



REPORT TO THE U.S. CONGRESS ON
THE NATIONAL OCEANOGRAPHIC
PARTNERSHIP PROGRAM,
FISCAL YEAR 2013

PRODUCT OF THE
National Ocean Council



February 2015

EXECUTIVE OFFICE OF THE PRESIDENT
NATIONAL OCEAN COUNCIL

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February 2, 2015

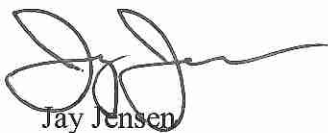
Dear Colleagues:

In our capacities as Deputy Co-Chairs of the National Ocean Council, we are pleased to transmit to you the *Report to the U.S. Congress on the National Oceanographic Partnership Program, Fiscal Year 2013*. Under the National Oceanographic Partnership Act (PL 104-201, 10 USC 7901-7903) the National Oceanographic Partnership Program (NOPP) is required to report to Congress annually.

The NOPP was established by Congress to promote the national goals of assuring national security, advancing economic development, protecting quality of life, and strengthening science education and communication by improving knowledge of the ocean. These goals are achieved through partnerships among federal agencies, academia, industry, and non-governmental organizations that advance interagency initiatives and priorities and cut across agency missions and multiple discipline. Through the NOPP, public and private sectors across the oceanographic community coordinate to support larger, more comprehensive projects, promote sharing of resources, and foster community-wide innovative advances in ocean science, technology, and education.

Since its establishment, the NOPP has driven advances in ocean science and technology research that have expanded the knowledge of our ocean. In Fiscal Year 2013, the NOPP continued this tradition of excellence. We appreciate your support of NOPP and look forward to continued engagement with you on this important effort and other ocean issues.

Sincerely,



Jay Jensen
Deputy Co-Chair, National Ocean Council
Council on Environmental Quality



Tamara L. Dickinson, PhD
Deputy Co-Chair, National Ocean Council
Office of Science and Technology Policy

About the National Ocean Council

The National Ocean Council (NOC) is charged with implementing the National Ocean Policy established in Executive Order 13547, Stewardship of the Ocean, Our Coasts, and the Great Lakes, which ensures the protection, maintenance and restoration of the health of the ocean, coastal, and Great lakes ecosystems and resources; enhances the sustainability of ocean and coastal economies; preserves maritime heritage; supports sustainable uses and access; provides for adaptive management to enhance understanding of and capacity to respond to climate change and ocean acidification; and coordinates with national security and foreign policy interests.

About this Document

This document was developed by the National Oceanographic Partnership Program Office, which supports administration of the Program. It was published by the NOC.

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Executive Summary

The National Oceanographic Partnership Program (NOPP) marked its 16th year in Fiscal Year (FY) 2013. Since its inception, NOPP has forged interagency and intersector cooperation through a multitude of cross-cutting ocean science and technology research and education projects. The NOPP has proven to be an effective forum for developing new interagency activities that advance ocean knowledge and transcend single agency missions.

In FY 2013 the NOPP, coordinated through the Interagency Working Group on Ocean Partnerships (IWG-OP) and the NOPP Office, continued to make progress on its four strategic goals:

- Continue and expand ocean partnership dialogues;
- Sponsor ocean partnership activities;
- Identify and remove obstacles and disincentives to ocean partnerships; and
- Facilitate opportunities for dialogue with the Nation's leadership.

FY 2013 saw a renewed investment from agencies to advance NOPP strategic goals. Nine new projects were funded in FY 2013 focusing on Marine Hydrokinetic Environmental Effects Assessments and Monitoring, bringing the total number of projects funded by NOPP from 1997 to 2013 to 192, including 21 renewal projects. The funding dedicated to these new projects in FY 2013 totaled \$2.43M, an increase over the previous fiscal year.

The NOPP celebrated a milestone in FY 2013 as the Argo Project, a NOPP-supported project initiated in 1999 and implemented by NOPP through 2011, reached its millionth ocean observation profile. In recognition of this accomplishment, the NOPP held a mini-symposium attended by internationally renowned scientists in December 2012 in Washington, D.C.

The NOPP-related Interagency Working Group on Facilities and Infrastructure (IWG-FI) made large strides in FY 2013 toward meeting priority objectives of the National Ocean Policy Implementation Plan. In FY 2013 the IWG-FI addressed the status of the Nation's research fleet in its report *Federal Oceanographic Fleet Status Report*. The IWG-FI also completed a white paper on the use of unmanned systems for oceanographic research titled *Federal Unmanned Systems: Status, Issues, and Recommendations*.

