Progress Report for
Enhancing
Northwest Association of Networked Ocean Observing Systems (NANOOS)
#NA05NOS4731124

December 1, 2007– May 31, 2008

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) and PI for this grant. Newton and Martin together form the NANOOS Leadership (ED&P), in consultation with the NANOOS Governing Council (GC) and its Executive Committee (EXCOM).

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 governance structures and business plans that will permit official federal certification of NANOOS as the PNW Regional Association and thus allow for the eventual 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 process to evolve the Governance structure for a Pacific Northwest Regional Association**.
5) **Develop and implement a Business Plan** in consonance with Ocean.US criteria 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

Key highlights of NANOOS progress and accomplishments for this period are listed below, with additional programmatic updates at the end.

- **NANOOS RCOOS kickoff**

In December, the successful RCOOS award from NOAA was formally recognized by the NANOOS GC in their telecom call. A generic press release was distributed to NANOOS GC members and RCOOS PIs for modification and delivery to their constituents.

- **NANOOS RCOOS DMAC kickoff**

Boeing hosted the DMAC kickoff at their facility in Kent on January 9-11, 2007 to assemble the DMAC team, and plot the strategy for moving forward. This included the production of several documents and conceptual diagrams, as well as milestones and deliverables.

- **NANOOS participation at Census of Marine Life workshop**

Newton represented NANOOS at the "Biological Ocean Observing: Exploring components of IOOS from the perspective of Census of Marine Life" workshop, held in Washington DC in January 14-16. The goals of the meeting were to explore the general types of biological observing data, and identify specific data sets that should be integrated into IOOS; consider critical data gaps in biological data measurement/collection, analysis, and management that should be addressed by IOOS; identify specific strategies to advance the interoperability between CoML/OBIS and IOOS; and to explore the development of predictive models based on current and future IOOS data efforts to support the move towards ecosystem based management

There were many fruitful discussions and break-out sessions on how the RAs can work with CoML to foster more biological observing data collection and better dissemination of data.

- **NANOOS Education and Outreach Committee holds several meetings**

Amy Sprenger, the NANOOS Education and Outreach Coordinator, has worked with Mike Kosro, NANOOS Education and Outreach (E&O) Committee Chair, to invigorate the Education and Outreach Committee in terms of setting direction for NANOOS' education and outreach efforts. The NANOOS E&O Committee held conference calls January 17, 2008, and June 13, 2008 to discuss progress on education and outreach goals and outline next steps for education and outreach.

- **NANOOS participates in California Current Ecosystem Based Management workshop**

The Communication Partnership for Science and the Sea (COMPASS) and the Institute of Marine Sciences (IMS), University of California, Santa Cruz invited Newton, as the NANOOS ED and representative, to the California Current Ecosystem-Based Management (CCEBM) initiative working meeting on January 29- 31, 2008, in Santa Cruz, CA. Newton participated on a panel to articulate the value of RAs to the CCEBM process. She and Steve Ramp (CeNCOOS) represented the IOOS community perspective at this workshop and conveyed the opportunity that RAs present to this initiative.

- **NANOOS invited to Washington State Ocean Caucus meeting**

The Washington State Ocean Caucus invited Newton to attend their meeting on the outer coast in Westport, WA to brief the Caucus and the attending public regarding NANOOS and the IOOS

endeavor. Specifically, while the caucus was very receptive to the information, audience members were frustrated with the low number and poor functionality of NOAA buoys along the coast. Newton passed along this information to NOAA IOOS Office and NDBC.

- **Two new NANOOS members**

Newton recruited two new NANOOS members, the Columbia River Crab Fisherman's Association and the Quinault Indian Nation, which resulted from conversations at the Washington State Ocean Caucus meeting.

- **NANOOS participation at NFRA 2 March and Ocean Sciences 3-7 March**

Martin and Newton attended the NFRA semi-annual meeting in Orlando, FL on 2 March. This meeting included participation by Zdenka Willis of NOAA IOOS Office. Newton and Martin also participated in the Ocean Sciences meeting which was held in Orlando the rest of that week. Newton co-chaired a session on Hypoxia, which featured real-time NANOOS observing assets.

