Northwest Association of Networked Ocean Observing Systems

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

www.nanoos.org
1. Call to Order
Welcome, Introductions, Charge for the Day

David Martin
NANOOS GC Board Chair
2. Introduction and IOOS Update

Dave Easter
NOAA US IOOS Office
IOOS Advisory Committee Calls for Members

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

Observing our oceans, coasts and Great Lakes

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

- Objectives:
  - Advocacy
  - Common Issues
  - IOOS federal/non-federal partnership
    - Administration
    - Congress
    - National Partners
  - Emerging Issues
Closing the Gaps: 5 yr Campaign

- Scalable campaign
- Tangible outcomes
- Align with Administration Priorities
- Filling targeted gaps in:
  - HR Radars
  - Gliders
Regional System Request: $33.9 m

- **$24.3 million** for the national network of 11 regional coastal observing systems
- **$1.5 million** for upgrades and repairs for aging regional systems
- **$3.1 million** to install 12 high frequency radar systems, to close key gaps and make the U.S. surface current mapping system the most reliable, efficient and comprehensive in the world
- **$5.0 million** for research and development, including competitive grants, modeling and verification to develop new products and systems to ensure comprehensive coverage

National System Request- $6.7 m

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

- Integrate federal and non-federal data
- Develop the nation’s first quality control standards for real-time data
- Coordinate across NOAA and the 12 Federal IOOS agencies and
- Certify the regional systems.
US IOOS FY 17 High Frequency Radar Request

$3.1 million to install 12 high frequency radar systems

SUCCESS!!
IOOS +$1.2M in FY 17

Safeguarding the Arctic Marine Highway
2 remote radars needed

Protecting Lives and Public Health in the Pacific Northwest
3 radars needed

Cleaning up the Great Lakes
3 radars needed

Saving Lives off Florida’s Coast
2 radars needed

Saving Millions in the Gulf of Mexico
3 radars needed
FY 18 IOOS Request

Mapping Surface Currents

Seeing Underwater with Coastal Gliders

Image courtesy of Ben Hollings, Blue Ocean Monitoring
FY 18 HFR and gliders

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

Beyond:
- HABs
- Water level
- Navigation
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<td>$29.3m</td>
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* Funding included in the Navigation, Observations and Positioning funding line
## Budgets

<table>
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<th>Year</th>
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<tr>
<td>FY 16</td>
<td>$29,500</td>
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<td>FY 17</td>
<td>$30,700 (+1.2M)</td>
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<tr>
<td>FY 18</td>
<td></td>
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<tr>
<td>Pres Bud</td>
<td>$29,500</td>
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<td>Senate</td>
<td>$33,700</td>
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<tr>
<td>House</td>
<td>$31,000</td>
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ICOOS Act Reauthorization

SENATE – S. 1425

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

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

House – HR 237

Representative Young (R-AK) has introduced H.R. 237 “Integrated Coastal and Ocean Observation System Act Amendment of 2017.”
• 7 RAs certified!
  – Congratulations to
    • PacIOOS, GLOS, MARACOOS,
    SCCOOS, CariCOOS, SECOORA, AOOS
• All others in process
• Opportunity to engage federal agencies
  – Operational forecasting
  – Regional data sharing
  – Agency engagement
Upcoming

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

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

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

**WHAT ARE HIGH-FREQUENCY RADARs?**

Land-based HF radars use radio-wave backscatter to map the speed and direction of surface currents in real-time. Because of the large coverage area, HF radar data are also valuable input for ocean models and for assisting with search and rescue operations and oil spill response.

Map of IOOS high frequency radars that provide real-time surface currents.

**IOOS FY 18 GLIDER REQUEST: $3.3m**

Where our nation needs gliders to support safe navigation, public health and safety, and the economy:

- **Great Lakes: Protecting Drinking Water**
  Over 35 million people depend on the Great Lakes for their drinking water. Gliders provide the flexibility to focus on issues impacting local areas and to better predict the risk of harmful algal blooms (HABs).

- **Northeast: Enhancing Maritime Industry By Reducing Endangered Right Whale Collisions**
  Ship strikes and fishing gear entanglements threaten the endangered right whales. Gliders equipped with acoustic sensors can detect the whales and alert mariners and fishermen in real-time about the location of the whales, thus minimizing impacts.

- **Mid-Atlantic: Protecting Lives and Property From Hurricanes**
  Gliders are a safe method for seeking below the surface of the coastal ocean, where strong winds stir cold water upwards, affecting the intensity of the storm. Such information improves warnings that can protect lives and property.

- **Southeast: Saving Lives, Supporting Fisheries and Detecting HABs**
  Information gathered from gliders along the Southeast coast is critical for predicting rip tides, optimizing fisheries management models, improving hurricane intensity forecasts and detecting marine mammals and HABs.

For more information, contact
Josie Quatrrelli, Executive Director, IOOS Association
207-772-0657 | Jojee@ioossassociation.org
NORTHWEST ASSOCIATION OF NETWORKED OCEAN OBSERVING SYSTEMS (NANOOS)
The eye on the Pacific Northwest’s ocean and coast

NANOOS provides critical life safety information to the public, aiding coastal communities to reduce risk.
Jonathan Allan, Coastal Geomorphologist
Oregon Department of Geology and Mineral Industries

NANOOS is the Regional Association of the national Integrated Ocean Observing System (IOOS) in the Pacific Northwest, primarily Washington and Oregon. Investments in NANOOS have resulted in high-technology jobs, better-informed decisions, and new innovation.

