Northwest Association of Networked Ocean Observing Systems

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

IOOS®
INTEGRATED OCEAN OBSERVING SYSTEM

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

www.nanoos.org

1. Call to Order
Welcome, Charge for the Day

David Martin
NANOOS GC Board Chair

2. Group Introductions

3. IOOS Update

Jennifer Rhoades
NOAA US IOOS Office

U.S. IOOS Office

Jenifer Rhoades

August 2014

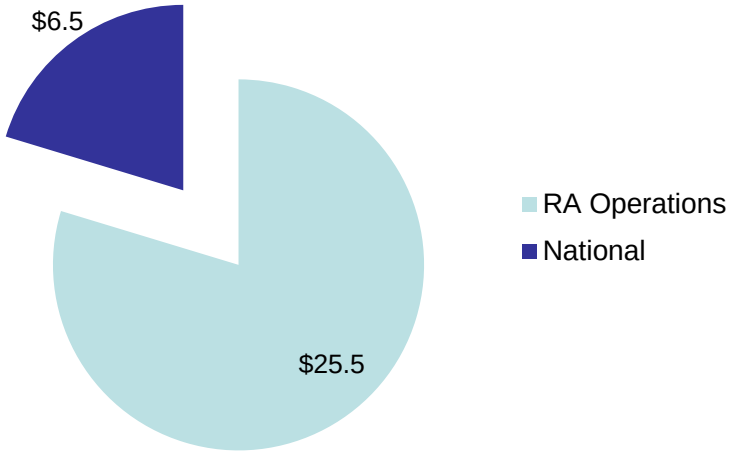
IOOS National and Regional Budget

NANOOS Y4 distribution $2,818,441, including:

- $109,000 for OSU HF Radar
- $217,305 from NOAA Ocean Acidification Program
- $50,000 from SWFSC to support Trinidad Glider Line

Marine Sensor Innovation awards (Sept 2014)

FY14 Appropriation $35M



FY15 President's Budget ($36.1M)

- $6.593M NOAA IOOS
- $29.5M Regional IOOS (1M increase for MSI)

ICOOS Act Re-Authorization

Forward Look at FY2015

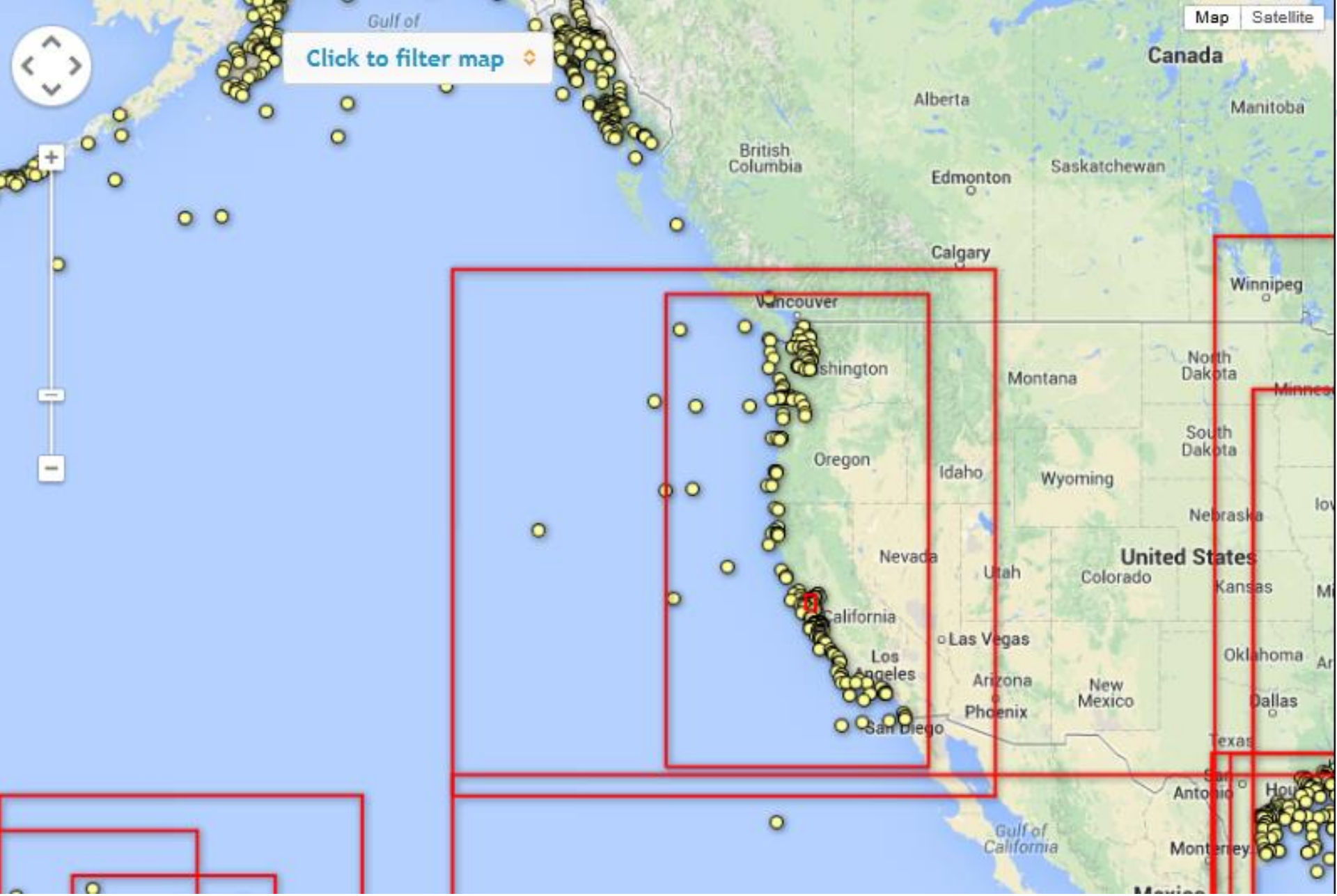
- IOOS Program Office Over-Arching Priorities
  - **DMAC and Modeling Progress**
  - **HF Radar**
  - **Marine Sensor Innovation**
  - **Certification**
  - **FY16 FFO Development**

DMAC and Modeling

- DMAC Focus
  - Routine Service Monitoring to ensure version control and performance
  - V3.0 IOOS Catalog Released (http://catalog.ioos.us/map)
  - **Continue to Register services (ioos.catalog@noaa.gov)**
  - Continue systems integration test of IOOS DMAC services

- Sustain QARTOD
  - Five manuals published
  - Publish Water Level manual (currently under review).
  - October 2014: Develop Ocean Optics Manual

- Modeling
  - Publish a national modeling strategy
    - Working groups formed
    - Draft scheduled for release - Sept 30


Map
Satellite
Click to filter map
Canada
Alberta
Manitoba
British Columbia
Edmonton
Saskatchewan
Calgary
Winnipeg
Vancouver
Montana
North Dakota
South Dakota
Oregon
Idaho
Wyoming
Nebraska
Nevada
Utah
Colorado
United States
Kansas
California
Las Vegas
Oklahoma
Los Angeles
Arizona
Phoenix
New Mexico
Dallas
San Diego
Texas
Gulf of California

IOOS®

NANOOS

urn:ioos:station:ncsos

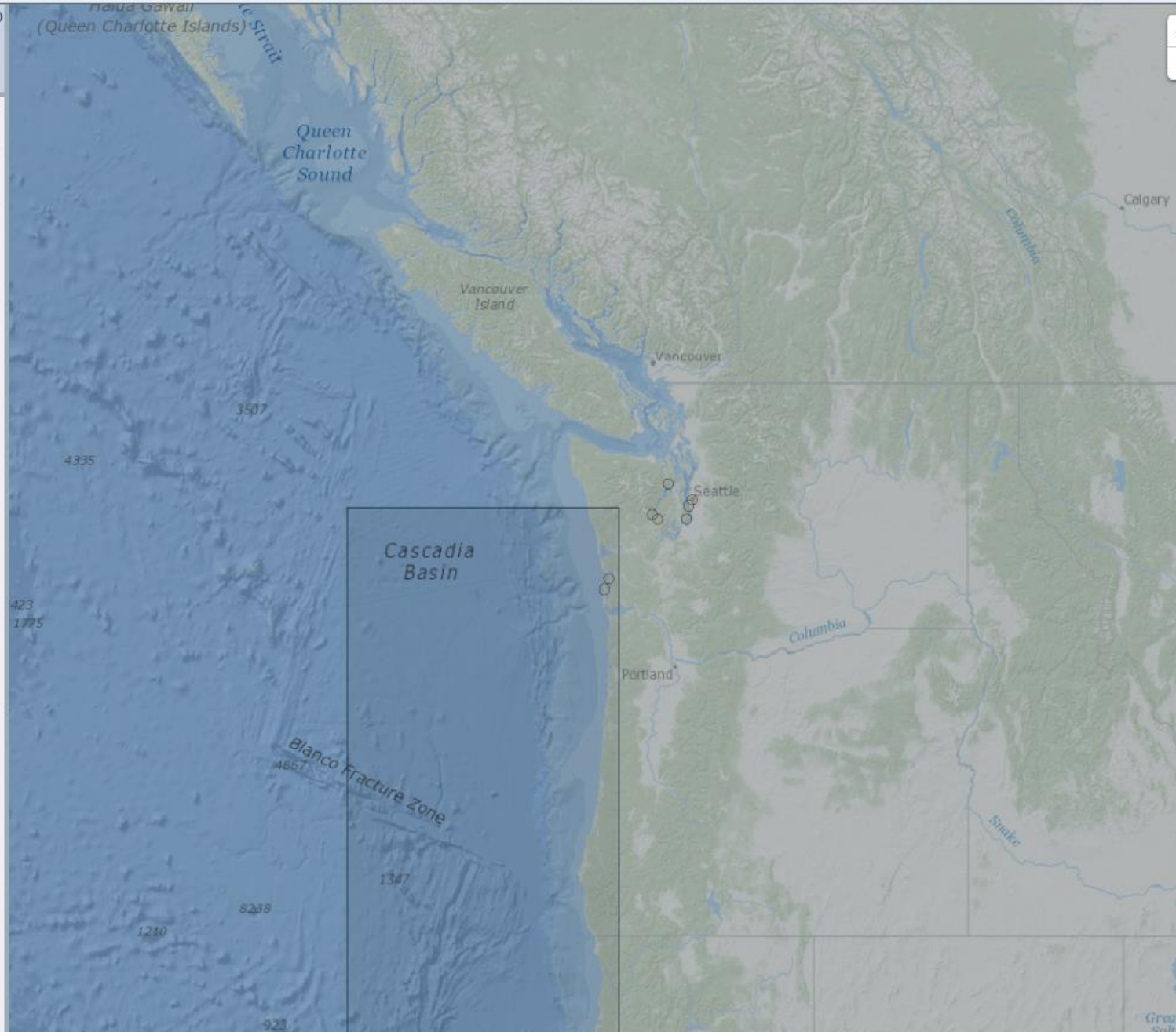
Aerosol Optical Thickness (100 KM)
The primary products are global one d...

Sea Surface Temperature (14 KM North America)
Product shows local sea surface temp...

Sea Surface Temperature (50 KM)
Product shows global sea surface tem...

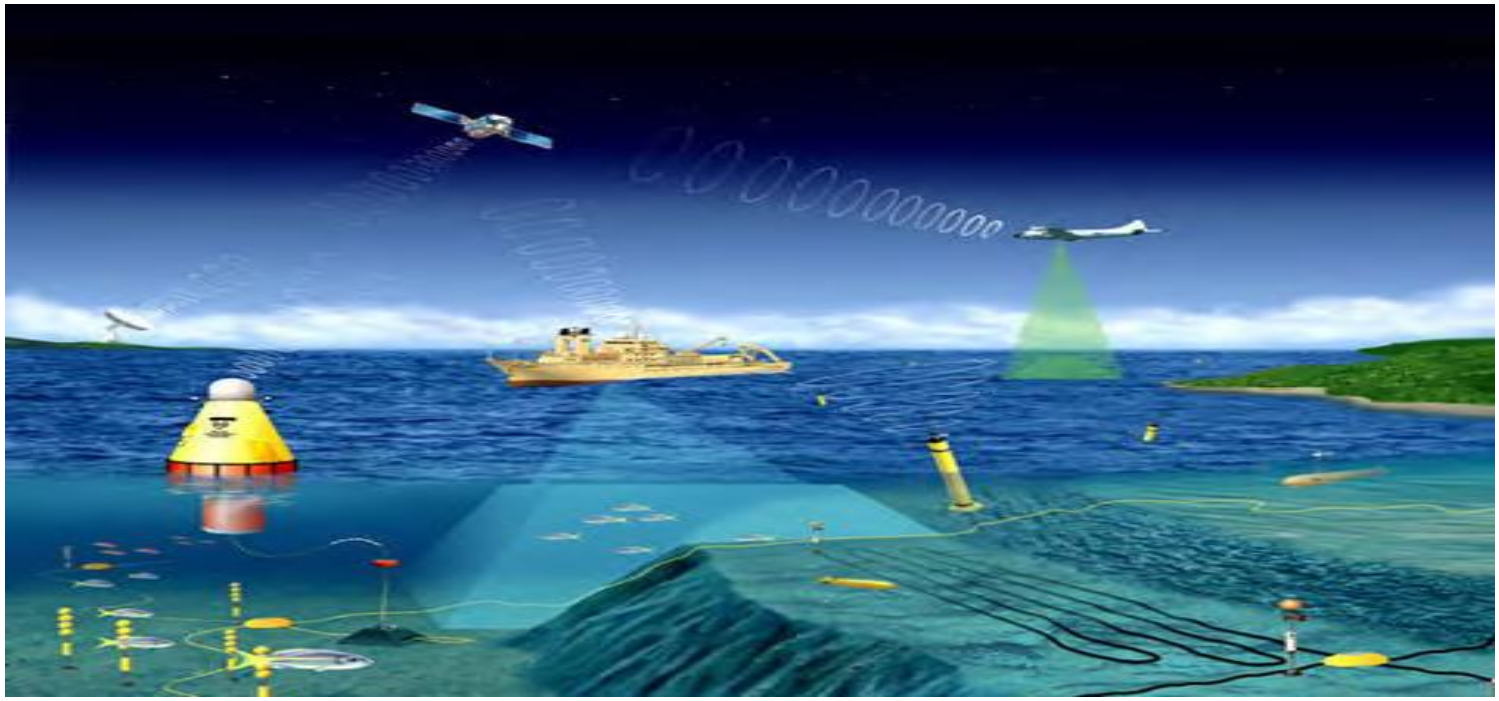
Sea Surface Temperature (100 KM Global)
Product shows global sea surface tem...

Regional Ocean Modeling System (ROMS): Oregon Coast
Regional Ocean Modeling System (R...



Marine Sensor Innovation Project

Focused effort to accelerate proven technology into operations.



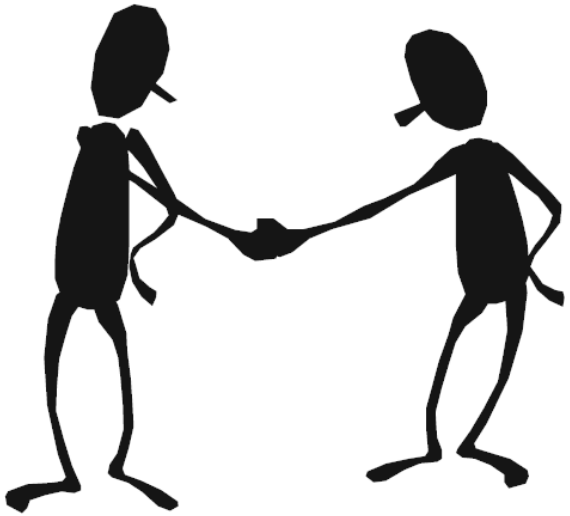
Supports research projects at a TRL => 6

Certification of RICEs

Program Office Now Offering Certification to RICEs!!!

