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. Introduction and IOOS Update

Dave Easter
NOAA US IOOS Office

IOOS Advisory Committee Calls for Members

IOOS Advisory Committee, University of the Virgin Islands – St. Thomas, November 2015.
Image credit: U.S. IOOS

The IOOS Advisory Committee is looking for new members. The Committee provides advice to the Under Secretary of Commerce for Oceans and Atmosphere and to the Interagency Ocean Observation Committee (IOOC) on the planning, integrated design, operation, maintenance, enhancement, and expansion of U.S. IOOS. Applications will be accepted through September 20, 2017. Applications received after September 20, 2017 may not be considered during this membership application cycle, but may be considered for future cycles. **Read more >**

3. IOOS Association Update

Josie Quintrell
IOOS Assn Executive Director

IOOS Association

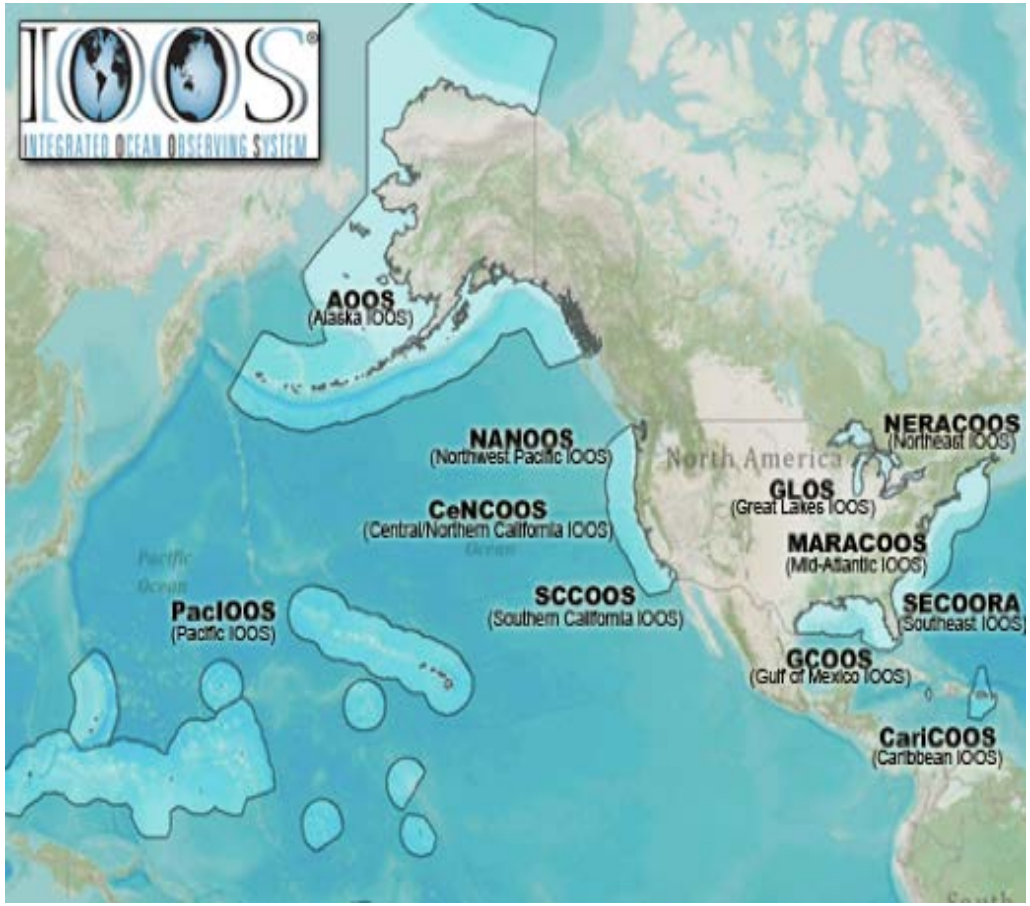
NANOOS Annual Meeting
August 10, 2017

IOOS | EYES ON THE OCEAN™

IOOS Association

Observing our oceans, coasts and Great Lakes

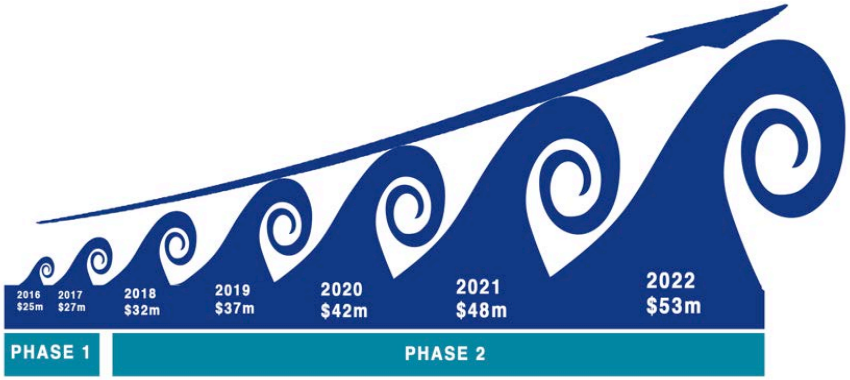
Providing information to those who need it, when they need it



- Objectives:
  - Advocacy
  - Common Issues
  - IOOS federal/non-federal partnership
    - Administration
    - Congress
    - National Partners
  - Emerging Issues

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

US IOOS FY 17 Request

Regional System Request: $33.9 m

$24.3 million for the national network of 11 regional coastal observing systems

$1.5 million for upgrades and repairs for aging regional systems

$3.1 million to install 12 high frequency radar systems, to close key gaps and make the U.S. surface current mapping system the most reliable, efficient and comprehensive in the world

$5.0 million for research and development, including competitive grants, modeling and verification to develop new products and systems to ensure comprehensive coverage

National System Request- $6.7 m

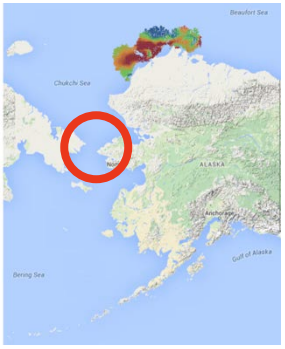
These funds will support the IOOS Program Office, to help:

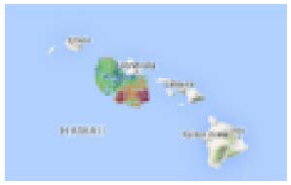
- integrate federal and non-federal data
- develop the nation's first quality control standards for real-time data
- coordinate across NOAA and the 12 Federal IOOS agencies and
- certify the regional systems.

IOOS | EYES ON THE OCEAN

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 IOOS Request

Mapping Surface Currents

Seeing Underwater with Coastal Gliders

IOOS | EYES ON THE OCEAN

US IOOS FY 18 and beyond…

- FY 18 HFR and gliders
  NANOOS glider request:
  - Make Columbia and La Push gliders operational
  - More gliders for swapping
  - New Cape Blanco line

- Beyond:
  - HABs
  - Water level
  - Navigation

Appropriations

	FY 11 Spend Plan	FY 12 Spend Plan	FY 13 Spend Plan	FY14 Enacted	FY 15 Enacted	FY 16 Enacted	FY 17 Enacted	FY 18 Pres. Budget	FY 18 Assoc. Request
Regional IOOS Total	**$21.9m**	**$22.9m**	**$26.5m**	**$28.5m**	**$29.5m**	**$29.5m**	**$30.7m**	**$29.4m**	**$35.9m**
National Network of Regional Ocean Systems	*$20m*	*$22m*	*$23.5m*	*$24.3m*	*$24.5m*	*$24.5m*	*$25.2m*	*$24.4m*	*$24.5m*
Gaps in Radars and Gliders									*$6.4m*
Marine Sensor Innovation Grants, Modeling Test Bed, Sensor Verification	*$1.9m*	*$1m*	*$3m*	*$4.2m*	*$5m*	*$5m*	*$5.5m*	*$5m*	*$5m*
U.S. IOOS Program Office*	**$6.6m**	**$6.4m**	**$6m**	**$6.5m**	**$6.6m**	**$6.7m**	**$6.7m**	**$6.7m**	**$6.7m**
Total U.S. IOOS	**$28.5m**	**$29.3m**	**$32.5m**	**$35m**	**$36.1m**	**$36.2m**	**$37.4m**	**$36.1m**	**$42.6m**

* *Funding included in the Navigation, Observations and Positioning funding line*

Budgets

FY 16 $29,500

FY 17 $30,700 (+1.2M)

FY 18

Pres Bud $29,500

Senate $33,700

House $31,000

ICOOS Act Reauthorization

SENATE – S. 1425

Senators Wicker (R-MS) and Cantwell (D-WA) introduced S. 1425 "A bill to reauthorize the Integrated Ocean Observing System Act of 2017.

Co-Sponsors: Senators Sullivan (R-AK), Murkowski (R-AK), Graham (R-SC), Cassidy (R-LA), Collins (R-ME), Markey (D-MA), Peters (D-MI) and Schatz (D-HI).

House – HR 237

Representative Young (R-AK) has introduced H.R. 237 "Integrated Coastal and Ocean Observation System Act Amendment of 2017."

RA Certification

- 7 RAs certified!
  - Congratulations to
    - PacIOOS, GLOS, MARACOOS,

      SCCOOS, CariCOOS, SECOORA, AOOS
- All others in process
- Opportunity to engage federal agencies
  - Operational forecasting
  - Regional data sharing
  - Agency engagement

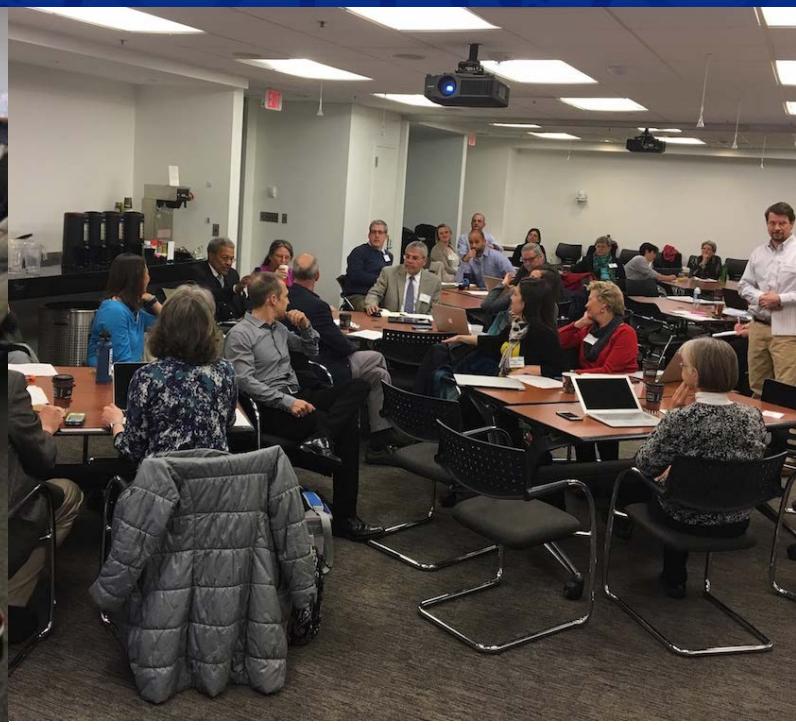
Upcoming

- House Briefing - ICOOS Act
- Congressional Site Visits - Summer
  - Congressional outreach - Bring them to IOOS!
    - Meetings, tours, field trips
- Foundation Funding – explore national campaign
- House Ocean Caucus Reception - Fall
- IOOS Annual Meeting Sept 26-27 PR

IOOS OpEd Project

- Raise awareness of sustained observations
- 1 OpEd in each region (or more)
- Will work with RAs to find compelling stories and authors
- Editorial assistance to frame story for publishing
- Link to social media

March Madness



- Strategic Planning
- Joint DMAC Meeting
- Congressional Visits
  - *Over 75 Offices visited
  - * OMB

IOOS | EYES ON THE OCEAN

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™

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

4. 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

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NANOOS Governing Council Members 8/2016

NORTHWEST ASSOCIATION OF NETWORKED OCEAN OBSERVING SYSTEMS

WASHINGTON - OREGON - NORTHERN CALIFORNIA

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 Sciences 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 GeoResearch
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

KEY: Tribal Government | Industry | NGO | Academia/Research | Federal/State/Local Government

New NANOOS members

- Aquatic Innovations Research
- Long Live the Kings

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 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 obs/adds)

Year 9 or 5

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

Year 10 or 1

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

Year 11 or 2

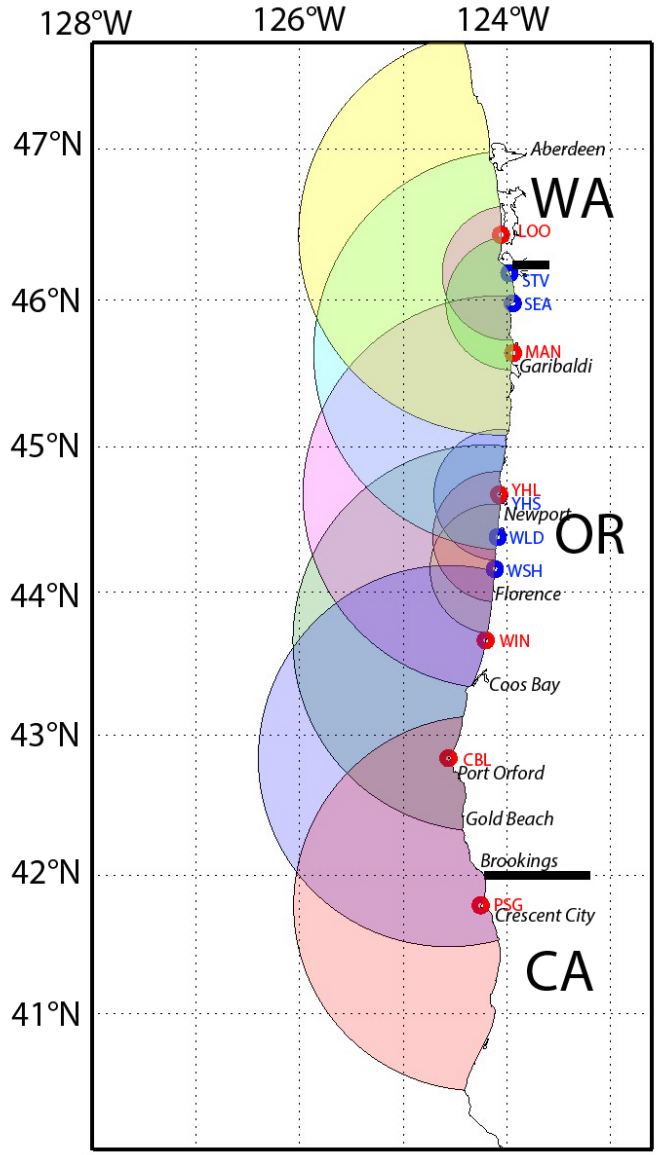
NANOOS budget:

FY17: $3,216,463 ($2,457,136 base; $360K HFR; $282K OAP; $117K adds)
Year 11 or 2

- $360,000 for the purchase and deployment of two HF radars.

- $50,000 to plan and execute a training event for biological data management with the MBON community
- $55,000 for the Ocean Technology Transition “Customer Service Application Project”
- $12,000 for OCS Olympic Coast cruise

- $30,000 to enhance the GOA-ON data portal as an OA dashboard to the World (Newton)
- $75,000 NANOOS Multi-Scale Prediction of California Current Carbonate System Dynamics (Hales)
- $64,181 for NANOOS Ocean Acidification Monitoring and Prediction in Oregon Coastal Waters (Hales)
- $33,146 NANOOS UW OA observatories (Newton)
- $25,000 to enhance the Cha'ba Mooring Program to Allow Year-Round Deployments (Newton)
- $55,000 for UW OA observatories (Newton): Replacement System due to loss



Map coastal currents from 11 remote-sensing sites on the coast
Two kinds:
Long-Range: (4.8 MHz, 150km range, 6 km radial interval.
Std-Range (12-13 Hz, 50+ km range, 2km radial inteval).

Time-resolution, 1 hr

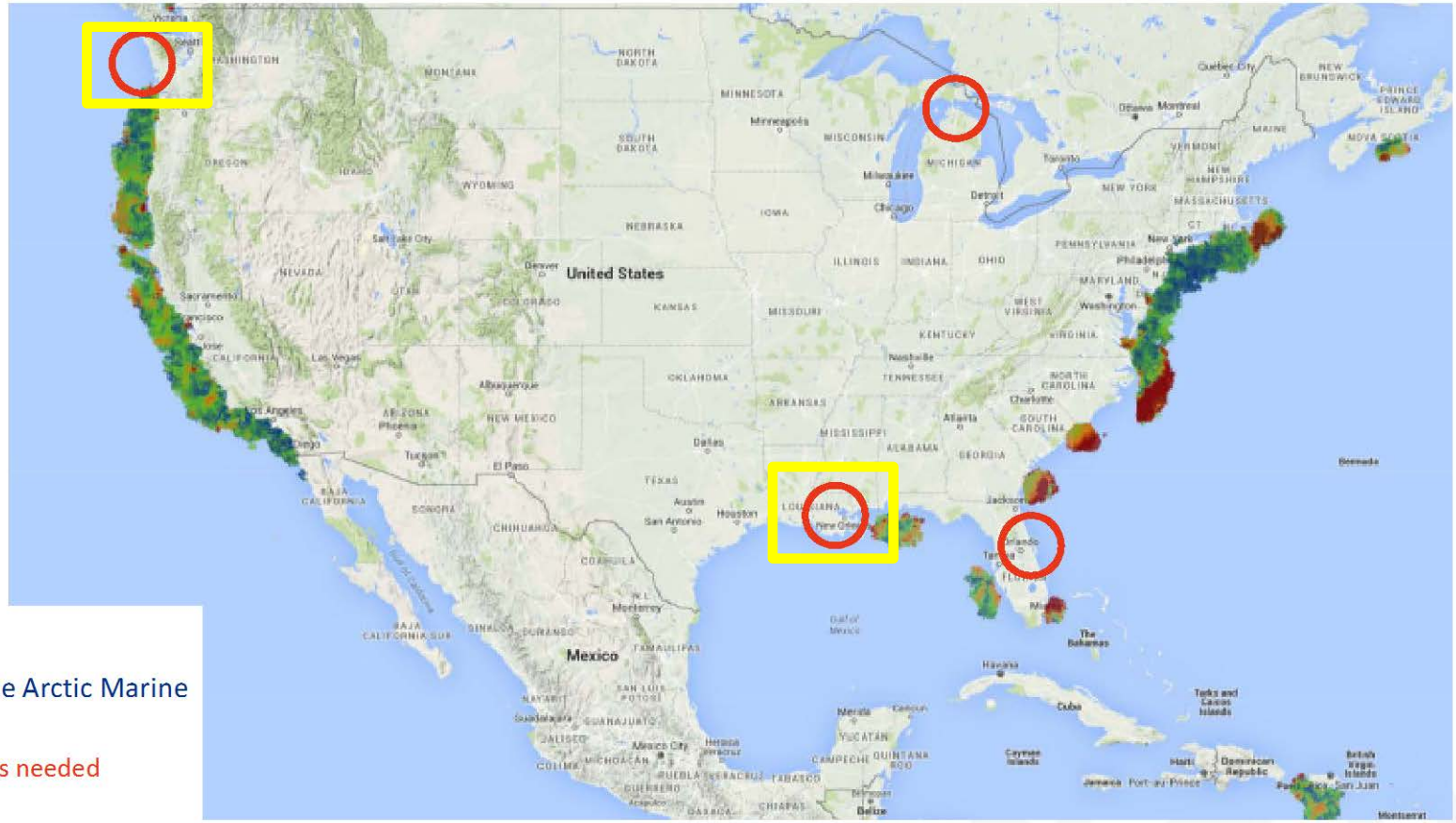
Radial Currents: toward or away from each radar site. Scalar: one component

Total (or Vector) Currents: combine radial currents from 2 or more sites.

