Year 1 Report for
Development of the
Northwest Association of Networked Ocean Observing Systems (NANOOS)

January 1, 2004 – December 31, 2004

This year 1 final report describes activities carried out in support of developing the Northwest Association of Networked Ocean Observing Systems (NANOOS). These activities are described in general and per the five objectives in our contract proposal.

Project Goal and Description/Methodology

The goal of this project is to foster and enhance Pacific Northwest Regional Partnerships to grow constituencies that will allow for the eventual installation and long-term maintenance of a Pacific Northwest Regional IOOS. We proposed to foster the development of strong Regional Association partnerships through proactively engaging, educating and entraining stakeholders throughout the Pacific Northwest in the benefits of an integrated regional ocean observing system.

Major activities to date:

- Planning Grant: Received an initial $100K planning grant from NOAA Coastal Services Center to David Martin (UW-APL), Jan Newton (WA-DOE/UW), Antonio Baptista (OGI/OHSU), Jack Barth (OSU), and Mike Kosro (OSU) for Pacific Northwest Regional IOOS development.
- Workshop I: Held the "Pacific Northwest Regional Ocean Observing System Workshop" on 23-24 October 2003 at Portland State University, OR. At the conclusion of the workshop a charter was signed by over 30 people creating NANOOS and appointing the above five individuals as the NANOOS Interim Steering Committee.
- Outreach: Numerous outreach talks/briefings given by Interim Steering Committee to several and diverse audiences (elaborated below).
- Pilot Project: Submitted two complementary pilots for NANOOS; one was funded: "A Pilot Coastal Ocean Observatory for the Estuaries and Shores of Oregon and Washington" (A. Baptista, PI) to focus on regional integration and expansion of existing but disparate observation and modeling capabilities for the estuaries and shores of Oregon (OR) and Washington (WA).
- Workshop II: Held the "NANOOS Governance Structure and Observing Priorities Workshop" on 5-7 May 2004, Oregon H&S Univ. Beaverton, OR. Specific output was general consensus on governance structure (501-c3) and other design characteristics, as well as prioritized lists for observing capabilities in both the National Backbone and for NANOOS.

- NFRA: Attended RA Summit in Washington, D.C. in March 2004 at which time the RA's agreed to form the National Federation of Regional Associations (NFRA) to serve as a coordinating body for regional efforts around the country. David Martin was elected the first Chair of the NFRA Organizing Committee.
- First IOOS Implementation Workshop: Attended this workshop 31 August – 01 September 2004 that provided RA/NFRA funding priorities to the federal agencies.
- Planning Grant II: Received a second $100K planning grant from NOAA Coastal Services Center to David Martin (UW-APL), Jan Newton (WA-DOE/UW), Antonio Baptista (OGI/OHSU), Jack Barth (OSU), and Mike Kosro (OSU) for continued development of NANOOS.
- NANOOS Coordinator: NANOOS Steering Committee unanimously recommended the hire of Dr. Jan Newton as the NANOOS Coordinator, using funding requested in second successful NANOOS proposal. Newton began this post on 1 November 2004. She will work to provide a more focused effort to bring NANOOS toward its goals of engaging stakeholders, building infrastructure, and establishing the necessary items for accreditation of NANOOS as the RA for the Pacific Northwest.
- COTS Workshop: Dr. Antonio Baptista, one of the NANOOS SC and PI for the NANOOS Pilot grant, attended the Charleston, OR, COTS Workshop in November, 2004. Baptista nominated Newton for the Communications Working Group, one of several working groups established at that workshop.
- Workshop III: Planning to hold this third NANOOS Planning Workshop "Priorities for Observing System Design and Data Products" in 28 February-2 March 2005 in Seattle, WA. The workshop will focus on identifying regional priorities for observing system design and data products. It will open by updating the membership on regional and national events impacting the IOOS, status on funding, current legislative efforts, etc. There will be a session devoted to present and discuss the draft Memorandum of Agreement (MOA) for NANOOS, including identification of any issues this document may pose for individual institutions, organizations, etc. The main thrust of this workshop will be to identify and prioritize user-driven data products and design the observational system that can be responsive to these needs.