The NOPP Office contract transitioned in FY 2013 with the Office of Naval Research awarding a five-year contract to Karthik Consulting and Vencore (formerly QinetiQ North America). The new NOPP Office continues to support the program, related interagency activities, and the Ocean Research Advisory Panel, a Federal Advisory Committee.

The NOPP partner agencies continued their support of the National Ocean Science Bowl in FY 2013 through a contract to the Consortium for Ocean Leadership. The nationwide competition is held at over 25 regional competition sites with over 350 high schools and approximately 2,000 students participating each year. Since the beginning of this program in 1998 more than 24,000 students and teachers have participated and many of these participants have gone on to college and careers in the fields of ocean science, education, and policy.

Introduction

The National Oceanographic Partnership Program (NOPP) was established by Congress in Fiscal Year (FY) 1998 to promote the national goals of assuring national security, advancing economic development, protecting quality of life, and strengthening science education and communication by improving knowledge of the ocean (PL104-201, 10 USC 7901-7903). This is accomplished through partnerships among Federal agencies, academia, industry, and non-governmental organizations (NGOs). While the ocean governance structure within which the NOPP operates has evolved over time, the program continues to serve as an effective forum for the advancement of the national goals through the development of interagency initiatives and priorities that span across agencies, sectors, and disciplines. Many NOPP-associated groups and activities also contribute toward advancement of the National Ocean Policy by providing forums for coordination, communication, and partnership across agencies.

Interagency Working Group on Ocean Partnerships

The objective of the Interagency Working Group on Ocean Partnerships (IWG-OP) is to plan, program, and execute ocean research and technology projects which result from agency partnerships and address topics of mutual and emerging interest. The IWG-OP focuses on projects that call for more than the work of a single agency, require government-private-academia partnerships, or involve several missions. Partnerships facilitated through the IWG-OP speak to a full range of ocean science, technology, and resource management priorities. To address various areas of interest, the IWG-OP has created sub-groups:

- The Biodiversity Ad Hoc Group plans future steps and initiate partnership activities involving such issues as biodiversity technology and science, metrics, indices and proxies, applications and data sharing, and international conventions and frameworks;
- The Task Force for Ocean Exploration and Research Technology and Infrastructure (TFORT) advises, assists, and makes recommendations to the IWG-OP on policies and procedures related to ocean exploration and undersea research technology and infrastructure; and
- The Federal Renewable Ocean Energy Working Group (FROEWG) identifies information needs and support research necessary to enhance the regulatory process for siting and deploying renewable ocean energy technologies.

Interagency Working Group on Facilities and Infrastructure

The Interagency Working Group on Facilities and Infrastructure (IWG-FI) addresses policies, procedures, and plans relating to oceanographic facility use, investments, and upgrades, and assists with oceanographic asset issues. The scope of the IWG-FI includes major Federal assets such as oceanographic ships, submersibles, remotely operated vehicles, autonomous underwater vehicles, and maritime research aircraft, which includes unmanned airborne vehicles. Sub-groups under the IWG-FI focus on particular areas of interest:

- The Subcommittee on Unmanned Systems (SUS) advises on policies and procedures related to unmanned systems uses, upgrades, and investments; and
- The Federal Fleet Metrics Group advises on Fleet operations management and Fleet performance and utilization.

Ocean Research Advisory Panel

The Ocean Research Advisory Panel (ORAP) was established in FY 1997 to deliver independent advice and guidance to the National Ocean Research Leadership Council (NORLC), which is now operating through the NOC. ORAP is composed of individuals from the National Academies, state government, academia, and ocean industries. ORAP provides advice to the NOC on a variety of topics covering the broad range of ocean science, education, and resource management

NOPP Investment Profile

The primary function of NOPP is to promote partnerships both within the Federal government and between the Federal government and other members of the ocean sciences community, including academia, industry, and non-governmental organizations. Each year, ocean research and technology topics of mutual and emerging interest that would benefit from cross-agency and cross-sector partnership are identified by the IWG-OP, selected topics are announced through an agency-issued formal NOPP Broad Agency Announcement (BAA), a Request for Proposals (RFP), or a Federal Funding Opportunity (FFO), and projects are selected for funding. The process of developing these funding opportunities is fully described in Appendix 1.

