Pacific Northwest Waters
Gateway to Our Future

Communication through the NANOOS Visualization System

Jonathan Allan
NANOOS User Products Chair

IOOS®
INTEGRATED OCEAN OBSERVING SYSTEM

NOAA
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
U.S. DEPARTMENT OF COMMERCE

NANOOS

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 ~160 'assets'.**

  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**.

The Challenge - Many Stakeholders

- State (e.g. ODFW, WADOE, DSL,…) and Federal agencies (NOAA, NWS, FEMA, US Coast Guard,...),
- 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,
- and many others…

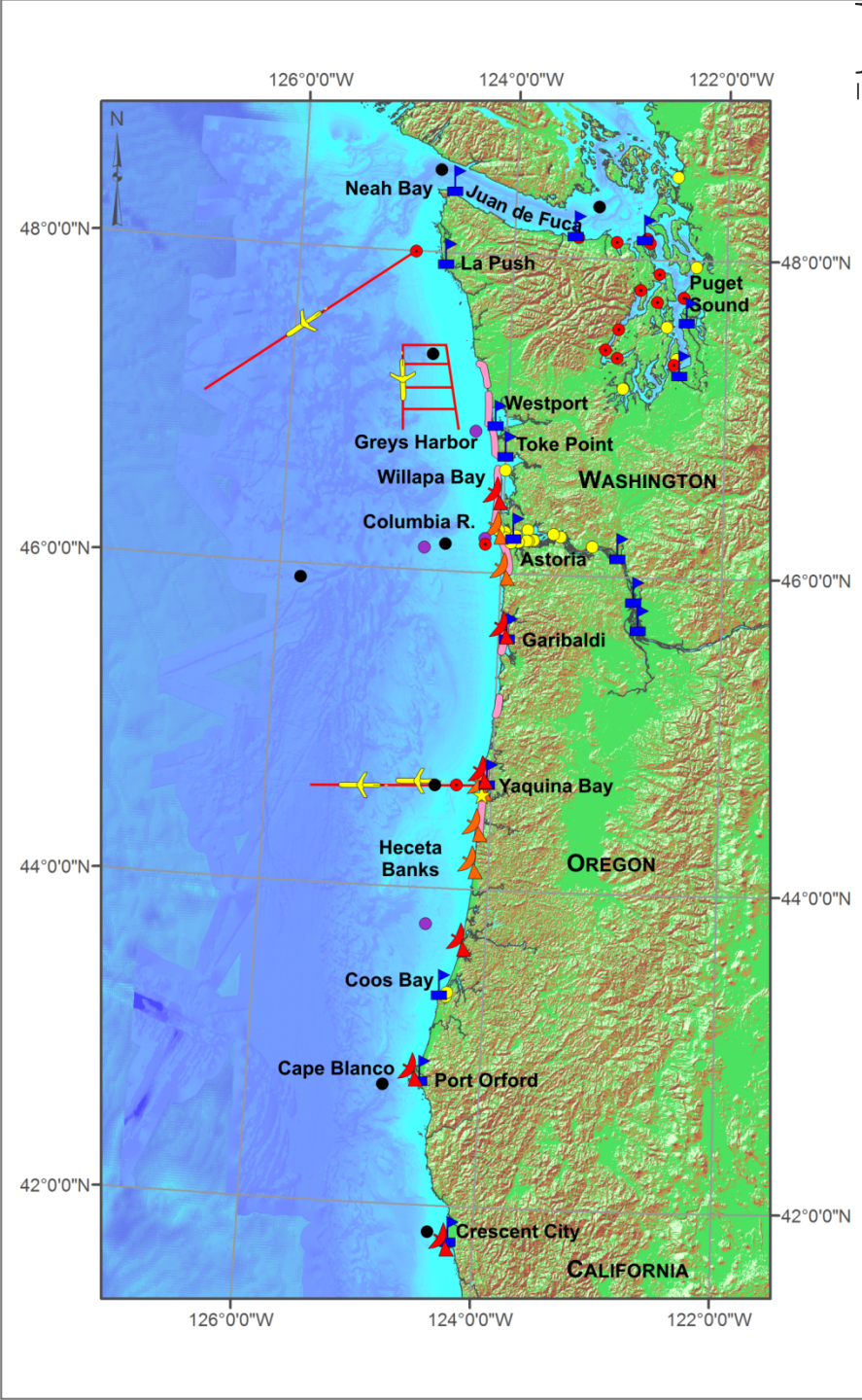
Methods of Communication

Needs to be **seamless**, **accurate**, of **sufficient temporal and spatial resolution**, and **meets user needs**;

Includes: portals, specific data/product page views, mobile applications, direct links, etc.

Key Requirements:

1) Interoperability with national-scale applications
2) Reliable, efficient ingest of data
3) Access to models, applications, tools and information products
4) A rich, yet simple (**Google-maps**) interface based around the following **core functions**:
    - ***current conditions***;
    - ***forecasts***; *and,*
    - ***access to historical data***.



INTEGRATED OCEAN OBSERVING SYSTEM

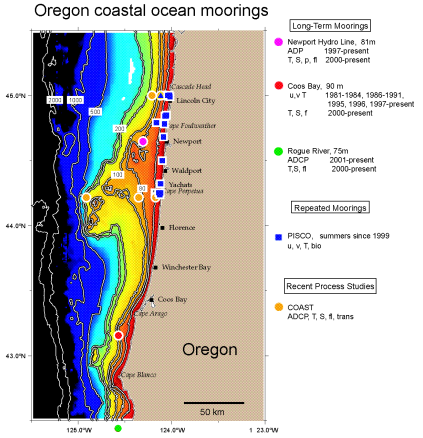
NANOOS RCOOS

Existing assets to be sustained in partnership:

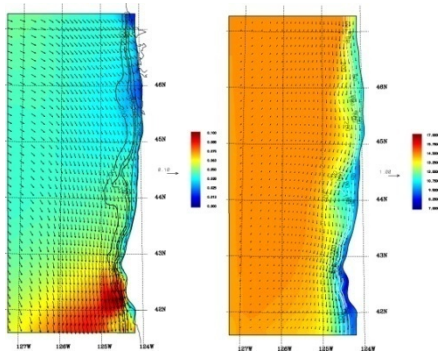
- Existing ***coastal*** and ***estuarine*** buoys
- Existing fixed mooring ***estuarine*** buoys
- Existing glider tracks
- Existing long-range (180 km range) HF radar site
- Existing standard-range (50 km range) HF radar site
- Port X-band wave radar
- Beach and shoreline assessment. Includes multiple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

