

Northwest Association of Networked Ocean Observing Systems
The Integrated Ocean Observing System (IOOS)
Regional Association for the Pacific NW



www.nanoos.org
www.ioos.gov



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NORTHWEST ASSOCIATION OF NETWORKED OCEAN OBSERVING SYSTEMS

WASHINGTON - OREGON - NORTHERN CALIFORNIA

What is NANOOS?

- A regional organization through which
 - to integrate and sustain existing ocean observing capability,
 - to strategize for new operational observing systems, and
 - to provide easy access to data, data products, model forecasts, etc. about regional marine conditions
 - via a **user-driven** regional coastal **ocean** observing system
 - “ocean” includes inland marine waters (*head of tide to EEZ*)
 - “user-driven” means users define priorities, delivery
- A system designed to produce and disseminate ocean observations and related products deemed necessary to the users, in a common manner and according to sound scientific practice

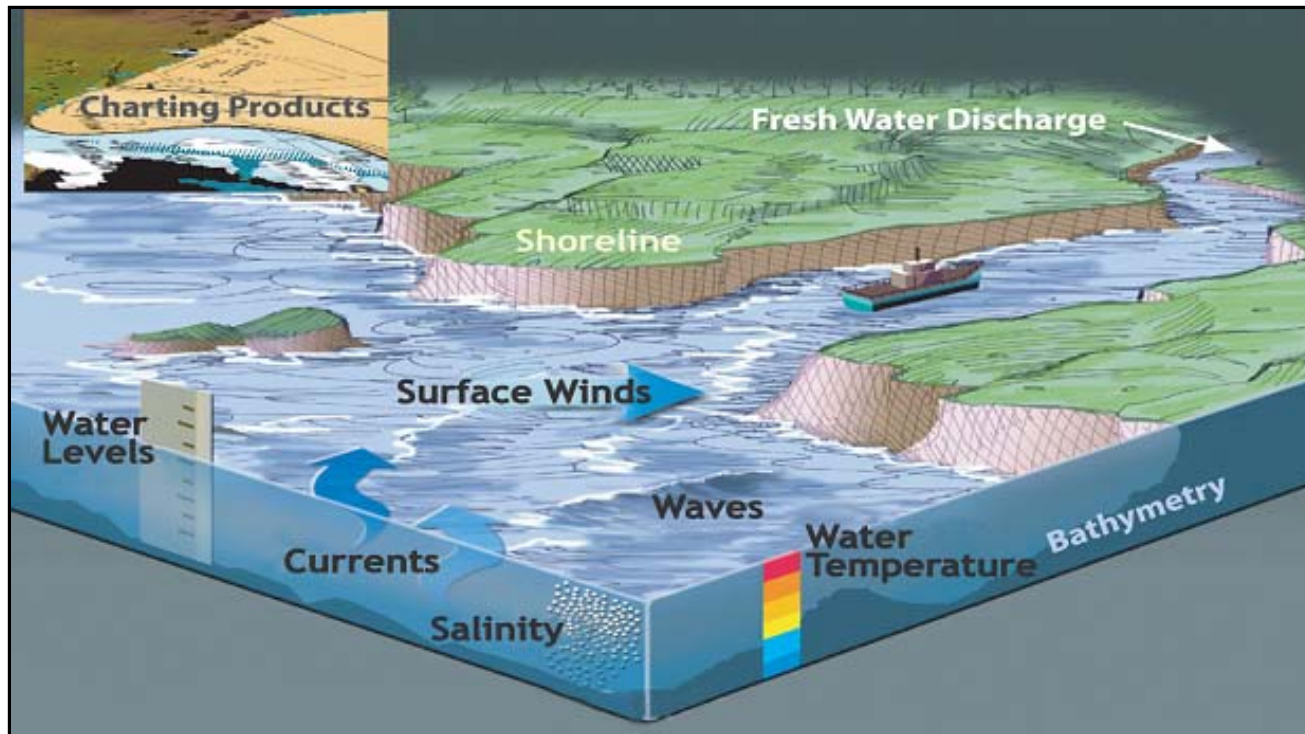


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The challenge!



