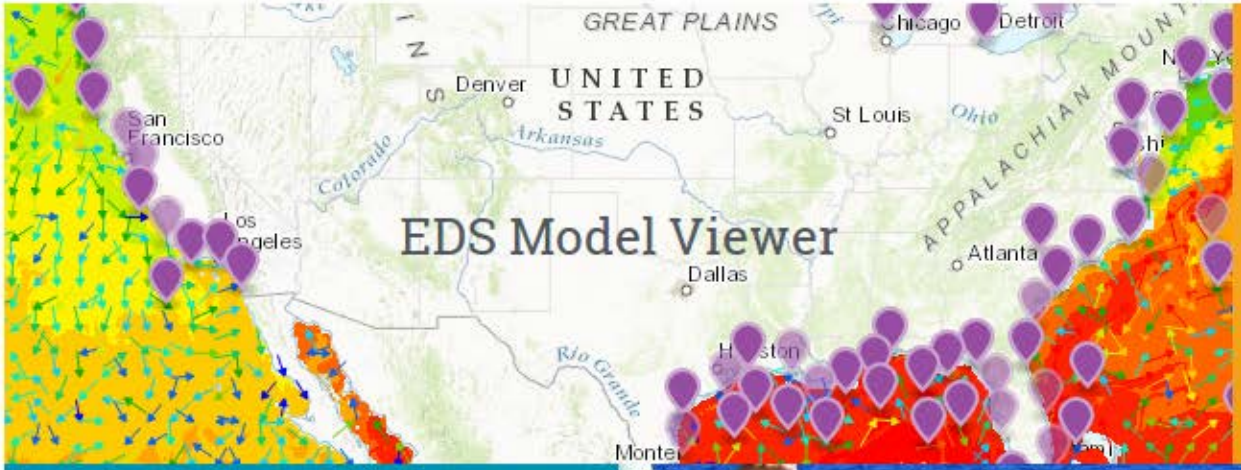
Search

THIS INSTANT

IOOS | Integrated Ocean Observing System

IOOS DATA VIEWERS DACS REGIONAL ASSOCIATIONS ABOUT

> Search IOOS Data



EDS Model Viewer

IOOS By The Numbers

Data Discovery

Profiling Gliders

eds.ioos.us

Other Activities

Biological Data

1. IOOS Biological Data Training Workshop
   a. Successful workshop with national and international attendance.
   b. February 2018, Seattle. https://ioos.github.io/BioData-Training-Workshop/
   c. IOOS funded NANOOS to host and co-organize.
   d. IOOS data standards and procedures for sharing data with national biological data systems (MBON, OBIS).
2. NANOOS first biological data IOOS exercise
   a. With momentum & bit of funding from workshop, applied IOOS procedures to existing PNW data set, as a learning experience with intern. Great progress.
3. New, one-year IOOS 15K funding
   a. Develop NANOOS capabilities. Identify, process, submit 1 or more biological dataset.

Ocean Acidification Data

1. NANOOS/PNW. Ongoing regional partnerships.
2. IPACOA. Expanding scope from original West Coast to National.
3. GOA-ON. Global coordination; inventory, data, and products; data portal.

NANOOS Outreach, Engagement, & Education

NANOOS Joint PI and Governing Council Meeting
August 16, 2018

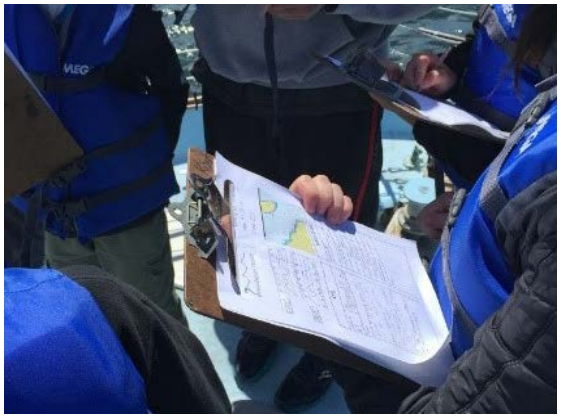
Rachel Wold, Outreach Chair
Alex Mitchell-Morton, Outreach Specialist

