

**Progress Report for  
Enhancing  
Northwest Association of Networked Ocean Observing Systems (NANOOS)  
#NA08NOS4730290  
1 June – 30 November, 2009**

This progress report describes activities carried out in support of enhancing the Northwest Association of Networked Ocean Observing Systems (NANOOS). This report was compiled by Jan Newton, NANOOS Executive Director (ED) and David Martin, NANOOS President (P); the co-PIs for this grant. Newton and Martin together form the NANOOS Leadership, in consultation with the NANOOS Governing Council (GC) and its Executive Committee (EXCOM). Other key NANOOS staff members are Amy Sprenger (Education and Outreach Specialist) and Eric Shulenberg. Per NOAA anticipatory guidance concerning the eventual combining of RA Planning and RCOOS awards, NANOOS begins to implement this NOAA-desired end-state by submitting progress reports for this grant while noting outcomes from the NANOOS RCOOS grant that were enabled and accelerated by collaborative resource allocations from these complimentary Planning Grant efforts.

### **1) Project Summary**

The goal of this project is to foster and enhance Pacific Northwest (PNW) Regional Partnerships to grow constituencies and develop and implement a governance structure and business plan that permit official federal certification of NANOOS as the PNW Regional Association and allow for the installation and long-term maintenance of a PNW Regional Coastal Ocean Observing System (RCOOS).

Specific NANOOS Objectives of the work are to:

- 1) **Continue to identify and engage the full and expanding spectrum of stakeholders** having significant interests in the waters of the Pacific Northwest to ensure their views and opinions are fully recognized and taken into account in all aspects of planning, science and governance, and that this partnership building effort takes advantage of their scientific, economic, social, cultural and operational expertise.
- 2) **Proactively engage the regional ocean science community** in this partnership-building project to ensure their expertise helps guide the eventual design and evaluation of the system. This approach will ensure the PNW Regional IOOS evolves to take advantage of new knowledge and technology as they are developed.
- 3) **Obtain input about sub-regional scale oceanographic concerns** by engaging with local stakeholders to ensure these factors are addressed at the Regional level. NANOOS will work within these smaller groups to build a sense of community and partnerships at the sub-regional scale and then translate this into strong regional partnerships through larger gatherings and workshops.
- 4) **Implement the results of the consensus agreement on the overall Governance structure for NANOOS.**
- 5) **Develop and implement a Business Plan** to guide NANOOS budget formulation, involvement of users, all aspects of linkages between observations and products, research and development decisions, training, and alternate funding opportunities.

- 6) **Strengthen international and inter-Regional partnerships** by engaging with Canadian colleagues and other western Regional Association efforts to build bridges to these efforts and ensure seamless integration of these efforts.
- 7) **Continue to engage at the national level** to ensure the PNW activities of NANOOS are fully supportive of the national effort to implement and maintain an IOOS.

## 2) Progress and accomplishments

To achieve the above seven NANOOS Objectives, NANOOS Leadership interacts with the NANOOS Governing Council, its Executive Committee (elected Officers and Standing Committee Chairs), and three Standing Committees (Data Management and Communication = DMAC; User Products Committee = UPC; Education and Outreach = E&O). Key highlights of NANOOS progress and accomplishments for this period that cumulatively address the objectives are listed below, with the requested additional programmatic updates at the end. This report encompasses efforts funded by this RA grant as well as our RCOOS grant, since all of these NANOOS activities are necessarily highly integrated.