Instruments purchased for previous science experiments with funding from NSF, ONR, NOAA/GLOBEC. This year added some backup from IOOS

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

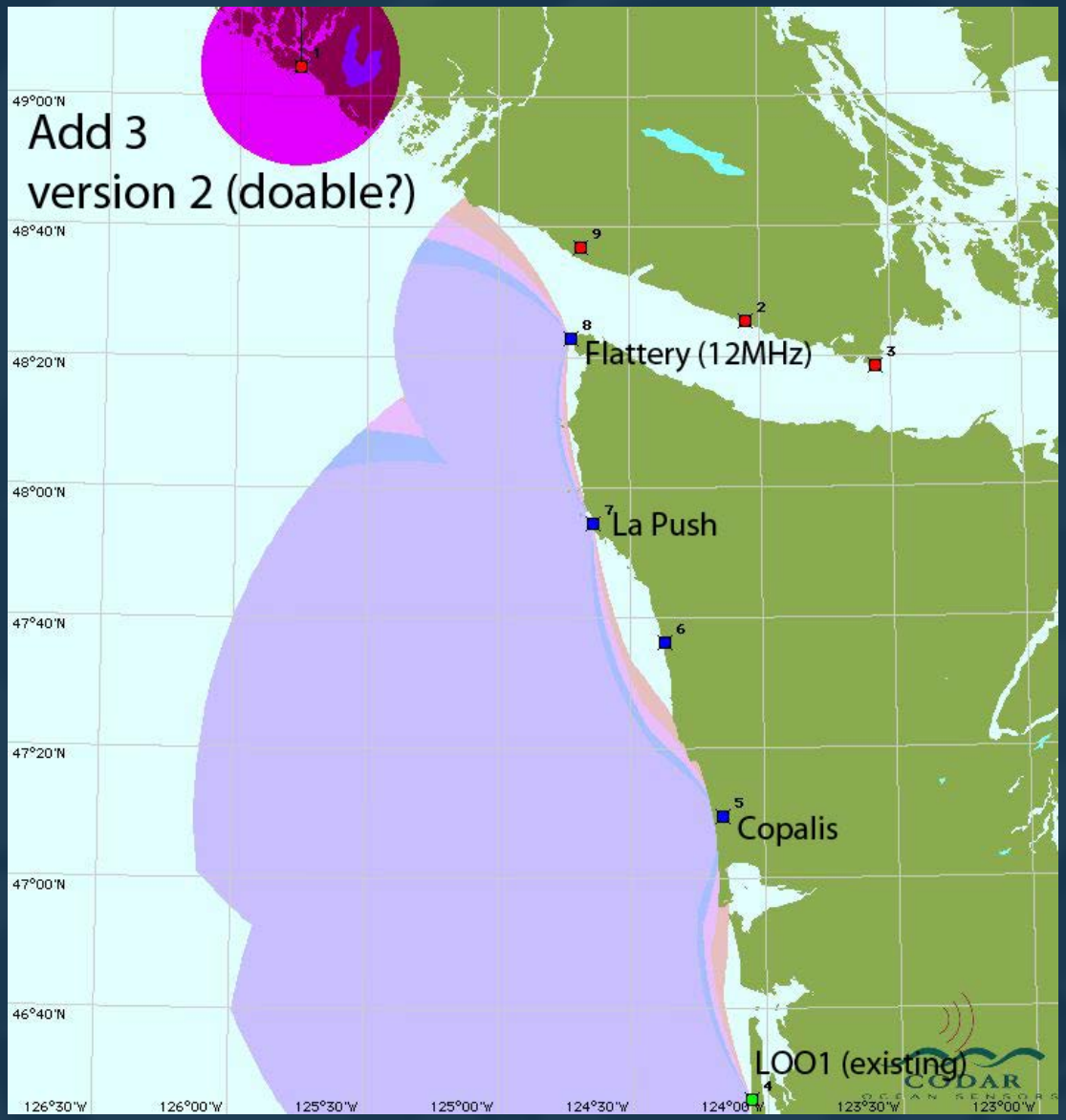
2 radars needed

Saving Millions in the Gulf of Mexico

3 radars needed

IOOS | EYES ON THE OCEAN


Add 2
Version 3
49°00'N
48°40'N
48°20'N
48°00'N
47°40'N
47°20'N
47°00'N
46°40'N
126°30'W
126°00'W
125°30'W
125°00'W
124°30'W
124°00'W
123°30'W
123°00'W
1
2
3
4
5
6
7 La Push
8
9
LOO (existing)
CDAR


Add 3
version 2 (doable?)
49°00'N
48°40'N
48°20'N
48°00'N
47°40'N
47°20'N
47°00'N
46°40'N
126°30'W
126°00'W
125°30'W
125°00'W
124°30'W
124°00'W
123°30'W
123°00'W
1
2
3
4
5
6
7
8
9
Flattery (12MHz)
La Push
Copalis
LOO1 (existing)
CODAR

NANOOS Objectives for FY2017

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

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

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

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**.

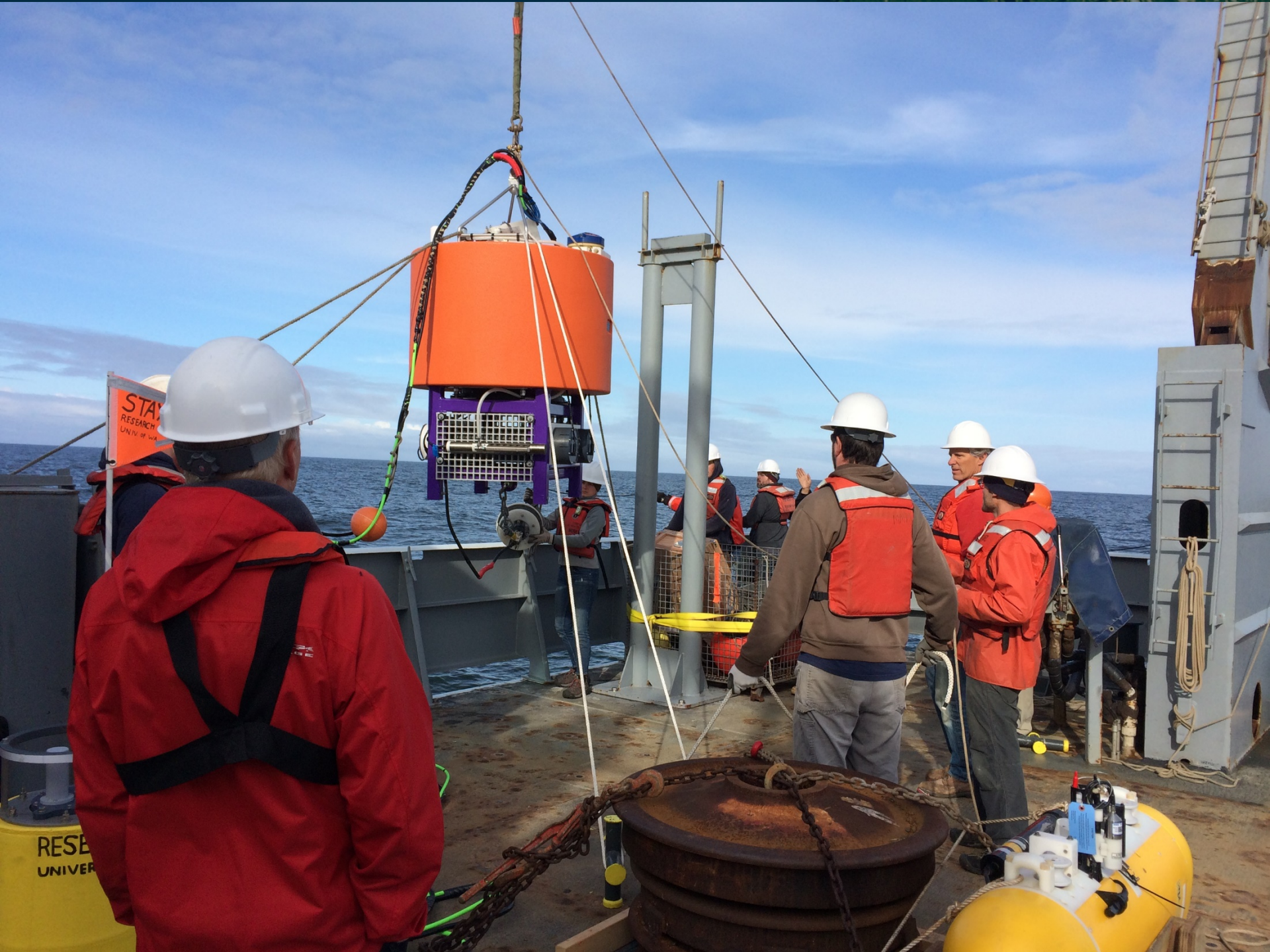
8) Continue to **deliver existing and, to the extent possible, create innovative and transformative user-defined products and services** for PNW stakeholders.

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

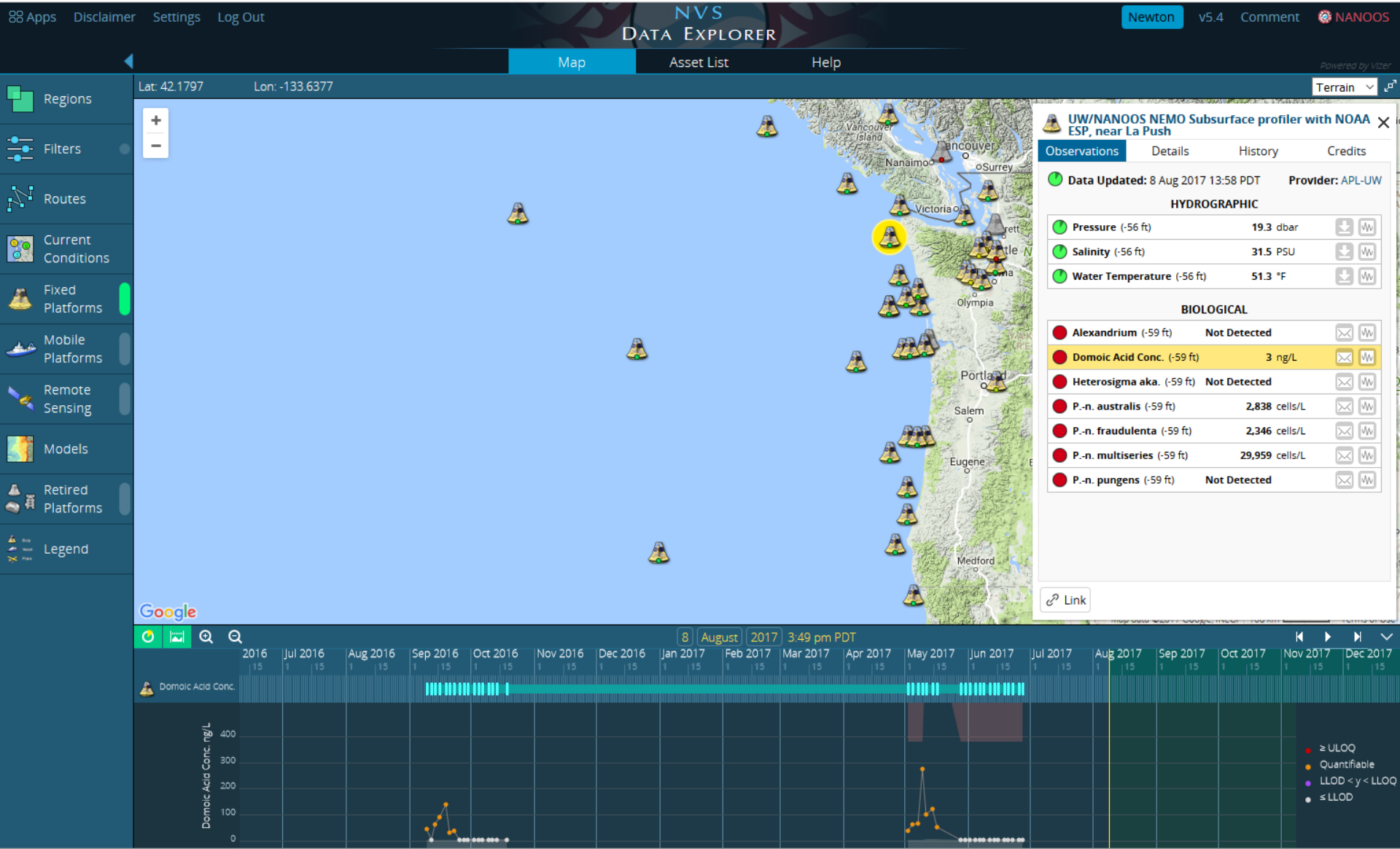
OTT: HABs

"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 planned for 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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- ESP Then
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- People
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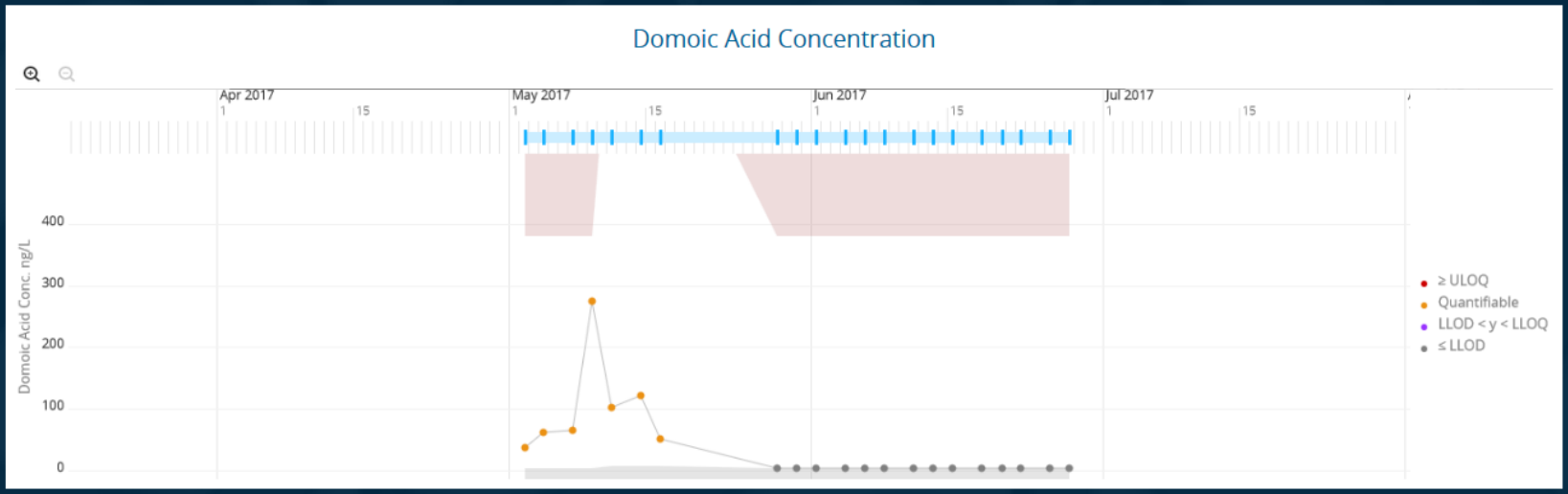
- Contact

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.

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

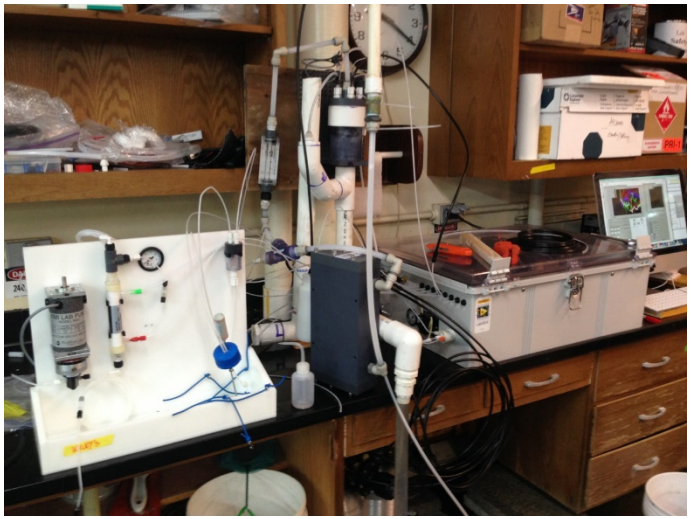
Razor clams are an economically important shellfish harvest off the coasts of Oregon and Washington. Closures due to *Pseudo-nitzschia* exposure in 2015 led to $22.7 million in losses. Credit: Washington Department of Fish and Wildlife.

OTT: OA

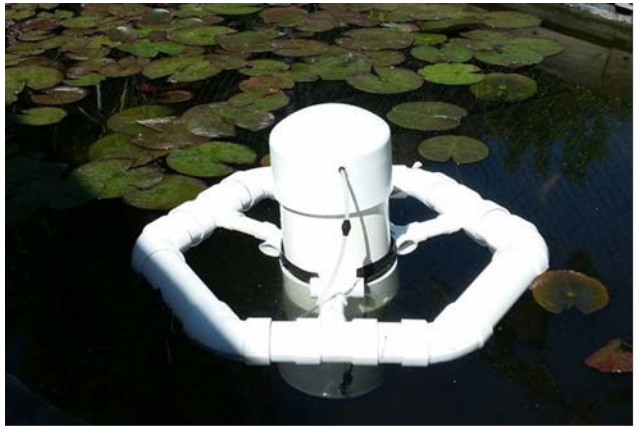
“Turning the headlight on 'high': Improving an ocean acidification observation system in support of Pacific coast shellfish growers.”

- 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



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

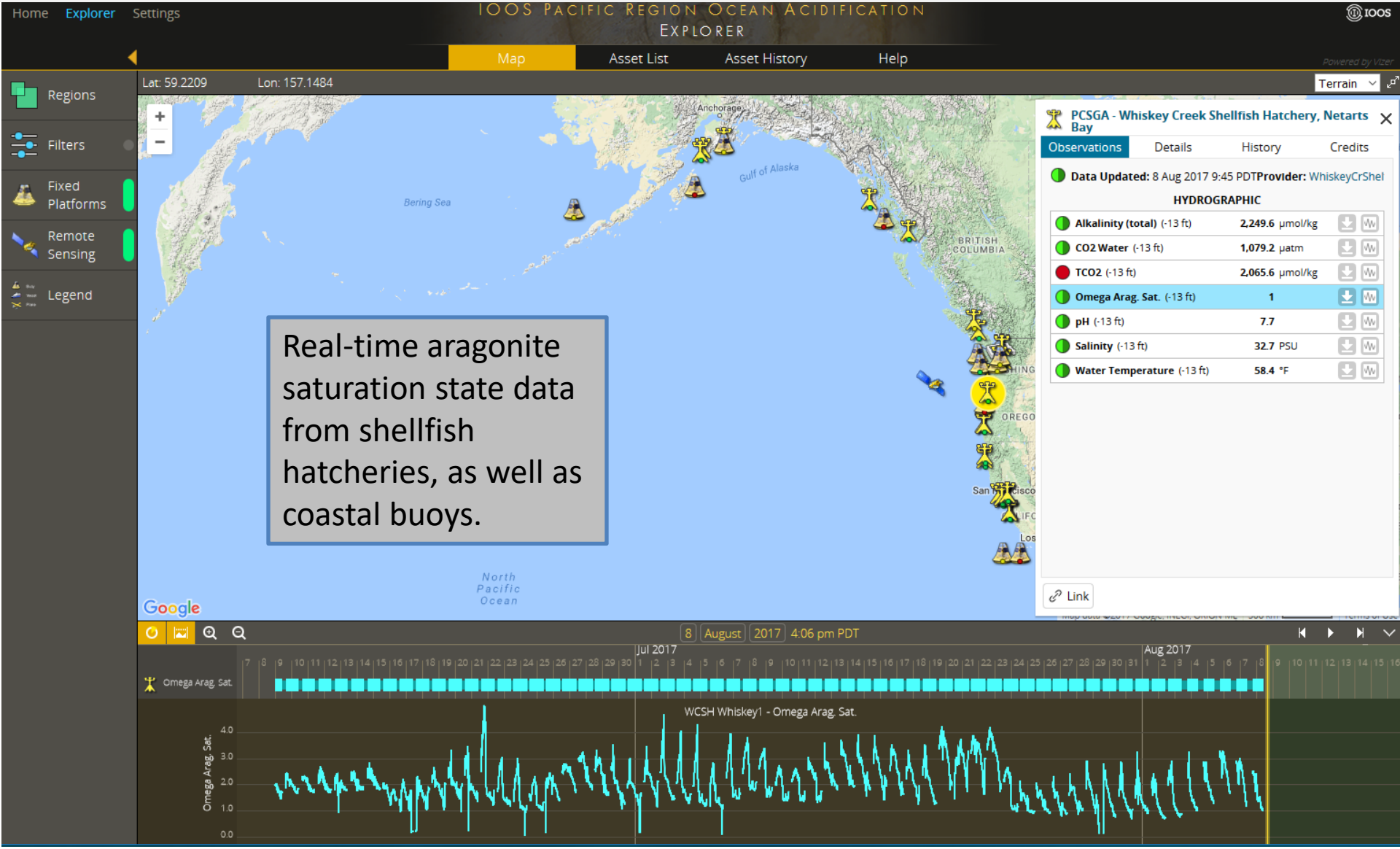
SOUTHERN CALIFORNIA COASTAL OCEAN OBSERVING SYSTEM

STATE OF OREGON 1859

OAP
OCEAN ACIDIFICATION PROGRAM

IOOS®
INTEGRATED OCEAN OBSERVING SYSTEM

IPACOA: IOOS Pacific Region ocean acidification data portal



IPACOA

- IOOS Pacific Region OA

  turning into

- IOOS Partners Across Coasts for OA

Other ‘16-17 NANOOS activity

Certification Application submitted!!
18 July, with 90-day review clock

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

Other '16-17 NANOOS activity

National Strategy for Sustained Network of Coastal Moorings Released

IOOS, the National Ocean Service (NOS) and the National Weather Service (NWS) have released the "National Strategy for a Sustained Network of Coastal Moorings". The Strategy evaluates the existing inventory and provides ten recommendations towards development of an implementation plan. The primary recommendation is to identify regional observing gaps best addressed with coastal moorings, using a targeted stakeholder engagement approach to integrate stakeholder input. This effort will be led jointly by NOAA mooring operators and IOOS RAs, like NANOOS.