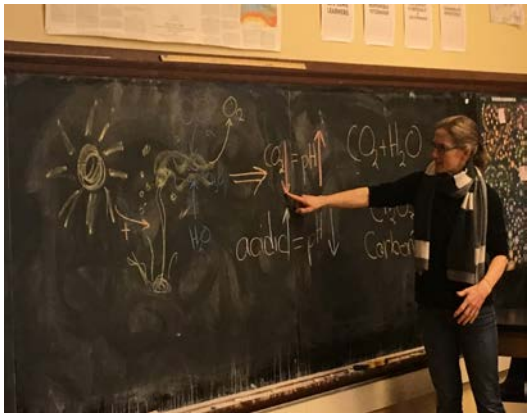
Scope of Work

Product Development	Work with DMAC and User Products Committees on tailored product development, increase usability of NVS
User Engagement	Conduct outreach and trainings to select user groups as resources permit
Networking	Maintain existing and build new relationships with NANOOS priority area users and the education community

Education:

NANOOS goal is to increase ocean literacy

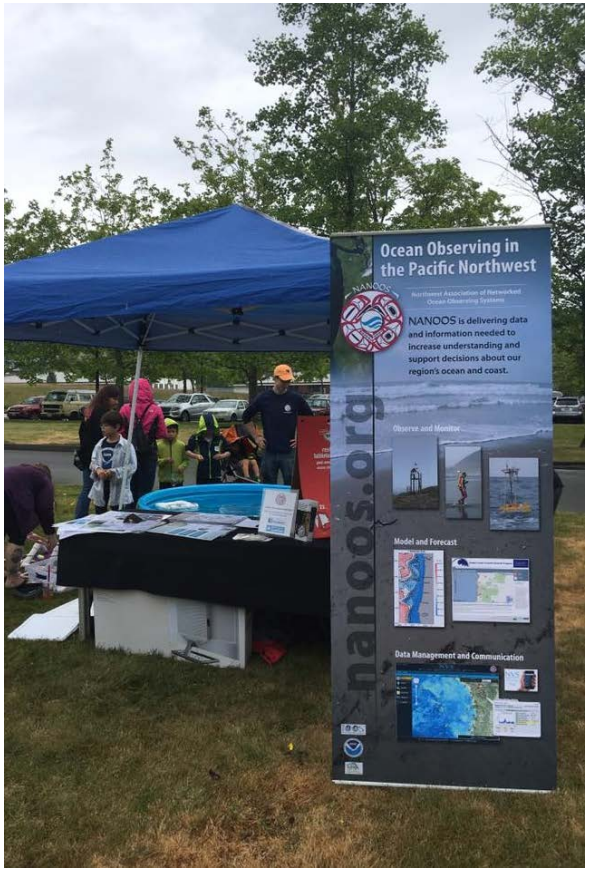




- NW Aquatic & Marine Educators Conferences
- Whidbey Watershed Stewards
- NOAA Science Camp
- Classroom Visits
- Updated lesson plans