We are limited and poorly coordinated with respect to environmental data supporting fundamental societal needs



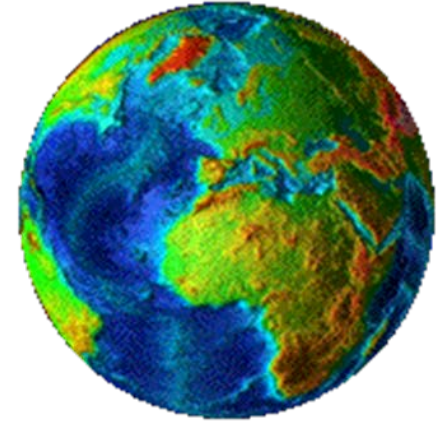
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How do we address this issue?

Build a system to deliver: Integrated and Sustained Ocean Observations



Goal: to coordinate the development of an operational, integrated, and sustained ocean observing system to routinely, reliably, and continuously provide data and information required to address seven goals:

- Detect and forecast oceanic components of climate variability
- Facilitate safe and efficient marine operations
- Ensure national security
- Manage resources for sustainable use
- Preserve and restoring healthy marine ecosystems
- Mitigate natural hazards
- Ensure public health

March 2009: President signs the Public Lands Management Act. Act authorizes for IOOS as a formal program.



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NANOOS Governing Council Members

- | | |
|---|--|
| 1. Ocean Inquiry Project | 24. Western Association of Marine Laboratories |
| 2. OR Dept of Land Conservation & Development | 25. Science Applications International Corporation |
| 3. Surfrider Foundation | 26. OR Dept of Fish and Wildlife |
| 4. The Boeing Company | 27. King County Dept Natural Resources & Parks |
| 5. Oregon State University | 28. Quinalt Indian Nation |
| 6. Puget Sound Partnership | 29. Western Resources and Applications |
| 7. University of Washington | 30. OR Dept of State Land |
| 8. WET Labs, Inc. | 31. Columbia River Crab Fisherman's Association |
| 9. Oregon Health and Sciences University | 32. Port of Neah Bay |
| 10. Quileute Indian Tribe | 33. Northwest Research Associates |
| 11. OR Dept of Geology and Mineral Industries | 34. Pacific Ocean Shelf Tracking Project |
| 12. Humboldt State University | 35. WA Dept of Fish and Wildlife |
| 13. Marine Exchange of Puget Sound | 36. Northwest Aquatic and Marine Educators |
| 14. WA Dept of Ecology | 37. Seattle Aquarium |
| 15. Pacific Northwest National Laboratory | 38. NOAA Northwest Fisheries Science Center |
| 16. Port of Newport | 39. Port Gamble S'Klallam Tribe |
| 17. Puget Sound Harbor Safety Committee | 40. The Nature Conservancy |
| 18. Sound Ocean Systems, Inc. | 41. Portland State University |
| 19. Council of American Master Mariners | 42. NOAA Olympic Coast National Marine Sanctuary |
| 20. Hood Canal Salmon Enhancement Group | 43. VENUS/U Vic |
| 21. Pacific Northwest Salmon Center | |
| 22. Northwest Indian Fisheries Commission | |
| 23. Sea-Bird Electronics, Inc. | |
- Tribal Government
- Federal/State/Local Government
- Industry
- Academia/Research
- NGO



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Stakeholder Priorities

The NANOOS GC selected four areas from among 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 RCOOS”:

- Maritime Operations
- Ecosystem Impacts, including hypoxia and HABs
- Fisheries
- Mitigating Coastal Hazards

These priorities were put forth in our NANOOS proposal and are being addressed by the development of our regional coastal ocean observing system (RCOOS).