FY2016 RA Federal Funding Opportunity

- *Timeline:*
  - Draft FFO – Q4 FY2014
  - NOAA Approval
  - Publish Announcement – Q1 FY2015
  - Proposal Close date – Q4 FY2015
  - Merit Review – Q4 FY2015, Q1 FY2016
  - Forward Recommendations Q2 FY2016



Thank You!

4. NANOOS Update

Jan Newton
NANOOS Executive Director

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IOOS Products and Services
Modeling and Analysis Systems
Data Archive Center
IOOS Service Center
Data Management and Communications
Data Assembly Center
Data Assembly Center
The U.S. IOOS
Observing Systems

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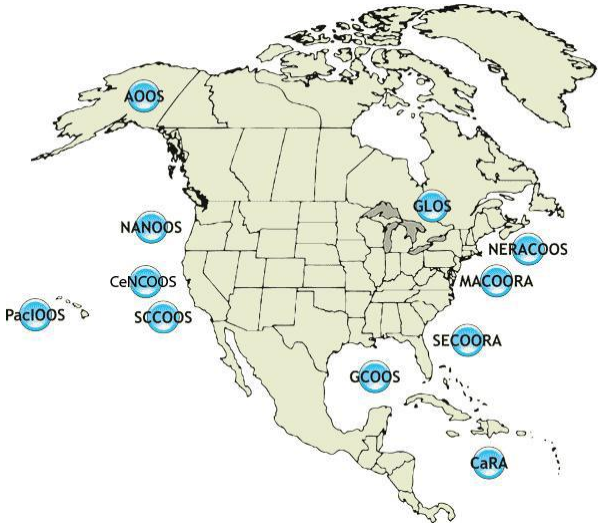
CONSISTENT NATIONAL CAPABILITY



assure

Reg. Assn's

engage

Leverage and Link

DIVERSE LOCAL STAKEHOLDERS

Integrated Coastal & Ocean Observation System Act of 2009

Created IOOS, with NOAA as lead Federal agency

"The purposes of this subtitle are to--

(1) establish a **national integrated System** of ocean, coastal, and Great Lakes observing systems,

comprised of **Federal and non-Federal** components coordinated at the national level by the National Ocean Research Leadership Council and at the regional level by a network of regional information coordination entities,
and that includes in situ, remote, and other **coastal and ocean observation, technologies, and data management and communication systems**,
and is **designed to address regional and national needs** for ocean information, to gather specific data on key coastal, ocean, and Great Lakes variables, and to ensure timely and sustained dissemination and availability of these data…"

Integrated Coastal & Ocean Observation System Act of 2009

"In order to fulfill the purposes of this subtitle, the System shall be national in scope and consist of--

(A) Federal assets to fulfill national and international observation missions and priorities;

(B) non-Federal assets, including a network of regional information coordination entities identified under subsection (c)(4), to fulfill regional observation missions and priorities;

(C) data management, communication, and modeling systems for the timely integration and dissemination of data and information products from the System;"

NANOOS

Northwest Association of Networked Ocean Observing Systems

Washington - Oregon - Northern California

NANOOS Governing Council Members 8/2014

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

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

New NANOOS members

- **Vancouver Island University**
- **Ocean Networks Canada**
- **Lower Columbia Estuary Partnership**
- **Western Washington University**

In limbo or process:

- **NOAA PMEL**
- **NW Power and Conservation Council**
- **WA Dept. Natural Resources**

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 MSI on OA plus OAP)

Year 7 or 3

FY14: $2,818,441 ($2,442,136 base; $109K for HF repairs and spares; $217K for OAP; $50K for Trinidad glider line)

Year 8 or 4

NANOOS base budget:

FY10: $2.1M, E#1: $3.2M, E#2: $4M

At FY14 level of $2.4 M:

- *All observational efforts up to 60-68% of Enhancement #1 level; outer coastal shelf buoys (OR & WA) at 80-90%*
- *Modeling at 50-70% of Enhancement #1*
- *DMAC at 50-75% of Enhancement #1*
- *E&O and Management at 90-100%*

NANOOS FY 14 base enhancement:

FY14 $2,442,136 vs. $2,392,136 base

Where to invest $50K enhancement?

- *DMAC/UPC*
- *affirmed by GC Board ExCom*
- *distributed to DOGAMI, OHSU, OSU, UW*
- *in consultation with team*

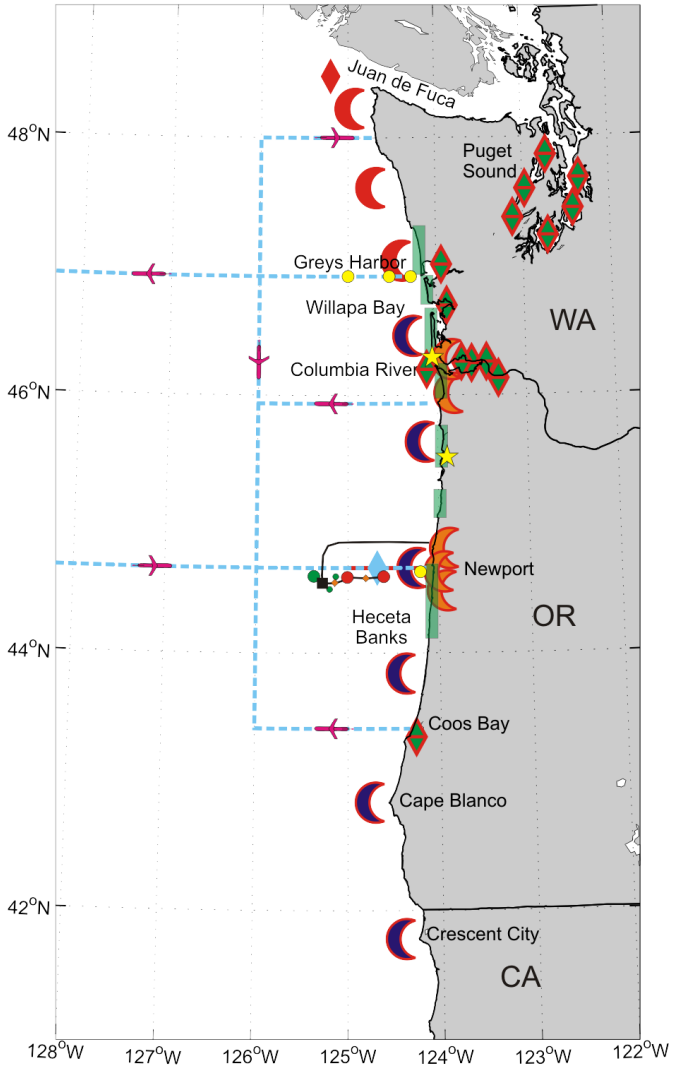
FY14:

- "This amount is less than what was originally proposed. As you consider which products or services will be impacted by this funding amount, we request that you consult with the U.S. IOOS program office prior to removing any type of assets from deployment, including any proposed reduction in your DMAC capabilities. While the Program Office recognizes the need to balance regional and national priorities, disproportionate cuts to DMAC shall be avoided. In accordance with ICOOS Act direction to the U.S. IOOS Program Office to develop national system capacity, the Northwest Association of Networked Ocean Observing Systems will make the following allotments with FY14 funding:
- No less than $405,000 to fund operations and maintenance of High Frequency Radars. While you may allocate these funds to support any HF Radars within the region, the allocation should not be one that negatively affects the performance of priority HF Radars for the benefit of non-priority HF Radars. Priority HF Radar performance will be measured using a metric to be developed with input from the National HF Radar Technical Steering Team.
- $109,000 for repairs and spares for OSU HF radars.
- $66,291 for the UW's Ocean Acidification observatories.
- $151,014 for OSU's Ocean Acidification monitoring & prediction in OR coastal waters."

NANOOS enhancements:

- *HF radar & repairs/spares*
- *OA Program funding for OA buoy ops*
  - *NH-10 (OR) and La Push (WA)*
- *Trinidad glider line*
  - *Collaboration with SWFSC and CeNCOOS*

PNW Ocean Observing Systems Design



NANOOS RCOOS Enhancement Conceptual Design

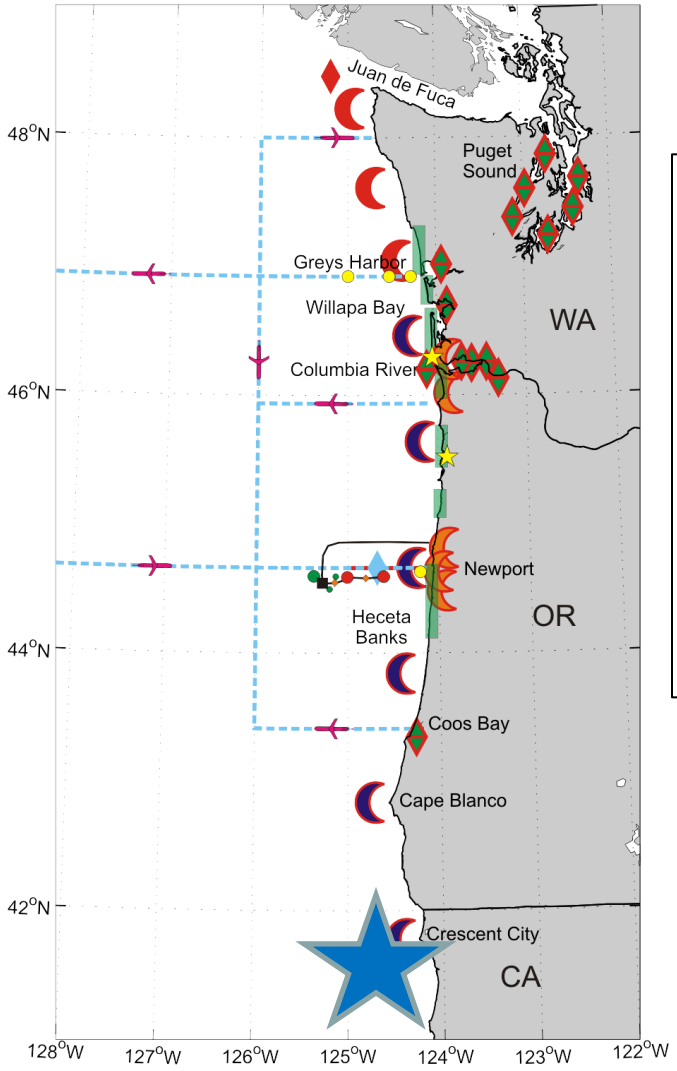
- Proposed new coastal buoy
- Existing coastal buoy to be sustained
- Existing estuarine buoys* to be sustained in partnership
- Existing glider track to be sustained
- Proposed new long-range HF site
- Existing long-range (180 km range) HF site to be sustained in partnership
- Existing standard-range (50 km range) HF site to be sustained in partnership
- Proposed new port wave radars
- Shoreline assessment to be sustained in partnership

*estuarine buoys are more numerous than symbols

OOI Conceptual Design

- Coastal mooring
- Cabled mooring
- Deepwater column mooring
- High voltage primary node
- Medium voltage primary node
- RSN cable
- Glider track
- Glider

PNW Ocean Observing Systems Design



NANOOS RCOOS Enhancement Conceptual Design

OSU (Barth, Shearman) moving Newport glider ops to Trinidad head, with Bjorkstedt's zpk/hydro cruises

Funded jointly by NANOOS, CeNCOOS, and SWFSC

Collaboration with HSU and SWFSC fisheries and El Niño studies

OOI Conceptual Design

- Coastal mooring
- Cabled mooring
- Deepwater column mooring
- High voltage primary node
- Medium voltage primary node
- RSN cable
- Glider track
- Glider

FY 14 MSI and NANOOS

- *FFO for competitive process*
- *Three year awards*
- *Two tracks:*
  - *1. marine sensors*
  - *2. OA with stakeholders*
- *NANOOS part of 7 submissions (6 and 1)*

- **Total of five MSI recommended to GMD**
- **NANOOS anticipates two !!**
  - Track 1: ESP for HABs; Mickett, PI
  - Track 2: “High beams” for OA; Newton, PI

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
- Tested in PS 2013; NANOOS served data
- HAB bulletin not funded, but still hoping to do

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 current MSI award for Burke-o-lators in more hatcheries and new IPACOA portal

Other NANOOS benefits

- Kurapov et al. awarded WC COMT
  - NANOOS, CeNCOOS, SCCOOS
- MacCready et al. awarded Forecast modeling award from WA OA Center
- NOAA FATE funded J-SCOPE, to refine & assess model and work with fisheries managers
- WC Gov Alliance funded Sea Grant fellow, Laura Lilly to work with them and the three OOS’es on marine debris and OA

NANOOS priorities:

Ecosystem Assessment

Fisheries & Biodiversity

Maritime Operations

Coastal Hazards

Climate & Weather

Accomplishments:

NANOOS sets bar high

The region is coming to NANOOS

NANOOS is supporting the region

NANOOS is relevant nationally

NANOOS leadership visible internationally

NANOOS uses its governance; is growing

New member drive

- **Feds:** WFOs
- **Tribes:** Oregon tribes
- **State:** *is everyone in?, WA Health*
- **Industry:** Microsoft Research
- **NGOs:** *re-engage Surfrider*
- **Academic/Research:** *who else?*

2012-16 NANOOS GC Board

Academic:

- David Martin, Governing Council Board Member for UW
- Mike Kosro, Governing Council Board Member for OSU
- Antonio Baptista, Governing Council Board Member for OHSU

State:

- Carol Maloy, Governing Council Board Member for Washington State Agencies
- Vicki McConnell, Governing Council Board Member for Oregon State Agencies

Tribes:

- Paul McCollum, Governing Council Board Member for Tribes
- Joe Schumacker, Governing Council Board Member for Tribes

Federal:

- John Stein, Governing Council Board Member for Washington Federal Offices
- Andy Lanier, Acting Member, Governing Council Board Member for Oregon Federal Offices

Industry:

- Casey Moore, Governing Council Board Member for Industry
- Steve Uczekaj, Governing Council Board Member for Industry

NGO:

- Fritz Stahr, Governing Council Board Member for Non-Governmental Organizations
- Jody Kennedy, Governing Council Board Member for Non-Governmental Organizations

At Large:

- Rich Chwaszczewski, Governing Council Board Member At-Large
- Chris Mooers, Governing Council Board Member At-Large

NANOOS business

- Fill 2 vacant seats on NANOOS GC Board
  - Any volunteers, please self identify; opportunity will be advertised; ballot distributed
- Identify how NANOOS pays annual $500 non-federal dues to IOOS Association
  - Discussion/volunteers today; if needed, e-mail to industry & NGO members

Opportunities

- More partnerships on many levels
- Diversify our funding portfolio
- User service (help, specialization, etc.)

Challenges

- Sustaining infrastructure on ~level funding
- Next 5-y plan/proposal
  - Balance “sustain” with “new”

NANOOS remains vital !