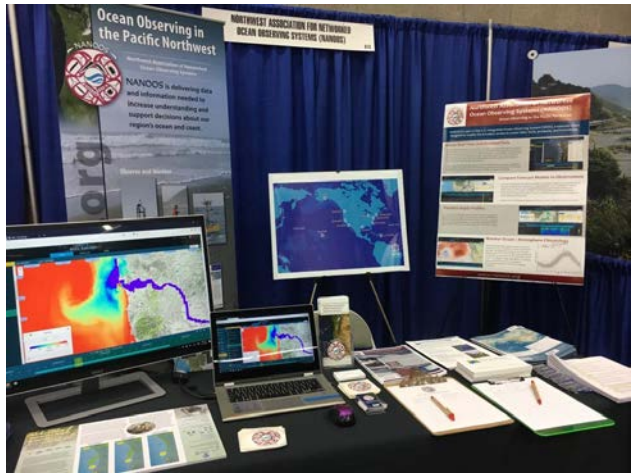
Outreach: engaging with the public

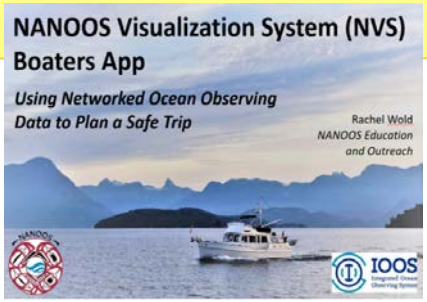
- Soundwaters – A ‘one-day university for all’
- NOAA Open House
- Seattle Aquarium Discover Science Weekend



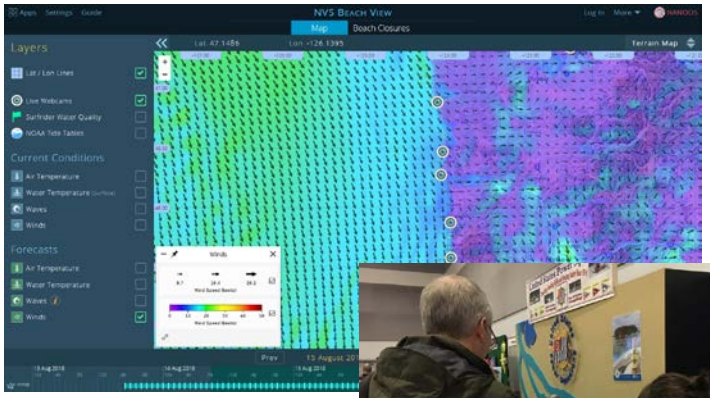
Outreach: targeted user groups

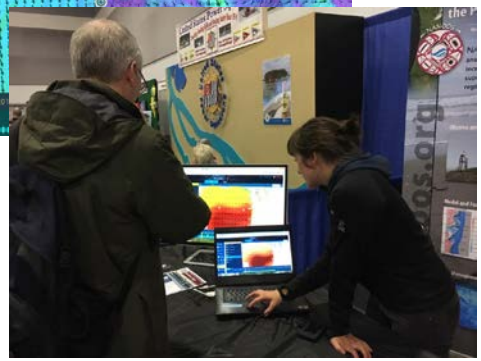
- Shellfish Growers
  - Pacific Coast Shellfish Growers Association Meeting
- Scientists
  - Ocean Sciences Meeting
  - Salish Sea Ecosystem Conference
- Recreational users
  - Booths and seminars at tradeshows
  - Guest speaker at club meetings and conferences