### *Major activities:*

- **NANOOS Annual Governing Council Meeting** – Held in Vancouver, WA, at the WSU campus, the NANOOS Governing Council assembled for its annual in person meeting on 25 June. It was attended by ~35 individuals. Martin and Newton led the all-day meeting, which included briefings on national and local issues, reports from all 3 Standing Committees, adoption of the Business Plan, and discussion of the Y4 NANOOS RCOOS proposal priorities and process. At the conclusion of the meeting, Martin and Newton turned the floor to NOAA NWFSC’s John Stein and Timi Vann, who led the NANOOS GC in the NOAA Next Generation Strategic Plan exercise.
- **NANOOS submits Bridge Proposal for RCOOS support and development** – To start this process, in June at the annual NANOOS Governing Council meeting, the full GC empowered the NANOOS Executive Committee to develop the NANOOS Y4 “Bridge” proposal. In August, Martin and Newton led a teleconference of the NANOOS Executive Committee. In this meeting, priorities for funding were reviewed, discussed, and consensus agreement achieved. This demonstrates the core functionality of the NANOOS leadership structure. Following the meeting, Newton worked with the many RCOOS PIs to develop the text and a final, modular budget. The proposal was submitted on behalf of the NANOOS GC on 30 October.
- **NANOOS gains Murdock-funded observing assets** – In August, 2009, NANOOS learned that the Murdock Charitable Trust chose to fund a proposal by Newton, Alford, Devol, and Martin submitted through the University of Washington for ~\$0.5M for an observing sensor array (surface and profiling moorings plus a glider) off the WA coast. These assets will be located at La Push, WA, filling in a critical piece of NANOOS’ Conceptual Design for coastal monitoring.
- **NANOOS prints its first newsletter** - The first edition of the “NANOOS Observer” was released on the NANOOS web in late October. It is the NANOOS community’s update for new products, news items, and ocean-related issues affecting the NANOOS region of the Integrated

Ocean Observing System. Many kudos to the hard work of Janet Olsonbaker, Amy Sprenger, and Eric Shulenberger

➤ **NANOOS launches the NVS** – Launched in November, 2009, and presented by C Risien at the Oceans 09 Conference in Biloxi, MS, the NANOOS Visualization System (NVS) is a web mapping portal that aggregates, displays and serves near real-time coastal, estuarine, oceanographic and meteorological data, derived from buoys, tide gauges, meteorological stations, cruise data, and shore based coastal stations, in such a way that it presents end users with a rich, informative and meaningful experience. Importantly, NVS addresses the IOOS mandate to “provide the data and information needed to improve safety, enhance our economy, and protect our marine environment”.

NVS has been undergone intense development since its inception at the beginning of the year, both in terms of its conceptual look and feel and level of functionality, The key components of NVS include the following capabilities:

- map views of national and local observational asset locations and links to information about the assets;
- the capability to undertake comparisons of multiple variables;
- ability to showcase changes in variables over time;
- ability to showcase changes in variables with depth;
- geographical map views of parameter values;
- cross-sectional map views that include comparisons of depth with distance along transect(s) or comparisons of depth versus time changes at a range of geographic locations and spatial scales; and,
- tag-based discovery and selection of assets and asset data using controlled vocabularies.

NVS has been the focus of NANOOS DMAC and UPC team members, including Rick Blair and Steve Uczekaj (Boeing), Troy Tanner and Emilio Mayorga (UW), Alec Jaramillo (OHSU), Craig Risien (OSU) and Jon Allan (DOGAMI). Their hard work really shows in this new product.

***Other activities:***

➤ **NANOOS and HAB planning** – At the invitation of ECOHAB, in June, Newton and Martin participated in a local Harmful Algal Bloom meeting in the Dean’s conference room at UW in which the need for robust ocean observing assets was highlighted. Newton presented a short summary of NANOOS efforts on this issue and NANOOS’ willingness and avenues for participation and collaboration.

➤ **“A Sea Change” and ocean observing** – This documentary film by Sven Huseby and Barbara Ettinger debuted at the Seattle Film Festival. Newton was invited to be on a discussion panel following the showing. She mentioned the importance of nationwide and global ocean observing of ocean acidification status and how the PNW was already involved in this effort. Newton also was invited to a briefing to the Director of the Washington State Department of Ecology on the same topic on 7 July.

➤ **NANOOS attends Regional IOOS Coordination and NFRA meeting** – Newton, Martin and Shulenberger attended this annual meeting 25-27 August in Seattle, WA. Newton presented

the NANOOS version of the NOAA slide template on RA progress and status review. Newton and Shulenberger joined discussions on products and other matters. NANOOS was happy to be the host RA for this meeting, including helping NFRA and meeting committee leads to site the meeting and an offsite dinner event, and to arrange for a talk by NOAA scientists Feely and Sabine about ocean acidification and observing needs. Sunny weather was included at no charge.