25 Jan 2017

Read the Full National Strategy (PDF) | View Full Article on IOOS Website

NANOOS Participates in NOAA West Watch

NOAA's Western Regional Environmental Conditions and Impacts Coordination project brought back its popular webinar series again and will present every other month. The January 2017 webinar summarized coastal environmental conditions and impacts in the Western Region. The webinar included contributed slides from NANOOS, CeNCOOS and SCCOOS, who will regularly report on their local coastal ocean conditions. The next webinar will be 20 March 2017 at 1 pm. Contact us at NANOOS if you want to participate.

24 Jan 2017

View the Webinar Slide Set (PDF)

Great Attendance at the NANOOS Community Workshop!

A big thank you to over 60 people who attended our NANOOS Community Workshop on July 13th in Newport, Oregon. During the one-day workshop, participants learned about what NANOOS is doing and explored NANOOS products and services including NANOOS' data portal, the NANOOS Visualization System and its many topical specialized apps. Most importantly, the participants provided us with helpful feedback on our products. We look forward to implementing some useful modifications.

26 Jul 2017

NANOOS Presentation (PDF) | Workshop Agenda (PDF) | NANOOS Community Workshop Site

IOOS | Integrated Ocean Observing System

Sign up for our Newsletter

NANOOS

Welcome to NANOOS, the Northwest Association of Networked Ocean Observing Systems. NANOOS is part of IOOS and provides information and products related to weather and ocean data.

Home
About

NANOOS Visualization System
NVS provides easy access to observations, forecasts, data, and visualizations.
Demo

NVS for specific user groups with targeted subsets of the data

Apps | Disclaimer | Settings | Log In

NVS

Contact

(All NANOOS assets and data streams)

Data Explorer

Tsunami Evacuation Zones

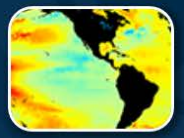
Boaters

Tuna Fishers

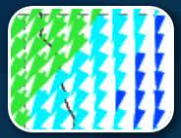
Shellfish Growers

Beach and Shoreline Changes

Maritime Operations



Climatology



High Frequency Radar

Cruises

Gliders

Help

IOOS

NANOOS focal areas:

- **Maritime Operations**

- **Ecosystem Assessment**

(also hypoxia, HABs)

- **Fisheries and Biodiversity**

- **Coastal Hazards**

- **Climate**

Some users say good things…

*"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

*"**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

Accomplishments:

NANOOS sets bar high

NANOOS is supporting the region

NANOOS is relevant nationally

NANOOS leadership visible internationally

NANOOS uses its governance

NANOOS remains vital !

"Why is NANOOS so good?"

- The people: creativity
- The spirit: cooperation
- The concept: collaboration

- New capabilities in all sectors

- But now is the time to spread the news for more usage…

Challenges

- Sustaining infrastructure on ~level funding
- Avoiding that NANOOS is the best kept secret
- Continuing to demonstrate utility

5. NANOOS Standing Committees reports

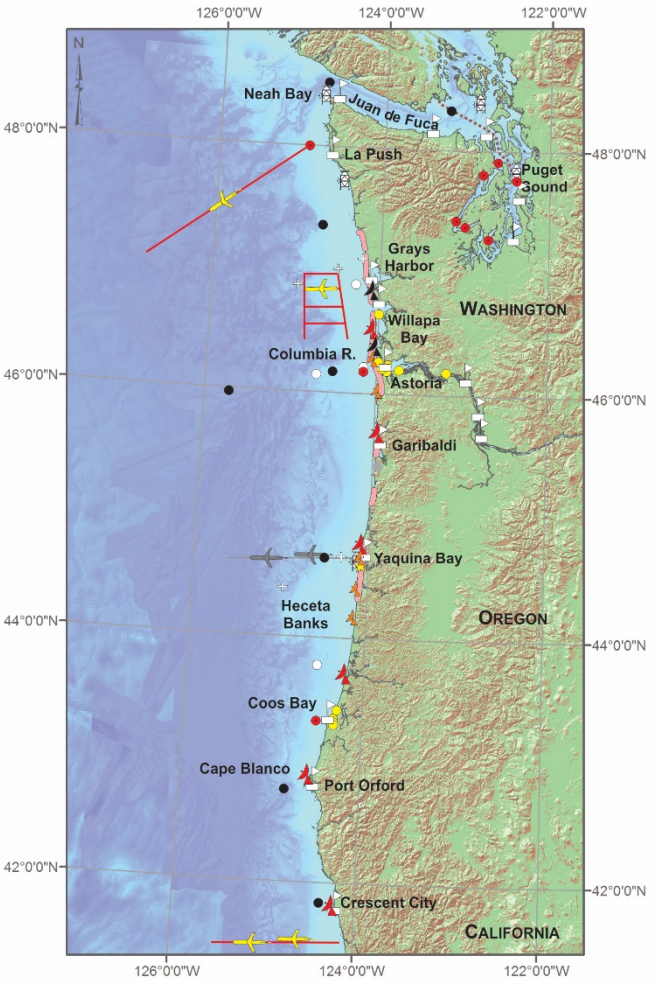
NANOOS User Products Update

Jonathan Allan
NANOOS User Products Chair

Team: Troy Tanner, Emilio Mayorga, Amy Glaub Sprenger, Rachel Wold, Marine Lebrec, Jan Newton (APL, UW); Craig Risien, Mike Kosro (CEOAS, OSU), Charles Seaton (CMOP, OHSU)

NANOOS
Northwest Association of Networked Ocean Observing Systems
IOOS

Lots of data: NANOOS provides access to 47 different types of variables, and in total ~200 'assets' & 10 model/forecast overlays.



NANOOS RCOOS

Existing assets to be sustained in partnership:

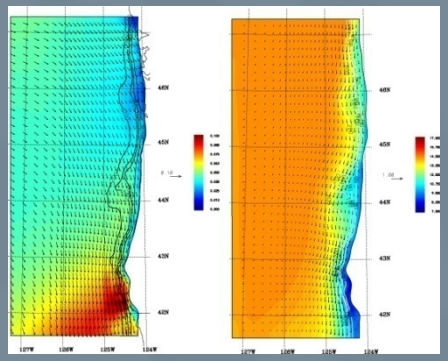
- Existing ***coastal*** and ***estuarine*** buoys
- Existing fixed mooring ***estuarine*** buoys
- Existing glider tracks
- Existing long-range (180 km range) HF radar site
- Existing standard-range (50 km range) HF radar site
- Port X-band wave radar
- Beach and shoreline assessment. Includes multiple sites where nearshore bathymetry is being collected
- Puget Sound ferry box
- Existing glider tracks (OOI)
- OOI moorings

Federal assets:

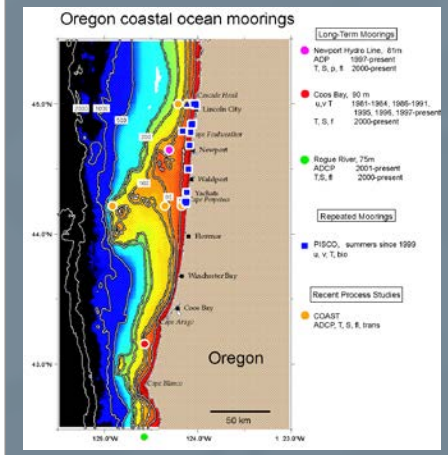
- NDBC buoys
- CDIP buoys
- NOS Tide gauges
- CMAN station

Proposed for new support to be sustained in partnership:

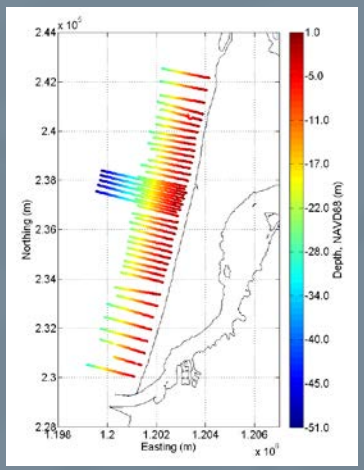
- Proposed long and short-range radar site



Overlays (Satellite, Models, & other geospatial data)



Gliders



Shorelines & Bathymetry

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.

NVS History and Status:

Nov. 2009 - v1.0 released

….

May 2010 - v1.6 released (added access to various map image overlays e.g. HF radar, satellite imagery, and ocean models). v1.0 iPhone NVS mobile app released

….

Jun 2011 - v. 2.0 iPhone NVS released (Android Sep 2011)

Nov 2011 - v. 1.0 iPhone TsunamiNW-Evac app released (Android Jan 2012)

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

….

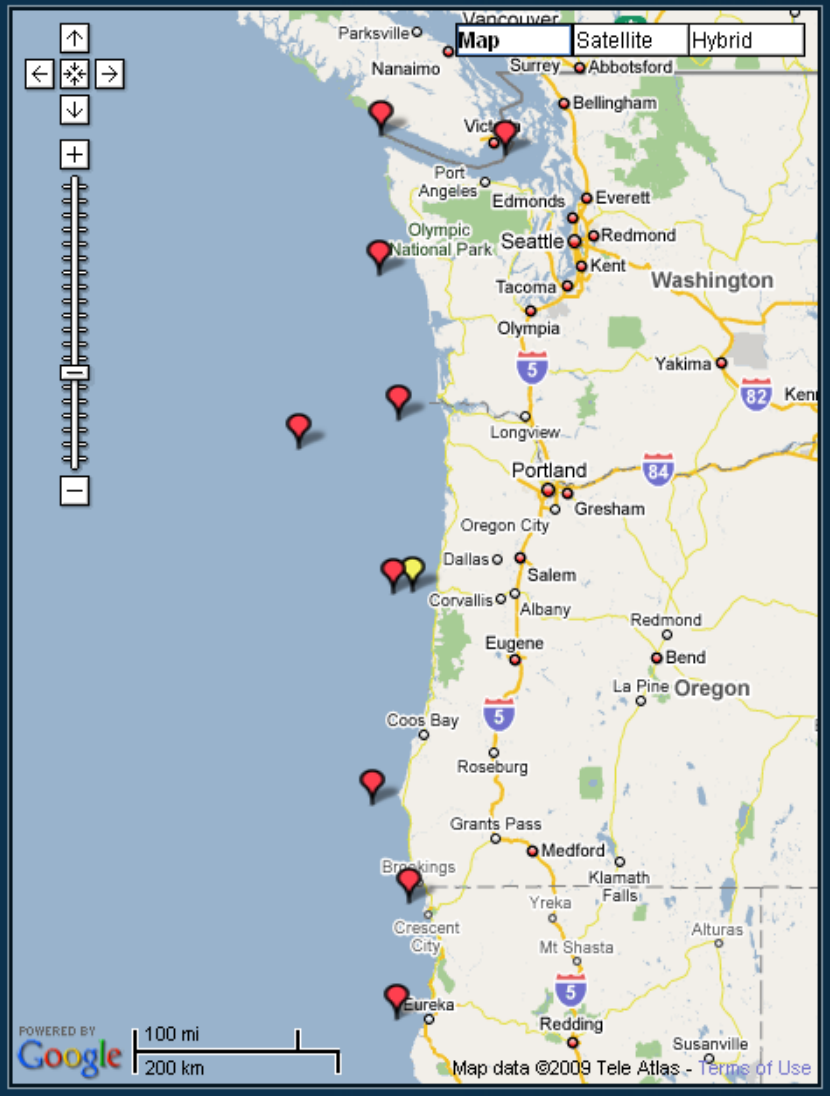
Sep 2016 – v 5.0 – Added profile plots, depth vs time (heatmap plots) and current conditions (Explorer);
Nov 2016 – v 5.1 – Added evacuation route modeling results to select communities. Improved access to evacuation brochures (Tsunami);
Jan 2017 – v5.2 – Added route feature (Tuna);
Feb 2017 – v5.3 – 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
Jul 2017 – v5.4 – Built HF radar plotting capability; Updated climatology indices; Updated Washington State tsunami evacuation zones (Explorer/Tsunami/Climatology);

NANOOS

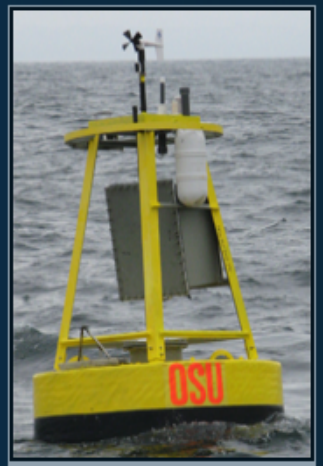
Northwest Association of Networked Ocean Observing Systems

Washington - Oregon - Northern California

NANOOS Buoy Locations



Lat: 48.4875, Lon: -127.5293

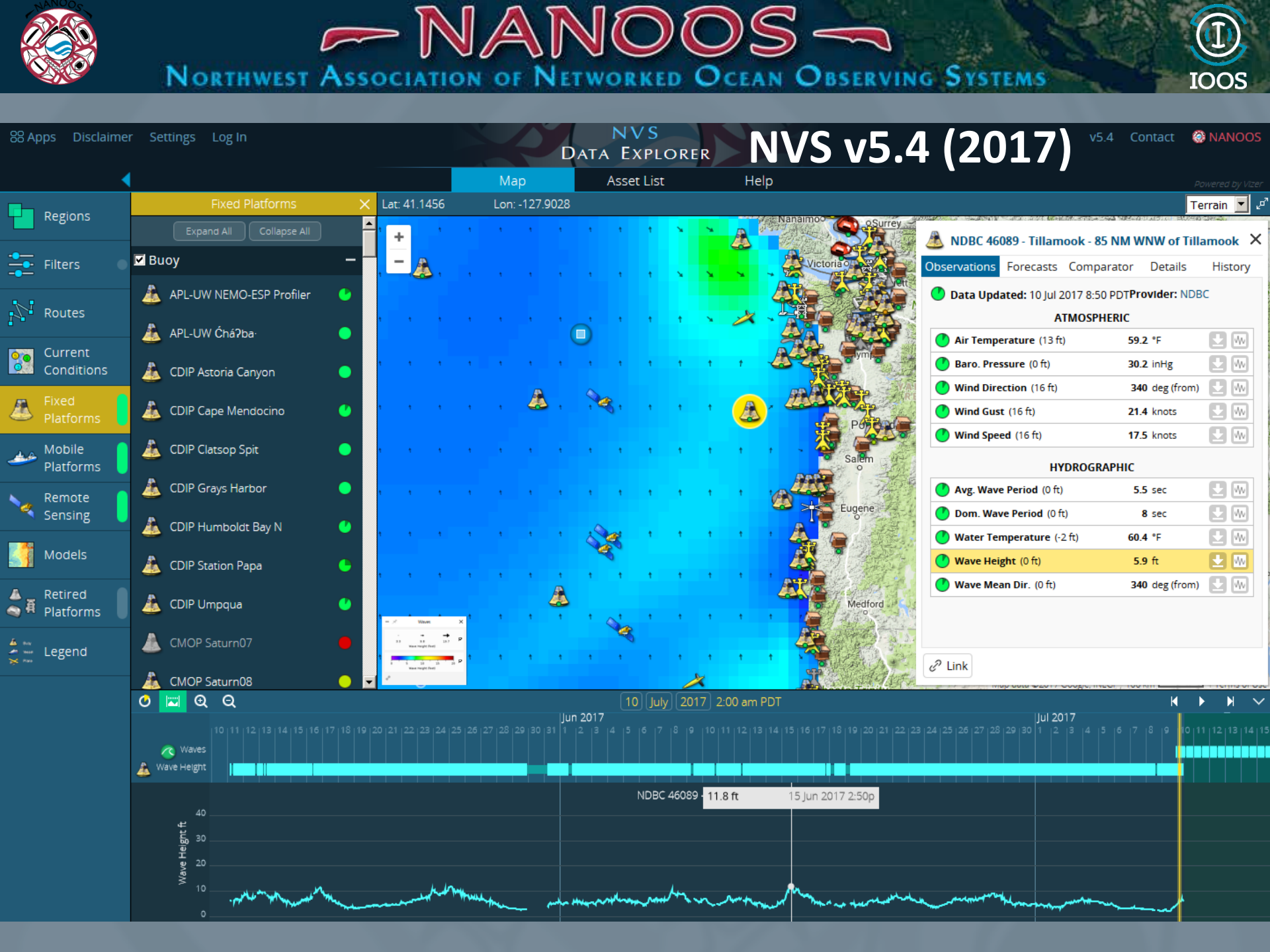


NH-10 Buoy

Map Legend

- NANOOS Buoy: NH-10
- NDBC Buoys

NVS v1.0 (2009)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NVS v5.4 (2017)
v5.4
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Legend
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Expand All
Collapse All
Buoy
APL-UW NEMO-ESP Profiler
APL-UW Ćhá?ba
CDIP Astoria Canyon
CDIP Cape Mendocino
CDIP Clatsop Spit
CDIP Grays Harbor
CDIP Humboldt Bay N
CDIP Station Papa
CDIP Umpqua
CMOP Saturn07
CMOP Saturn08
Lat: 41.1456
Lon: -127.9028
Terrain
Nanaimo
Surrey
Victoria
Salem
Eugene
Medford
NDBC 46089 - Tillamook - 85 NM WNW of Tillamook
Observations
Forecasts
Comparator
Details
History
Data Updated: 10 Jul 2017 8:50 PDT Provider: NDBC
ATMOSPHERIC
Air Temperature (13 ft) 59.2 °F
Baro. Pressure (0 ft) 30.2 inHg
Wind Direction (16 ft) 340 deg (from)
Wind Gust (16 ft) 21.4 knots
Wind Speed (16 ft) 17.5 knots
HYDROGRAPHIC
Avg. Wave Period (0 ft) 5.5 sec
Dom. Wave Period (0 ft) 8 sec
Water Temperature (-2 ft) 60.4 °F
Wave Height (0 ft) 5.9 ft
Wave Mean Dir. (0 ft) 340 deg (from)
Link
10 July 2017 2:00 am PDT
Jun 2017
Jul 2017
Waves
Wave Height
NDBC 46089 - 11.8 ft 15 Jun 2017 2:50p
Wave Height ft
40
30
20
10
0