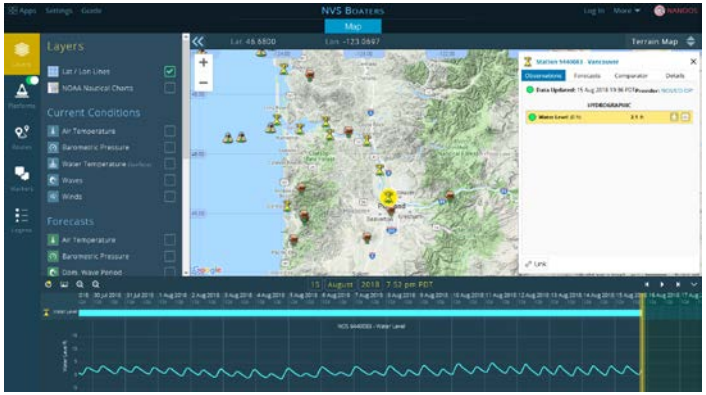




Engagement: recreational users





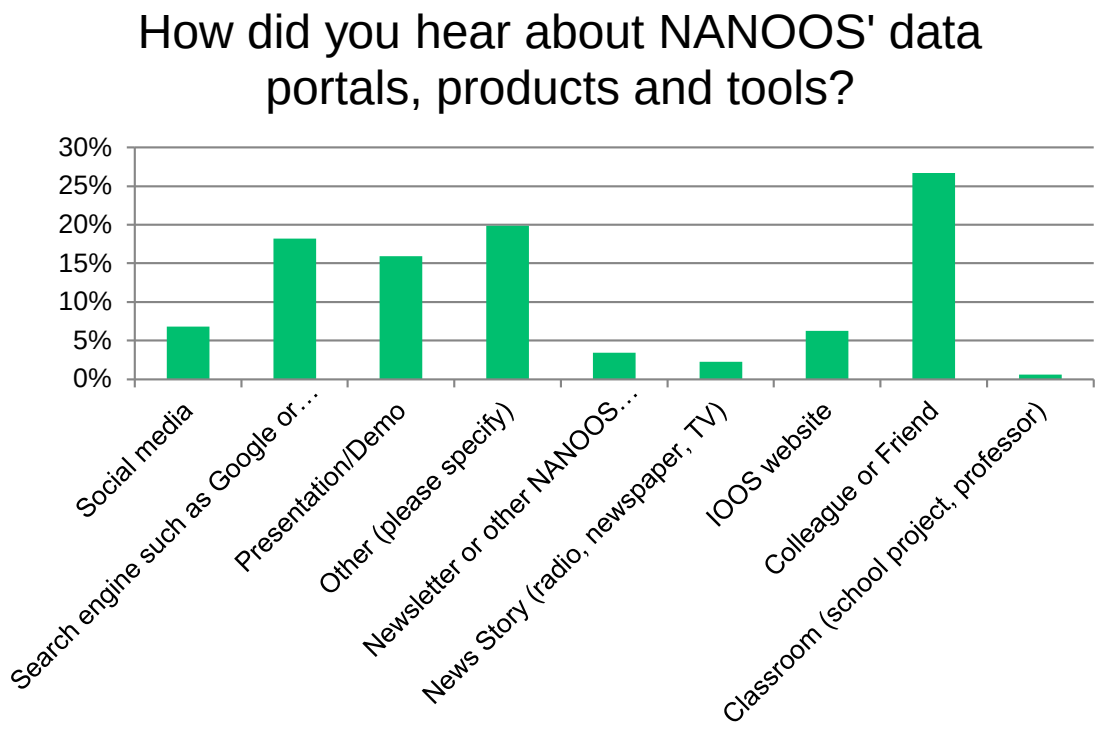


- Beach View
  - Added forecasts
- Tuna Fishers
  - Further developed Seacast
- Boaters
  - Added assets, river height and discharge, Canadian tidal height
- Surfers
  - Worked directly with users to develop app
  - What assets and variable to include?

