

BRIDGE DOCUMENT

This document serves to connect NANOOS' 5-year proposal, which we have referred to as our NANOOS Strategic Operational Plan, to include all of the elements laid out in the IOOS certification requirements for a Strategic Operational Plan (§997.23). The majority of the content required for a Strategic Operational Plan is found within our current NANOOS FY16-20 proposal. This Bridge document has been created to show how the NANOOS FY16-20 proposal satisfies the elements of NANOOS's Strategic Operational Plan, as well as to fill in gaps where the information was found elsewhere.

§997.23 Strategic Operational Plan

(b) Background and Context

The Strategic Operational Plan shall contain a Background and Context section that describes:

- 1) The role of the RICE in furthering the development of the regional component of the System;*

The text that we submitted in our certification application describing our role in furthering NANOOS as the PNW regional component of IOOS, including its regional role, context and background, is summarized from the Background section and Section C of the NANOOS FY16-20 proposal.

- 2) The process by which the RICE updates the Strategic Operational Plan at least once every five years and how the RICE seeks inputs from the broader user community; and*

We added new text in our revised certification application to describe this element, which was not in the NANOOS FY16-20 proposal.

- 3) Partners*

The RICE's primary partners and any contributing observing systems. For the purposes of § 997.23, NOAA defines a primary partner as any organization or individual that contributes significant staff time, funding or other resources to project activities. This is not an exhaustive list of all RICE partners but the primary partners the RICE is working with on a given project.

The excerpt from the NANOOS FY16-20 proposal, Project Summary, which we submitted in our certification application describes our primary partners and any contributing observing systems.

(c) Goals and Objectives

The Strategic Operational Plan shall contain a Goals and Objective section that describe:

- 1) How the RICE addresses marine operations; coastal hazards; ecosystems, fisheries and water quality; and climate variability and change; and*

The excerpt from the NANOOS FY16-20 proposal, Section B, that we submitted in our certification application outlines our goal and objectives that address marine operations; coastal hazards; ecosystems, fisheries and water quality; and climate variability and change.

2) *The major objectives that guide the RICE's priorities for data collection and management, development of products and services, research and development, and education and outreach.*

The NANOOS FY16-20 proposal, Section B, contains the goals and objectives that we submitted in our certification application. These are the major objectives that guide NANOOS priorities for data collection and management, development of products and services, research and development, and education and outreach

(d) Operational Plan for the Observing System

The Strategic Operational Plan shall include or reference an Operational Plan for the Observing System that:

1) *Describes the desired outcomes of the observing system; and*

The Work Plan Section (Section D) of the NANOOS FY16-20 proposal serves as NANOOS' Operational Plan for FY16-20. For each objective in the NANOOS FY16-20 proposal, the excerpt we provided in our certification application details the objective and its corresponding outcome statement.

For each FY during the current 5-yr period, NANOOS has gone through a de-scope process, once the funding level has been communicated, and submits a revised Work Plan that guides the particular fiscal year.

2) *Describes the elements of the operational integrated observing system that will deliver those outcomes;*

The elements of the observing system that will deliver the outcomes for NANOOS observing system objectives are summarized below, pulled directly from Section D, Work Plan, of the NANOOS FY16-20 proposal. In our first certification application submission, we did not provide the italicized statements below, although these are in our NANOOS FY16-20 proposal. In our revised certification application, we have included these to better show the elements listed in our Work Plan are integrated to achieve the desired outcomes of our objectives.

“Objective 2: Maintain and enhance surface current and wave mapping capability
Maintain existing HF-radar foundational capability and extend it to un-served areas in Washington, northward to the international border, providing a new portion of critical national capacity; continue investment in wave mapping at critical ports.

- PNW Coast HF Surface Current Mapping
- Wave Imaging at Critical PNW Ports

Objective 3: Sustain existing buoys and gliders in the PNW coastal ocean
Maintain and harden essential assets providing regional coastal ocean observations, with focus on hypoxia, HABs, ocean acidification (OA), climate change detection, and new investment in biological observations.

- WA Shelf buoy and glider
- OR shelf buoy
- Columbia River shelf mooring and glider
- CA shelf glider
- WA and OR nearshore OAH and hypoxia
- Biological observations

Objective 4: Maintain and Expand observation capabilities in PNW estuaries

Maintain assets to aid sustainable resource management, water quality assessment, sub-regional climate change evaluation, and to sustain and enhance observing ability including new investments in hypoxia, OA, and biological observations.

