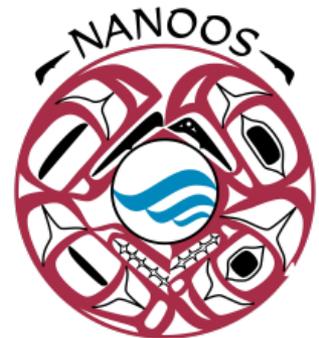


# ***An overview of U.S. IOOS, NANOOS, & applications for Pacific Northwest stakeholders***

Jan Newton  
NANOOS Executive Director



# *What is IOOS?*

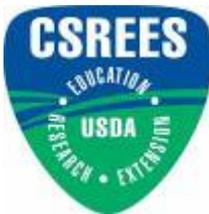
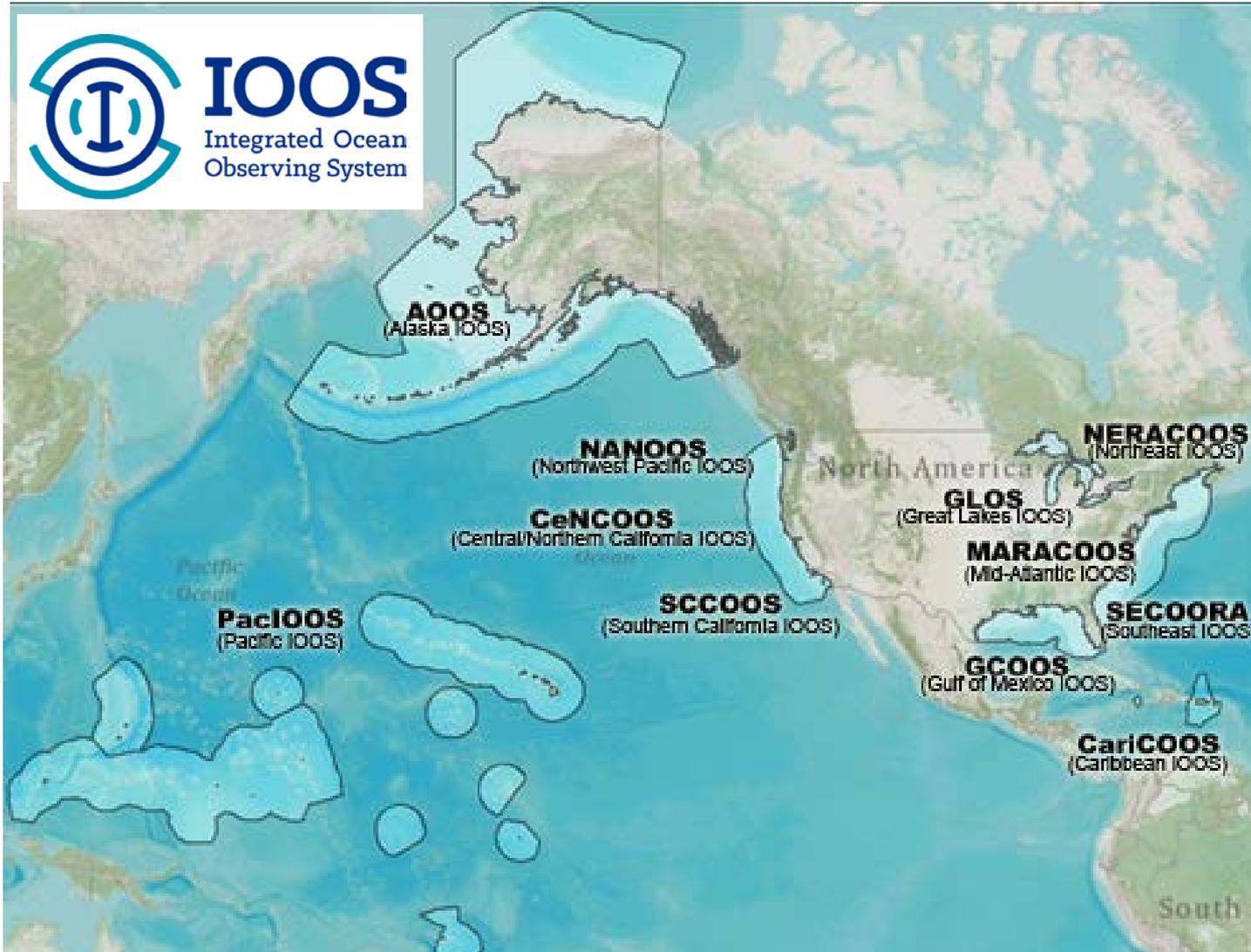
- The Integrated Ocean Observing System (IOOS) in the U.S. is a **national-regional** partnership working to provide **new tools and forecasts** to improve safety, enhance the economy, and protect health.
- **Integrated ocean information** is available in near-real-time, as well as retrospectively.
- **Easier and better access** to this information is improving our ability to understand and predict coastal events and conditions (e.g., waves, acidification, etc.).
- Such knowledge is **widely used and needed...!**

# Coastal U.S. IOOS:

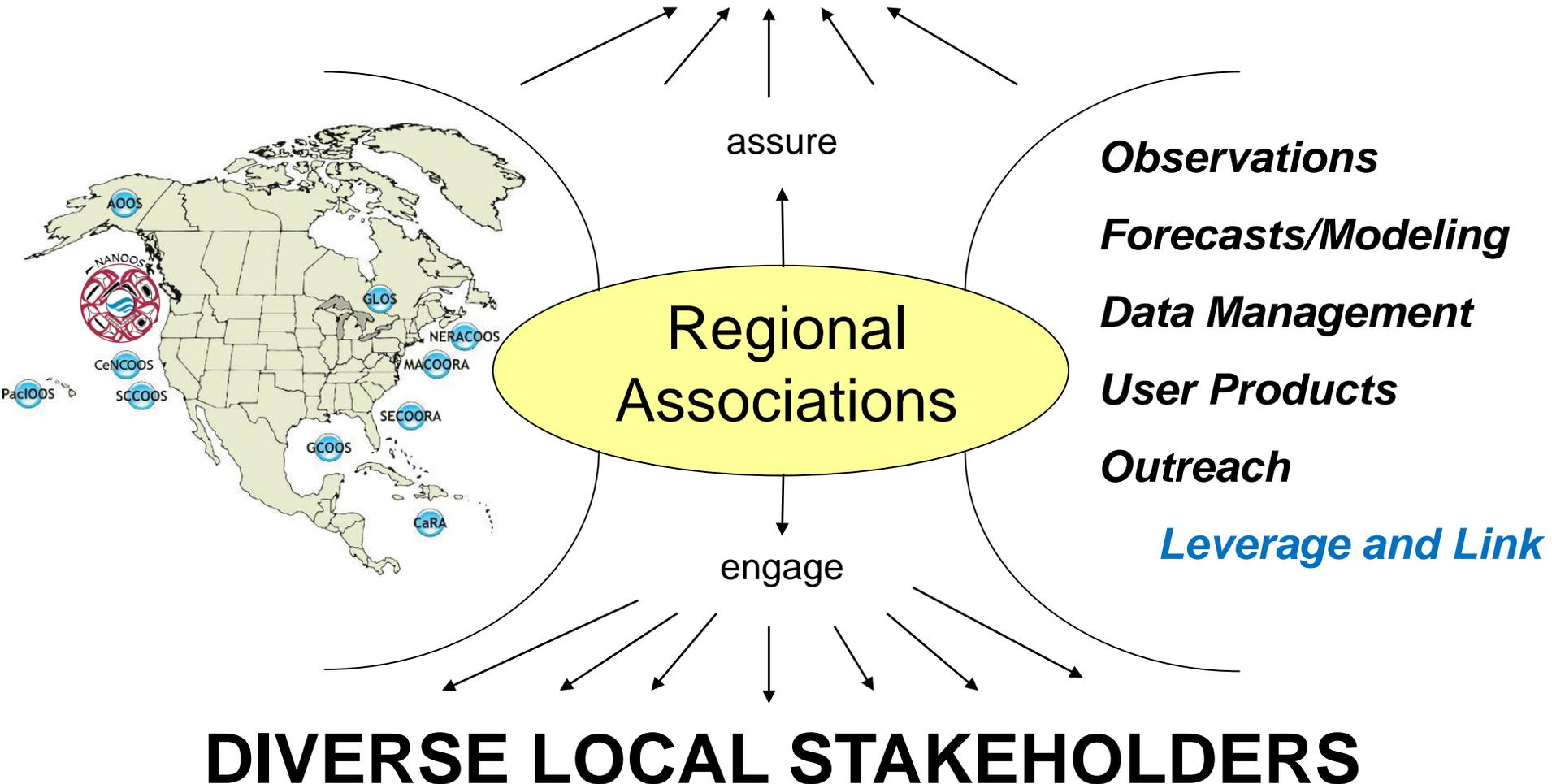
17 Federal Agencies; 11 Regional Associations



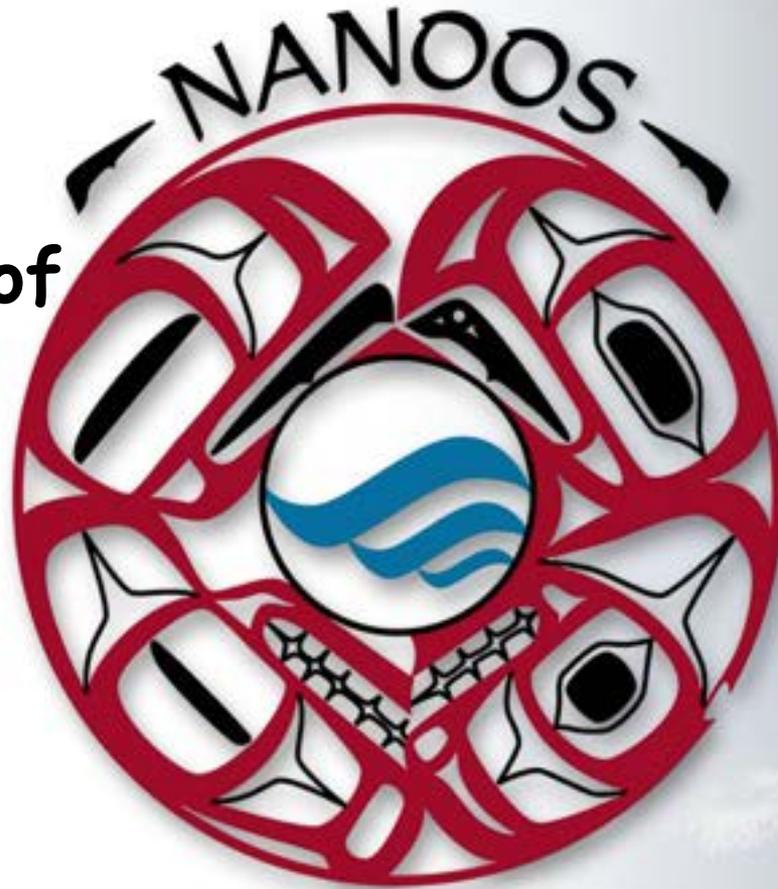
**IOOS**  
Integrated Ocean  
Observing System



# CONSISTENT NATIONAL CAPABILITY



# Northwest Association of Networked Ocean Observing Systems



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



# Started by defining the region, the users, their needs:

## 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:

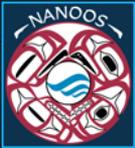
Rocky to sandy, dynamic: storms, erosion  
Winds, development, climate

## 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 Governing Council Members 7/2017

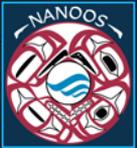


NORTHWEST ASSOCIATION OF NETWORKED OCEAN OBSERVING SYSTEMS

WASHINGTON - OREGON - NORTHERN CALIFORNIA

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

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



## NANOOS Stakeholder Priorities

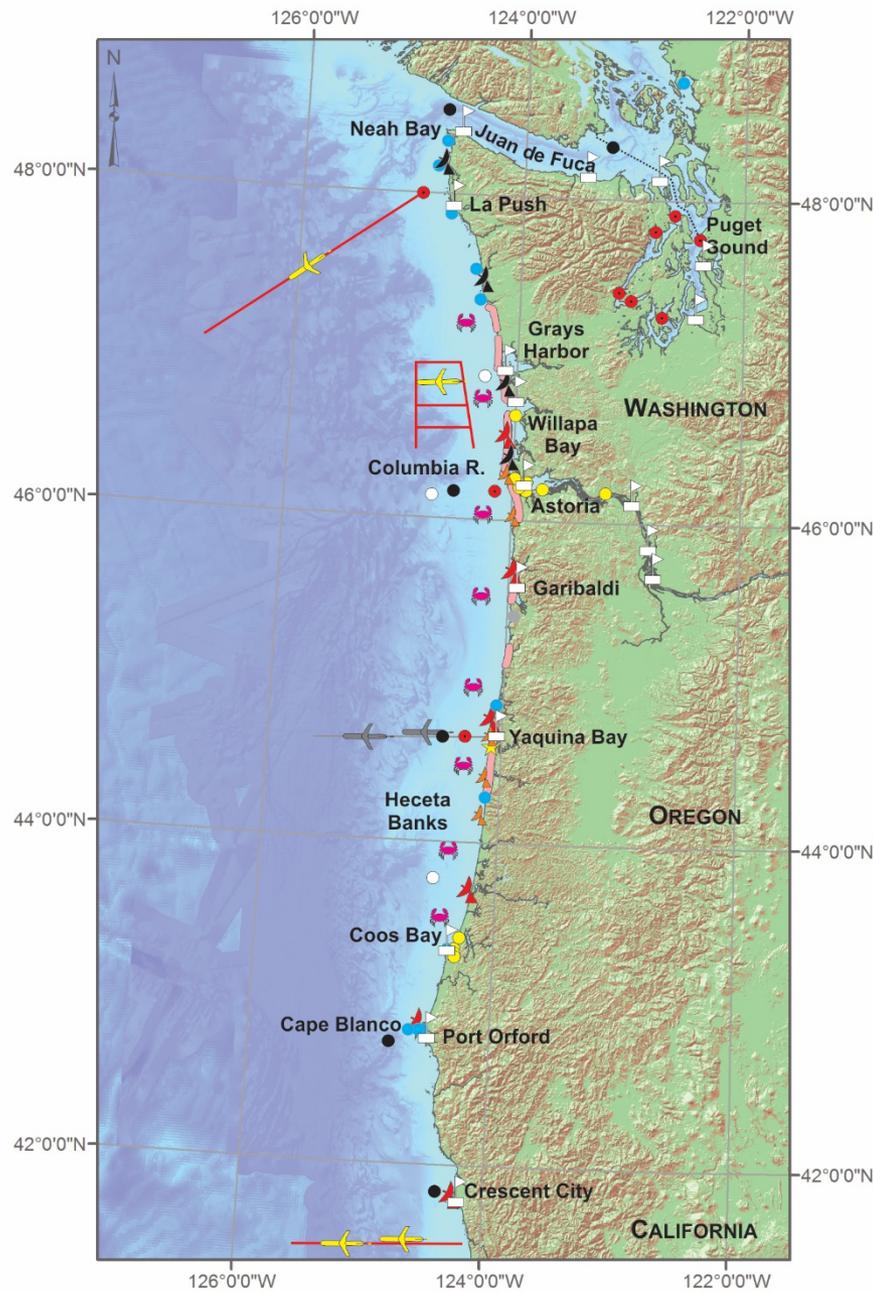
The NANOOS Governing Council selected five areas from results of numerous regional workshops as the highest regional priorities because “these issues represent those having the greatest impact on PNW citizenry and ecosystems and, we believe, are amenable to being substantively improved with the development of a PNW Regional Coastal Ocean Observing System:”

- **Maritime Operations**
- **Ecosystem Assessment**
- **Fisheries and Biodiversity**
- **Coastal Hazards**
- **Climate**



## Strategy to develop a PNW Observing System

1. Integrate what we have (*observing assets, people, technologies*)  
= federal, tribal, state, local, academic, NGO, and industry
2. Be strategic regarding what we need, based on priorities



# 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)

## Federal assets:

- NDBC buoys
- CDIP buoys
- NOS Tide gauges

## Proposed for new support to be sustained in partnership:

- ▲ Proposed long and short-range radar site
- Proposed support for estuarine and nearshore sites
- ✈ Crab pot moorings

# NANOOS "Effort versus Application" Map for Observing and Modeling

APPLICATIONS: EFFORTS:	Coastal Ocean					Estuaries					Shorelines				
	mar ops	ecology	hazards	biodiversity	climate	mar ops	ecology	hazards	biodiversity	climate	mar ops	ecology	hazards	biodiversity	climate
<b>Multivariable assets:</b>															
WA shelf glider line															
Columbia shelf, glider tracks															
CA shelf glider line															
WA shelf buoy															
Columbia shelf buoy															
OR shelf buoy															
WA nearshore OAH															
PNW nearshore hypoxia	no coastal nearshore														
OR nearshore OAH															
Puget Sound estuary buoys															
Puget Sound estuary ferrybox															
Columbia estuary buoys															
South Slough estuary moorings															
Salish Sea estuary buoy						no central Salish Sea									
<b>Biological sampling:</b>															
OR shelf plankton timeseries	no plankton		no plankton												
OR estuarine timeseries						no plankton		no plankton							
<b>Shorelines:</b>															
Washington shorelines															
Oregon shorelines															
PNW bathymetry															
<b>Surface currents:</b>															
Oregon coastlines HF															
Washington coastlines HF	no WA		no WA		no WA						no WA		no WA		no WA
Critical coastal ports X-band															
<b>Forecast models:</b>															
PNW circulation forecasts															
Puget Sound circulation forecasts															
Columbia circulation forecasts															
PNW biogeochem forecasts															
Puget Sound biogeochem forecasts															
Columbia estuary habitat forecasts															
Coastal wave forecasts	no forecast		no forecast		no forecast	no forecast		no forecast			no forecast		no forecast		no forecast
Flood/erosion forecasts	no forecast		no forecast		no forecast						no forecast		no forecast		no forecast

KEY:						
<i>Italicized efforts indicate new investment</i>		Currently directly supports		Proposed to directly support		Not applicable
		Currently indirectly supports		Proposed to indirectly support	no ...	Text explains the current gap the proposed activities fill

# NANOOS Objectives for FY2016

- 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 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**.



