PRIORITIES FOR THE ADMINISTRATION

ORAP

Ocean Research Advisory Panel

A United States Federal Advisory Committee

ORAP MEMBERS

TABLE OF CONTENTS

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INTRODUCTION

WHO WE ARE The Ocean Research Advisory Panel (ORAP) is a non-federal statutorily established committee appointed by the Secretary of Defense in accordance with the Federal Advisory Committee Act. The ORAP provides independent advice and recommendations to the heads of federal agencies with ocean-related missions. Together these currently operate as the National Ocean Council and promote the national goals of assuring homeland security, advancing economic development, protecting quality of life, and strengthening ocean science education and communication.

As a maritime nation, with more ocean area in our Exclusive Economic Zone than in our terrestrial 50 states combined, the United States depends more than ever upon the ocean, coasts, and Great Lakes for its national and economic security, food, recreation, and energy. A strong ocean economy is key to a strong overall economy. Yet the ocean resources of the past are no longer guaranteed to be the ocean resources of the future. The U.S. faces increasingly complex challenges and opportunities in responding to growing pressure on marine resources, global competition in ocean research and exploration, and either aging or non-existent ocean and coastal research infrastructure. To make our federal investments in these areas "smarter," maximize their collective benefits and ensure the security of our coasts, ORAP submits the following recommendations for the administration:

1. Sustain America's leadership position in science and technology on the world stage by building a workforce that excels in science, technology, engineering, and mathematics and investing in the innovative technology required to address the challenges we face with regard to marine and freshwater resources, energy production and use, and economic development;
2. Increase our nation's competitiveness by rebuilding and enhancing our nation's research infrastructure in the ocean and along our nation's coasts and Great Lakes, from ocean observing platforms to research vessels and laboratory facilities;
3. Enhance our ability to provide energy and food security by providing the knowledge needed to access marine and freshwater resources, including fisheries and aquaculture, offshore oil and gas, and wind and wave energy in a sustainable and responsible fashion;
4. Promote a safe and healthy human population by providing the environmental intelligence needed to ensure clean drinking water and reduce impacts from ocean acidification, storm inundation, and harmful algal blooms; and
5. Commit the resources needed in key regions that face acute pressures on ocean and coastal resources: the Great Lakes, Gulf of Mexico and the Arctic.


(Robert Schwemmer/ CINMS/ NOAA)

OCEAN SCIENCE & TECHNOLOGY

Sustain the U.S. Lead in Ocean Science & Technology and the New Blue Economy

OUTCOME A highly trained workforce and robust ocean research, exploration, and observing capabilities will ensure that the U.S. sustains - and increases - its leadership in ocean and coastal science and technology.

RATIONALE The U.S. faces ever-increasing competition within the global scientific community. We must maintain - and continue to build upon - our leadership position in ocean science and technology by developing a diverse workforce that excels in science, technology, engineering, and mathematics (STEM), in addition to investing in the innovation and technology required to address the challenges we face with regard to marine resources, energy production and use, and economic development. Global leadership in ocean science and technology is tied to our ability to produce and retain superior students in the STEM disciplines. The U.S. has led the world in science and engineering by investing the most of any country in research and development and producing the most advanced science and engineering degrees. Asian countries are quickly closing that gap, especially China and South Korea. Moreover, it is no longer the case that students from those countries remain in the U.S. upon the completion of their degrees. We must become again the destination of choice for the best and the brightest scientific minds. The success of our K-12 education in the STEM disciplines is lagging behind other developed nations (20th in mathematics and 27th in science), as are our federal investments in research and development. If these trends are not reversed it is inevitable that we will be surpassed as the nation with the most intellectual capacity in the world.

We must also be prepared to take leadership in the new Blue Economy - a knowledge-based economy, looking to the sea not only for extraction of energy, food, and mineral resources, but also for the data and information needed to address a range of inter-related economic challenges. Ships transiting the newly available Arctic routes require better seasonal sea ice predictions. Improved prediction of current structure (and rogue waves) throughout the global ocean can save fuel costs and make passage safer for cruise lines and container ships. Forecasting the intrusion of upwelled low-pH water can help shellfish hatcheries respond to increased ocean acidification. Real-time observations of the deep ocean circulation are needed for effective oil spill response and recovery. Providing this "Blue Economy" information can become a new economic boost for our nation.