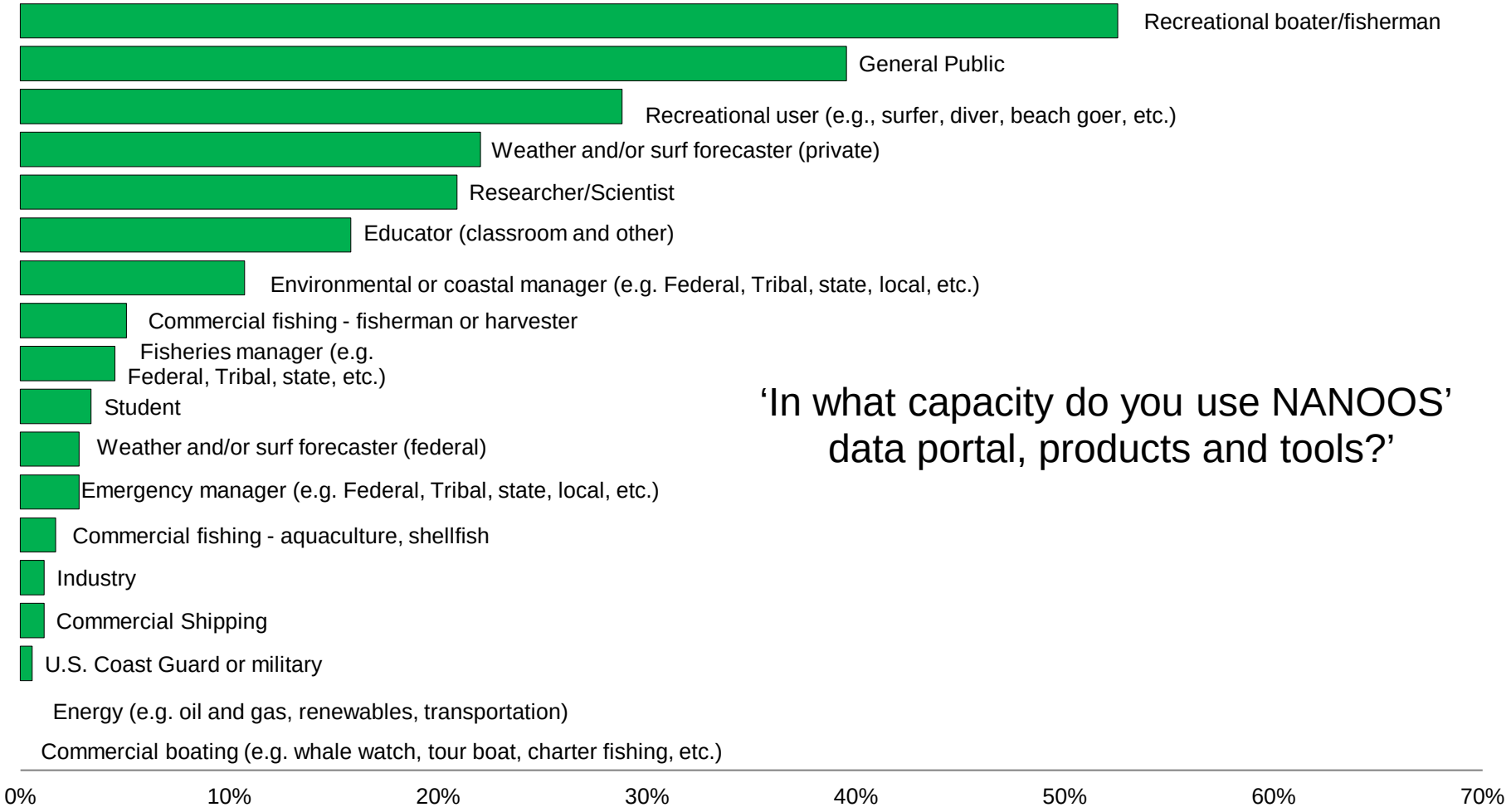
Web-based user survey

Goal:

- Gain a better understanding of who uses the data portal and why
- Conducted by all RAs to provide an IOOS-wide assessment
- Solicit feedback from a wider audience