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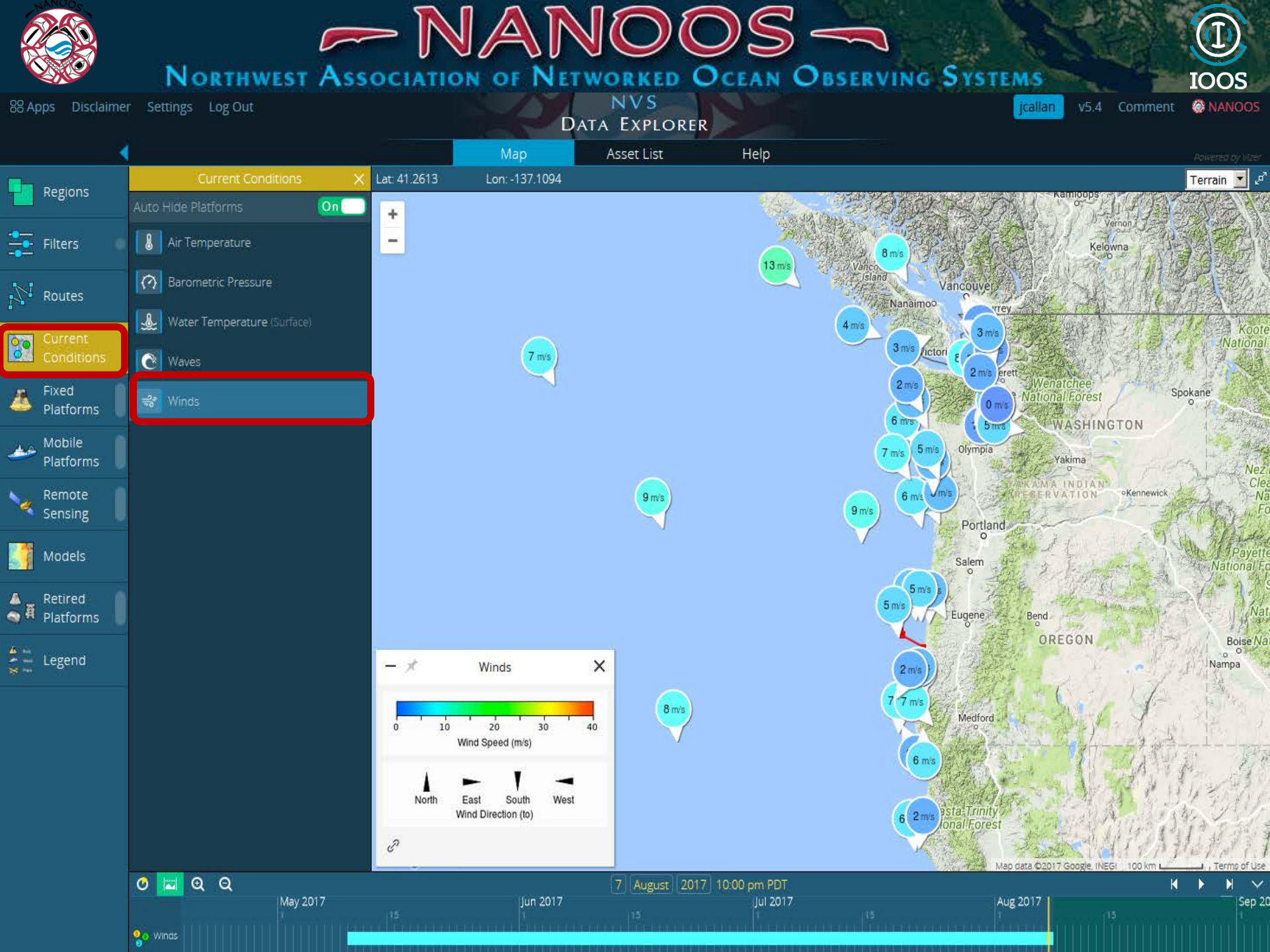
Jul 2017 – v5.4 – Built HF radar plotting capability; Updated climatology indices; Updated Washington State tsunami evacuation zones (Explorer/Tsunami/Climatology);

Climatologies Web App	
Plot other year data (development of long time-series started)	Underway
Scalable climate plots – include plots for different years, scalable time (i.e. Ability to zoom in on specific period, hours, days, week etc …)	Planning
Incorporate NERRS data into Climatology App	Not Started
Misc. Requested Apps or Features	
Bathymetric contours (Fathoms).	COMPLETED
X-band radar app (Incorporate into Maritime/Boater App, i.e. time-average imagery of wave, tidal fronts, wave direction, spectra plots, time series of wave length, period, extrapolate bathymetry)	Waiting for imagery
Common color map for all models.	Some discussion.
Particle tracking. Develop a prototype using one model and then add models and parameters that could be adjusted	Not Started
Extreme Total Water Level prediction tool	Not Started
Develop standardized data sets for modelers to use for testing purposes. NANOOS model testbed (consistent colors and variable ranges (incorporate all models in comparator).	Not Started
Integrate nearshore bathymetric surveys into NVS beaches and shorelines web app	Not Started
Estuary information page / co upwelling page. Includes infographics for events and describing stories.	Not Started
Watershed address. GIS of watershed layers to incorporate into layers in NVS. Clickable point that pops up user address.	Not Started
Profile plots for ORCA buoys	COMPLETED
Current Conditions (synoptic awareness)	COMPLETED
"Recreational water app": Target: kayakers, surfers, kite boarding, etc	NEW: Not Started
Build your own web app	NEW: Not Started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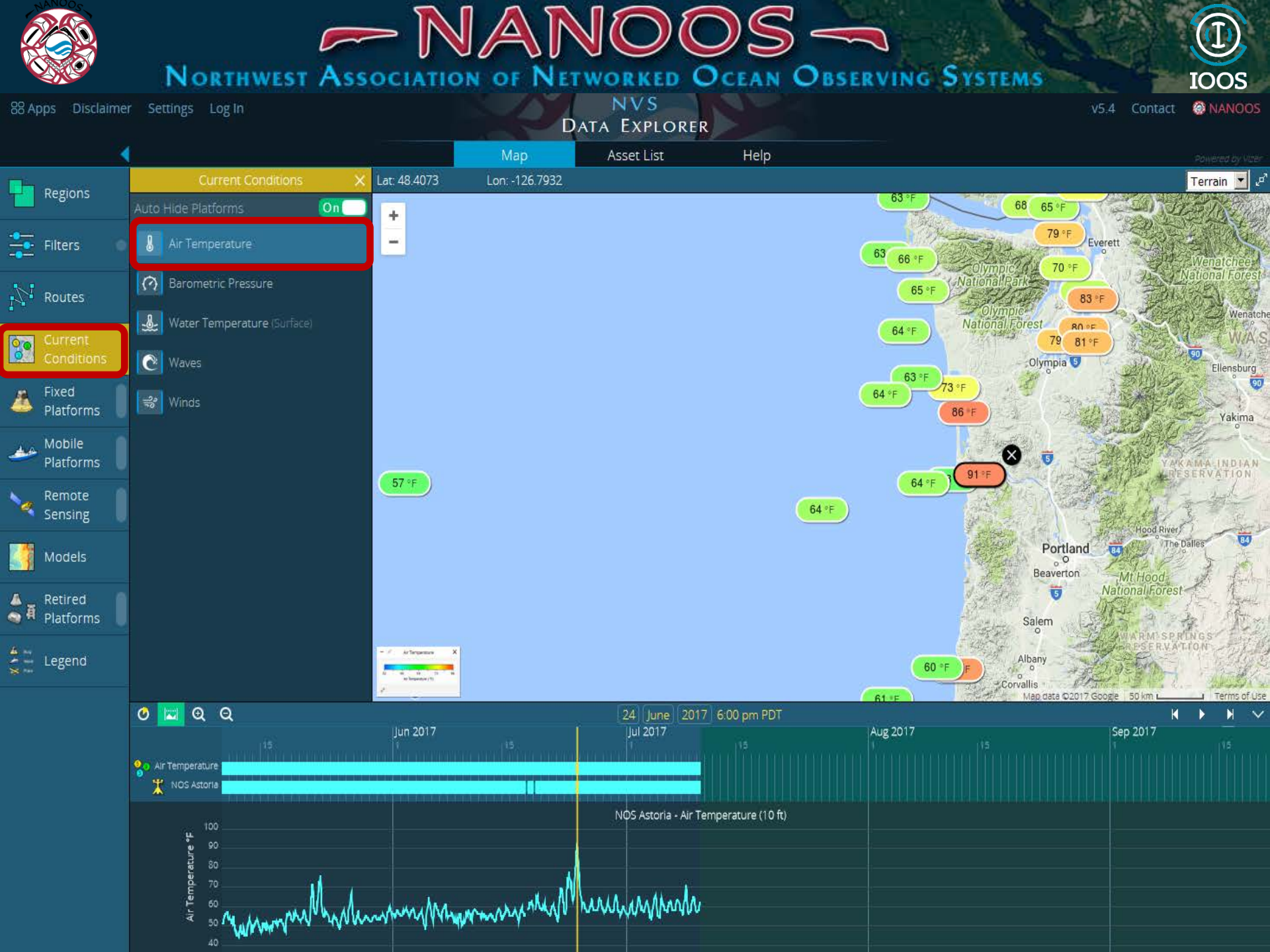
Current Conditions
Auto Hide Platforms
On
Air Temperature
Barometric Pressure
Water Temperature (Surface)
Waves
Winds
Lat: 41.2613
Lon: -137.1094
Terrain
Winds
0
10
20
30
40
Wind Speed (m/s)
North
East
South
West
Wind Direction (to)
Vancouver
Victoria
Nanaimo
Kelowna
Spokane
Olympia
Yakima
Portland
Salem
Eugene
Bend
Medford
Kennewick
WASHINGTON
OREGON
Wenatchee National Forest
Map data ©2017 Google, INEGI
100 km
Terms of Use
7
August
2017
10:00 pm PDT
May 2017
Jun 2017
Jul 2017
Aug 2017
Winds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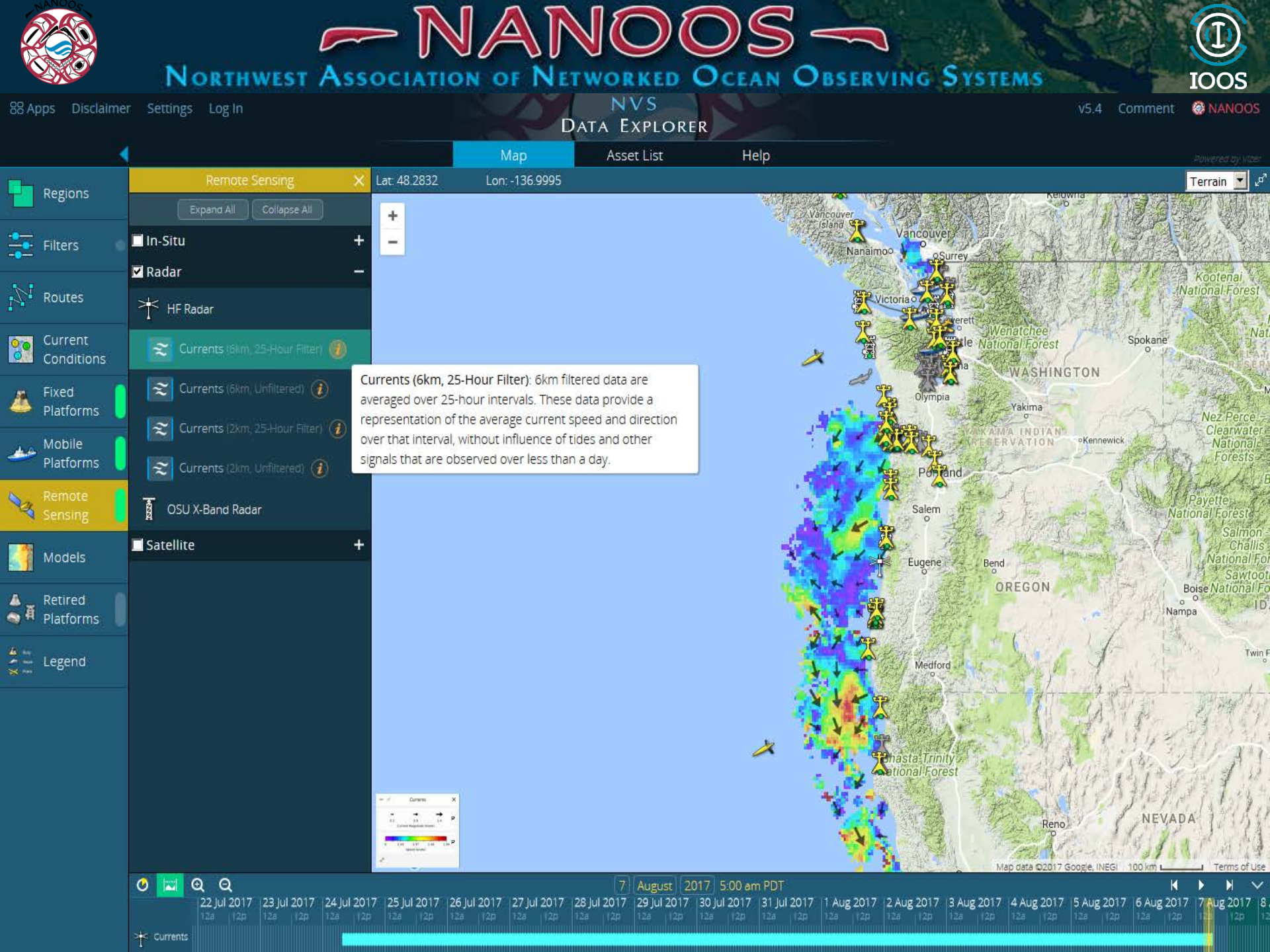
On
Air Temperature
Barometric Pressure
Water Temperature (Surface)
Waves
Winds
Lat: 48.4073
Lon: -126.7932
Terrain
63 °F
68
65 °F
79 °F
Everett
63
66 °F
70 °F
Olympic National Park
Olympic National Forest
Wenatchee National Forest
65 °F
83 °F
64 °F
79
81 °F
Olympia
Ellensburg
63 °F
73 °F
64 °F
86 °F
Yakima
57 °F
91 °F
64 °F
64 °F
Portland
Beaverton
Hood River
The Dalles
Mt Hood National Forest
Salem
Albany
Corvallis
60 °F
Map data ©2017 Google
50 km
Terms of Use
24
June
2017
6:00 pm PDT
Jun 2017
Jul 2017
Aug 2017
Sep 2017
Air Temperature
NOS Astoria
NOS Astoria - Air Temperature (10 ft)
Air Temperature °F
100
90
80
70
60
50
40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Retired Platforms
Legend
Remote Sensing
Expand All
Collapse All
In-Situ
Radar
HF Radar
Currents (6km, 25-Hour Filter)
Currents (6km, Unfiltered)
Currents (2km, 25-Hour Filter)
Currents (2km, Unfiltered)
OSU X-Band Radar
Satellite
Currents (6km, 25-Hour Filter): 6km filtered data are averaged over 25-hour intervals. These data provide a representation of the average current speed and direction over that interval, without influence of tides and other signals that are observed over less than a day.
Lat: 48.2832
Lon: -136.9995
Terrain
Vancouver Island
Vancouver
Nanaimo
Surrey
Victoria
Kootenai National Forest
Wenatchee National Forest
Spokane
WASHINGTON
Olympia
Yakima
YAKAMA INDIAN RESERVATION
Kennewick
Nez Perce Clearwater National Forests
Portland
Salem
Payette National Forest
Salmon Challis National Forest
Eugene
Bend
OREGON
Boise National Forest
Nampa
Medford
Shasta-Trinity National Forest
Reno
NEVADA
Map data ©2017 Google, INEGI
100 km
Terms of Use
7 August 2017 5:00 am PDT
22 Jul 2017
23 Jul 2017
24 Jul 2017
25 Jul 2017
26 Jul 2017
27 Jul 2017
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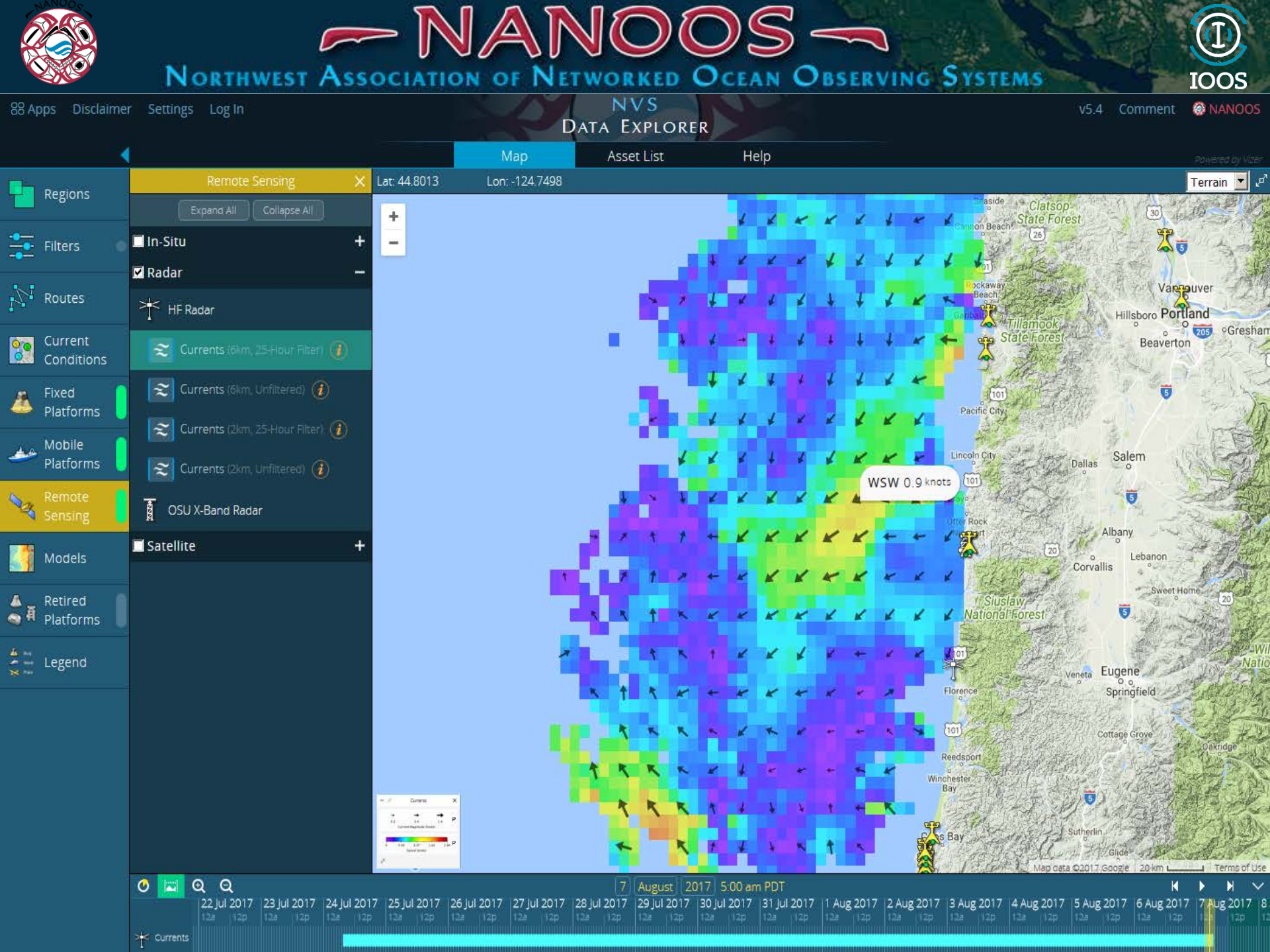
29 Jul 2017
30 Jul 2017
31 Jul 2017
1 Aug 2017
2 Aug 2017
3 Aug 2017
4 Aug 2017
5 Aug 2017
6 Aug 2017
7 Aug 2017
Currents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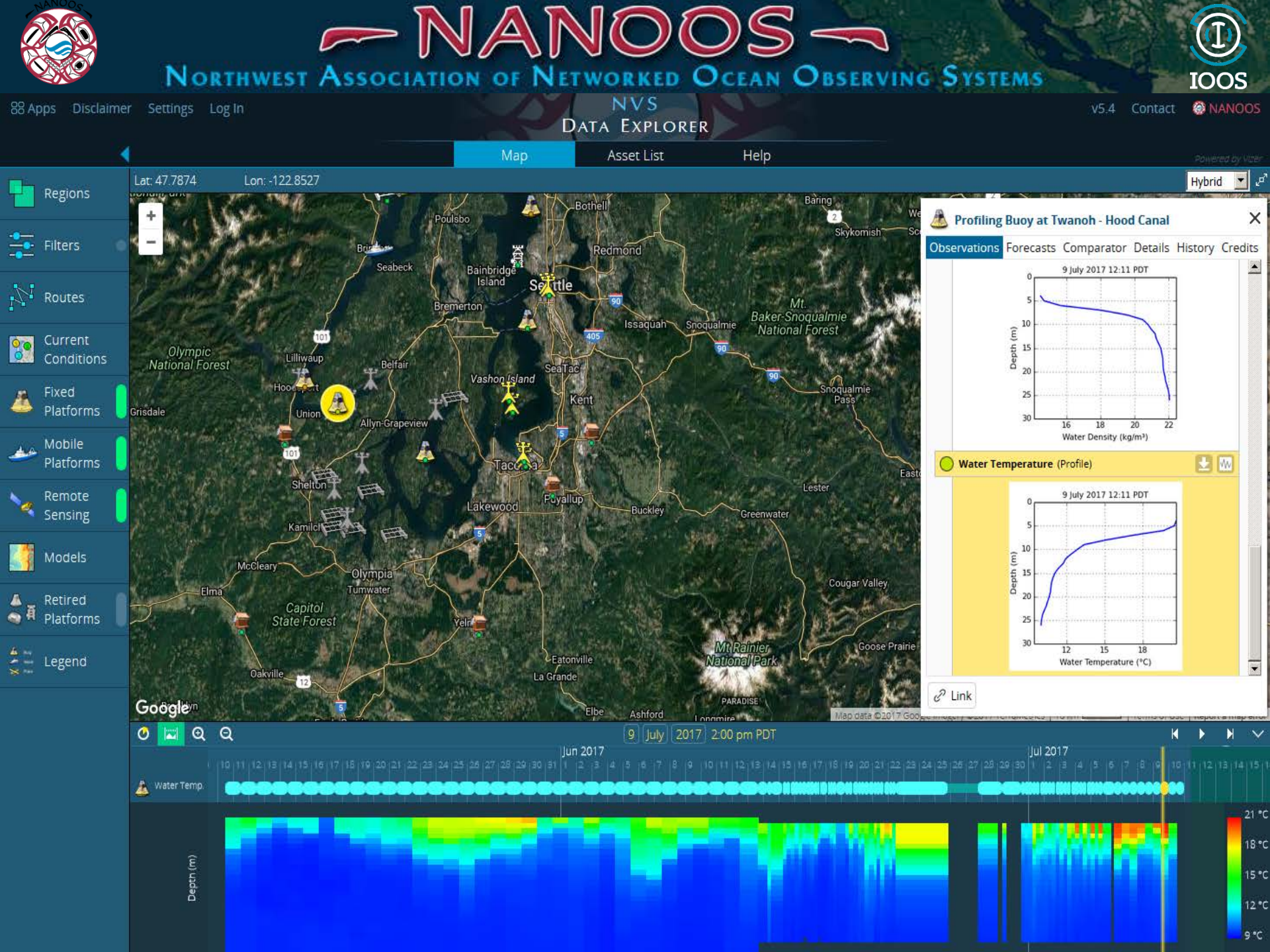
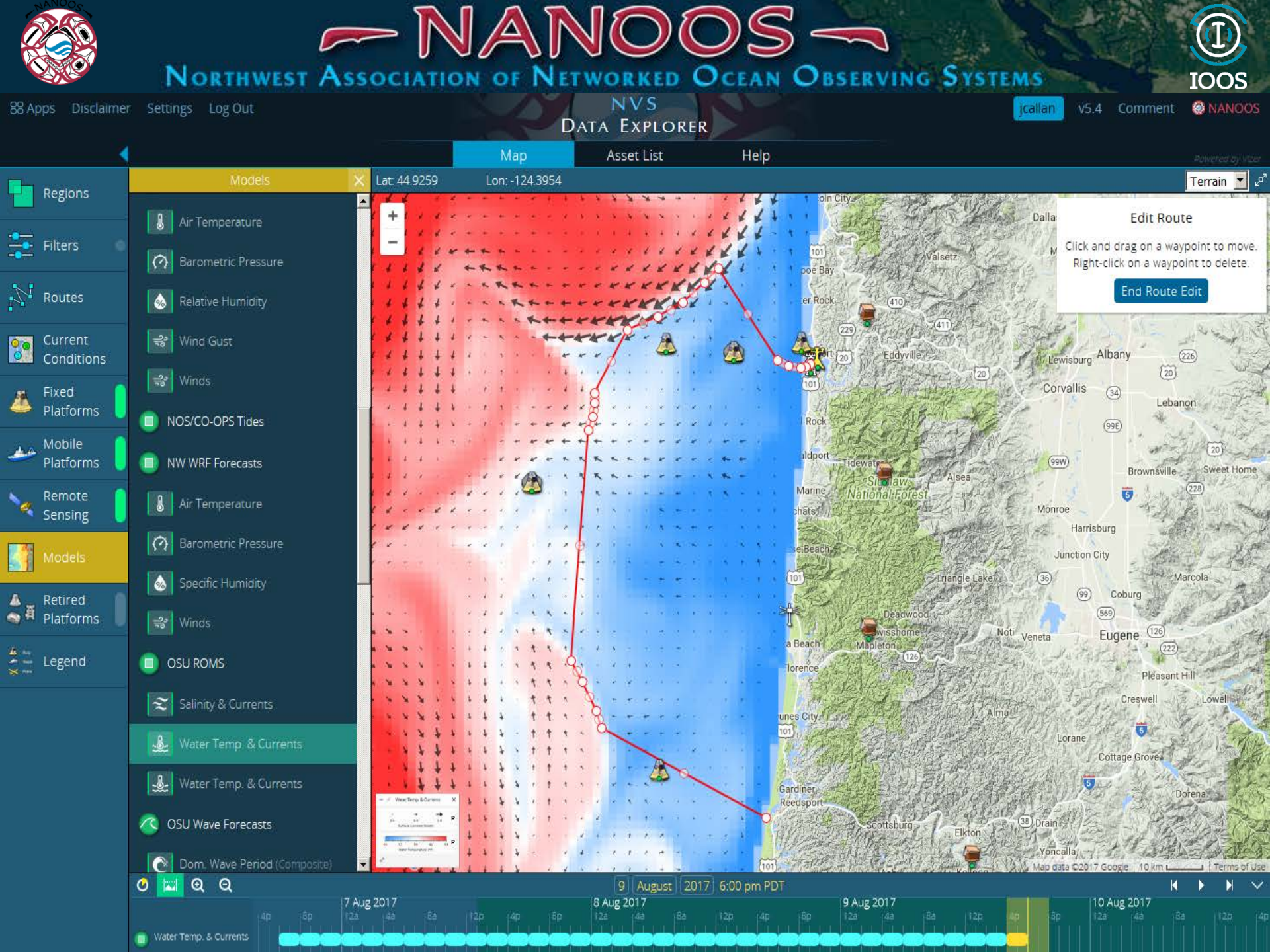
Expand All
Collapse All
In-Situ
Radar
HF Radar
Currents (6km, 25-Hour Filter)
Currents (6km, Unfiltered)
Currents (2km, 25-Hour Filter)
Currents (2km, Unfiltered)
OSU X-Band Radar
Satellite
Lat: 44.8013
Lon: -124.7498
Terrain
WSW 0.9 knots
Clatsop State Forest
Tillamook State Forest
Portland
Beaverton
Salem
Albany
Corvallis
Lebanon
Eugene
Springfield
Florence
Reedsport
Siuslaw National Forest
Pacific City
Lincoln City
Dallas
Hillsboro
Sweet Home
Cottage Grove
Oakridge
Sutherlin
Map data ©2017 Google
20 km
Terms of Use
7
August
2017
5:00 am PDT
22 Jul 2017
23 Jul 2017
24 Jul 2017
25 Jul 2017
26 Jul 2017
27 Jul 2017
28 Jul 2017
29 Jul 2017
30 Jul 2017
31 Jul 2017
1 Aug 2017
2 Aug 2017
3 Aug 2017
4 Aug 2017
5 Aug 2017
6 Aug 2017
7 Aug 2017
Currents