We help improve:

HEALTH
Decision-making to protect human health

SAFETY
Enabling preparedness and security

ECONOMY
Preserving economic benefits of the ocean

nanoos.org

Benefits for People and Businesses in the Pacific Northwest

Innovative Technology for Safe & Profitable Resource Use
NANOOS detects toxins from harmful algal blooms (HABs) from an underwater robot at La Push.
*Having the NANOOS automated HAB sampler, with toxin assessment capability, offshore between our harvest beaches and the HAB generation sites will give tribes the forewarning they need to adjust sampling protocols and better protect the health of coastal residents, tribal and non-tribal.*
- Joe Schumacker, Department of Fisheries, Quinault Indian Nation
NANOOS partners with industry to develop a lower cost sensor for effective shellfish growing.
*This current generation of shellfish farmer is reliant upon data and services from NANOOS. Checking the NANOOS app before seeding a beach or filing a setting tank has become standard practice.*
- Margaret Barretta, Pacific Coast Shellfish Growers Association Director

Support for Maritime Operations, Safety & Fishing Commerce
NANOOS data products allow mariners to choose safe and efficient routing. High frequency radars in Oregon provide real-time data on surface currents, which decrease the size of search and rescue areas by two-thirds. We need to extend this radar system to the Washington Coast to fill the gap in coverage.

*Ships crossing the Columbia River Bar face one of the most dangerous harbor entrances in the world. The Columbia River Bar Pilots rely on weather forecasts, real-time buoy data along with wave and current models when determining safe times for ships to cross the bar. NANOOS provides an excellent location for us to see and compare all the available data sources.*
- Captain Dan Jordan, Columbia River Bar Pilots

Information for Coastal Hazard Risk Reduction
NANOOS products help coastal communities minimize impacts from coastal hazards and keep the public safe. NANOOS data are used by the Oregon Department of Geology and Mineral Industries (DOGAMI) for coastal flood hazard maps; together NANOOS and DOGAMI provide tsunami hazard evacuation information to coastal populations. Both products aid risk reduction and increase coastal preparedness.

NANOOS support has *
provided us with invaluable information concerning our ongoing erosion problems. Without such assistance, we are operating blind.*
- Mayor Crystal Dingler, City of Ocean Shores

*The Oregon Office of Emergency Management (OEM) appreciates the tools that NANOOS provides. The online tsunami evacuation route viewer is especially useful in helping coastal residents and visitors understand and respond to the tsunami hazards.*
- Althea Rizzo, Oregon OEM Geologic Hazards Program Coordinator

For More Information
Contact us if you have any questions, or to learn more about our program:
Jan Newton, NANOOS Executive Director
Tel: (206) 543-9152 | jannewtornw@uw.edu
4. NANOOS Update

Jan Newton
NANOOS Executive Director
Northwest Association of Networked Ocean Observing Systems

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

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

**KEY:**
- 🐳 Tribal Government
- 🏛️ Industry
- 🌐 NGO
- 🏤 Academia/Research
- 🇺🇸 Federal/State/Local Government
New NANOOS members

- Aquatic Innovations Research
- Long Live the Kings

Welcome!
Coastal ocean:
Northern extent of California Current
Winds, topography, freshwater input, ENSO & other climate cycles

Major inland basins:
Puget Sound-Georgia Basin, Columbia River
Urban centers, nearshore development, climate variation

Coastal estuaries:
Willapa Bay, Grays Harbor, Yaquina Bay, Coos Bay, +20
Resource extraction, development, climate

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

Major rivers:
Columbia River (~75% FW input to Pacific from US WC)
many rivers (e.g., Fraser, Skagit) via Strait Juan de Fuca
Dredging, water regulation, climate change

NANOOS Region User Groups:
Maritime: shipping, oil transport/spill remediation
Fisheries: salmon, shellfish, crab, groundfish, aquaculture
Environmental management: HABs, hypoxia
Shoreline: erosion, inundation
Hazards: Search and rescue, national security
Educators: formal, informal, research
Marine recreation: boating, surfing, diving
NANOOS budget:

FY07-09: $1.4M + 0.4M = $1,800,000
Year 1, 2, 3

FY10: $1.7M + 0.4M = $2,100,000
Year 4

FY11: $2,087,500 (w/ new start date)
Year 5 or 1 of new 5-y award

FY12: $2,428,291 ($2,288,000 base; ~$140K for DMAC, OA workshops)
Year 6 or 2

FY13: $3,089,477 ($2,392,136 base; ~$700K for OTT on OA plus OAP)
Year 7 or 3

FY14: $2,818,441 ($2,442,136 base; $109K HF; $217K OAP; $50K glider)
Year 8 or 4

FY15: $2,771,890 ($2,462,136 base; $309K OAP obs/adds)
Year 9 or 5

FY16: $2,848,900 ($2,452,552 base; $317K OAP obs; $79K adds)
Year 10 or 1

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

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

Year 11 or 2

- $360,000 for the purchase and deployment of two HF radars.
- $50,000 to plan and execute a training event for biological data management with the MBON community
- $55,000 for the Ocean Technology Transition “Customer Service Application Project”
- $12,000 for OCS Olympic Coast cruise
- $30,000 to enhance the GOA-ON data portal as an OA dashboard to the World (Newton)
- $75,000 NANOOS Multi-Scale Prediction of California Current Carbonate System Dynamics (Hales)
- $64,181 for NANOOS Ocean Acidification Monitoring and Prediction in Oregon Coastal Waters (Hales)
- $33,146 NANOOS UW OA observatories (Newton)
- $25,000 to enhance the Cha'ba Mooring Program to Allow Year-Round Deployments (Newton)
- $55,000 for UW OA observatories (Newton): Replacement System due to loss
Map coastal currents from 11 remote-sensing sites on the coast
Two kinds:
**Long-Range**: (4.8 MHz, 150km range, 6 km radial interval).
**Std-Range** (12-13 Hz, 50+ km range, 2km radial interval).