Specific Project Objectives:

1) **Identify the full 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, and that this partnership building effort takes advantage of their scientific, economic, social, cultural and operational expertise.

Activities to Date:

- Created basic communication tools to promote NANOOS, including handouts, Powerpoint presentations, a Website (www.nanoos.org), and a logo. The website

contains Powerpoint presentations from both workshops and all workshop products (e.g., Charter, observing priority lists, governance consensus etc.).

- Ensured that Workshop I and II invitations went out to a broad spectrum of groups including local, NGO, Tribal, state, industry, academic, and federal representatives. Participation actually did include some representation from all of the above groups, but needs enhancement for Tribal, industry, and NGO representation.
- Have made numerous contacts with stakeholders and potential users of NANOOS products in either individual or group meetings and presentations, including: The Coastal Society, Washington State Department of Ecology, University of Washington, Georgia Basin/Puget Sound Research Conference, Olympic Region Harmful Algal Bloom study group, Skokomish Tribe. Makah Tribe, Puget Sound Ambient Monitoring Program, Puget Sound Regional Synthesis Model group, Puget Sound Marine Environmental Modeling group, Puget Sound Nearshore Ecosystem Restoration Program.
- Dedicated the NANOOS logo at Workshop II which embodies the essence of the PNW ecosystem and outwardly reflects the PNW Native American cultural values as well as artistic expression.
- Expanded the NANOOS email list significantly, through outreach of SC and Coordinator to various sectors, including industry, tribes, and NGOs.
- Continued outreach to industry: The Marine Exchange, The Boeing Company.
- Continued outreach with tribes: Met Sonny Davis, Tribal Liaison for Washington State, who will work on setting up meetings with numerous tribes. Will expand to Oregon.
- Continued outreach to non-profits and NGOs: Marine Resource Committees in several Puget Sound counties; Restore America's Estuaries; The Coastal Society.
- Actively coordinating NANOOS efforts with those of Dr. Marc Hershman (UW, School of Marine Affairs) through his NOAA-CSC funded project "Assessing the Potential for a Regional Ocean Governance Pilot Project in the Pacific Northwest." Marc has engaged with 90+ marine user groups in the PNW, to assess information needs and concerns.

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.

Activities to Date:

- Composed an Interim Steering Committee that is comprised of individuals with affiliations from major scientific institutions in the PNW.
- Gave outreach talks to the major universities, including University of Washington: School of Oceanography and Applied Physics Lab; Oregon State University, etc.

- Had strong participation in both NANOOS Workshops from the PNW ocean science community.
- Composed two pilot projects proposals that brought together groups of ocean scientists from diverse areas (WA and OR) to focus on coastal and estuarine observations together. Included both academic and state agency ocean scientists.
- Baptista held NANOOS Pilot meeting in Portland, OR in November, 2004, to discuss strategies and user needs.
- Planned third Workshop to begin to define the scientific system design of the Pacific Northwest Regional Coastal Ocean Observing System (RCOOS) that NANOOS will eventually manage. This highly technical aspect of Workshop III will build on the process of obtaining user group buy-in to our planning that we began in our first Workshop and highlighted in our second Workshop, but will engage the scientific community on technology and system design plans.
- Several NANOOS Principals are collaborating with the Department of Energy's Pacific Northwest National Laboratory's (PNNL) Marine Research Laboratory in coastal observing projects.
- David Martin and John Delaney hosted a UW "Ocean Dialogues" forum in which IOOS and OOI components were presented. David's talk focused on NANOOS.
- Newton represents NANOOS on the Alliance for Coastal Technologies' Stakeholder Council.

3) **Obtain input about sub-regional scale oceanographic concerns** by engaging with local stakeholders in advance of a major Regional Workshop and to ensure these factors are addressed at the Regional level. We 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.

Activities to Date:

- Held some smaller, informal gathering e.g., at Georgia Basin-Puget Sound Research Conference, for stakeholders with interests and concerns.
- Had a well-attended "User Forum" at Workshop II to listen to audience input on regional concerns. List was instrumental in construction of Observing Priorities listings requested by Ocean.US.
- Continue to gain sub-regional understanding of concerns through individual outreach efforts by Steering Committee members.
- Will use survey results from Dr. Marc Hershman (UW, School of Marine Affairs) from his NOAA-CSC funded project that has interviewed coastal oriented user groups to assess needs and concerns.