➤ **NANOOS participates in ACT demo of pCO<sub>2</sub> sensors** – Though not a specific ACT partner, NANOOS members Newton and Devol facilitated work with ACT and NOAA to demo pCO<sub>2</sub> sensors in southern Hood Canal at an existing profiling buoy in the NANOOS system. This demo ran from late August through late September, and was facilitated by another NANOOS member, the Hood Canal Salmon Enhancement Group, who assisted with boat and logistics. Funding for two undergraduate student interns was leveraged by another NANOOS partner, CMOP. ACT demo-ed these sensors also in Hawaii.

➤ **NANOOS represented at Ocean Obs 2009** – Newton contributed a poster on NANOOS at the Ocean Obs 2009 meeting in Venice, Italy. The poster was in the session on “Delivering societal benefits from the ocean observing system.” It focused on using NANOOS as a case study on how to develop a regional system with national and global continuity but societal benefit. [https://abstracts.congrex.com/scripts/jmevent/abstracts/FCXNL-09A02-1663835-1-NEWTON\\_Ocean%20Obs%2009.doc](https://abstracts.congrex.com/scripts/jmevent/abstracts/FCXNL-09A02-1663835-1-NEWTON_Ocean%20Obs%2009.doc) There she discussed IOOS, international plans, and ocean acidification issues with Zdenka Willis and other IOOS and non-IOOS colleagues.

➤ **Ocean Observing briefings**

- In June, Martin met with representatives of the Pacific Northwest National Laboratory (PNNL) to discuss continuing collaboration in operational ocean observing efforts.
- In September, Martin hosted the Deputy Director of the Naval Sea Systems Command’s office for University affairs and the Office of Naval Intelligence’s lead for Science and Technology in discussions of operational ocean observing systems and their utility for national and homeland security.

➤ **NANOOS, IOOS and Oceans 2009** – In October, many NANOOS members participated in the MTS/IEEE Oceans 2009 conference in Biloxi, MS. The new NANOOS Visualization System was presented during a special IOOS session. Martin, as well as numerous NANOOS PIs and members attended.

➤ **NANOOS, IOOS and Oceans 2010** - Martin is a Co-chair of the Technical Committee for Oceans 2010 that will be held in Seattle, WA in September 2010 and has established a special session for Operational Ocean Observing Systems that will be chaired by Newton to again highlight regional and national IOOS activities. Martin discussed this in Mississippi with Zdenka Willis.

Another session scheduled for Oceans 2010 is to deal with renewable marine energy and Martin and Newton have led discussions on the need for long term ocean observing assets (from NANOOS) in areas being considered for tidal energy extraction facilities.

➤ **NANOOS participation at CERF**– Several scientists involved in NANOOS presented talks and posters using NANOOS data, models, or products at the Coastal and Estuarine Research Federation conference in Portland, OR, during 2-5 November.

➤ **Leveraging NSF’s Coastal Margin Observations and Prediction STC** - Throughout the reporting period, Martin, Shulenberger and Newton remain deeply involved with a complimentary research ocean observing effort in the Pacific Northwest, the NSF-funded Science and Technology Center (STC) for Coastal Margin Observation and Prediction (CMOP). NANOOS leverages CMOP products heavily, especially in the areas of DMAC and Education and Outreach. Martin and Shulenberger remain involved in CMOP oversight and coordination with NANOOS. Newton acts as UW’s Education and Outreach Coordinator for CMOP and is coordinating these education efforts with NANOOS.

***NANOOS Standing Committee updates:***

➤ **NANOOS DMAC** - Chaired by Steve Uczekaj (The Boeing Company) this committee, composed of members from Boeing, OHSU, UW, OSU, and DOGAMI, has weekly “tag-up” calls to achieve consistent work efforts for NANOOS DMAC. In addition, Uczekaj participates in regular Regional DIF Implementation (RDI) team conference calls.

The DMAC group played a key role in the implementation and support of the NVS, described above. Significant accomplishments were made in maturing the NANOOS DMAC architecture including addition of new data sources and addition of distributed sensor observation services. Recent progress includes: extension of the NANOOS data services to include a second SOS server for assets based in Washington State and Canada; addition of an experimental open source ERDDAP server as a data aggregation service; addition of an open source THREDDS data service for OSU model output; addition of a Web Coverage Service for Tsunami inundation model output; creation of an asset database as the backend to the NANOOS Visualization System (NVS); and updating of CMOP SOS server to be compliant with current DIF Standards.