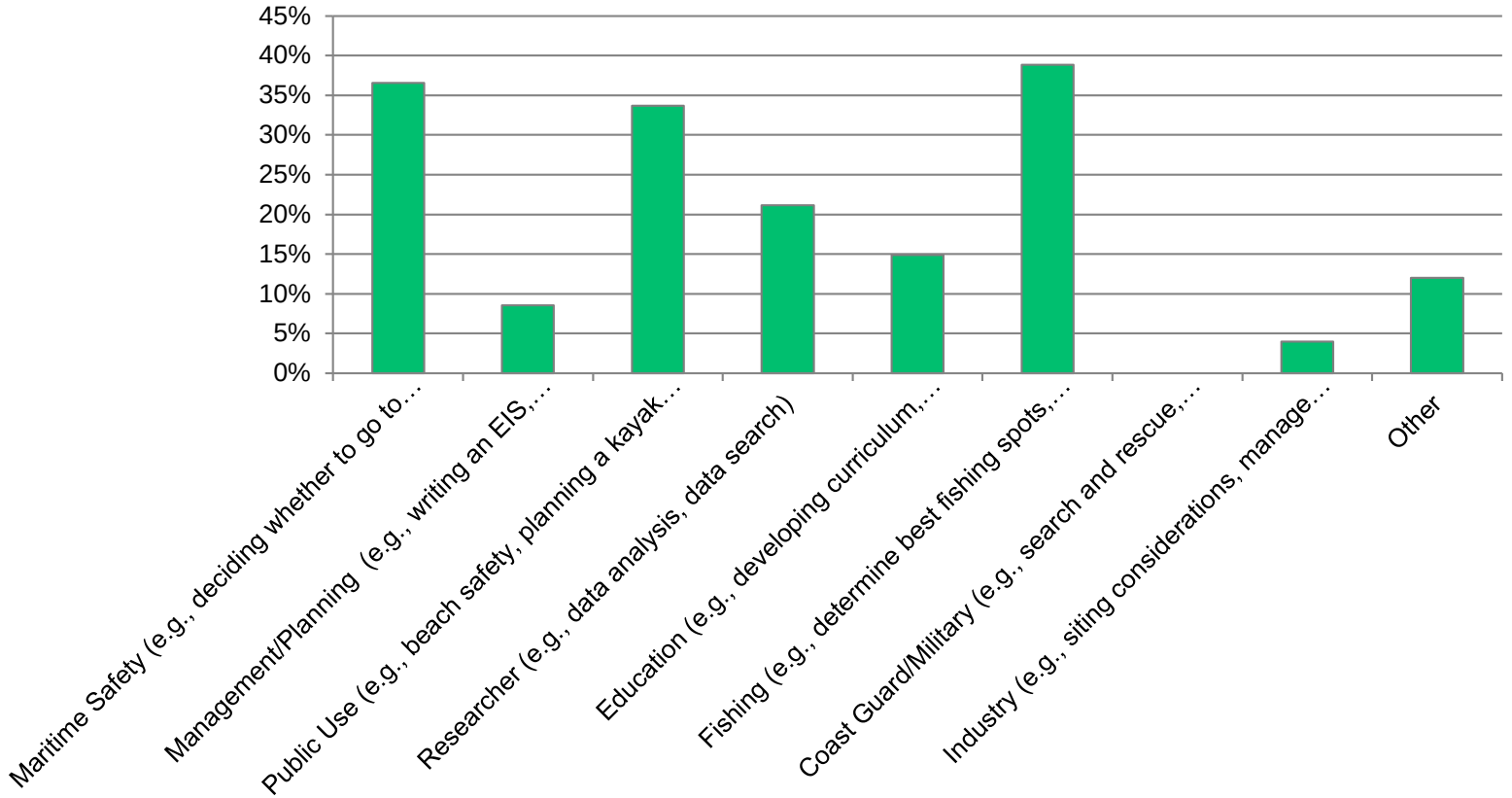
User survey



‘In what capacity do you use NANOOS’ data portal, products and tools?’