Federal assets:

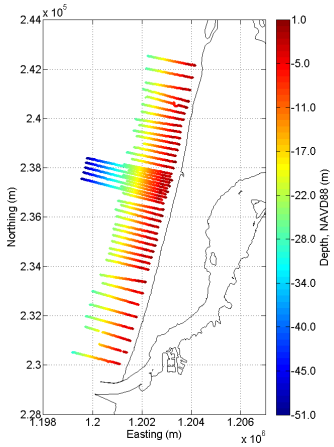
- NDBC buoys
- CDIP buoys
- NOS Tide gauges



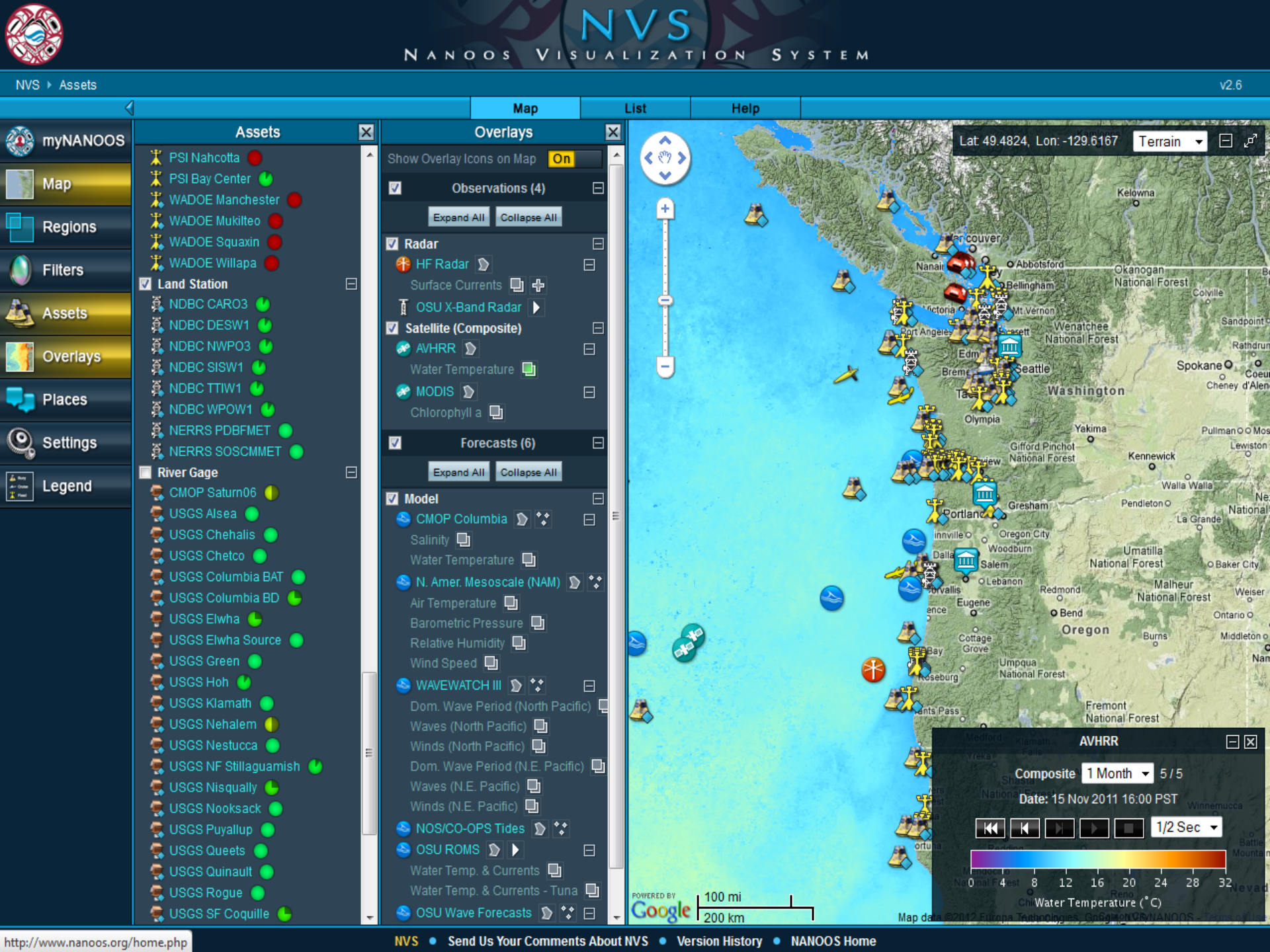
Shelf moorings & gliders



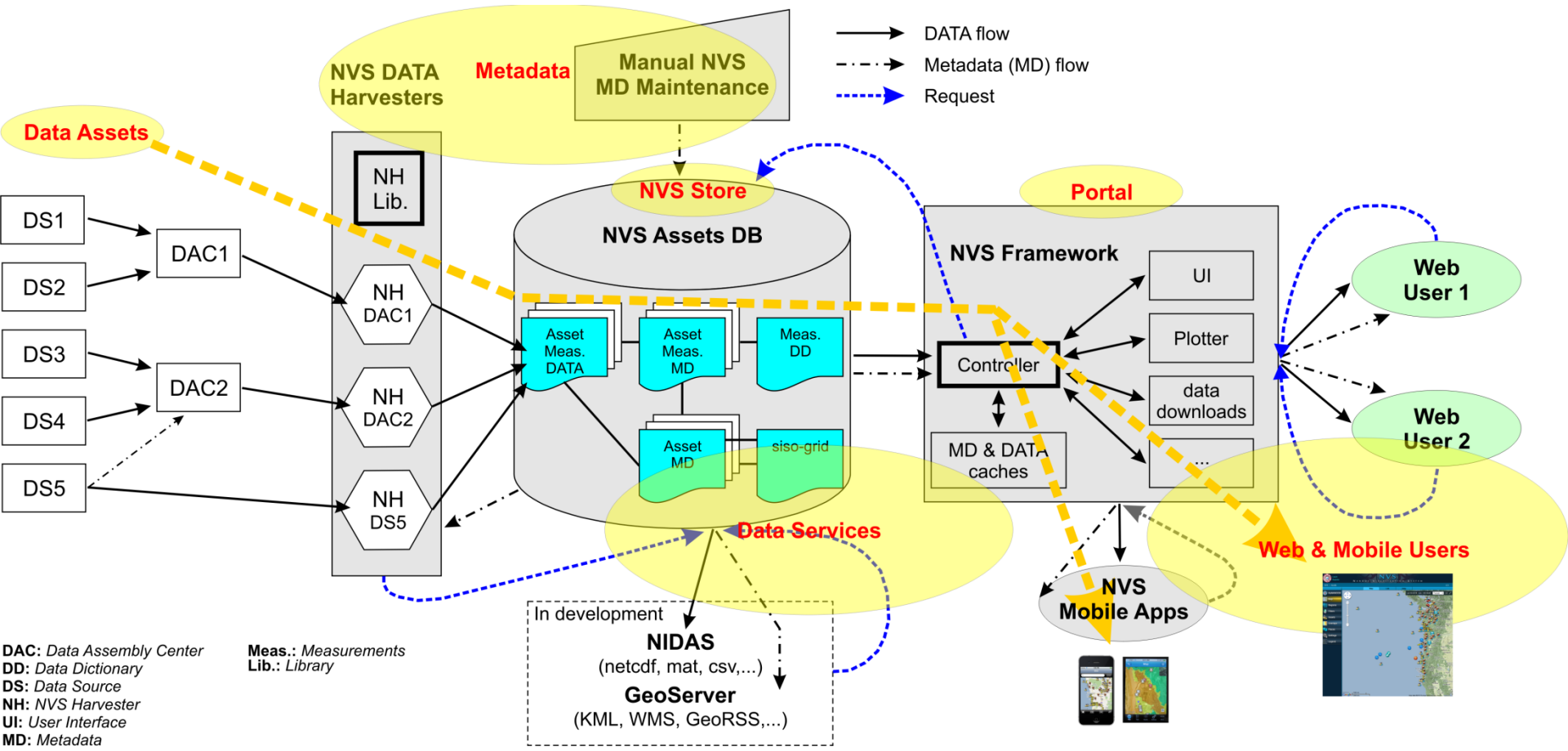
Overlays (Satellite, Models, & other geospatial data)



Shorelines & Bathymetry


NVS
Nanoos Visualization System
NVS ▸ Assets
v2.6
Map
List
Help
myNANOOS
Map
Regions
Filters
Assets
Overlays
Places
Settings
Legend
Assets
PSI Nahcotta
PSI Bay Center
WADOE Manchester
WADOE Mukilteo
WADOE Squaxin
WADOE Willapa
Land Station
NDBC CARO3
NDBC DESW1
NDBC NWPO3
NDBC SISW1
NDBC TTIW1
NDBC WPOW1
NERRS PDBFMET
NERRS SOSCMMET
River Gage
CMOP Saturn06
USGS Alsea
USGS Chehalis
USGS Chetco
USGS Columbia BAT
USGS Columbia BD
USGS Elwha
USGS Elwha Source
USGS Green
USGS Hoh
USGS Klamath
USGS Nehalem
USGS Nestucca
USGS NF Stillaguamish
USGS Nisqually
USGS Nooksack
USGS Puyallup
USGS Queets
USGS Quinault
USGS Rogue
USGS SF Coquille
Overlays
Show Overlay Icons on Map
On
Observations (4)
Expand All
Collapse All
Radar
HF Radar
Surface Currents
OSU X-Band Radar
Satellite (Composite)
AVHRR
Water Temperature
MODIS
Chlorophyll a
Forecasts (6)
Expand All
Collapse All
Model
CMOP Columbia
Salinity
Water Temperature
N. Amer. Mesoscale (NAM)
Air Temperature
Barometric Pressure
Relative Humidity
Wind Speed
WAVEWATCH III
Dom. Wave Period (North Pacific)
Waves (North Pacific)
Winds (North Pacific)
Dom. Wave Period (N.E. Pacific)
Waves (N.E. Pacific)