NANOOS
Northwest Association of Networked Ocean Observing Systems
IOOS
Apps
Disclaimer
Settings
Log In
NVS
Data Explorer
v5.4
Contact
NANOOS
Map
Asset List
Help
Regions
Filters
Routes
Current Conditions
Fixed Platforms
Mobile Platforms
Remote Sensing
Models
Retired Platforms
Legend
Lat: 47.7874
Lon: -122.8527
Hybrid
Profiling Buoy at Twanoh - Hood Canal
Observations
Forecasts
Comparator
Details
History
Credits
9 July 2017 12:11 PDT
Depth (m)
Water Density (kg/m³)
Water Temperature (Profile)
9 July 2017 12:11 PDT
Depth (m)
Water Temperature (°C)
Link
Seattle
Bellevue
Redmond
Bothell
Kent
Tacoma
Olympia
Lakewood
Puyallup
Bainbridge Island
Bremerton
Vashon Island
Olympic National Forest
Mt. Baker-Snoqualmie National Forest
Mt Rainier National Park
Capitol State Forest
Google
9 July 2017 2:00 pm PDT
Jun 2017
Jul 2017
Water Temp.
Depth (m)
21 °C
18 °C
15 °C
12 °C
9 °C


NANOOS
Northwest Association of Networked Ocean Observing Systems
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Settings
Log Out
NVS
Data Explorer
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v5.4
Comment
NANOOS
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Regions
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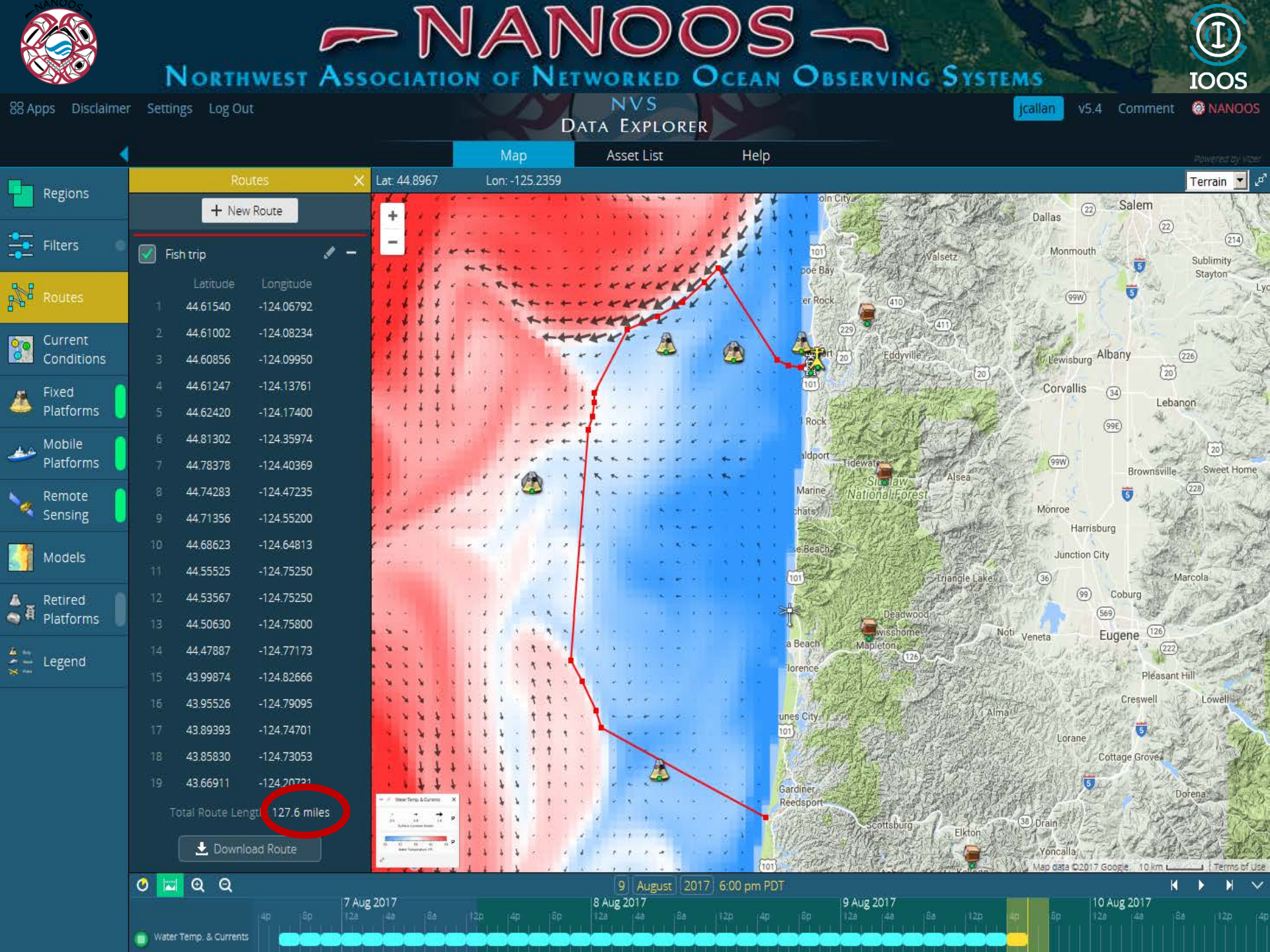
Current Conditions
Fixed Platforms
Mobile Platforms
Remote Sensing
Models
Retired Platforms
Legend
Models
Air Temperature
Barometric Pressure
Relative Humidity
Wind Gust
Winds
NOS/CO-OPS Tides
NW WRF Forecasts
Air Temperature
Barometric Pressure
Specific Humidity
Winds
OSU ROMS
Salinity & Currents
Water Temp. & Currents
Water Temp. & Currents
OSU Wave Forecasts
Dom. Wave Period (Composite)
Lat: 44.9259
Lon: -124.3954
Terrain
Edit Route
Click and drag on a waypoint to move.
Right-click on a waypoint to delete.
End Route Edit
Valsetz
Eddyville
Lewisburg
Albany
Corvallis
Lebanon
Tidewater
Siuslaw National Forest
Alsea
Brownsville
Sweet Home
Monroe
Harrisburg
Junction City
Triangle Lake
Marcola
Coburg
Deadwood
Mapleton
Noti
Veneta
Eugene
Pleasant Hill
Creswell
Lowell
Alma
Lorane
Cottage Grove
Gardiner
Reedsport
Scottsburg
Elkton
Drain
Yoncalla
Dorena
Map data ©2017 Google
10 km
Terms of Use
9
August
2017
6:00 pm PDT
7 Aug 2017
8 Aug 2017
9 Aug 2017
10 Aug 2017
Water Temp. & Currents


NANOOS
Northwest Association of Networked Ocean Observing Systems
IOOS
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Settings
Log Out
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Data Explorer
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v5.4
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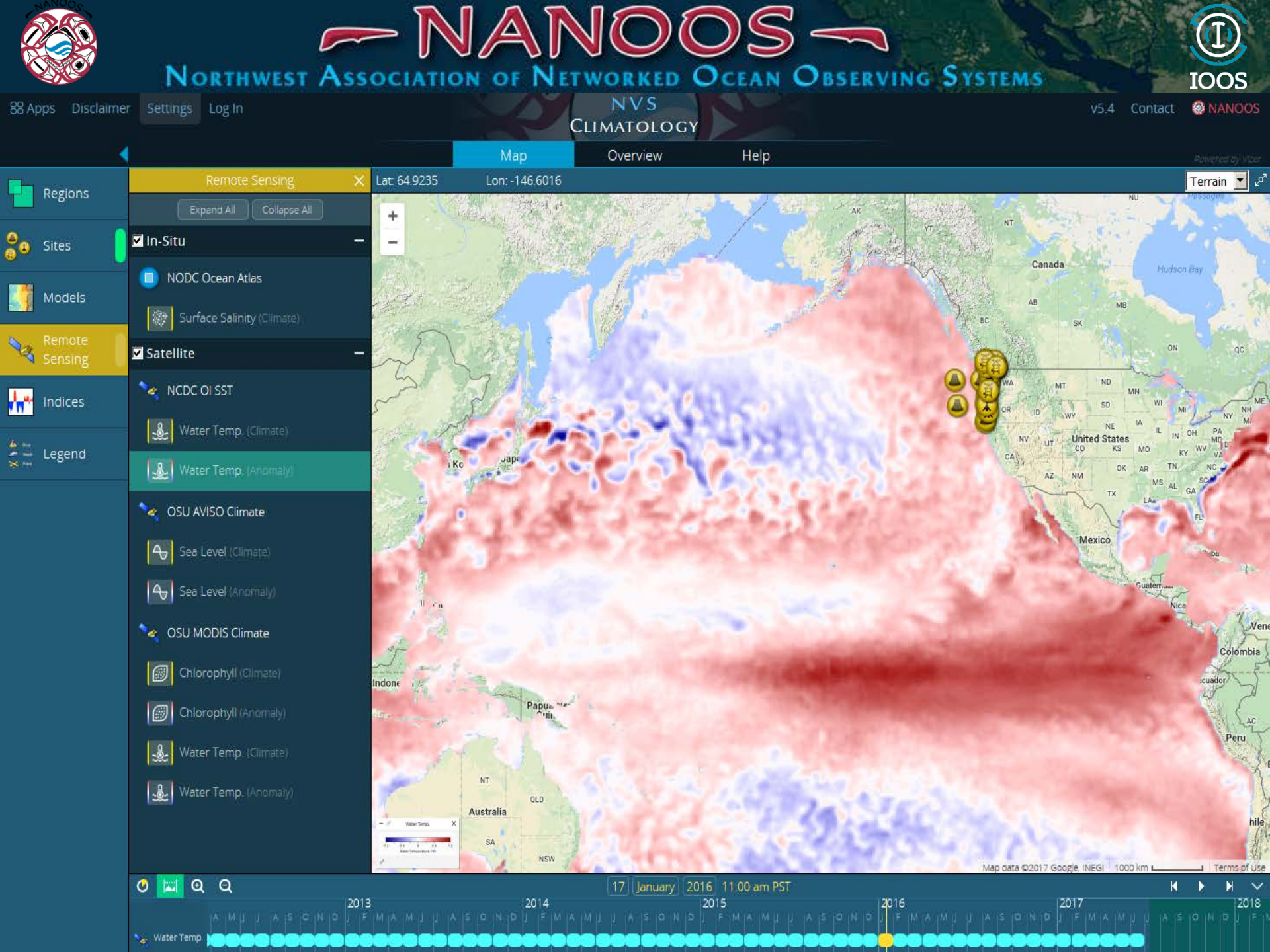
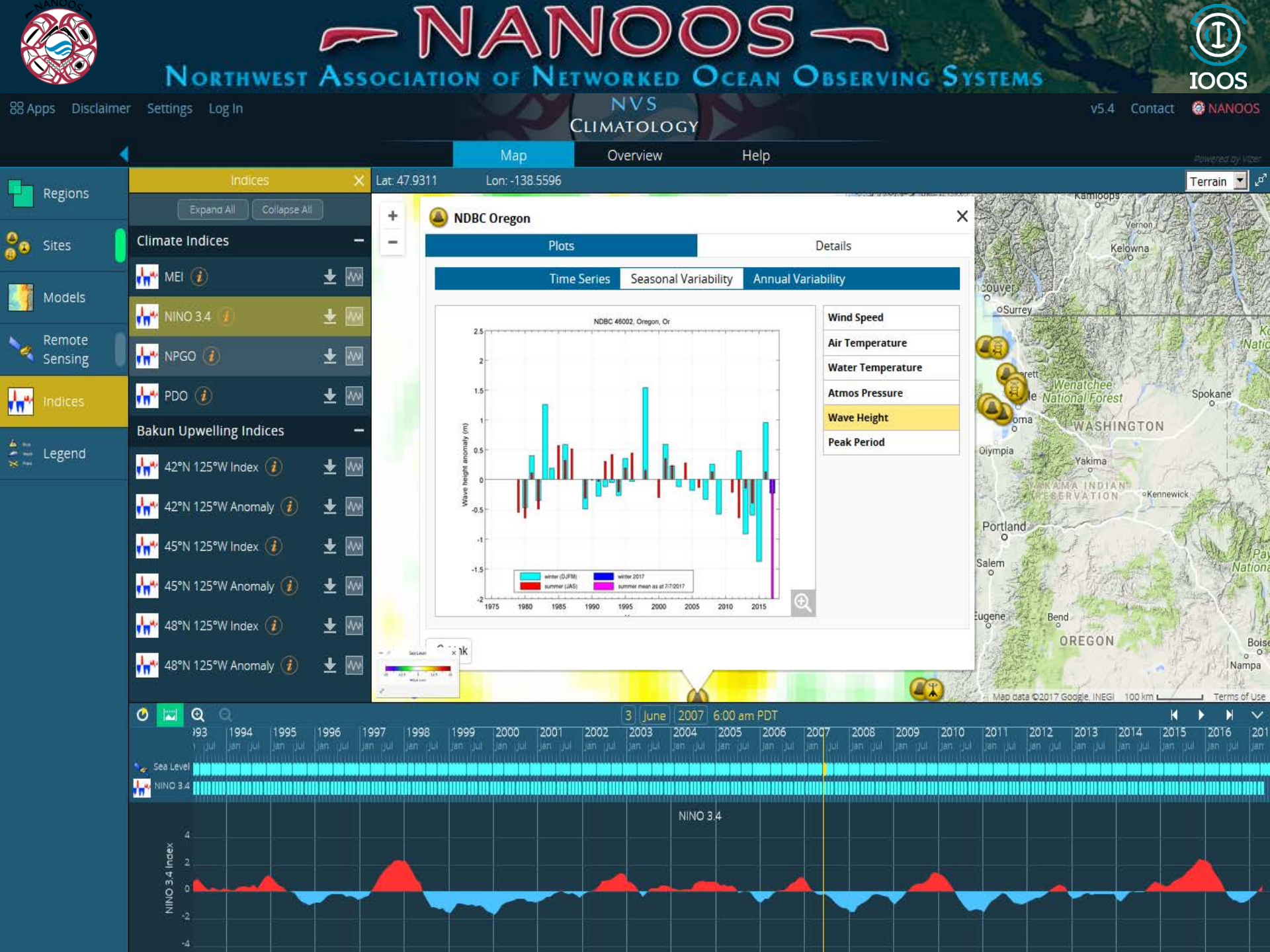
Asset List
Help
Regions
Filters
Routes
Current Conditions
Fixed Platforms
Mobile Platforms
Remote Sensing
Models
Retired Platforms
Legend
Routes
New Route
Fish trip
Latitude
Longitude
1 44.61540 -124.06792
2 44.61002 -124.08234
3 44.60856 -124.09950
4 44.61247 -124.13761
5 44.62420 -124.17400
6 44.81302 -124.35974
7 44.78378 -124.40369
8 44.74283 -124.47235
9 44.71356 -124.55200
10 44.68623 -124.64813
11 44.55525 -124.75250
12 44.53567 -124.75250
13 44.50630 -124.75800
14 44.47887 -124.77173
15 43.99874 -124.82666
16 43.95526 -124.79095
17 43.89393 -124.74701
18 43.85830 -124.73053
19 43.66911 -124.20731
Total Route Length 127.6 miles
Download Route
Lat: 44.8967
Lon: -125.2359
Terrain
Salem
Dallas
Monmouth
Sublimity
Stayton
Valsetz
Eddyville
Lewisburg
Albany
Corvallis
Lebanon
Tidewater
Siuslaw National Forest
Alsea
Brownsville
Sweet Home
Marine
Monroe
Harrisburg
Junction City
Triangle Lake
Marcola
Coburg
Deadwood
Noti
Veneta
Eugene
Mapleton
Pleasant Hill
Creswell
Lowell
Alma
Lorane
Cottage Grove
Gardiner
Reedsport
Dorena
Scottsburg
Elkton
Drain
Yoncalla
Map data ©2017 Google
10 km
Terms of Use
9 August 2017 6:00 pm PDT
7 Aug 2017
8 Aug 2017
9 Aug 2017
10 Aug 2017
Water Temp. & Currents


NANOOS
Northwest Association of Networked Ocean Observing Systems
IOOS
Apps
Disclaimer
Settings
Log In
NVS
Climatology
v5.4
Contact
NANOOS
Map
Overview
Help
Regions
Sites
Models
Remote Sensing
Indices
Legend
Remote Sensing
Expand All
Collapse All
In-Situ
NODC Ocean Atlas
Surface Salinity (Climate)
Satellite
NCDC OI SST
Water Temp. (Climate)
Water Temp. (Anomaly)
OSU AVISO Climate
Sea Level (Climate)
Sea Level (Anomaly)
OSU MODIS Climate
Chlorophyll (Climate)
Chlorophyll (Anomaly)
Water Temp. (Climate)
Water Temp. (Anomaly)
Lat: 64.9235
Lon: -146.6016
Terrain
Canada
United States
Mexico
Colombia
Peru
Australia
Map data ©2017 Google, INEGI
1000 km
Terms of Use
17
January
2016
11:00 am PST
2013
2014
2015
2016
2017
2018
Water Temp.