- **NANOOS participation in Quarterly Area Maritime Security Committee Meeting**

Martin attended the quarterly meeting of the Area Maritime Security Committee hosted by the United States Coast Guard at the Joint Harbor Operations Center (JHOC) on March 12th in Seattle. This meeting brought together representatives of all federal, state, and local responders to maritime security events. Martin attended as the area representative of the IOOS community.

- **NANOOS DMAC Committee meeting**

The NANOOS DMAC Committee held a preliminary design review at Boeing. DMAC committee participants included Craig Risien of OSU, Bill Howe of OHSU, Stuart Maclean and Troy Tanner of UW, and John Hurtz and Steve Uczekaj of Boeing. Other participants included the NANOOS User Products Group chairperson Jonathan Allen, as well as executive director Jan Newton and president David Martin both from UW. The meeting centered on discussion of approaches to implementing DMAC services supporting delivery of ocean observation data to the regional users and the national IOOS efforts. The NANOOS DMAC architecture supports four functions that map to the IOOS Data Integration Framework. They include an asset list and data formatting for data collection, data and application provider products, portal interface for user interfacing, and registration and discovery. The group committed to implementing a service oriented architecture with interfaces that match emerging standard recommendations from IOOS and WDSE committees.

- **NANOOS User Products Committee (UPC) meeting**

The core focus of the NANOOS User Products committee (UPC) is to guide the conceptual development of the data/analysis products (i.e. observations, time series, models, applications, etc.) identified by NANOOS stakeholders. Critical to this is the recognition that the UPC works closely with other NANOOS committees, most importantly the DMAC and Education/Outreach teams to ensure product concepts are effectively developed and tested prior to their release.

The User Products Committee met on March 21st in Beaverton, OR. The meeting examined a variety of topics, including:

1) Reviewing material gleaned from earlier meetings, particularly those initial discussions that identified various potential products, which could become the basis for product development as part of the NANOOS project;

2) Re-evaluating and eventually prioritizing various potential products for development. This was necessary due to project funding cut-backs, that effectively eliminated several core observing capabilities. Potential products for development were divided according to the four core thematic areas (i.e. Maritime Ops, Ecosystem Impacts, Marine Fisheries, and Coastal Hazards) and were identified by NANOOS stakeholders during previous meetings; Several key products targeted for initial development included:
    a. Integrating the NANOOS Asset inventory database into a web-based server application;
    b. Develop a Boater Information System (BIS) interactive web-based product, which integrates near-real-time information derived from tides, waves (modeled and measured), winds (modeled and measured), and HF radar for the NANOOS region;
    c. Develop visual data products that integrate HF measured currents (nowcast) with different satellite data layers (chlorophyll, SST etc.);
    d. Develop visual data products that would integrate model data of coastal currents, T, S, for the NANOOS region;
    e. Develop visual data products that focus on estuarine circulation modeling – vector plots of T, S; and,
    f. Develop visual data products of alongshore beach shoreline response for the Oregon and Washington coast.
3) Review the existing NANOOS web site and provide input on a newer web site scheduled for release in July 2008.

Aside from the March 21 UPC meeting, the chair of the UPC group has attended periodic DMAC meetings.

- **NANOOS Governing Council (GC) meeting 25 March**

NANOOS held its semi-annual Governing Council meeting on 25 March at Washington State University-Vancouver campus. It was attended by 21 people. The agenda is attached at the end of this report. The GC elected a new DMAC Chair, Steve Uczekaj (The Boeing Company), as the previous Chair, Jay Pearlman, had retired. The GC also recertified the Officer and Standing Committee Chair terms such that the existing terms were extended for another two years to ensure continuity of the RA during this complex RCOOS development phase.