4) **Obtain consensus agreement on the overall process to define a Governance structure** for a Pacific Northwest Regional Association based on the partnerships developed in this project.

Activities to Date:

- In Workshop II, achieved general consensus that 1) NANOOS should evolve towards an open-membership, non-profit entity (e.g., 501c3) at some point in the future and that 2) there is need to draft an initial Governance enabling document.
    - We should draft an MOA for signing by initial institutions (exact makeup TBD) soon. The enabling document should expressly articulate that this initial Governance structure will evolve towards an open-membership, non-profit corporate entity in a directed manner.
    - Initial Board Members will be assigned from the signatory institutions on the initial enabling MOA. The MOA will detail this assignment as well as the specific intent to move towards an elected Board (to come either from the Membership or Chairs of Working Groups – no Group consensus here) as NANOOS matures. The initial Governing Board will select from among its members, an Executive Committee.
    - Working Groups should be aligned FUNCTIONALLY to maximize efficiency (data/products can serve multiple Themes) & to simplify structure.
- Attended a US Ocean Commissioner's (Dr. Marc Hershman) meeting on Regional Ocean Governance, as recommended by the Ocean Commission, to represent NANOOS purpose, structure, and governance.
- Developed draft MOA for NANOOS. Currently passing by SC's university legal counsel in both OR and WA.
- Working with Dr. Marc Hershman (UW, School of Marine Affairs) on aligning his assessment of Regional Ocean Governance potential in the PNW with the structure of NANOOS.

5) **Build international and inter-Region 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.

Activities to Date:

- Included participation from AOOS and CenCOOS leadership at NANOOS Workshop II and actively discussed governance structure and other issues with both.
- Newton and Martin briefed Juan de Fuca Strait Ecosystem Symposium held in Sydney, British Columbia, on NANOOS.
- Jan Newton gave a brief NANOOS talk at the Eastern Pacific Ocean Conference in Sidney, BC, earning several new Canadian members.
- David Martin briefed the PICES meeting on IOOS and NANOOS.
- Jack Barth and David Martin serve on the Board of Governors's for NOAA's Pacific Coastal Ocean Observing System (PaCOOS) proposal, which will serve as

part of the national backbone for biological monitoring and assessment for waters of the contiguous U.S. west coast.
- Newton and Martin attend monthly NFRA conference calls and provide NANOOS updates to the collective, as well as hear the other nascent RA updates.
- Newton working with the COTS Communication Working Group to improve ease of cross-RA communications.

Other Related Activities to Date:
- NANOOS Steering Committee members have spent substantial time involved in overall IOOS (Integrated Ocean Observing System) planning and implementation, including development of National Federation of Regional Associations (NFRA).
- David Martin chairs the Organizing Committee for development of NFRA.
- Steve Rumrill (South Slough Research Reserve) attended March OBIS (Oceanographic Biological Information System) workshop held 24-25 March 2004 in Washington DC as NANOOS representative.
- Susan Cowles (OSU), Jon Luke (Hatfield Marine Science Center), Jan Newton (WA Ecology/UW) and Fritz Stahr (Ocean Inquiry Project) attended Education Planning Workshop on 22-24 March 2004 in Charleston, SC as NANOOS representatives.

Priorities for IOOS from NANOOS perspective

Below we articulate our NANOOS top priorities for the National Backbone and the RCOOS, as established in our Workshop II. However, as we submitted to Ocean.US in May 2004, there are three overarching issues that need to be addressed above and beyond observing system components.

1. Ship-time will be needed to install and maintain an enlarged sensor array. This must be addressed at a national level and certain capacities cannot be enlarged (e.g., mooring arrays) without it.

2. A uniform and common methodology for evaluating and reviewing sensor systems (and other components) as to their robustness & quality for inclusion in any OOS should be promulgated by Ocean.US.