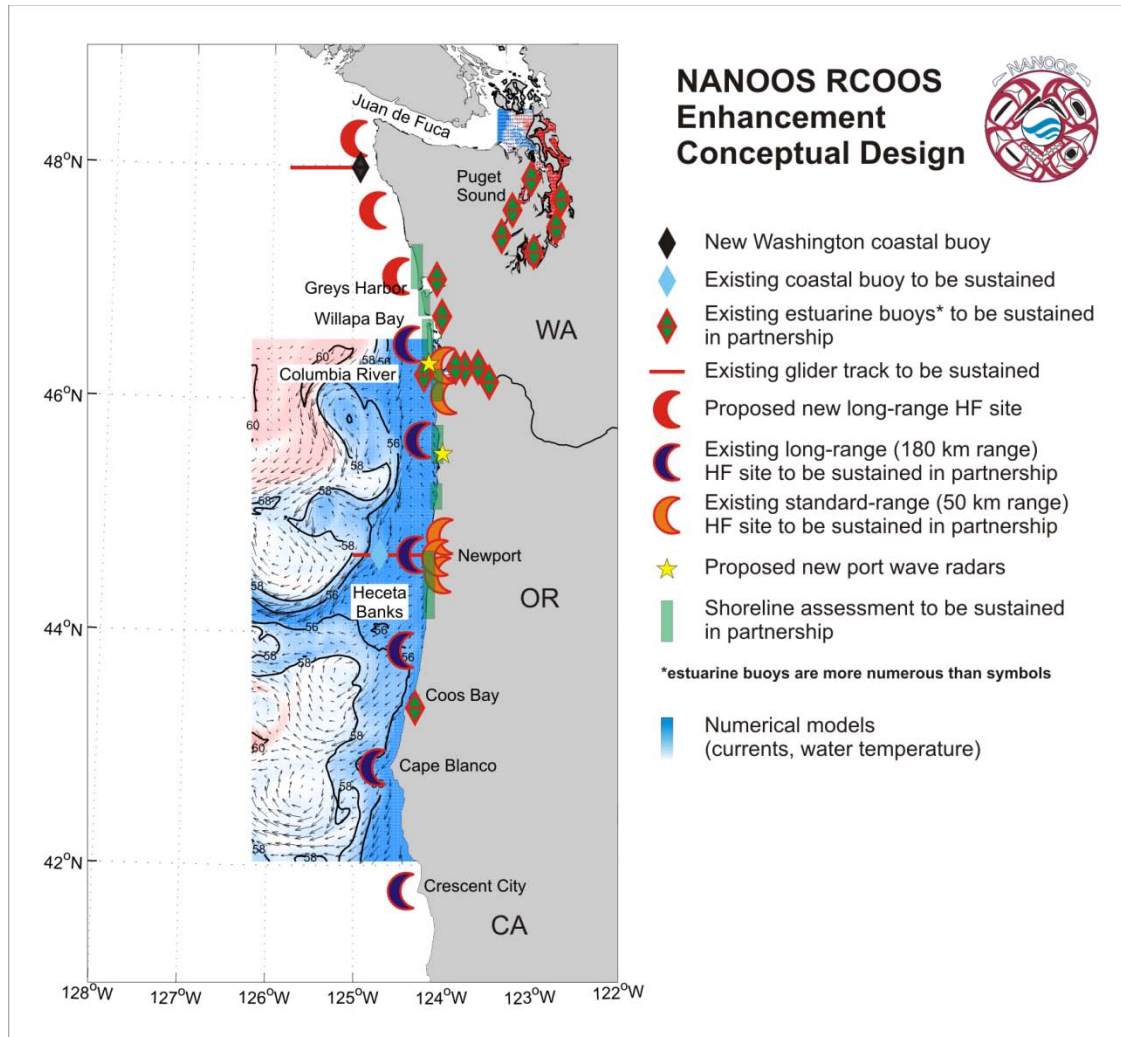


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Regional scope:



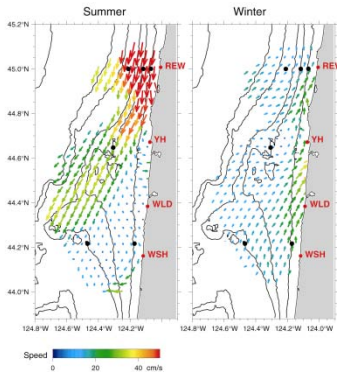
NANOOS 2007 proposal ranked top three. Awarded funds totaling \$9 million over three years. Funding reduced by 66% due to federal shortfall.