(Robert Schwemmer/ CINMS/ NOAA)

OCEAN SCIENCE & TECHNOLOGY

Sustain the U.S. Lead in Ocean Science & Technology and the New Blue Economy

OPPORTUNITIES FOR THE ADMINISTRATION

1. Make ocean science STEM education, outreach, and extension (EOE) a priority within federal agencies, including mission-driven agencies, and ensure collaboration across federal investments by designating a lead federal agency for ocean science education.
2. Encourage the private sector and government agencies at all levels to work collaboratively with vocational training centers, two- and four-year colleges and universities to retrain and retool our existing workforce, thereby catalyzing economic development and interest in our oceans and Great Lakes, and maximizing the impact of federal investments.
3. Create additional incentives for private sector investments in technology development with public -private programs such as the National Science Foundation's Ocean Observatories Initiative, the Integrated Ocean Observing System (IOOS) Ocean Technology Transition Project, and monetary prize programs such as the XPRIZE to accelerate the development of and transition to operations of sensors, autonomous vehicles, and other observing technologies.
4. Work with international partners to develop and support international programs of mutual interest (e.g. the Galway Declaration on Atlantic Ocean Cooperation and the Belmont Forum).
5. Review and strengthen cooperation and communication processes among federal, state, and private entities to benefit ocean research and education.

(Lieutenant Elizabeth Crapo/ NOAA Corps)

RESEARCH INFRASTRUCTURE

Rebuild and Enhance Our Nation's Ocean, Coastal, and Great Lakes Research Infrastructure

OUTCOME Ocean, coastal, and Great Lakes research infrastructure will be considered a critical part of the nation's infrastructure portfolio. Our nation will have the ocean observing platforms, research vessels, and laboratory facilities essential to meeting the needs of the ever-expanding Blue Economy.

RATIONALE Gaps in our nation's ocean observing infrastructure limit weather forecasting capabilities for agriculture production and energy consumption, prediction capabilities for the nation's shipping industry, improvements to search and rescue and oil spill response efforts, and economic development. While federal investment in the U.S. has not kept pace with inflation, competitors (in particular China and the European Union, but also South Korea and Japan) have, over the last decade or more, substantially increased funding for ocean research, education, and research infrastructure. These increases have funded new ships, observing platforms, sensor and instrument development, and shore-side research and education facilities. For example, when the ships already in construction are complete, China alone will operate well over 50% of the global oceangoing research fleet, with additional construction planned over the coming decade. China has also constructed multiple new ocean research campuses that rival - or even exceed - the best facilities available in the U.S.

OPPORTUNITIES FOR THE ADMINISTRATION

1. While progress has been made, critical gaps in our observing infrastructure remain to be filled if the U.S. is to retain its leadership in ocean science. These deficiencies are found in the nation's earth-observing satellites and network of land-based coastal high-frequency radars, autonomous vehicles (gliders and drones), and moored buoys that support energy development, promote safe and efficient commerce, sustain fisheries and aquaculture resources, and aid prediction, preparation and response to coastal hazards such as flooding and erosion.
2. Investments must be made in shore-side capabilities through the National Science Foundation's major facilities program and in the oceanographic research fleet. In particular the incoming administration must continue efforts to "right-size" and modernize the U.S. research fleet, extend the lifetime of global class vessels (and initiate timely construction of replacements), and accelerate plans for new icebreakers. At present U.S. research efforts in high latitudes (Arctic and Antarctic) are increasingly dependent upon foreign icebreakers. The same dependency is true with respect to search and rescue capability at a time when Arctic ship commerce is increasing. Federal investments in laboratory facilities must be made to ensure they have the technical capacity to be globally competitive.


(Pat Kight/ Oregon Sea Grant)

NATIONAL SECURITY

Increase National Security by Ensuring Energy and Food Security

OUTCOME The U.S. has a sustainable supply of energy and food to support its needs, thereby increasing national security.

RATIONALE We can enhance our ability to provide energy and food security in a sustainable and responsible fashion by ensuring there is adequate knowledge needed to access U.S. ocean resources from fisheries to aquaculture, to offshore oil and gas, and to wind and wave energy in a sustainable and responsible fashion. The ocean represents an immense resource for both renewable and non-renewable energy. Our nation produces about 70 million gallons of oil every day from offshore fields, and is estimated to have 200 billion gallons of additional proven offshore oil reserves. This does not include billions more of unproven but likely reserves. These resources could be significantly augmented with the immense resource potential of tidal, wave, and current energy. If only a small fraction (<10%) of the tidal, wave, and current energy in the ocean that is directly adjacent to our country was captured, we could substantially reduce our dependence on foreign oil.

The ocean's role in food safety and security is critical. Recent conflicts throughout the world illustrate the relationship between food scarcity and social and political instability, whether caused by drought conditions, changes in fish distributions and abundance, or threatened freshwater sources due to saltwater intrusion or coastal erosion. The ocean provides 20% of the animal protein that Americans depend on for food. Over 90% of that seafood is imported from other countries around the world. This number continues to rise in order to meet consumer demand. A significant portion of this imported seafood is caught by American fishermen, exported overseas for processing, and then imported back to the U.S.

Aquaculture not only provides protein, but also creates jobs and supports other business sectors. Every $1 of seafood sales returns an estimated $2.63 to the local economy. With an estimated 80% of the U.S. farmed seafood consumption imported, the resulting $14 billion seafood deficit moves potential jobs overseas and threatens our nation's food security.