3. Continuing to ask for only the top few priorities will keep biological and chemical measuring and modeling systems from coming to pass as all need the physical measurements and therefore those tend to dominate any "top 5" list. In order to attain the ultimate goal of making a total observing system, these factors (biological & chemical) must be given some special attention and emphasis.

NANOOS top priorities for the National Backbone:
(These are presented numerically, but the consensus prioritization was for the asterisks to indicate the top 5, in no relative order, and for the rest to be important but of a lesser immediate priority.)

1.* Buoys: more (double coverage, esp, fill in WA coast, nearshore, offshore, sanctuaries) and better (salinity, oxygen, depth-resolved currents, temperature, chlorophyll, nitrate, other biological variables, PAR, visibility, full frequency/directional wave spectrum, incoming solar radiation, and a standard interface), co-located with radar and fisheries transects, and the ships to maintain them.

2.* Long range HF radar installation through WA, including short-range in the Strait of Juan de Fuca, with maintenance for entire PNW array

3.* Coastal/Nearshore Bathymetry and shoreline topography (access to existing data e.g. U.S. Army Corps Eng. Surveys, USGS LIDAR data, hyperspectral; and increased frequency and coverage of such collections)

4.* Better access to satellite data & products, delivery and distribution

5.* Models (circulation, waves, data assimilation, micro and meso-scale atmospheric) and computer infrastructure to run those

6. Enhance fisheries and ecosystem information (surveys, zooplankton, benthic habitat)

7. Increase stream gauges, include water quality and sediment supply, and make real-time

8. Increase number of sea level sites

9. HAB identification

10. Pilots for sensors/technologies that may become backbone

NANOOS top priorities for the RCOOS:

1.* Integrate, enhance, and sustain existing estuarine and shoreline monitoring, to include, but not be limited to, adding real-time capabilities and X-band radar at critical areas/bar crossings e.g., for navigation and river mouth monitoring

2.* Cross-shelf, depth-resolved (profiling) moorings and gliders with real-time telemetry along coast with physical, chemical, and biological sensors, surface wave and meteorological measurement capability

3.* HF at high-resolution

4.* Regional models (estuaries, shelf, nearshore, e.g., Puget Sound, Columbia River estuary) for physical (incl. waves and data assimilation), chemical, and biological variables, from watershed to offshore

5.* Regionalize DMAC capability (incl. web-site with portals, identify data sets/meta data, education and outreach, etc)

6. Access to regional fisheries statistics and ancillary data

7. Further develop gliders and AUVs as useful technologies for coastal and offshore monitoring

8. Species monitoring, including invasive, HAB, and nuisance species

9. Toxic pathways in food-webs

Status of progress

Governance Plan

During year 1, we drafted an MOA that reflects the input we received during our Workshop II on Governance. We will air and identify POCs for vetting the MOA with various organizations at Workshop III and plan to have it adopted during year 2.

Business Plan

This will be developed during year 2.

Stakeholder identification and involvement

We have made significant progress during year 1, though we do not underestimate the level of effort needed to obtain regional consensus and prioritization. We are committed to continuing during future years the open, inclusive process we use at our Workshops to obtain the widest consensus we can from the various ocean community stakeholders in the Pacific Northwest.

DMAC

Funds for NANOOS DMAC development were requested in year 3; however, significant progress on this element will be leveraged through the NANOOS Pilot Study during year 2.

Education and Outreach

Dedicated funds for concerted development of this element were requested in year 3. As shown by activities to date, above, however, we are engaged in education and outreach.

Major issues needing resolution

A fundamental issue concerns the level of actionable Federal support of NANOOS and the other non-agency Regional efforts. To date, the fact is that support has not equated to sufficient funding. As Ocean.US noted in the Airlie Center report, resource requirements are substantial for Regional Coastal Ocean Observing System (RCOOS) initial and full operation; they are relatively modest for RA Certification, but several times greater than present RA Partnership building grants. Simply stated, present funding levels will not allow successful RA certification in the next 2 years. This issue must be squarely addressed by the federal agencies since the entire IOOS effort will fail absent robust, accredited RA's and attendant RCOOS's.