User survey

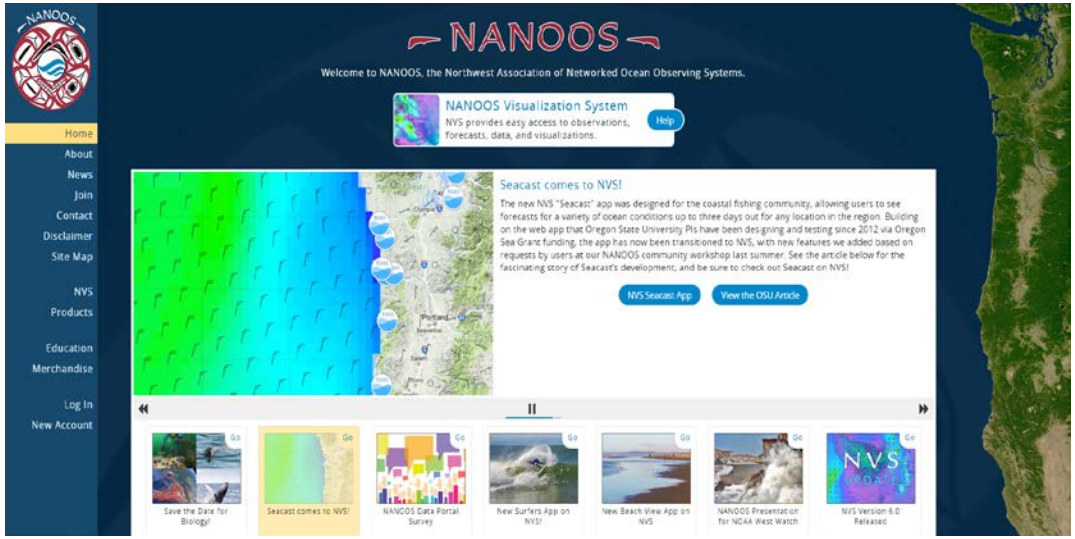
‘Please select a category that describes how you are using data from the NANOOS portal.’