The NOPP Investment Profile has two investment types. The first investment in the NOPP profile consists of the projects selected by NOPP participating agencies, known here as NOPP-Solicited Activities. The second investment consists of NOPP-Managed Activities which are single agency expenditures that support the NOPP objectives, including the NOPP Office and the National Ocean Science Bowl (NOSB).

The amount of dollars spent in each fiscal year for NOPP-Solicited Activities and NOPP-Managed Activities from FY 1997 through FY 2013 totals \$427.37M and is shown in Figure 1. Over the 16 year history of the NOPP the per annum spending level has generally increased, however there were no new projects funded in FY 2012. In FY 2013 there was an increased interest in NOPP partnership opportunities, but challenges in transferring funds and restricted availability of funds remained, leading to only a small increase in the investment of new funding in NOPP-Solicited Activities.

NOPP-Solicited Activities

NOPP-Solicited Activities are the direct result of formal NOPP BAAs, RFPs, or FFOs. In FY 2013 three NOPP-Solicited Activities were announced; of these one completed the proposal review process and had funds distributed in FY 2013. The other two completed this process in FY 2014. Funding for NOPP-Solicited Activities in FY 2013 totaled \$2.43M and the cumulative investment in these activities from FY 1997 to FY 2013 is \$386.46M.

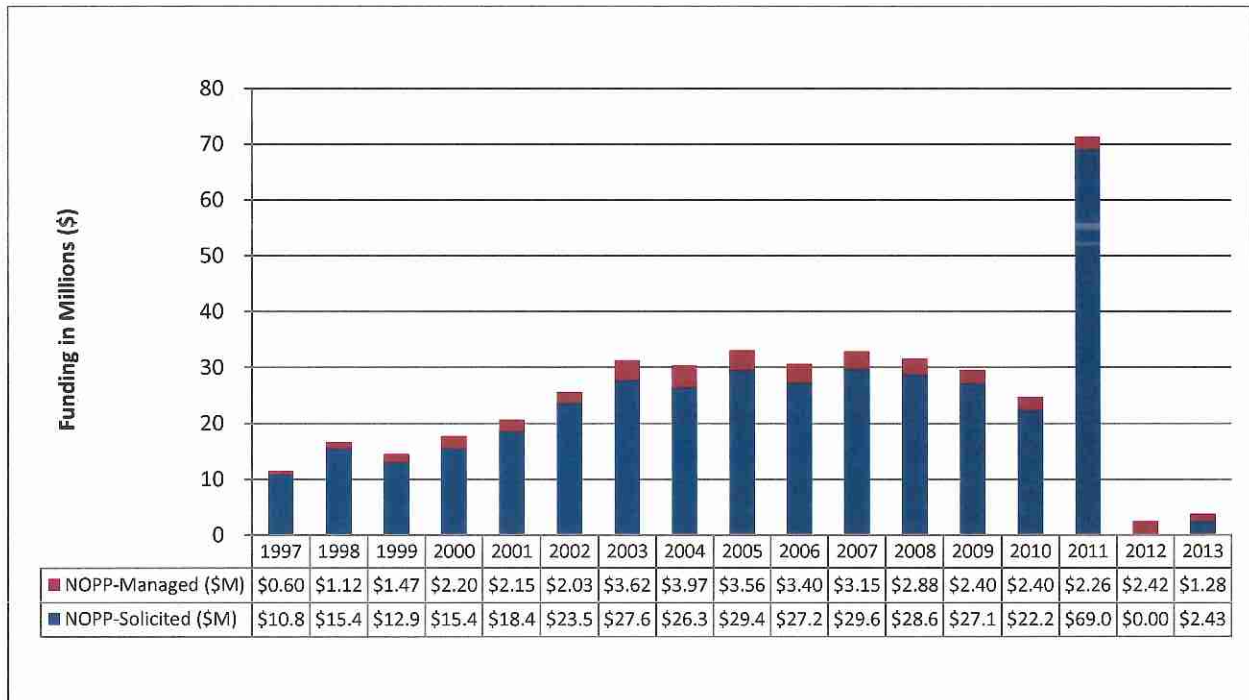


Figure 1. Investments in NOPP-Managed and NOPP-Solicited Activities from FY97 to FY13. Note that the amounts shown are those budgeted annually. The increase in FY11 solicited funds was due to a new partnership with the Integrated Ocean Observing System.