Winds (N.E. Pacific)
NOS/CO-OPS Tides
OSU ROMS
Water Temp. & Currents
Water Temp. & Currents - Tuna
OSU Wave Forecasts
Lat: 49.4824, Lon: -129.6167
Terrain
Kelowna
Abbotsford
Bellingham
Okanogan National Forest
Mt.Vernon
Wenatchee National Forest
Seattle
Spokane
Washington
Olympia
Yakima
Gifford Pinchot National Forest
Kennewick
Walla Walla
Pendleton
Gresham
Oregon City
Woodburn
Salem
Lebanon
Umatilla National Forest
Malheur National Forest
Redmond
Bend
Eugene
Oregon
Burns
Cottage Grove
Umpqua National Forest
Fremont National Forest
AVHRR
Composite
1 Month
5 / 5
Date: 15 Nov 2011 16:00 PST
1/2 Sec
0 4 8 12 16 20 24 28 32
Water Temperature (°C)
POWERED BY Google
100 mi
200 km
Map data
NVS
Send Us Your Comments About NVS
Version History
NANOOS Home
http://www.nanoos.org/home.php

NANOOS Visualization System (NVS) Workflow



Assets

Show Asset Icons on Map: On

Cruises, Flights, & Gliders (7)

Expand All | Collapse All

- **Cruise**
  - HCDOP Cruises
  - PRISM Cruises
- **Flight**
  - WADOE Marine Flights
- **Glider**
  - APL-UW La Push Glider
  - CMOP SW WA Glider
  - OSU Bob Glider
  - OSU Jane Glider

In-Situ Assets (143)

Expand All | Collapse All

- **Buoy**
  - APL-UW NEMO Profiler
  - APL-UW NPB-1
  - APL-UW NPB-2
  - APL-UW Ćhá?ba·
  - CDIP Astoria Canyon
  - CDIP Cape Mendocino
  - CDIP Clatsop Spit
  - CDIP Grays Harbor
  - CDIP Humboldt Bay
  - CDIP Station Papa
  - CDIP Umpqua
  - CMOP Saturn02
  - EC 46036
  - EC 46131
  - EC 46132