- Puget Sound Profiling buoys
- Columbia River, OR and WA estuary buoys (SATURN)
- South Slough/Coos Bay estuary moorings
- Central Salish Sea, Bellingham Bay buoy
- Puget Sound estuary ferrybox

Objective 5: Maintain and enhance core elements of beach and shoreline observing programs

Contribute to hazard mitigation by providing essential observations and better decision support tools for coastal managers, planners and engineers.

- WA and OR shoreline monitoring
- WA and OR nearshore bathymetry

Objective 6: Sustained support to a community of complementary regional numerical models.

Contribute to the operation of regional models, and the tools and products they support, covering the head of tide of estuaries to the outer edges of the EEZ in both OR and WA, with strategic improvements to capabilities and scope, including new forecasts for waves, flood and erosion.

- PNW circulation forecasts
- Puget Sound circulation forecasts
- Columbia River circulation forecasts
- PNW biogeochemical forecasts
- Puget Sound biogeochemical forecasts
- Columbia estuary habitat forecasts
- Coastal wave forecasts
- Flood/erosion forecasts”

3) Documents to NOAA’s satisfaction that the individual(s) responsible for RICE operations has the necessary qualifications and possesses relevant professional education and work experience to deliver observations successfully. At a minimum the Strategic Operational Plan shall:

- Identify the individual(s) responsible for overall RICE management;
- Identify, as applicable, the individual(s) responsible for observations system management across the region;

The NANOOS FY16-20 proposal was necessarily terse regarding the roles and responsibilities of the NANOOS personnel. In our revised certification application, we elaborate on the roles and responsibilities of the individuals involved in NANOOS management and observations system management across the region.

“i. Overall NANOOS Management:

- Jan Newton, NANOOS Executive Director

Leads the NANOOS enterprise. The Executive Director of NANOOS reports to and receives guidance from the Governing Council. Specific duties of the Executive Director include: Management and execution of the U.S. Northwest Association of Networked Ocean Observing System enterprise; organization of NANOOS planning workshops, as needed, and service as Presiding Officer at these workshops; coordination of all official NANOOS Correspondence; preparation or cause the preparation of plans and policy documents for

NANOOS including the Business Plan, Operation Plan, etc.; and performance of other functions, as directed by the Council

- Mike Kosro, NANOOS Board Vice Chair, deputy Director

Assists the Executive Director in direction of the NANOOS enterprise, including the tasks above. The Board Vice Chair shall be responsible to the Board Chair and shall exercise such authority as may be delegated by the Chair, including to: act as meeting chair in the absence of the Chair; execute any instruments the Council authorizes, except in cases where signing and execution thereof is expressly delegated by the Council to another representative or agent of NANOOS. Actively promote NANOOS within and outside of the region.

ii. Observations System Management:

NANOOS necessarily utilizes distributed operational observing leadership over the three domains (coastal ocean, estuaries, and shorelines) and two states (WA and OR) that we operate in across our region, with a lead expert for each observing arena. State agency participation and regional oceanographic variation necessitates the distributed system NANOOS employs.

- Surface current and wave observing lead: Mike Kosro

Leads implementation, operation, and maintenance of HF radars for the NANOOS system. Performs data QC and dissemination tasks as needed to assure coherency with IOOS Program standards.

- Coastal shelf buoy observing co-leads: John Mickett (WA) and Mike Kosro (OR)

Each lead maintains and operates a coastal ecosystem mooring in their local waters, utilizing their knowledge of local oceanographic and weather conditions, ability to leverage local assets, and contributions to local stakeholder needs to provide NANOOS with cost-effective and targeted coastal buoy ecosystem observations from WA and OR. Performs data QC and dissemination tasks as needed to assure coherency with IOOS Program standards.

- Coastal shelf glider observing co-leads: Jack Barth (OR) and Antonio Baptista (WA)

Each lead maintains and operates a coastal glider in their local waters, utilizing their knowledge of local oceanographic and weather conditions, ability to leverage local assets, and contributions to local stakeholder needs to provide NANOOS with cost-effective and targeted glider observations from WA and OR. Performs data QC and dissemination tasks as needed to assure coherency with IOOS Program standards.