New data offerings to the NANOOS SOS service including the following:

1. Fixed Moorings from Environment Canada.
2. Water Quality from King County Marine Moorings.
3. PRISM Cruises from University of Washington.
4. Fixed platforms from National Estuarine Research Reserve System (NERRS)
5. Tides and Currents data from Center for Operation Oceanographic Products (CO-OPS)

Also effort was directed to strengthen regional partnerships to support the redistribution of sub-regional assets through DIF services. Support may involve providing NANOOS expertise and assistance or assuming the role of direct re-distributor.

➤ **NANOOS User Products Committee (UPC) meeting** - Chaired by Jonathan Allan (OR State Dept of Geology and Mineral Industries), the NANOOS UPC instigated the highly successful “Tri-Committee” meeting concept last April in its inaugural meeting. The focus of the meeting was to share progress and then to prioritize activities. In this half of the year, efforts

were placed on implementing key products and directions from that meeting. Another Tri-Committee meeting is planned for March, 2010.

Work during this period has focused on the successful implementation of topics and outcomes from the meeting, some of which were: 1) the NANOOS Visualization System (NVS) Portal, launched via our website in November 2009; 2) an interactive education/outreach display developed by Sarah Mikulak (OSU) for the Hatfield Marine Science Center, integrated into NANOOS web format for interactive capability, launched this summer; 3) work to scope expansion of the successful “Ocean Acidification Theme Page” to other topics; in this period, work has focused on theme pages for hypoxia and coastal erosion; 4) work to scope expansion of the NANOOS data streams to more data sets.

➤ **NANOOS Education and Outreach Committee** – Chaired by Mike Kosro (OSU) and staffed by Amy Sprenger (APL-UW), this vital NANOOS committee met over the period via quarterly teleconference calls to discuss NANOOS E&O efforts as well as E&O activities of NANOOS members. Sea Grant, CMOP STC, NERRs and COSEE staff are part of this Committee and actively participate.

Specific activities of Sprenger or NANOOS E&O committee members included:

- NFRA Education Committee - Sprenger participated in monthly NFRA Education committee teleconferences where representatives from each RA share resources and information on educational projects, work with the NOAA IOOS office on outreach and IOOS messaging, and collaborate on projects which reach across RAs.
  - For the first major collaboration the NFRA Education Committee jointly presented a session “What Can the Integrated Ocean Observing System Offer Educators?” at the National Marine Educators Association Annual Conference in Monterey, CA, June 2009. Each RA’s educational programs were presented, as well as NOAA IOOS material. A resource guide for educators on using real time data was adapted by the NFRA education committee and presented. In addition NFRA Education committee members met to discuss and develop plans for future across-region education initiatives.
  - Sprenger is participating in the COSEE Networked Ocean World led webinar workshop series for ocean observing educators “Exhibit Design for an Integrated Ocean Observing System”. This webinar for OOS educators focuses on the challenges of designing exhibits using real-time data from Ocean Observing Systems and focused on sharing ideas and resources on the development of interactive exhibits or kiosks for use in informal learning institutions.
- NANOOS-supported OSU graduate student, S. Mikulak, received her MS in Education in June, 2009 and has continued to work with NANOOS on developing educational material for the NANOOS web portal. The exhibit she developed is now available on the NANOOS web portal and lesson plans to accompany the exhibit are in progress.
- Lesson plans for teachers using real-time data (RTD) to determine sea conditions, have been adapted by Sprenger, and posted to the Education section of the NANOOS web page. Lesson plans using marine water monitoring data from the WA State Department of Ecology and data via the NVS have been completed and are in review by educators.
- Sprenger and Mikulak presented on ocean observing, NANOOS, and its educational products to approx 25 educators from the Pacific Northwest at the annual NW Aquatic

and Marine Educators (NAME) conference in Vancouver BC, Canada, in August.  
<http://www.pacname.org/conferencepics09.html>