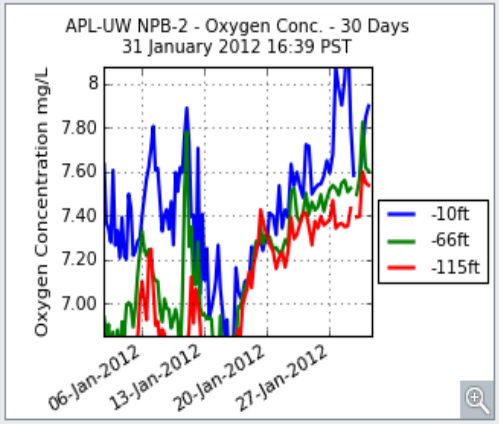
Observations | Forecasts | Comparator | Details

LSG NPB-2 Profiling Buoy at Carr Inlet

Website

Location: Puget Sound, Washington **Lat:** 47.28 **Lon:** -122.73
Provider: APL-UW **Data Source:** NANOOS-APL

Data Updated: 31 Jan 2012 16:22 PST



24 Hours | 7 Days | 30 Days

Air Temperature (7ft):	46.8 °F
Barometric Pressure (7ft):	30 in Hg
Chlorophyll	
-10ft:	0.9 µg/L
-66ft:	0.6 µg/L
-115ft:	0.7 µg/L
Oxygen Concentration	
-10ft:	7.9 mg/L
-66ft:	7.6 mg/L
-115ft:	7.5 mg/L
Oxygen Percent Sat.	
-10ft:	79.9 %
-66ft:	77.2 %
-115ft:	76.6 %
Salinity	
-10ft:	29 PSU

Link

WAVEWATCH III

Assets

- EC 46036
- EC 46131
- EC 46132
- EC 46146
- EC 46206
- ICM Marrowstone
- ICM PortAngeles
- ICM Potomac
- ICM Poulsbo
- ICM Sequim
- ICM Worden
- KC NSGE01
- KC Alki
- LOBO Yaqui
- NDBC Cape Elizabeth
- NDBC Col River Bar
- NDBC Eel River
- NDBC Neah Bay
- NDBC New Dungeness
- NDBC Oregon
- NDBC Port Orford
- NDBC St. Georges
- NDBC Stonewall Banks
- NDBC Tillamook
- NDBC Washington
- ORCA Hansville
- ORCA Hoodsport
- ORCA Twanoh
- ORCA Dabob Bay
- OSU NH-10
- Ocean Station Papa

Fixed Shore Platform

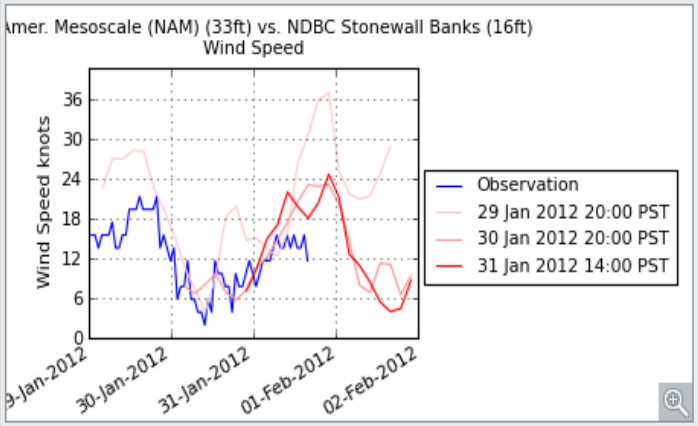
- CMOP Am169

Observations | Forecasts | Comparator | Details

The Comparator provides comparisons between observations and models at the asset's location. If the asset and selected forecast do not have any common measurements, no comparison is possible.

Station 46050 (LLNR 641) - 20NM W of Newport *Website*

CMOP Columbia | NAM | OSU WWIII | WAVEWATCH III



- Air Temperature
- Barometric Pressure
- Wind Direction
- Wind Gust
- Wind Speed

Link

Lat: 49.5252, Lon: -124.4092 Terrain

NAM

Model Run: 31 Jan 2012 04:00 PST

Forecast Time 2 Feb 2012 04:00 PST 17 / 29

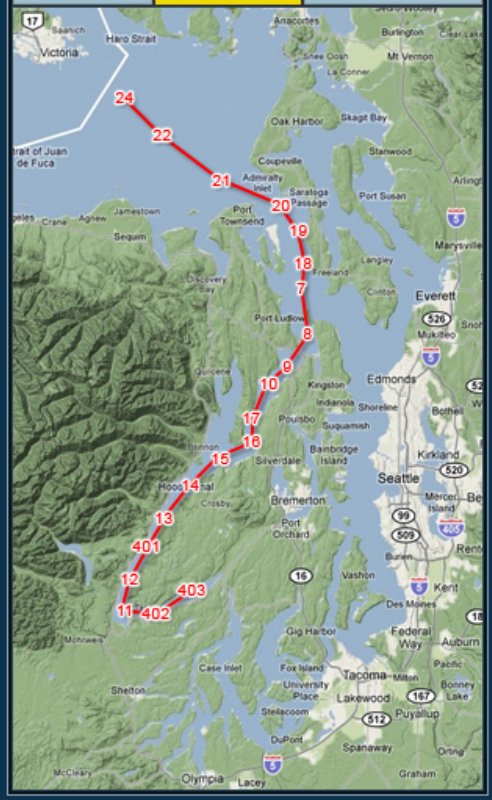
1/2 Sec

1.9 7.8 15.6
Wind Speed (knots)

0 10 20 30 40 50
Wind Speed (knots)