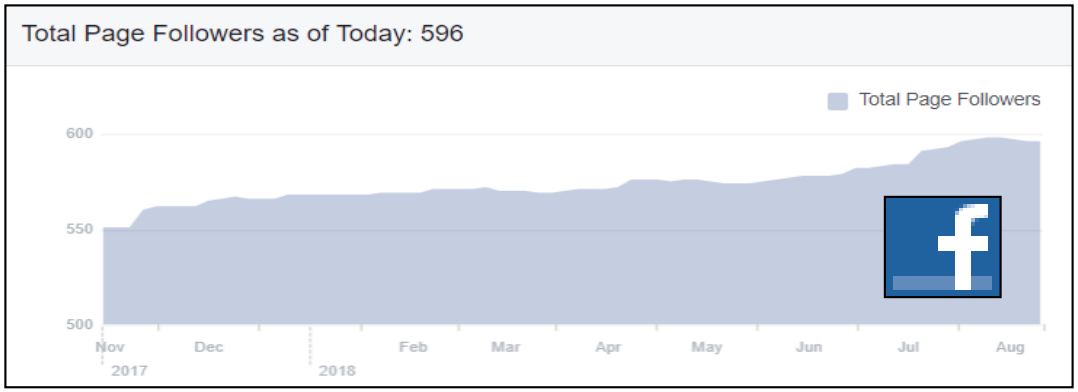


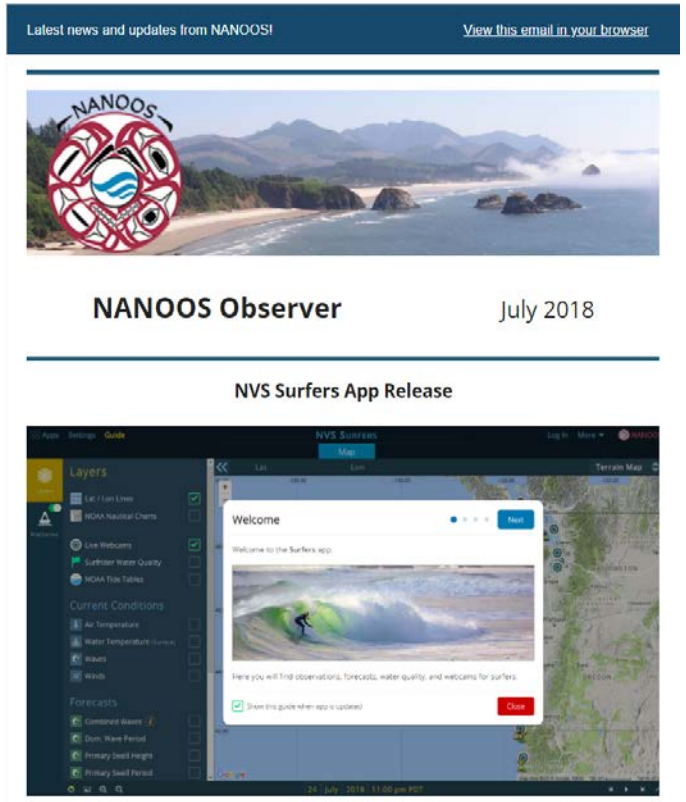
User survey

‘Do you have any comments, suggestions or feedback on how to improve our data portal, products, and tools?’

Online presence







The new NVS Surfers App was designed using input directly from the surfing community, thanks to the Surfrider Foundation, a NANOOS member. The app offers data and tools needed to plan a safe and successful surf experience,

Plan for Upcoming Year

- Continue to assist with development of web and mobile apps
- Continue outreach to current users groups, expanding the audience of recreational users using NVS, e.g.,
  - Surfrider Foundation Conference
  - Ilwaco Tuna Club
- Focused beachgoer campaign for 2019 season
- Develop stronger bonds with commercial maritime (e.g., USCG, pilots) and resource managers

7. Discussion
Biology discussion

Questions to consider:

- What are your priority biological data needs?
- What kind of products do you need?
  - For decision support, for prediction?
- Are there geographical priorities?

8. Round Table for contributions from GC members

Chris Mooers

10. GC Business

2017-8 NANOOS GC Board

Academic:

- Parker MacCready, UW, Governing Council Board Member for UW
- Mike Kosro, OSU, Governing Council Board Member for OSU **(VICE CHAIR)**
- Antonio Baptista, OHSU, Governing Council Board Member for OHSU

State:

- Carol Maloy, Ecology, Governing Council Board Member for Washington State Agencies
- Jon Allan, DOGAMI, Governing Council Board Member for Oregon State Agencies

Tribes:

- Paul McCollum, Port Gamble S'Klallam Tribe, Governing Council Board Member for Tribes
- Joe Schumacker, Quinault Indian Nation, Governing Council Board Member for Tribes

Federal:

- Mark Strom, NOAA NWFSC, Governing Council Board Member for Washington Federal Offices
- Andy Lanier, Governing Council Board Member for Oregon Federal Offices

Industry:

- Margaret Barrette, PCSGA, Governing Council Board Member for Industry
- Andrew Barnard, WetLabs, Governing Council Board Member for Industry

NGO:

- Fritz Stahr, OIP, Governing Council Board Member for Non-Governmental Organizations
- Gus Gates, Surfrider, Governing Council Board Member for Non-Governmental Organizations

At Large:

- Paul Dye, WA Sea Grant, Governing Council Board Member At-Large
- David Martin, Retired, Governing Council Board Member At-Large **(CHAIR)**

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NANOOS business

- NANOOS GC Board
  - election

- NANOOS pays annual $1000 non-federal dues to IOOS Association
  - Seabird Scientific
  - Pacific Coast Shellfish Growers Association

THANK YOU!!!

g. Elections

Approximately one month before every other Annual Meeting, the Executive Director will assemble a Nominating Committee to provide a list of candidates for the Board positions. The four-year terms of the Board members will be staggered, such that half of the Board will be elected every two years. To permit this staggering to occur, at the 2011 Governing Council Meeting, half the Board will be elected to two year terms and the other half to four year terms. The "At-Large" Board position will be elected every two years. The Executive Director will cause ballots with those names, and other such information as may be pertinent, to be delivered to the members of the Governing Council before the Annual Meeting. Completed ballots must be received before the Annual Meeting for tally by the Executive Director. At the Annual Meeting, the Executive Director will provide the election results to the Board Chair who will announce the results for the Board to the Governing Council.

10. Wrap-up, Action Item review, and Adjourn