- "Why is NANOOS so good?"
  - The people: creativity
  - The spirit: cooperation
  - The concept: collaboration

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5. NANOOS Standing Committees reports

NANOOS
User Products

Jonathan Allan

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NANOOS

The NANOOS visualization system

- The past: **disparate suite of web sites available to the public** (serving a wide range of data); often complex and confusing, or were simply inadequate

- **Regional needs:**
  - **seamless delivery of coastal, estuarine and ocean data to stakeholders within the NANOOS domain** at appropriate time and spatial scales (+external partners, other RCOOS, and national/international programs).
  - aid our understanding of **climate variability in our coastal ocean**, reduce the potential for loss of life (i.e. **improve safety)**, meet the needs of maritime **operations**, and lead to **improved resource management** and **regional productivity**.

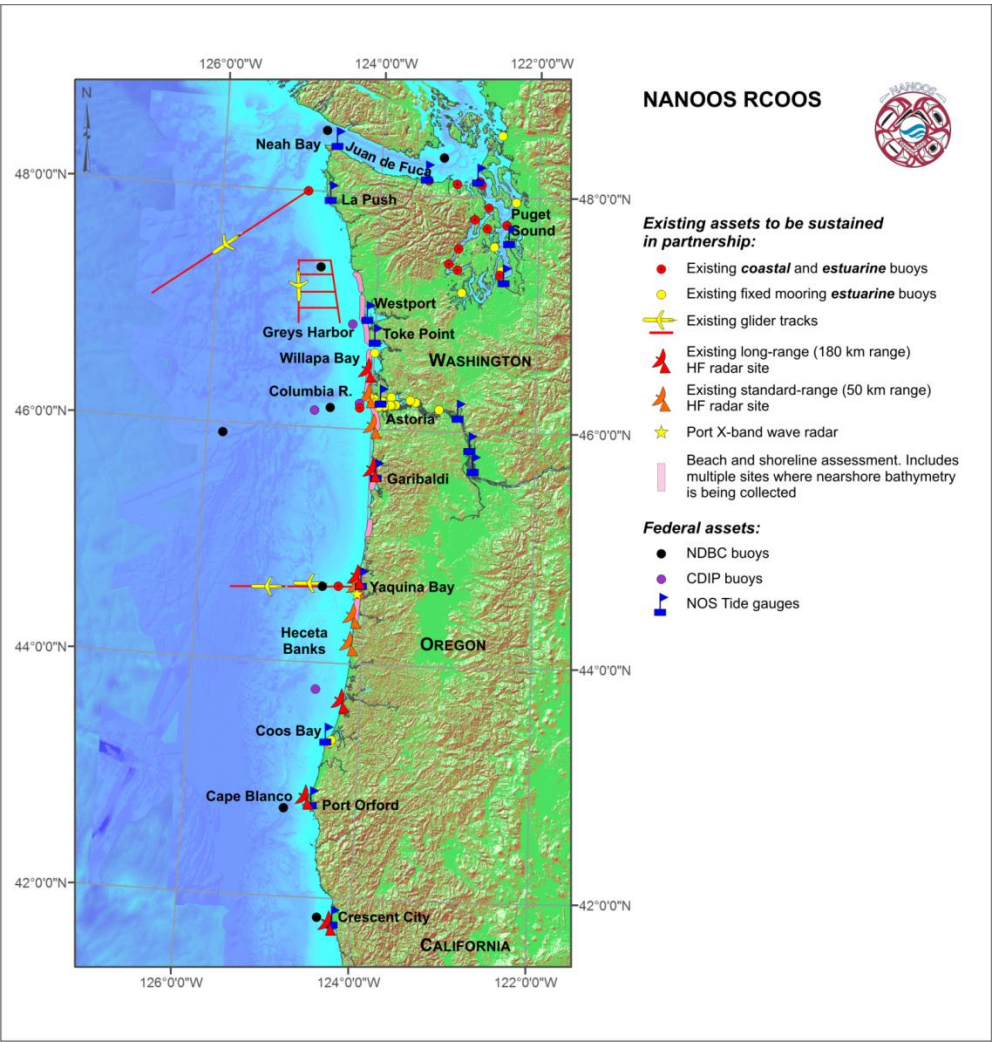
- **NANOOS currently provides access to 47 different types of variables, and in total 173 'assets' & 9 model/forecast overlays and growing.**

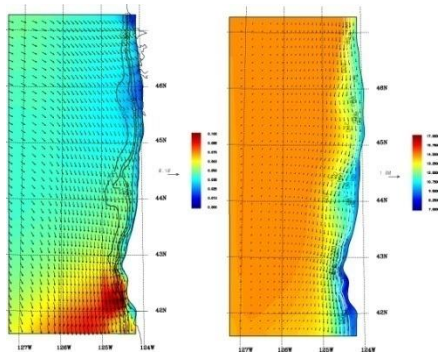
  Effective delivery of these data and product feeds can lead to:
  - **greater situational awareness (local and regional scales);**
  - **improved access to and understanding of environmental variables/conditions; and,**
  - **enable development and access to short- and long-term time-series.**

A Challenge - Many Stakeholders

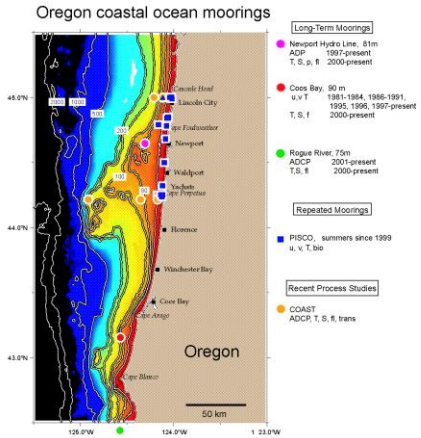
- State agencies (e.g. ODFW, WADOE, DSL, etc.)
- Federal agencies (NOAA, NWS, FEMA, US Coast Guard, etc.)
- Cities and Counties
- Ocean engineering (instruments, wave energy, telecommunication)
- NGO's
- Ports
- Bar pilots
- Fishers (recreational and commercial)
- Shellfish growers
- Recreational boaters
- Tribes
- Geotechnical consultants
- Universities/researchers
- Schools (K-12)
- Public-at-large
- Scientists
- and many others…

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

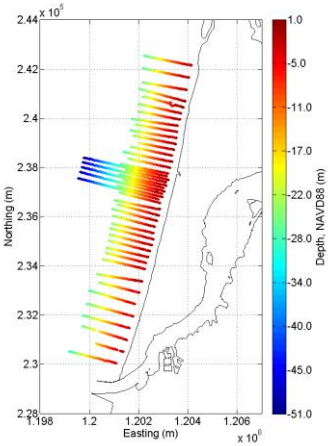




Overlays (Satellite, Models, & other geospatial data)

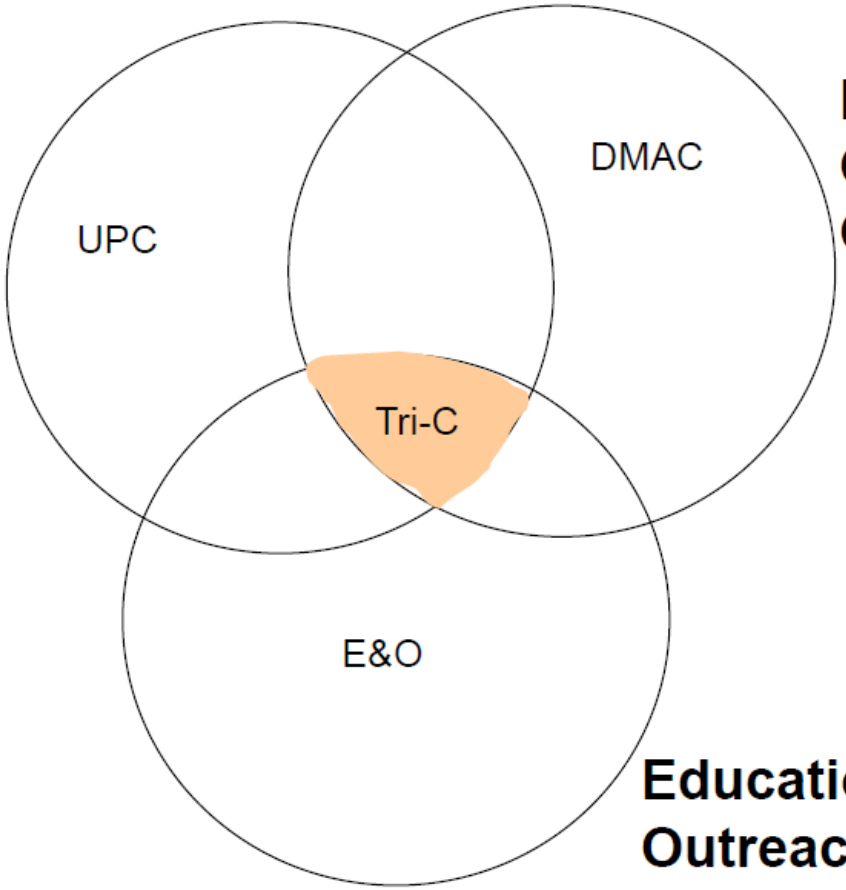


Shelf moorings & gliders



Shorelines & Bathymetry

User Products Committee



Data Management and Communication Committee

Education and Outreach Committee

- Weekly tag-ups
- Annual/biannual meetings (e.g. Apr 2014) – develop goals for forthcoming year

NVS History and Status:

Nov. 2009 - v1.0 released

….

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

….

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

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

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 web apps.

Apr 2014 – v3.2 – Major overhaul of NANOOS database and harvesters.

Apr2014 – v3.5 – Added boaters app (Xtide currents and tides)

NANOOS

Northwest Association of Networked Ocean Observing Systems

NANOOS

Welcome to NANOOS, the Pacific Northwest regional ocean observing system of IOOS (Integrated Ocean Observing System). NANOOS is creating customized information and tools with these areas of emphasis:

Maritime Operations | Ecosystem Assessment | Fisheries & Biodiversity | Coastal Hazards | Climate

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NVS
Products
Mobile Apps

Education
Resources

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New Account

Data Exploration

NVS (NANOOS Visualization System) is a web app that provides easy access to observations, forecasts, data, and visualizations.

Nautical Charts are available on NVS Web Apps

Nautical charts are available on both the NVS Maritime Operations and NVS Tuna Fishers Apps. To view NOAA Navigational Charts, select "Charts" from the left hand menu and charts will display on the map. Within the Charts Panel, users can select "Seamless Nautical Charts" to be able to pan and zoom within the entire map view.

Visit the NVS Maritime Operations App

Visit the NVS Tuna Fishers App

Finding a Story in Data Educator Workshop August 15-16, 2014

New NVS Boaters App

Ocean Acidification Webinar Series

http://nvs.nanoos.org/TunaFish

Data Explorer

Tsunami Evacuation Zones

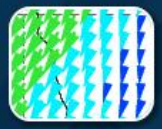
Boaters

Tuna Fishers

Shellfish Growers

Beach and Shoreline Changes

Maritime Operations


High Frequency Radar

Cruises

Gliders

Help

Additions & Updates

View Last 3 Months

WCSH-PCSGA Whiskey Crk — *Updated on 5 Aug 2014*
Sensor data collection and transmission are available again in near-real-time. New sensors and processing target ocean acidification observations, including aragonite saturation state. Data from previous 60 days have been loaded.

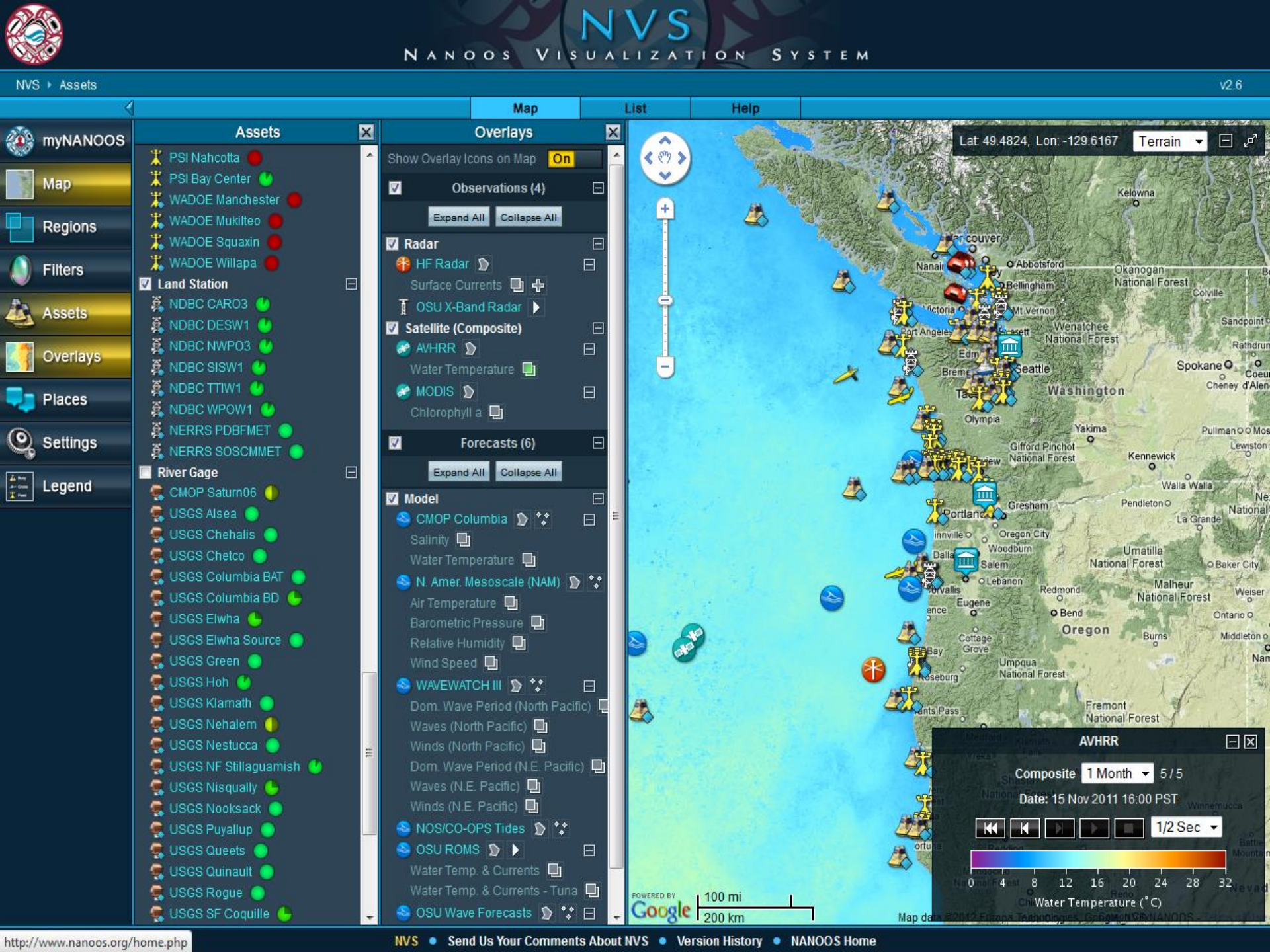
EC 46036
Offline since May 26. Status message from Environment Canada: 'Serviced May 4/14. Failed May 26/14'.

APL-UW NPB-1 — *Updated on 1 Aug 2014*
The buoy was refurbished extensively and redeployed on Jul 31. Water profiling has resumed.

STTI Port Susan — *Updated on 1 Aug 2014*
Oxygen sensor was replaced on July 15; oxygen data ingest into NVS was reestablished on July 23.

NDBC Washington — *Updated on 31 Jul 2014*
Buoy restored to service around July 10, 2014, after two years offline. Location (lat & lon) was updated to the new deployment coordinates.