# NANOOS

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## NVS DATA EXPLORER

v5.3 Contact NANOOS

Map

Asset List

Help

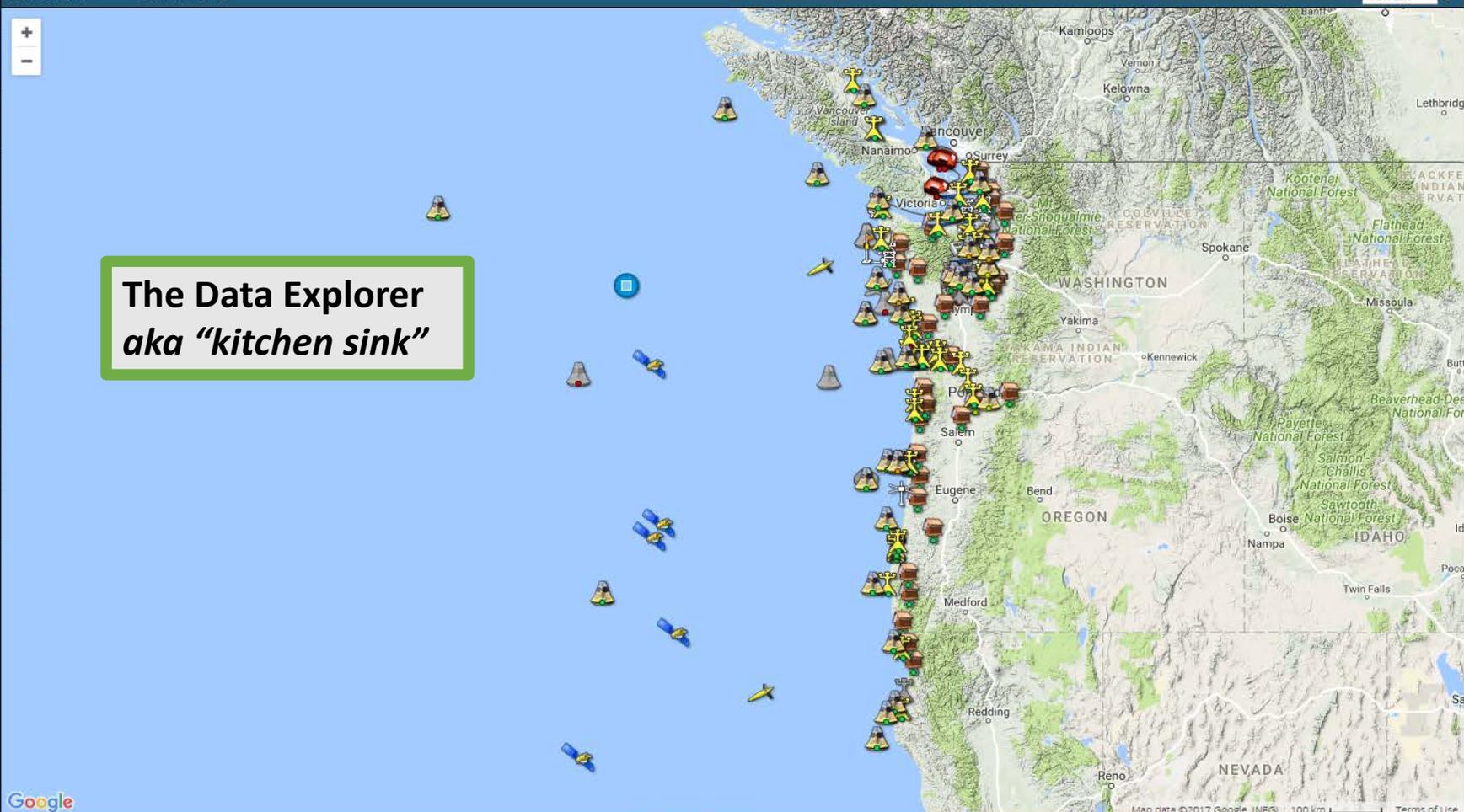
Terrain

Powered by Vico

Lat: 50.0924 Lon: -141.0425

- Regions
- Filters
- Routes
- Current Conditions
- Fixed Platforms
- Mobile Platforms
- Remote Sensing
- Models
- Retired Platforms
- Legend

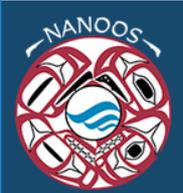
The Data Explorer aka "kitchen sink"



Map data ©2017 Google, INEGI 100 km Terms of Use

11 April 2017 2:11 pm PDT





# 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





## *NANOOS focal areas:*

- **Maritime Operations**



Maritime  
Operations



Boaters

- **Ecosystem Assessment**



Shellfish Growers

(also hypoxia, HABs)

- **Fisheries and Biodiversity**



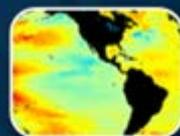
Tuna Fishers

- **Coastal Hazards**



Tsunami  
Evacuation Zones

- **Climate**



Climatology



# NANOOS

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## NANOOS Visualization System

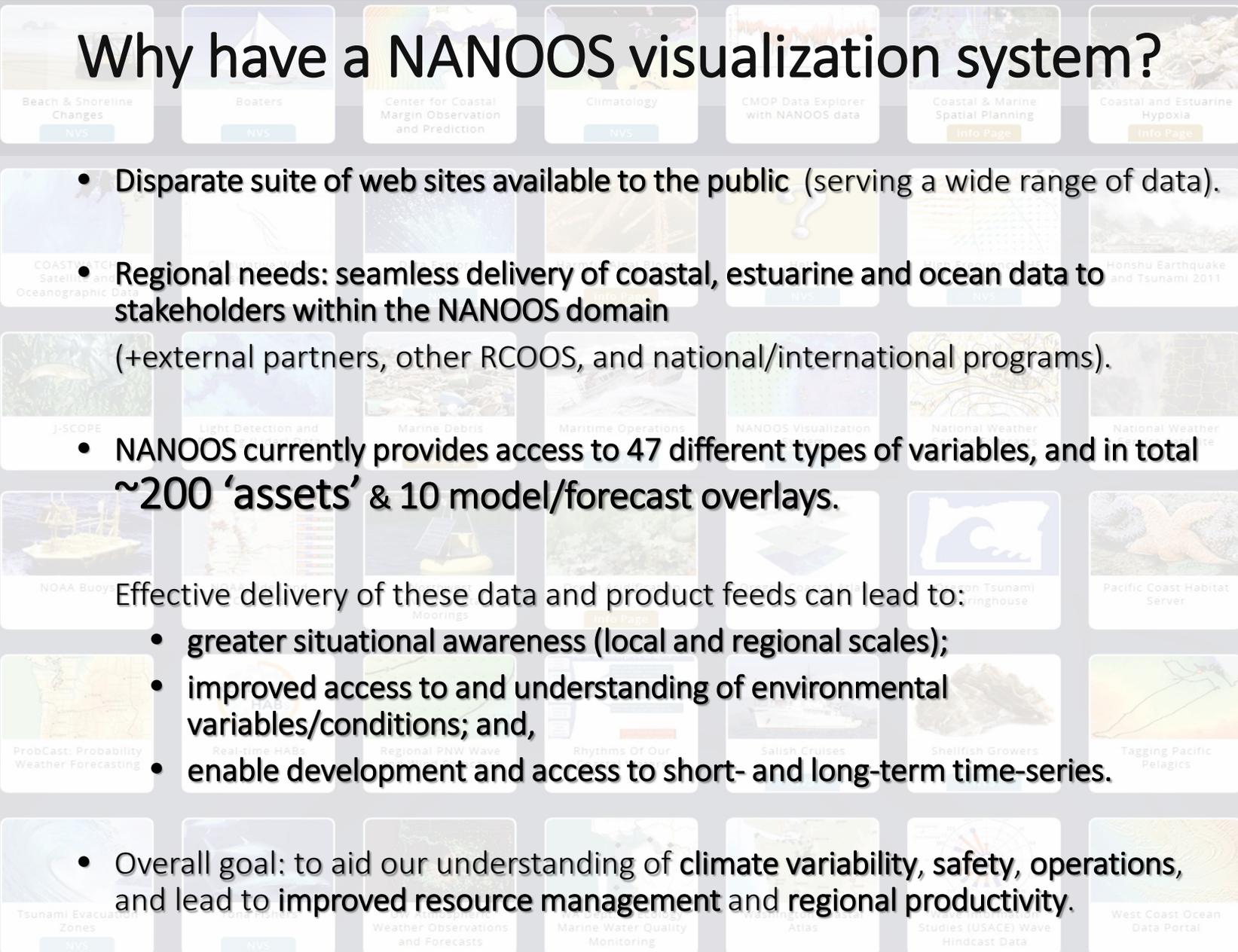
Jonathan Allan  
NANOOS User Products Chair

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)



# Why have a NANOOS visualization system?

- Disparate suite of web sites available to the public (serving a wide range of data).
  - Regional needs: seamless delivery of coastal, estuarine and ocean data to stakeholders within the NANOOS domain (+external partners, other RCOOS, and national/international programs).
  - NANOOS currently provides access to 47 different types of variables, and in total ~200 'assets' & 10 model/forecast overlays.
- Effective delivery of these data and product feeds can lead to:
- 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.
- Overall goal: to aid our understanding of climate variability, safety, operations, and lead to improved resource management and regional productivity.





## A Challenge - 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)

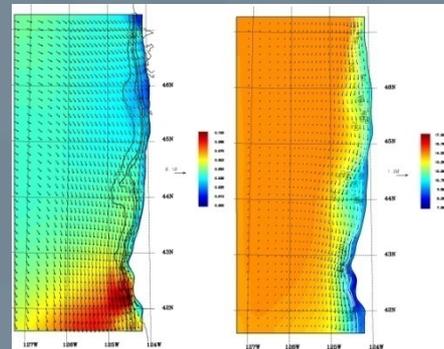
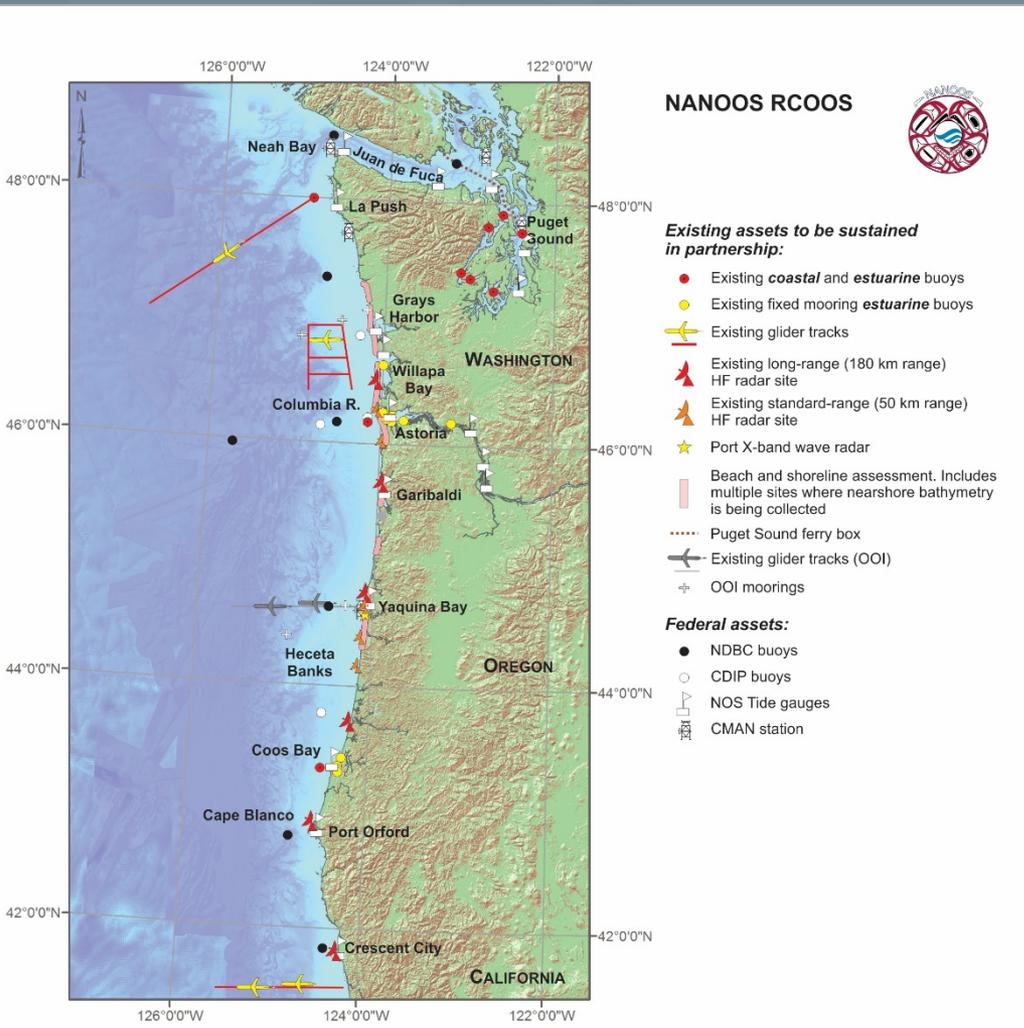
Public-at-large

Scientists

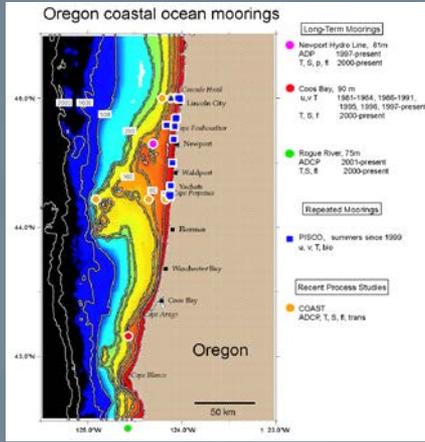
and many others...