NOPP-Managed Activities

Funding for NOPP-Managed Activities in FY 2013 totaled \$1.28M and the cumulative investment in these activities from FY 1997 to FY 2013 is \$40.91M. The decrease in NOPP-Managed Activities in FY 2013 is due in part to the transition of the NOPP Office to a contract with the small business, Karthik Consulting, which has promoted the responsible stewardship of federal resources.

NOPP Excellence in Partnering Award

Each year the NOPP Excellence in Partnering Award is presented to a research team that best demonstrates the partnership objectives of NOPP. The research team of the NOPP-sponsored project “Long-term in situ chemical sensors for monitoring nutrients: phosphate sensor commercialization and ammonium sensor development” was the recipient of the 2012 NOPP Excellence in Partnering Award. The project was nominated for its exceptionally diverse partnership which brought together chemical and environmental research scientists from both the freshwater and oceanic communities, leading *in situ* instrument manufacturers, operators, and ocean observing and resource managers from four Federal agencies, two small businesses, one non-profit organization, and four universities. In addition to the partnership at the research project level, two contributing NOPP agencies, the Bureau of Energy Management (BOEM) and the Department of Energy (DOE), partnered together to support the project.

The three-year project, led by Dr. Andrew Barnard from WET Labs, focused on meeting a demonstrated need for *in situ*, real-time nutrient monitoring capabilities for ocean observing. The objective of the project was to provide an easy-to-use and accurate commercial *in situ* nutrient sensor to the ocean observing, resource management, and freshwater quality communities with the goal of improving routine and long-term monitoring of water quality, coastal management measures, and coastal ecosystems.

The project team successfully developed a reliable and accurate long-term *in situ* nutrient sensor system using reagent-based colorimetric methods that are both user-friendly and can be readily adapted for several nutrients. Using this system they completed the development of a phosphate analyzer, the CYCLE-PO4 sensor, and an ammonium analyzer, the CYCLE-NH4 sensor. The phosphate analyzer has been thoroughly field tested and is now available commercially from WET Labs, while the ammonium analyzer is still undergoing field testing.

By involving the partners as active participants in the development and commercialization process, Dr. Andrew Barnard and his team effectively transitioned the phosphate sensor into key local, state, and Federal monitoring programs, as well as ocean observing and scientific research projects. In doing so, they illustrate the core purpose of the NOPP: collaboration and partnership with the goal of advancing ocean research and education.

Fiscal Year 2013 Activities

NOPP-Solicited Activities

NOPP partner agencies invested approximately \$2.43M in new NOPP-Solicited Activities in FY 2013. The new projects selected for funding in FY 2013 were in response to the BAA on Marine and Hydrokinetic (MHK) Environmental Effects Assessment and Monitoring. Research subtopics under this BAA included: 1) Fish Behavior and Mortality Around Hydrokinetic Turbines; 2) Environmental Monitoring of MHK Projects; and 3) Analysis of Environmental Effects of MHK Surrogate Technologies. Received proposals underwent a peer review process, and nine projects were selected for funding by the partner agencies and the IWG-OP. Information on the selected projects is in Appendix 2.

There were two additional solicitations in late FY 2013 for funding in FY 2014. These solicitations were on the research topics: 1) Advancing Air-Ocean-Land-Ice Global Coupled Prediction on Emerging Computational Architectures; and 2) Demonstrating a U.S. Marine Biodiversity Observation Network (Marine BON). Additional information on these solicitations is in Appendix 3.

NOPP-Managed Activities

NOPP Office

In FY 2013 the Office of Naval Research awarded a five-year contract to the team of Karthik Consulting and Vencore (formerly QinetiQ North America). Upon the award of the new contract, the NOPP Office, now under Karthik Consulting and Vencore, continued to support interagency activities including all meetings and intercessional activities of the IWG-OP, IWG-FI, and ORAP. In support of these groups, the NOPP Office served as liaison to other related interagency committees.

An important role of the NOPP Office is to provide public outreach and education about the NOPP and NOPP supported groups. In this role the NOPP Office represented the NOPP at the 2013 American Geophysical Union Fall Conference, the Ocean Sciences '12 Conference, and the 2013 Marine Technology Society Conference. These conferences provided opportunities for outreach to students, scientists, and industry.

The NOPP Office continued to promote public outreach through maintaining its website, www.nopp.org, and through its Twitter and Facebook accounts. Through participation in social media the NOPP Office assists the NOPP in engaging a wider public audience in the importance of ocean science and technology research and education, as well as the importance of partnerships.