Time-resolution, 1 hr

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

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

Instruments purchased for previous science experiments with funding from NSF, ONR, NOAA/GLOBEC. This year added some backup from IOOS.
US IOOS FY 17 High Frequency Radar Request

$3.1 million to install 12 high frequency radar systems

- Safeguarding the Arctic Marine Highway
  - 2 remote radars needed

- Protecting Lives and Public Health in the Pacific Northwest
  - 3 radars needed

- Cleaning up the Great Lakes
  - 3 radars needed

- Saving Lives off Florida’s Coast
  - 2 radars needed

- Saving Millions in the Gulf of Mexico
  - 3 radars needed
Add 2
Version 3

7 La Push
Copalis
LOO (existing)
Add 3 version 2 (doable?)

Flattery (12MHz)
La Push
Copalis
LOO1 (existing)
NANOOS Objectives for FY2017

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**.
OTT: HABs

“Operational ecological forecasting of harmful algal blooms in the Pacific Northwest using an environmental sample processor”

- ESP on Cha’ba at La Push
- UW, NOAA NWFSC, MBARI, NOAA CCEHBR, NWIC, Spyglass, WHOI
- Detects *Pseudo-nitzschia* cells, species, toxicity
- Strong support from coastal tribes, WA managers
- Tested in PS 2015; NANOOS served data: “Real-Time HABs”
- Deployed off coast May-July’16, Sep-Oct ’16, May-July ’17, and planned for Sep ‘17
HABs on NVS
Real-time HABs

The latest water measurements at the NEMO Observatory site where the Environmental Sample Processor is located 13 miles off La Push, Washington. Data are updated in near real time. These products are provided to help understand where toxic algae may be moving and the conditions that may influence toxic blooms.

Species Abundance
- *Pseudo-nitzschia australis*
- *Pseudo-nitzschia multiseries*
- *Pseudo-nitzschia fraudulenta*
- *Pseudo-nitzschia pungens*

Species Present / Not Detected
- *Alexandrium Species*
- *Heterosigma akashiwo*

Toxins
- Domoic Acid Concentration

Domoic Acid Concentration

Concentration of particulate domoic acid in seawater. Domoic acid is a toxin produced by some species of phytoplankton in the genus *Pseudo-nitzschia*. If domoic acid concentrations are detected above the Lower Limit Of Quantification (LLOQ, see description below), this means that one or more *Pseudo-nitzschia* species are producing the toxin. There is no regulatory threshold for domoic acid in seawater, rather the toxin is regulated based on its concentration in the tissues of shellfish where 20 ppm is a "no-harvest" limit (see the Washington State Department of Health Beach Closures site). However, a high seawater domoic acid concentration may provide an early warning of a HAB event.
New HAB Forecast System to be Developed for PNW

NOAA’s National Centers for Coastal Ocean Science (NCCOS) are funding development of a harmful algal bloom (HAB) forecast in the Pacific Northwest to support management of shellfisheries, clamming beaches, and human health. The experimental monitoring and forecasting system will launch in 2017, with forecast bulletins predicting bloom location and concentration several days in advance. This new development is a joint effort between NOAA, members of the Makah Tribe, the University of Washington, the University of Strathclyde, the Oregon Department of Fish and Wildlife, and NANOOS.

NOAA Funds Harmful Algal Bloom Forecast System Development in Pacific Northwest

Posted on September 29th, 2016 (10 months ago) in Ecology & Oceanography, Forecasting, Harmful Algal Blooms, Marine Biotoxin Impacts, Monitoring & Event Response, Water Quality

NOAA’s National Centers for Coastal Ocean Science (NCCOS) are funding development of a harmful algal bloom (HAB) forecast in the Pacific Northwest to support management of shellfisheries, clamming beaches, and human health. The experimental monitoring and forecasting system will launch in 2017, with forecast bulletins predicting bloom location and concentration several days in advance.

Annual outbreaks of the toxic algae *Pseudo-nitzschia* produce the neurotoxin domoic acid, which builds up in exposed shellfish and can cause amnesic shellfish poisoning (ASP) in humans. Commercial and recreational shellfisheries are therefore monitored for HAB toxins, and closed to prevent outbreaks of ASP. These closures can result in millions of dollars in lost harvests. For example, exposure to *Pseudo-nitzschia* in Oregon and Washington in 2015 led to $22.7 million in losses. Credit: Washington Department of Fish and Wildlife
OTT: OA

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

- New “ACDC” pCO$_2$ sensor
- UW, OSU, Sunburst, AOOS, CeNCOOS, SCCOOS, NOAA PMEL, PCSGA
- Lower cost pCO$_2$ for “weather” grade data
- Strong support from shellfish industry
- Builds on existing Burke-o-lators in hatcheries and the IPACOA portal
Science-Grower Partnerships

Wiley Evans, Hakai Institute

Tessa Hill, UC Davis

Todd Martz, SIO

Simone Alin, NOAA PMEL

QA

Burke Hales, OSU

Todd Martz, SIO
Real-time aragonite saturation state data from shellfish hatcheries, as well as coastal buoys.