- A NANOOS display was exhibited by Sprenger along with other PNW marine education programs at the North American Environmental Education Conference held in Portland, OR, in Sept, reaching 25 to 30 educators.
- NANOOS E&O Committee members Mikulak and Risien put up a NANOOS display at OSU's COAS 50<sup>th</sup> Anniversary celebration. Mikulak also presented her work on the development of the interactive date exhibit.
- NANOOS continues to support NERRS in maintaining the Real Time Water quality data website for Shellfish Growers. Sprenger is an active member on the project team for this website.
- Sprenger is an active member of ECO-Net, the Puget Sound Partnership's Education and Outreach Network
- Mikulak, Newton and Sprenger met with members of the Port Townsend Marine Science Center and Intellicheck Mobilisa on 24 July in Port Townsend to begin designs on an interactive display using RTD to be installed at the PTMSC. Mikulak and Sprenger continue to work on the development of this future exhibit.
- The NANOOS Newsletter "The NANOOS Observer" has been established and has made available Issue #1 – both on the web and in hard-copy. Initial plans for the newsletter are for quarterly or semi-annual issues.
- A NANOOS display with information on NANOOS, IOOS and other RAs was set-up in the exhibit hall during the biannual CERF conference in Portland, Oregon. Sprenger and Mikulak interacted with at least 40 scientists during this event, using a laptop to demonstrate NANOOS and other RAs' data products. Many more scientists visited the booth to gather information on the RAs.
- Sprenger will be displaying information on NANOOS and NANOOS members - Ocean Inquiry Project and NAME at the COSEE Ocean Learning Communities event for Puget Sound area scientists: "Addressing Broader Impact Requirements for Research Proposals" in early January 2010.
- Sprenger is part of the planning committee for the annual "Storming the Sound" conference in central Puget Sound for environmental and sustainability education for informal and formal educators coming up early spring 2010. Sprenger will be presenting a session on Puget Sound data available through NVS.

➤ **Ongoing IOOS-related activity:**

➤ ***NANOOS participation in NFRA and IOOS***

- o Newton and Martin participate in the monthly NFRA Board phone conferences.
- o Newton participates in NFRA Executive Committee teleconference calls and meetings.
- o Sprenger participates in the NFRA-IOOS led Education and Outreach teleconferences.

➤ ***NANOOS participation in ACT***

- o Newton is the Co-Chair of the Stakeholders Council of the Alliance for Coastal Technologies (ACT). As such, she routinely participates in the regularly scheduled Board meetings and teleconference calls, when possible.

➤ ***NANOOS programmatic updates***

- RA organizational structure:
  - *Changes:* Several new member organizations were added to NANOOS this period: Port Gamble S'Klallam Tribe, Portland State University, NOAA Northwest Fishery Science Center, NOAA Olympic Coast National Marine Sanctuary, University of Victoria and the VENUS Observatory.
- Planning and implementation:
  - *Progress made towards the development of the business plan:* NANOOS has a Business Plan which was adopted at the NANOOS Governing Council meeting on 25 June 2009. It is on our web.
  - *Progress toward defining regional observing system priorities:* The NANOOS Governing Council has defined the PNW regional observing system priorities; we continue to work with stakeholders to refine information needs regarding the priorities. The NANOOS RCOOS effort is directed toward addressing information needs about the top four regional priorities: Maritime Operations; Ecosystem Impacts; Regional Fisheries; Coastal Hazards. The NANOOS User Products Committee and Education and Outreach Committees are vital to this effort since there are many stakeholders on these committees. The process for this selection was described in our first RCOOS proposal (FY2007-9), which is on the web.
  - *Progress toward development of an observing system design for the region:* The design phase is completed and we are in the implementation phase. NANOOS has presented its observing system conceptual design to NOAA IOOS and its membership. It is on our web. The RCOOS effort is directed toward implementing it, as funding allows.
  - *Progress toward regional data management:* NANOOS DMAC, funded from both the NANOOS RCOOS and this RA contract, continues to implement the regional data management system in accordance with the schedule presented in the RCOOS grant. Progress has been satisfactory during this period.
- Stakeholder engagement:

NANOOS continues to actively engage with our stakeholders in numerous ways, via their participation on our Governing Council, Standing Committees, targeted theme pages on our web, and via the specific activities, reported throughout this document.

**3) Scope of work** – We had no changes to our statement of work. We neither anticipate changes to our statement of work, nor problems in meeting objectives of this effort.

**4) Leadership personnel** – no changes.

**5) Budget analysis** – We are 50% through the anticipated three-year grant period of this award and have expended 31% of the total anticipated funding of \$1.2M - This is a satisfactory expenditure rate as our actual expenditure rate of received funding is at the correct rate to ensure



success of the project. We anticipate no difficulty in maintaining a proper level of expenditures as we move towards the conclusion of this award in May of 2011. .