National Ocean Science Bowl

The National Ocean Sciences Bowl (NOSB®) was created through NOPP in 1998 in honor of the International Year of the Ocean. In FY 2013 it continued to be supported by the NOPP through a contract with the Consortium for Ocean Leadership. The NOSB has shown through a longitudinal study that many of students who compete in the program enter a college program or career in the fields of ocean science, education, and policy.

In FY 2013, the nationwide competition was held at 25 regional competition sites with over 350 high schools and approximately 2,000 students participating. The 2013 Finals competition was held April 19-21 at the University of Wisconsin-Milwaukee, School of Continuing Education, in Milwaukee, Wisconsin. The theme for this year's NOSB Finals, the first ever to be held in the Great Lakes region, was Great Lakes: A Window into Freshwater Science. This theme invoked the interconnectedness of freshwater and marine systems and included, but was not limited to, our understanding of freshwater processes and the connection to the ocean, human impacts on freshwater ecosystems, and the effects of invasive species. The winner of the NOSB was Arcadia High School from Arcadia, California. The top eight teams from the 2013 NOSB are shown in Table 1.

Table 1. 2013 NOSB Finals Competition Winners

Place	School
1 st	Arcadia High School – Arcadia, California
2 nd	Lexington High School – Lexington, Massachusetts
3 rd	Juneau-Douglas High School, Juneau, Alaska
4 th	Neah-Kah-Nie High School, Rockaway Beach, Oregon
5 th	Albany High School – Albany, California
6 th	Greenhills School, Ann Arbor, Michigan
7 th	Dana Hills High School, Dana Hills, California
8 th	Maui High School – Kahului, Hawaii

NOPP Interagency Interactions

Interagency partnership is a central tenet of NOPP; as such the engagement of partner agencies is essential to the success of NOPP initiatives. In FY 2013 agency participation in NOPP included sponsoring research through partnership funding opportunities, hosting topical workshops, providing input to NOPP publications, and attending NOPP-related outreach events. The following sections summarize the recent activities of the NOPP and agency participation.

Interagency Working Group on Ocean Partnerships

The IWG-OP met monthly in FY 2013 to explore innovative areas of ocean science and technology research and initiate partnerships. These meetings resulted in the development of solicitations on three topics: 1) MHK Environmental Effects Assessment and Monitoring; 2) Advancing Air-Ocean-Land-Ice Global Coupled Prediction on Emerging Computational Architectures; and 3) Demonstrating a U.S. Marine BON.

The IWG-OP December 2012 meeting was a special celebration of the Argo Program's collection of its one-millionth profile of temperature and salinity below 2,000 meters. The Argo program began in 1998 as a NOPP project and was implemented through NOPP until 2011. The Argo Program was initiated to provide global ocean observations for a better understanding and prediction of climate variability. Today thousands of profiling floats drift the world's ocean collecting continuous profiles.

The IWG-OP Biodiversity Ad Hoc Group met quarterly in FY 2013. This group has facilitated the discussions on the Demonstrating a U.S. Marine BON solicitation and informed participating agencies on biodiversity related topics.

The FROEWG met bimonthly in FY 2013. The focus was to provide feedback to participating agencies on specific ocean renewable-energy related research projects. In FY 2013 the FROEWG group focused effort on the solicitation for MHK Environmental Effects Assessment and Monitoring.

The TFORT met quarterly in FY 2013. It focused on issues related to ocean exploration and undersea research technology and infrastructure.

Interagency Working Group on Facilities and Infrastructure

During FY 2013 the IWG-FI made progress toward meeting priority objectives of the National Ocean Policy Implementation Plan. The Federal Oceanographic Fleet Working Group met regularly in FY 2013 to update the *Federal Oceanographic Fleet Status Report*, which was last produced in FY 2007. The report, a comprehensive review of the Nation's fleet of oceanographic survey and research vessels, was released in May 2013, fulfilling an action under the National Ocean Policy Implementation Plan (http://www.whitehouse.gov/sites/default/files/federal_oceanographic_fleet_status_report.pdf).

In FY 2013, the SUS met regularly and was tasked with several actions that supported the National Ocean Policy Implementation Plan. The SUS also completed a white paper, *Federal Unmanned Systems: Status, Issues, and Recommendations*, which provided recommendations on maximizing coordination and promoting efficiencies within the Federal unmanned systems community.