Also notable were oral presentations from three of the NANOOS Standing Committees (DMAC, User Products, Education & Outreach), and discussion on the NANOOS Business Plan. A sub-committee of the GC is now in the process of crafting the final version of this Business Plan for approval by the entire GC and posting on the NANOOS website for the PNW marine stakeholder community. In addition, Newton and Martin polled the GC for input to the questions and topics NOAA had requested for their RA Assessment in June.

- **NANOOS support for IOOS legislation**

The University of Washington COFS Dean, Arthur Nowell, requested Martin and Newton as NANOOS ED&P, to meet with him and Ms. Sarah Spreitzer (UW Washington DC Office of Federal Relations) to discuss status and importance of pending national IOOS legislation on March 28th at the University of Washington.

- **NANOOS presentation to Dept of Homeland Security**

Martin briefed Dr. Ervin Capos, head of the DHS Science Advisory Board, on national and PNW regional IOOS activities on April 16th in Seattle. The thrust of the presentation was the importance of IOOS in national efforts to improve Maritime Domain Awareness (MDA).

- **NANOOS arranges Pacific coast DMAC con calls after Regional IOOS DMAC Meeting**

Steve Uczekaj, NANOOS DMAC Chair, attended the IOOS regional meeting in February at the NOAA Coastal Service Center in Charleston, S.C., and met several west coast regional representatives for ocean observation efforts. Steve setup a bi-monthly telecom with west coast representatives for the purpose of discussing progress on regional efforts and in particular to share solutions and results on DMAC implementations. The first meeting was held on May 7th and included participants from NANOOS, CeNCOOS, SCCOOS and CDIP.

- **NANOOS represented at Washington Weekend**

Newton staffed a NANOOS booth at the annual "Washington Weekend" open house to the public that the University of Washington hosts in late April. Thousands of people attended the campus-wide event and hundreds came by the booth which featured real-time data display, informational brochures, NANOOS stickers, and coloring pages for children.

- **NANOOS participation in Council of American Master Mariners (CAMM) Annual Meeting**

Martin delivered presentations on IOOS and NANOOS to the Leadership Committee of CAMM on May 15th in Reno, NV, at their annual Spring Meeting. The purpose of the presentations was to entrain this powerful stakeholder community in the IOOS enterprise and to build bridges between IOOS and the maritime transportation industry. The briefings were exceptionally well-received and contributed to a greater mutual understanding between the ocean observing and marine shipping sectors.

- **NANOOS presents at Tribal Habitat Conference**

The Quinault Indian Nation, a new NANOOS member, invited NANOOS to present at the Northwest Indian Fisheries Commission's Tribal Habitat Conference on May 22, 2008 at Quinault Beach. Amy Sprenger, NANOOS Education and Outreach Coordinator attended and presented a NANOOS poster.

- **NANOOS presentations at PaCOOS Board of Governors meeting**

Newton, as NANOOS ED, and Steve Uczekaj, NANOOS DMAC Chair, participated in the PaCOOS Board of Governors Meeting in La Jolla, California on May 21-22. Jan presented an overview of the NANOOS effort and Steve presented progress on the NANOOS DMAC architecture.

- **NANNOOS DMAC Chair to national DMAC meeting and IOOS Standards Participation**

At the NOAA assessment meeting on June 4th, Steve Uczekaj, NANOOS DMAC Chair, met with Thomas Crowley of LMI to discuss setting up a follow-up meeting in July or August to identify synergies and leveraging opportunities of NANOOS DMAC efforts. As members of the IOOS WDSE team, Rick Blair of Boeing identified a need by national members to utilize NANOOS developed Java bindings to the current DIF schema standards. A library of java

interface bindings for the IOOS-DIF xml schema data formats was uploaded and made available to the community at large on 6/18/2008.

- **NANOOS participation in NFRA and IOOS**
  - Newton and Martin participated in the phone calls for NFRA hosted by Ocean.US when these were held.
  - Martin participates in the NFRA ExCom teleconference calls monthly.
  - Martin and Newton participated in teleconference calls with LMI on January 18 as part of that company's effort to understand various RA governance structures and status of development.

