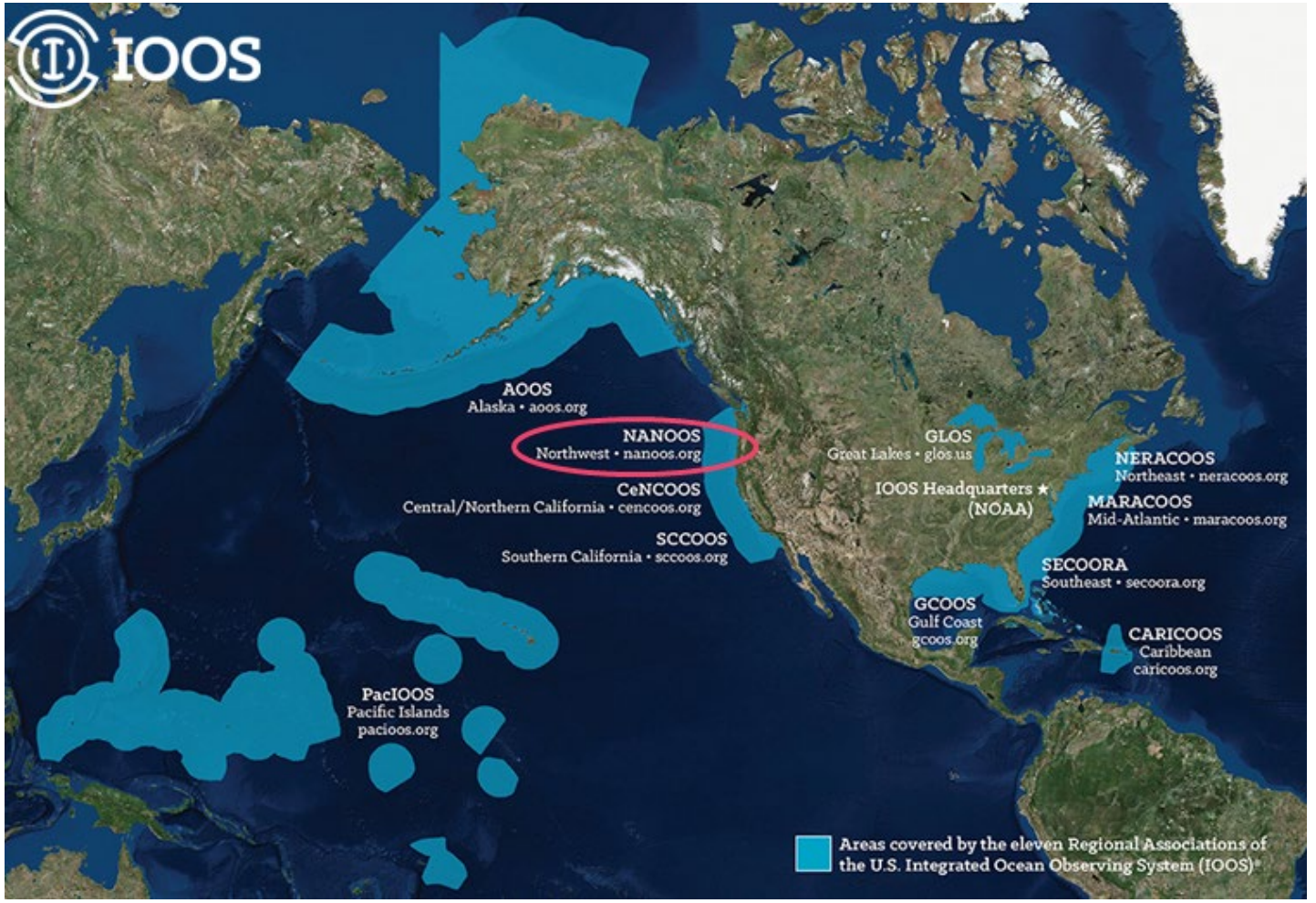
Northwest Association of Networked Ocean Observing Systems

Supporting Diverse PNW Marine Data Access Needs

Rachel Wold
rwold@uw.edu

Columbia River Estuary Conference
13 May 2025

Coastal U.S. IOOS:
17 Federal Agencies; 11 Regional Associations



NANOOS is the Pacific Northwest Regional Association of the U.S. Integrated Ocean Observing System (IOOS).

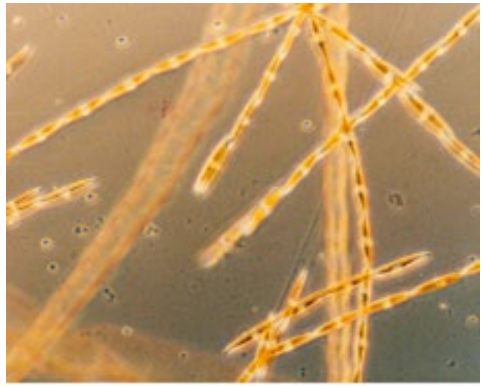
NANOOS is a **network of over 70 member organizations and data providers** that work to sustain and integrate ocean observations and modeling to produce regional data products that help:

- Ensure safety at sea
- Build economic resilience
- Increase understanding of the coastal ocean and estuaries

Weather & Climate

Coastal Hazards

Marine Ecosystems

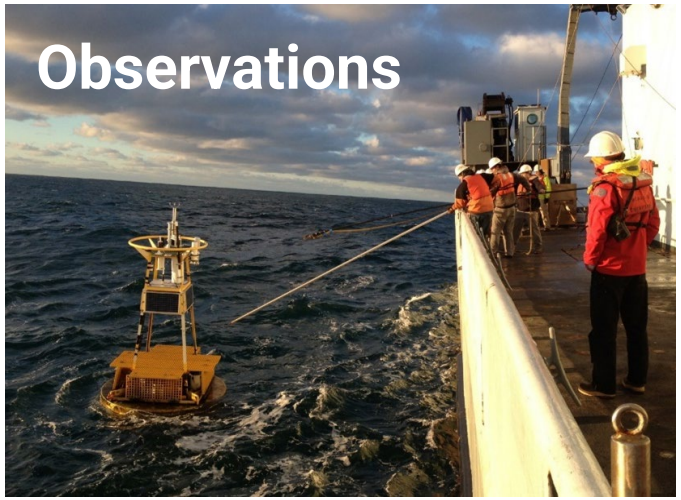


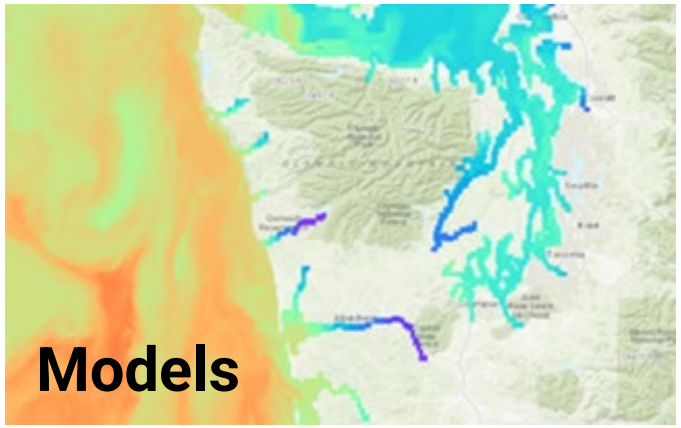
Fisheries & Marine Life

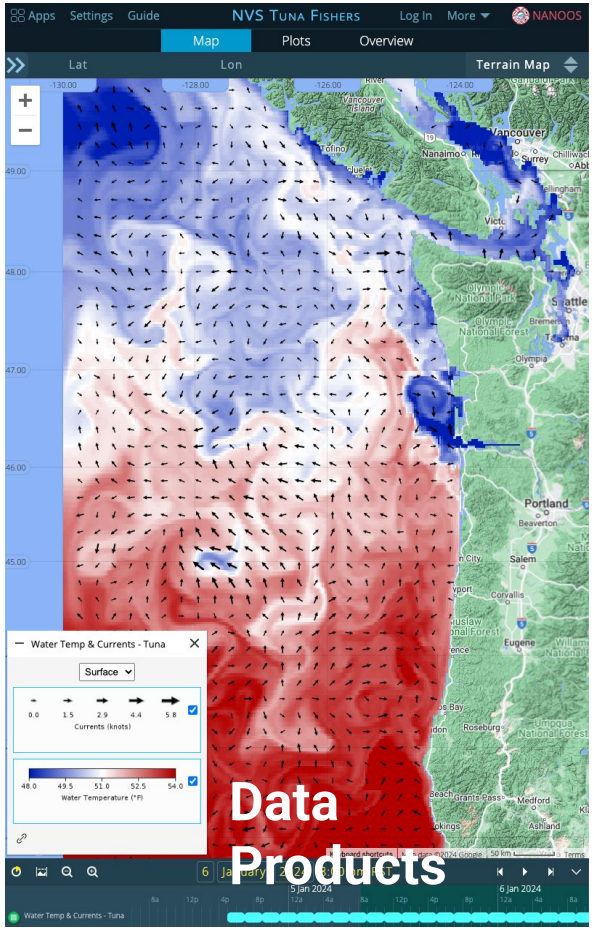
Maritime Operations

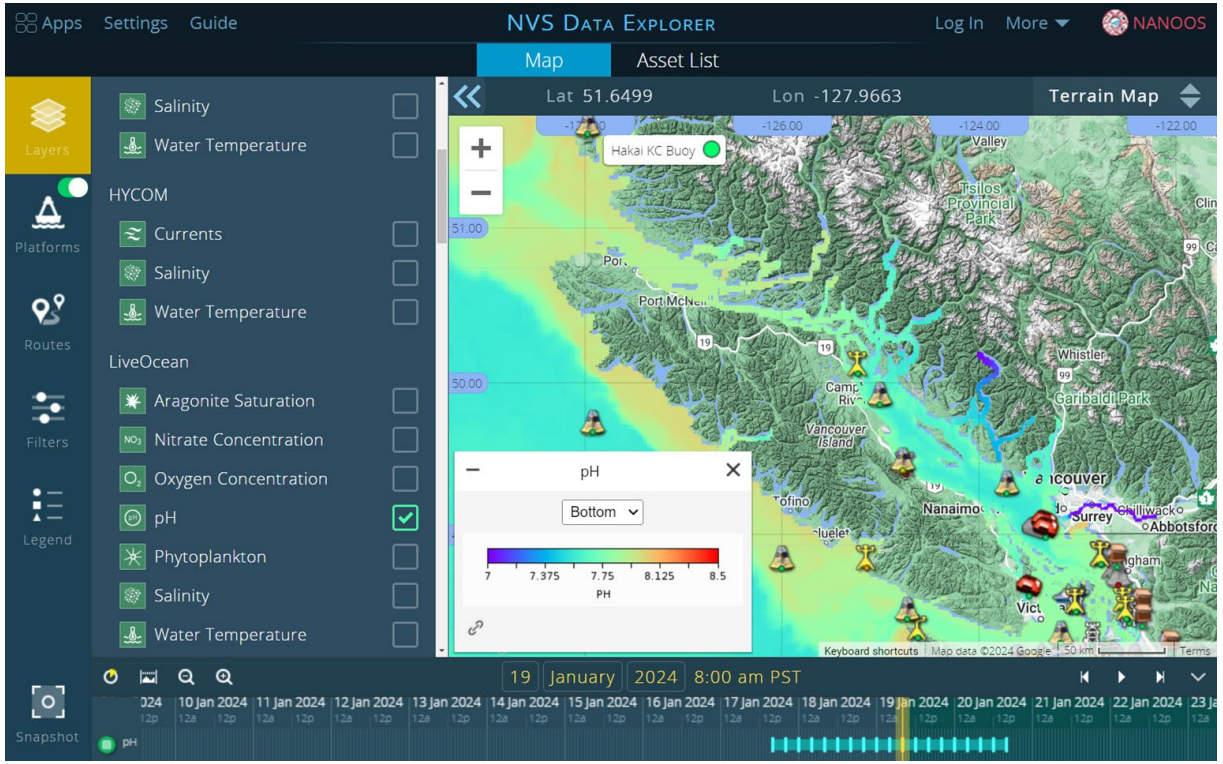
NANOOS Visualization System (NVS)

nvs.nanoos.org









NANOOS

Northwest Association of Networked Ocean Observing Systems

NANOOS

Home
About
News
Join
Contact
Disclaimer

NVS
Products
Mobile Apps

Workshops
Education
Videos

Log In
New Account

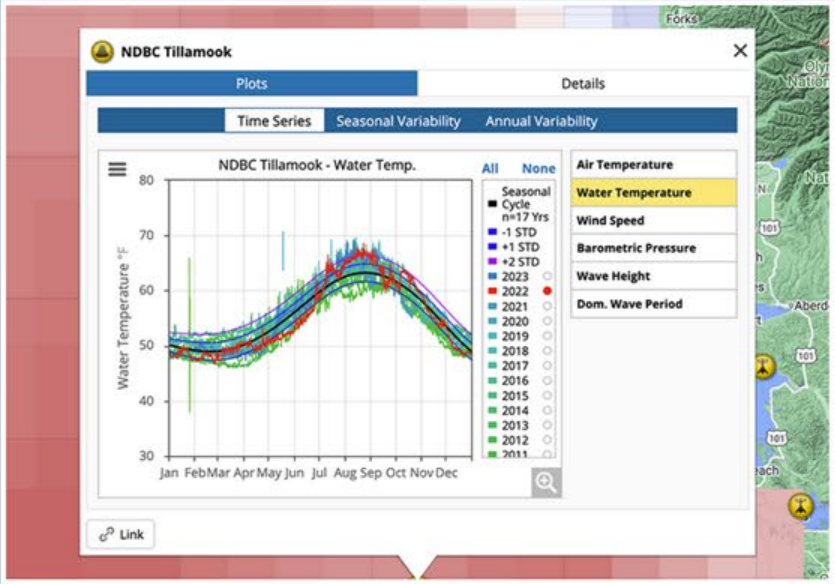
NANOOS

Welcome to NANOOS, the Northwest Association of Networked Ocean Observing Systems.