Ocean Research Advisory Panel

ORAP, the Nation's only FACA committee whose scope covers the full spectrum of ocean science, education, and resource management topics, continued to provide advice and guidance to the NOC. ORAP held three meetings in FY 2013. At these meetings the ORAP addressed policy issues for NOC consideration, were briefed by interagency working groups on their activities, and developed reports on relevant issues. Two reports developed by ORAP in FY 2013 were released in early FY 2014 and are described in further detail in the Fiscal Year 2014 Activities and Plans section.

Fiscal Year 2014 Activities

The NOPP partner agencies continued in FY 2014 to contribute toward extramural funding opportunities, implementation of the National Ocean Policy, and other activities to foster interagency partnerships and coordination. The NOPP Office continued to support interagency activities and ORAP.

NOPP-Solicited Activities

Solicitations on Advancing Air-Ocean-Land-Ice Global Coupled Prediction on Emerging Computational Architectures and Demonstrating a U.S. Marine BON were announced at the end of FY 2013 for funding in FY 2014. Funding projections for these projects were still tentative with initial agency commitments shown in Table 2.

Table 2. 2014 Agency Commitments

Agency	Marine BON Solicitation	Air-Ocean-Land-Ice Solicitation
NASA	\$1,881,041	
NOAA	\$300,000	
ONR		\$3,750,000

Topic areas for further solicitations included:

- Real-Time Opportunity for the Development of Environmental Observations (RODEO); and
- Marine Arctic Ecosystem Study (MARES).

NOPP-Managed Activities

NOPP Office

In FY 2014, the NOPP Office continued its support of interagency activities and ORAP.

National Ocean Science Bowl

The FY 2014 NOSB Finals Competition was held May 1-4, 2014, in Seattle, Washington, hosted by the Washington Sea Grant and the University of Washington. The theme was Ocean Acidification. The winning team came from Boise High School, Boise, Idaho.

NOPP Interagency Interactions

In FY 2014, NOPP continued to work with and through the appropriate ocean governance channels, including the NOC, to provide collaboration opportunities to initiate innovative ocean science and technology research. FY 2014 activities are described below.

Interagency Working Group on Ocean Partnerships

The IWG-OP continued to meet monthly in FY 2014. Initiatives continued along the IWG-OP's strategic planning and implementation process, including in support of the National Ocean Policy. To that end, the IWG-OP planned to conduct its four year reassessment of its strategic policies in FY 2014. In FY 2014 the IWG-OP continued to develop solicitations for FY 2014 and beyond with potential research topics including real-time environmental observations, marine arctic ecosystem studies, marginal ice zones, and a sea state project.

The IWG-OP's Biodiversity Ad Hoc Group continued to meet quarterly during FY 2014. In FY 2014 the group continued to inform participating agencies on biodiversity related topics including biological research and monitoring for environment and habitat protection and/or fisheries management, archiving marine biological data, vulnerable deep-sea ecosystem issues, and the integration of satellite data with in situ observations of elements in marine biodiversity.

TFORT continued to meet quarterly during FY 2014. TFORT planned to continue implementing activities guided by its 5-year strategic goals and priorities outlined when TFORT was created in 2013. The strategic goals include: develop a catalog of priority Ocean Exploration and Undersea Research Technologies which will form the core reference for all activities related to TFORT; communicate technology needs, solutions, and technology partnership opportunities; conduct activities in coordination with, and in support of, the outreach and education of the objectives of the IWG-OP as they relate to ocean research and undersea

technology; and, investigate technology solutions and identifying potential funding to further the use of high priority ocean exploration and undersea research technologies.

Interagency Working Group on Facilities and Infrastructure

The IWG-FI continued to meet regularly during FY 2014. The IWG-FI continued to address policies, procedures, and plans relating to oceanographic facility use, upgrades, and investments and support the implementation of National Ocean Policy. The scope of the IWG-FI in FY 2014 continued to include developing metrics, both standardized and mission-specific, that assess, characterize, and quantify the usage of major Federal assets including ships, maritime research aircraft, Unmanned Aerial Vehicles (UAVs) and Unmanned Undersea Vehicles (UUVs). The IWG-FI also provided guidance as needed for other systems used in ocean observations, such as moorings, drifting buoys, and observatories. New topics of interest included two new research vessels, design and construction of regional class research vessels, and the Ocean Observatories Initiative.

The SUS continued to advise the IWG-FI on policies and plans related to unmanned systems uses, upgrades, and investments in FY 2014. The FY14 priorities of the SUS were to facilitate coordination between agencies utilizing unmanned systems, establish a coordinated operation center, discuss metadata standards, data standards, and architectures, and establish asset pools.