OSU NH-10 — *Updated on 14 Jul 2014*
Ocean acidification sensors measuring CO2 in air and surface water, and pH, now being ingested into NVS. First deployed with the NH10 redeployment in April (and previously, w/o telemetry), these sensors are a collaboration between NANOOS, OSU and PMEL.


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
Okanogan National Forest
Bellingham
Mt.Vernon
Wenatchee National Forest
Seattle
Washington
Spokane
Olympia
Yakima
Gifford Pinchot National Forest
Kennewick
Walla Walla
Pendleton
Portland
Gresham
Oregon City
Woodburn
Salem
Lebanon
Umatilla National Forest
Malheur National Forest
Redmond
Bend
Eugene
Oregon
Cottage Grove
Umpqua National Forest
Fremont National Forest
Burns
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)
100 mi
200 km
Google
NVS
Send Us Your Comments About NVS
Version History
NANOOS Home
http://www.nanoos.org/home.php

Data Explorer

Tsunami Evacuation Zones

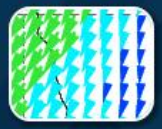
Boaters

Tuna Fishers

Shellfish Growers

Beach and Shoreline Changes

Maritime Operations


High Frequency Radar

Cruises

Gliders

Help

Additions & Updates

View Last 3 Months

WCSH-PCSGA Whiskey Crk — *Updated on 5 Aug 2014*
Sensor data collection and transmission are available again in near-real-time. New sensors and processing target ocean acidification observations, including aragonite saturation state. Data from previous 60 days have been loaded.

EC 46036
Offline since May 26. Status message from Environment Canada: 'Serviced May 4/14. Failed May 26/14'.

APL-UW NPB-1 — *Updated on 1 Aug 2014*
The buoy was refurbished extensively and redeployed on Jul 31. Water profiling has resumed.

STTI Port Susan — *Updated on 1 Aug 2014*
Oxygen sensor was replaced on July 15; oxygen data ingest into NVS was reestablished on July 23.

NDBC Washington — *Updated on 31 Jul 2014*
Buoy restored to service around July 10, 2014, after two years offline. Location (lat & lon) was updated to the new deployment coordinates.

OSU NH-10 — *Updated on 14 Jul 2014*
Ocean acidification sensors measuring CO2 in air and surface water, and pH, now being ingested into NVS. First deployed with the NH10 redeployment in April (and previously, w/o telemetry), these sensors are a collaboration between NANOOS, OSU and PMEL.

NANOOS
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Washington - Oregon - Northern California
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Regions
Fixed Platforms
Remote Sensing
Forecasts
Markers
Legend
Fixed Platforms
Expand All
Collapse All
Fixed Shore Platform
NOS Astoria
NOS Charleston
NOS Cherry Point
NOS Friday Harbor
NOS Garibaldi
NOS Hammond
NOS La Push
NOS Neah Bay
NOS North Spit
NOS Port Orford
NOS Port Townsend
NOS Seattle
NOS South Beach
NOS Tacoma
NOS Toke Point
NOS Westport
Forecasts
Air Temperature (NAM)
Air Temperature (WRF)
Barometric Pressure (NAM)
Barometric Pressure (WRF)
Dom. Wave Period (N.E.P.) (WWIII)
Relative Humidity (NAM)
Specific Humidity (WRF)
Surface Currents (XTIDE)
Tides (XTIDE)
Waves (N.E.P.) (WWIII)
Wind Gust (NAM)
Winds (N.E.P.) (WWIII)
Winds (WRF)
Lat: 51.2344
Lon: -134.3628
Terrain
Mouse Action Info
Select Tide Location
-1.3 ft
0.7 ft
-1.3 ft
0.2 ft
0.1 ft
Vancouver
Victoria
Seattle
Tacoma
Portland
Salem
Albany
Eugene
Bend
Oregon
Roseburg
Nanaimo
Surrey
Courtenay
Port Alberni
Chilliwack
Kelowna
Yakima
Mt Baker-Snoqualmie National Forest
Deschutes National Forest
XTIDE
4.9 ft
Rising Tide
4.9 ft
Falling Tide
Water Level (feet)
Google
11 August 2014 8:52 am PDT
8 Aug 2014
9 Aug 2014
10 Aug 2014
11 Aug 2014
12 Aug 2014
13 Aug 2014
14 Aug 2014
15 Aug 2014

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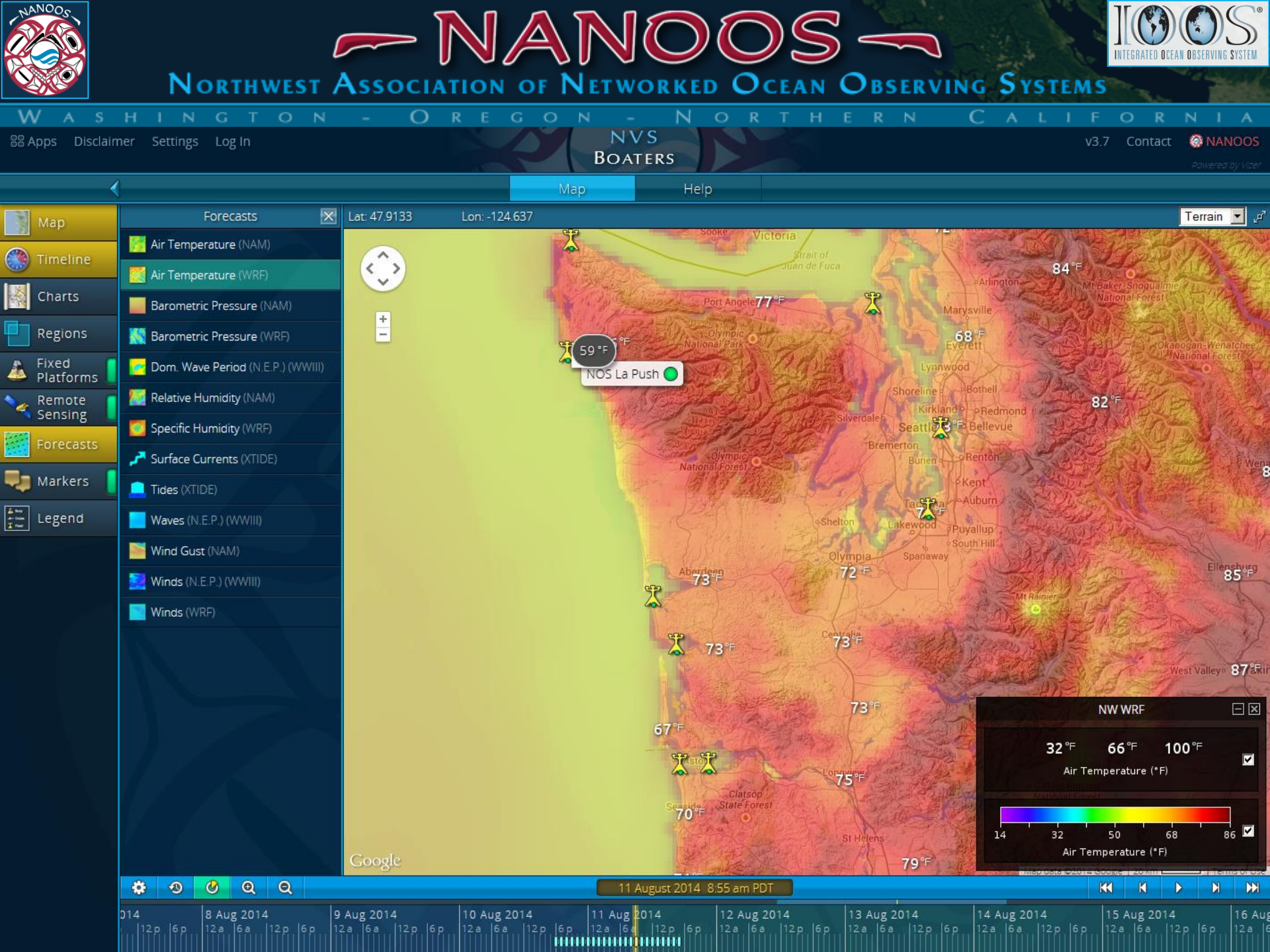
Forecasts
Air Temperature (NAM)
Air Temperature (WRF)
Barometric Pressure (NAM)
Barometric Pressure (WRF)
Dom. Wave Period (N.E.P.) (WWIII)
Relative Humidity (NAM)
Specific Humidity (WRF)
Surface Currents (XTIDE)
Tides (XTIDE)
Waves (N.E.P.) (WWIII)
Wind Gust (NAM)
Winds (N.E.P.) (WWIII)
Winds (WRF)
Lat: 47.2867
Lon: -124.2828
Terrain
Mouse Action Info
Select Tide Location
Point Grenville
Region: Washington
Latitude: 47.3033
Longitude: -124.27
-1.3 ft
-1.5 ft
-1.3 ft
-0.7 ft
-0.7 ft
3.5 ft
2.8 ft
8.3 ft
4.2 ft
-0.6 ft
8.3 ft
-1.3 ft
-2.1 ft
Victoria
Strait of Juan de Fuca
Marysville
Everett
Bothell
Kirkland
Redmond
Bellevue
Seattle
Silverdale
Bremerton
Renton
Kent
Auburn
Shelton
Lakewood
Puyallup
South Hill
Spanaway
Aberdeen
Centralia
Ellensburg
Mt Rainier
Okanogan-Wenatchee National Forest
XTIDE
4.9 ft
Rising Tide
4.9 ft
Falling Tide
Water Level (feet)
Google
11 August 2014 8:56 am PDT
7 Aug 2014
8 Aug 2014
9 Aug 2014
10 Aug 2014
11 Aug 2014
12 Aug 2014
13 Aug 2014
14 Aug 2014
15 Aug 2014
16 Aug
15 ft
12 ft
9 ft
6 ft
3 ft
0 ft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Legend
Forecasts
Air Temperature (NAM)
Air Temperature (WRF)
Barometric Pressure (NAM)
Barometric Pressure (WRF)
Dom. Wave Period (N.E.P.) (WWIII)
Relative Humidity (NAM)
Specific Humidity (WRF)
Surface Currents (XTIDE)
Tides (XTIDE)
Waves (N.E.P.) (WWIII)
Wind Gust (NAM)
Winds (N.E.P.) (WWIII)
Winds (WRF)
Lat: 47.9133
Lon: -124.637
Terrain
59 °F
NOS La Push
NW WRF
32 °F
66 °F
100 °F
Air Temperature (°F)
14
32
50
68
86
Air Temperature (°F)
11 August 2014 8:55 am PDT
8 Aug 2014
9 Aug 2014
10 Aug 2014
11 Aug 2014
12 Aug 2014
13 Aug 2014
14 Aug 2014
15 Aug 2014
Google