NANOOS Visualization System

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

Help



Tracking Warm Sea Temperatures - Is it a Marine Heatwave?

The NVS Climatology app allows visualization of current and historical data to see how different conditions are. Dynamic plotting enables users to explore year-to-year differences for a variety of data sets including water temperature and wave height. This function makes it easy to compare recent marine heat waves or to compare current data to other years, as well as the long term average. Click to expand the plot, then highlight any year in red by clicking the bubble next to the year. See the guide on how to track anomalies and follow the Tracker to see if a heat anomaly is a marine heatwave.

View the Data | How to Track Anomalies | Marine Heatwave Tracker

Go

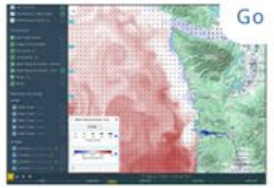
NVS Fishers Webinar

Go

Backyard Buoys In-Person All-Hands

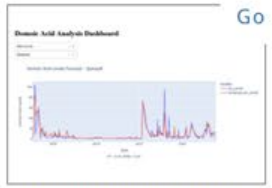
Go

NANOOS Presentation for NOAA West Watch



Go

Upcoming NVS Fishers Webinar



Go

Student Awarded for HAB Prediction Model

NANOOS Visualization System nvs.nanoos.org

NANOOS Region User Groups:

Maritime: shipping, oil transport/spill remediation

Fisheries: salmon, shellfish, groundfish, aquaculture

Environmental conditions: HABs, hypoxia, ocean acidification

Shoreline: erosion, inundation

Hazards: Search and rescue, national security, tsunami evacuation

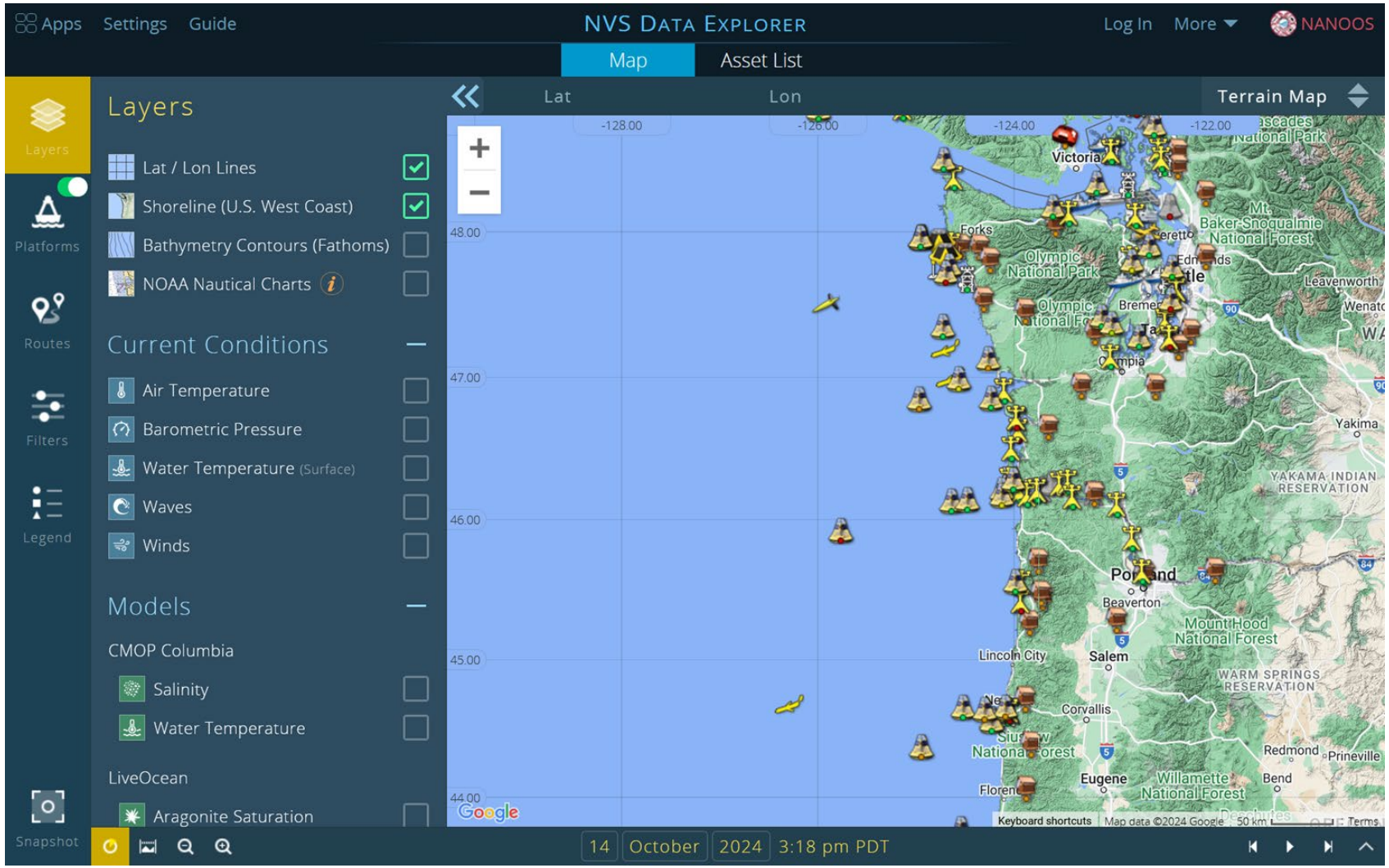
Educators: formal, informal, research

Marine recreation: boating, surfing, diving

nvs.nanoos.org/DataExplorer

NVS Data Explorer:

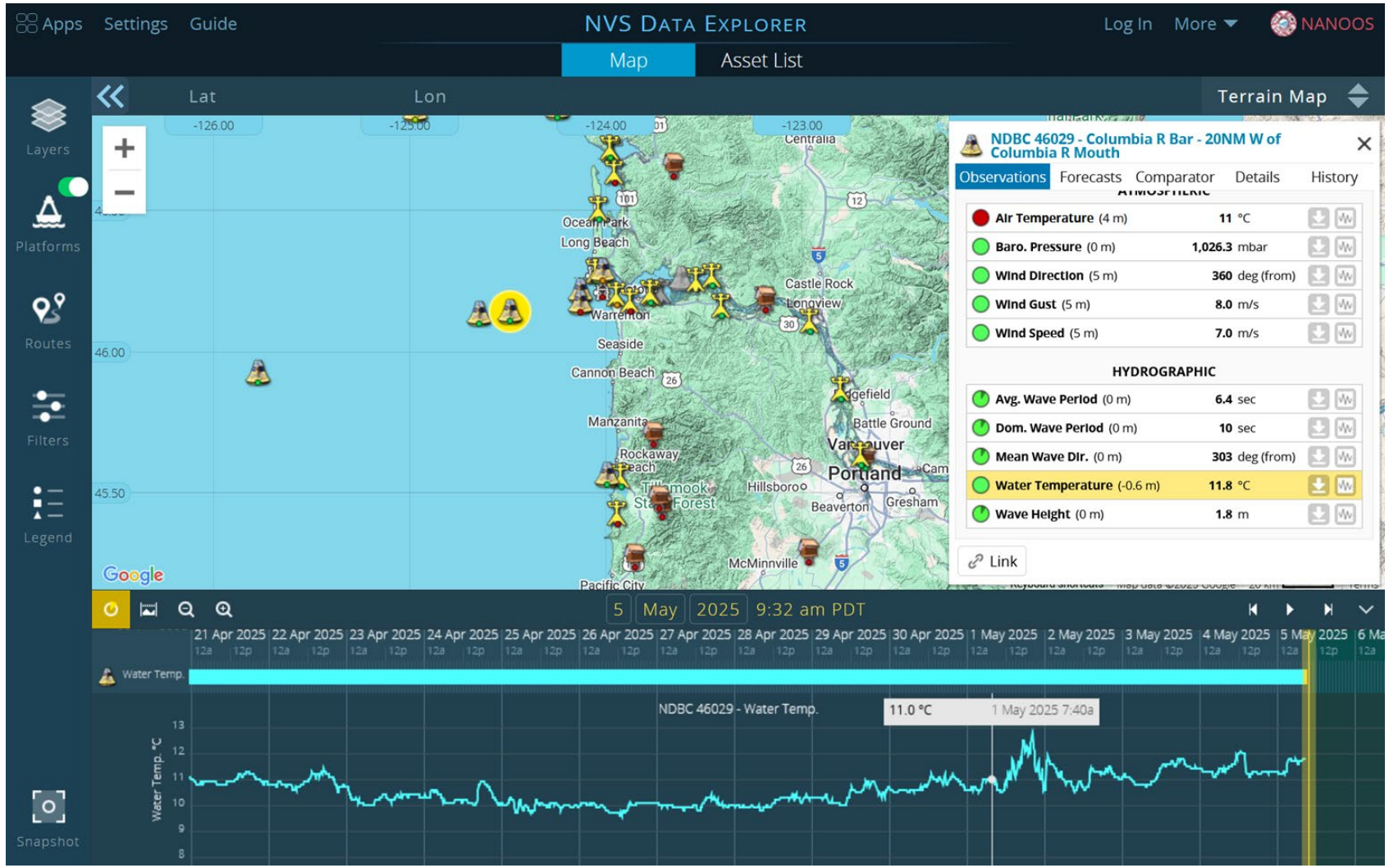
- Near real-time water quality data, weather and sea conditions from in-situ assets like buoys, fixed platforms, etc.
- Water quality forecast models, including aragonite, pH, nitrates, phytoplankton, etc.
- Currents, wind, wave and weather forecasts
- Temperature and chlorophyll satellite data
- Tide forecasts and water level plots
- River discharge and height



nvs.nanoos.org/DataExplorer

NVS Data Explorer:

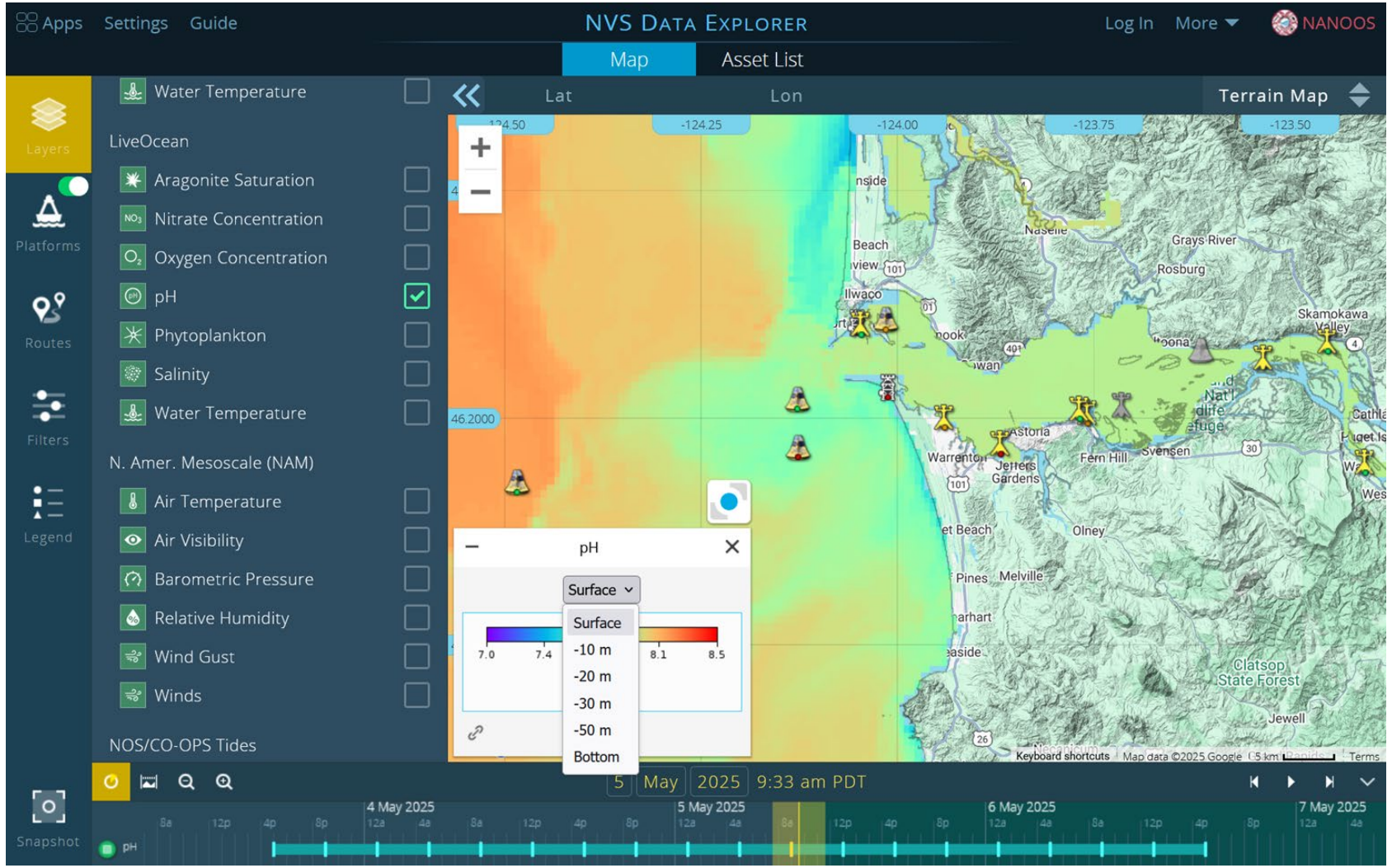
- **Near real-time water quality data, weather and sea conditions from in-situ assets like buoys, fixed platforms, etc.**
- Water quality forecast models, including aragonite, pH, nitrates, phytoplankton, etc.
- Currents, wind, wave and weather forecasts
- Temperature and chlorophyll satellite data
- Tide forecasts and water level plots
- River discharge and height

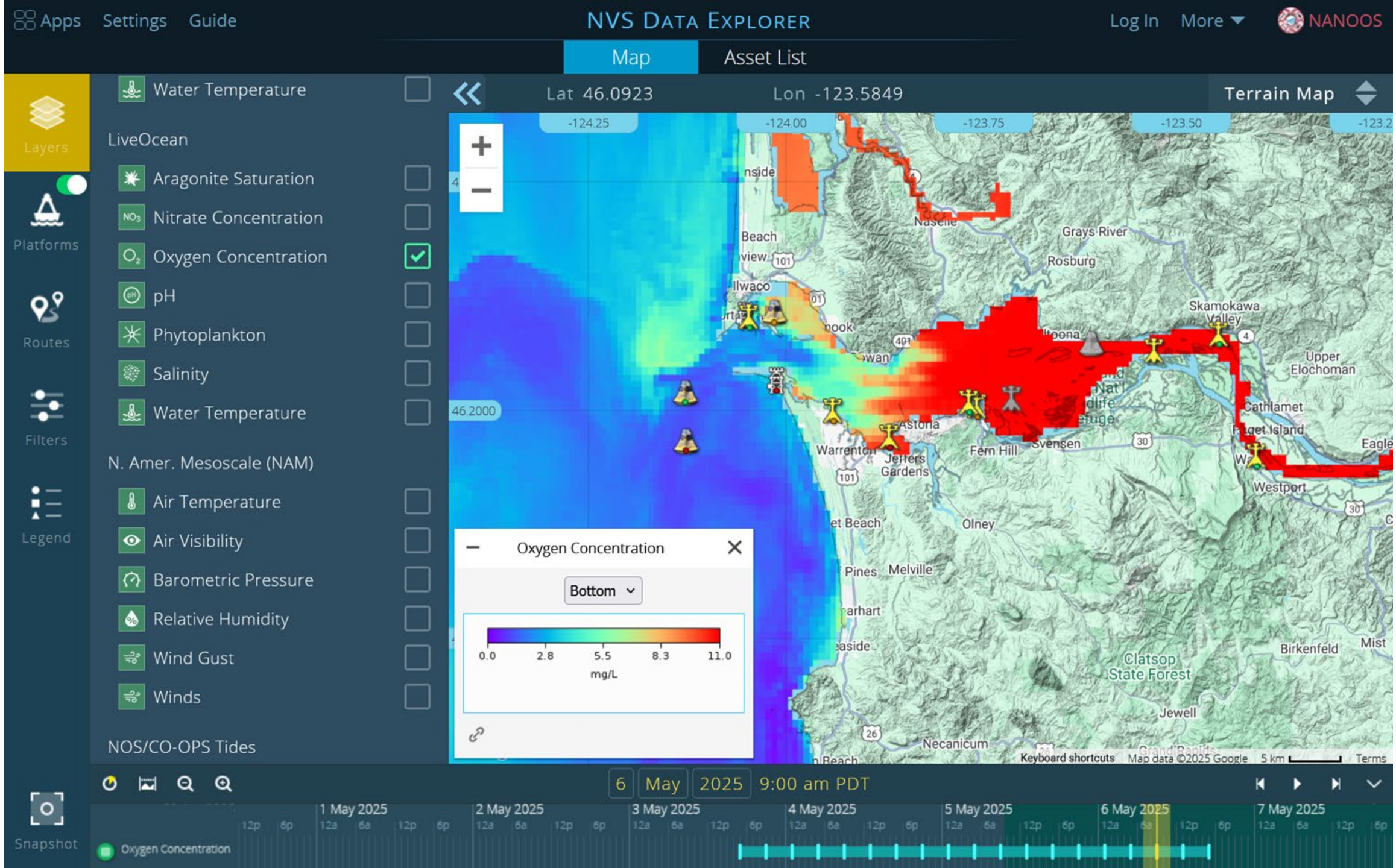


nvs.nanoos.org/DataExplorer

NVS Data Explorer:

- Near real-time water quality data, weather and sea conditions from in-situ assets like buoys, fixed platforms, etc.
- **Water quality forecast models, including aragonite, pH, nitrates, phytoplankton, etc.**
- Currents, wind, wave and weather forecasts
- Temperature and chlorophyll satellite data
- Tide forecasts and water level plots
- River discharge and height

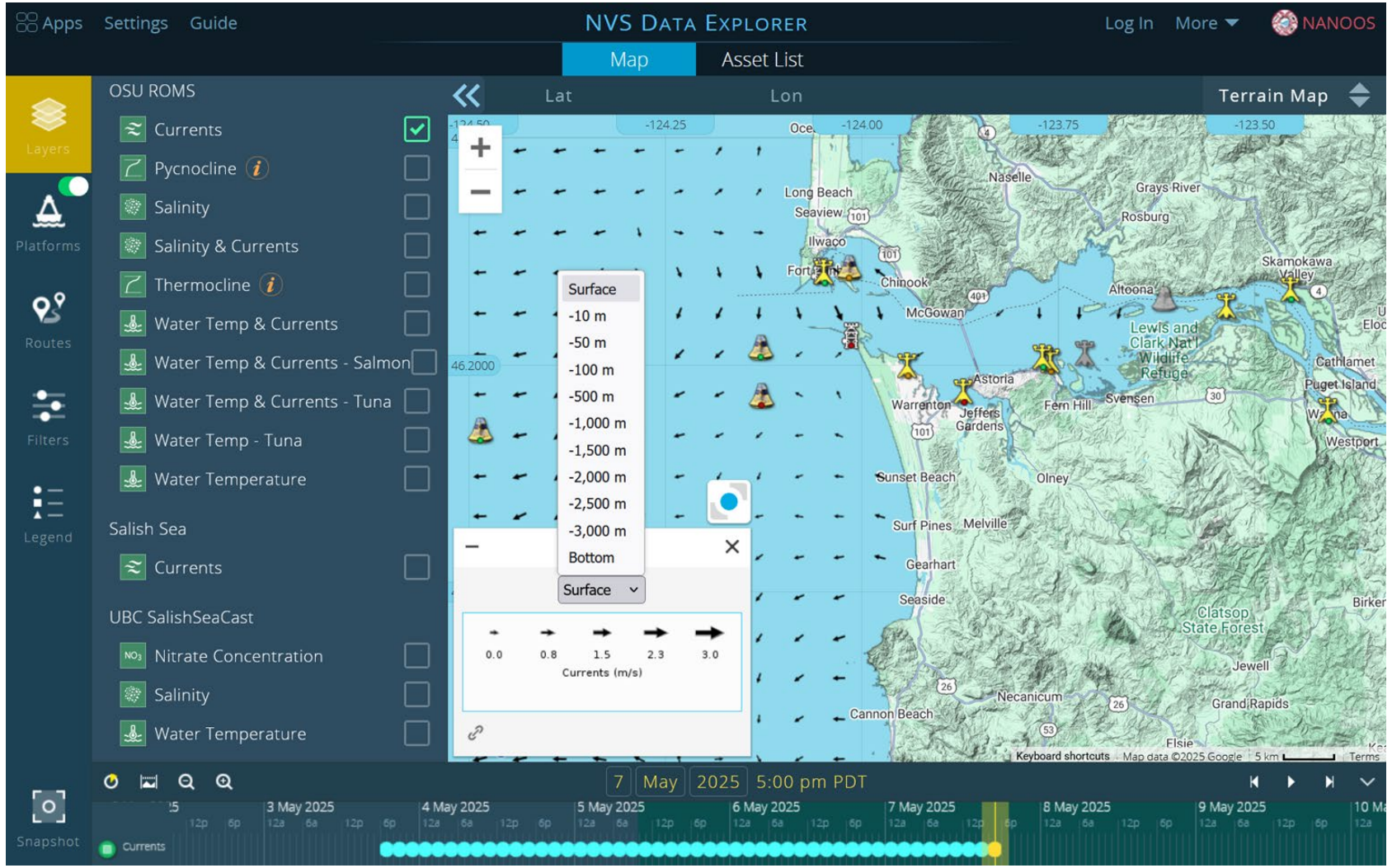



Apps
Settings
Guide
NVS Data Explorer
Log In
More
NANOOS
Map
Asset List
Layers
Platforms
Routes
Filters
Legend
Snapshot
Water Temperature
LiveOcean
Aragonite Saturation
Nitrate Concentration
Oxygen Concentration
pH
Phytoplankton
Salinity
Water Temperature
N. Amer. Mesoscale (NAM)
Air Temperature
Air Visibility
Barometric Pressure
Relative Humidity
Wind Gust
Winds
NOS/CO-OPS Tides
Lat 46.0923
Lon -123.5849
Terrain Map
-124.25
-124.00
-123.75
-123.50
46.2000
Oxygen Concentration
Bottom
0.0
2.8
5.5
8.3
11.0
mg/L
Astoria
Warrenton
Jeffers Gardens
Fern Hill
Svensen
Olney
Pines
Melville
Clatsop State Forest
Jewell
Necanicum
Rosburg
Grays River
Skamokawa Valley
Upper Elochoman
Cathlamet
Westport
Birkenfeld
Keyboard shortcuts
Map data ©2025 Google
5 km
Terms
6 May 2025 9:00 am PDT
1 May 2025
2 May 2025
3 May 2025
4 May 2025
5 May 2025
6 May 2025
7 May 2025
Oxygen Concentration

nvs.nanoos.org/DataExplorer

NVS Data Explorer:

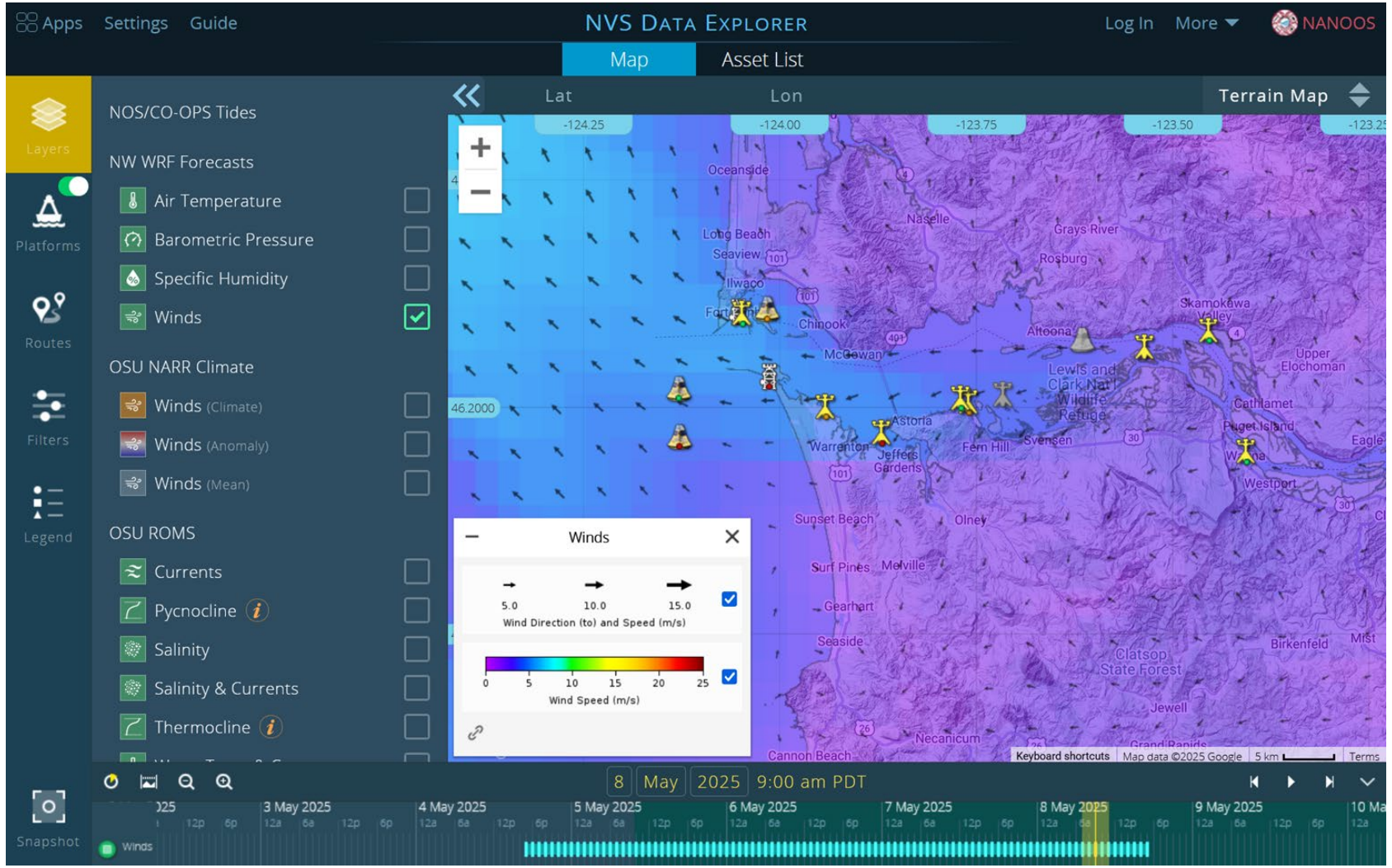
- Near real-time water quality data, weather and sea conditions from in-situ assets like buoys, fixed platforms, etc.
- Water quality forecast models, including aragonite, pH, nitrates, phytoplankton, etc.
- **Currents, wind, wave and weather forecasts**
- Temperature and chlorophyll satellite data
- Tide forecasts and water level plots
- River discharge and height



nvs.nanoos.org/DataExplorer

NVS Data Explorer:

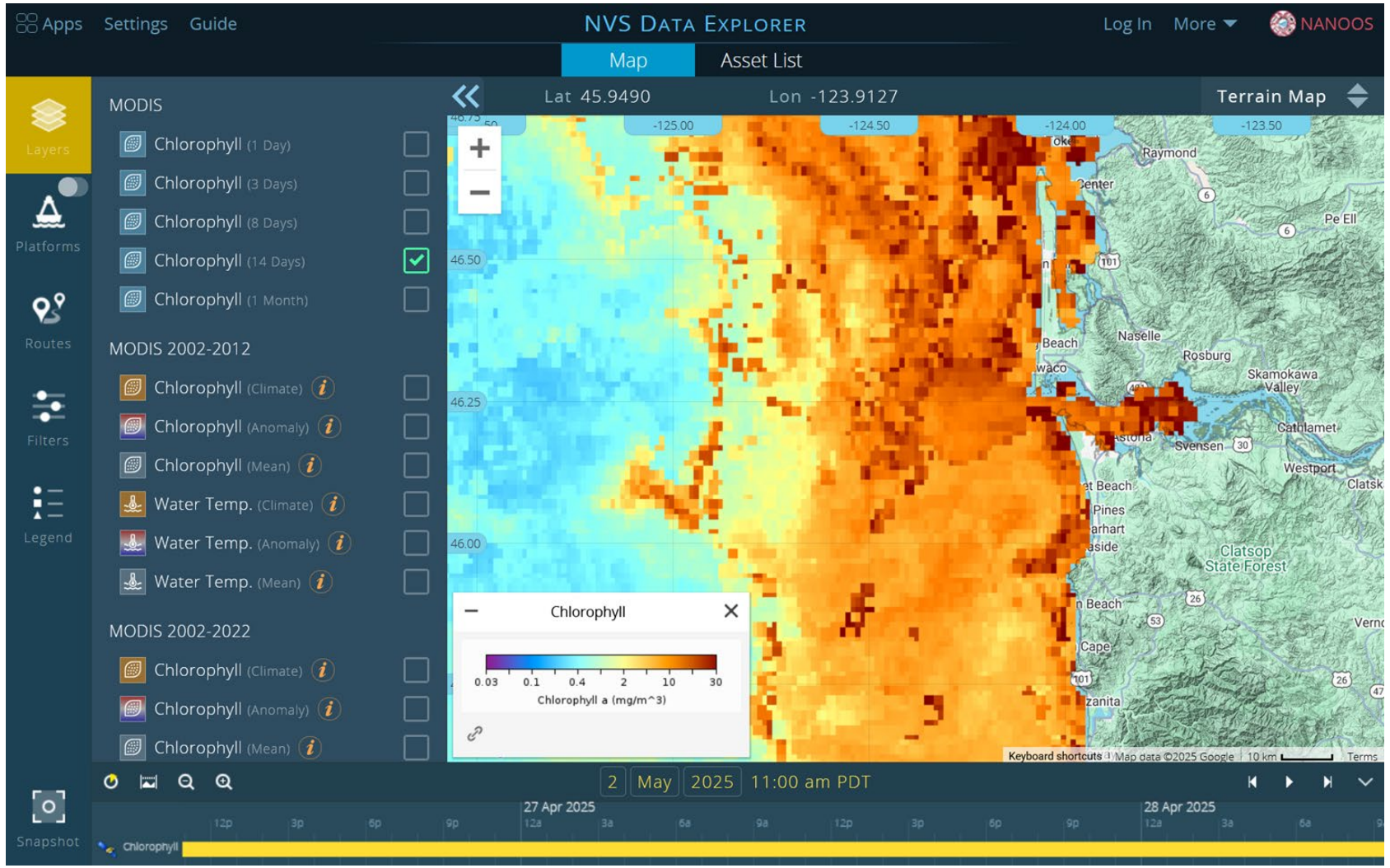
- Near real-time water quality data, weather and sea conditions from in-situ assets like buoys, fixed platforms, etc.
- Water quality forecast models, including aragonite, pH, nitrates, phytoplankton, etc.
- **Currents, wind, wave and weather forecasts**
- Temperature and chlorophyll satellite data
- Tide forecasts and water level plots
- River discharge and height



nvs.nanoos.org/DataExplorer

NVS Data Explorer:

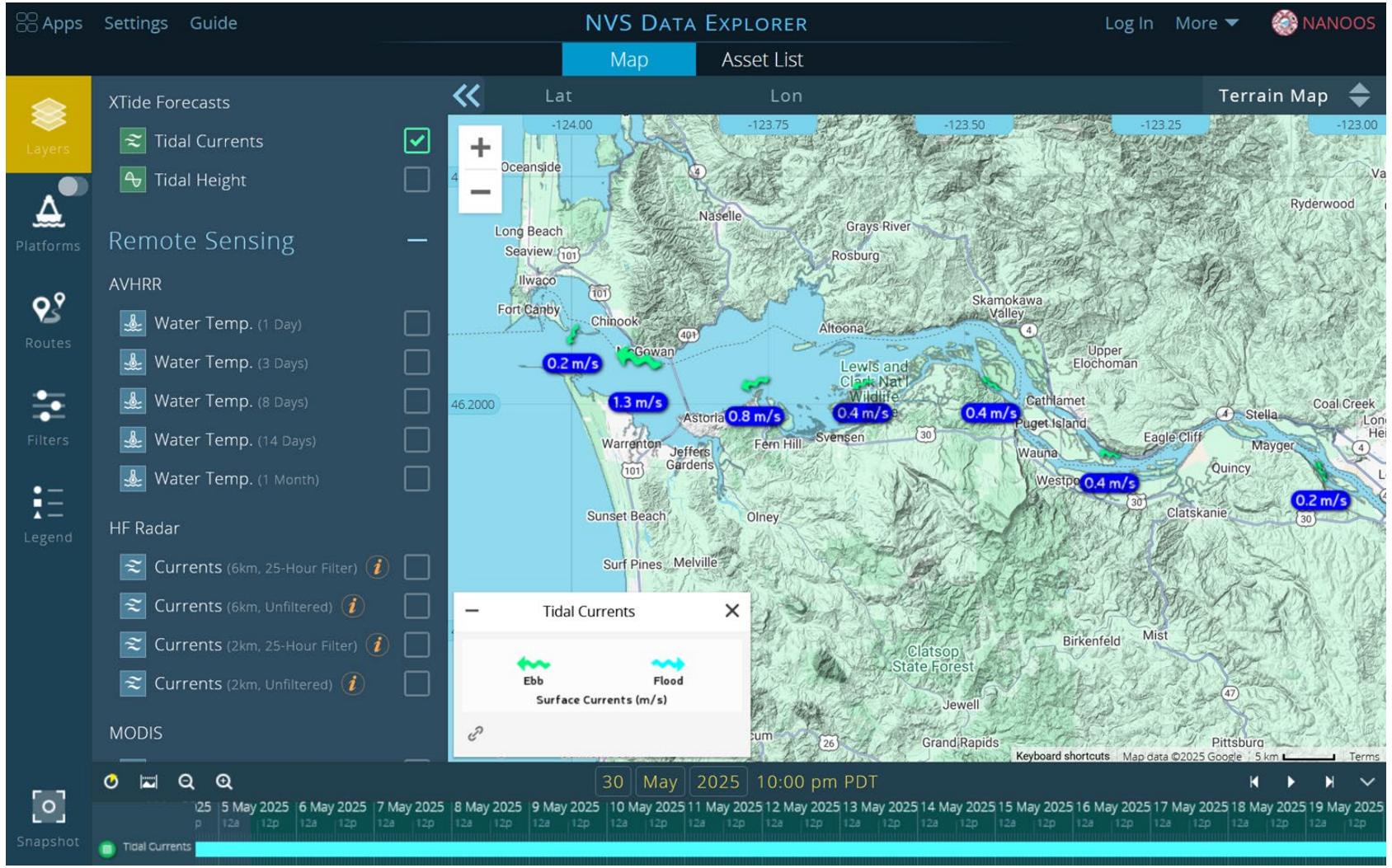
- Near real-time water quality data, weather and sea conditions from in-situ assets like buoys, fixed platforms, etc.
- Water quality forecast models, including aragonite, pH, nitrates, phytoplankton, etc.
- Currents, wind, wave and weather forecasts
- **Temperature and chlorophyll satellite data**
- Tide forecasts and water level plots
- River discharge and height



nvs.nanoos.org/DataExplorer

NVS Data Explorer:

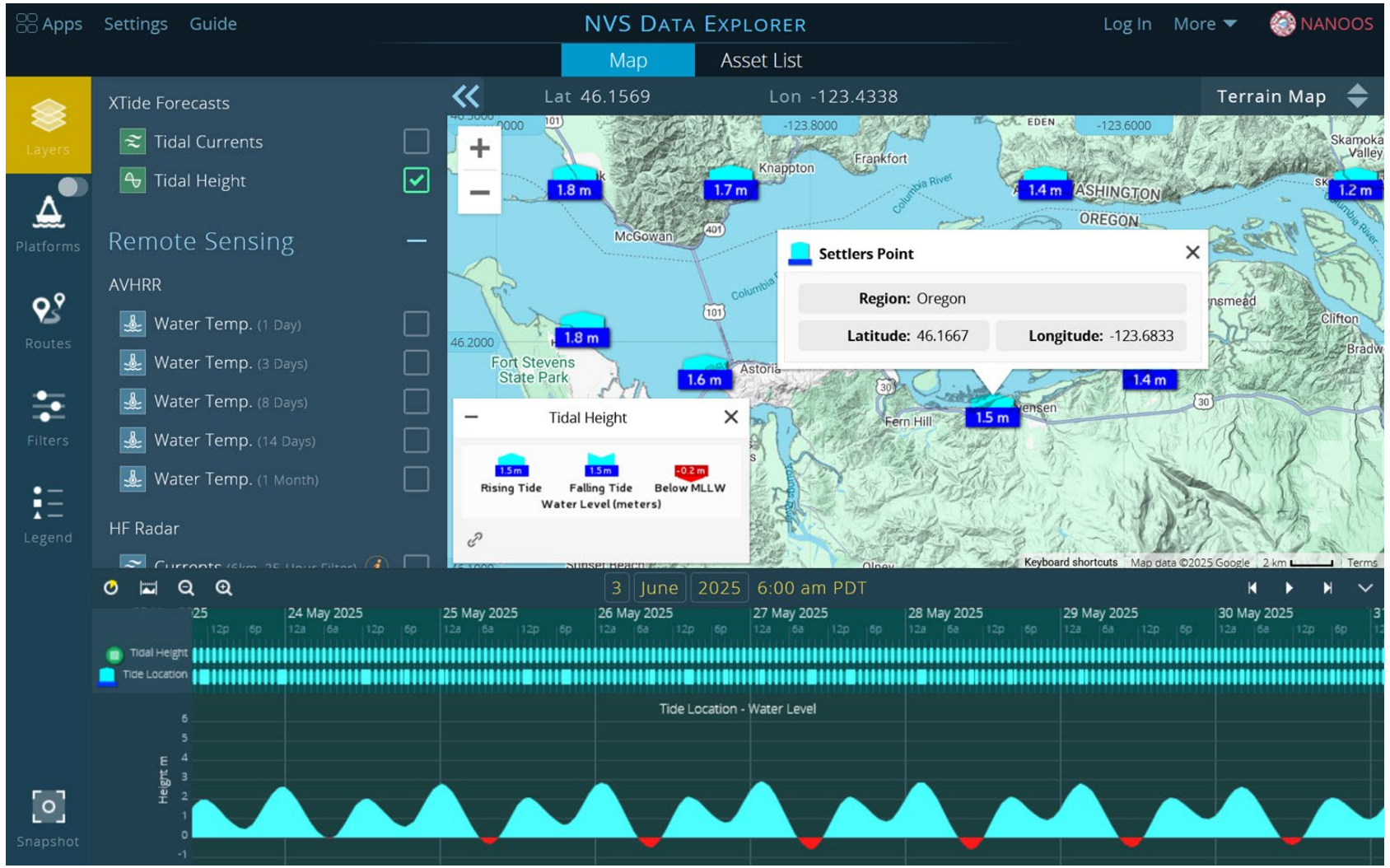
- Near real-time water quality data, weather and sea conditions from in-situ assets like buoys, fixed platforms, etc.
- Water quality forecast models, including aragonite, pH, nitrates, phytoplankton, etc.
- Currents, wind, wave and weather forecasts
- Temperature and chlorophyll satellite data
- **Tide forecasts and water level plots**
- River discharge and height



nvs.nanoos.org/DataExplorer

NVS Data Explorer:

- Near real-time water quality data, weather and sea conditions from in-situ assets like buoys, fixed platforms, etc.
- Water quality forecast models, including aragonite, pH, nitrates, phytoplankton, etc.
- Currents, wind, wave and weather forecasts
- Temperature and chlorophyll satellite data
- **Tide forecasts and water level plots**
- River discharge and height



NVS User Specific Applications

nvs.nanoos.org

NANOOS Region User Groups:

Maritime: shipping, oil transport/spill remediation

Fisheries: salmon, shellfish, groundfish, aquaculture

Environmental conditions: HABs, hypoxia, ocean acidification

Shoreline: erosion, inundation

Hazards: Search and rescue, national security, tsunami evacuation

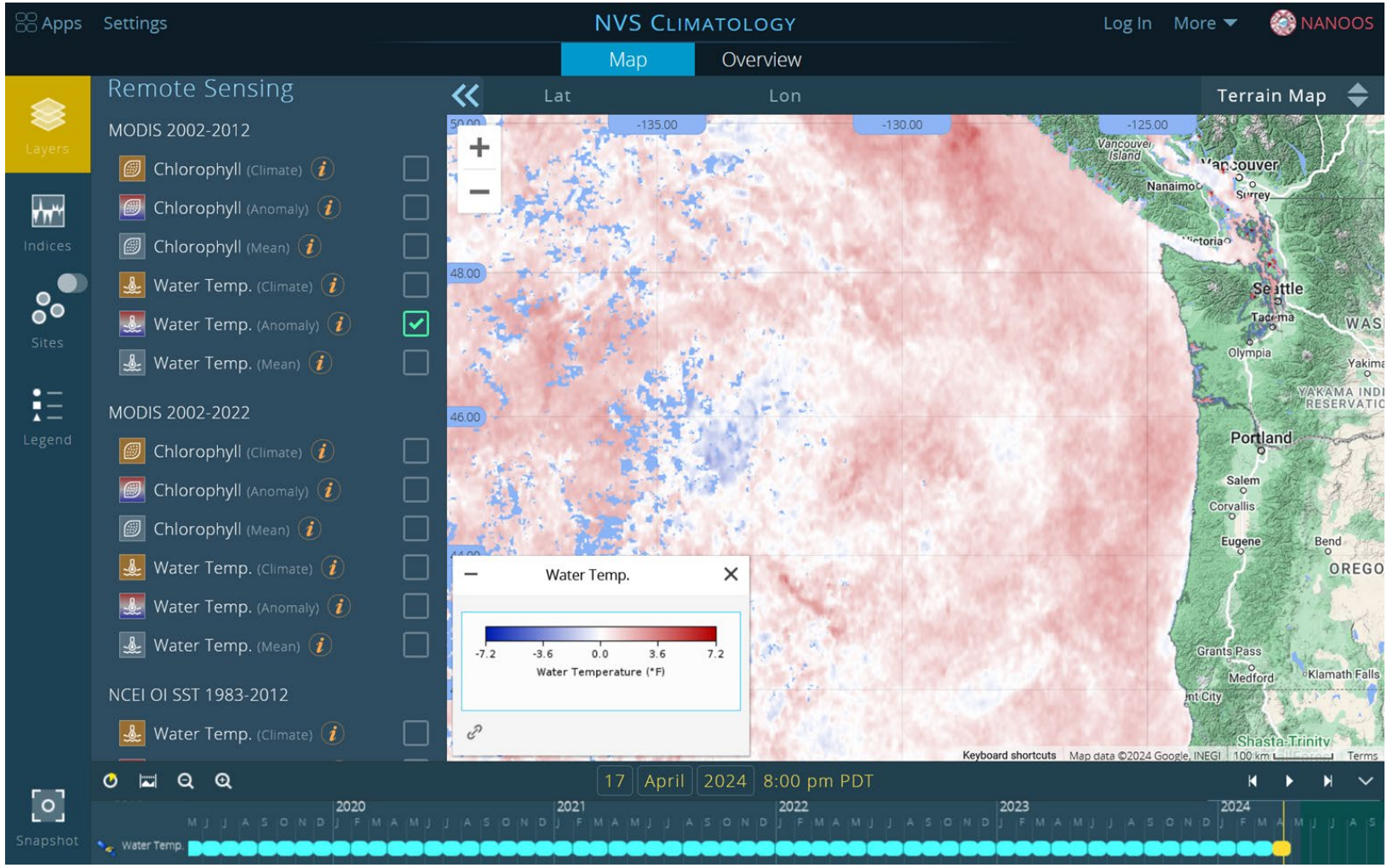
Educators: formal, informal, research

Marine recreation: boating, surfing, diving

nvs.nanoos.org/Climatology

NVS Climatology:

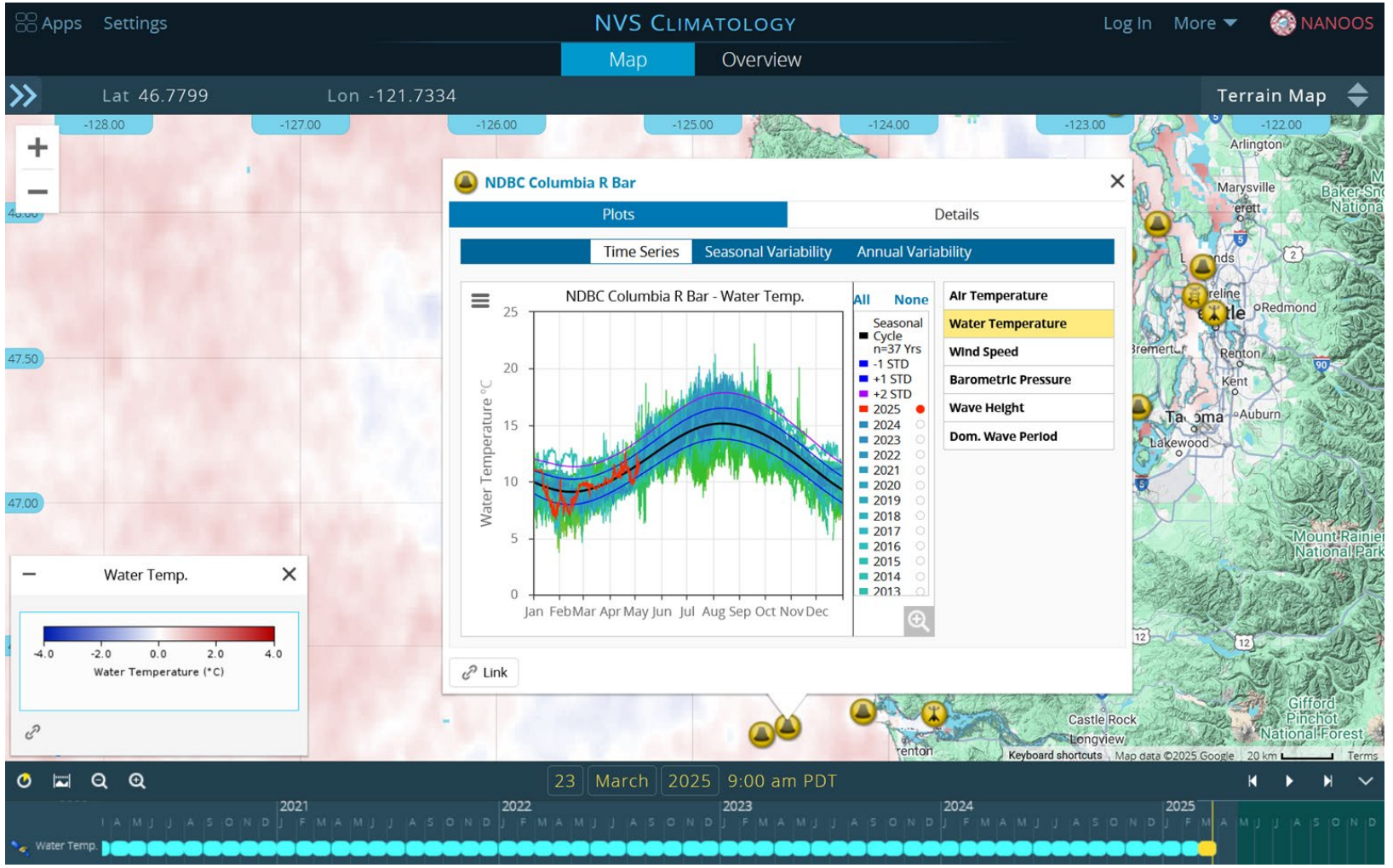
- Easily compare conditions (means and anomalies) between different months or years
- Overlays allow for quick and easy comparison over a large spatial range
- Interannual comparison using the timeline at the bottom, just toggle between different months or years
- Individual asset (buoy, station, etc.) timeseries, seasonal and annual variability



nvs.nanoos.org/Climatology

NVS Climatology:

- Easily compare conditions (means and anomalies) between different months or years
- Overlays allow for quick and easy comparison over a large spatial range
- Interannual comparison using the timeline at the bottom, just toggle between different months or years
- Individual asset (buoy, station, etc.) timeseries, seasonal and annual variability

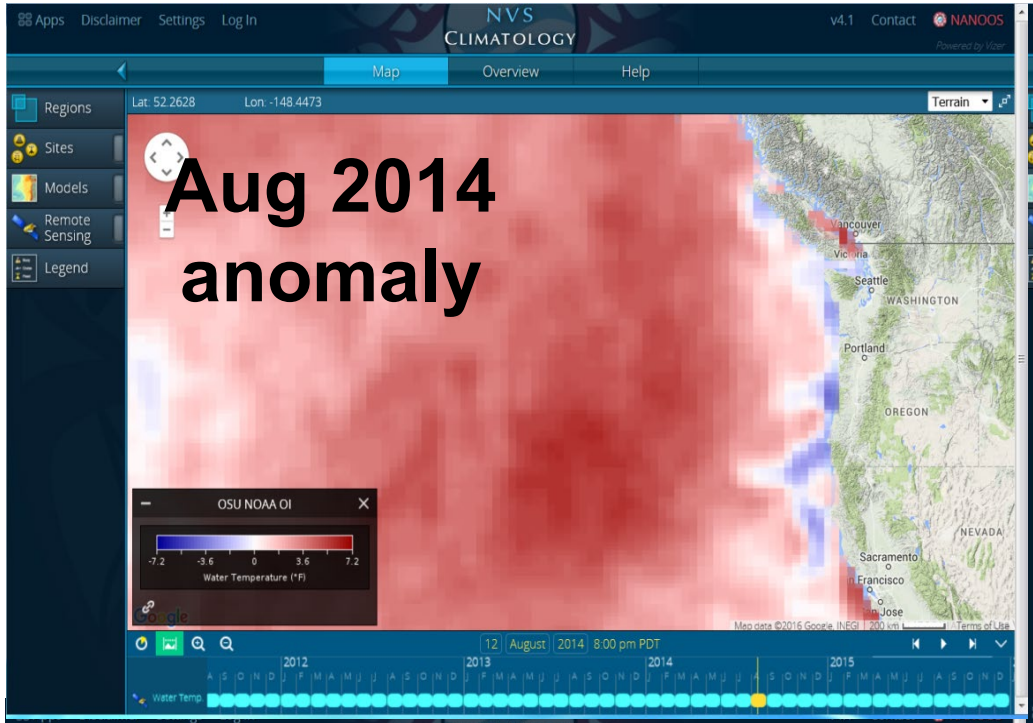


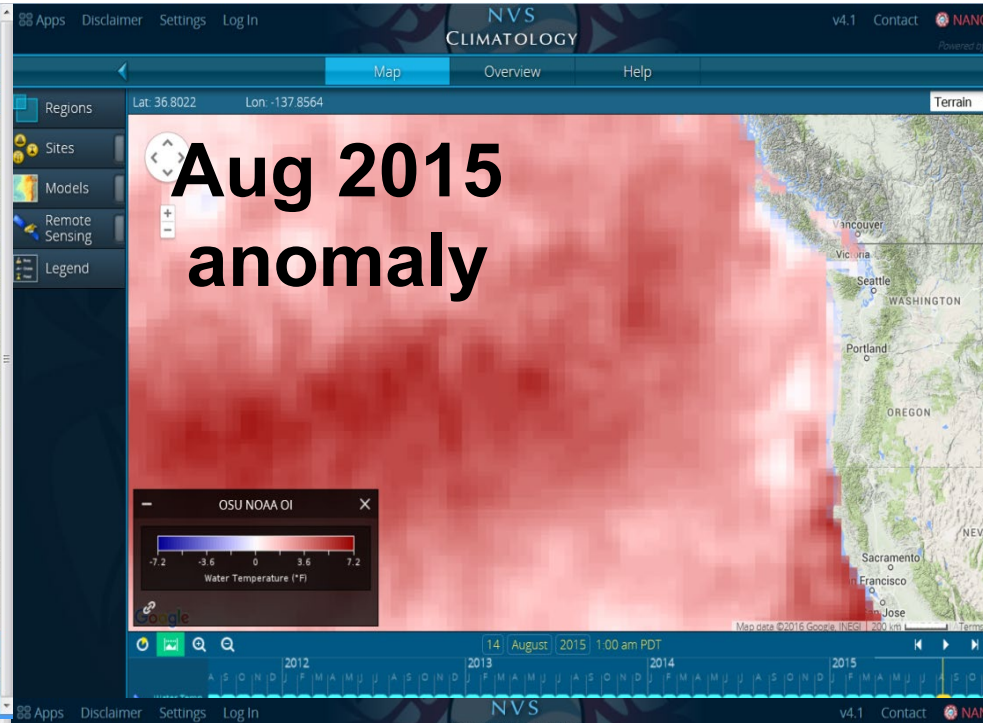
“The Blob”

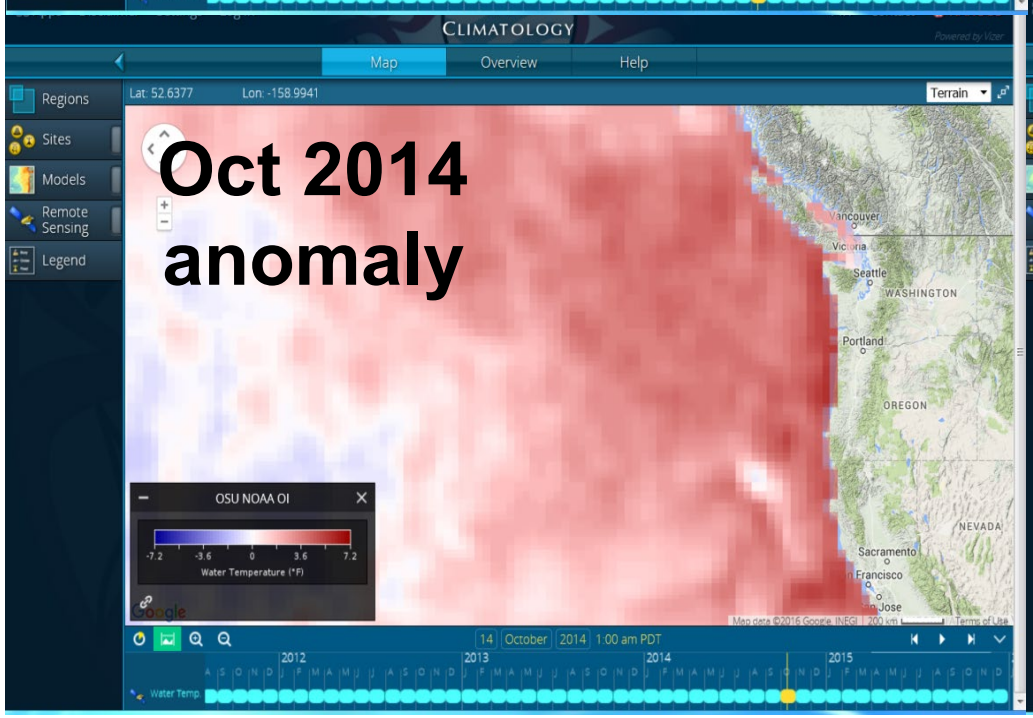
The marine heat wave known as “the blob” lasted from late 2013 through 2015.

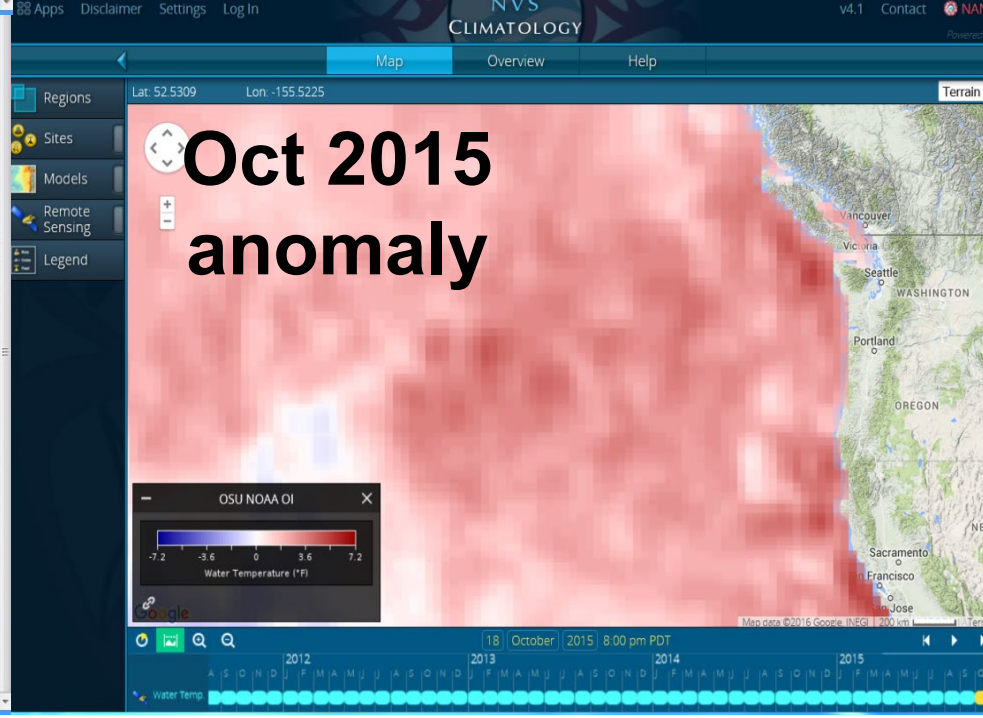
Anomalous SSTs were mostly kept offshore during 2014 by seasonal upwelling, until the shift to downwelling in fall 2014 brought warmer waters to the coast and into the Columbia River Estuary.