- Estuarine observing co-leads: John Mickett (WA) and Antonio Baptista (OR)

Each lead maintains and operates estuarine ecosystem moorings in their local waters, utilizing their knowledge of local oceanographic and weather conditions, ability to leverage local assets, and contributions to local stakeholder needs to provide NANOOS with cost-effective and targeted estuarine buoy ecosystem observations from WA and OR. Performs data QC and dissemination tasks as needed to assure coherency with IOOS Program standards.

- Beach and shoreline observing co-leads: Jonathan Allan (OR) and George Kaminsky (WA)

Each lead, situated at their respective state agency, maintains and operates beach shoreline observations for areas where their state has legal jurisdiction, utilizing their knowledge of conditions, ability to leverage local assets, and contributions to local stakeholder needs to provide NANOOS with cost-effective and targeted beach and shoreline observations from WA and OR. Performs data QC and dissemination tasks as needed to assure coherency with IOOS Program standards.

- Regional numerical modeling co-leads: Alex Kurapov (Coastal PNW ocean), Parker MacCready (Estuarine WA: Salish Sea and Nearshore WA), and Antonio Baptista (Estuarine OR: Columbia Estuary and Plume)

Each lead maintains and operates a numerical forecast model displayed on NANOOS NVS for their respective domain that is tailored and validated to capture the key features of the domain (e.g., river plumes, fjord circulation, etc.). These experts actively utilize observing data for validation, highlight areas where new observations are needed, and provide critical model output used by myriad stakeholders in the PNW for a diversity of uses.

- Data Management: Emilio Mayorga, NANOOS DMAC Lead; NANOOS DMAC Committee Chair Leads the NANOOS data management (DAC) team, ensuring that all data collected by the program are timely, properly preserved, and made available via IOOS standard services. Coordinates and leads the implementation of IOOS DMAC functional capabilities involving data integration, management, quality control, distribution and archiving. Coordinates DAC activities among NANOOS DAC partners and serves as primary point of contact between NANOOS, the DAC team, data providers, peer RA DMAC teams, and the IOOS Program Office DMAC team. Also provides coordination with other relevant Cyberinfrastructure and data initiatives regionally, nationally and internationally.

- User Product Development: Jonathan Allan, NANOOS User Products Committee Chair Leads and coordinates NANOOS User Product activities to seek user feedback and prioritizing of user product development and enhancements. Also provides and oversees direct data product development in his areas of expertise, including shoreline observations, near-shore bathymetry, tsunami hazards, and climatology.

- Web Communications: Troy Tanner, NANOOS Web Development Lead/Software Engineer Leads NANOOS web portal and user application development, including mobile applications. Lead developer for NVS, including plot and map rendering capabilities such as map tile generation from gridded data. Coordinates integration of distributed data products into cohesive and user friendly user applications. Also coordinates NVS metadata and data store development and maintenance together with E. Mayorga. Supervises staff who perform system administration for all UW NANOOS servers, including those supporting DAC capabilities.”

iii. Provide the curriculum vitae for each identified individual; and

iv. Identify the procedures used to evaluate the capability of the individual(s) identified in subsection §997.23(d)(3) to conduct the assigned duties responsibly; and

The NANOOS FY16-20 proposal does not provide information about element iv. In our first certification application, we did not provide sufficient detail on this element, which we have added in our revised certification application.

“NANOOS selected these individual leads to implement discrete functions of our observing system, based on their achievements, qualifications, and regional knowledge, as detailed in their CVs. All are known experts in their respective fields. Each of these NANOOS leads provides a detailed performance report every six months, beyond the requirements of the IOOS PO progress reports, to the Executive Director, which are reviewed by the Director, posted publically, and are part of annual NANOOS reviews presented to the Governing Council and its Board. Any corrective actions are identified and discussed with the leads.

Every five years, starting a year and a half before the new proposal submission, NANOOS reassesses these existing efforts, the leaders, and any gaps or deficiencies to define its development of the new 5-year proposal.

Additionally, all leads are subjected to the annual review processes of their home institutions. Each institution has a process in place for personnel evaluation.

The Executive Director serves at the will of the Governing Council (NANOOS MOA Section 8). Annually at the Governing Council meeting the Board Chair gives an assessment of NANOOS and the performance of the Executive Director, inviting comments or written concerns. The Board Chair calls for a vote of confidence for the Director at the start of every 5-y proposal planning process.”