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Powered by Vizer
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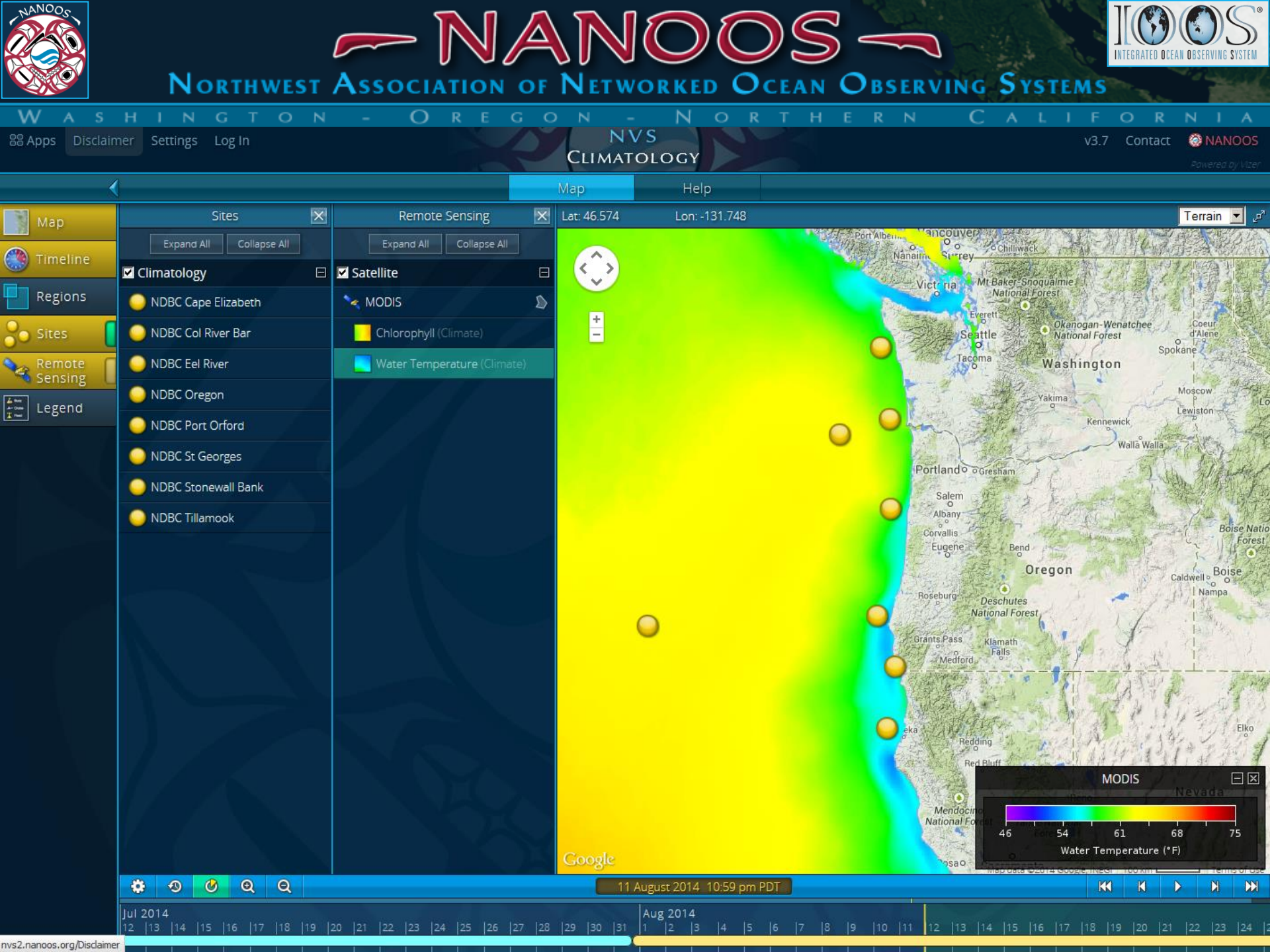
Remote Sensing
Legend
Lat: 49.6676
Lon: -146.1401
Terrain
Kamloops
Vernon
Kelowna
Courtenay
Port Alberni
Vancouver
Nanaimo
Surrey
Chilliwack
Victoria
Mt Baker-Snoqualmie National Forest
Everett
Seattle
Okanogan-Wenatchee National Forest
Tacoma
Washington
Yakima
Kennewick
Portland
Gresham
Salem
Albany
Corvallis
Eugene
Bend
Oregon
Roseburg
Deschutes National Forest
Grants Pass
Klamath Falls
Medford
Redding
Red Bluff
Reno
Mendocino National Forest
Google
Map data ©2014 Google, INEGI
100 km
Terms of Use
11 August 2014 10:57 pm PDT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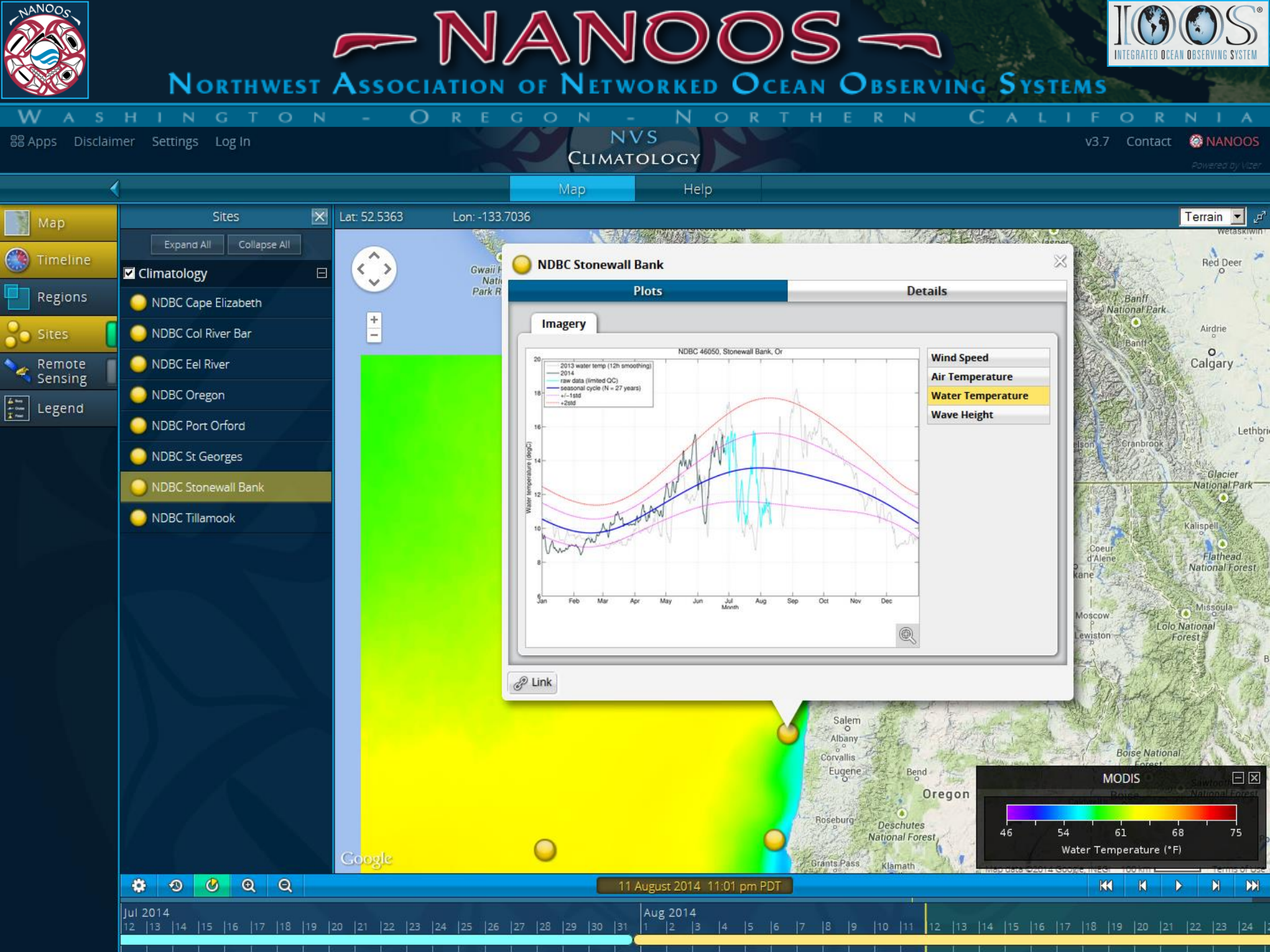
Expand All
Collapse All
Climatology
NDBC Cape Elizabeth
NDBC Col River Bar
NDBC Eel River
NDBC Oregon
NDBC Port Orford
NDBC St Georges
NDBC Stonewall Bank
NDBC Tillamook
Remote Sensing
Expand All
Collapse All
Satellite
MODIS
Chlorophyll (Climate)
Water Temperature (Climate)
Lat: 46.574
Lon: -131.748
Terrain
Vancouver
Victoria
Seattle
Tacoma
Everett
Mt Baker-Snoqualmie National Forest
Okanogan-Wenatchee National Forest
Washington
Spokane
Yakima
Kennewick
Walla Walla
Portland
Salem
Albany
Corvallis
Eugene
Bend
Oregon
Roseburg
Deschutes National Forest
Grants Pass
Klamath Falls
Medford
Redding
Red Bluff
Boise
Caldwell
Nampa
Elko
Nevada
MODIS
46
54
61
68
75
Water Temperature (°F)
Google
11 August 2014 10:59 pm PDT
Jul 2014
Aug 2014
nvs2.nanoos.org/Disclaimer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Climatology
NDBC Cape Elizabeth
NDBC Col River Bar
NDBC Eel River
NDBC Oregon
NDBC Port Orford
NDBC St Georges
NDBC Stonewall Bank
NDBC Tillamook
Lat: 52.5363
Lon: -133.7036
Terrain
NDBC Stonewall Bank
Plots
Details
Imagery
NDBC 46050, Stonewall Bank, Or
2013 water temp (12h smoothing)
2014
raw data (limited QC)
seasonal cycle (N = 27 years)
+/-1std
+2std
Water temperature (degC)
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
Month
Wind Speed
Air Temperature
Water Temperature
Wave Height
Link
MODIS
46
54
61
68
75
Water Temperature (°F)
Google
11 August 2014 11:01 pm PDT
Jul 2014
Aug 2014
Red Deer
Banff
Banff National Park
Airdrie
Calgary
Cranbrook
Glacier National Park
Kalispell
Flathead National Forest
Missoula
Lolo National Forest
Moscow
Lewiston
Coeur d'Alene
Salem
Albany
Corvallis
Eugene
Bend
Oregon
Roseburg
Deschutes National Forest
Grants Pass
Klamath
Boise National Forest

NANOOS

Northwest Association of Networked Ocean Observing Systems

Washington - Oregon - Northern California

IOOS Integrated Ocean Observing System

Apps | Disclaimer | Settings | Log In

NVS
Climatology

v3.7 | Contact | NANOOS

Powered by Vizer

Map | Help

Map | Timeline | Regions | Sites | Remote Sensing | Legend

Sites

Expand All | Collapse All

Climatology

- NDBC Cape Elizabeth
- NDBC Col River Bar
- NDBC Eel River
- NDBC Oregon
- NDBC Port Orford
- NDBC St Georges
- NDBC Stonewall Bank
- NDBC Tillamook

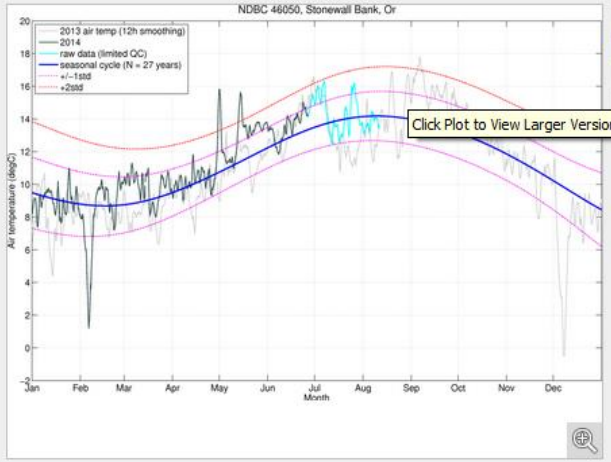
Lat: 52.7097 Lon: -120.8496

Terrain

NDBC Stonewall Bank

Plots | Details

Imagery



Wind Speed
Air Temperature
Water Temperature
Wave Height

Click Plot to View Larger Version

Link

MODIS

46 54 61 68 75

Water Temperature (°F)

Google

11 August 2014 11:02 pm PDT

Jul 2014 | Aug 2014

agate.coas.oregonstate.edu/nvs/clim_buoy/ndbc46050_air_temp.png

NANOOS

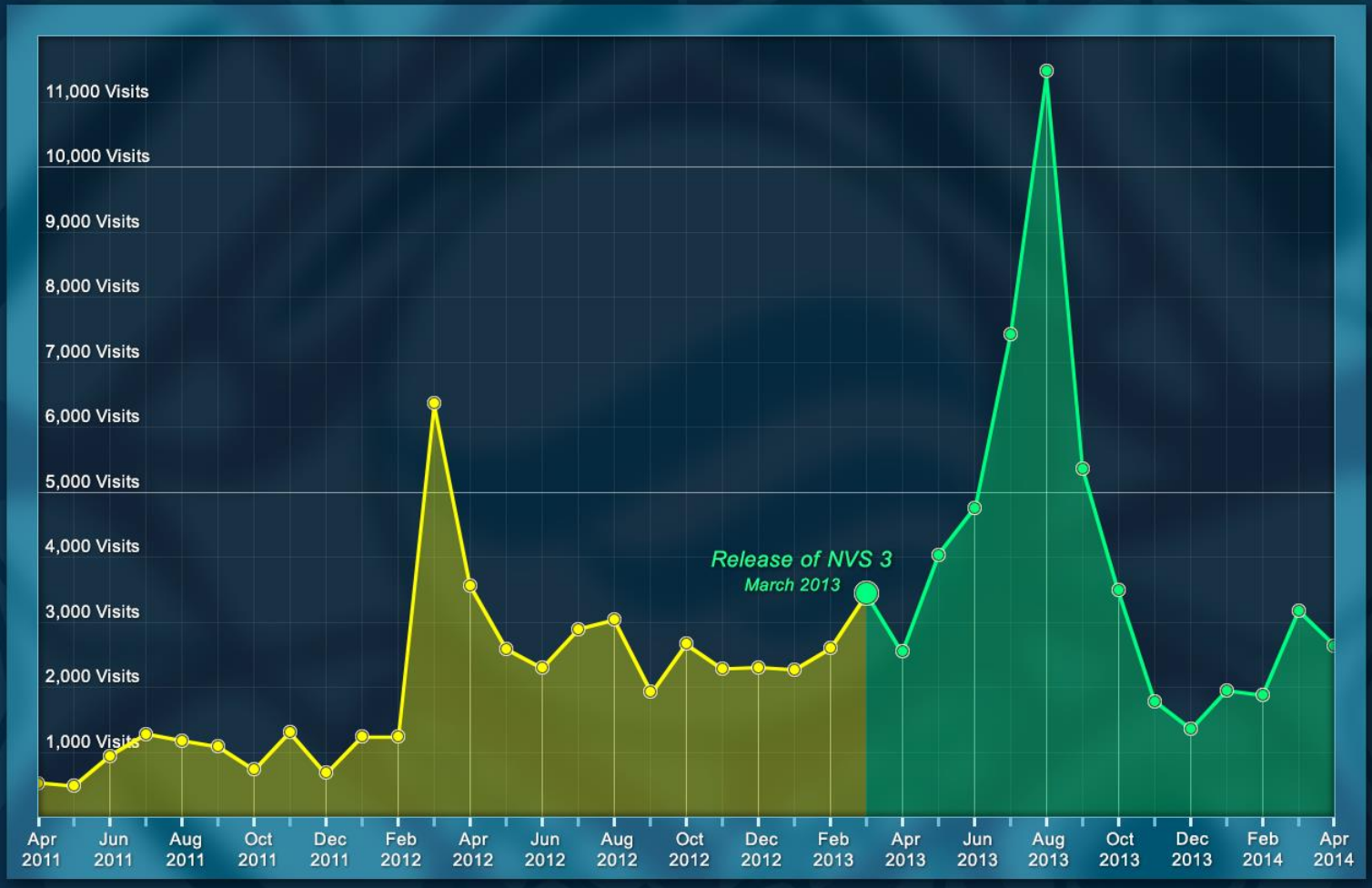
Northwest Association of Networked Ocean Observing Systems

Washington - Oregon - Northern California

IOOS Integrated Ocean Observing System

NVS

Visitor Counts: April 2011 - April 2014



Statistics provided by Google Analytics

Troy Tanner, APL-UW

30 April 2014

Questions?

NANOOS

Northwest Association of Networked Ocean Observing Systems

Washington - Oregon - Northern California

NANOOS
Data Management and Communications (DMAC)

presentation to NANOOS Principal Investigators & Governing Council
August 12, 2014

NANOOS DMAC co-chairs:
Emilio Mayorga – UW
Stephen Uczekaj – Boeing

DMAC Core Team

Emilio Mayorga – UW/APL, Co-Chair
Stephen Uczekaj – Boeing, Co-Chair

Jonathan Allan – DOGAMI OR, User Products Chair
Rick Blair – Boeing, Infrastructure and Standards
Alex Dioso – UW/APL, System Administration
Charles Seaton – OHSU/CMOP, Data Provider Services
Craig Risien – OSU, Data Provider Services
Troy Tanner – UW/APL, Portal Services, System Administration

DMAC Events

- Quarterly IOOS DMAC Steering Committee (Steve Uczekaj)
- Marine Portal Planning meeting (Aug 2013, Portland)
- **IOOS DMAC Workshop (Sept. 2013)**
- WCGA Ocean Data Network meeting (Nov. 2013)
- **Annual DMAC-UPC meeting (Feb. 2014, Portland)**
- Co-led two monthly IOOS DMAC webinars: Python data access solutions, and Hydrological data (NSF-funded CUAHSI and Water Data Center), Feb. & May, 2014
  - *2013-2014 special support from IOOS DMAC for special projects advancing DMAC standards and capabilities*

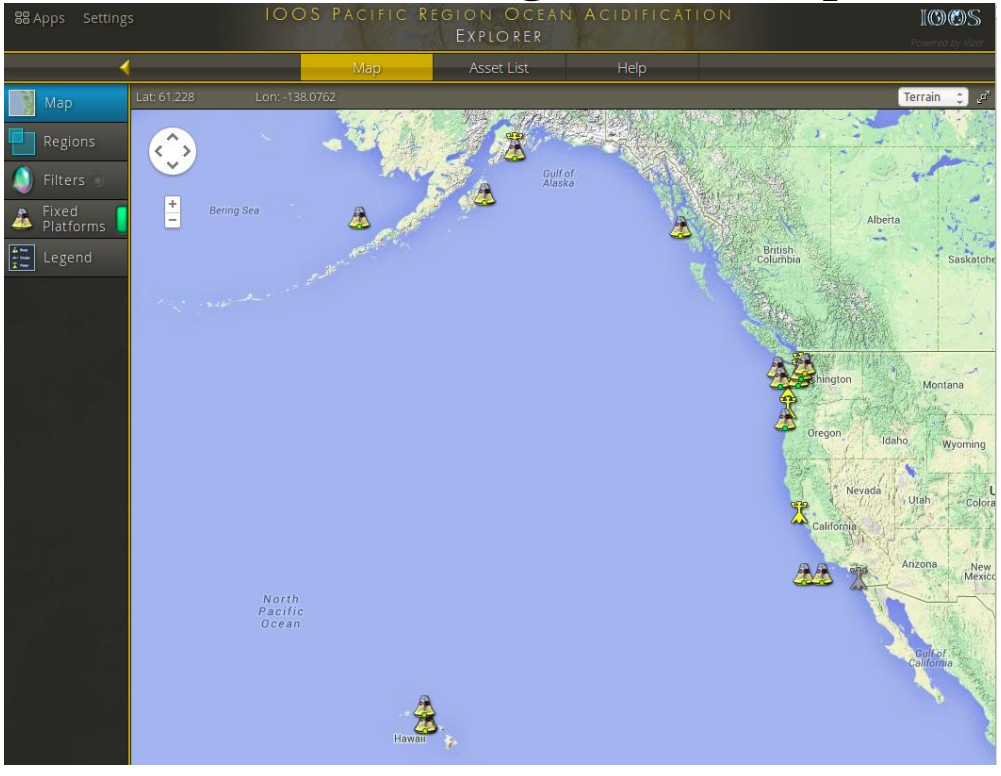
"Aging Infrastructure"

2013-2014: Enhanced hardware and backend software environments

- **NVS**: Overhauled server environments, User-Interface framework, database structure, and data harvesting code. Much more capable and adaptable infrastructure.
- **UW**: New hardware, new backend management operations, upgraded software environments.
- **OSU**: New server, improved THREDDS service.
- **OHSU/CMOP**: Improved THREDDS service.