NANOOS presently supports:

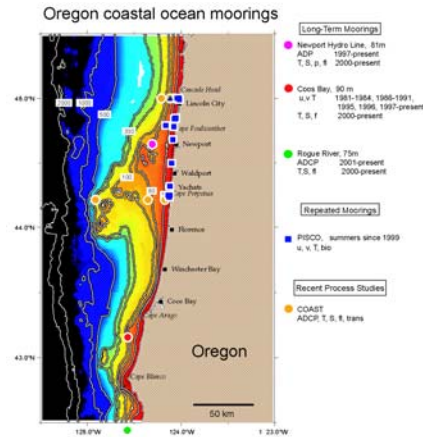
- OR coastal shelf buoy and glider (Newport Line)
- OR coastal shelf currents (HF)
- Puget Sound, Columbia River, Willapa and Coos Bays, and Grays Harbor moorings/buoys
- WA and OR shoreline profiles

Funds for the WA coastal shelf were cut (buoy) or eliminated (HF)

NANOOS RCOOS Objectives



Current mapping



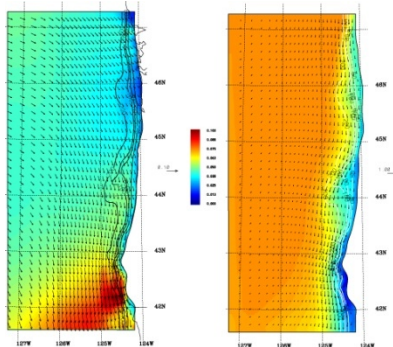
Shelf moorings



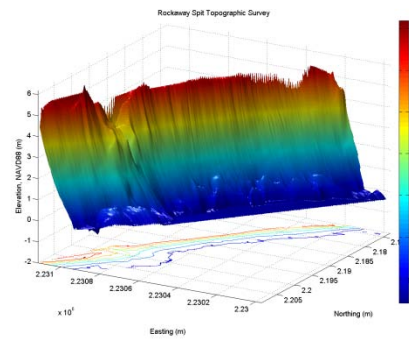
Beach/shoreline monitoring



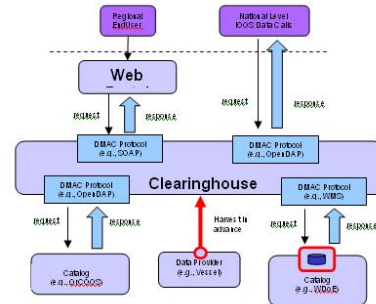
Estuary monitoring



Circulation models



Shoreline change models



Data Management & Communications



Education/Outreach



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User products:

- Maritime Operations
 - [Puget Sound Boater Information System](#)
 - Forecasts (wave, tide, currents, weather)
- Regional Fisheries
 - [Forecasts \(temperature, currents\)](#)
 - PaCOOS Ecosystem reports & Habitat server; CROOS, TOPPS links
- Coastal Hazards
 - [Forecasts \(currents, waves\)](#)
 - Shoreline data (DOGAMI, WDOE, OSU)
- Ecosystem Impacts
 - [Water quality data \(Shellfish Growers, "Pilot" Estuarine obs\)](#)
 - Ocean acidification (with NOAA PMEL)
 - [HABs \(Biotxin Bull., regional page: Sound Toxins, ORHAB, MOCHA\)](#)
 - Hypoxia (*regional page: OrCOOS, HCDOP*)



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Welcome to NANOOS, the Pacific Northwest regional ocean observing system of IOOS (Integrated Ocean Observing System), an integrated network of regional systems.