4) Describes how the RICE manages ongoing regional system operations and maintenance. At a minimum the Strategic Operational Plan shall

i. Describe the RICE’s standard operating procedures for calibrating, validating, operating, and maintaining equipment owned and/or operated by the RICE regularly and in accordance with manufacturer guidance or industry best practice. Equipment is defined in §997.1; and

This content is not in the NANOOS FY16-20 proposal, nor was it adequately covered in our original certification application. We worked with each of our NANOOS operators to add the following language, or some similar content as applicable, to each of their Data Management Plans, that we resubmit:

“NANOOS operators of observing assets follow best practices and manufacturer guidance where applicable, to calibrate, operate, and maintain the equipment used in this effort, and are able to provide documentation of this upon request. NANOOS operators maintain equipment inventories, shipping logs, and instrument maintenance history logs, as appropriate, that are also available upon request.”

(e) Development of a Strategy to Sustain and Enhance the System

1) Identify the guiding principles that inform the strategy:

This content is not in the NANOOS FY16-20 proposal, but was in our original certification application:

“NANOOS’s development was guided by many years of community and NANOOS meetings and stakeholder input that NANOOS continues to collect. Key developmental factors have been an equitable focus on coastal ocean, estuarine, and shoreline observations and on product development to meet user needs in both Washington and Oregon, with connections to our partners in Canada and northern California. Prioritization for NANOOS activities/products continues to be advised by our outreach and from active stakeholder involvement within NANOOS governance and within the RCOOS and its committees. The NANOOS GC proposes to sustain and enhance NANOOS: to maintain NANOOS as the PNW regional arm of U.S. IOOS; to harden and strengthen existing infrastructure and capacity, assuring the reliability our users need; and to make selective increases in our capabilities in strategic topical areas dictated by our stakeholders, thus serving Pacific Northwest resiliency, coastal intelligence, and conservation, in line with the NOAA NOS priorities to provide data and information to enhance safe and efficient transportation and commerce, coastal preparedness and risk reduction, and coastal stewardship, recreation and tourism.”

2) Connections to Regional Build-Out Plan

“In concert with IOOS, the IOOS Association, and other Regional Associations, NANOOS developed its five to ten-year Regional Build-Out Plan after strong consideration of regional issues and product needs,

based on stakeholder input. The NANOOS GC and PIs were involved with the production of the Build-Out Plan. In subsequent years, we have used this Build-Out Plan to inform and develop our “NANOOS Effort versus Application” matrix (Table 1 in the NANOOS FY16-20 proposal) which we have utilized to identify existing gaps for prioritization of our build-out efforts, should funds be available.”

3) Annual Planning Process

“The process NANOOS uses to set priorities for distributing funds is as follows:

NANOOS engages its Governing Council (GC), with representation from diverse sectors and a regionally equitable distribution, to define and refine its regional priorities. Annual GC meetings are used to identify priorities, new members, and deficiencies of the NANOOS enterprise.

The 15-member elected GC Board, with sector representation from federal, state/local agencies, tribes, academia, industry, and NGOs, and the operational Standing Committee Chairs (DMAC, User Products, and OEE) comprise the ExCom, providing a more agile yet still representative advisory body for NANOOS. The ExCom provides decision-making authority on annual budgets and other prioritization decisions.

With the input from NANOOS PIs, GC, and stakeholders, NANOOS developed its Effort vs. Application Map as part of our current 5-y proposal plan. Gaps for build-out were solicited via a publicly advertised LOI process, with results ranked by our Governing Council Board. NANOOS will use this matrix and the prioritization from the Board to assess where any new funding, should it be available, will be directed as part of our system build-out.”

(f) Data Management and Communications (DMAC) Plan

This content is not in the NANOOS FY16-20 proposal, and has been added to our revised certification application:

“NANOOS maintains an overall Data Management Plan for NANOOS DMAC. In addition, NANOOS collects individual data management plans from each of our providers. These are available at http://www.nanoos.org/about_nanoos/documents.php within the Certification folder (at bottom of page)”

(g) Budget Plan

1) Identifies who supports the RICE financially;

This content is not in the NANOOS FY16-20 proposal. Only the first sentence below was in our original certification application. We have elaborated the content in our revised certification application.

“NANOOS operates primarily via funds from its 5-y award from NOAA’s IOOS Program Office. NANOOS coordinates with specific PNW efforts or receives funding from other federal and local entities, including the *NOAA Ocean Acidification Program (NOAA OAP)*, *NOAA Pacific Marine Environmental Laboratory (NOAA PMEL)*, *National Estuarine Research Reserve System (NERRS)*, and *the Washington Ocean Acidification Center (WOAC)*.