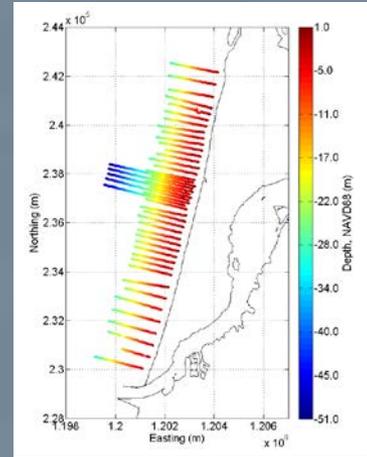
# A Challenge - Many Data Types & How to Display Complex Data Effectively



Overlays (Satellite, Models, & other geospatial data)



Shelf moorings & gliders

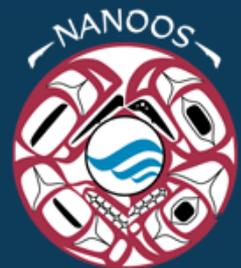


Shorelines & Bathymetry

# NANOOS

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WASHINGTON - OREGON - NORTHERN CALIFORNIA



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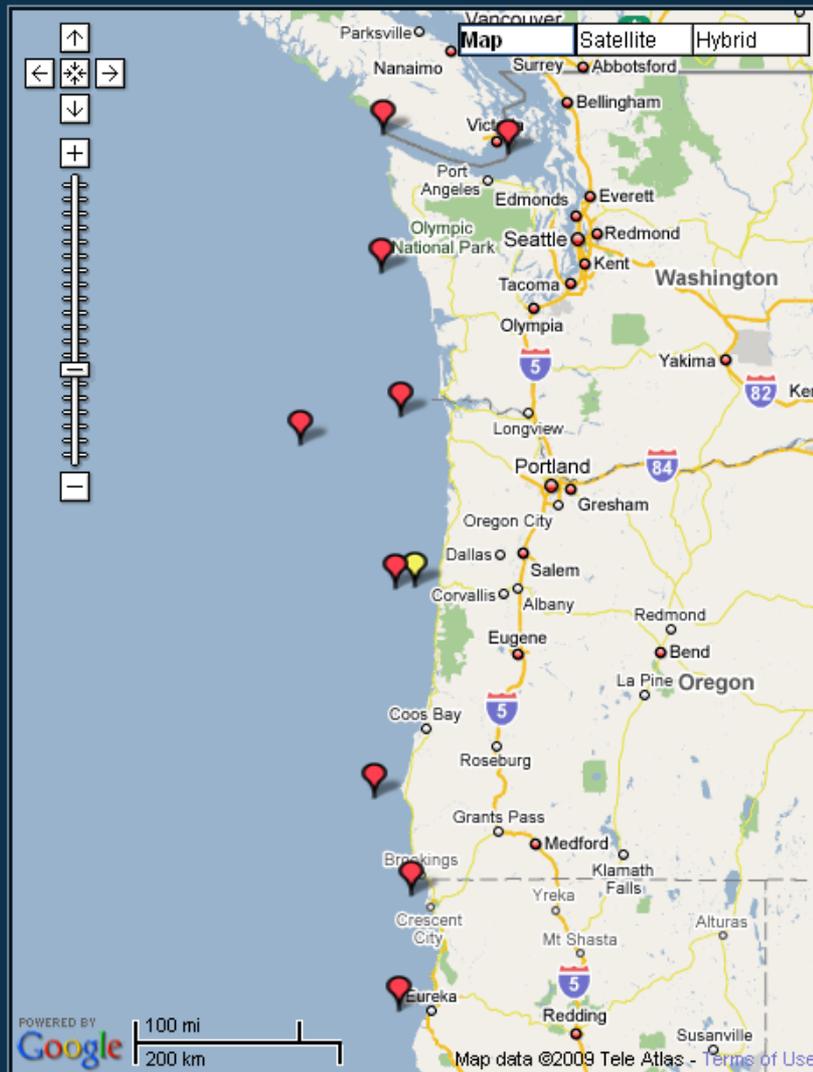
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[Sponsors](#)



## NANOOS Buoy Locations



NH-10 Buoy

### Map Legend

- NANOOS Buoy: NH-10
- NDBC Buoys

# NVS v1.0 (2009)

Lat: 48.4875, Lon: -127.5293



# NANOOS

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## NVS DATA EXPLORER

v5.4 Contact NANOOS

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Map

Asset List

Help

Fixed Platforms

Lat: 41.1456

Lon: -127.9028

Terrain

Expand All Collapse All

Buoy

APL-UW NEMO-ESP Profiler

APL-UW Čhá?ba

CDIP Astoria Canyon

CDIP Cape Mendocino

CDIP Clatsop Spit

CDIP Grays Harbor

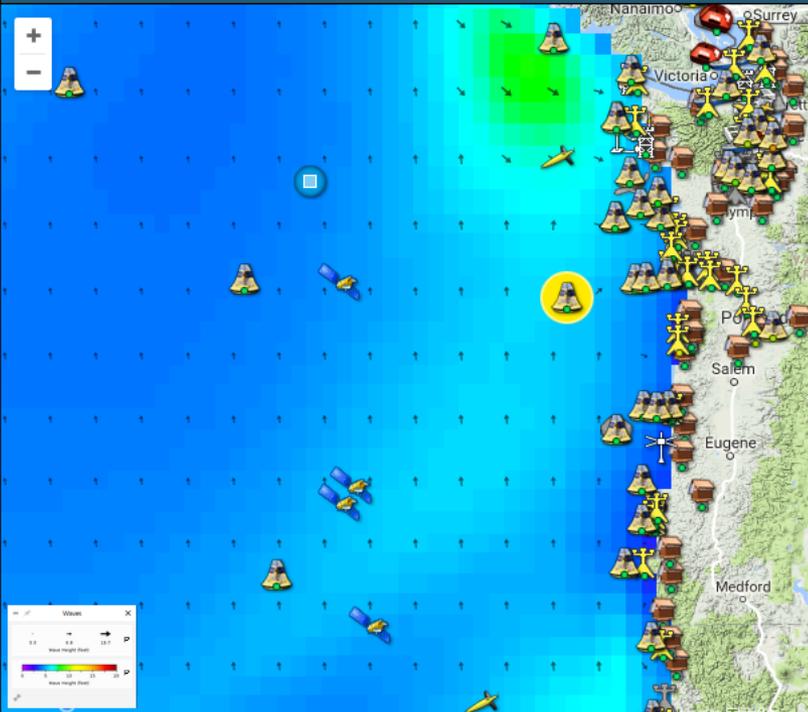
CDIP Humboldt Bay N

CDIP Station Papa

CDIP Umpqua

CMOP Saturn07

CMOP Saturn08



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	Download	Refresh
Baro. Pressure (0 ft)	30.2 inHg	Download	Refresh
Wind Direction (16 ft)	340 deg (from)	Download	Refresh
Wind Gust (16 ft)	21.4 knots	Download	Refresh
Wind Speed (16 ft)	17.5 knots	Download	Refresh

### HYDROGRAPHIC

Avg. Wave Period (0 ft)	5.5 sec	Download	Refresh
Dom. Wave Period (0 ft)	8 sec	Download	Refresh
Water Temperature (-2 ft)	60.4 °F	Download	Refresh
Wave Height (0 ft)	5.9 ft	Download	Refresh
Wave Mean Dir. (0 ft)	340 deg (from)	Download	Refresh

Link

Wave Height

10 July 2017 2:00 am PDT

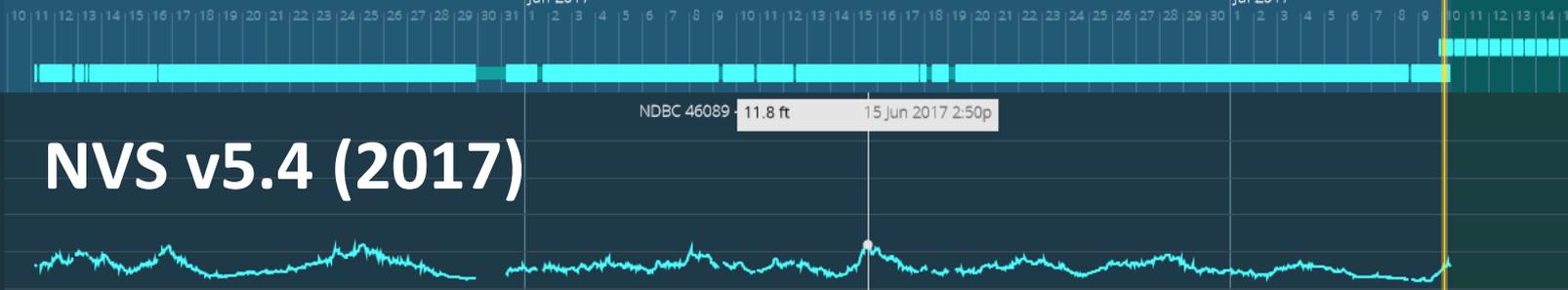
Waves

Wave Height

Wave Height ft

# NVS v5.4 (2017)

NDBC 46089 - 11.8 ft 15 Jun 2017 2:50p





## 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 - v2.6 released (Tsunami evacuation zones web app)

[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

Jul 2015 – v4.0 – New timeline, plotting tool, and depth control for overlays released

....

[Jun 2017 - v. 4.0 iPhone/Android NVS rebuild released](#)

**Jul 2017 – v5.4 – Updated climatology indices; Updated Washington State tsunami evacuation zones...**



# NANOOS

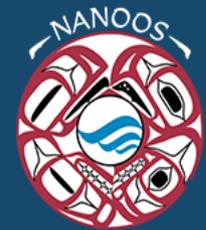
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IOOS

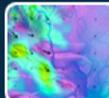
IOOS | Integrated Ocean Observing System

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.



## NANOOS Visualization System

NVS provides easy access to observations, forecasts, data, and visualizations.

Demo

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New Account

## Boating Season is Here!

Plan your next trip using the NVS Boaters App, which offers features like current sea and weather conditions, tide and currents forecasts, and marina information to keep you informed before you go out. Use the new routing capability over NOAA nautical charts to safely plot your course, then log in to save your routes for another time.

Check out the following article from Three Sheets Northwest which highlights some of these features.

Visit the NVS Boaters App

Three Sheets Northwest Article



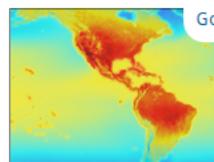
Go

NANOOS Community Workshop July 13th in Newport, Oregon



Go

NOAA Participates in NOAA West Watch



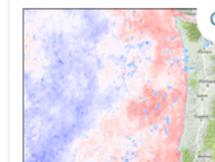
Go

Climate Indices Now Available on NVS



Go

Boating Season is Here!



Go

How Typical are Current Conditions?



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powered by VIZR



Data Explorer



Tsunami  
Evacuation Zones



Boaters



Tuna Fishers



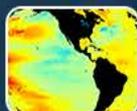
Shellfish Growers



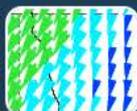
Beach and  
Shoreline Changes



Maritime  
Operations



Climatology



High Frequency  
Radar



Cruises



Gliders



Help

## ADDITIONS & UPDATES

[View Last 3 Months](#)



### HMSC Newport

Station is offline since 6/22 due to sensor malfunction. It will likely be a few months before station is back online.

Updated on 6 Jul 2017



### OSU CB-06

New NANOOS shelf mooring deployed 6/10, 6 nm off Coos Bay / Cape Arago as relocation of now-decommissioned NH-10 mooring. Measures (in near-real-time) weather, temp. & salt (1.5 m), and currents. PMEL air & water CO2 and 1-m temp. & salt also deployed.

Added on 5 Jul 2017



### OSU NH-10

The NH-10 mooring has been relocated to a new location offshore of Coos Bay, designated as CB-06. See the OOI CE02SHSM mooring for continued data near the NH-10 station location.

Updated on 5 Jul 2017



### CMOP Saturn02

Mooring was redeployed in early June. NVS harvesting is now restored, with an updated weather and water sensor configuration for this multi-depth asset.

Updated on 23 Jun 2017



### Taylor-PCSGA Dabob

Sensors are back online starting on June 14, after a gap due to instrument problems and maintenance.

Updated on 21 Jun 2017



### NDBC Washington

Buoy deployed and data released on 5/31/2017; but continuous data transmission started on Jun. 5. Buoy location was updated (previous deployment position was 42.612

Updated on 7 Jun 2017





# NANOOS

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IOOS

NANOOS

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NVS DATA EXPLORER

v5.4 Contact

Powered by VIZ

Map

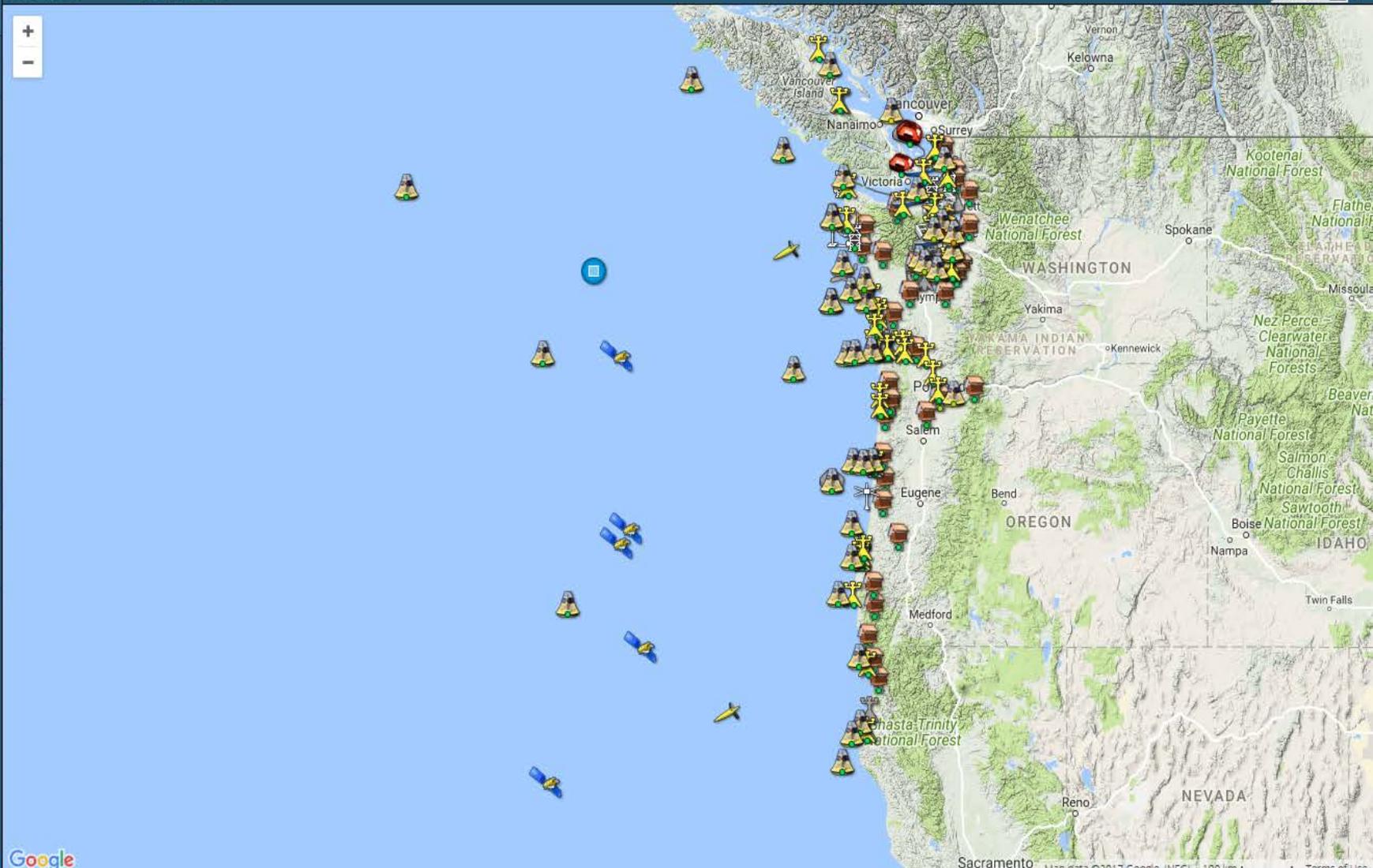
Asset List

Help

Lat: 50.5693 Lon: -142.4268

Terrain

- Regions
- Filters
- Routes
- Current Conditions
- Fixed Platforms
- Mobile Platforms
- Remote Sensing
- Models
- Retired Platforms
- Legend



Google

Map data ©2017 Google, INEGI 100 km Terms of Use

10 July 2017 12:38 pm PDT





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NORTHWEST ASSOCIATION OF NETWORKED OCEAN OBSERVING SYSTEMS



IOOS

NANOOS

88 Apps Disclaimer Settings Log In

NVS DATA EXPLORER

v5.4 Contact

Powered by Vizeer

Map

Asset List

Help

Fixed Platforms

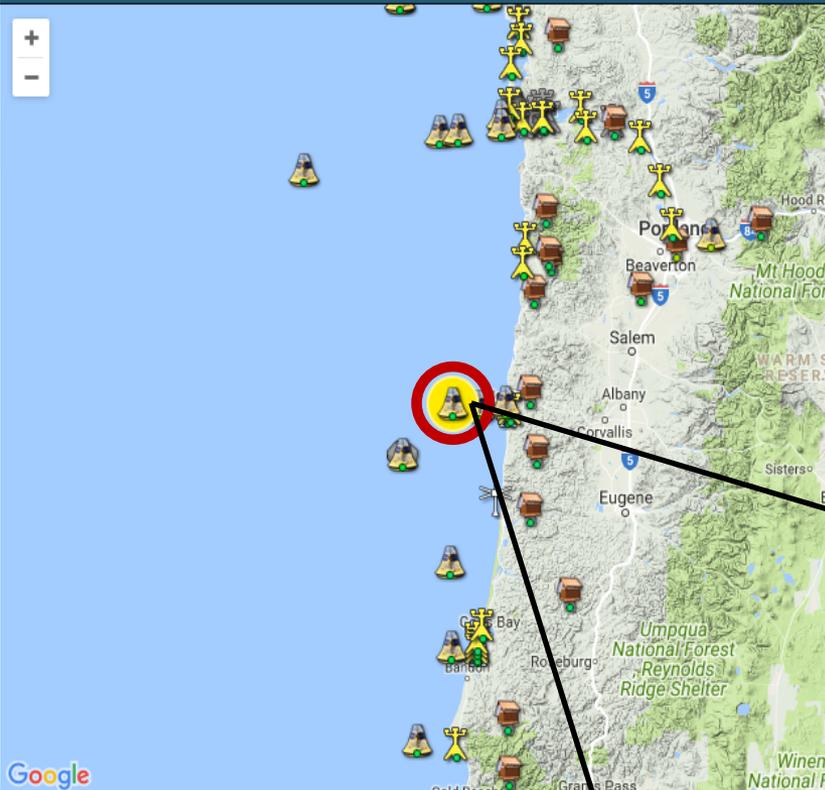
Lat: 42.5854

Lon: -124.8706

Terrain

- Regions
- Filters
- Routes
- Current Conditions
- Fixed Platforms**
- Mobile Platforms
- Remote Sensing
- Models
- Retired Platforms
- Legend

- NDBC Neah Bay
- NDBC New Dungeness
- NDBC Oregon
- NDBC Port Orford
- NDBC St Georges
- NDBC Stonewall Bank**
- NDBC Tillamook
- NDBC Washington
- NWIC Bellingham Bay
- OOI CE01SSM
- OOI CE02SHSM
- OOI CE04OSSM