IPACOA: IOOS Pacific Region ocean acidification data portal
• IOOS Pacific Region OA

  turning into

• IOOS Partners Across Coasts for OA
Other ‘16-17 NANOOS activity

Certification Application submitted!!
18 July, with 90-day review clock
Other ‘16-17 NANOOS activity

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

25 Jan 2017

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

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

24 Jan 2017

View the Webinar Slide Set (PDF)

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

26 Jul 2017

NANOOS Presentation (PDF) 
Workshop Agenda (PDF) 
NANOOS Community Workshop Site
Tailored User Products

(All NANOOS assets and data streams)

NVS for specific user groups with targeted subsets of the data
NANOOS focal areas:

- Maritime Operations
- Ecosystem Assessment (also hypoxia, HABs)
- Fisheries and Biodiversity
- Coastal Hazards
- Climate
Some users say good things...

“Ships crossing the Columbia River Bar face one of the most dangerous harbor entrances in the world. The Columbia River Bar Pilots rely on weather forecasts, real time buoy data along with wave and current models when determining safe times for ships to cross the bar. NANOOS provides an excellent location for us to see and compare all the available data sources.”

- Captain Dan Jordan, Columbia River Bar Pilots

“NANOOS provides critical life safety information to the public, aiding coastal communities to reduce risk.”

- Jonathan Allan, Coastal Geomorphologist
  Oregon Department of Geology and Mineral Industries
Accomplishments:

NANOOS sets bar high
NANOOS is supporting the region
NANOOS is relevant nationally
NANOOS leadership visible internationally
NANOOS uses its governance
NANOOS remains vital!

“Why is NANOOS so good?”

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

– New capabilities in all sectors

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

• Sustaining infrastructure on ~level funding

• Avoiding that NANOOS is the best kept secret

• Continuing to demonstrate utility
5. NANOOS Standing Committees reports
NANOOS User Products
Update

Jonathan Allan
NANOOS User Products Chair

Team: Troy Tanner, Emilio Mayorga, Amy Glaub Sprenger, Rachel Wold, Marine Lebrec, Jan Newton (APL, UW); Craig Risien, Mike Kosro (CEOAS, OSU), Charles Seaton (CMOP, OHSU)
Lots of data: NANOOS provides access to 47 different types of variables, and in total ~200 ‘assets’ & 10 model/forecast overlays.
Objective: to aid our understanding of climate variability, safety, operations, and lead to improved resource management and regional productivity throughout the region.

Goal is the seamless delivery of coastal, estuarine and ocean data to stakeholders within the NANOOS domain (+external partners, other RCOOS, and national/international programs).

Enabling:
- greater situational awareness (local and regional scales);
- improved access to and understanding of environmental variables/conditions; and,
- enable development and access to short- and long-term time-series.
NVS History and Status:

Nov. 2009 - v1.0 released

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

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

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

Mar 2013 - v3.0 – Major overhaul of interface; move to Google Maps 3 API; move to dedicated web apps.

Oct 2014 – v3.8 – Climatology web app released

Sep 2016 – v 5.0 – Added profile plots, depth vs time (heatmap plots) and current conditions (Explorer);
Nov 2016 – v 5.1 – Added evacuation route modeling results to select communities. Improved access to evacuation brochures (Tsunami);
Jan 2017 – v5.2 – Added route feature (Tuna);
Feb 2017 – v5.3 – Updated Salish Cruise plots/interface. Modifications to tsunami evacuation portal (added safety destinations) (Explorer/Tsunami);
Jun 2017 - v. 4.0 iPhone/Android NVS rebuild released
Jul 2017 – v5.4 – Built HF radar plotting capability; Updated climatology indices; Updated Washington State tsunami evacuation zones (Explorer/Tsunami/Climatology);
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)

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Jun 2017 - v. 4.0 iPhone/Android NVS rebuild released

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

<table>
<thead>
<tr>
<th>Task</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plot other year data (development of long time-series started)</td>
<td>Underway</td>
</tr>
<tr>
<td>Scalable climate plots – include plots for different years, scalable time (i.e. Ability to zoom in on specific period, hours, days, week etc ...)</td>
<td>Planning</td>
</tr>
<tr>
<td>Incorporate NERRS data into Climatology App</td>
<td>Not Started</td>
</tr>
</tbody>
</table>

### Misc. Requested Apps or Features

<table>
<thead>
<tr>
<th>Task</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bathymetric contours (Fathoms).</td>
<td>COMPLETED</td>
</tr>
<tr>
<td>X-band radar app (Incorporate into Maritime/Boater App, i.e. time-average imagery of wave, tidal fronts, wave direction, spectra plots, time series of wave length, period, extrapolate bathymetry)</td>
<td>Waiting for imagery</td>
</tr>
<tr>
<td>Common color map for all models.</td>
<td>Some discussion.</td>
</tr>
<tr>
<td>Particle tracking. Develop a prototype using one model and then add models and parameters that could be adjusted</td>
<td>Not Started</td>
</tr>
<tr>
<td>Extreme Total Water Level prediction tool</td>
<td>Not Started</td>
</tr>
<tr>
<td>Develop standardized data sets for modelers to use for testing purposes. NANOOS model testbed (consistent colors and variable ranges (incorporate all models in comparator).</td>
<td>Not Started</td>
</tr>
<tr>
<td>Integrate nearshore bathymetric surveys into NVS beaches and shorelines web app</td>
<td>Not Started</td>
</tr>
<tr>
<td>Estuary information page / co upwelling page. Includes infographics for events and describing stories.</td>
<td>Not Started</td>
</tr>
<tr>
<td>Watershed address. GIS of watershed layers to incorporate into layers in NVS. Clickable point that pops up user address.</td>
<td>Not Started</td>
</tr>
<tr>
<td>Profile plots for ORCA buoys</td>
<td>COMPLETED</td>
</tr>
<tr>
<td>Current Conditions (synoptic awareness)</td>
<td>COMPLETED</td>
</tr>
</tbody>
</table>