NVS: More adaptable, and external funding support (NOAA OA & NSF)

IOOS Pacific Region OA Explorer



NSF Critical Zone Observatories

New Data Sets Integrated into NANOOS

1. Several near-real-time in-situ monitoring assets. NOAA PMEL CO_2 sensors on existing platforms/sites (NDBC Cape Elizabeth & Seattle Aquarium); OSU CO_2 sensors on NH10 buoy; Penn Cove Shellfish; Vancouver Island University (BC) shellfish research station; Whiskey Creek overhaul ("Burkolator"). *New South Slough NERR site (Coos Bay) very soon.*

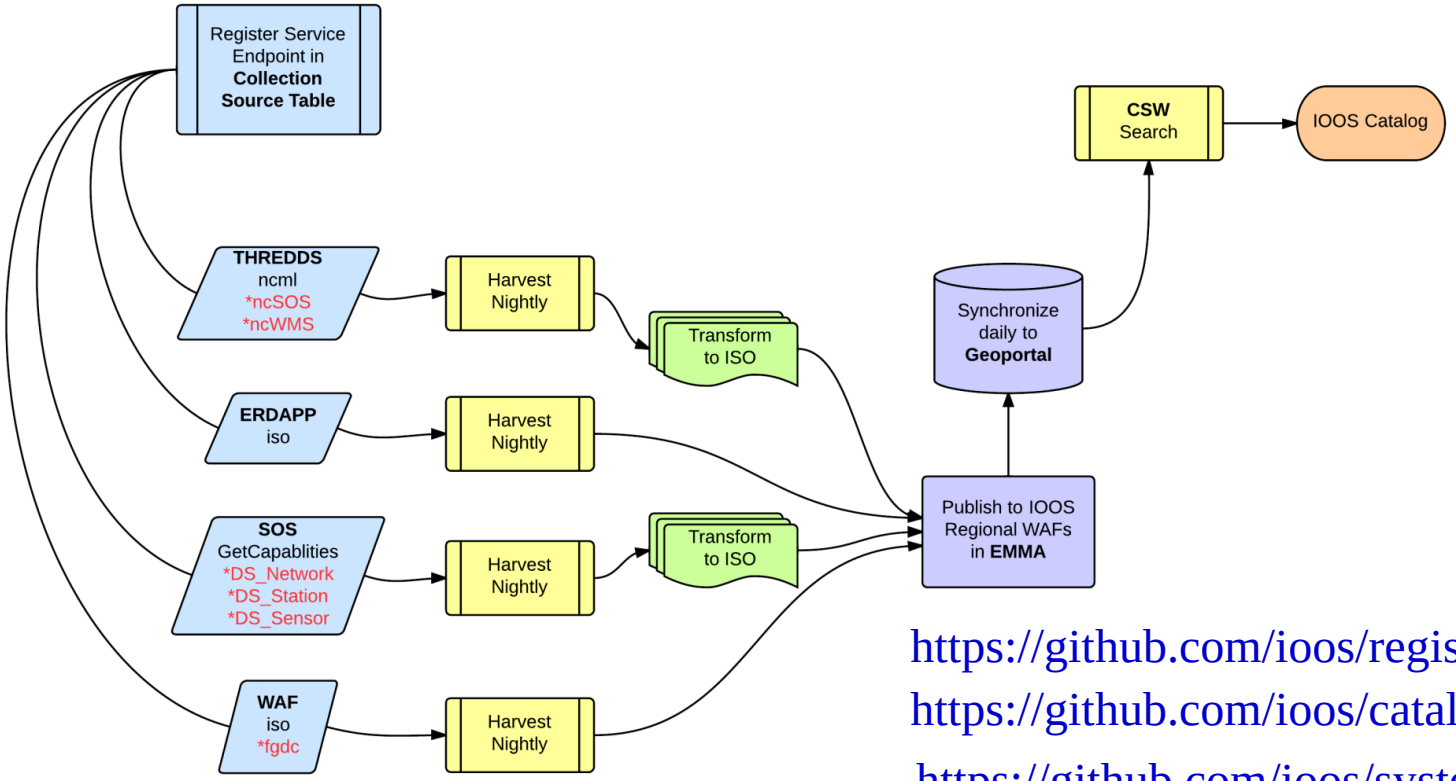
2. Remote sensing, models, and other forecasts. OSU satellite climatologies; NCEP HYCOM ocean model forecasts; XTide forecasts.

3. Climatologies. From NDBC buoys and OSU satellite climatologies.

And many redeployments and refinements to existing assets.

Registering Services with IOOS DMAC:

Clearer workflow and outcomes



https://github.com/ioos/registry

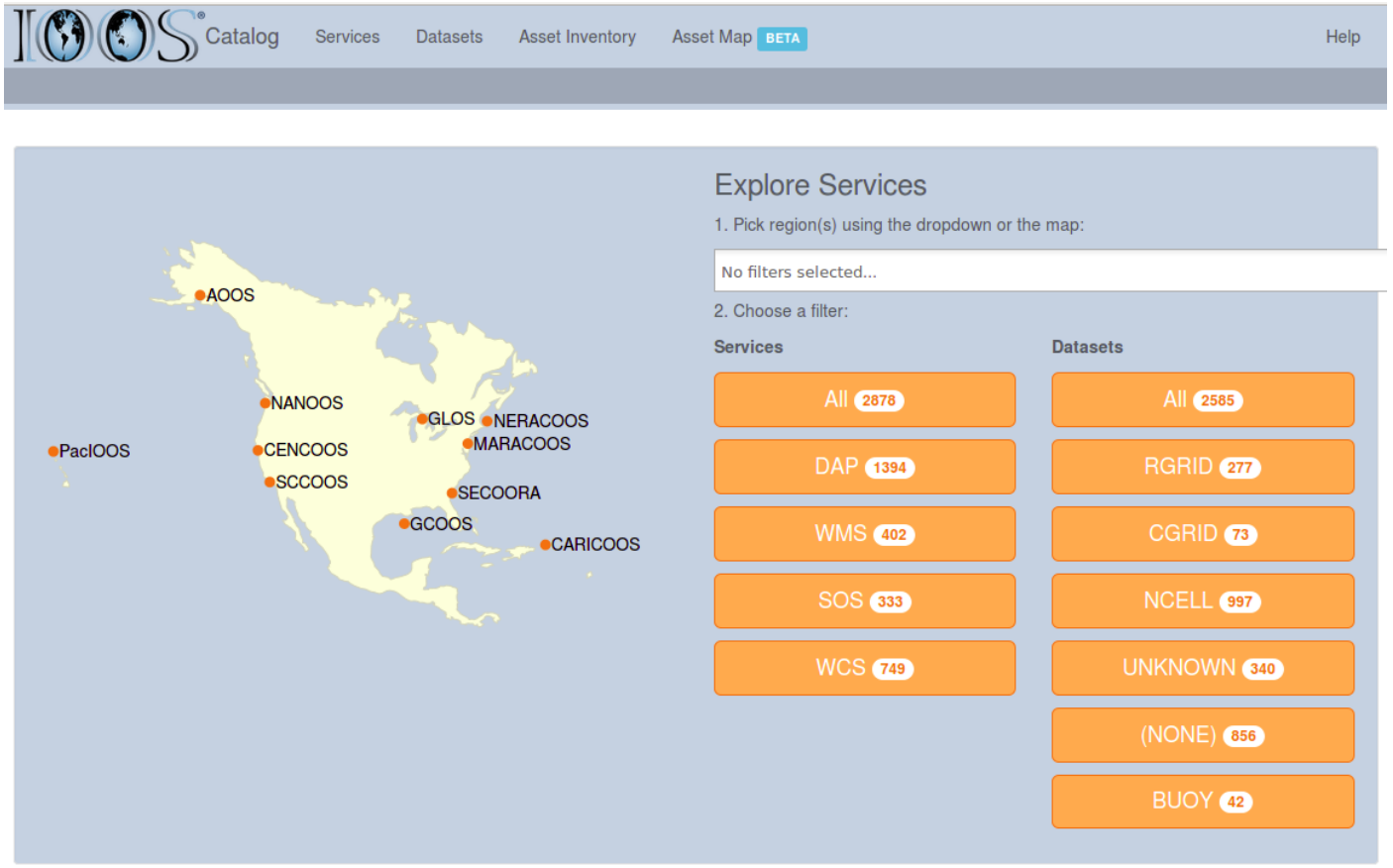
https://github.com/ioos/catalog

https://github.com/ioos/system-test

IOOS System Integration Test

Test service infrastructure, develop reusable code examples

IOOS Catalog (in development)



NANOOS DMAC presence

- New http://data.nanoos.org (consistent, stable organization of web services for programmatic data access)
  - http://data.nanoos.org/geoserver
  - http://data.nanoos.org/52nsos/sos (new IOOS SOS-compliant service)

- *(Soon)* New NANOOS DMAC page in NANOOS portal
  - To describe our activities and resources (for more technical users)

- THREDDS services at OSU and OHSU/CMOP, improved

- At National & Regional Catalogs, Resources
  - IOOS Registry & Catalog
  - NOAA SWFSC CoastWatch ERDDAP
  - NDBC
  - WCGA Ocean Data Portal catalog *(Soon)*

NANOOS

NORTHWEST ASSOCIATION OF NETWORKED OCEAN OBSERVING SYSTEMS

WASHINGTON - OREGON - NORTHERN CALIFORNIA

Test below adapted from work
by **Tanya Haddad**,
OR Ocean-Coastal Management Program,
from FGDC grant "endorsed" by NANOOS

NANOOS GeoServer WFS GetCapabilities

What is this? A human-readable page of information about the WFS service hosted on thi
derived from the GetCapabilities XML of the WFS service.

Service Identification Information

- **Title:** GeoServer Web Feature Service
- **Abstract:** This is the reference implementation of WFS 1.0.0 and WFS 1.1.0, supports
  Transaction.
- **Service Type:** WFS (Version 1.1.0)
- **Access Constraints:** NONE

Service Provider Information

- **Provider Name:** NANOOS
- **Contact Email:**

Service Operations Available

- GetCapabilities
- DescribeFeatureType
- GetFeature

WFS Layers Available from this Catalog

Title
Chlorophyll-a Concentration Daily Average, Upper 3 meters
Chlorophyll-a Concentration Monthly Average, Upper 3 meters
Chlorophyll-a Concentration Weekly Average, Upper 3 meters
Oxygen Concentration (mg/L) Daily Minimum -- Upper 3 meters
Oxygen Concentration Daily Average, Upper 3 meters
Oxygen Concentration Monthly Average, Upper 3 meters
Oxygen Concentration Weekly Average, Upper 3 meters
Oxygen Concentration Weekly Minimum, Upper 3 meters
PNW coast line and land area

data.nanoos.org/52nsos/sos/kvp?service=SOS&request=GetCapabilities&A

```
−<sos:Capabilities version="1.0.0" xsi:schemaLocation="http://www.opengis.net/gml
http://schemas.opengis.net/gml/3.1.1/base/gml.xsd http://www.opengis.net/sensorML/1.0.1
http://schemas.opengis.net/sensorML/1.0.1/sensorML.xsd http://www.opengis.net/ows/1.1
http://schemas.opengis.net/ows/1.1.0/owsAll.xsd http://www.opengis.net/swe/1.0.1 http://schemas.opengis.net
/sweCommon/1.0.1/swe.xsd">
 −<ows:ServiceIdentification>
  −<ows:Title>
     NANOOS Sensor Observation Service (SOS), a 52North IOOS SOS server
   </ows:Title>
  −<ows:Abstract>
     IOOS Sensor Observation Service (SOS) Server for NANOOS, the Northwest Association of Networked
     Ocean Observing Systems (http://nanoos.org). Provides access to marine in-situ observation data for the
     US Pacific Northwest and lower British Columbia, from the NANOOS asset data store harvested and
     integrated by NVS (NANOOS Visualization System, http://nvs.nanoos.org). To avoid data duplication,
     currently only assets not otherwise available to the IOOS Catalog (http://ioos.noaa.gov/catalog) are
     accessible through this SOS server; for example, assets from most federal agencies are not accessible on
     this server, but they are available on the NVS application. This NANOOS service is run by the 52North
     IOOS SOS server software, and complies with the IOOS SOS "Milestone 1" service profile
     (https://code.google.com/p/ioostech/wiki/SOSGuidelines).
   </ows:Abstract>
  −<ows:Keywords>
     <ows:Keyword>Air Temperature</ows:Keyword>
     <ows:Keyword>British Columbia</ows:Keyword>
     <ows:Keyword>California</ows:Keyword>
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     <ows:Keyword>Dissolved Oxygen</ows:Keyword>
     <ows:Keyword>Marine</ows:Keyword>
     <ows:Keyword>NANOOS</ows:Keyword>
     <ows:Keyword>Oregon</ows:Keyword>
     <ows:Keyword>Pacific Northwest</ows:Keyword>
     <ows:Keyword>Salinity</ows:Keyword>
```

IOOS Catalog | Services | Datasets | Asset Inventory | Asset Map BETA | Help

Services — By Provider: NANOOS — By Type: -

provider	type	name	updated (utc)	code	time (ms)	weekly avg (ms)	status
habu.apl.washington.edu							1/1
NANOOS	SOS	NANOOS Sensor Observation Service (SOS)	04 Jun 14	200	253	32.0	✔
ona.coas.oregonstate.edu:8080							2/2
NANOOS	WMS	Regional Ocean Modeling System (ROMS): O...	04 Jun 14	200	685	92.0	✔
NANOOS	DAP	Regional Ocean Modeling System (ROMS): O...	04 Jun 14	200	278	46.0	✔

West Coast collaborations: WCGA

- Ocean Data Network and Portal (technical guidance)
- Laura Lilly, WCGA – WC RA's SeaGrant Fellow
  - Emilio is technical supervisor; Julie Thomas (SCCOOS Director) is overall supervisor; Todd Hallenbeck is WCGA supervisor
  - Ocean Acidification & Marine Debris focus
  - Ocean data products (from HF surface currents, etc)
- Ocean Data Portal catalog awarded ESRI Ocean Special Achievement Award, May 2014, “in recognition of outstanding work with GIS technology”
- Supporting Marine Spatial Planning needs; enhancing accessibility (technology + education + prototyping) to ocean data, for GIS-oriented community

WEST COAST OCEAN DATA PORTAL

A project of the West Coast Governors Alliance on Ocean Health

DISCOVER CONNECT INFORM ABOUT

PAGE 1 2 3 SHOW

SEARCH KEYWORDS

Location

Categories

Biological Data

Human Data

- [ ] Economy 5

Physical Data

- [x] Water 14

Issues

Sources

- [ ] California Coastal Geoportal 2
- [ ] Marine Cadastre.gov 5
- [ ] Oregon Spatial Data Library 2

14 *results found for* Physical: Water .