- **NANOOS Programmatic Updates**

- RA Organizational Structure
  - Changes: There have been two new members added to the NANOOS Governing Council: Columbia River Crab Fisherman's Association; Quinault Indian Nation

- Planning and Implementation
  - Progress made towards the development of the business plan:

    The draft NANOOS Business Plan was presented to the NANOOS GC at our GC meeting in March 2008. A small group of primarily industry representatives (Sea Bird Electronics, SAIC, Western Resources, WetLabs) volunteered to review the document. They returned a revised draft in early June that will be presented to the GC after review by NANOOS ED&P, with the final posted on the NANOOS web.

  - Progress toward defining regional observing system priorities:

    As part of our RCOOS System Design, the NANOOS GC selected four topical areas based on results of numerous regional workshops as the highest regional priorities: Maritime Operations; Ecosystem Impacts including hypoxia and HABs; Fisheries; Mitigating Coastal Hazards. NANOOS continues to engage with the regional stakeholders to refine their particular interest in these priorities and what product delivery they need.

  - Progress toward development of an observing system design for the region:

    NANOOS has posted its Conceptual Design for phase I of our RCOOS development on the NANOOS website (http://www.nanoos.org/internal/) . We are implementing that design as the reduced funding of the RCOOS grant allows.

  - Progress toward regional data management:

    As indicated by the DMAC-related bullets in the highlights section, there has been significant progress made by the DMAC group. We leverage both the NANOOS Planning Grant and the NANOOS RCOOS grant in our PNW Regional DMAC efforts and report more completely on the substantive progress we continue to make in this vital area in Progress Reports for our more robustly funded (for DMAC and other operational activities) RCOOS grant.

- Stakeholder Engagement
  - Shellfish Growers:

The NANOOS-NERRS pilot project is continuing to grow. NERRS invested some additional funds (through August 2008) to make some revisions to the website. Based on previous discussions and feedback from the survey, the following additions are being made:

- Weather data is being added to the different locations
- Two Ecology sites will be added: Squaxin Passage at Carlyon Beach and a site in central Willapa Bay
- The times-series graphs will be expanded to one week, two weeks, three weeks, and four weeks
- Raw data will be able to be downloaded to an excel spreadsheet

As part of the previous NERRS pilot grant which will be billed out at the end of June:

- A new monitoring site will be added at South Slough
- The current Padilla Bay site at Joe Leary Slough will be moved to a more desirable location and that site will be added

Mindfly, the private company developing the website, is exploring some different graphing software.

Cathy Angell, NERRS, Padilla Bay and Coastal Training Program, has been the lead NERRS person on this project. She has worked with Newton, NANOOS ED, and representatives from the Shellfish Growers community to design a user survey regarding the pilot site and future needs. Fifteen growers have completed the user survey …one from Alaska, none from Oregon, and the rest from Washington…and more outreach is planned for gaining more surveys especially in Oregon and Alaska.

- Marine Educators:
  NOTE: Amy Sprenger, the NANOOS Education and Outreach Coordinator, was on maternity leave mid January, and returned mid March after having given birth to a wonderful baby boy.

Amy primarily has been developing educationally focused web content for the new NANOOS website. She has modified existing field-tested lesson plans in ocean science to incorporate ocean data available through NANOOS. She has also created new classroom exercises which integrate the NANOOS applications BIS and Shellfish Growers water quality data to teach ocean science concepts. These lesson plans will be made available to educators via the new NANOOS website. Each lesson has been aligned with Ocean Literacy Essential Principles, National Science Education Standards, and both Oregon content standards for science and Washington State Grade Level Expectations for science.

To entrain the PNW marine educator stakeholder group:
-Amy met with Centers for Ocean Science Education Excellence (COSEE) Ocean Learning Communities (OLC) staff to discuss future collaborations in December, 2007.
-Amy met with the education staff of the Center for Coastal Margin Observation & Prediction (CMOP), a multi-institutional National Science Foundation Science and

Technology Center to discuss future collaboration on professional development opportunities for teachers in March, 2008
-Amy participated in the Environmental Education Association of Washington (EEAW) conference in December 2007
-Amy met with COSEE Pacific Partnerships staff to discuss future collaboration on Ocean science curriculum development for community college classrooms and professional development opportunities for community college level ocean science instructors in June, 2008
-Amy met with South Slough National Estuary Research Reserve education staff to discuss future collaboration in June 2008.
-Amy will be presenting NANOOS education materials at the NAME conference in July, 2008.
-Amy will be participating in the National Marine Education Association's conference in July, 2008.