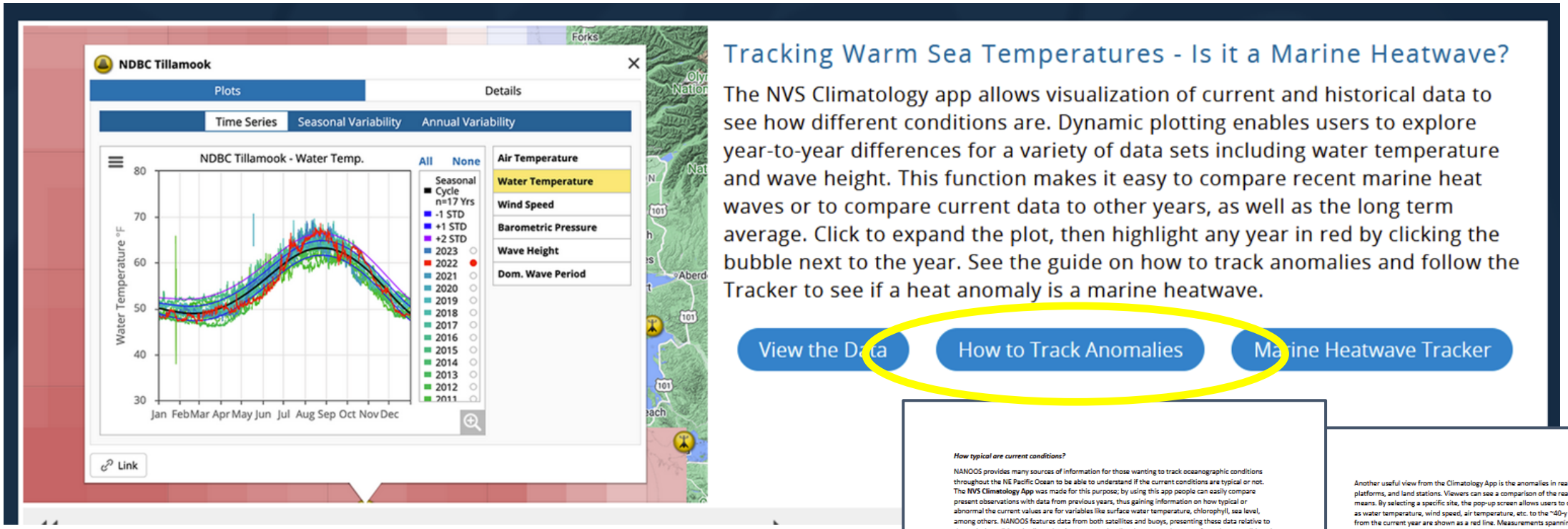
Dynamics were different in 2015.

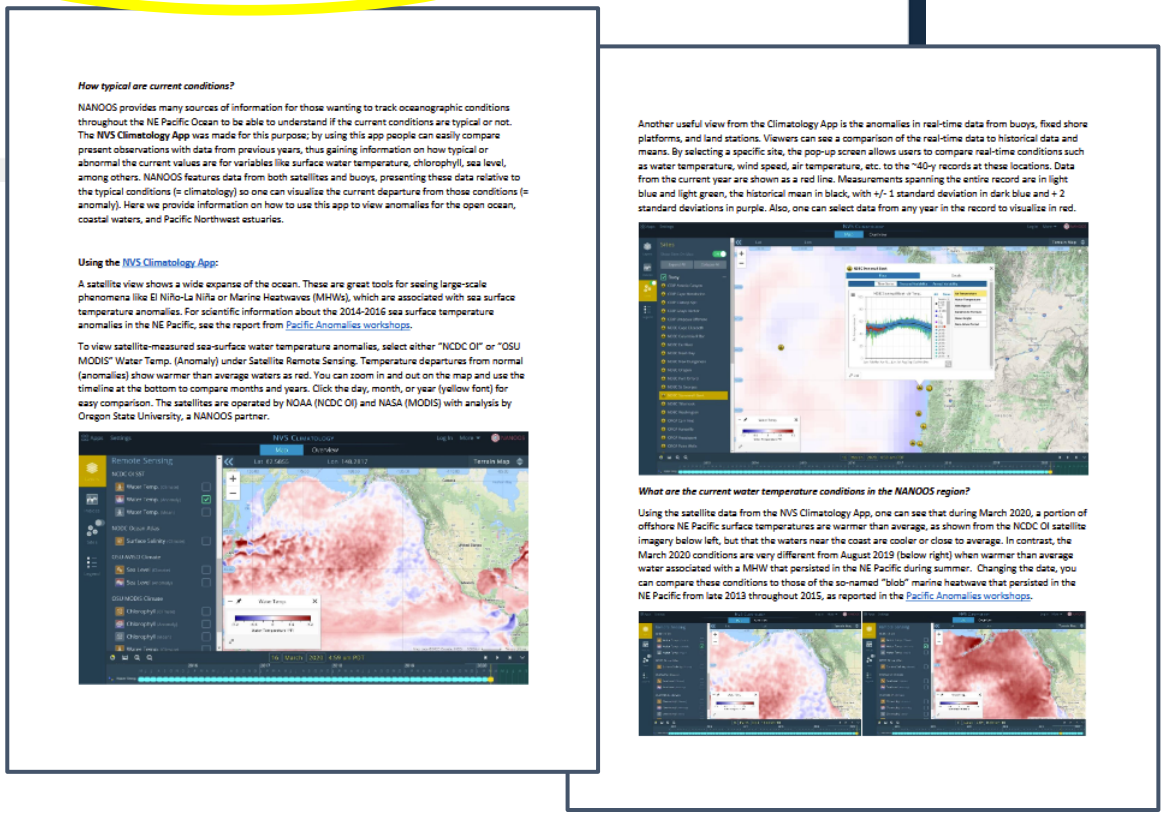












How typical are current conditions?

NANOOS provides many sources of information for those wanting to track oceanographic conditions throughout the NE Pacific Ocean to be able to understand if the current conditions are typical or not. The **NVS Climatology App** was made for this purpose; by using this app people can easily compare present observations with data from previous years, thus gaining information on how typical or abnormal the current values are for variables like surface water temperature, chlorophyll, sea level, among others. NANOOS features data from both satellites and buoys, presenting these data relative to the typical conditions (= climatology) so one can visualize the current departure from those conditions (= anomaly). Here we provide information on how to use this app to view anomalies for the open ocean, coastal waters, and Pacific Northwest estuaries.

Using the NVS Climatology App:

A satellite view shows a wide expanse of the ocean. These are great tools for seeing large-scale phenomena like El Niño-La Niña or Marine Heatwaves (MHWs), which are associated with sea surface temperature anomalies. For scientific information about the 2014-2016 sea surface temperature anomalies in the NE Pacific, see the report from Pacific Anomalies workshops.

To view satellite-measured sea-surface water temperature anomalies, select either "NCDC OI" or "OSU MODIS" Water Temp. (Anomaly) under Satellite Remote Sensing. Temperature departures from normal (anomalies) show warmer than average waters as red. You can zoom in and out on the map and use the timeline at the bottom to compare months and years. Click the day, month, or year (yellow font) for easy comparison. The satellites are operated by NOAA (NCDC OI) and NASA (MODIS) with analysis by Oregon State University, a NANOOS partner.

Another useful view from the Climatology App is the anomalies in real-time data from buoys, fixed shore platforms, and land stations. Viewers can see a comparison of the real-time data to historical data and means. By selecting a specific site, the pop-up screen allows users to compare real-time conditions such as water temperature, wind speed, air temperature, etc. to the ~40-y records at these locations. Data from the current year are shown as a red line. Measurements spanning the entire record are in light blue and light green, the historical mean in black, with +/- 1 standard deviation in dark blue and + 2 standard deviations in purple. Also, one can select data from any year in the record to visualize in red.

What are the current water temperature conditions in the NANOOS region?

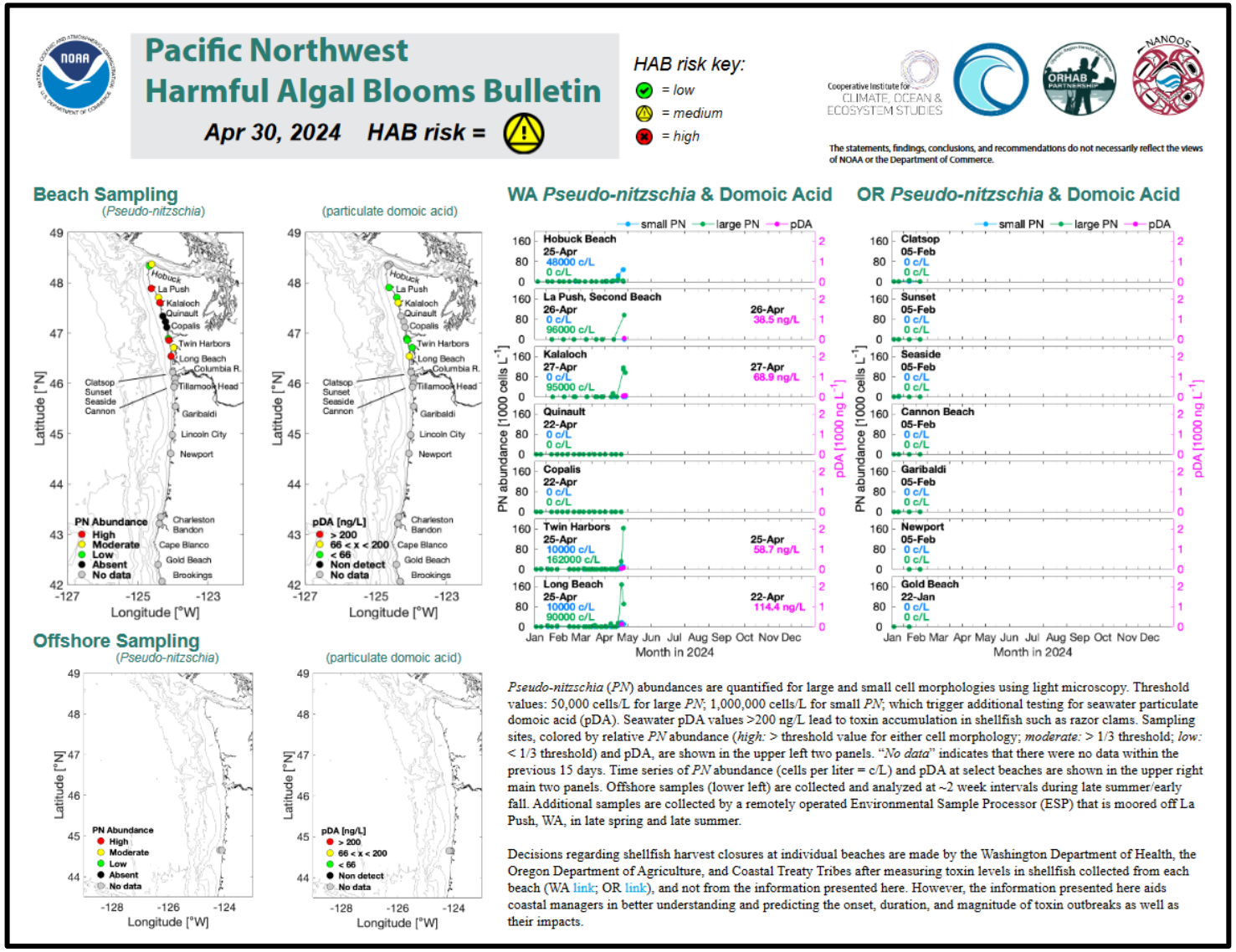
Using the satellite data from the NVS Climatology App, one can see that during March 2020, a portion of offshore NE Pacific surface temperatures are warmer than average, as shown from the NCDC OI satellite imagery below left, but that the waters near the coast are cooler or close to average. In contrast, the March 2020 conditions are very different from August 2019 (below right) when warmer than average water associated with a MHW that persisted in the NE Pacific during summer. Changing the date, you can compare these conditions to those of the so-named "blob" marine heatwave that persisted in the NE Pacific from late 2013 throughout 2015, as reported in the Pacific Anomalies workshops.