NOAA AVERAGE ANNUAL SALINITY (3-ZONE)

The 3-Zone Average Annual Salinity Digital Geography is a digital sp...

ZIP
METADATA XML
JSON

COASTAL WETLANDS (A FILTERED SUBSET OF WETLAND POLYGONS FROM THE NATIONAL WETLANDS INVENTORY THAT ARE BELOW OR WITHIN 100 METERS OF THE MHHW LINE)

This dataset distinguishes coastal wetlands from inland wetlands w...

ESRI REST
METADATA XML
JSON

NET SHORE-DRIFT IN WASHINGTON STATE

Littoral drift, or shore drift, is the process by which beach sediment...

METADATA XML
JSON

ESTUARINE INFLUENCE

This dataset contains three metrics - Salmon Ranking, Nursery Are...

ZIP
METADATA XML
JSON

OCEAN WAVE RESOURCE POTENTIAL IN

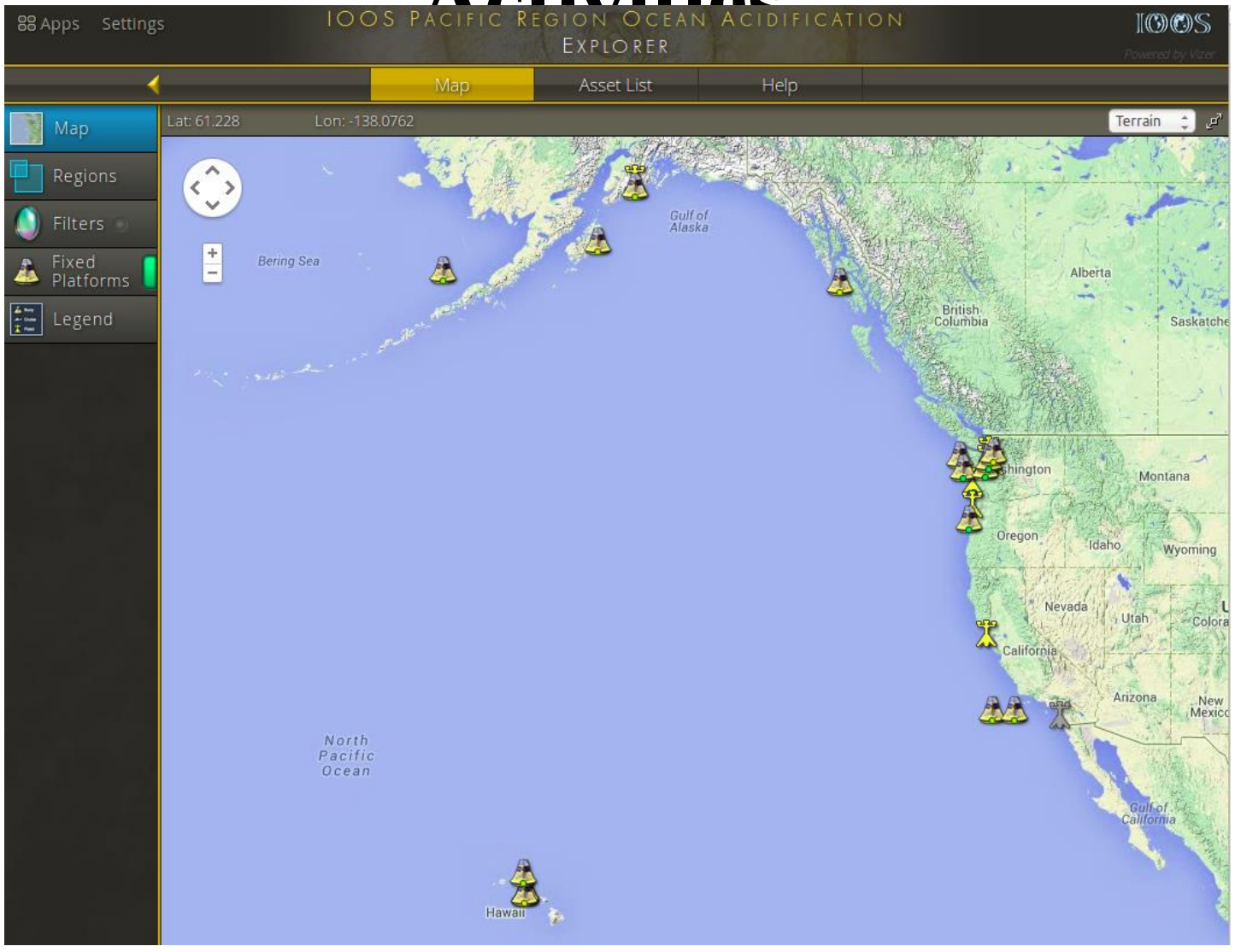
ZIP

NANOOS

NORTHWEST ASSOCIATION OF NETWORKED OCEAN OBSERVING SYSTEMS

WASHINGTON - OREGON - NORTHERN CALIFORNIA

Ocean Acidification Data Activities



2014 – 2015
Priorities, Challenges

Continued asset integration

- **Regional Assets**
  - South Slough NERRS (North Spit very soon; others?)
  - Penn Cove Shellfish enhancements
  - NEMO profiler
  - ADCP currents data
  - New opportunities and partnerships
- **Federal Assets**
  - Improved NERRS access mechanism (very soon)
  - NOS/COOPS, additional variables
  - Weather stations at regional airports
  - New priorities as they arise

Data "Types" (origin) vs. Certification and IOOS DMAC

1. **NANOOS Supported Assets**
2. Federal Assets
3. Regional assets not supported by NANOOS
4. Models vs. observations

QA/QC procedures, documentation – Data submis
to IOOS via interoperable standards – Data submis
for long-term archiving

IOOS 26
Core Variables

name	definition
acidity	Acidity
bathymetry	Bathymetry
bottom_character	Bottom character
cdom	Color dissolved organic matter
contaminants	Contaminants
dissolved_nutrients	Dissolved Nutrients
dissolved_oxygen	Dissolved oxygen
fish_abundance	Fish abundance
fish_species	Fish species
heat_flux	Heat flux
ice_distribution	Ice distribution
ocean_color	Ocean color
optical_properties	Optical properties
pathogens	Pathogens
pco2	Partial pressure of carbon dioxide
phytoplankton_species	Phytoplankton species
salinity	Salinity
sea_level	Sea level
stream_flow	Stream flow
surface_currents	Surface currents
surface_waves	Surface waves
temperature	Temperature
total_suspended_matter	Total suspended matter
wind	Wind Speed and Direction
zooplankton_abundance	Zooplankton abundance
zooplankton_species	Zooplankton species

Expanding IOOS DMAC support in ways that also Enhance Capabilities for regional products, needs

- **QARTOD (QA/QC).** Documentation, algorithm implementations, consistency. Collaboration with other RA's. Exposed on NVS.
- **Long time series**. Available via compliant IOOS DMAC services. Accessible to NVS and regional users. Initially for prioritized sites.
- **Enhance NANOOS services** and **Register** all with IOOS DMAC Catalog.
- Expose **NANOOS** model output and glider data with **IOOS Model and Glider DAC's**.
- **Expose NANOOS data products** (climatologies, etc) to IOOS Catalog.

WEST COAST OCEAN DATA PORTAL

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ZIP

NANOOS Education & Outreach Update

NANOOS Joint PI and Governing Council Meeting
August 12, 2014

Amy Sprenger, Education & Outreach Coordinator
Rachel Vander Giessen, Outreach Specialist (as of 2/14)

Scope of Work

Product Development	Work with DMAC and User Products Committees on tailored product development, increase usability of NVS
User Engagement	Conduct outreach and trainings to select user groups as resources permit
Networking	Maintain existing and build new relationships with NANOOS priority area users and the education community

Scope of Work

Product Development	Work with DMAC and User Products Committees on tailored product development, increase usability of NVS
User Engagement	Conduct outreach and trainings to select user groups as resources permit
Networking	Maintain existing and build new relationships with NANOOS priority area users and the education community

- Through weekly tag-ups, we have consistently provided input on usability of NANOOS products

Scope of Work

Product Development	Work with DMAC and User Products Committees on tailored product development, increase usability of NVS
User Engagement	Conduct outreach and trainings to select user groups as resources permit
Networking	Maintain existing and build new relationships with NANOOS priority area users and the education community

- Throughout FY13, we have provided outreach to a variety of user groups and also to the public at large using social media

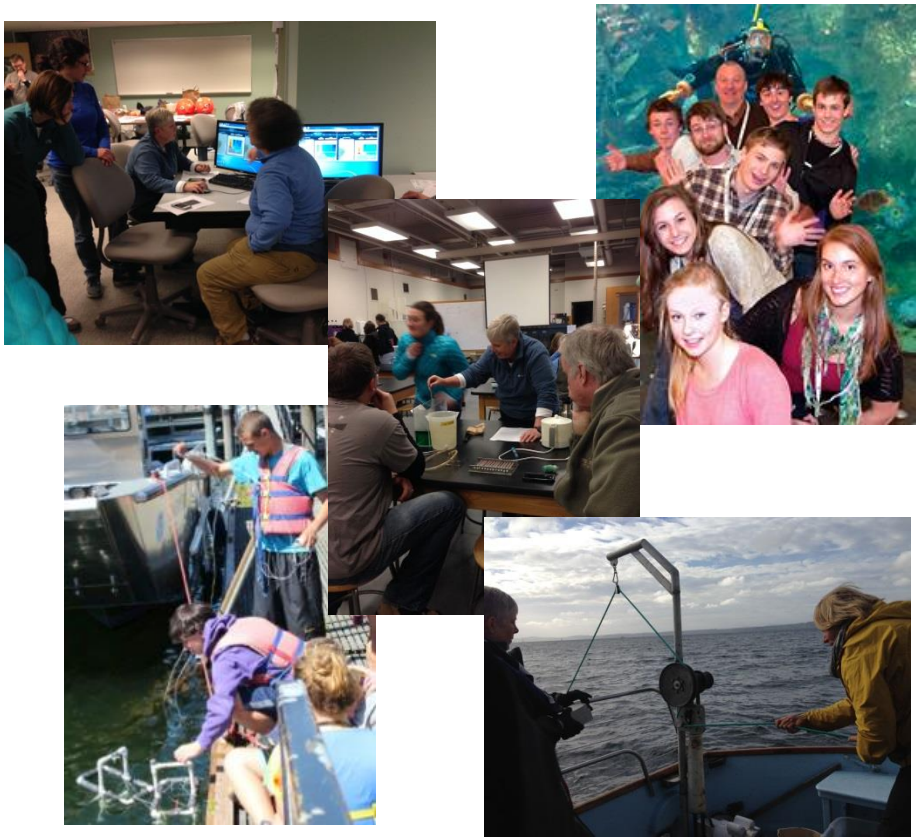
Scope of Work

Product Development	Work with DMAC and User Products Committees on tailored product development, increase usability of NVS
User Engagement	Conduct outreach and trainings to select user groups as resources permit
Networking	Maintain existing and build new relationships with NANOOS priority area users and the education community

- NANOOS is well-regarded in PNW education community; now we are sought after, for our participation, instead of us seeking involvement

Education:

NANOOS goal remains increasing ocean literacy



- National Science Teacher Assoc. presentation & exhibit – Portland, OR
- "Finding a Story in Data "Teacher workshop – Seattle ,WA
- Ocean Acidification Education workgroup, Marine Resources Advisory Council
- NOAA OAP SOARCE webinar
- NOAA Science Camp
- National Ocean Science Bowl

Informal Education

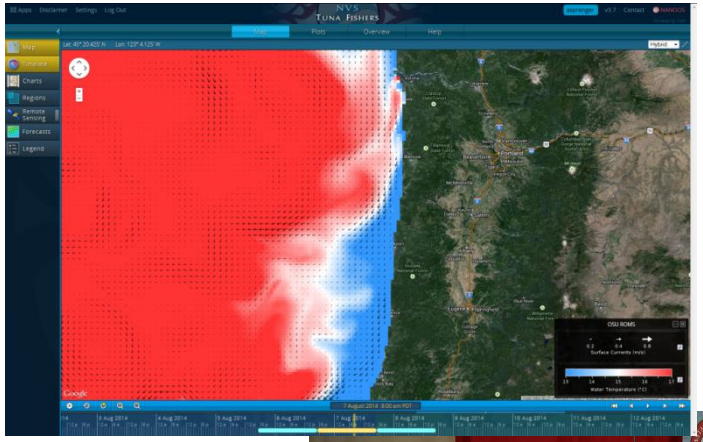
Learn by having fun!!!

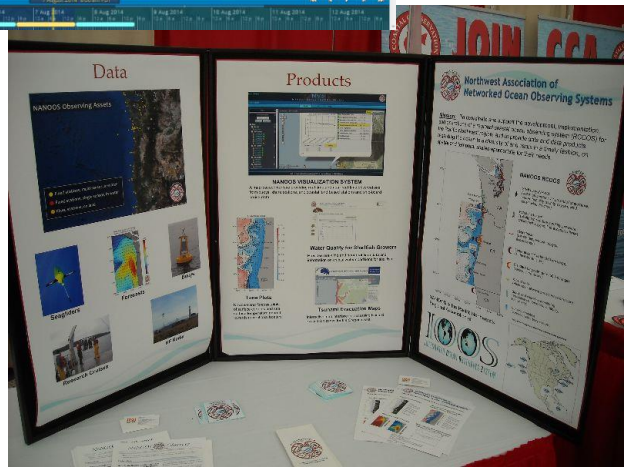
Great Build a Buoy Challenge
Pacific Science Center

Discover Science Weekend
Seattle Aquarium

Outreach: targeted user groups

NANOOS goal to link user groups with data products





- Pacific Coast Shellfish Growers Association Meeting, Bend, OR
- Saltwater Sportsmen's Show, Salem, OR
- Aquaculture America 2014
- Sidelights Article on Maritime Operations for Council of American Master Mariners, Inc
- "Native America Calling" Interview

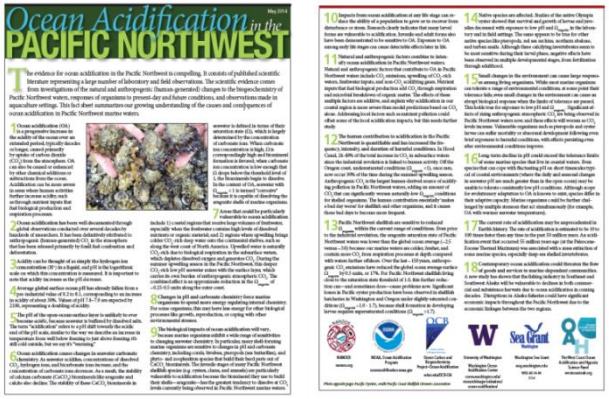
Outreach: science

Bringing NANOOS to scientists:

Coastal & Estuarine Research Federation IOOS Panel

Salish Sea Ecosystem Conference, New Data Tools and Technologies Panel

PS Marine Waters Overview 2013, 2014


Ocean Acidification in the PACIFIC NORTHWEST

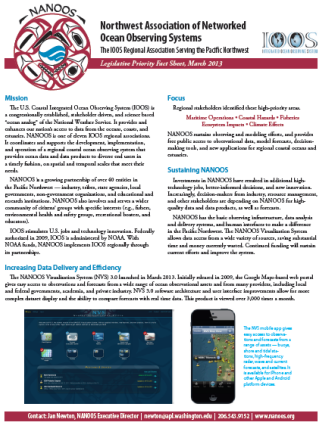
Bringing NANOOS to policy makers:

OA in the PNW FAQ

U.S. State Dept "Our Ocean" Conference

U.S. Senate Testimony on ICOOS Act Re-authorization

Hill visits with NANOOS updates

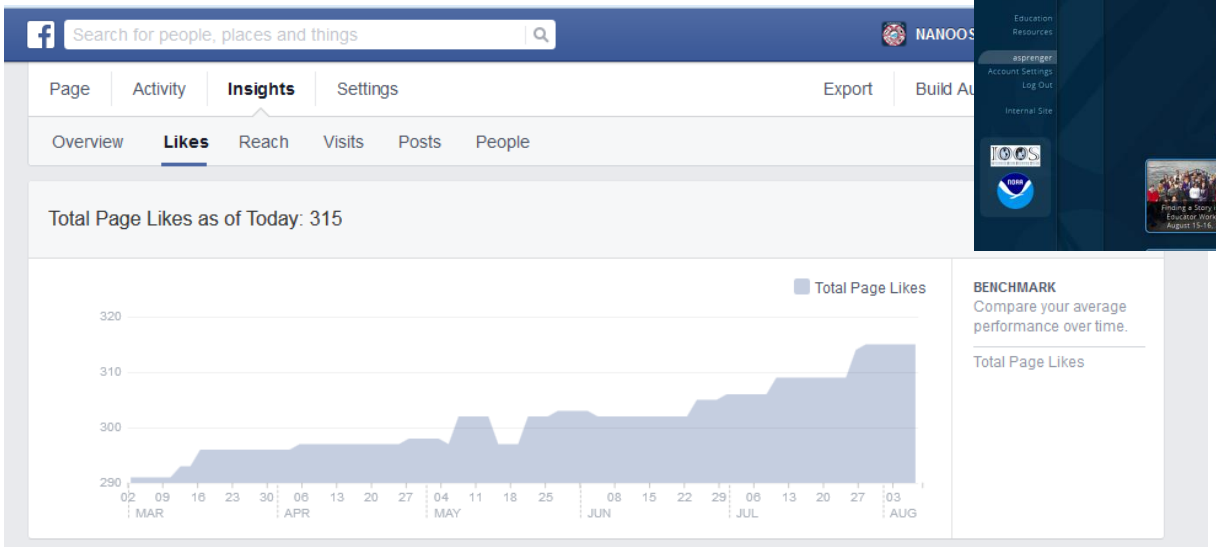

Northwest Association of Networked Ocean Observing Systems
The IOOS Regional Association Serving the Pacific Northwest
Legislative Priority Fact Sheet, March 2013

Outreach: public

NANOOS on social media

Facebook: https://www.facebook.com/NANOOS.PNW

NANOOS Blog on home page



Plan for Y8

Education Efforts

- Ocean acidification curricula
- Needs assessment re real-time data use in classroom
  - Strategize classroom resource needs for teaching using real-time data, etc.

Outreach Efforts

- Stay the course!
- Continue to assist with development of new web and mobile apps
- Continue outreach to current users groups, adding maritime ops & recreational boaters communities

6. Round Table for announcements from GC members

7. Positioning NANOOS for the future (FY16-20)

7. Positioning NANOOS for the future (FY16-20)

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, and 20 more

Resource extraction, development, climate

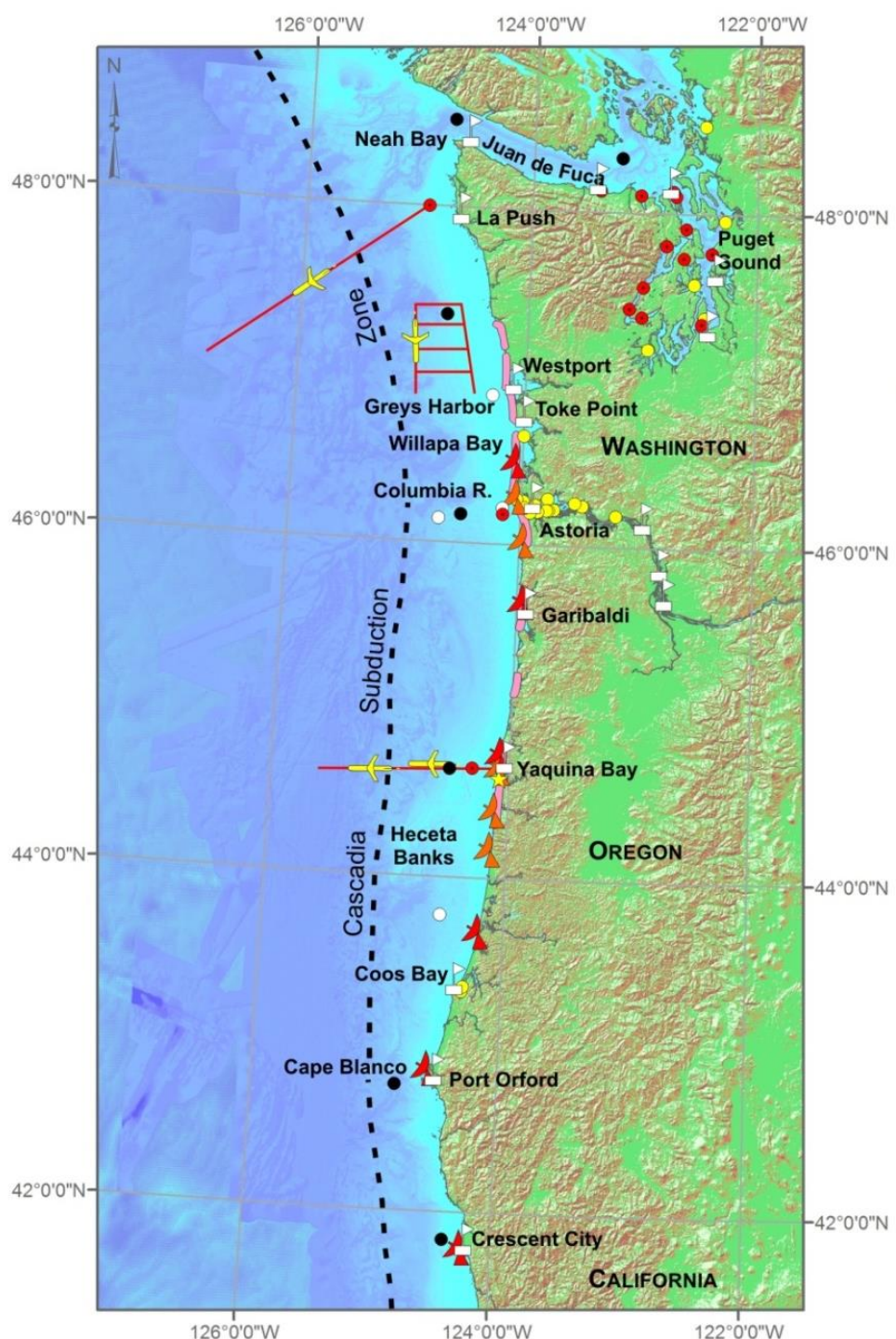
Major rivers:

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 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

NANOOS focus areas:

Coastal Ocean

Estuaries and Bays

Shorelines

NANOOS Stakeholder Priorities

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

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

Strategy to develop a PNW Observing System

1. Integrate what we have *(observing assets, people, technologies)*

   = federal, tribal, state, local, academic, NGO, and industry

2. Be strategic regarding what we need, based on priorities

Sustaining NANOOS, the Pacific Northwest component of the U.S. IOOS®

1) Maintain NANOOS as the PNW IOOS **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) Contribute to a community of complementary **numerical regional models**.

7) Maintain NANOOS' **Data Management and Communications** (DMAC) system for routine operational distribution of data and information.

8) Deliver existing **user-defined products and services** for PNW stakeholders.

9) Sustain NANOOS **education and outreach** efforts.

Process

- Today, we use last year's Governing Council exercise to highlight themes and NANOOS priorities and hear from GC
- Await FFO
- Anticipate using LOI process
- Consult NANOOS Build-out Plan, Business Plan
- Anticipate using NANOOS Governing Council for selection for proposal
- Anticipate modular budget

IOOS Summit Declaration

INTERAGENCY OCEAN OBSERVING COMMITTEE

INTEGRATED OCEAN OBSERVING SYSTEM (IOOS)

IOOS SUMMIT 2012 DECLARATION

In the United States, critical decisions affecting our lives, livelihoods and quality of life depend on successful communication and understanding of accurate and reliable scientific information about our oceans, coasts and Great Lakes. The U.S. Integrated Ocean Observing System (IOOS®) is a coordinated national, international, regional and local network of observations, modeling, data management and communications that provides the knowledge needed by society to protect life and property, to sustain a growing economic vitality, to safeguard ecosystems, and to advance quality of life for all people. Building upon progress over the past several decades, we must continue to expand, improve, and sustain the system to address the growing societal needs for ocean observations and information.

BACKGROUND

The Interagency Ocean Observing Committee convened an IOOS Summit, on November 13-16, 2012, ten years after an initial workshop defining IOOS requirements. The participants at the Summit reviewed progress in the design and implementation of IOOS. They identified the notable successes in developing a functioning system, as well as the technical and practical challenges and opportunities that IOOS will face in the coming decade. This Declaration captures and emphasizes the findings and commitments of the participants in the Summit.

IOOS is a national endeavor that is endorsed by federal and state agencies, tribes, academia, industry and NGOs; and is a partnership at the national and regional levels through the federal agencies and the IOOS Regional Associations. The past ten years have seen substantial progress in designing and implementing U.S. IOOS. We are delivering real value to the American public and foresee even greater contributions in the coming decades.

UNDERSTANDING OF THE NEED FOR IOOS

Recent events underscore the importance of IOOS to the economic, security and environmental interests of the United States.

1. Observing Capability

- All IOOS components currently under-observe their target phenomena. IOOS will seek to encompass deep-ocean observations, nearshore and estuarine observations, biological and chemical variables, ecosystem variables; to better integrate remote sensing; and to meet spatial (including sub-surface) and temporal requirements for ocean data, addressing user needs.

  This will build on the successes of the coordinated global ocean, terrestrial, atmospheric observing systems.

1. Observing Capability

- Keep doing what you are doing
- Bolster DMAC for increased bandwidth
- HF on WA coast, include spares
- More profilers in gradient regions
- Gliders/autonomous to fill in fixed platform gaps
- Surface and deep current sensing
- Bio-phys-chem measurements of open ocean to estuarine connectivity
- Increase habitat monitoring, including biology
- Acoustic telemetry for biology and fisheries
- Cameras sensors for biology
- Microbial communities as sentinels for change
- Interact with coastal communities to understand needs
- LIDAR expansion
- RA NASA test-bed satellites for RS
- UASes (drone) in the air to monitor bio-physical-chemical variables
- Ocean noise monitoring
- Technical / vocational training to support all the observations

2. Technology & Workforce

- IOOS will promote leading edge technology development capabilities. IOOS will incorporate emerging technologies as a standard operating procedure, in particular leveraging the development of the Ocean Observatories Initiative. IOOS will foster the development of a workforce for the future, adept at developing, using and furthering these technologies.

2. Tech & workforce

- In context of NANOOS, invest in cheaper, simpler technologies that will last and require less training
- Develop technologies, genome on a chip, non-wet biochem sensors, bacterial/indiv particle ID, identify species
- Unattended chemical sensors
- Continuous sensor development, satellite air, space-borne
- Synoptic observations of biology

- Workforce: internship/fellowship for ocean obs/techs
- Post-docs, grads, w/ cross training in federal labs
- Hiring young investigators
- Citizen scientists
- New course work developments
- Training programs for techs (comm college)

3. Modeling and Predictive Capability

- Models and observations will work together to provide the information needed by user communities. Improved and more sophisticated models will better exploit IOOS observations, leading to more precise and accurate predictions to aid in making economic, environmental and societal decisions.

3. Modeling and Predictive Capability

- Keep what you are doing and expand capability to new areas
- Develop climatologies
- Demand for wave models; sustained funding for wave modeling
- Sediment transport,
- Oil hazmat modeling
- Food-web models; fisheries; incorporate of biology & biochemistry in the models
- A needs assessment should drive this, vice modeling for modeling sake
- Invest in interdisciplinary modeling for today's operations
- Modeling for future change, anticipate changes and effective responses
- Support national model backbone assigned to a federal agency
- Use models to fill in gaps of observations, reduce observing needs
- Use models to help with observing system design
- Data assimilation (50:50 split on whether to do this or not)
- Model verification and validation: model to model comparisons, model analytic solution comparisons (when we know what answer should be)
- Offer models with published caveats, best uses, applications

4. Information Products

- IOOS plays a foundational role by providing reliable access to quality-controlled data and information products that support critical decision making for multiple uses. The system preserves the value of the information now and for future generations. This information plays a critical role in ocean literacy and education at all levels.

4. Information Products

- Information products are why we exist: should be our #1 priority
- Keep NVS, expand visualization capabilities
- QA/QC: automated, best practices, data validity, need for core metrics
- Information product access: web access to all obs and model data for more than 60 days
- Tools to access (profile, slices/sections, maps, temporal (monthly, seasonally, annually, decadal, and beyond)
- Archival: replicated outside Cascadia subduction zone
- Products for ocean literacy

5. Partnerships

- IOOS will continue to succeed as a collaborative effort among federal and state government agencies, tribes, regional partnerships, the academic community, and the private commercial and environmental communities.

  The U.S. collaborative will help to sustain global efforts, as well as derive understanding and context from parallel efforts around the globe.

5. Partnerships

- Continue with international (Canada)
- Create and promote communities of practice for national glider, HF, etc. for common technologies/applications, etc.
- Maritime partners
- Fishing and recreation
- Public health
- Insurance and re-insurance industry
- NW tribes
- WA DNR & OR agencies (Parks, DEQ)
- State and federal agencies and parks associated with hydrol cycle, (USGS, EPA, NWS, NFS)
- FEMA
- OOI
- NGO on environ and other ocean conservation
- Atmospheric community v.v. deposition
- Value added industry

6. User Communities

- As the demand for economic growth and stability in sectors influenced by marine resources grows, it becomes more imperative to support an increasingly diverse user community.

6. User Communities

- Users are our #2 priority, think of them as consumers
- Outreach to coastal communities can't be stressed enough and yields benefits on many levels
- Re-evaluate our outreach strategies, and locational focus
- Industry
- Fisheries
- Marine industry/shipping
- Human / public health
- Energy (renewable)
- Deep sea mineral extraction
- Seafood industry, growers, harvesters, retailers (shellfish)
- Education and informal learning
- Tourism
- Recreational boaters, fishers, divers, surfers, etc.
- MPAs
- Software developers

7. Resources

- Federal support has been and will continue to be critical to the success of IOOS. New approaches to product development and distribution need to consider a broadening of funding support, additional funding sources, and innovative public-private partnership.

7. Resources

- Collaborations
- Institutionalize our partnerships with states and tribal nations; can these entities provide core funds? SLR, fisheries, climate change, issues…
- Maybe feds will shift toward more spending…cyclical…not just NOAA federal funds into our coffers
- Regional feds, engage with them on projects
- Various NOAA line offices … engage
- Do something with industry, partnerships
- Funding from foundations
- Fee for services?
- Donation for services: adopt a buoy (PI)
- Space for advertising on website or buoy?
- Our own foundation for NANOOS?
  - e.g. National Marine Sanctuaries Foundation
  - IOOS Association is a non-profit
  - Question the 501c3s if they fund-raise successfully

8. Wrap-up, Action Item review, and Adjourn