- Web Portal Development

Based on input from the DMAC Committee meeting in January 2008 and the User Product Committee meeting in March 2008, the NANOOS web development team has been overhauling the current NANOOS website and developing a state-of-the-art NANOOS Web Portal. This new portal provides the infrastructure for future data collection and management, and data sharing among diverse user groups through NANOOS tools currently under development.

The web development team has employed the disciplines of Cognitive Engineering and Human Computer Interaction, and through User-Centered Design principles has created a pleasing navigational experience for NANOOS stakeholders that will also support the future goals and needs of data management and communication.

Public Release: The first rendition of the new NANOOS Web Portal is scheduled for public release in July 2008. The portal's design makes access to data, products, and decision tools the top-level priority. The portal collects the critical regional information that is available at this time, but allows for continual updates as new DMAC infrastructure, such as data registry and search, and also new environmental sensors, become available. An additional focus of the portal is education and outreach. Users will find complete content on the mission for NANOOS and its place regionally and within the national IOOS. NANOOS history, including its logo and documents, and all constituents and member organizations are represented. Teachers and students will find lesson plans and activities. A "How to use this site" menu button will aid all users in understanding the organization of the many products and features of the new NANOOS Web Portal. Sponsors, news items, people and contact information are all readily available as well as all IOOS websites and other useful links.

Internal: In July 2008, the NANOOS Internal Website will also be available. NANOOS participants will be able to manage content and data that is currently available on the NANOOS Web Portal.

NVS: The integration of data: winds, temperature, currents, and tides developed for Puget Sound boaters in the NOAA-funded Boater Information System has become the prototype for the NANOOS Visualization Suite or NVS. NVS is currently under development and will expand to include all of NANOOS territory from Washington to Oregon to Northern California.

3) Scope of Work

We anticipate no changes to our statement of work or in meeting objectives. We have a no cost extension to 31 May 2009 for the completion of this work

4) Leadership Personnel

No changes in Leadership.

5) Budget Analysis

NANOOS remains well-balanced in terms of budget expenditures and allotted time. Specifically, for the period 06/01/2005 through 5/31/2008, NANOOS expended 72% of its anticipated expenditures in support of this project; with a 31 May 2009 end date, we have expended 77% of our allotted time.

NANOOS Governing Council Meeting

25 March 2008
Vancouver, WA

10:00 – 10:15
1. Call to order – David Martin (NANOOS President)
    Welcome, Introductions, Logistics
    David Martin and Jan Newton (NANOOS Executive Director)

10:15 – 10:45
2. Updates
    a. IOOS and the national scene – David Martin
    b. NANOOS within the national scene – Jan Newton

10:45 – 12:30
3. Reports from NANOOS Standing Committees
    a. DMAC – Steve Uczekaj (Acting DMAC Chair)
    b. User Products – Jonathan Allan (UPC Chair)
    c. Education and Outreach – Mike Kosro (E&O Chair) and Amy Sprenger (E&O Coordinator)
    d. DISCUSSION: interaction of committees and working together

12:30 – 1:30
Lunch

1:30 – 2:00
4. NANOOS Governance – David Martin
    a. elect DMAC SC Chair
    b. re-certify Officer and Standing Committee Chair terms
    c. process to adopt NANOOS Business Plan

2:00 – 3:00
5. Y1 deliverables and milestones – David Martin and Jan Newton
    DISCUSSION

3:00 – 4:00
6. Y2 RCOOS budget and milestones – David Martin and Jan Newton
    DISCUSSION

4:00 – 4:30
7. Action Item review and wrap-up