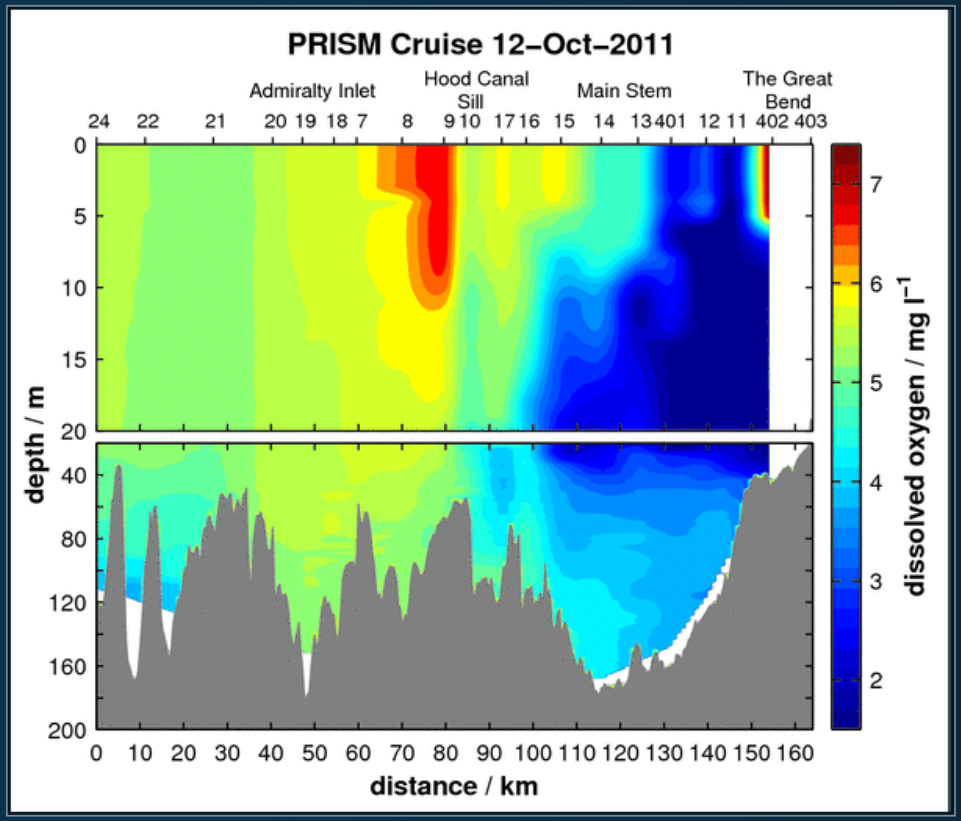
Basin Cross Sections

Main Basin | Hood Canal | Whidbey Island



Cruises: 2011 October

Variables: Oxygen Concentration - Uncalibrated



NANOOS Visualization Applications (NVAPs)

Beach and Shoreline Mapping Portal (Hazards, Climate)
Washington coast data coming soon + plus bathymetry

Pacific Northwest Tsunami Evacuation Zones (Hazards)
iPhone TsunamiNW-Evac app (v. 1.0, released Nov. 2011, Android Jan. 2012)

Maritime Operations Portal (Maritime Operations, Climate, Hazards, Fisheries)
1 km alongshore virtual nodes providing high resolution WWIII model time series, surface currents, etc.
Under development

Situational Awareness Portal (All themes)
Most recent observations providing situational awareness capability for multiple assets
Under development

Others…

NANOOS Integrated Data Access System (NIDAS) (All themes)
Access longer time series, user defined plots, etc.
Under development

NANOOS/CMOP Data Explorer (All themes)
Compare multiple variables and sites, user defined plots, etc.
Under development

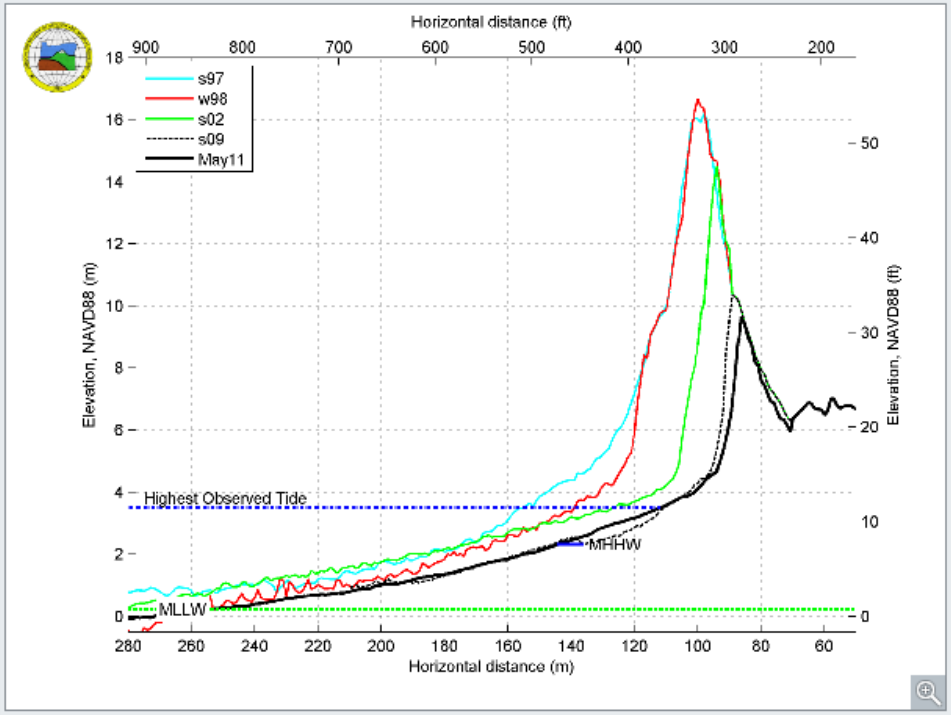
Map
Beaches
Regions
Legend

Lat: 45.5552, Lon: -124.0617 Terrain

Netarts - Netarts09

ET IDP: 255 **Lat:** 45.38932656 **Lon:** -123.9644902
Provider: DOGAMI / DLCD **Data Source:** DOGAMI