**NDBC 46050 - Stonewall Bank - 20NM W of Newport**

Observations Forecasts Comparator Details History

Data Updated: 10 Jul 2017 11:50 PDT Provider: NDBC

**ATMOSPHERIC**

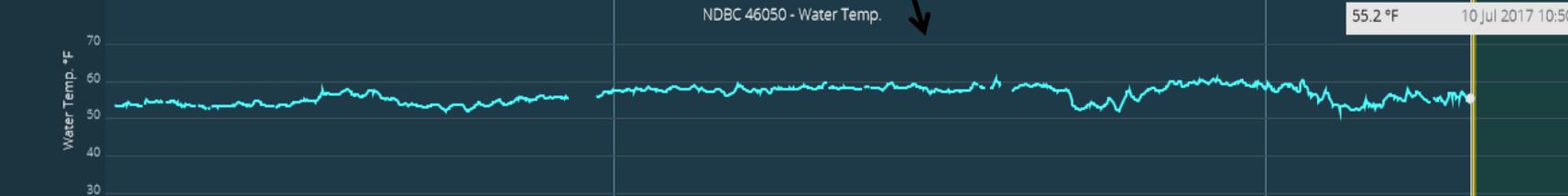
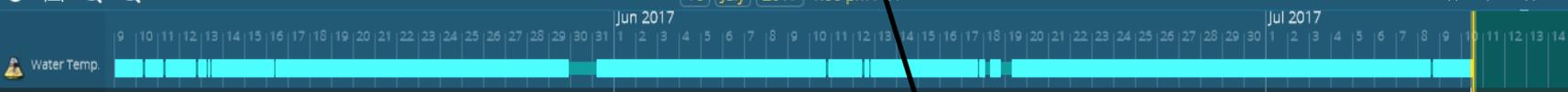
Air Temperature (13 ft)	60.4 °F	Download	Refresh
Baro. Pressure (0 ft)	30.1 inHg	Download	Refresh
Wind Direction (16 ft)	20 deg (from)	Download	Refresh
Wind Gust (16 ft)	9.7 knots	Download	Refresh
Wind Speed (16 ft)	9.7 knots	Download	Refresh

**HYDROGRAPHIC**

Avg. Wave Period (0 ft)	5.9 sec	Download	Refresh
Dom. Wave Period (0 ft)	8 sec	Download	Refresh
<b>Water Temperature (-2 ft)</b>	<b>55.9 °F</b>	Download	Refresh
Wave Height (0 ft)	5.6 ft	Download	Refresh
Wave Mean Dir. (0 ft)	330 deg (from)	Download	Refresh

[Link](#)

10 July 2017 1:00 pm PDT





# NANOOS

NORTHWEST ASSOCIATION OF NETWORKED OCEAN OBSERVING SYSTEMS



IOOS

NANOOS

88 Apps Disclaimer Settings Log In

NVS DATA EXPLORER

v5.4 Contact

Powered by Vizeer

Map

Asset List

Help

Lat: 44.6561 Lon: -124.5258

Terrain

- Regions
- Filters**
- Routes
- Current Conditions
- Fixed Platforms
- Mobile Platforms
- Remote Sensing
- Models
- Retired Platforms
- Legend

Filters

Asset Order

Type

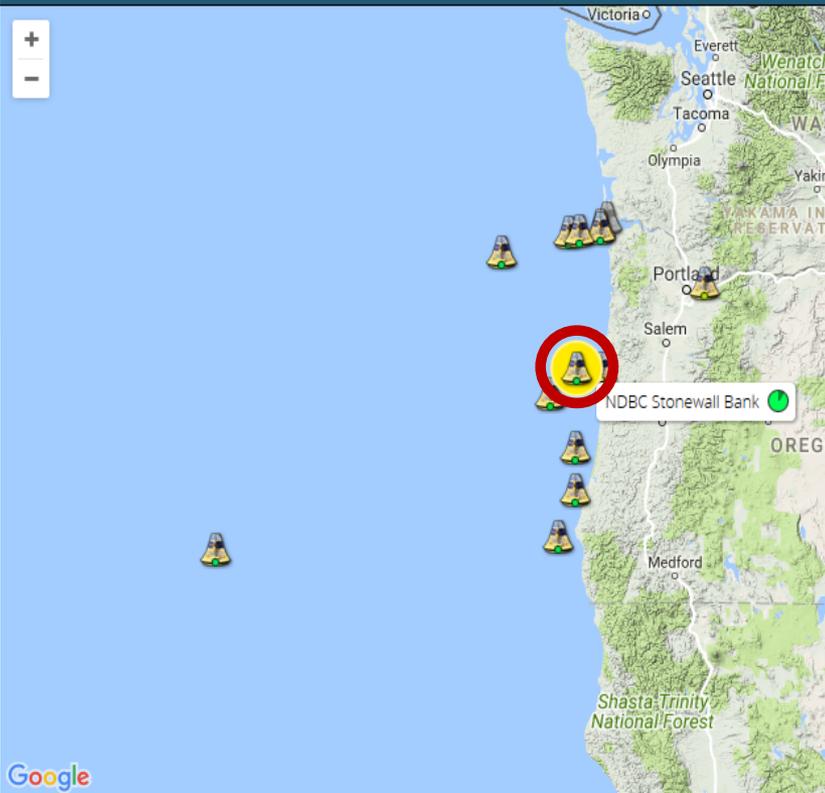
Keywords

Regions

- Washington 131
- Oregon 90
- California 28
- British Columbia 30

Platforms

- Buoys 56
- Cruises 3
- Ferries 2
- Fixed Shore 81
- Flights 1
- Land Stations 9
- Seabed Cabled 8
- Gliders 5
- Radar 2



**NDBC 46050 - Stonewall Bank - 20NM W of Newport**

Observations Forecasts Comparator Details History

Data Updated: 10 Jul 2017 11:50 PDT Provider: NDBC

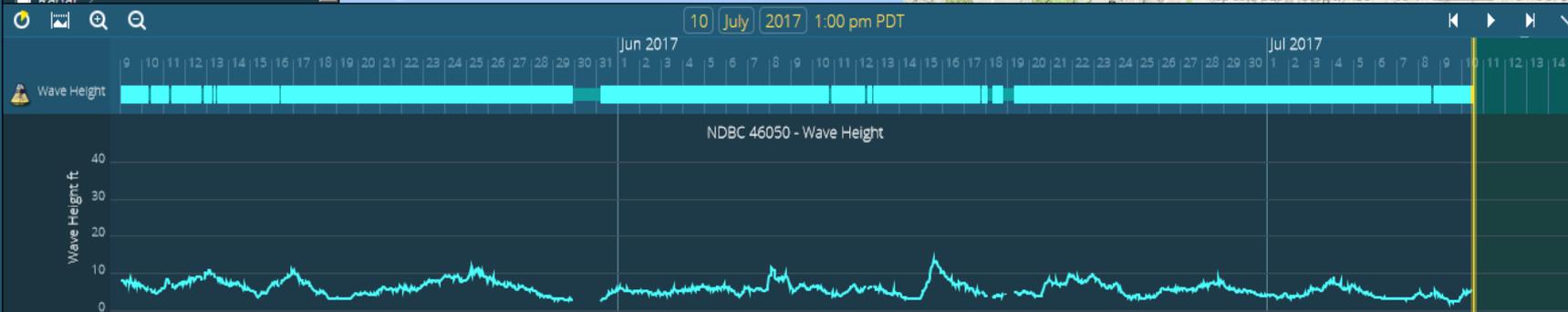
**ATMOSPHERIC**

Air Temperature (13 ft)	60.4 °F	Download	Refresh
Baro. Pressure (0 ft)	30.1 inHg	Download	Refresh
Wind Direction (16 ft)	20 deg (from)	Download	Refresh
Wind Gust (16 ft)	9.7 knots	Download	Refresh
Wind Speed (16 ft)	9.7 knots	Download	Refresh

**HYDROGRAPHIC**

Avg. Wave Period (0 ft)	5.9 sec	Download	Refresh
Dom. Wave Period (0 ft)	8 sec	Download	Refresh
Water Temperature (-2 ft)	55.9 °F	Download	Refresh
<b>Wave Height (0 ft)</b>	<b>5.6 ft</b>	Download	Refresh
Wave Mean Dir. (0 ft)	330 deg (from)	Download	Refresh

[Link](#)





Lat: 46.5060 Lon: 130.1331

Terrain

- Regions
- Filters
- Routes
- Current Conditions
- Fixed Platforms
- Mobile Platforms
- Remote Sensing
- Models
- Retired Platforms
- Legend

### Settings

**Units**  
*Determines the format in which units are displayed.*

- Common** °F, ft, ft/s, Hg, etc.
- Scientific °C, m, m/s, mbar, etc.

**Lat / Lon Format**  
*Determines the format in which latitude and longitude are displayed.*

- DDD dddd°** 44.5226
- DDD° MM' SS.ss" 44° 31' 21.36"
- DDD° MM.mmm' 44° 31.356'

**Plot Y-Axis**  
*Determines if plots use a common y-axis for all plots of the same measurement, or if each plot uses a y-axis based on its values.*

- Global
- Local**

**Overlay Value Locations**  
*Determines the location of numeric labels on map overlays. Only applicable to overlays that have value layers.*

- Geographical Features**
- Grid Points

**Time Zone Region**  
*Local time zone region*

- US/Pacific**

### Stonewall Bank - 20NM W of Newport

Recasts Comparator Details History

10 Jul 2017 11:50 PDT Provider: NDBC

**ATMOSPHERIC**

13 ft	60.4 °F	[icon]	[icon]
10 ft	30.1 inHg	[icon]	[icon]
16 ft	20 deg (from)	[icon]	[icon]
ft	9.7 knots	[icon]	[icon]
ft	9.7 knots	[icon]	[icon]

**HYDROGRAPHIC**

10 ft	5.9 sec	[icon]	[icon]
10 ft	8 sec	[icon]	[icon]
10 ft	55.9 °F	[icon]	[icon]
10 ft	5.6 ft	[icon]	[icon]
10 ft	330 deg (from)	[icon]	[icon]

18 Jun 2017 19 Jun 2017



# NANOOS

NORTHWEST ASSOCIATION OF NETWORKED OCEAN OBSERVING SYSTEMS



88 Apps Disclaimer Settings Log In

NVS DATA EXPLORER

v5.4 Contact NANOOS

Map

Asset List

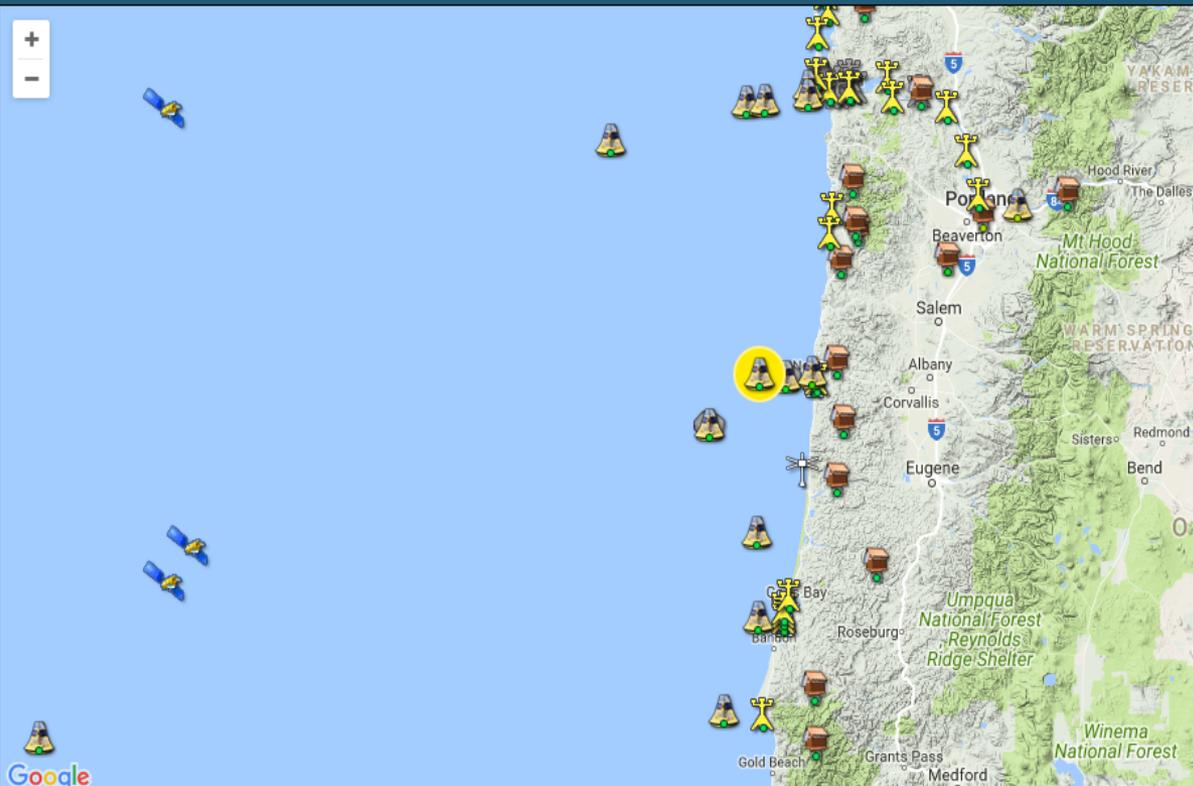
Help

Powered by Vizeer

Lat: 42.5369 Lon: -123.3875

Terrain

- Regions
- Filters
- Routes
- Current Conditions
- Fixed Platforms
- Mobile Platforms
- Remote Sensing
- Models
- Retired Platforms
- Legend



**NDBC 46050 - Stonewall Bank - 20NM W of Newport**

Observations Forecasts Comparator Details History

Data Updated: 10 Jul 2017 11:50 PDT Provider: NDBC

### ATMOSPHERIC

Air Temperature (13 ft)	60.4 °F	Download	Refresh
Baro. Pressure (0 ft)	30.1 inHg	Download	Refresh
Wind Direction (16 ft)	20 deg (from)	Download	Refresh
Wind Gust (16 ft)	9.7 knots	Download	Refresh
Wind Speed (16 ft)	9.7 knots	Download	Refresh

### HYDROGRAPHIC

Avg. Wave Period (0 ft)	5.9 sec	Download	Refresh
Dom. Wave Period (0 ft)	8 sec	Download	Refresh
Water Temperature (-2 ft)	55.9 °F	Download	Refresh
<b>Wave Height (0 ft)</b>	<b>5.6 ft</b>	Download	Refresh
Wave Mean Dir. (0 ft)	330 deg (from)	Download	Refresh

[Link](#)





# NANOOS

NORTHWEST ASSOCIATION OF NETWORKED OCEAN OBSERVING SYSTEMS



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NVS DATA EXPLORER

v5.4 Contact NANOOS

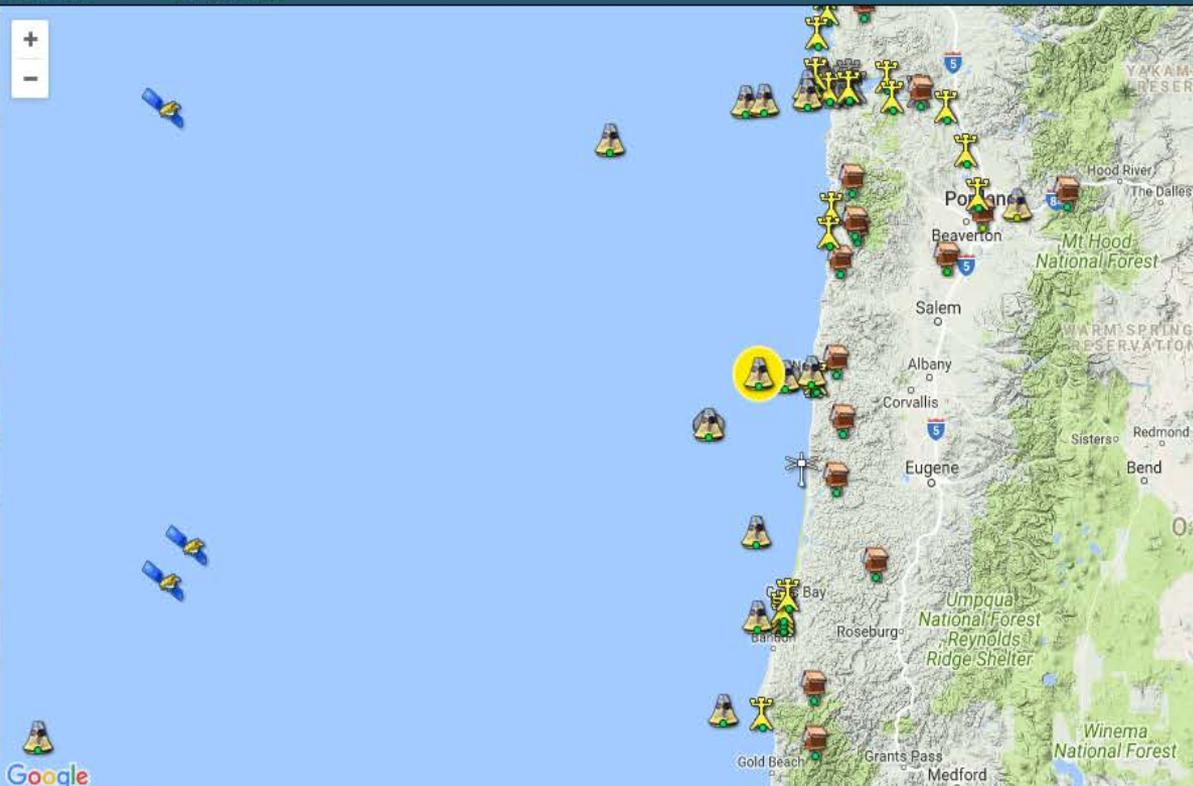
Map Asset List Help

Powered by Vize

Lat: 46.6419 Lon: -118.5205

Terrain

- Regions
- Filters
- Routes
- Current Conditions
- Fixed Platforms
- Mobile Platforms
- Remote Sensing
- Models
- Retired Platforms
- Legend