Using the NVS Climatology app to track anomalies

www.nanoos.org/products/habs/real-time/

Real-time HABs:

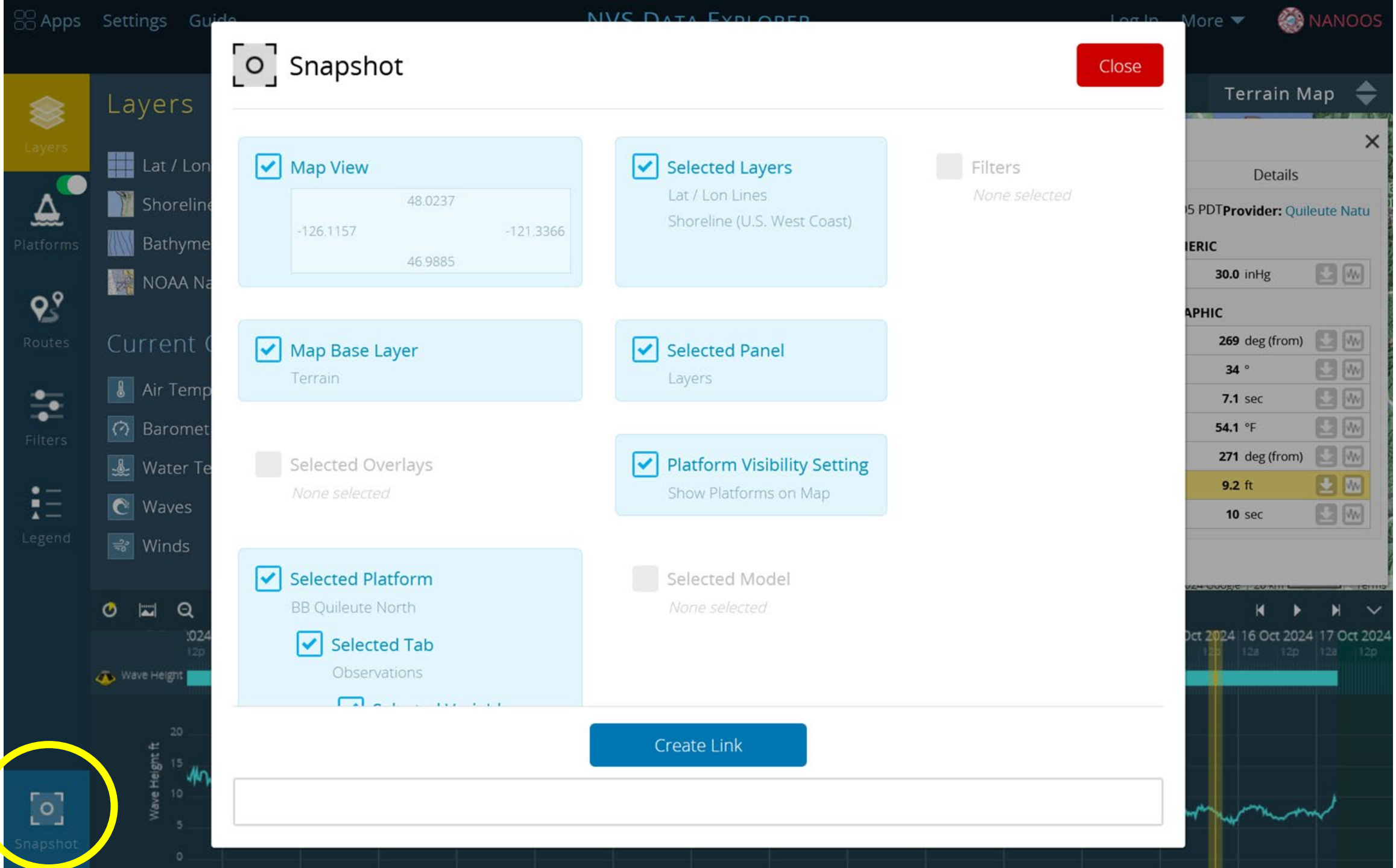
- Environmental Sample Processor (ESP) off the coast of La Push, WA monitors specific algal species and domoic acid
- Seasonal real-time observations
- Forecasts provide an early warning of HABs to coastal shellfish managers
- **PNW HAB Bulletins produced through the ORHAB Partnership**



www.nanoos.org/education/lesson_plans

Education: Increasing Ocean Literacy

- Middle and high school engagement including visits, mentorship, career expos, etc.
- Undergraduate internships and volunteer opportunities
- Teacher training
- Lesson plans available online


Apps
Settings
Guide
NVS Data Explorer
Log In
More
NANOOS
Layers
Platforms
Routes
Filters
Legend
Snapshot
Layers
Lat / Lon
Shoreline
Bathyme
NOAA Na
Current
Air Temp
Baromet
Water Te
Waves
Winds
Terrain Map
Details
Provider: Quileute Natu
30.0 inHg
269 deg (from)
34 °
7.1 sec
54.1 °F
271 deg (from)
9.2 ft
10 sec
16 Oct 2024
17 Oct 2024
Wave Height
Wave Height ft
Snapshot
Close
Map View
48.0237
-126.1157
-121.3366
46.9885
Selected Layers
Lat / Lon Lines
Shoreline (U.S. West Coast)
Filters
None selected
Map Base Layer
Terrain
Selected Panel
Layers
Selected Overlays
None selected
Platform Visibility Setting
Show Platforms on Map
Selected Platform
BB Quileute North
Selected Tab
Observations
Selected Model
None selected
Create Link

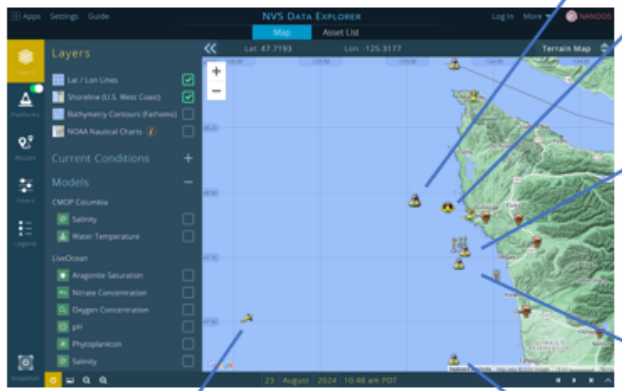
NORTHWEST ASSOCIATION OF NETWORKED OCEAN OBSERVING SYSTEMS (NANOOS)

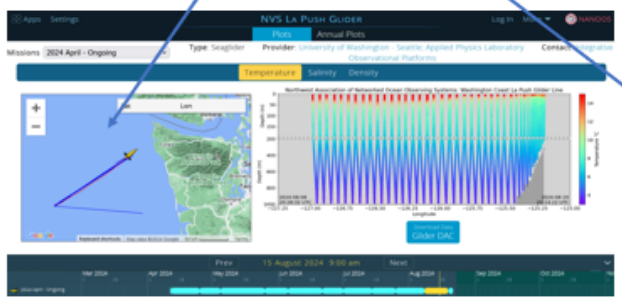
The eye on the Pacific Northwest's ocean and coast

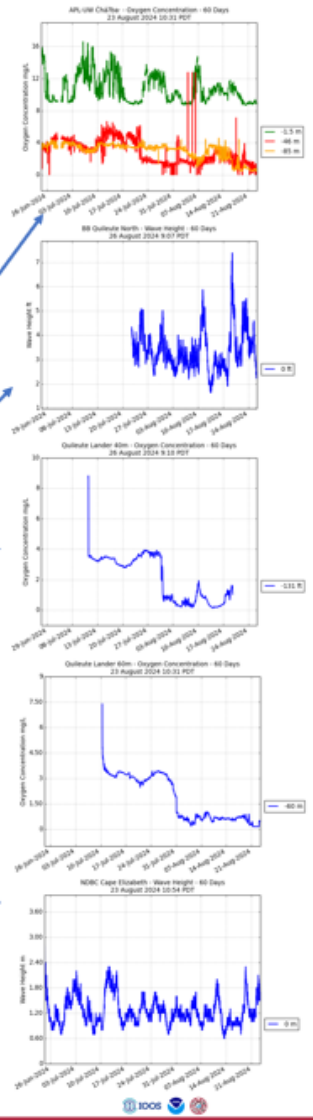
The Northwest Association of Networked Ocean Observing Systems, NANOOS, is part of a national NOAA-funded effort, the U.S. Integrated Ocean Observing System, IOOS, designed to enable the broadest access to ocean data, tools, products, and knowledge. NANOOS provides coordination of people, technology, and data to make coastal ocean information more accessible and usable.

In response to the Hoh Tribe's request, here, on two pages, we provide links to tailored information of specific interest to the Hoh Tribe accessed from our comprehensive NANOOS Visualization System (NVS).

Here, each link takes you directly to updated data for oxygen or wave height. Other variables like temperature are also available to explore. When oxygen is below 2 mg/liter, that is hypoxia and sensitive organisms may be stressed or perish; oxygen below 5 mg/liter may cause avoidance behavior in some species. See real-time oxygen data, if available, from the UW Cha'ba mooring, two Quileute Tribe moorings (1, 2), and a UW glider. See real-time wave data from a Quileute Tribe wave buoy and a NOAA NDBC mooring at Cape Elizabeth. Just click on the image and you will see the latest data on NANOOS.

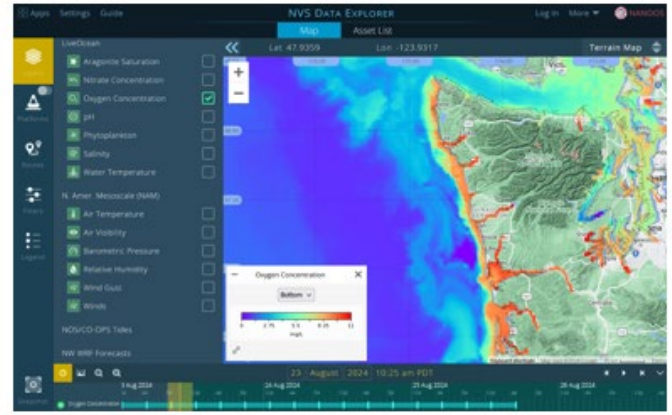






nanoos.org

nvs.nanoos.org

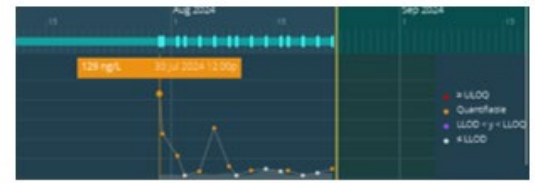


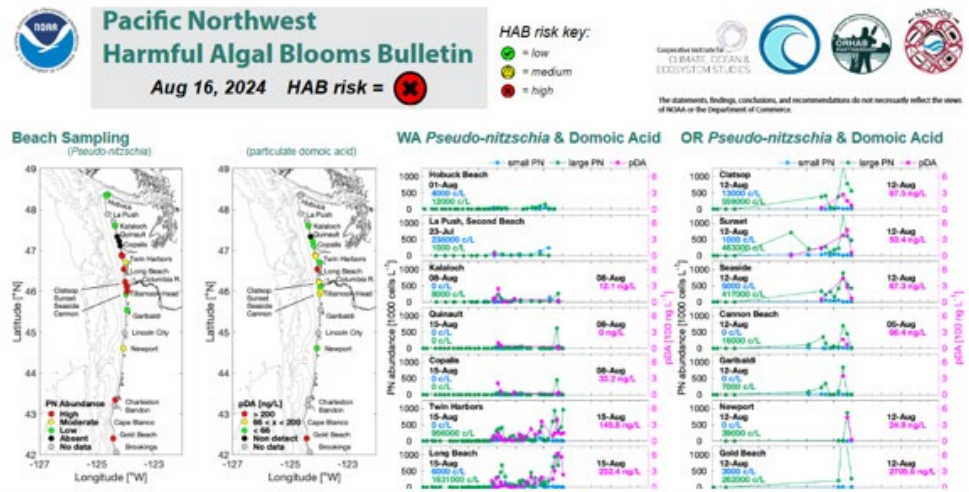
Here you can see what a UW forecast model called "LiveOcean" predicts for oxygen concentration at the sea-bed. Use the menu at left to change the variable of the model output or use the legend drop-down menu to change the depth.

We also provide access to information on Harmful Algal Blooms, both real-time toxin data and the Pacific Northwest Harmful Algal Bloom Bulletin (when these are available).

Additional items that may be of interest include 'apps' tuned to show safe boating conditions, where sea surface temperatures favor tuna or salmon, and additional forecasts of coastal properties.

Please contact us with feedback or questions!





nanoos.org

For More Information

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

Jan Newton, NANOOS Executive Director

206-543-9152 | janewton@uw.edu

Apps Settings

NVS Send a Comment

Log In More NANOOS

Comment
Disclaimer
Certification
Glossary
Version 6.2

We want to hear from you. Your ideas about what you'd like in NVS matter to us.

Let us know what works for you and what doesn't. We look forward to hearing from you.

Subject NVS

Message

Name

Email

Phone

Send Message

nvs.nanoos.org

Thank you!

We'd love your feedback… please visit us at

www.nanoos.org

rwold@uw.edu

IOOS