### “Recreational water app”: Target: kayakers, surfers, kite boarding, etc

<table>
<thead>
<tr>
<th>Task</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Build your own web app</td>
<td>NEW: Not Started</td>
</tr>
</tbody>
</table>
NANOOS
Northwest Association of Networked Ocean Observing Systems

NVS Data Explorer

Current Conditions

 Regions
 Filter
 Routes
 Current
 Fixed
 Platforms
 Mobile
 Platforms
 Remote
 Sensing
 Models
 Retired
 Platforms
 Legend

Current Conditions

Auto-Hide Platforms: On

Winds

Lat: 41.2613
Lon: -137.1094

Map
Asset List
Help

Wind Speed (m/s)

0 5 10 15 20 25 30 35 40

Wind Direction (°)

North
East
South
West

13 m/s
8 m/s
7 m/s
9 m/s

Winds

May 2017
Jun 2017
Jul 2017
Aug 2017

May 2017
10:00 pm PDT

August 2017

NANAMO
Washington
Oregon

Portland
Salem
Eugene
Reno
Los Angeles

Map Data © 2017 Google

100 km
110 km
120 km
130 km
140 km
150 km
160 km
170 km
180 km
190 km
200 km

Terrain

Powered by Mapbox

NANOOS geo

Map scale: © 2017 Google

NANOOS
Currents (6km, 25-Hour Filter): 6km filtered data are averaged over 25-hour intervals. These data provide a representation of the average current speed and direction over that interval, without influence of tides and other signals that are observed over less than a day.
NANOOS
Northwest Association of Networked Ocean Observing Systems
NVS
Tsunami Evacuation Zones

Map Layers
Regions
Places
Markers
Information
Legend

Enter Address
Click on Map

Get Location

Brochures for Map View
Seaside, OR

Retrofit Bridge, Necanicum River/1st Ave

West Coast Tsunami Information
No watch, warning, or advisory is in effect.

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

~3.7 mi (6 km)

Wave breaking

Ebb plume

05/01/2017
How are we doing?
<table>
<thead>
<tr>
<th>Web App/Page</th>
<th>Pageviews</th>
<th>%</th>
<th>Avg. Time on Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>/TsunamiEvac</td>
<td>76895</td>
<td>22.88</td>
<td>4:53</td>
</tr>
<tr>
<td>/TunaFish</td>
<td>86076</td>
<td>25.61</td>
<td>5:01</td>
</tr>
<tr>
<td>/Explorer</td>
<td>43883</td>
<td>13.06</td>
<td>4:38</td>
</tr>
<tr>
<td>/Explorer:NWIC_Bellinghambay (obs)</td>
<td>7234</td>
<td>2.15</td>
<td>5:44</td>
</tr>
<tr>
<td>/Boaters</td>
<td>5032</td>
<td>1.50</td>
<td>3:33</td>
</tr>
<tr>
<td>/Climatology</td>
<td>4883</td>
<td>1.45</td>
<td>4:00</td>
</tr>
<tr>
<td>/ShellfishGrowers</td>
<td>4649</td>
<td>1.38</td>
<td>3:49</td>
</tr>
<tr>
<td>/MaritimeOps</td>
<td>3031</td>
<td>0.90</td>
<td>2:42</td>
</tr>
<tr>
<td>/BeachMapping</td>
<td>2921</td>
<td>0.87</td>
<td>3:02</td>
</tr>
<tr>
<td>/CruisePrism</td>
<td>2455</td>
<td>0.73</td>
<td>4:31</td>
</tr>
<tr>
<td>/Explorer:HMSC_Newport (obs)</td>
<td>2092</td>
<td>0.62</td>
<td>4:13</td>
</tr>
<tr>
<td>/HFRadar</td>
<td>1764</td>
<td>0.52</td>
<td>1:33</td>
</tr>
<tr>
<td>/GliderLaPush</td>
<td>1809</td>
<td>0.54</td>
<td>1:46</td>
</tr>
<tr>
<td>/Explorer:NERRS_SOSNSWQ (obs)</td>
<td>556</td>
<td>0.17</td>
<td>6:01</td>
</tr>
<tr>
<td>Landing page, login, settings, contact, disclaimer</td>
<td>80649</td>
<td>24.00</td>
<td>0:43</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>336065</strong></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### A Challenge going forward – Many Stakeholders

| State agencies (e.g. ODFW, WADOE, DSL, etc.) |
| Federal agencies (NOAA, NWS, FEMA, US Coast Guard, etc.) |
| Cities and Counties |
| Ocean engineering (instruments, wave energy, telecommunication) |
| NGO’s |
| Ports |
| Bar pilots |

| Fishers (recreational and commercial) |
| Shellfish growers |
| Recreational boaters |
| Tribes |
| Geotechnical consultants |
| Universities/researchers |
| Schools (K-12) |
| Public-at-large |
| Scientists |
| and many others... |

---

**Build your own app**

*(add the assets and overlays you want)*
Questions?
NANOOS DMAC Focus Team:

Emilio Mayorga – UW/APL, Chair
Craig Risien – OSU
Charles Seaton – OHSU/CMOP
Don Setiawan – UW/APL

Part of broader DMAC-UPC-Web-Outreach team. But with focused interactions to give sustained attention to “low-level” DMAC issues and IOOS DMAC compliance.