**NDBC 46050 - Stonewall Bank - 20NM W of Newport**

Observation **Forecasts** Comparator Details History

LiveOcean NAM OSU ROMS OSU WWIII  
WAVEWATCH III

Provider: NOAA-NCEP Data Source: OSU

**HYDROGRAPHIC**

Dom. Wave Period (0 ft) [Download] [Wave]

Wave Height (0 ft) [Download] [Wave]

Wave Mean Dir. (0 ft) [Download] [Wave]

**ATMOSPHERIC**

Wind Direction (33 ft) [Download] [Wave]

**Wind Speed (33 ft)** [Download] [Wave]

[Link](#)





# NANOOS

NORTHWEST ASSOCIATION OF NETWORKED OCEAN OBSERVING SYSTEMS



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NVS DATA EXPLORER

v5.4 Contact NANOOS

Map

Asset List

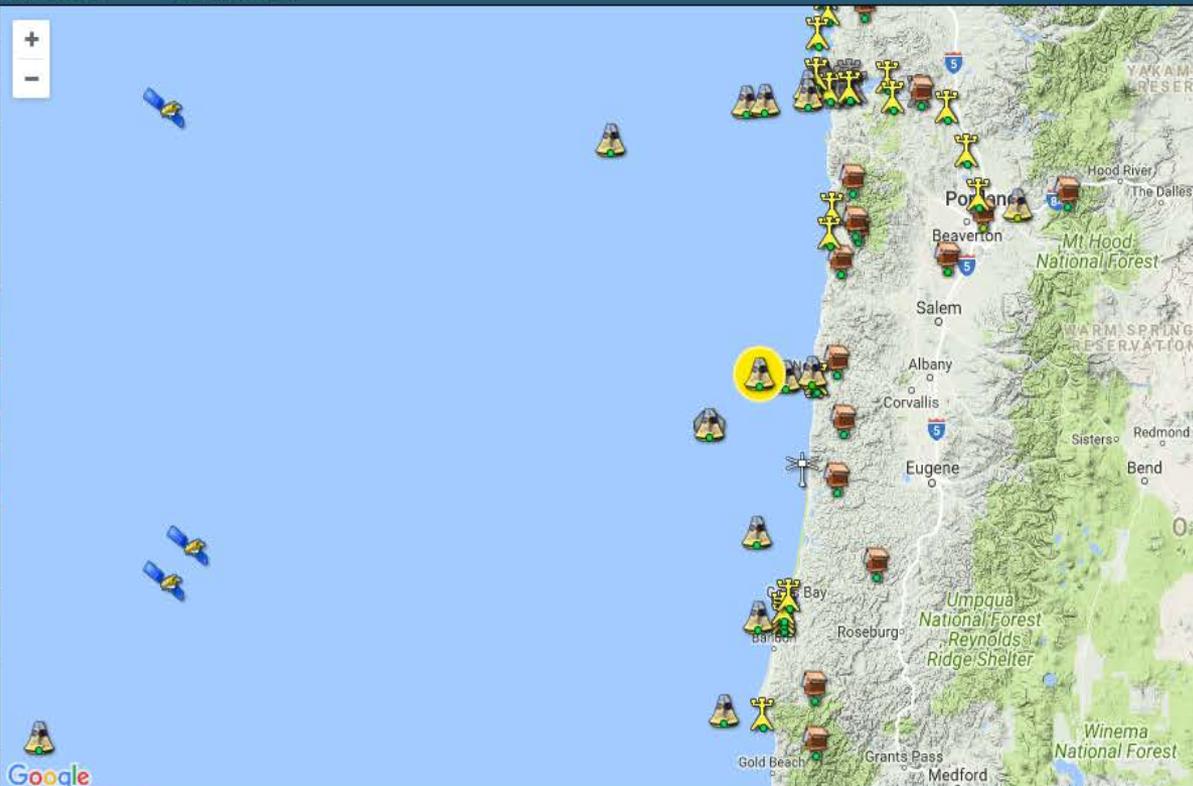
Help

Powered by VIZ

Lat: 46.3848 Lon: -126.0022

Terrain

- Regions
- Filters
- Routes
- Current Conditions
- Fixed Platforms
- Mobile Platforms
- Remote Sensing
- Models
- Retired Platforms
- Legend



**NDBC 46050 - Stonewall Bank - 20NM W of Newport**

Observations Forecasts **Comparator** Details History

LiveOcean NAM OSU ROMS OSU WWIII

WAVEWATCH III

Provider: OSU Data Source: OSU

**HYDROGRAPHIC**

Dom. Wave Period	[Download] [Wave]
<b>Wave Height</b>	[Download] [Wave]
Wave Mean Dir.	[Download] [Wave]

[Link](#)





# NANOOS

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IOOS

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NVS DATA EXPLORER

v5.4 Contact NANOOS

Map

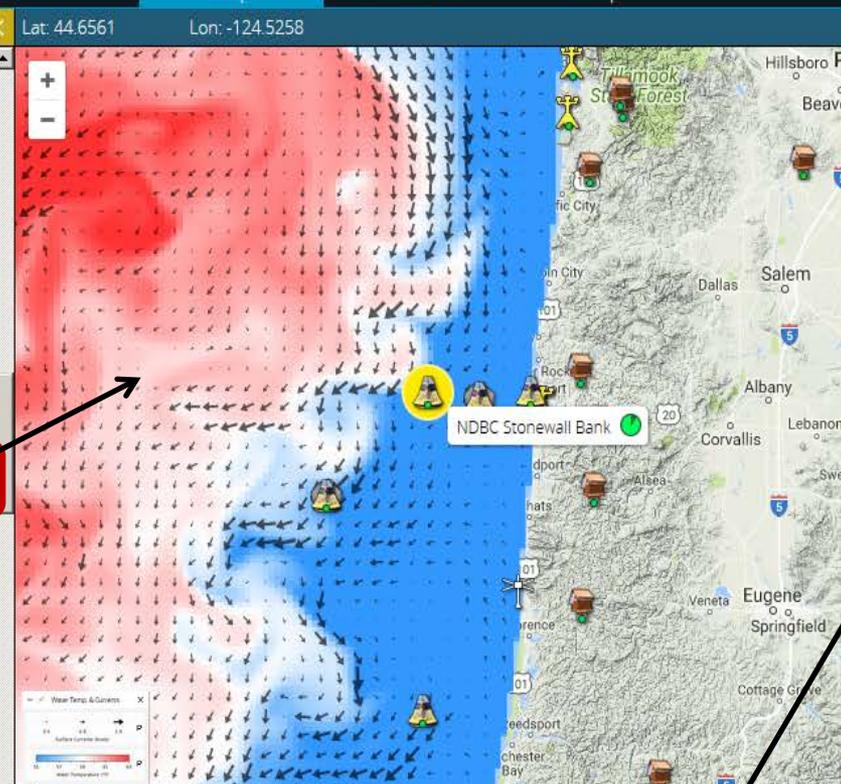
Asset List

Help

Powered by VIZ

- Regions
- Filters
- Routes
- Current Conditions
- Fixed Platforms
- Mobile Platforms
- Remote Sensing
- Models**
- Retired Platforms
- Legend

- Models
- 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)
  - Waves (Composite)
  - WAVEWATCH III



**NDBC 46050 - Stonewall Bank - 20NM W of Newport**

Observations Forecasts Comparator Details History

Data Updated: 10 Jul 2017 11:50 PDT Provider: NDBC

**ATMOSPHERIC**

Air Temperature (13 ft)	60.4 °F	Download	View
Baro. Pressure (0 ft)	30.1 inHg	Download	View
Wind Direction (16 ft)	20 deg (from)	Download	View
Wind Gust (16 ft)	9.7 knots	Download	View
Wind Speed (16 ft)	9.7 knots	Download	View

**HYDROGRAPHIC**

Avg. Wave Period (0 ft)	5.9 sec	Download	View
Dom. Wave Period (0 ft)	8 sec	Download	View
<b>Water Temperature (-2 ft)</b>	<b>55.9 °F</b>	Download	View
Wave Height (0 ft)	5.6 ft	Download	View
Wave Mean Dir. (0 ft)	330 deg (from)	Download	View

[Link](#)

10 July 2017 1:00 pm PDT





# NANOOS

NORTHWEST ASSOCIATION OF NETWORKED OCEAN OBSERVING SYSTEMS



IOOS

NANOOS

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NVS DATA EXPLORER

v5.4 Contact

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Map

Asset List

Help

Fixed Platforms

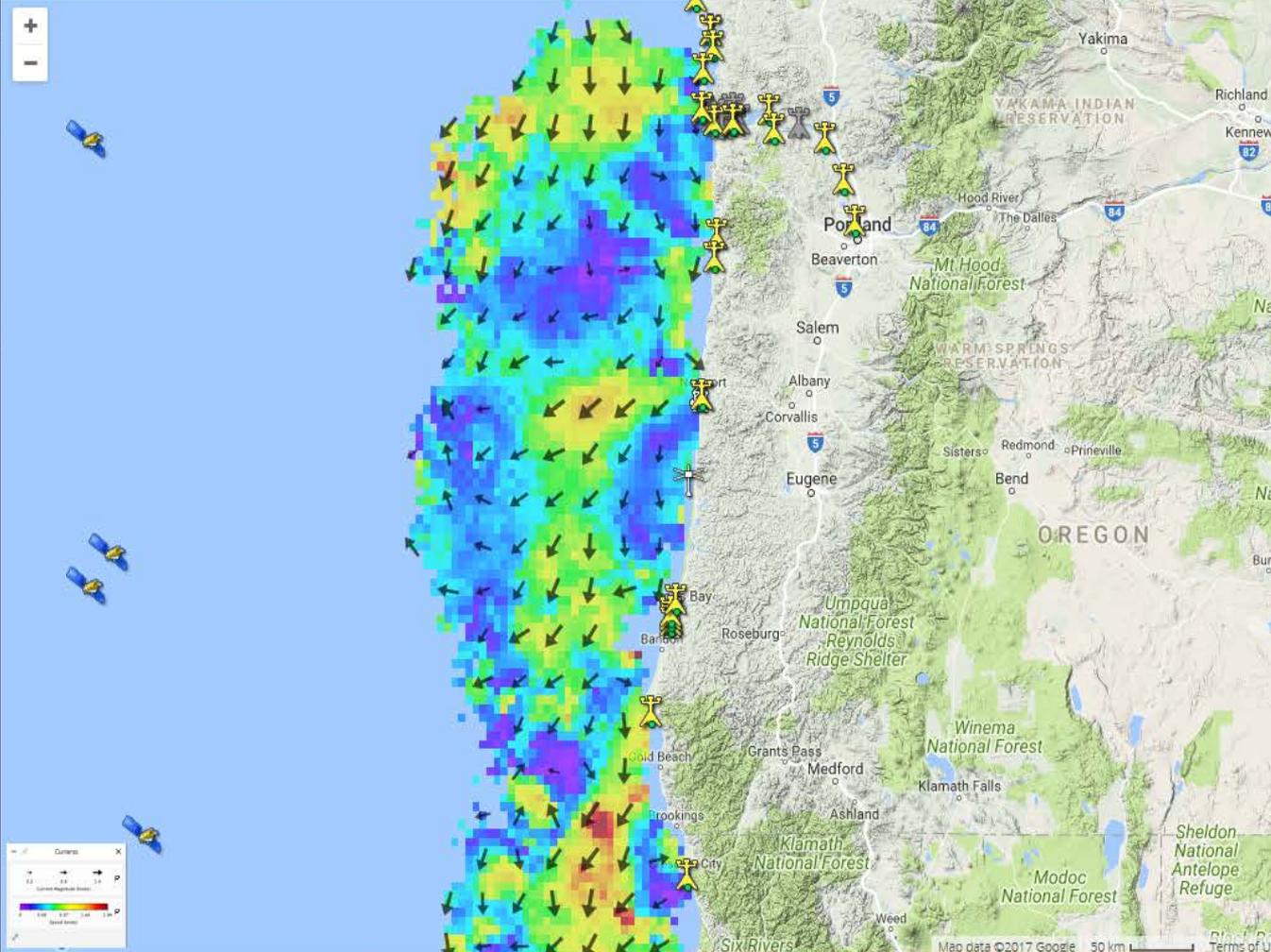
Lat: 44.7389

Lon: -130.2209

Terrain

Expand All Collapse All

- Buoys
- Fixed Shore Platform
- Land Station
- Moored Shellfish Raft
- Mooring Array
- River Gauge
- Sealed Cabled Platform





# NANOOS

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NVS DATA EXPLORER

v5.4 Contact NANOOS

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Map

Asset List

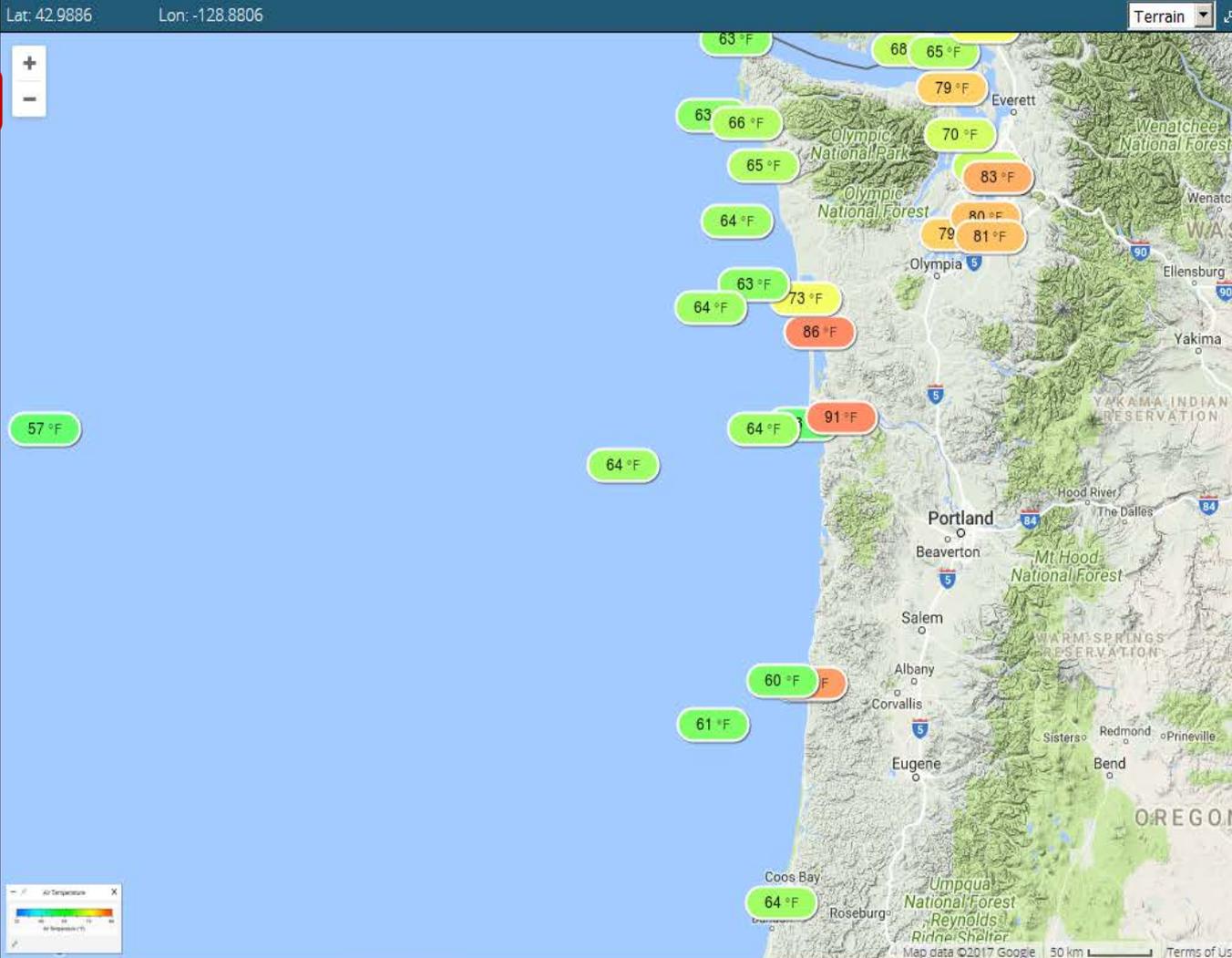
Help

Lat: 42.9886 Lon: -128.8806

Terrain

- Regions
- Filters
- Routes
- Current Conditions**
- Fixed Platforms
- Mobile Platforms
- Remote Sensing
- Models
- Retired Platforms
- Legend

- Current Conditions
- Auto Hide Platforms
- Air Temperature**
  - Barometric Pressure
  - Water Temperature (Surface)
  - Waves
  - Winds