NANOOS is creating customized information and tools for Washington, Oregon, and Northern California with these areas of emphasis:

- ♦ Maritime Operations
- ♦ Ecosystem Impacts
- ♦ Regional Fisheries
- ♦ Coastal Hazards

NOTEWORTHY



NANOOS Visualization System

Announcing the NANOOS Visualization System (NVS), your tool for easy access to data. NVS gathers data across a wide range of assets such as buoys, shore stations, and coastal land-based stations. Never before available downloads and visualizations are provided in a consistent format. You can access plots and data for almost all in-situ assets for the previous 30-day period. Try NVS and let us know what you think.



NANOOS Observer - Fall 2009 (PDF)

Welcome to the inaugural edition of the NANOOS Observer, your update for new products, news items, and ocean-related issues affecting the NANOOS region of the Integrated Ocean Observing System.

[Archived Observer Editions](#)



Center for Coastal Margin Observation & Prediction (CMOP)

NANOOS member, CMOP, an NSF Science and Technology Center, seeks to shift from "reactive" to "anticipatory" science by taking advantage of the inherent power of structured integrations of information, methods and people: "collaboratories". The newsletter Coastal Margin Perspectives provides updates on the center's activities in research, education and knowledge transfer.

[Newsletter](#)



Tsunami Evacuation Zones for the Oregon Coast - Interactive Map

NANOOS works with the Oregon Department of Geology and Mineral Industries and Oregon Emergency Management to implement a Google interactive map interface for accessing tsunami evacuation maps for the Oregon coast. Next steps include working with Washington emergency officials to integrate evacuation maps developed for the Washington Coast.



VENUS

One of NANOOS' newest members is VENUS. VENUS is a cabled ocean observatory in British Columbia, Canada, designed as an undersea laboratory for ocean researchers. Through their website, you can examine their research and see live ocean data. NANOOS is pleased to partner with VENUS so that ocean data and understanding can be shared internationally.

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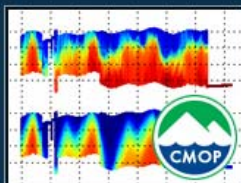
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Products

Show Products that Contain ALL of the Following:				
Regions	<input checked="" type="checkbox"/> Washington	<input type="checkbox"/> Oregon	<input type="checkbox"/> California	<input type="button" value="All"/>
Data Types	<input checked="" type="checkbox"/> Observation	<input type="checkbox"/> Model / Forecast		<input type="button" value="None"/>
Variables	<input type="checkbox"/> Bathymetry	<input type="checkbox"/> Dissolved O2	<input checked="" type="checkbox"/> Salinity	<input checked="" type="checkbox"/> Temperature
	<input type="checkbox"/> Bottom Character	<input type="checkbox"/> Ocean Color	<input type="checkbox"/> Sea Level	<input type="checkbox"/> Tides
	<input type="checkbox"/> Contaminants	<input type="checkbox"/> Optical Properties	<input type="checkbox"/> Surface Currents	<input type="checkbox"/> Wind Direction
	<input type="checkbox"/> Dissolved Nutrients	<input type="checkbox"/> Pathogens	<input type="checkbox"/> Surface Waves	<input type="checkbox"/> Wind Speed
Keywords	<input type="text"/>			<input type="button" value="Clear"/>

5 Matches (out of 50 Products)



CMOP DataMart

Center for Coastal Margin Observation & Prediction

- Flexible data access — not just canned, pre-generated images.
- Coverage — online access to the entire CMOP observation archive, not just current observations.
- Specificity — access just what you need when you need it; no need for bulk downloads.



Marine Water Monitoring

WA State Dept. of Ecology Environmental Assessment Program assesses surface and ground waters and identifies threatened or impaired waters, utilizing a statewide network of stations in rivers, streams, and estuaries. Historical water quality observations available.