NANOOS
Northwest Association of Networked Ocean Observing Systems
IOOS
Apps
Disclaimer
Settings
Log In
NVS
Climatology
v5.4
Contact
NANOOS
Map
Overview
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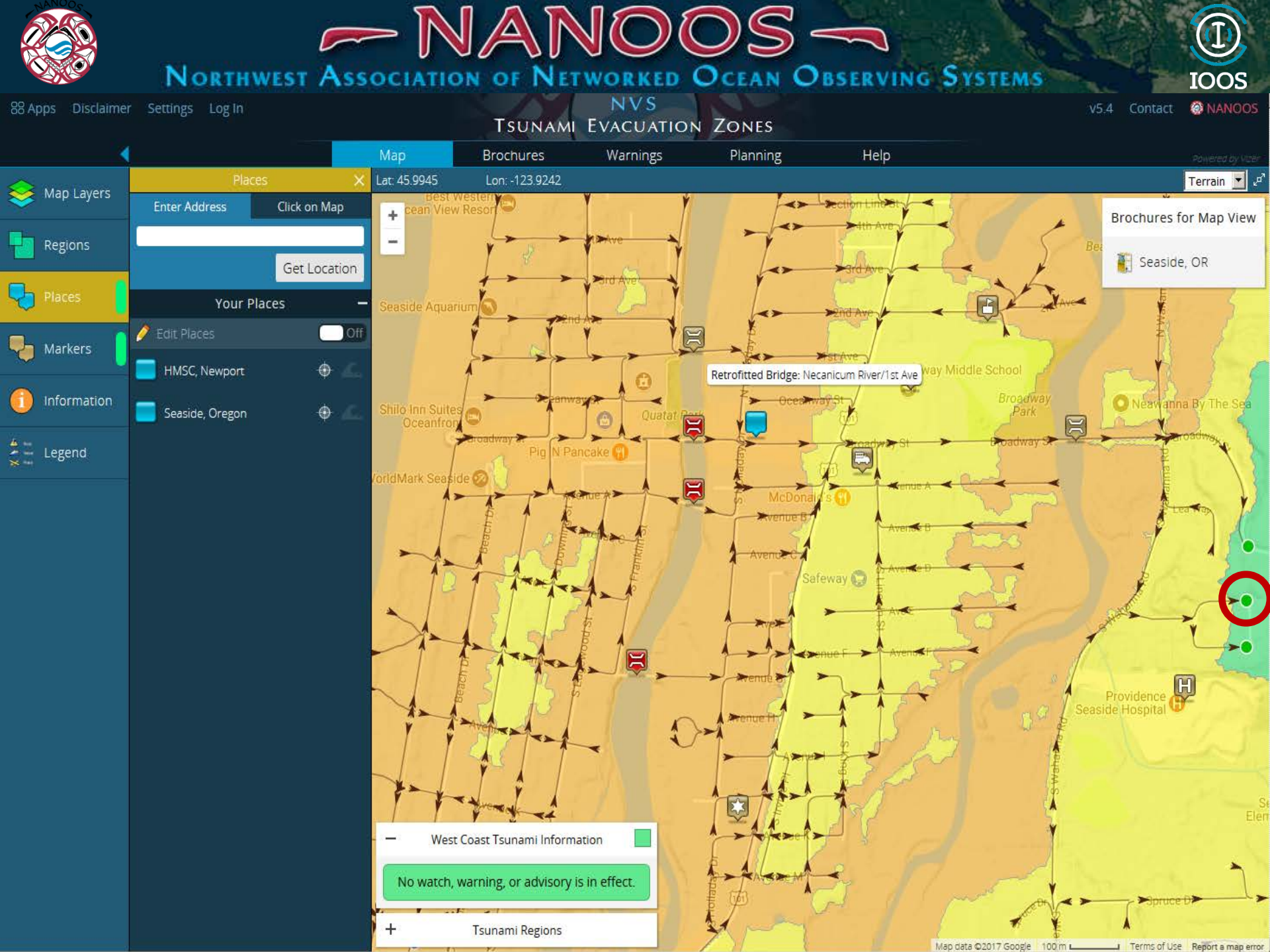
Models
Remote Sensing
Indices
Legend
Indices
Expand All
Collapse All
Climate Indices
MEI
NINO 3.4
NPGO
PDO
Bakun Upwelling Indices
42°N 125°W Index
42°N 125°W Anomaly
45°N 125°W Index
45°N 125°W Anomaly
48°N 125°W Index
48°N 125°W Anomaly
Lat: 47.9311
Lon: -138.5596
Terrain
NDBC Oregon
Plots
Details
Time Series
Seasonal Variability
Annual Variability
NDBC 46002, Oregon, Or
Wave height anomaly (m)
winter (DJFM)
summer (JAS)
winter 2017
summer mean as at 7/7/2017
Wind Speed
Air Temperature
Water Temperature
Atmos Pressure
Wave Height
Peak Period
Wenatchee National Forest
Spokane
WASHINGTON
Yakima
Kennewick
Portland
Salem
Eugene
Bend
OREGON
Nampa
Map data ©2017 Google, INEGI
100 km
Terms of Use
3 June 2007 6:00 am PDT
Sea Level
NINO 3.4
NINO 3.4
NINO 3.4 Index


NANOOS
Northwest Association of Networked Ocean Observing Systems
IOOS
Apps
Disclaimer
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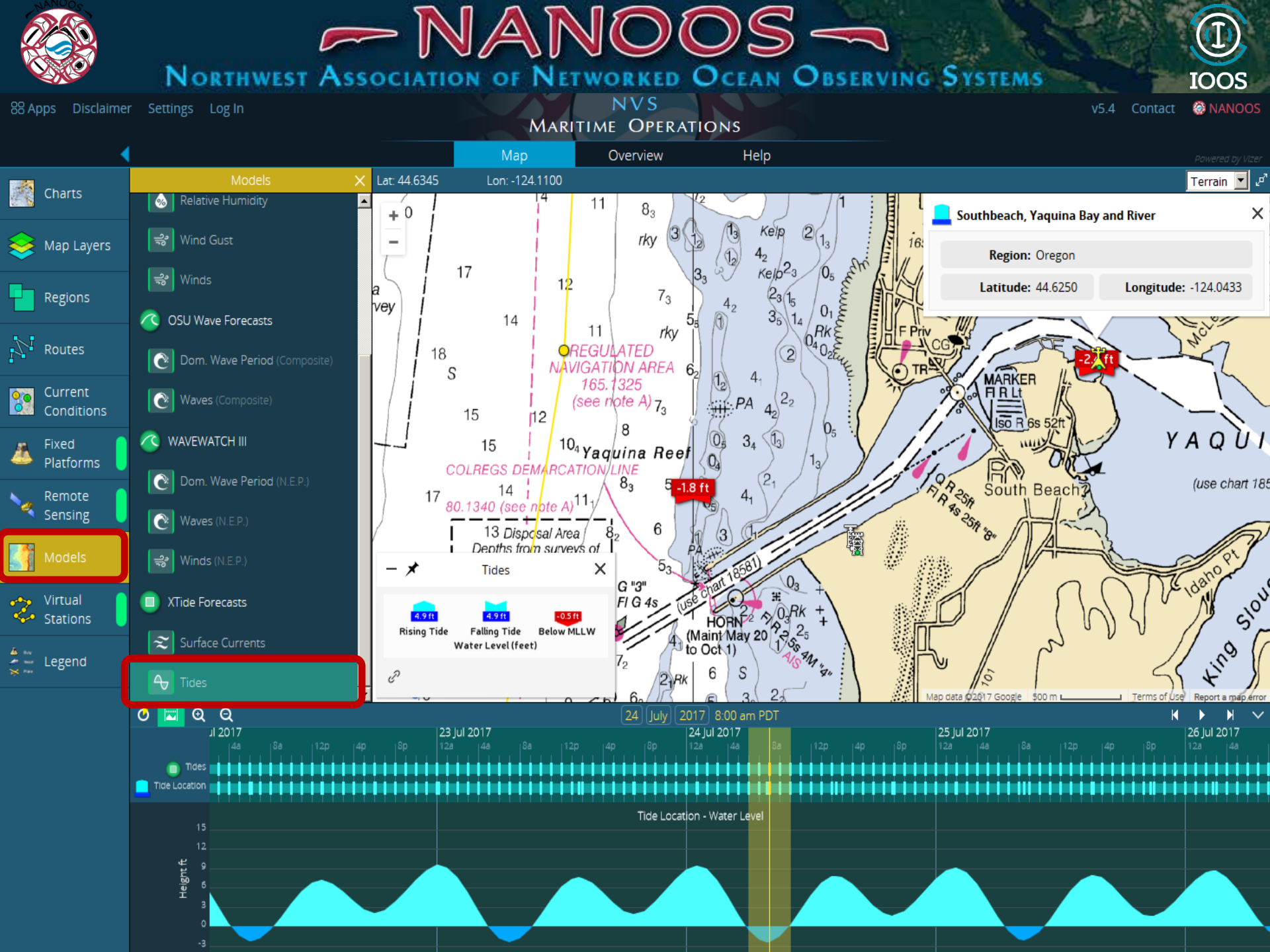
Log In
NVS
Tsunami Evacuation Zones
v5.4
Contact
NANOOS
Map
Brochures
Warnings
Planning
Help
Map Layers
Regions
Places
Markers
Information
Legend
Places
Enter Address
Click on Map
Get Location
Your Places
Edit Places
Off
HMSC, Newport
Seaside, Oregon
Lat: 45.9945
Lon: -123.9242
Terrain
Brochures for Map View
Seaside, OR
Retrofitted Bridge: Necanicum River/1st Ave
Seaside Aquarium
Shilo Inn Suites Oceanfront
Pig N Pancake
McDonald's
Safeway
Broadway Park
Providence Seaside Hospital
West Coast Tsunami Information
No watch, warning, or advisory is in effect.
Tsunami Regions
Map data ©2017 Google
100 m
Terms of Use
Report a map error


NANOOS
Northwest Association of Networked Ocean Observing Systems
IOOS
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Disclaimer
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NVS
Maritime Operations
v5.4
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NANOOS
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Overview
Help
Powered by Vizer
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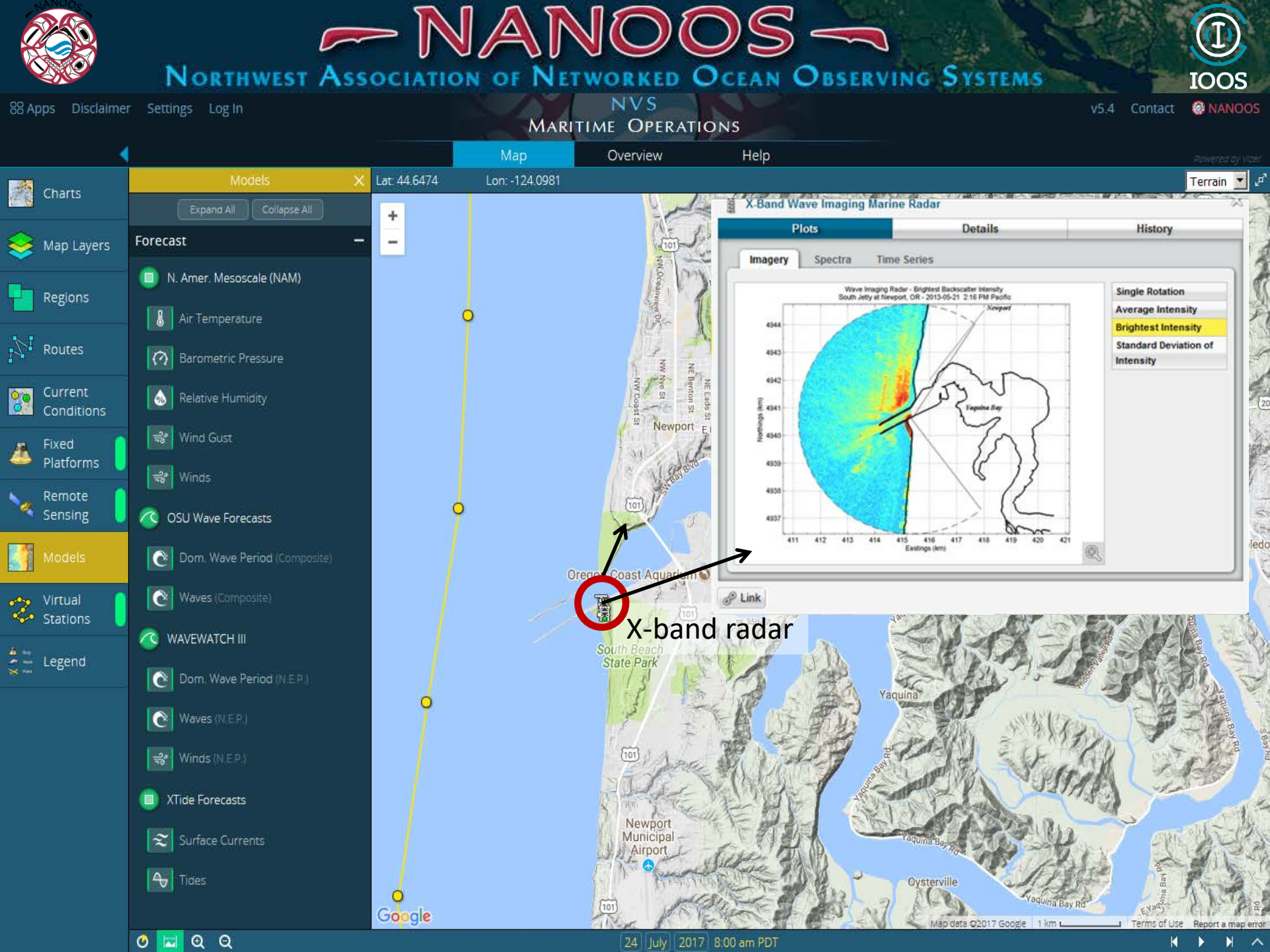
Current Conditions
Fixed Platforms
Remote Sensing
Models
Virtual Stations
Legend
Models
Relative Humidity
Wind Gust
Winds
OSU Wave Forecasts
Dom. Wave Period (Composite)
Waves (Composite)
WAVEWATCH III
Dom. Wave Period (N.E.P.)
Waves (N.E.P.)
Winds (N.E.P.)
XTide Forecasts
Surface Currents
Tides
Lat: 44.6345
Lon: -124.1100
Terrain
Southbeach, Yaquina Bay and River
Region: Oregon
Latitude: 44.6250
Longitude: -124.0433
REGULATED NAVIGATION AREA 165.1325 (see note A)
COLREGS DEMARCATION LINE 80.1340 (see note A)
Yaquina Reef
-1.8 ft
-2.2 ft
MARKER Fl R Lt
Iso R 6s 52ft
South Beach
Q R 25ft Fl R 4s 25ft "8"
HORN (Maint May 20 to Oct 1)
Fl R 2.5s 4M "4"
AIS
(use chart 18581)
Idaho Pt
King Slough
Tides
4.9 ft
Rising Tide
4.9 ft
Falling Tide
-0.5 ft
Below MLLW
Water Level (feet)
Map data ©2017 Google
500 m
Terms of Use
Report a map error
24 July 2017 8:00 am PDT
23 Jul 2017
24 Jul 2017
25 Jul 2017
26 Jul 2017
Tides
Tide Location
Tide Location - Water Level
Height ft


NANOOS
Northwest Association of Networked Ocean Observing Systems
IOOS
Apps
Disclaimer
Settings
Log In
NVS
Maritime Operations
v5.4
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NANOOS
Map
Overview
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Charts
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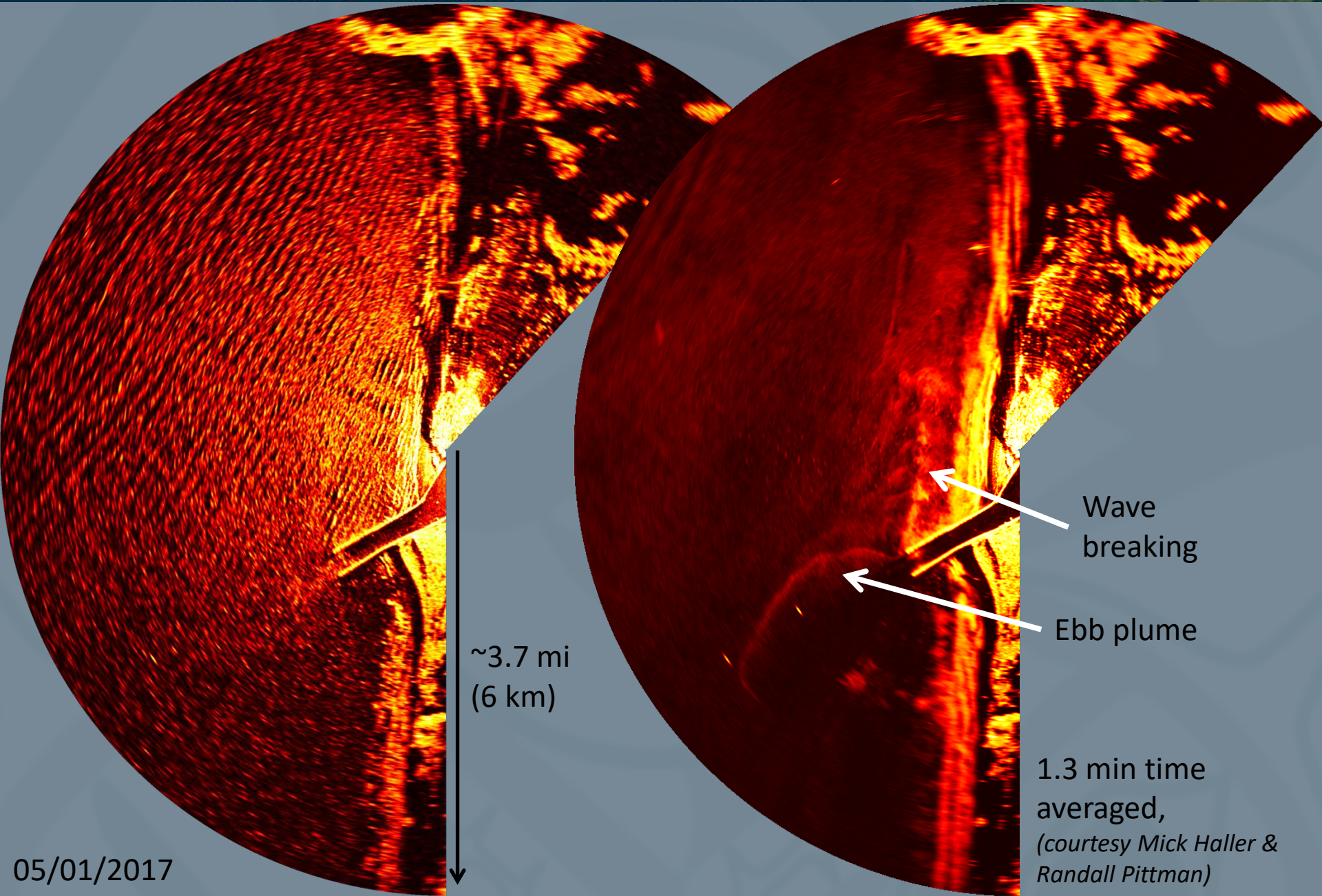
Routes
Current Conditions
Fixed Platforms
Remote Sensing
Models
Virtual Stations
Legend
Models
Expand All
Collapse All
Forecast
N. Amer. Mesoscale (NAM)
Air Temperature
Barometric Pressure
Relative Humidity
Wind Gust
Winds
OSU Wave Forecasts
Dom. Wave Period (Composite)
Waves (Composite)
WAVEWATCH III
Dom. Wave Period (N.E.P.)
Waves (N.E.P.)
Winds (N.E.P.)
XTide Forecasts
Surface Currents
Tides
Lat: 44.6474
Lon: -124.0981
Terrain
X-Band Wave Imaging Marine Radar
Plots
Details
History
Imagery
Spectra
Time Series
Single Rotation
Average Intensity
Brightest Intensity
Standard Deviation of Intensity
Link
X-band radar
Newport
South Beach State Park
Yaquina
Newport Municipal Airport
Oysterville
Google
24
July
2017
8:00 am PDT