24 June 2017 6:00 pm PDT

Jun 2017 Jul 2017 Aug 2017 Sep 2017

Track with Time

Air Temperature



# NANOOS

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## NVS DATA EXPLORER

v5.4 Contact NANOOS

Map

Asset List

Help

Powered by VIZ

Terrain

Current Conditions

Lat: 48.4073 Lon: -126.7932

Auto Hide Platforms

Air Temperature

Barometric Pressure

Water Temperature (Surface)

Waves

Winds



57 °F

64 °F



24 June 2017 6:00 pm PDT



NOS Astoria - Air Temperature (10 ft)





# NANOOS

NORTHWEST ASSOCIATION OF NETWORKED OCEAN OBSERVING SYSTEMS



IOOS

NANOOS

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NVS DATA EXPLORER

v5.4 Contact

Powered by Vize

Map

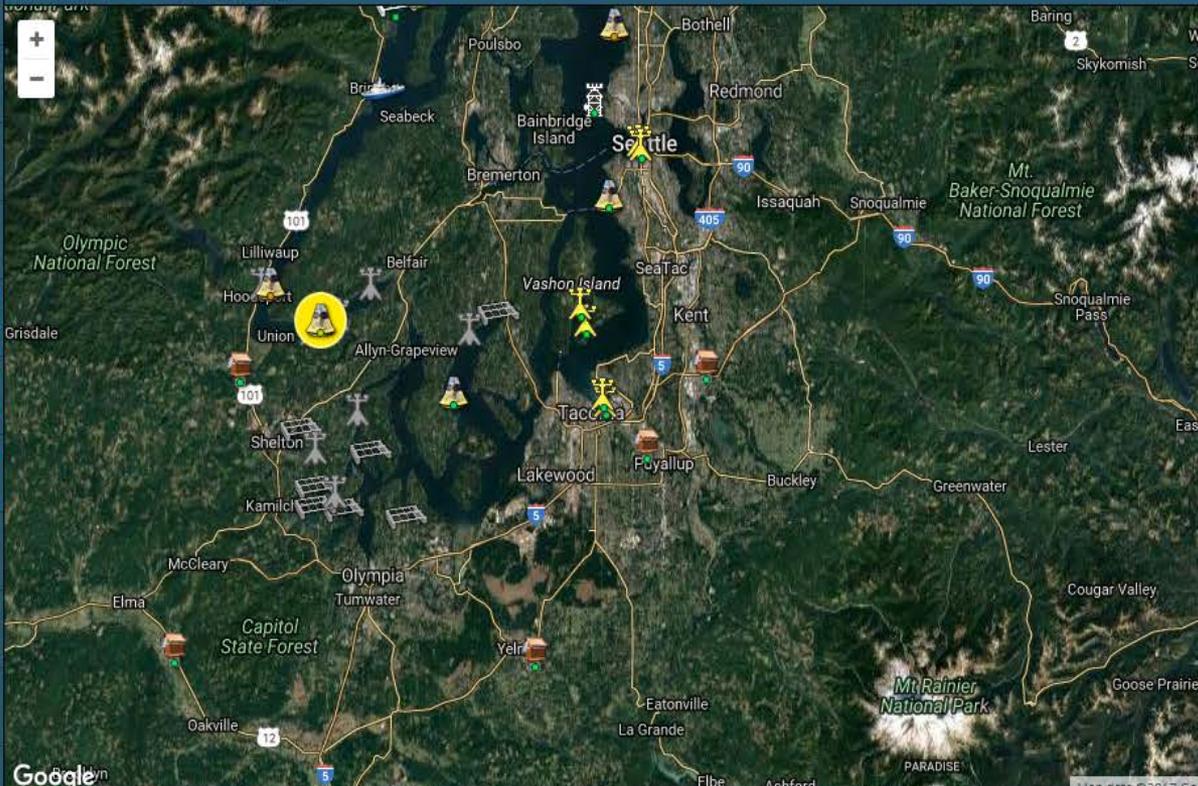
Asset List

Help

Lat: 47.7874 Lon: -122.8527

Hybrid

- Regions
- Filters
- Routes
- Current Conditions
- Fixed Platforms
- Mobile Platforms
- Remote Sensing
- Models
- Retired Platforms
- Legend



### Profiling Buoy at Twanoh - Hood Canal

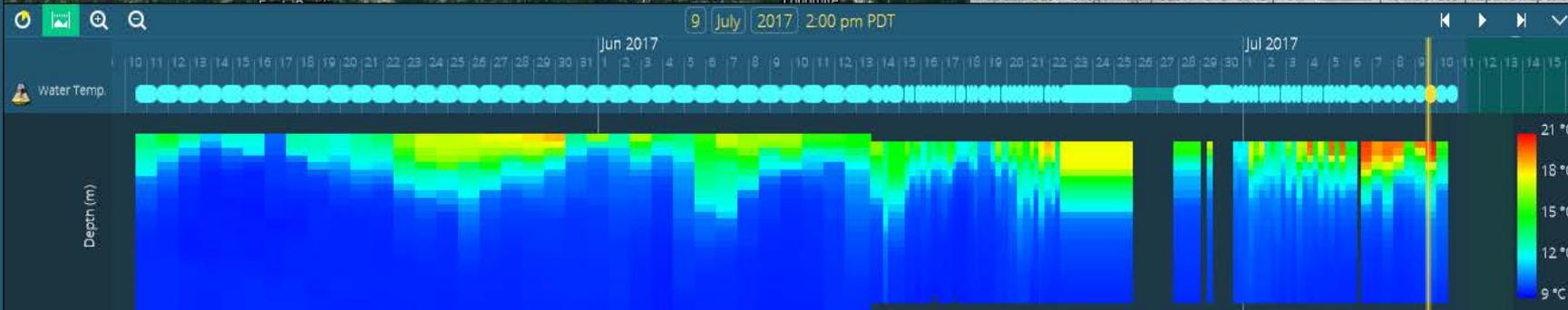
Observations Forecasts Comparator Details History Credits

9 July 2017 12:11 PDT

Water Temperature (Profile)

9 July 2017 12:11 PDT

[Link](#)





Data Explorer



Tsunami Evacuation Zones



Boaters



Tuna Fishers



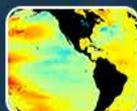
Shellfish Growers



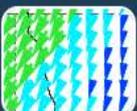
Beach and Shoreline Changes



Maritime Operations



Climatology



High Frequency Radar



Cruises



Gliders



Help

### ADDITIONS & UPDATES

[View Last 3 Months](#)



#### HMSC Newport

Station is offline since 6/22 due to sensor malfunction. It will likely be a few months before station is back online.

Updated on 6 Jul 2017



#### OSU CB-06

New NANOOS shelf mooring deployed 6/10, 6 nm off Coos Bay / Cape Arago as relocation of now-decommissioned NH-10 mooring. Measures (in near-real-time) weather, temp. & salt (1.5 m), and currents. PMEL air & water CO2 and 1-m temp. & salt also deployed.

Added on 5 Jul 2017



#### OSU NH-10

The NH-10 mooring has been relocated to a new location offshore of Coos Bay, designated as CB-06. See the OOI CE02SHSM mooring for continued data near the NH-10 station location.

Updated on 5 Jul 2017



#### CMOP Saturn02

Mooring was redeployed in early June. NVS harvesting is now restored, with an updated weather and water sensor configuration for this multi-depth asset.

Updated on 23 Jun 2017



#### Taylor-PCSGA Dabob

Sensors are back online starting on June 14, after a gap due to instrument problems and maintenance.

Updated on 21 Jun 2017



#### NDBC Washington

Buoy deployed and data released on 5/31/2017; but continuous data transmission started on Jun. 5. Buoy location was updated (previous deployment position was 42.612 N, 130.537 W)

Updated on 7 Jun 2017



Lat: 43.8107 Lon: -125.6067

Terrain

- Map
- Timeline
- Charts
- Map Layers
- Regions
- Fixed Platforms
- Remote Sensing
- Models
- Nodes
- Legend



**Station 46015 (LLNR 590) - Port Orford**

Observations Forecasts **Comparator** Details History

NAM OSU WWIII

OSU Wave Forecasts (0m) vs. NDBC Port Orford (0m)  
Wave Height

Wave Height m

9  
7.50  
6  
4.50  
3  
1.50  
0

20-May-2013 21-May-2013 22-May-2013 23-May-2013

Observation  
19 May 2013 07:00 PDT  
20 May 2013 07:00 PDT  
21 May 2013 07:00 PDT

Dominant Wave Period  
Wave Height  
Wave Mean Direction

Link

Helps mariners assess wave and wind conditions, comparing data to forecasts

Google 20 km 10 mi

22 May 2013 2:00 pm PDT

OSU WWIII

Timeline navigation: 18 May 2013, 19 May 2013, 20 May 2013, 21 May 2013, 22 May 2013, 23 May 2013, 24 May 2013, 25 May 2013

Timeline markers: 12 a, 6 a, 12 p, 6 p



# NANOOS

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IOOS

NANOOS

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NVS  
BOATERS

v.5.4 Contact

Powered by VIZ

Map

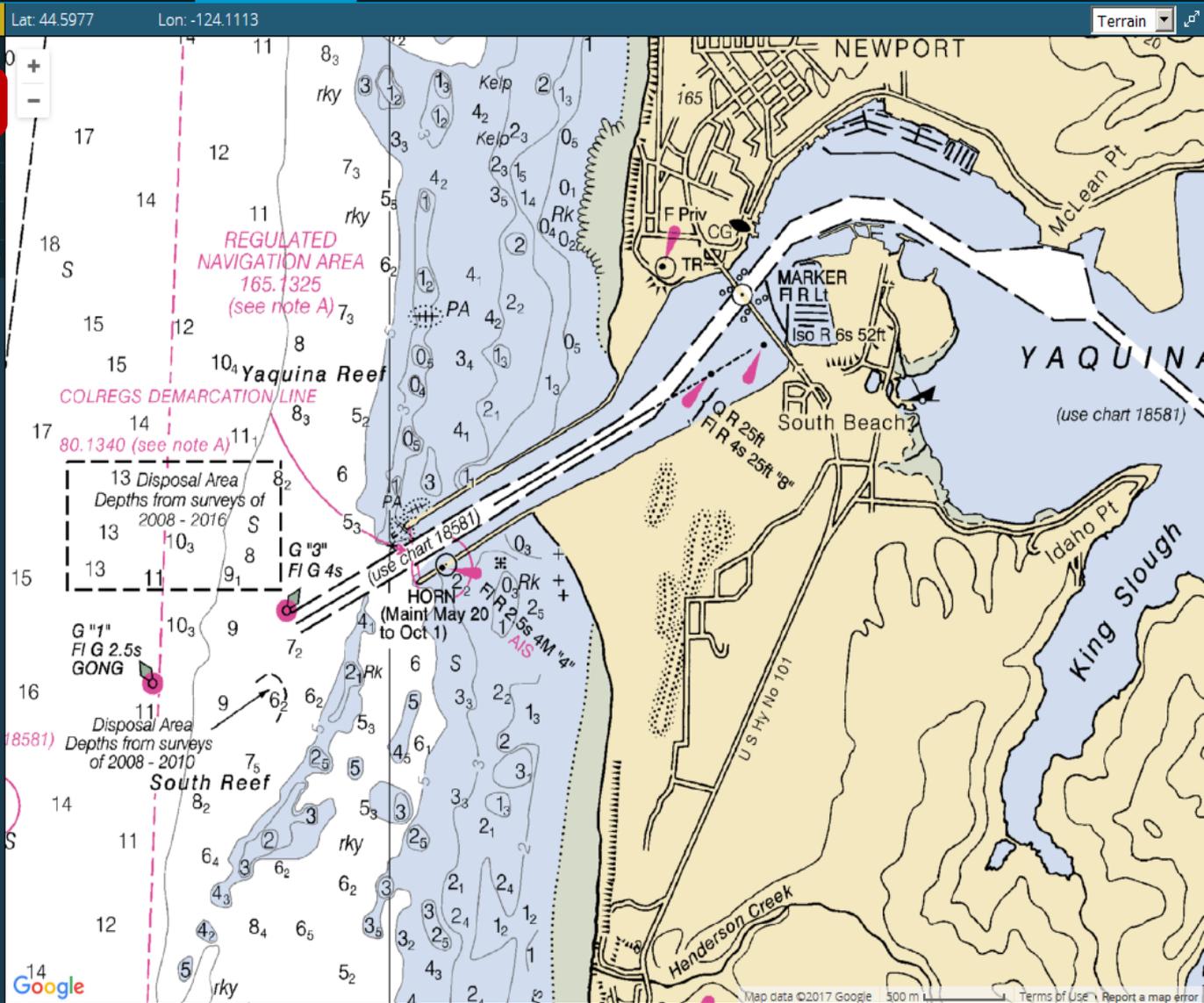
Help

Terrain

Lat: 44.5977 Lon: -124.1113

- Charts
- Regions
- Routes
- Current Conditions
- Fixed Platforms
- Remote Sensing
- Forecasts
- Markers
- Legend

- Charts
  - Seamless Nautical Charts
  - NOAA Nautical Charts
  - Washington Nautical Charts
  - Oregon Nautical Charts
  - California Nautical Charts
  - Other Nautical Charts







# NANOOS

NORTHWEST ASSOCIATION OF NETWORKED OCEAN OBSERVING SYSTEMS



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MARITIME OPERATIONS

v5.4 Contact

Powered by VIZ

Map

Overview

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Models

Lat: 44.6474

Lon: -124.0981

Terrain

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.)

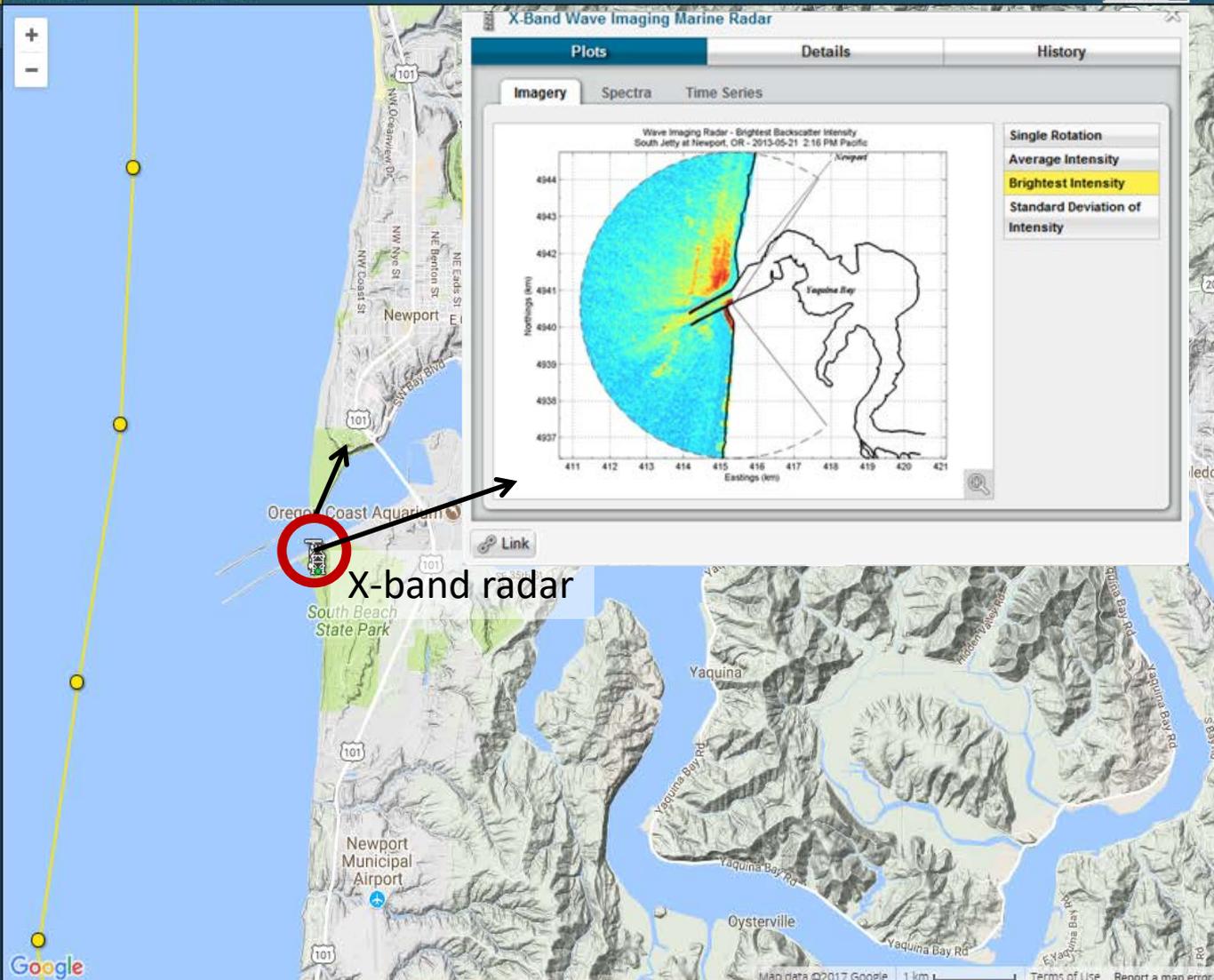
Waves (N.E.P.)

Winds (N.E.P.)