NANOOS Buoy Locations

Interactive plot of NANOOS buoys.



OpenIOOS Real-Time Data Display

The Real Time Data Display uses standards from OGC to display data from sensor platforms in near realtime. This website is a testbed for interoperability between data providers. Data for the Pacific Northwest is provided by NANOOS via the NANOOS SOS service.



Puget Sound ORCA

Oceanic Remote Chemical Analyzer (ORCA) measures the physical parameters of temperature and salinity to obtain density, and measures the biological parameters of dissolved oxygen, phytoplankton chlorophyll fluorescence, and nutrient concentrations (Nitrate).





Chart

List

Help

Filters

In-Situ Assets (94)

Platform Type ▾

Expand All

Collapse All

☒ Buoy☒ APL-UW

APL-UW NPB-1 Buoy

☒ CDIP-Scripps

CDIP Cape Mendocino

CDIP Clatsop Spit

CDIP Grays Harbor

CDIP Humboldt Bay

CDIP Umpqua

☒ CMOP

CMOP Ogi02

☒ Env. Canada

EC 46131

EC 46132

EC 46146

EC 46206

☒ ICM-Mobilisa

ICM Marrowstone

ICM Poulso

ICM Worden

☒ King County

KC NSGE01

☒ LOBO

LOBO Yaqui

☒ NDBC

NDBC Cape Elizabeth

NDBC Col River Bar

NDBC Eel River

NDBC Neah Bay

NDBC New Dungeness

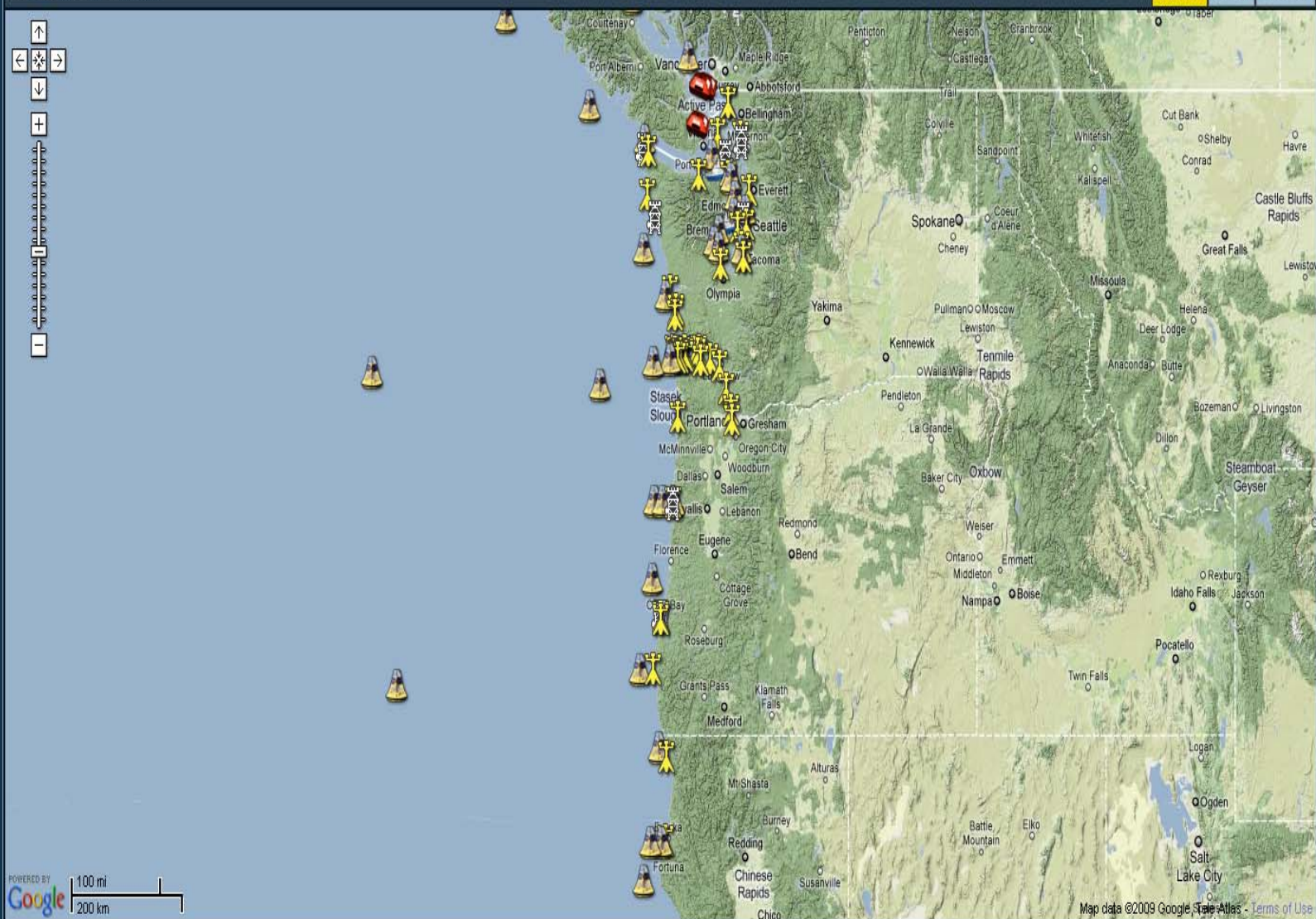
NDBC Oregon

Lat: 49.6249, Lon: -134.5386

Terrain

Road

Satellite

POWERED BY
Google

Map data ©2009 Google, Terra Atlas - Terms of Use



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ICM Marrowstone

ICM Poulsbo

ICM Worden

☒ King County

KC N8GE01

☒ LOBO

LOBO Yaqui

☒ NDBC

NDBC Cape Elizabeth

NDBC Col River Bar

NDBC Eel River

NDBC Neah Bay

NDBC New Dungeness

NDBC Oregon

Lat: 50.8753, Lon: -130.5615

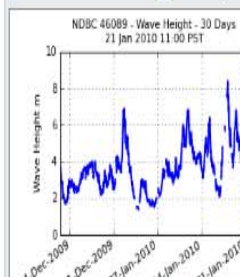


Station 46089 (LLNR 689) - 85 NM WNW of Tillamook