Profile | EDA

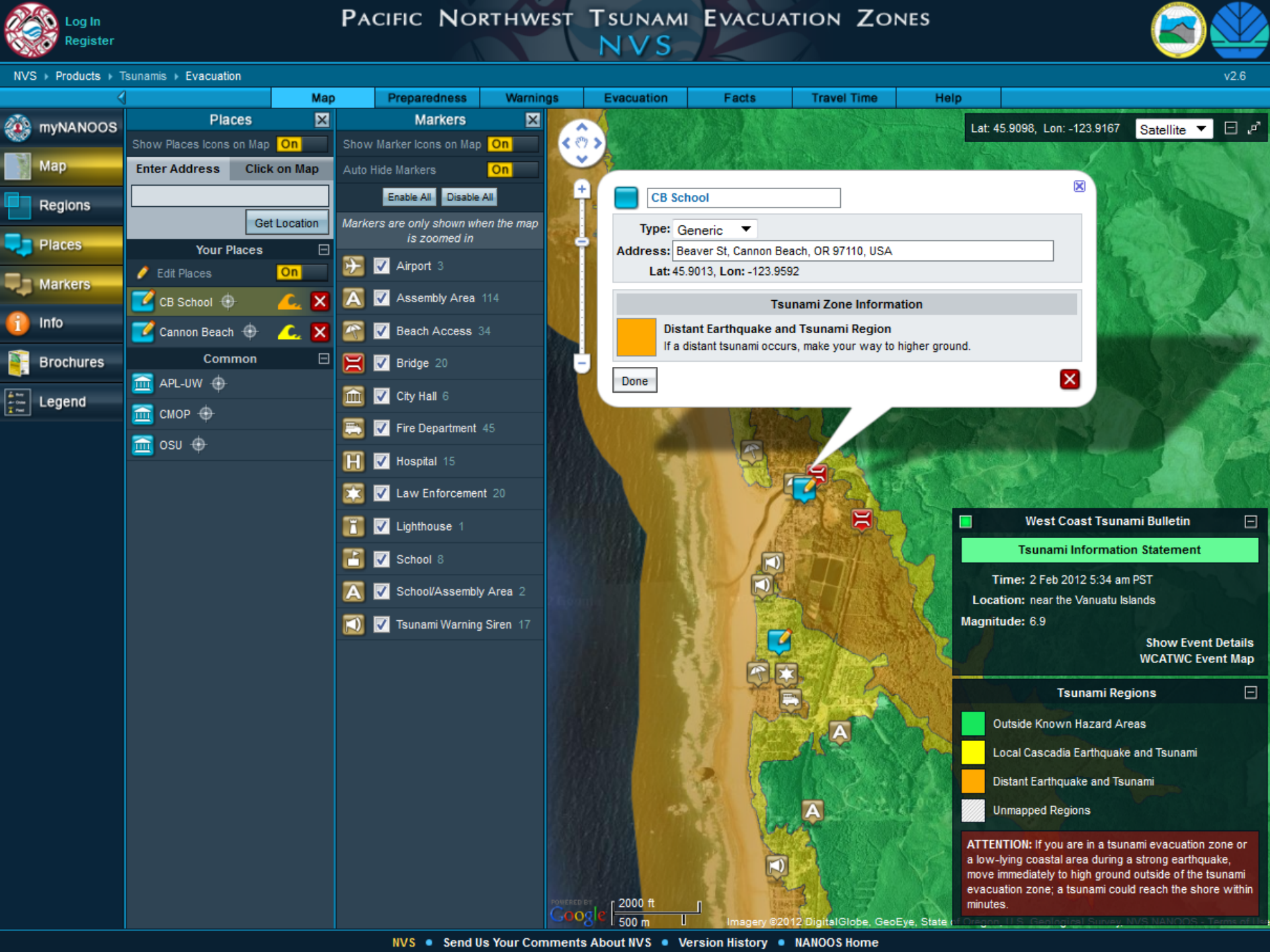


Link

Wilson River Hwy
1st St
Fairview
Oregon Coast Hwy
Tillamook Airport
Netarts Bay Rd
Whiskey Creek Rd
101

POWERED BY Google 2 mi 2 km

Map data ©2012 Google - Terms of Use


Log In
Register
Pacific Northwest Tsunami Evacuation Zones
NVS
NVS ▸ Products ▸ Tsunamis ▸ Evacuation
v2.6
Map
Preparedness
Warnings
Evacuation
Facts
Travel Time
Help
myNANOOS
Map
Regions
Places
Markers
Info
Brochures
Legend
Places
Show Places Icons on Map On
Enter Address
Click on Map
Get Location
Your Places
Edit Places On
CB School
Cannon Beach
Common
APL-UW
CMOP
OSU
Markers
Show Marker Icons on Map On
Auto Hide Markers On
Enable All
Disable All
Markers are only shown when the map is zoomed in
Airport 3
Assembly Area 114
Beach Access 34
Bridge 20
City Hall 6
Fire Department 45
Hospital 15
Law Enforcement 20
Lighthouse 1
School 8
School/Assembly Area 2
Tsunami Warning Siren 17
Lat: 45.9098, Lon: -123.9167
Satellite
CB School
Type: Generic
Address: Beaver St, Cannon Beach, OR 97110, USA
Lat: 45.9013, Lon: -123.9592
Tsunami Zone Information
Distant Earthquake and Tsunami Region
If a distant tsunami occurs, make your way to higher ground.
Done
West Coast Tsunami Bulletin
Tsunami Information Statement
Time: 2 Feb 2012 5:34 am PST
Location: near the Vanuatu Islands
Magnitude: 6.9
Show Event Details
WCATWC Event Map
Tsunami Regions
Outside Known Hazard Areas
Local Cascadia Earthquake and Tsunami
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.
2000 ft
500 m
Imagery ©2012 DigitalGlobe, GeoEye, State of Oregon, U.S. Geological Survey, NVS NANOOS - Terms of Use
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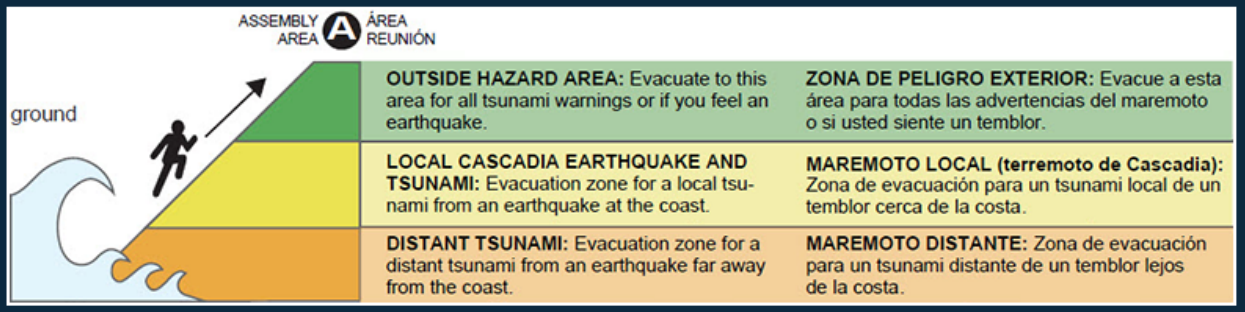
If you are in a tsunami evacuation zone or a low-lying coastal area during a strong earthquake, move immediately to high ground outside of the tsunami evacuation zone - a tsunami could reach the shore within minutes.