XTide Forecasts

Surface Currents

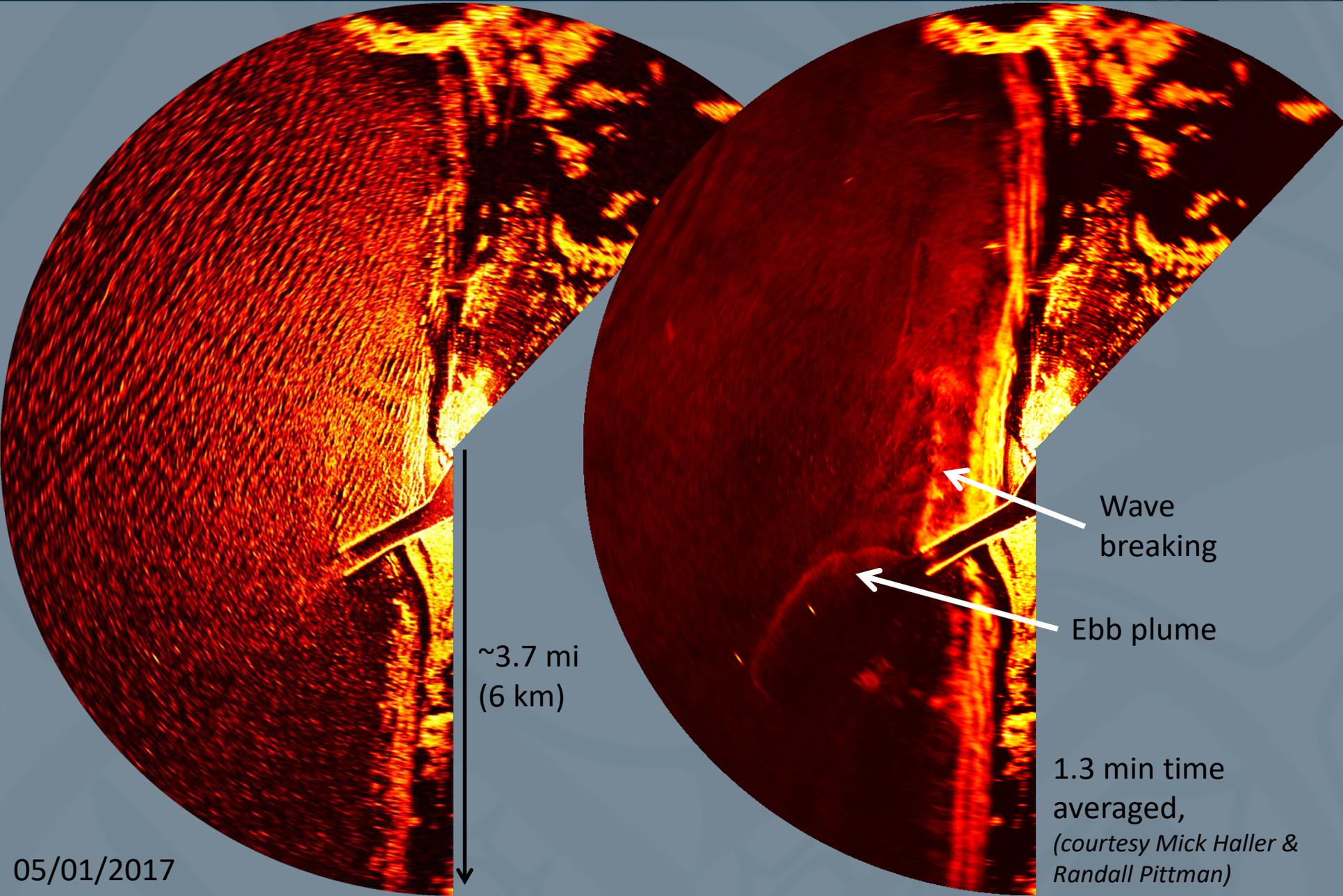
Tides





# NANOOS

NORTHWEST ASSOCIATION OF NETWORKED OCEAN OBSERVING SYSTEMS



~3.7 mi  
(6 km)

Wave  
breaking

Ebb plume

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

05/01/2017



# NANOOS

NORTHWEST ASSOCIATION OF NETWORKED OCEAN OBSERVING SYSTEMS



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MARITIME OPERATIONS

v5.4 Contact

Powered by Vizeer

Map

Overview

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Models

Lat: 45.6256

Lon: -125.2002

Terrain

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)

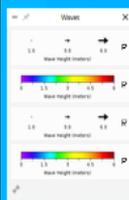
WAVEWATCH III

Dom. Wave Period (N.E.P.)

Waves (N.E.P.)

Winds (N.E.P.)

XTide Forecasts



## Wave Forecasts - 25 meters - Location 111

Plots

Details

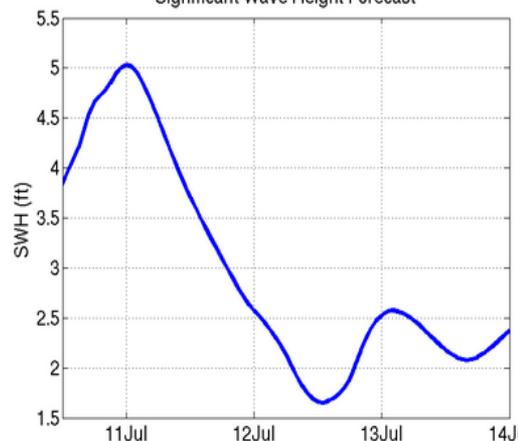
Forecast

Alongshore

Spectra

Polar

Significant Wave Height Forecast



Wave Height (SI)

Wave Height (US)

Wave Direction

Wave Period

Spectral Width

Wave Power

Link

10 Jul 2017

10 July 2017 5:00 am PDT

12 Jul 2017

13 Jul 2017

14 Jul 2017

Waves



# NANOOS

NORTHWEST ASSOCIATION OF NETWORKED OCEAN OBSERVING SYSTEMS



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v5.4

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NANOOS

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Data Explorer



Tsunami  
Evacuation Zones



Boaters



Tuna Fishers



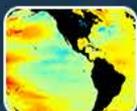
Shellfish Growers



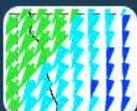
Beach and  
Shoreline Changes



Maritime  
Operations



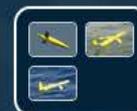
Climatology



High Frequency  
Radar



Cruises



Gliders



Help

## ADDITIONS & UPDATES

[View Last 3 Months](#)



### HMSC Newport

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Updated on 6 Jul 2017



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Added on 5 Jul 2017



### OSU NH-10

The NH-10 mooring has been relocated to a new location offshore of Coos Bay, designated as CB-06. See the OOI CE02SHSM mooring for continued data near the NH-10 station location.

Updated on 5 Jul 2017



### CMOP Saturn02

Mooring was redeployed in early June. NVS harvesting is now restored, with an updated weather and water sensor configuration for this multi-depth asset.

Updated on 23 Jun 2017



### Taylor-PCSGA Dabob

Sensors are back online starting on June 14, after a gap due to instrument problems and maintenance.

Updated on 21 Jun 2017



### NDBC Washington

Buoy deployed and data released on 5/31/2017; but continuous data transmission started on Jun. 5. Buoy location was updated (previous deployment position was 42.612

Updated on 7 Jun 2017





# NANOOS

NORTHWEST ASSOCIATION OF NETWORKED OCEAN OBSERVING SYSTEMS



IOOS

NANOOS

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NVS  
TUNA FISHERS

v5.4 Contact

Powered by Viz

Map

Plots

Overview

Help

Routes

Lat: 45.2323

Lon: -127.2931

Terrain

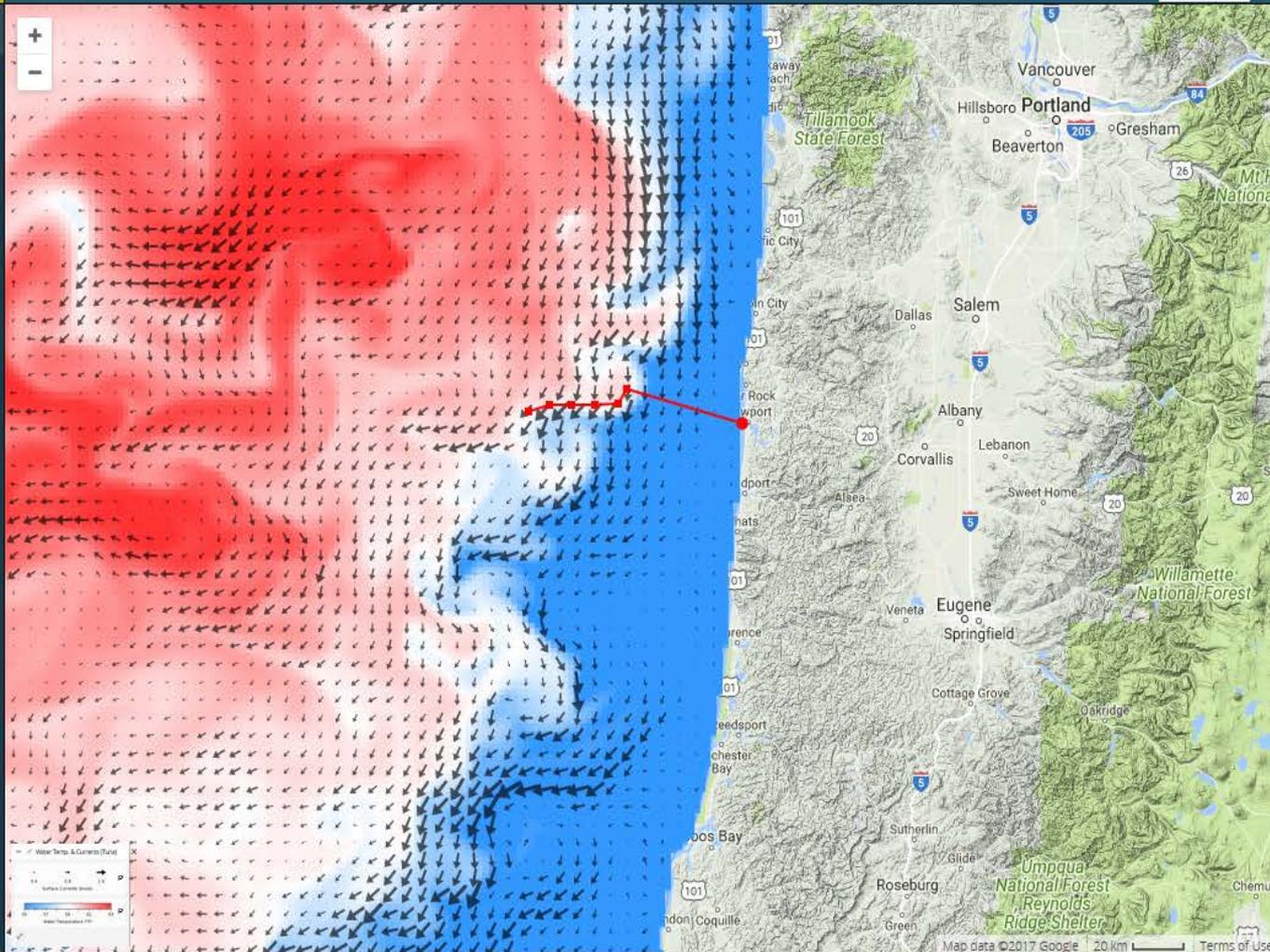
+ New Route

New Route 1

	Latitude	Longitude
1	44.63348	-124.07959
2	44.73503	-124.59595
3	44.69209	-124.63440
4	44.68818	-124.73877
5	44.68818	-124.84314
6	44.68818	-124.94202
7	44.66865	-125.03540

Total Route Length: 49.8 miles

Download Route



10 July 2017 3:57 pm PDT

10 Jul 2017

11 Jul 2017

12 Jul 2017

13 Jul 2017

Water Temp. & Currents (Tuna)





Data Explorer



Tsunami Evacuation Zones



Boaters



Tuna Fishers



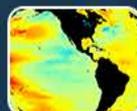
Shellfish Growers



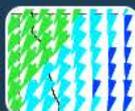
Beach and Shoreline Changes



Maritime Operations



Climatology



High Frequency Radar



Cruises



Gliders



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### ADDITIONS & UPDATES

[View Last 3 Months](#)



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Updated on 23 Jun 2017



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Updated on 7 Jun 2017





# NANOOS

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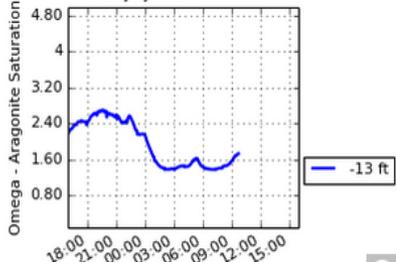
Lat: 45.9378 Lon: -125.2304

Terrain

- Regions
- Current Conditions
- Fixed Platforms
- Remote Sensing
- Forecasts
- Plots
- Legend

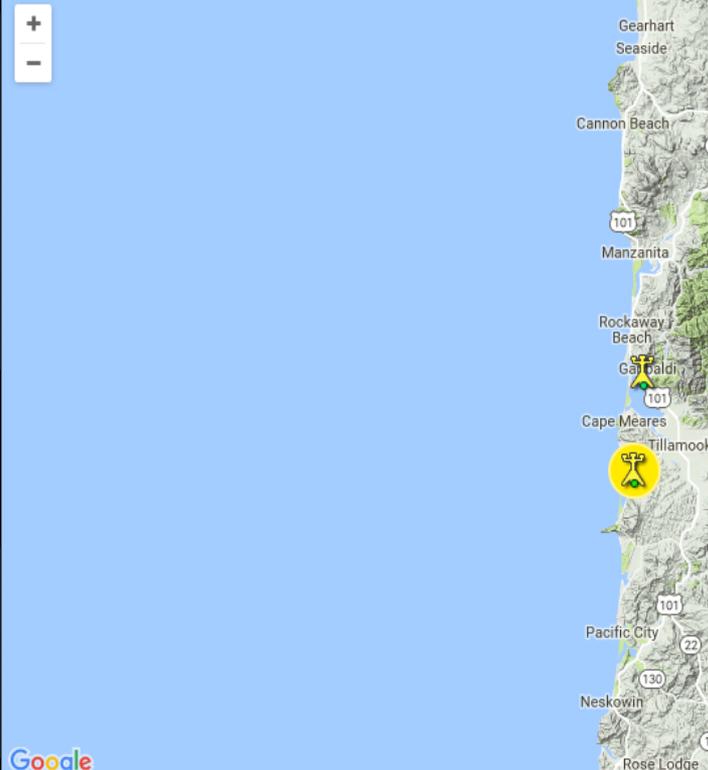
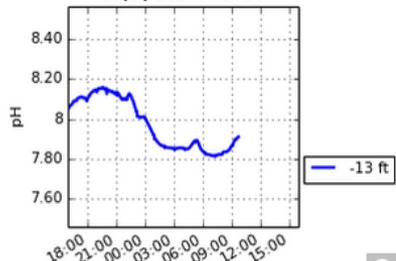
Plots

WCSH-PCSGA Whiskey Crk - Omega Arag. Sat. - 24 Hours  
10 July 2017 3:59 PDT



pH

WCSH-PCSGA Whiskey Crk - pH - 24 Hours  
10 July 2017 3:59 PDT



PCSGA - Whiskey Creek Shellfish Hatchery, Netarts Bay

Observations Forecasts Comparator Details History Credits

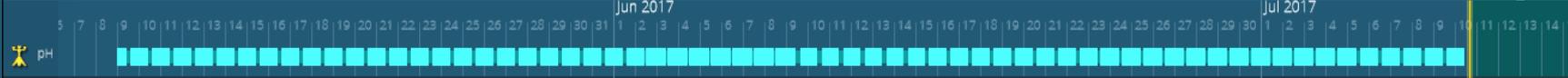
Data Updated: 10 Jul 2017 9:45 PDT Provider: WhiskeyCrShell

### HYDROGRAPHIC

Alkalinity (total) (-13 ft)	2,301.4 $\mu\text{mol/kg}$		
CO2 Water (-13 ft)	576.4 $\mu\text{atm}$		
TCO2 (-13 ft)	2,065.6 $\mu\text{mol/kg}$		
Omega Arag. Sat. (-13 ft)	1.7		
pH (-13 ft)	7.9		
Salinity (-13 ft)	33.4 PSU		
Water Temperature (-13 ft)	57.2 $^{\circ}\text{F}$		

Link

10 July 2017 4:05 pm PDT





# NANOOS

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Tsunami Evacuation Zones



Boaters



Tuna Fishers



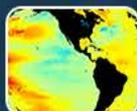
Shellfish Growers



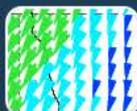
Beach and Shoreline Changes



Maritime Operations



Climatology



High Frequency Radar



Cruises



Gliders



Help

## ADDITIONS & UPDATES

[View Last 3 Months](#)