Ocean Research Advisory Panel

In FY 2014 the ORAP continued the process of closing its current tasks, which include providing advice on ecosystem-based management (EBM), the balance between ocean infrastructure and ocean research, and leveraging ocean education opportunities. In early FY 2014 ORAP released two reports titled *Implementing Ecosystem Based Management* and *Leveraging Ocean Education Opportunities*.

Implementing Ecosystem Based Management was drafted at the request of the NOC to identify strategies and recommendations in advancing EBM as outlined by the National Ocean Policy. Key findings of this report include the need for greater clarity and understanding of EBM across stakeholder groups, that existing management frameworks should be re-engineered to implement EBM through pilot projects and eventually long-term management efforts, and consistent messaging across Federal agencies is critical for EBM to become a key management principle.

Leveraging Ocean Education was drafted at the request of the NOC to provide input on leveraging federal ocean education efforts to maximize investment and more effectively linking informal ocean education efforts to education standards. Key findings of this report include endorsing the Next Generation Science Standards as the framework for aligning agency Science, Technology, Engineering, and Mathematics (STEM) education and outreach goals; the framework for assembling, managing, and leveraging the STEM portfolio should be clarified; existing STEM networks should be connected by an overarching national network; and Federal agencies should support professional development programs for STEM educators and scientists.

As membership under ORAP needs to be recertified every year, the memberships for FY 2014 have been submitted and were awaiting renewal. There are currently 13 active members on the ORAP with 4 new members in progress.

Fiscal Year 2015 Plans

Funding levels and associated programmatic issues for FY 2015 are not yet firmly established. It is anticipated that NOPP contributions will be comparable to those expected in FY 2014, and interagency

collaborations and extramural research partnerships will continue, including implementing the National Ocean Policy.

Conclusion

In FY 2013, the NOPP saw many successes including continued investment in ocean science and technology research and education, celebrating milestones in NOPP funded research projects, and completing National Ocean Policy action items. Going forward, the NOPP, with its 16 years of experiences and lessons learned to draw upon, will continue to serve as an efficient mechanism for implementing productive ocean partnerships among Federal agencies, industry, and academia; supporting interagency working groups focused on key ocean research and education issues; and supporting implementation of the National Ocean Policy.

Appendix 1. Development and Process for NOPP Funded Research

Two or more agencies typically collaborate on funding NOPP research. Funded NOPP projects require multi-sector partnerships among academia, industry (including non-government organizations), and government (including state, local, and tribal).

Research topics funded through NOPP are initiated via interactions among agency program managers, often at IWG-OP meetings. The partner agencies then discuss the research topic with the IWG-OP. At this point, interagency partnerships are formed, tentative levels of support are pledged on an as-available basis, and draft solicitation language is developed. The IWG-OP reviews the funding announcement language that is then announced by a lead agency as a Broad Agency Announcement, Request for Proposals of Federal Funding Opportunity on behalf of NOPP.

Once a funding opportunity is announced, all submitted proposals undergo a peer review process similar to that of the National Science Foundation. Proposals are reviewed based on:

- Relevance of the proposed research to NOPP objectives;
- Overall scientific and technical merits of the proposal;
- Level of support of critical research objectives or operational goals;
- Quality of proposed partnerships;
- The offeror's capabilities, related experience, and facilities that are critical to the proposal objectives;
- The long-term commitment of the partners to the proposed objectives;
- The qualifications and experience of the proposed PI and key personnel; and
- Reasonableness of cost.

The rankings of the peer review panel are made available to, and reviewed by, the agency program managers, who make a recommendation for funding. After IWG-OP discussion, the funded research projects are announced.

To learn more about the NOPP Process and what makes a successful funding solicitation, please see the NOPP Best Practices and Guidelines document: www.nopp.org/wp-content/uploads/2011/03/NOPP-Funding-Best-Practices_FINAL.pdf.