The coasts of Oregon, Washington, and Northern California are exposed to two types of tsunami sources:

- **Distant tsunamis** (e.g. the recent Tōhoku, Japan tsunami) that cross the expanse of the Pacific Ocean are produced by earthquakes far from the Pacific Northwest coast.
- Very large **local tsunamis**, in contrast, are generated by a great subduction earthquake occurring immediately offshore the Pacific Northwest coast on the Cascadia Subduction Zone.

Of these, local Cascadia tsunamis pose the greatest hazard to people living along the PNW coast.

A Locally Generated Earthquake and Tsunami

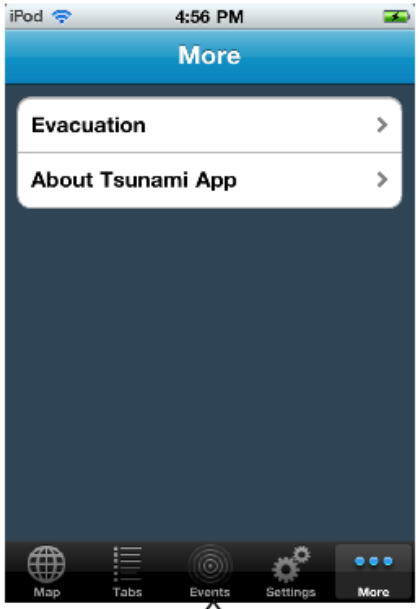
Local subduction zone earthquakes and tsunamis occur without warning at any time of the day. The odds of you and your loved ones all being home when the earthquake strikes is slim. It is important that you and your loved ones know what to do, and what not to do. It is important to plan in advance. Make a family emergency plan.

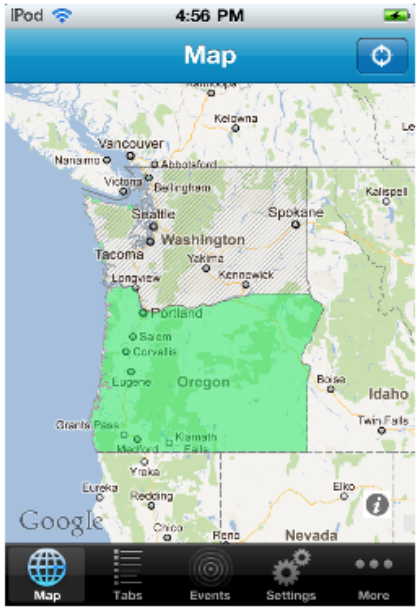
What to do: The proper instruction is for everyone to individually survive the earthquake by ducking under something sturdy, covering your head from debris, and holding on until the shaking stops. When the shaking stops, immediately leave the building (if in one) and move quickly to high ground. High ground is 50 feet minimum to as much as a 100 feet for a locally generated tsunami. If you are already above 100 feet, stay there.

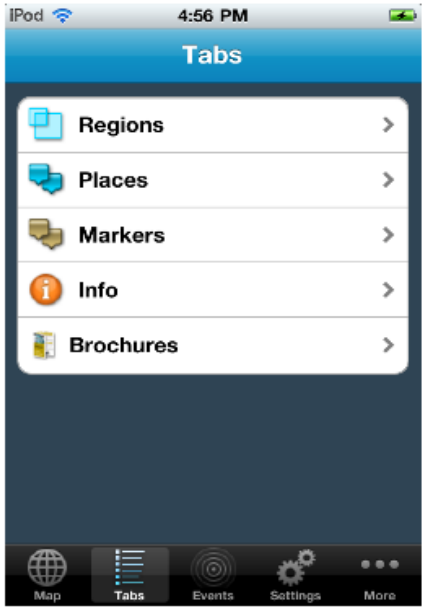
In most situations the fastest and safest way to move out of the tsunami evacuation

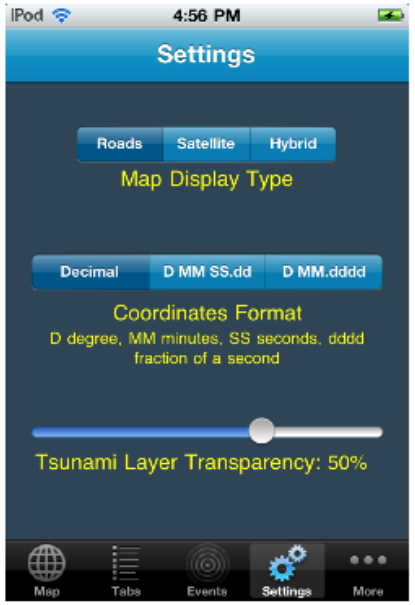
TsunamiNW-Evac

(iPhone/Android)