NANOOS

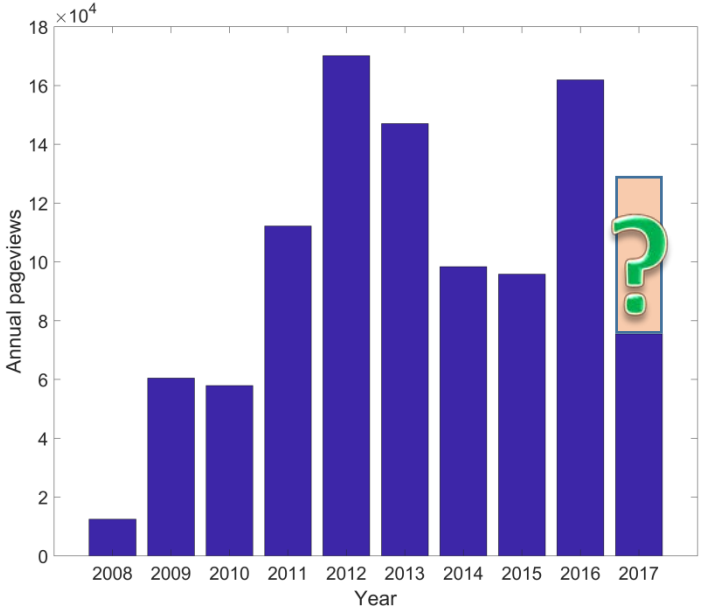
Northwest Association of Networked Ocean Observing Systems

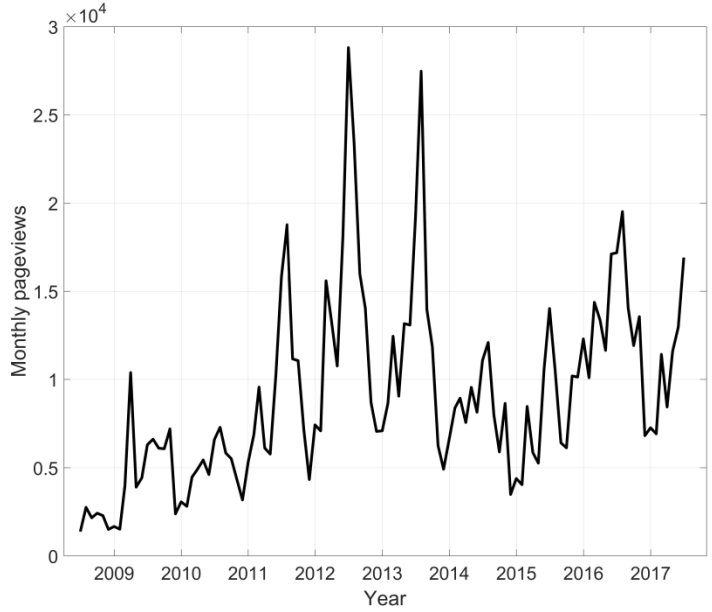
IOOS



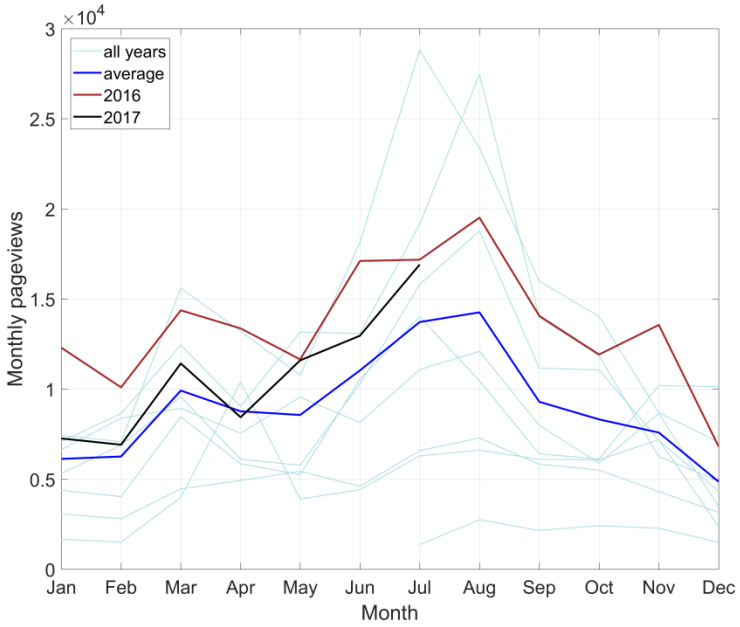
05/01/2017

1.3 min time averaged,
(courtesy Mick Haller & Randall Pittman)





How are we doing?



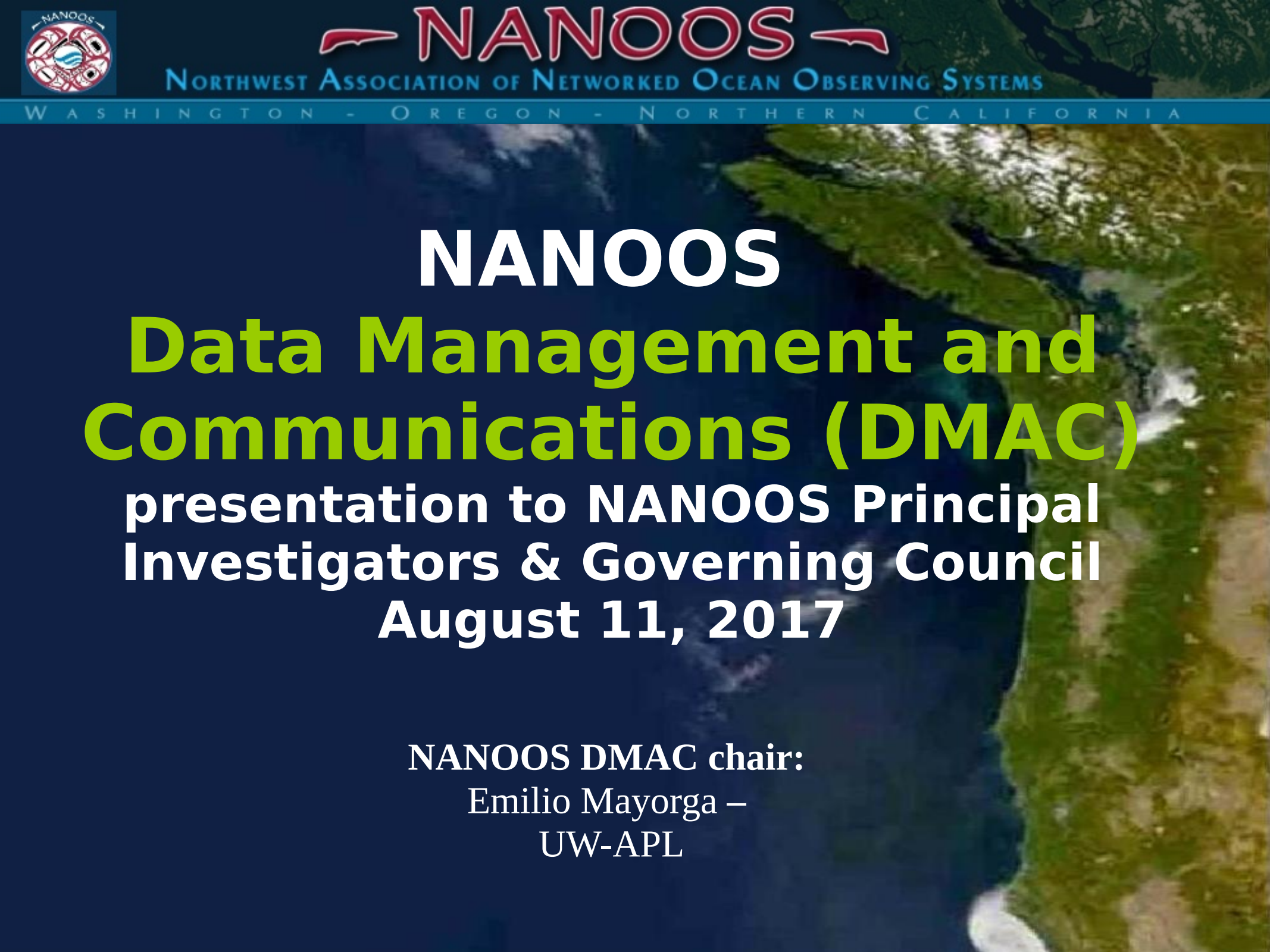
Web App/Page		Pageviews	%	Avg. Time on Page
/TsunamiEvac		76895	22.88	4:53
/TunaFish		86076	25.61	5:01
/Explorer		43883	13.06	4:38
/Explorer:NWIC_Bellinghambay (obs)	↑	7234	2.15	5:44
/Boaters	↑	5032	1.50	3:33
/Climatology	↑	4883	1.45	4:00
/ShellfishGrowers		4649	1.38	3:49
/MaritimeOps		3031	0.90	2:42
/BeachMapping		2921	0.87	3:02
/CruisePrism		2455	0.73	4:31
/Explorer:HMSC_Newport (obs)		2092	0.62	4:13
/HFRadar		1764	0.52	1:33
/GliderLaPush		1809	0.54	1:46
/Explorer:NERRS_SOSNSWQ (obs)		556	0.17	6:01
Landing page, login, settings, contact, disclaimer		80649	24.00	0:43
Total		336065		

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…

Build your own app
(add the assets and overlays you want)

Questions?



NANOOS
Data Management and Communications (DMAC)
presentation to NANOOS Principal Investigators & Governing Council
August 11, 2017

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

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

DMAC Annual Review: NANOOS

Meeting Recap

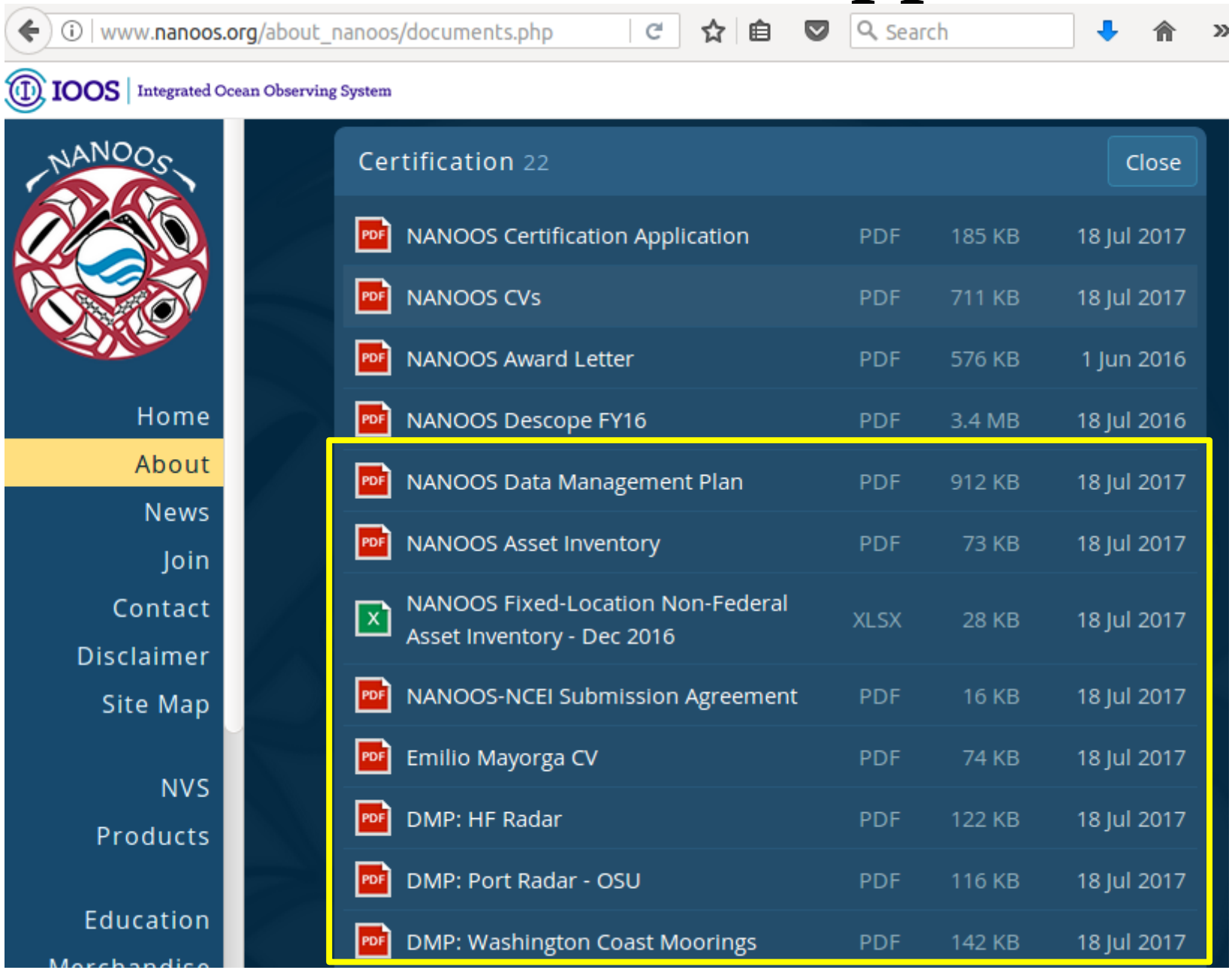
Meeting Date: Mon April 17, 1 - 3 pm ET
1-877-417-3954 code 9119817
Google hangout in calendar invite

PO Invitees: Derrick, Tiffany, Kathy, Micah, Jenn, Becky (opt), RA POC
RA Invitees: Jan Newton, Emilio Mayorga, Charles Seaton from OHSU-CMOP

Related Meeting Documents:

- This Recap document is the main location for comments and updates moving forward. Please add information here unless there is a specific reason to add it to the minutes.
- Meeting agenda - the original agenda for the meeting with the questions and answers from the RA and the Program Office
- Minutes of the meeting - The minutes taken during the meeting. If you make edits to

"RICE" Certification Application



NANOOS Data Management Plan

Table of Contents

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

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 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)
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.

New or Enhanced Assets

http://nvs.nanoos.org/AssetHistory

- **In situ, fixed**
  - CB-06 off Coos Bay (relocated NH-10 mooring)
  - Fanny Bay, BC (Hakai Institute & Fanny Bay Oysters)
  - ONC/VENUS overhaul, re-activation
  - Relocated/new NOS/COOPS station at Columbia mouth
  - New SS NERR met station; improved NERR data harvesting
  - OOI enhancements
- **Overlays (remote sensing, models, reanalysis)**
  - HF Radar overhaul, great improvements
  - LiveOcean model: New nutrient, oxygen and OA variables
  - OSU ROMS: Increased forecasting frequency to 2 hours and added site forecasts
- **Others**
  - Climate indices
  - Upwelling indices and anomalies

NANOOS

Northwest Association of Networked Ocean Observing Systems

Washington - Oregon - Northern California

https://ioos.us

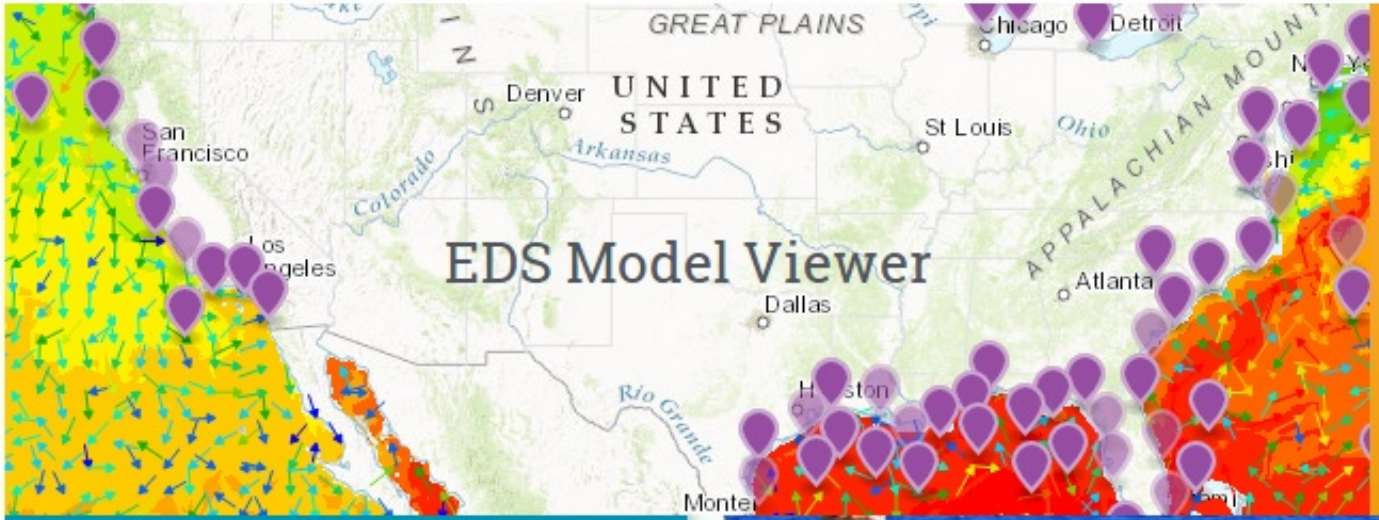
Search

THIS INSTANT

IOOS | Integrated Ocean Observing System

IOOS DATA VIEWERS DACS REGIONAL ASSOCIATIONS ABOUT

> Search IOOS Data



IOOS By The Numbers

Data Discovery

eds.ioos.us

NANOOS

NORTHWEST ASSOCIATION OF NETWORKED OCEAN OBSERVING SYSTEMS

WASHINGTON - OREGON - NORTHERN CALIFORNIA

https://data.ioos.us/dataset?q=NANOOS&sort=metadata_

Search

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IOOS Integrated Ocean Observing System

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/ Datasets

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 ERDDAP

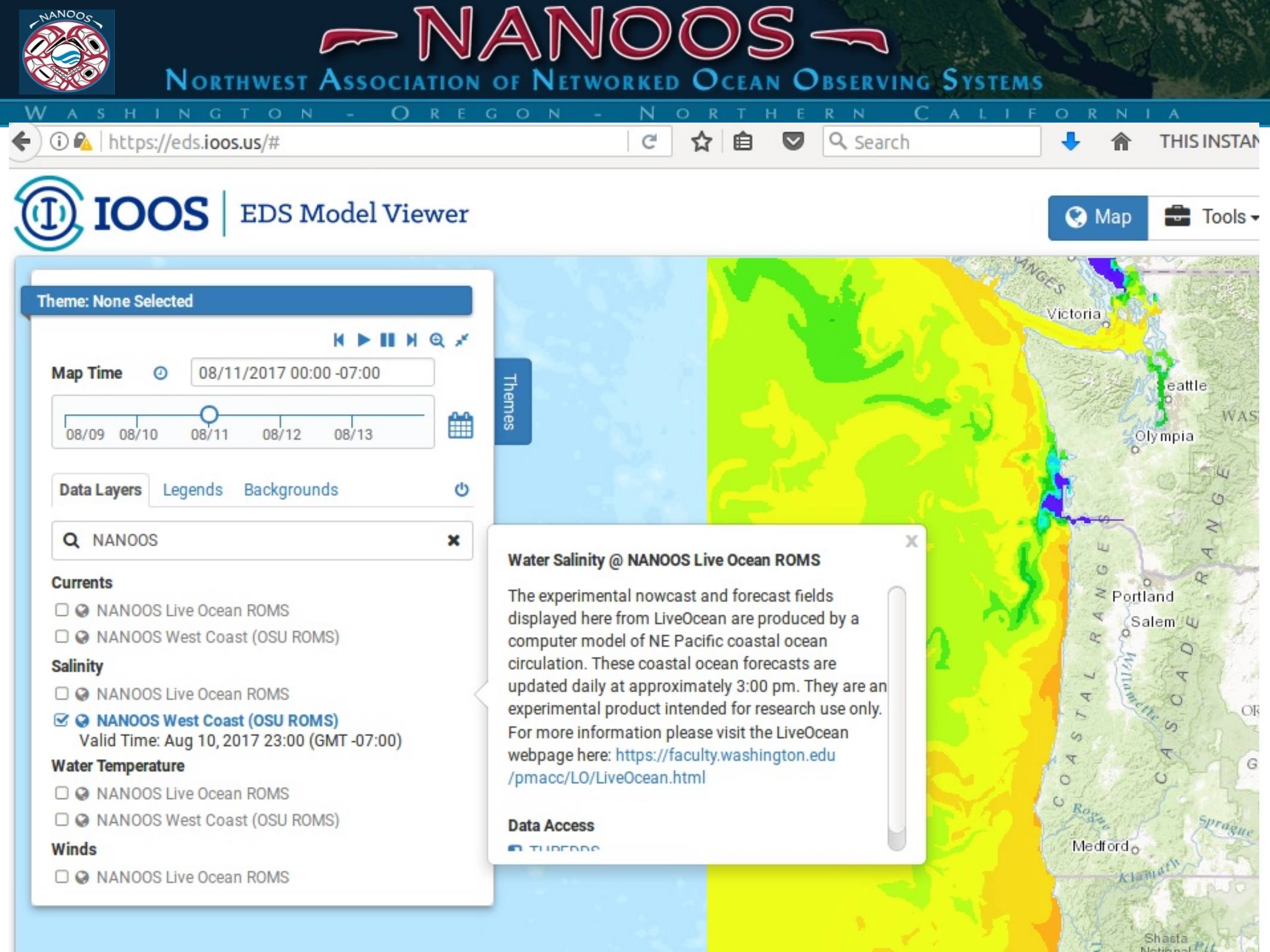
SG187-20100716T1208

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...