OPPORTUNITIES FOR THE ADMINISTRATION

1. Identify and fund the ocean observation platforms critical to sustainable development of both renewable and non-renewable energy resources, as well as seafood and aquaculture resources.
2. Provide financial incentives for ocean renewable energy development and production.
3. Increase and sustain basic ocean research as an essential component of the nation's research program in order to increase our ability to forecast change, resulting in more informed decision-making for commercial and recreational fisheries, future aquaculture development, and offshore oil and gas and renewable energy development and transportation.


(Norman Kuring/ NASA)

ENVIRONMENTAL HEALTH

Provide the Environmental Intelligence Needed to Ensure a Safe and Healthy Human Population

OUTCOME Americans can be confident that the water they drink is clean, the fish and shellfish they consume are free from pathogens and toxins, and that they are prepared for coastal storms and flooding.

RATIONALE A safe and healthy human population depends on clean drinking water and a sustainable non-toxic supply of high-quality protein (much of which is provided by fish and shellfish), as well as appropriate awareness and preparedness for coastal storms and flooding events. We need the scientific knowledge to forecast and then respond to or prevent impacts from ocean acidification, harmful algal blooms and increasing amounts of plastic beads that can result in pathogens and toxins affecting shellfish and other fishery resources, pollution affecting drinking water and fish and wildlife habitat, and storms and flooding that can devastate coastal communities.

OPPORTUNITIES FOR THE ADMINISTRATION

1. Create better linkages between ocean science and human health issues to ensure greater data and information distribution in management and decision-making.
2. Develop monitoring and forecasting systems for coastal inundation, ocean acidification, harmful algal blooms, plastic microbeads, and beach and drinking water pollution.
3. Strengthen federal programs to prevent the importation of new invasive species, and sustain the successful monitoring and control efforts already underway (e.g., in the Great Lakes under the Asian Carp Control Strategy Framework).
4. Examine the framework and methodology of existing models, such as the Great Lakes, Everglades, and Chesapeake Bay restoration initiatives that encourage federal agencies to partner with states, municipalities, tribes, universities, and other organizations to enable research constrained by the lack of new funding.

(Chief Petty Officer David Mosley/ USCG)

CRITICAL REGIONS

Provide Critical Investments in Key Regions of the U.S.: the Great Lakes, Gulf of Mexico, and the Arctic

OUTCOME Key regions of the U.S. oceans, coasts, and Great Lakes that face increased pressures from multiple stressors receive the scientific research and observations needed to address growing issues.

RATIONALE The Gulf of Mexico region is a major producer of petroleum and natural gas, supplies much of the nation's seafood, has a significant coastal tourism industry, and is heavily involved in the marine transportation industry. Threats to these economically important industries make them vulnerable to natural, economic, and technological disasters. Hurricanes, nuisance flooding, land subsidence, and sea level rise will continue to negatively impact coastal communities. The 2010 Deepwater Horizon Oil Spill was the nation's largest environmental disaster and underscored the importance of providing petroleum and natural gas to the nation using processes that lower the risk of future oil spills.

The U.S. Arctic is rapidly and dramatically changing, which makes it challenging for indigenous residents, resource managers, and others to make choices about how best to manage development, transportation, and other land and water uses. Basic infrastructure and investments are needed to support the changing and growing uses of this region, especially given diminished sea ice and consequent lengthening of the ice-free season, growing international interest in shipping, energy development, mining, and fisheries.

The Great Lakes account for about 95 percent of the nation's fresh water and 20 percent of the world's freshwater resources. More than 40 million people in the U.S.-Canada Great Lakes region rely on the lakes for drinking water. In addition, a significant portion of the population benefits from the commerce and business that depend on the Great Lakes waters, including 1.5 million people whose jobs are directly connected to the Great Lakes in industries such as manufacturing, tourism and recreation, commercial and sport fishing, electrical power generation, and shipping.

OPPORTUNITIES FOR THE ADMINISTRATION

1. Work with the existing restoration programs resulting from settlements following the Deepwater Horizon oil spill to develop a sustained ocean observation program for the Gulf of Mexico, a priority area for offshore oil and gas production and development.
2. Develop baseline research and observing capabilities in the Arctic to include replacement of the U.S. fleet of icebreakers, satellites, buoys to collect meteorological and ocean acidification data, and autonomous vehicles for surface and water column observations.
3. Enhance international cooperation and remove barriers to cross-nation collaborations related to Arctic research to improve our understanding of changes in the Arctic.
4. Continue support for the Great Lakes Protection and Restoration Platform and initiate construction of additional Great Lakes fisheries research vessels.
5. Support socioeconomic research to monitor, quantify, and verify the social and economic benefits derived from the Great Lakes while ensuring its protection.

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