From our FY17 De-scope Package, added-on tasks funded from NOAA OAP were:

1. \$30,000 to enhance the GOA-ON data portal as an OA dashboard to the World
2. \$75,000 NANOOS Multi-Scale Prediction of California Current Carbonate System Dynamics

3. \$64,181 for NANOOS Ocean Acidification Monitoring and Prediction in Oregon Coastal Waters
4. \$33,146 NANOOS UW OA observatories
5. \$25,000 to enhance the Cha'ba Mooring Program to Allow Year-Round Deployments
6. \$55,000 for UW OA observatories: Replacement System due to loss

Many observing assets are leveraged significantly from the NANOOS partner entities, which has not been tracked in terms of dollars. Some of these sources of leverage are indicated below:

- WA Shelf buoy: NOAA OAP, NOAA PMEL, WOAC
- OR shelf buoy: NOAA OAP, NOAA PMEL
- Puget Sound Profiling buoys: NOAA OAP, NOAA PMEL, WOAC
- Columbia River, OR and WA estuary buoys (SATURN): US Geological Survey
- South Slough/Coos Bay estuary moorings: NERRS
- Central Salish Sea, Bellingham Bay buoy: Northwest Indian College
- Puget Sound estuary ferrybox: WA State Department of Ecology
- WA and OR shoreline monitoring: WA State Department of Ecology, OR Department of Geology and Mineral Industries”

2) Identifies how RICE priorities guide funding decisions; and

This content is not in the NANOOS FY16-20 proposal but was in our original certification application.

“NANOOS’s development was guided by many years of meetings and stakeholder input that NANOOS continues to collect. Key developmental factors have been an equitable focus on coastal ocean, estuarine, and shoreline observations and on product development to meet user needs. Prioritization for NANOOS activities/products continues to be advised by our outreach and from active stakeholder involvement within NANOOS governance and within the RCOOS and its committees. The NANOOS GC proposes to sustain and enhance NANOOS: to maintain NANOOS as the PNW regional arm of U.S. IOOS; to harden and strengthen existing infrastructure and capacity, assuring the reliability our users need; and to make selective increases in our capabilities in strategic topical areas dictated by our stakeholders, thus serving PNW resiliency, coastal intelligence, and conservation.

Funding decisions are guided by NANOOS priorities. The GC has voted that they prioritize sustaining current observations first. New activities were prioritized by the GC Board aided by the “NANOOS Effort vs. Application” matrix.”

3) Assesses funding constraints and the associated risks to the observing System that the RICE must address for the future.

This content is not in the NANOOS FY16-20 proposal, directly, and was insufficiently addressed in our original certification application. We have clarified our answer in the revised certification application.

“NANOOS is highly constrained by funding, with proposals being funded at about 60% of its need. When NANOOS outlined risks to the system in our NANOOS Business Plan (Strengths, Weaknesses, Opportunities, and Threats (SWOT) Analysis Section), funding constraints was listed as a considerable risk to the NANOOS enterprise. NANOOS has had the fortune to be relatively level-funded, though we

recognize this is a slight reduction each year due to increasing costs. However, this funding level has allowed us to sustain across the years the key observing assets that NANOOS originally invested in. While additions to our observing system are desired, none of these original assets are underperforming, and all have links to stakeholders and applications, as per our most recent 5-year review.

Our Governing Council was solicited as to what to preserve if a major funding cut (e.g., \geq \$500k) was made and they considered preservation of existing observations to be the highest priority. However, they also stated that such a cut would require a wholesale reevaluation of this system, which would take considerable time and was not advised unless this magnitude of a cut was pending.

In our NANOOS FY16-20 proposal, we stated that: “We discuss three levels of work effort based on the requested funding levels: \$1.5M which is a ~60% cut to our current budget, significantly reducing NANOOS’ core capacity, putting in question the relevance of NANOOS and feasibility of many of its sub-systems, requiring serious rethinking of our vision and design; \$2.5M which allows NANOOS to maintain current capacity; and \$4.0M which allows for hardening of our existing capacity and new investments to fill significant gaps. Our prioritization with stakeholders and our GC has focused on NANOOS priorities for the latter two scenarios.”

We stand by our assertion that if this risk becomes serious, we will reengage our Governing Council and stakeholders to prioritize activities and investments at that time.”