OPeNDAP SOS HTML

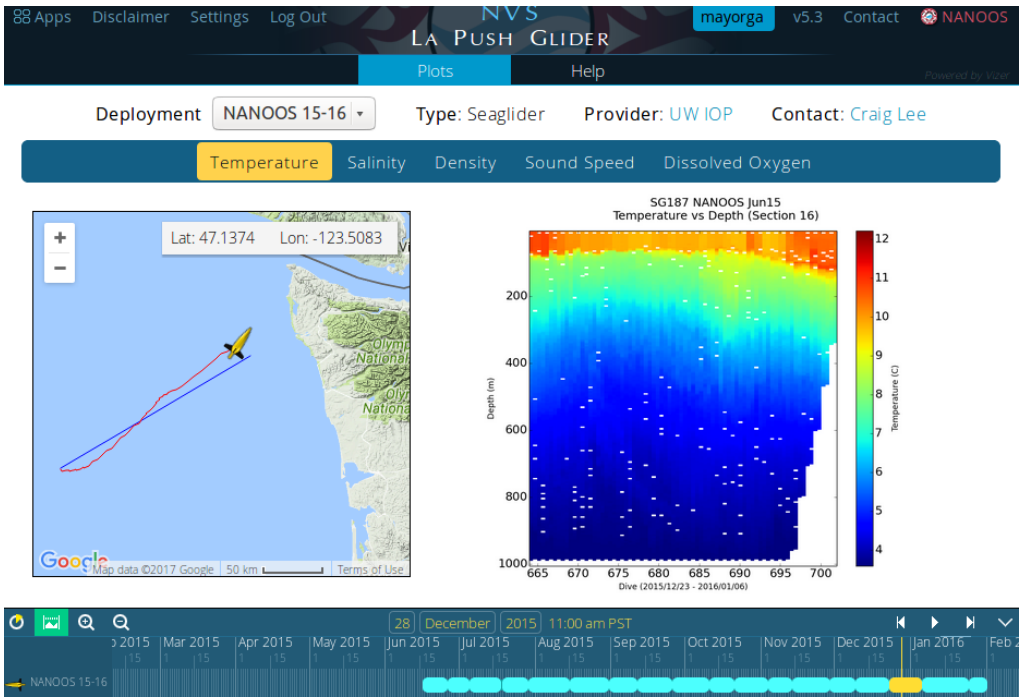
SG187-20120912T1125

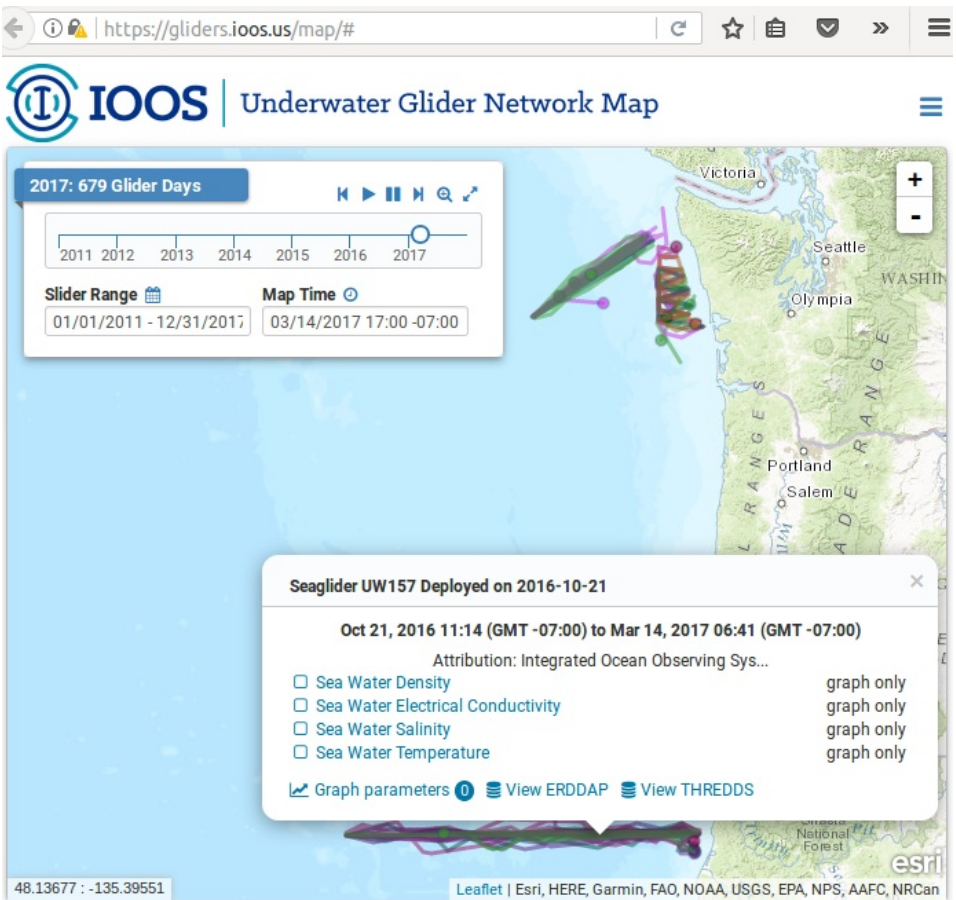
Seaglider La Push NANOOS line, Washington. Glider covering a 200km SW-NE transect off La Push


NANOOS
Northwest Association of Networked Ocean Observing Systems
Washington - Oregon - Northern California
https://eds.ioos.us/#
Search
IOOS | EDS Model Viewer
Map
Tools
Theme: None Selected
Map Time
08/11/2017 00:00 -07:00
08/09 08/10 08/11 08/12 08/13
Themes
Data Layers
Legends
Backgrounds
NANOOS
Currents
NANOOS Live Ocean ROMS
NANOOS West Coast (OSU ROMS)
Salinity
NANOOS Live Ocean ROMS
NANOOS West Coast (OSU ROMS)
Valid Time: Aug 10, 2017 23:00 (GMT -07:00)
Water Temperature
NANOOS Live Ocean ROMS
NANOOS West Coast (OSU ROMS)
Winds
NANOOS Live Ocean ROMS
Water Salinity @ NANOOS Live Ocean ROMS
The experimental nowcast and forecast fields displayed here from LiveOcean are produced by a computer model of NE Pacific coastal ocean circulation. These coastal ocean forecasts are updated daily at approximately 3:00 pm. They are an experimental product intended for research use only. For more information please visit the LiveOcean webpage here: https://faculty.washington.edu/pmacc/LO/LiveOcean.html
Data Access
Victoria
Seattle
Olympia
Portland
Salem
Medford
Coastal Range
Cascade Range

NANOOS Glider data advances

- 3 transects now on IOOS Glider DAC as complete time series:
  - La Push (UW), 6 deployments
  - SW WA (CMOP), 16 deployments
  - Trinidad Head (OSU), 5 deployments
- https://data.ioos.us/gliders/erddap/search/index.html?searchFor=NANOOS
- NVS Glider App
  - Soon: Enhanced La Push coverage, plots
  - Next: Trinidad Head?





Important milestone with formal NANOOS archiving with NCEI, initially with complete CMOP time series and monthly updates

https://www.nodc.noaa.gov/ioos/

NOAA NATIONAL CENTERS FOR ENVIRONMENTAL INFORMATION
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION

formerly the National Oceanographic Data Center (NODC)... more on NCEI

Home | Access Data | Submit Data | Public Outreach | About

NOAA Satellite and Information Service

This Site / All of NOAA Search Go

You are here: Home › IOOS Archive Data Portal

IOOS Archive Data Portal: New Search | Help

Searching for:

Regional Associations: Pacific Northwest
Data Category: any
Observation Dates: any
Geographic Coverage: global
Additional Terms: none

Refine Search | New Search

Showing results 1 to 30 of 30

See results through REST API: GEORSS ATOM HTML FRAGMENT KML JSON CSV

Oceanographic data collected from Offshore Buoy by Center for Coastal Margin Observation and Prediction (CMOP) and assembled by Northwest Association of Networked Ocean Observation Systems (NANOOS) in the Columbia River Estuary and North East Pacific Ocean from 2005-01-13 to 2015-10-16 (NCEI Accession 0162179)

NCEI Accession 0162179 contains navigational and physical data collected at Offshore Buoy, a fixed station in the Columbia River estuary - Washington/Oregon. These sensors measure CONDUCTIVITY, DEPTH - OBSERVATION, LATITUDE, LONGITUDE, SALINITY and WATER ...

NCEI metadata THREDDS DAP Data files

Oceanographic data collected from Tansy Point (USCG front range board) by Center for Coastal Margin Observation and Prediction (CMOP) and assembled by Northwest Association of Networked Ocean Observation Systems (NANOOS) in the Columbia River Estuary and North East Pacific Ocean from 1996-09-05 to 2014-10-01 (NCEI Accession 0162189)

NCEI Accession 0162189 contains navigational and physical data collected at Tansy Point (USCG front range board), a fixed station in the Columbia River estuary - Washington/Oregon. These sensors measure CONDUCTIVITY, DEPTH - OBSERVATION, HYDROSTATIC PRESS...

NCEI metadata THREDDS DAP Data files

Expanding DMAC capabilities, compliance

- **Ongoing enhancements and expansion of NANOOS web services, registration with IOOS Catalog.** Primary observation data, models, and data products (anomalies, etc.).
- **Long time series**. Substantial progress over last year. Goal to make data available via IOOS DMAC services and accessible to NVS. Anticipated initial, visible benefits on those two fronts in next 6 months.
- **ERDDAP** implementation for more thorough and flexible data access (OSU and UW test servers in place).
- **QARTOD near-real-time QA/QC.** Ongoing participation in IOOS QARTOD webinars, discussions. Pilot NANOOS implementation next 6-12 months.
- **Data Archiving with NCEI.** Adapt procedures and lessons learned with CMOP archiving, to other NANOOS assets.

NANOOS Outreach Engagement & Education

NANOOS Joint PI and Governing Council Meeting
August 11, 2017

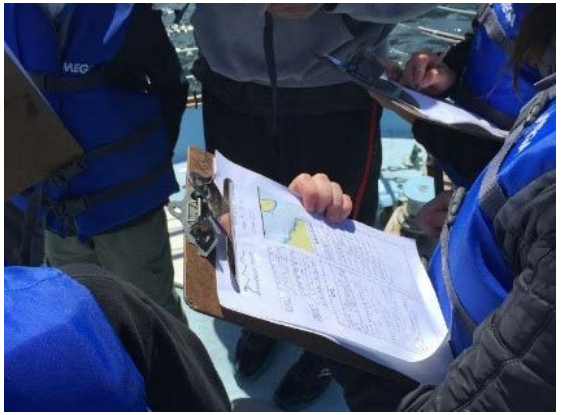
Rachel Wold, Outreach Specialist
Marine Lebrec, Outreach Specialist

Scope of Work

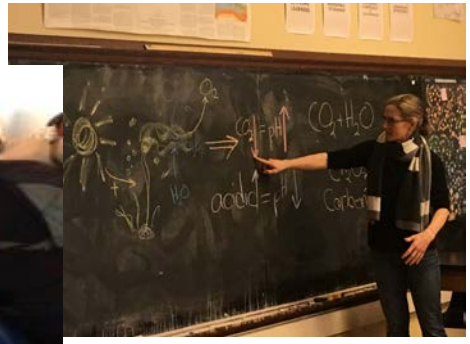
Product Development	Work with DMAC and User Products Committees on tailored product development, increase usability of NVS
User Engagement	Conduct outreach and trainings to select user groups as resources permit
Networking	Maintain existing and build new relationships with NANOOS priority area users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

Education:

NANOOS goal remains increasing ocean literacy



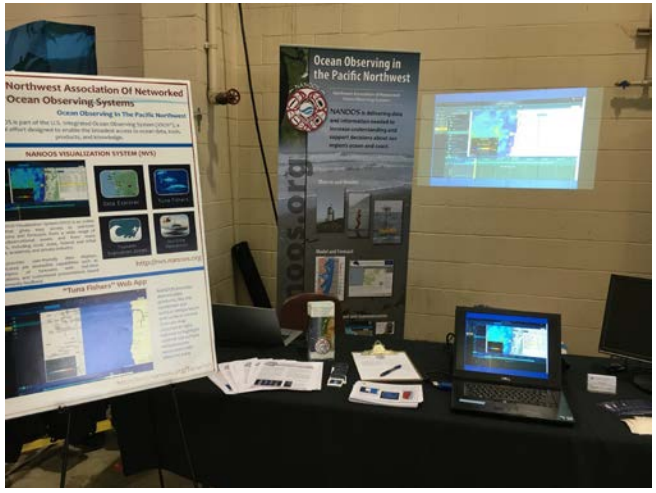
- NW Aquatic & Marine Educators Conferences
- Classroom Visits
- MS & HS Summer Science Camps
- Outreach @ informal learning centers



Outreach: targeted user groups

NANOOS goal to link user groups with data products

- Pacific Coast Shellfish Growers Association Meeting
- Saltwater Sportsmen's Show
- Pacific Seabird Group Conference
- Recreational boaters



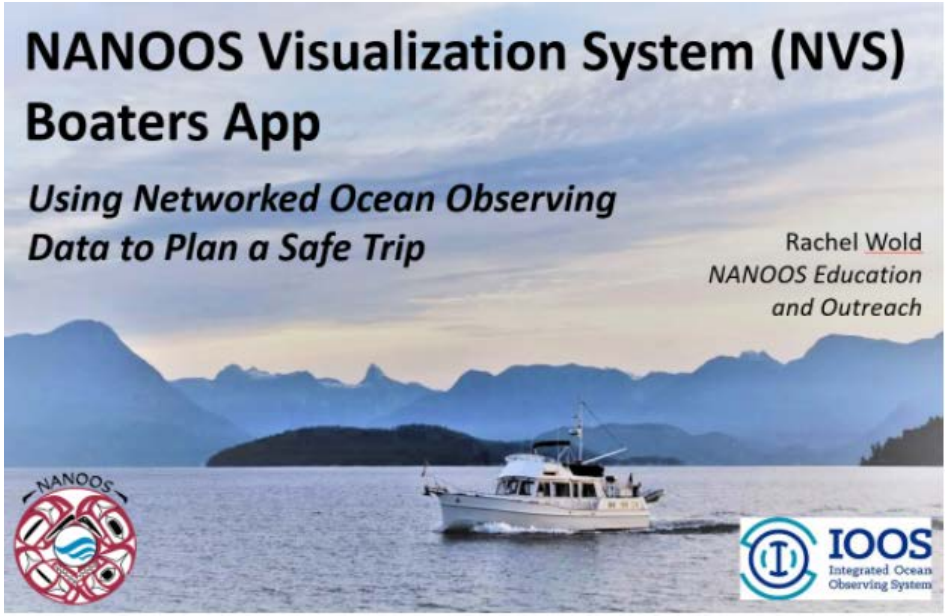
SALTWATER SPORTSMEN'S SHOW

Pacific Seabird Group

PCSGA

Outreach: targeted user groups

BOATERS



- Coho Ho Ho seminar and Captains' Meetings
- Puget Sound Yacht Club
- Corinthian Yacht Club
- Puget Sound Cruising Club
- Newsletters and blog posts
- Focus groups
- Portland Boat Show 2018
- Seattle Boat Show 2018

Outreach: engaging with the public

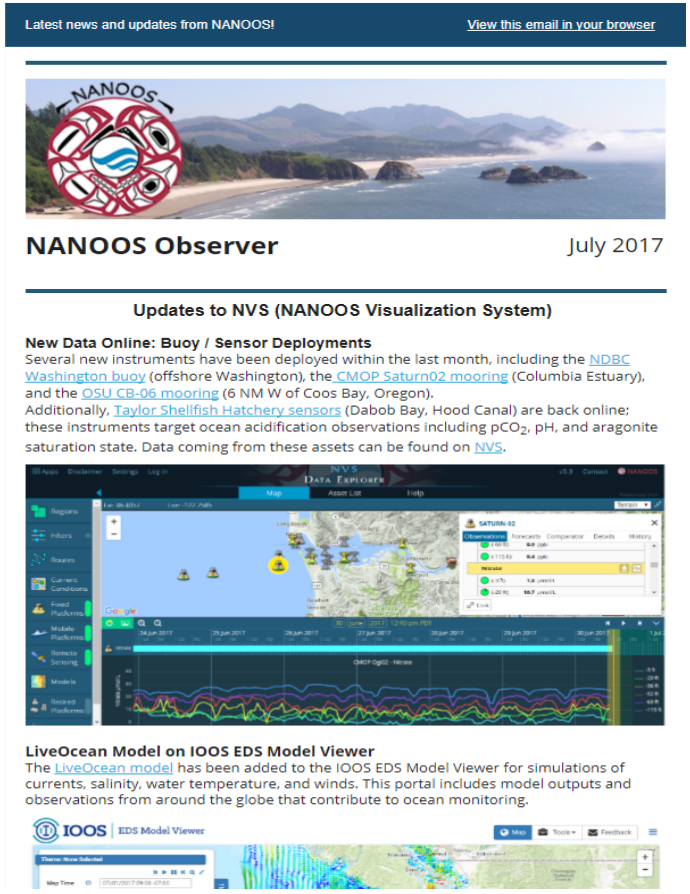
- Soundwaters - A ‘one day university for all’
- American Meteorological Society WeatherFest
- NOAA Open House
- Aquarium Discover Science Weekend

Community Workshop Newport, Oregon

Goals:

- Increase awareness of IOOS and NANOOS
- Share knowledge of what NANOOS is doing
- Showcase NVS portal and apps
- Understand community's needs with respect to NVS
- Hear what additional tools and data are needed

Outreach: social media & NANOOS website



Plan for Upcoming Year

Education Efforts

- Continue to support NANOOS education partners
- Continue to support student built buoy and similar STEM projects
- Portland conference NAME

Outreach Efforts

- Continue to assist with development of web and mobile apps
- Continue outreach to current users groups, expand to other recreational users
- Additional tutorial videos for various apps

6. GC Business

2017 NANOOS GC Board

Academic:

- David Martin, UW, Governing Council Board Member for UW **(CHAIR)**
- 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
- Chris Mooers, PSU, Governing Council Board Member At-Large

NANOOS business

- NANOOS GC Board
  - election next year

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

THANK YOU!!!

7. Round Table for announcements from GC members

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