• Close interactions with: Jon Allan (DOGAMI) & Troy Tanner (UW/APL)
• Also: Alex Dioso – UW/APL (System Administration, software development support); and others, ad hoc
DMAC Annual Review: NANOOS
Meeting Recap
Meeting Date: Mon April 17, 1 - 3 pm ET
1-877-417-3954  code 9119817
Google hangout in calendar invite

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

Related Meeting Documents:

Follow-up Actions: (immediate/near-term actions)
Future Ideas: (longer term projects and efforts)

Meeting Summary/Follow-up Comments:
  Meeting Summary Notes Key
  Intro Discussion:
  DMAC Review Notes:

Related Meeting Documents:

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

[Image: screenshot of "RICE" Certification Application page from the NANOOS website]

## Certification 22

<table>
<thead>
<tr>
<th>File Name</th>
<th>Type</th>
<th>Size</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>NANOOS Certification Application</td>
<td>PDF</td>
<td>185 KB</td>
<td>18 Jul 2017</td>
</tr>
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<td>NANOOS CVs</td>
<td>PDF</td>
<td>711 KB</td>
<td>18 Jul 2017</td>
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<td>NANOOS Award Letter</td>
<td>PDF</td>
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<td>1 Jun 2016</td>
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<tr>
<td>NANOOS Descope FY16</td>
<td>PDF</td>
<td>3.4 MB</td>
<td>18 Jul 2016</td>
</tr>
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<td>PDF</td>
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<td>18 Jul 2017</td>
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<td>73 KB</td>
<td>18 Jul 2017</td>
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<tr>
<td>NANOOS Fixed-Location Non-Federal Asset Inventory - Dec 2016</td>
<td>XLSX</td>
<td>28 KB</td>
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<td>NANOOS-NCEI Submission Agreement</td>
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<td>Emilio Mayorga CV</td>
<td>PDF</td>
<td>74 KB</td>
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<td>PDF</td>
<td>122 KB</td>
<td>18 Jul 2017</td>
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<td>DMP: Port Radar - OSU</td>
<td>PDF</td>
<td>116 KB</td>
<td>18 Jul 2017</td>
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<td>DMP: Washington Coast Moorings</td>
<td>PDF</td>
<td>142 KB</td>
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</table>
NANOOS Data Management Plan

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C. Implementation of Data Management Protocols 3
D. Computing Infrastructure 3
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      * Fixed-location Sensor Platforms
      * Gliders and Ferries
      * Beach and Shoreline Observations
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Note: Certification does NOT cover models.
Data Management Plan mentions NANOOS models, but only sparsely.
# NANOOS Data Management Plan

Table 1. Data Management summary for NANOOS-supported (“internal”) assets; for additional, detailed information on each asset, see the corresponding Appendix Data Management Plan (DMP) file(s) listed for each asset.

<table>
<thead>
<tr>
<th>Operator</th>
<th>Asset Count</th>
<th>NVS Metadata Store</th>
<th>NYS Access*</th>
<th>52N SOS</th>
<th>GeoServer</th>
<th>NDBC / WMO / GTOS</th>
<th>National DAC</th>
<th>Archiving</th>
<th>Appendix DMP File</th>
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</thead>
<tbody>
<tr>
<td>HF Radar (currents)</td>
<td>OSU</td>
<td>11#</td>
<td>X</td>
<td>All</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>NCEI</td>
<td>1.DMP.HF.Radar.pdf</td>
</tr>
<tr>
<td>Port X-Band Radar (waves)</td>
<td>OSU</td>
<td>2#</td>
<td>X</td>
<td>Plots</td>
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<td></td>
<td></td>
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<td>2.DMP.PortsXBandRadar.pdf</td>
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<tr>
<td><strong>Surface Currents and Waves</strong></td>
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<td></td>
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<td></td>
<td></td>
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<tr>
<td>Washington Shelf Buoys</td>
<td>UW</td>
<td>2</td>
<td>X</td>
<td>All</td>
<td>X</td>
<td>X</td>
<td>X</td>
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<td>3.DMP.WAShelFBuoy.pdf</td>
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<tr>
<td>Oregon Shelf Buoy</td>
<td>OSU</td>
<td>1</td>
<td>X</td>
<td>All</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
<td>4.DMP.ORShelfBuoy.pdf</td>
</tr>
<tr>
<td>Puget Sound, ORCA Buoy Program</td>
<td>UW</td>
<td>6</td>
<td>X</td>
<td>All</td>
<td>X</td>
<td>X</td>
<td>X</td>
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<td>5.DMP.PugetSoundORCABuoys.pdf</td>
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<tr>
<td>Columbia River estuary and plume, SATURN network</td>
<td>OHSU</td>
<td>14+</td>
<td>X</td>
<td>All</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>NCEI</td>
<td>6.DMP.ColumbiaSATURNNetwork.pdf</td>
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<td>South Slough Estuary Observations</td>
<td>SSNERR</td>
<td>6</td>
<td>X</td>
<td>All</td>
<td>X</td>
<td>X</td>
<td>X</td>
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<td>7.DMP.SouthSloughNERR.pdf</td>
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<tr>
<td><strong>Fixed-location Sensor Platforms</strong></td>
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<td></td>
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<tr>
<td>Gliders and Ferries</td>
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<tr>
<td>Northern California Shelf Glider</td>
<td>OSU</td>
<td>1</td>
<td>X</td>
<td>Plots</td>
<td></td>
<td>X</td>
<td>X</td>
<td>NCEI</td>
<td>9.DMP.NorthernCAGlider.pdf</td>
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<tr>
<td>SW WA Glider</td>
<td>OHSU</td>
<td>1x</td>
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<td>X</td>
<td>NCEI</td>
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<td>Victoria Clipper Ferry</td>
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<td>1</td>
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<td>All</td>
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<td></td>
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<td></td>
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<tr>
<td><strong>Beach and Shoreline Observations</strong></td>
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<td></td>
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<td></td>
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<tr>
<td>Oregon Shoreline Observations</td>
<td>DOGAMi</td>
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<td></td>
<td>State Agency</td>
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<td>11.DMP.ORBeachShorelineObs.pdf</td>
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<tr>
<td>Washington Shoreline Observations</td>
<td>WDOE</td>
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<td>State Agency</td>
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<tr>
<td>Nearshore Bathymetry</td>
<td>OSU</td>
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<td></td>
<td></td>
<td></td>
<td>13.DMP.NearshoreBathymetry.pdf</td>
</tr>
</tbody>
</table>