Appendix 2. NOPP-Funded Projects Initiated in Fiscal Year 2013

Marine and Hydrokinetic (MHK) Environmental Effects Assessment and Monitoring

Projects Assessing Environmental Effects of MHK Devices in situ:

- “Interactions of aquatic animals with the ORPC OCGen® in Cobscook Bay, Maine: Monitoring behavior change and assessing the probability of encounter with a deployed MHK device.”
Lead Principal Investigator (PI): Dr. Gayle Zydlewski, University of Maine
Funding Requested: \$393,593
- “Assessment of Potential Impact of the Magnetic Field from Undersea Cable on Migratory Fish Behavior.”
Lead Principal Investigator (PI): Dr. Rob Kavet, Electric Power Research Institute, Inc.
Funding Requested: \$400,000
- “Informing a Tidal Turbine Strike Probability Model through Characterization of Fish Behavioral Response using Multibeam Sonar Output.”
Lead Principal Investigator (PI): Dr. Mark Bevelheimer, Oak Ridge National Laboratory
Funding Requested: \$150,000
- “Measuring changes in ambient noise levels from the installation and operation of a wave energy converter in the coastal ocean.”
Lead Principal Investigator (PI): Dr. Sarah K. Henkel and Dr. Joe Haxel, Oregon State University
Funding Requested: \$149,613
- “Marine Mammal Behavioral Response to Tidal Turbine Sound.”
Lead Principal Investigator (PI): Dr. Brian Polagye, University of Washington
Funding Requested: \$399,572
- “Using Multiple In Situ Approaches to Assess Fish Communities and Their Connectivity in the Vicinity of Natural Rocky Outcrops and an Adjacent Active WEC Site in the Pacific Northwest.”
Lead Principal Investigator (PI): Dr. Sarah K. Henkel, Oregon State University
Funding Requested: \$397,381
- “Effects of EMF Emissions from Cables and Junction Boxes on Marine Species.”
Lead Principal Investigator (PI): Dr. Manhar Dhanak, Florida Atlantic University
Funding Requested: \$399,469

Projects Analyzing Environmental Effects of Surrogate Technologies:

- “Evaluating The Potential For Marine And Hydrokinetic Devices To Become Artificial Reefs Or Fish Aggregating Devices Based On Analysis Of Surrogates In Tropical, Subtropical, And Temperate U.S. West Coast And Hawaiian Coastal Waters.”
Lead Principal Investigator (PI): Dr. Sharon Kramer, H.T. Harvey & Associates
Funding Requested: \$74,502
- “Impacts of electromagnetic fields associated with marine and hydrokinetic surrogate technologies on fish movements and behaviors.”
Lead Principal Investigator (PI): Dr. Daniel J Pondella II, Vantuna Research Group
Funding Requested: \$69,935

Appendix 3. NOPP Solicitations in Fiscal Year 2013

FY 2013 DOE Broad Agency Announcement #DE-FOA-0000816

- Fish Behavior and Mortality Around Hydrokinetic Turbines
- Environmental Monitoring of MHK Projects
- Analysis of Environmental Effects of MHK Surrogate Technologies

FY 2014 ONR Broad Agency Announcement #ONR-BAA-13-011

- Advancing Air-Ocean-Land-Ice Global Coupled Prediction on Emerging Computational Architectures

FY 2014 NOAA Broad Agency Announcement #NOAA-NOS-IOOS-2014-2003803

- Demonstrating a U.S. Marine Biodiversity Observation Network (Marine BON)

Abbreviations

BAA	Broad Agency Announcement
BOEM	Bureau of Ocean Energy Management
BON	Biodiversity Observation Network
DOE	Department Of Energy
EBM	Ecosystem-Based Management
FACA	Federal Advisory Committee Act
FFO	Federal Funding Opportunity
FROEWG	Federal Renewable Ocean Energy Working Group
FY	Fiscal Year
IWG-FI	Interagency Working Group on Facilities and Infrastructure
IWG-OP	Interagency Working Group on Ocean Partnerships
M	Million
MARES	Marine Arctic Ecosystem Study
MHK	Marine and Hydrokinetic
NASA	National Air and Space Administration
NGOs	Non-Governmental Organizations
NOAA	National Oceanic and Atmospheric Administration
NOC	National Ocean Council
NOPP	National Oceanographic Partnership Program
NORLC	National Ocean Research Leadership Council
NOSB	National Ocean Sciences Bowl
NSF	National Science Foundation
NSTC	National Science and Technology Council
ONR	Office of Naval Research
ORAP	Ocean Research Advisory Panel
PL	Public Law
RFP	Request for Proposals
RODEO	Real Time Opportunity for the Development of Environmental Observation
SOST	Subcommittee on Ocean Science and Technology
STEM	Science, Technology, Engineering, and Mathematics
SUS	Subcommittee on Unmanned Systems
TFORT	Task Force on Ocean Exploration and Undersea Research Technology and Infrastructure
UAVs	Unmanned Aerial Vehicles
UUVs	Unmanned Undersea Vehicles