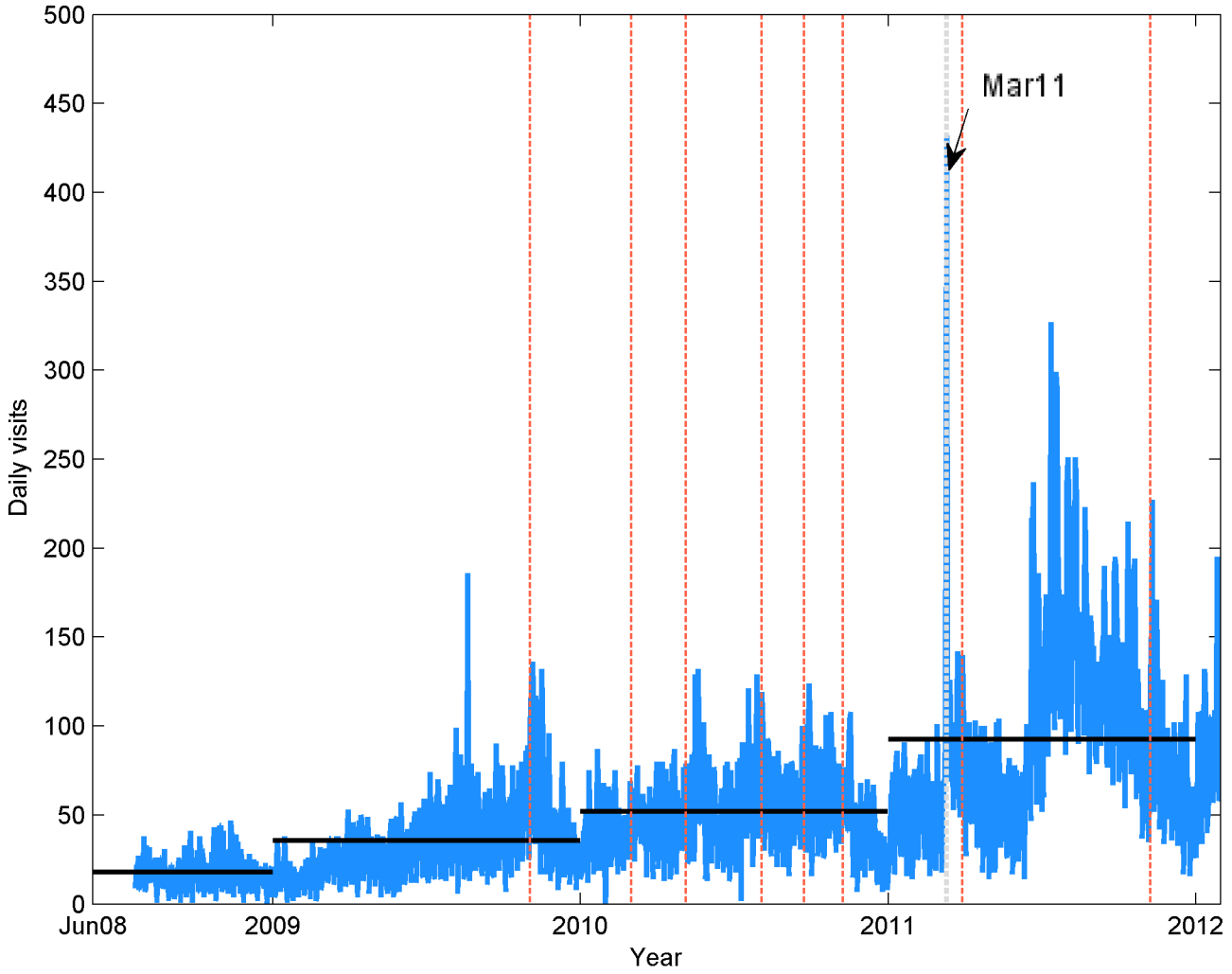








Usage Trends



Questions?

NVS History and Status:

Mar. 2010 - v1.5 released (added forecast capabilities, access to gliders and cruise data)

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

Aug 2010 - v2.0 released (added comparator (model vs measured time series) and forecast overlays). v1.0 Android NVS mobile app released

Mar 2011 - v2.5 released (added MyNANOOS option, customized units and settings)

Apr 2011 – v1.5 iPhone NVS released

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

Nov 2011 - v2.6 released (added Tsunami evacuation zones NVAP, and user created places)

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

Boaters | Ecosystem Monitors | Educators
Emergency Responders | Fishers | Researchers
Resource Managers | Shellfish Growers | Shoreline Observers

Advanced Filters

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Other IOOS Regions
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Event Calendar
Disclaimer

Data Explorer
NVS
Products
NERRDAP

Education
Introduction
Lesson Plans
Learning Tools
Resources

myNANOOS
Log In
Create New Account

Sponsors

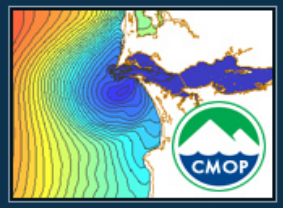
43 Matches (out of 43 Products)

Show Meta Tags

NANOOS Products (21)

BIS - Puget Sound Boater Info

The Boater Information System (BIS) delivers the data Puget Sound boaters asked for: wind speed and direction (no longer available), water temperature (no longer available), currents, and tides. Boaters can display multiple weather and oceanographic products concurrently to study the interactions among the data. Funded primarily by Washington Sea Grant Program, APL-UW employed the disciplines of Cognitive Engineering and Human Computer Interaction to give boaters this decision making tool.

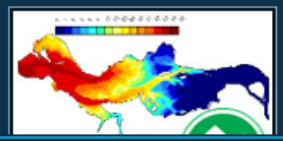


CMOP - Center for Coastal Margin Observation & Prediction

The data center is a resource for you to access information about the Columbia River estuary, near plume, and coastal margins of Oregon and Washington. This includes access links to physical and biogeochemical data (near real-time) from SATURN endurance stations in the Columbia River estuary, glider data, forecast Surface Ocean Conditions for the Pacific Northwest and the Columbia River estuary, and climatological maps of the Columbia River estuary.

Coastal & Marine Spatial Planning Information

Coastal & Marine Spatial Planning (CMSP) provides a public policy process for society to better determine how these areas are sustainably used and protected - now and for future generations. Successful management of the marine environment needs to be based on the best available science and will require continual information gathering to establish baselines, monitor ecosystems, and evaluate the efficacy of marine spatial plans.



Columbia River Climatological Atlas

The Climatological Atlas is a scientific project designed to offer insights into multiple scales of variability of the contemporary Columbia River coastal margin, via statistics of an extensive set of indicators. The focus of the Atlas is on indicators for the estuary and plume, but indicators of external forcing are also included for context.