* For NVS Access, “All” represents both data download and graphic presentation, and “Plot” only includes graphic presentation; # Number of radar sites; + Several stations are currently inactive but may be redeployed as resources allow; x Not currently deployed, pending servicing.
# NANOOS Data Management Plan

Table 2. External, fixed-location in-situ data streams other than those from federal or Canadian federal agencies. These assets are integrated into the NANOOS DAC and NVS.

| Provider Information | | |
|---|---|---|---|---|---|
| Code | Name & URL | Type | Contact Name & Email | Asset Count | Notes |
| Hakai Institute | Hakai Institute | Academic | Wiley Evans, wiley.evans@hakai.org | 2 | Canadian. Burke-o-lator (OA) |
| HMSC | Hatfield Marine Science Center | Non-Profit | Dann Cutter, Dann.Cutter@oregonstate.edu | 1 | Offline due to sensor servicing |
| King County | King County | County | Stephanie Jaeger, Stephanie.Jaeger@kingcounty.gov | 4 | Implementing QARTOD-based QC flagging. |
| NWIC | Northwest Indian College | Academic | Beth Curry, beth4cu@uw.edu | 1 | Close partnership with NANOOS, UW |
| ONC | Ocean Networks Canada | Academic | Mike Morley, mmorley@uvic.ca | 4 | Canadian. Large, long-term observation system. Only seabed platforms currently integrated; will expand platform integration in 2017 |
| OOI | Ocean Observatories Initiative | Academic | Jack Barth, barth@coas.oregonstate.edu | 6 | Large, long-term observation system. Using Endurance Array platforms. Will expand sensor and platform integration in 2017 and 2018 |
| PennCoveShellfish | Penn Cove Shellfish | Industry | Jim Nagel, jim@penncoveshellfish.com | 2 | Includes one Burke-o-lator (OA). Close partnership with NANOOS. |
| PSI | Pacific Shellfish Institute | Non-Profit | Andy Suhrbier, suhrbier@pacshell.org | 2 | Includes one Burke-o-lator (OA). Close partnership with NANOOS. |
| TaylorShellfish | Taylor Shellfish | Industry | Benoit Eudeline, BenoitE@taylorshellfish.com | 1 | Burke-o-lator (OA). Close partnership with NANOOS. |
| WADOH | Washington Department of Health | State | Clara Hard, clara.hard@doh.wa.gov | 18 | Seasonal network (late Spring to early Fall) |
| WhiskeyCrShellfish | Whiskey Creek Shellfish Hatchery | Industry | Alan Barton, alan_barton22@yahoo.com | 1 | Burke-o-lator (OA). Close partnership with NANOOS. |

All assets are in the NVS Metadata Store and all provide data+graphic access on NVS. OA: Ocean Acidification, where the Burke-o-lator is a specialized OA sensor.
New or Enhanced Assets

http://nvs.nanoos.org/AssetHistory

- **In situ, fixed**
  - CB-06 off Coos Bay (relocated NH-10 mooring)
  - Fanny Bay, BC (Hakai Institute & Fanny Bay Oysters)
  - ONC/VENUS overhaul, re-activation
  - Relocated/new NOS/COOPS station at Columbia mouth
  - New SS NERR met station; improved NERR data harvesting
  - OOI enhancements

- **Overlays (remote sensing, models, reanalysis)**
  - HF Radar overhaul, great improvements
  - LiveOcean model: New nutrient, oxygen and OA variables
  - OSU ROMS: Increased forecasting frequency to 2 hours and added site forecasts

- **Others**
  - Climate indices
  - Upwelling indices and anomalies
95 datasets found for "NANOOS"

SG108-20130923T1728
Seaglider La Push NANOOS line, Washington. Glider covering a 200km SW-NE transect off La Push (Olympic Peninsula), Washington, as part of the Northwest Association of Networked...

Order by: Last Modified

SG187-20100716T1208
Seaglider La Push NANOOS line, Washington. Glider covering a 200km SW-NE transect off La Push (Olympic Peninsula), Washington, as part of the Northwest Association of Networked...