Location: Tillamook, Oregon Lat: 45.908 Lon: -125.76

Provider: NDBC Data Source: NDBC

Data Updated: 21 Jan 2010 9:50 PST



24 Hours

7 Days

30 Days

[Link](#)

Terrain

Road

Satellite

POWERED BY
 100 mi
200 km

Ocean Acidification Theme Page:



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[What is Ocean Acidification?](#)

[What Do We Know?](#)

[Who's Doing What?](#)

[Real-time Data](#)

[Scientists Talk](#)

Ocean Acidification is on the Rise



Ocean acidification refers to the ongoing decrease in the pH of the Earth's oceans caused by the uptake of carbon dioxide from the atmosphere. For the last 200 years, the burning of fossil fuels — coal, oil, natural gas — for energy, cement production, and deforestation pumps carbon dioxide or CO_2 into the atmosphere. The ocean has absorbed about 1/3 of this CO_2 , which when combined with water, forms a weak acid. The drop in pH increases the hydrogen ion concentration in the ocean thereby making the oceans less alkaline. The impacts of ocean acidification are an urgent issue because of the potential global-scale effects they present across a broad spectrum of marine life.

The absorption of excessive amounts of CO_2 from the atmosphere is changing the chemistry of seawater by increasing the acidity and lowering the seawater's naturally occurring carbonate ion, a building block of the calcium carbonate required of many marine organisms to grow their shells and skeletons. Ocean acidification reduces calcification rates in corals, leaving reef structures vulnerable to storm damage, and may affect economically important shellfish species such as oysters, scallops, mussels, clams, sea urchins, crabs, and lobsters.