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# NANOOS

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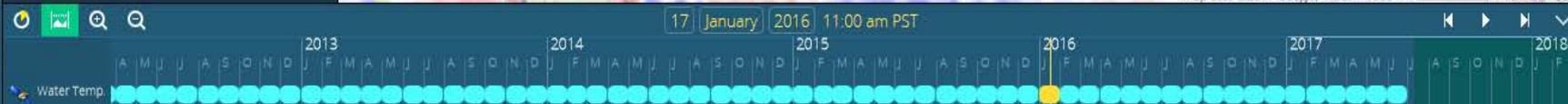
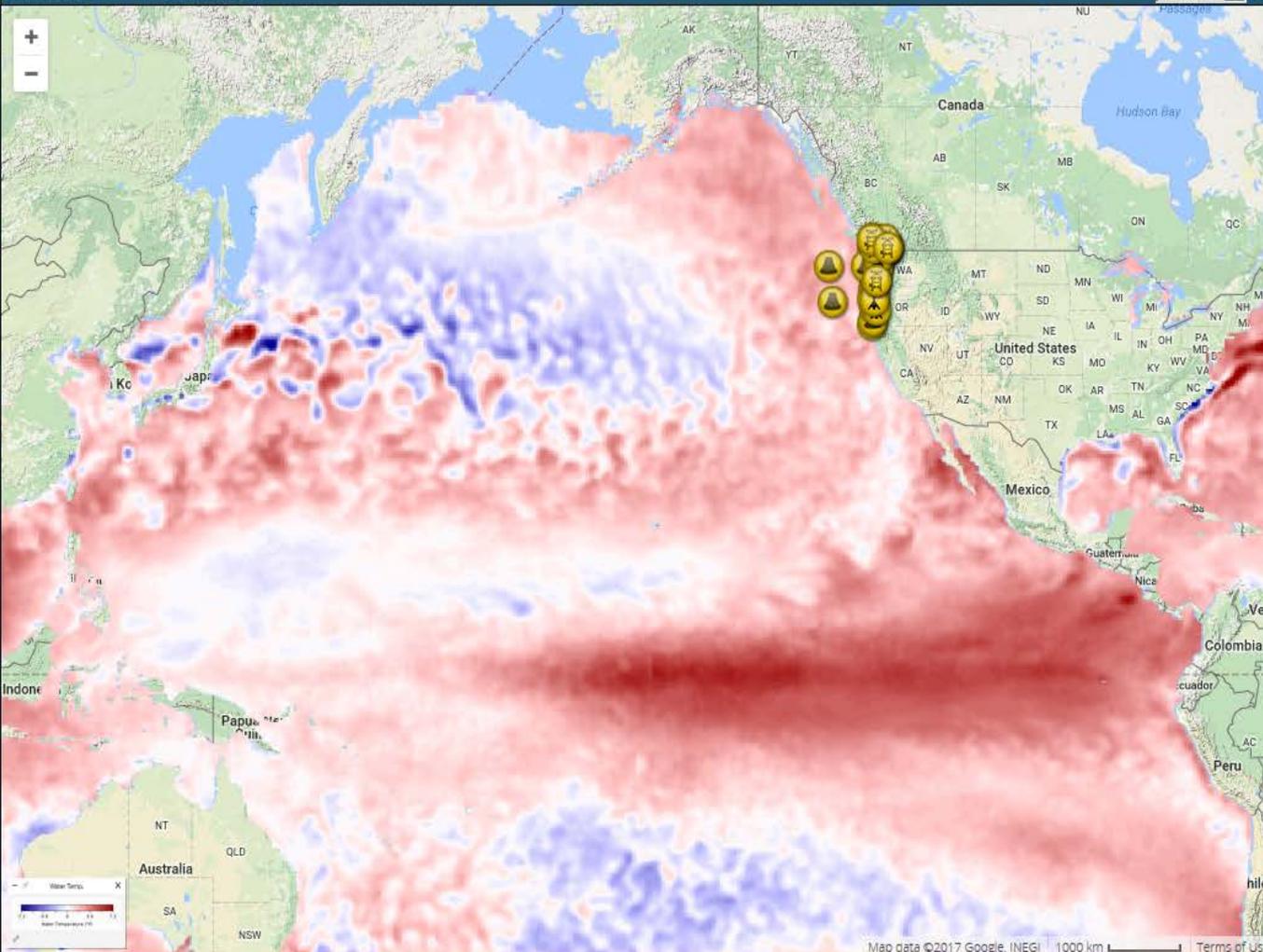
Terrain

Lat: 64.9235

Lon: -146.6016

- 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)





# NANOOS

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Indices

Lat: 47.9311

Lon: -138.5596

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Expand All Collapse All

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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

NDBC Oregon

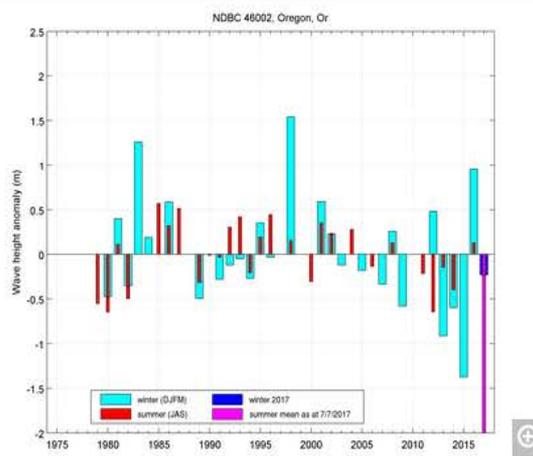
Plots

Details

Time Series

Seasonal Variability

Annual Variability



Wind Speed

Air Temperature

Water Temperature

Atmos Pressure

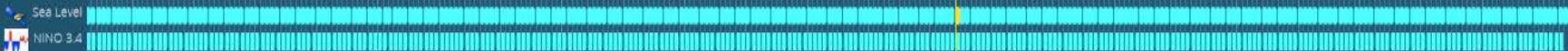
Wave Height

Peak Period



3 June 2007 6:00 am PDT

193 194 195 196 197 198 199 200 201 202 203 204 205 206 207 208 209 210 211 212 213 214 215 216 217



NINO 3.4 Index

NINO 3.4





Data Explorer



Tsunami Evacuation Zones



Boaters



Tuna Fishers



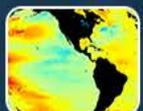
Shellfish Growers



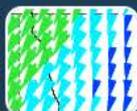
Beach and Shoreline Changes



Maritime Operations



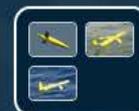
Climatology



High Frequency Radar



Cruises



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# NANOOS

NORTHWEST ASSOCIATION OF NETWORKED OCEAN OBSERVING SYSTEMS



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## NVS TSUNAMI EVACUATION ZONES

Map

Brochures

Warnings

Planning

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Powered by

Places

Lat: 44.6029

Lon: -124.0467

Terrain

- Map Layers
- Regions
- Places
- Markers
- Information
- Legend

Enter Address Click on Map

Get Location

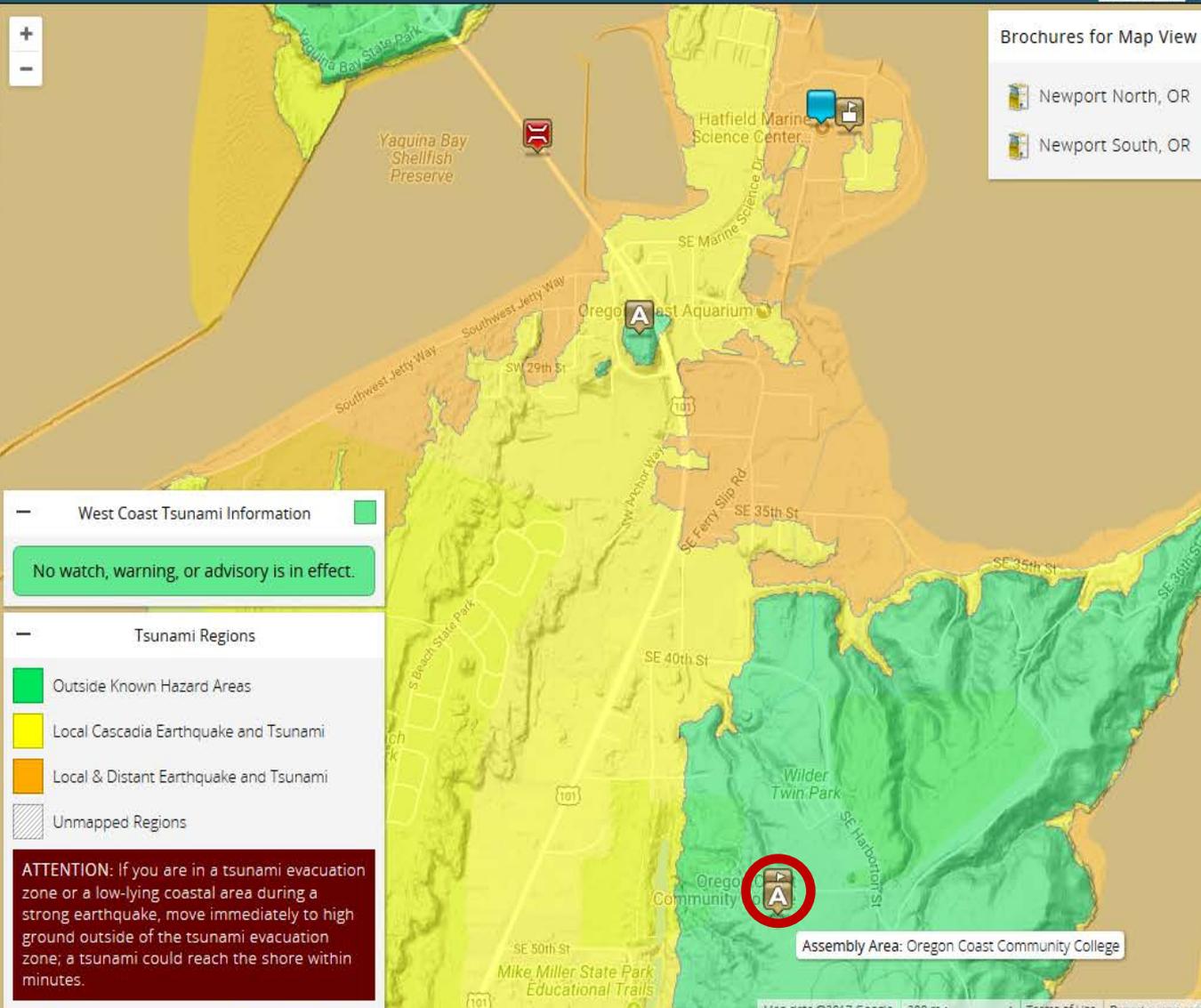
Your Places

Edit Places  Off

HMSC, Newport

### Brochures for Map View

- Newport North, OR
- Newport South, OR



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.



Assembly Area: Oregon Coast Community College



# NANOOS

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## NVS TSUNAMI EVACUATION ZONES

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- Map Layers
- Regions
- Places
- Markers
- Information
- Legend

Map

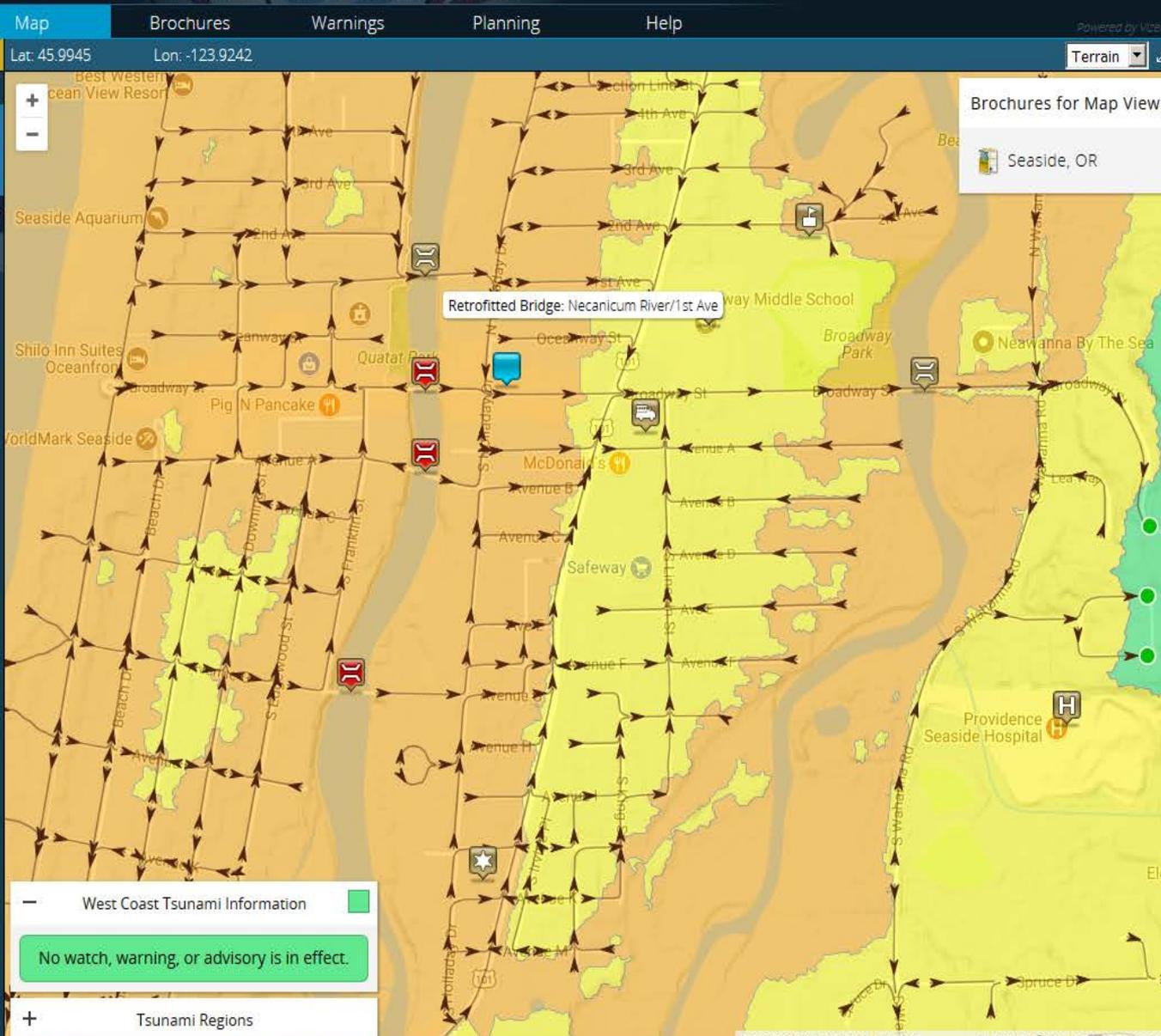
Brochures Warnings Planning Help

Places  Lat: 45.9945 Lon: -123.9242

Enter Address  Click on Map

Your Places  Edit Places  Off

- HMSC, Newport
- Seaside, Oregon



Brochures for Map View

- Seaside, OR



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IOOS Integrated Ocean Observing System

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- Products**
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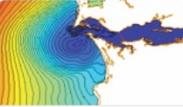
Beach & Shoreline Changes

NVS

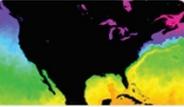


Boaters

NVS

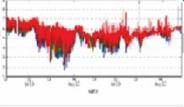


Center for Coastal Margin Observation and Prediction



Climatology

NVS



CMOP Data Explorer with NANOOS data



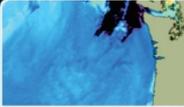
Coastal & Marine Spatial Planning

Info Page

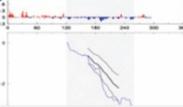


Coastal and Estuarine Hypoxia

Info Page



COASTWATCH: Satellite and Oceanographic Data

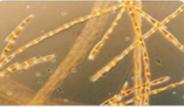


Cumulative Wind Stresses for Oregon



Data Explorer

NVS



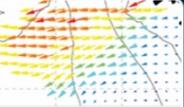
Harmful Algal Blooms

Info Page



Help

NVS



High Frequency (HF) Radar

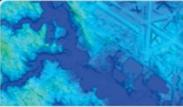
NVS



Honshu Earthquake and Tsunami 2011



J-SCOPE



Light Detection and Ranging (Lidar) Data



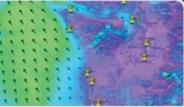
Marine Debris

Info Page



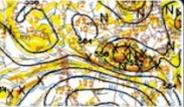
Maritime Operations

NVS

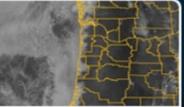


NANOOS Visualization System

NVS



National Weather Service Forecasts



National Weather Service Satellite Imagery



NOAA Buoys



NOAA Tides and Currents



Northwest Environmental Moorings



Ocean Acidification

Info Page



Oregon Coastal Atlas



Oregon Tsunami Clearinghouse



Pacific Coast Habitat Server



ProbCast: Probability Weather Forecasting



Real-time HABs



Regional PNW Wave and Wind Forecasts



Rhythms Of Our Coastal Waters



Salish Cruises

NVS



Shellfish Growers

NVS



Tagging Pacific Pelagics



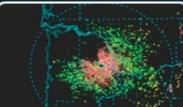
Tsunami Evacuation Zones

NVS



Tuna Fishers

NVS



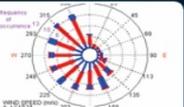
UW Atmospheric Weather Observations and Forecasts



WA Dept. of Ecology Marine Water Quality Monitoring



Washington Coastal Atlas



Wave Information Studies (USACE) Wave Hindcast Data



West Coast Ocean Data Portal



# NANOOS

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*Thank you*