Organizations
NANOOS (80)
Glider DAC (12)
CeNCOOS (2)
IOOS (1)
Water Salinity @ NANOOS Live Ocean ROMS

The experimental nowcast and forecast fields displayed here from LiveOcean are produced by a computer model of NE Pacific coastal ocean circulation. These coastal ocean forecasts are updated daily at approximately 3:00 pm. They are an experimental product intended for research use only. For more information please visit the LiveOcean webpage here: https://faculty.washington.edu/pmacc/LO/LiveOcean.html
NANOOS Glider data advances

• 3 transects now on IOOS Glider DAC as complete time series:
  • La Push (UW), 6 deployments
  • SW WA (CMOP), 16 deployments
  • Trinidad Head (OSU), 5 deployments

• https://data.ioos.us/gliders/erddap/search/index.html?searchFor=NANOOS

• NVS Glider App
  • Soon: Enhanced La Push coverage, plots
  • Next: Trinidad Head?
Important milestone with formal NANOOS archiving with NCEI, initially with complete CMOP time series and monthly updates.
Expanding DMAC capabilities, compliance

• Ongoing enhancements and expansion of NANOOS web services, registration with IOOS Catalog. Primary observation data, models, and data products (anomalies, etc.).

• **Long time series.** Substantial progress over last year. Goal to make data available via IOOS DMAC services and accessible to NVS. Anticipated initial, visible benefits on those two fronts in next 6 months.

• **ERDDAP** implementation for more thorough and flexible data access (OSU and UW test servers in place).

• **QARTOD near-real-time QA/QC.** Ongoing participation in IOOS QARTOD webinars, discussions. Pilot NANOOS implementation next 6-12 months.

• **Data Archiving with NCEI.** Adapt procedures and lessons learned with CMOP archiving, to other NANOOS assets.
NANOOS Outreach Engagement & Education

NANOOS Joint PI and Governing Council Meeting
August 11, 2017

Rachel Wold, Outreach Specialist
Marine Lebrec, Outreach Specialist
# Scope of Work

<table>
<thead>
<tr>
<th>Product Development</th>
<th>Work with DMAC and User Products Committees on tailored product development, increase usability of NVS</th>
</tr>
</thead>
<tbody>
<tr>
<td>User Engagement</td>
<td>Conduct outreach and trainings to select user groups as resources permit</td>
</tr>
<tr>
<td>Networking</td>
<td>Maintain existing and build new relationships with NANOOS priority area users and the education community</td>
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Education:

NANOOS goal remains increasing ocean literacy

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

NANOOS goal to link user groups with data products

- Pacific Coast Shellfish Growers Association Meeting
- Saltwater Sportsmen's Show
- Pacific Seabird Group Conference
- Recreational boaters
Outreach: targeted user groups

**BOATERS**

- Coho Ho Ho seminar and Captains’ Meetings
- Puget Sound Yacht Club
- Corinthian Yacht Club
- Puget Sound Cruising Club
- Newsletters and blog posts
- Focus groups
- Portland Boat Show 2018
- Seattle Boat Show 2018
Outreach: engaging with the public

Soundwaters - A ‘one day university for all’
American Meteorological Society WeatherFest
NOAA Open House
Aquarium Discover Science Weekend
Goals:
• Increase awareness of IOOS and NANOOS
• Share knowledge of what NANOOS is doing
• Showcase NVS portal and apps
• Understand community’s needs with respect to NVS
• Hear what additional tools and data are needed
Outreach: social media & NANOOS website

NANOOS Observer

July 2017

Updates to NVS (NANOOS Visualization System)

New Data Online: Buoy / Sensor Deployments
Several new instruments have been deployed within the last month, including the NPSC Washington buoy (offshore Washington), the CANOPP SATURN buoy (Columbia Estuary), and the OCEANUS buoy (5 nM W of Coos Bay, Oregon). Additionally, Taylor Shellfish hatcheries sensors (Dabob Bay, Hood Canal) are back online: these instruments target ocean acidification observations including pCO2, pH, and aragonite saturation state. Data coming from these assets can be found on NVS.

LiveOcean Model on IOOS EDS Model Viewer

The LiveOcean model has been added to the IOOS EDS Model Viewer for simulations of currents, salinity, water temperature, and winds. This portal includes model outputs and observations from around the globe that contribute to ocean monitoring.
Plan for Upcoming Year

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

**Outreach Efforts**
- Continue to assist with development of web and mobile apps
- Continue outreach to current users groups, expand to other recreational users
- Additional tutorial videos for various apps
6. GC Business
2017 NANOOS GC Board

**Academic:**
- David Martin, UW, Governing Council Board Member for UW *(CHAIR)*
- Mike Kosro, OSU, Governing Council Board Member for OSU *(VICE CHAIR)*
- Antonio Baptista, OHSU, Governing Council Board Member for OHSU

**State:**
- Carol Maloy, Ecology, Governing Council Board Member for Washington State Agencies
- Jon Allan, DOGAMI, Governing Council Board Member for Oregon State Agencies

**Tribes:**
- Paul McCollum, Port Gamble S’Klallam Tribe, Governing Council Board Member for Tribes
- Joe Schumacker, Quinault Indian Nation, Governing Council Board Member for Tribes

**Federal:**
- Mark Strom, NOAA NWFSC, Governing Council Board Member for Washington Federal Offices
- Andy Lanier, Governing Council Board Member for Oregon Federal Offices

**Industry:**
- Margaret Barrette, PCSGA, Governing Council Board Member for Industry
- Andrew Barnard, WetLabs, Governing Council Board Member for Industry

**NGO:**
- Fritz Stahr, OIP, Governing Council Board Member for Non-Governmental Organizations
- Gus Gates, Surfrider, Governing Council Board Member for Non-Governmental Organizations

**At Large:**
- Paul Dye, WA Sea Grant, Governing Council Board Member At-Large
- Chris Mooers, PSU, Governing Council Board Member At-Large
NANOOS business

• NANOOS GC Board
  – election next year

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

THANK YOU!!!
7. Round Table for announcements from GC members
8. Wrap-up, Action Item review, and Adjourn