

**Written Testimony of
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**Legislative Hearing on H.R. 1489, the “Coastal Ocean Observing
System Integration and Implementation Act of 2005,” before the
Subcommittee on Fisheries and Oceans
Committee on Resources
U.S. House of Representatives**

April 19, 2005

Good morning, Mr. Chairman and members of the Subcommittee. I am Richard W. Spinrad, the National Oceanic and Atmospheric Administration’s Assistant Administrator for Ocean Services and Coastal Zone Management, National Ocean Service. I serve as the U.S. representative to the Intergovernmental Oceanographic Commission and the NOAA representative to the committee overseeing Ocean.US, the interagency office developing plans for the Integrated Ocean Observing System (IOOS). Within NOAA, I co-chair the NOAA Ocean Council, which is one of two NOAA-wide bodies focused on the coordination of observing system activities. I was recently named a Co-Chair to the interagency Joint Subcommittee on Ocean Science and Technology.

I appreciate this opportunity to discuss NOAA’s role and coordination efforts in the development of an integrated ocean observing system. Comments on the draft legislation that accompanied your letter of invitation are located near the end of this written statement.

NOAA manages a diverse yet interrelated suite of federal programs. Of particular interest to this Subcommittee is NOAA’s specific expertise in ecosystem approaches to marine resource management and information services supporting safe and efficient marine commerce and transportation. Our coral, sanctuary, estuarine, fisheries and coastal management, protected resources and other ocean-related programs are premised on partnerships, outreach, and training. Our technical and scientific experts provide services including geospatial information and nautical charting, coastal and fisheries research, living marine resource monitoring and assessment, hazard response, protected species and habitat restoration, and coastal forecasting and real-time observations. While national in scope, all of these programs rely on engaging and responding to regional and local needs and interests.

Ocean observing systems advance our scientific understanding, enhance forecasting capabilities, and provide products and services that are essential for balancing the use and conservation of the marine environment. The societal goals outlined for the sustained Integrated Ocean Observing System (IOOS) in the U.S. Ocean Action Plan are:

- Improved understanding of climate change and its socio-economic consequences;

- Improved safety and efficiency of marine operations;
- More effectively mitigating the effects of natural hazards such as tropical storms;
- Reduced public health risks;
- Protecting and restoring healthy marine ecosystems more effectively; and
- Improved ecosystem-based management of natural resources.

IOOS will integrate existing local, regional, and national capabilities into a seamless network of observations, data management, products, and services. IOOS will support development and use of the latest technological advances and capabilities to reduce risks, mitigate harm, and promote the safety of people, property and the environment. IOOS data and services will provide first responders and commercial interests with information to make more timely and informed decisions. The success of operational, demonstration, and pilot systems has become a primary driver of the growing interest and support for the development of a more comprehensive system.

The users and beneficiaries of IOOS include everyone who uses our marine waters from the tanker operator to the recreational boater, from the fisher to the beach-goer. IOOS will facilitate trade and commerce, allowing vessels to more safely navigate increasingly congested ports, harbors and waterways. It will directly benefit nearly half our population. Our burgeoning coastal areas will have improved forecasts and warnings, mitigating vulnerability to storms, enhancing security and protecting public health. It will improve the management of fish stocks and protected species through enhanced ecological forecasting. Ultimately IOOS will benefit all Americans. For example, a farmer in the Midwest will be able to use IOOS data to more efficiently plant, store and transport crops.

In addition to meeting the ocean observing needs of the United States, IOOS benefits will extend internationally. IOOS will be a major U.S. contribution to the international Global Ocean Observing System (GOOS), as well as to the U.S. Integrated Earth Observation System (IEOS), both of which are substantial components of the international Global Earth Observation System of Systems (GEOSS). GEOSS seeks to integrate ocean, atmospheric and terrestrial systems.¹ The Administration supports and is actively promoting GEOSS. Almost four years ago, President George W. Bush stated that: *“An integrated earth observation system will benefit people around the world . . . our nations will develop and link observation technologies, . . . which will allow us to make more informed decisions affecting our environment and economies.”* The U.S. and NOAA have provided strong leadership to this international effort and in February nearly 60 nations agreed to the GEOSS implementation plan at the third Earth Observation Summit in Brussels, Belgium.

The Need for an Integrated Ocean Observing System

The Nation’s coastal areas are home to essential ecosystems, intensive economic activity and major population centers. IOOS is needed to help understand these complex interactions and mitigate and ameliorate unforeseen impacts. Over half the U.S. population lives in coastal watershed counties, and about half of the nation’s Gross Domestic Product (GDP)— some \$4.5 trillion — and 60 million jobs are generated in coastal watershed counties. Almost half of the GDP is generated in coastal watershed counties, and more than one-third of the GDP is generated in those counties in which states operate their Coastal Zone Management programs. The

nearshore area, which makes up 4 percent of the Nation's land, produces more than 11 percent of the nation's economic output.² About 75 million Americans are directly involved in on-the-water activities and 90 percent of international trade by weight is carried by sea. On a global scale, over 25 percent of the world's energy is produced within nations' exclusive economic zones, which also yield approximately 90 percent of all fish landings.³

But pressure on the marine environment is mounting:

- According to some estimates, up to 12,000 square miles of the Gulf of Mexico regularly becomes hypoxic, or abnormally low in oxygen, in the summer months.⁴
- Thousands of beach closures and swimming advisories are issued annually.⁵
- Of the 267 major fish stocks in the U.S., which represent 99 percent of total commercial landings, approximately 19 percent are either currently overfished, or are currently experiencing overfishing.⁶
- Over 500 invasive species are now established in North American coastal habitats.⁷
- Harmful algal blooms cost the U.S. an average of \$49 million each year due to fisheries closures, loss of tourism and recreation, and increased health care and monitoring expenses.⁸
- Roughly 1,500 homes will be lost to erosion each year, on average, for the next several decades.⁹

Several completed and preliminary studies have examined the regional economic drivers that may influence or be influenced by IOOS. Preliminary results of these investigations have provided insights into how the private sector views and uses environmental information. They indicate that IOOS environmental data supports fundamental societal needs. A few examples from these investigations include:

- Installation of flood control measures is estimated to prevent approximately \$22 billion worth of damage annually and every dollar invested in flood control is estimated to prevent almost six dollars in damage.¹⁰ Improved observations will provide more timely and accurate predictions, leading to even more savings on investments in flood control.
- Current projections estimate a four-fold increase in foreign trade value by 2020, with inland waterway traffic increasing by one third.¹¹ At least half of all commercial ocean transits today use weather-based vessel routing services, saving on the order of \$300 million in transportation costs annually.¹² IOOS will result in more timely and accurate weather and oceanographic services, further reducing transportation costs.
- Hurricanes and other severe weather events impose significant costs on energy production by adversely affecting marine operations and the transportation of supplies and personnel. Improved storm track and landfall forecasts will result in fewer unnecessary evacuations and potentially save off-shore companies as much as three days of production per shut-down, at an estimated savings of \$15 million dollars per day.¹³
- Many agricultural decisions could be improved with more reliable seasonal weather forecasts. One recent study found that by incorporating El Niño Southern Oscillation (ENSO) forecasts into planting decisions, farmers in the U.S could increase agricultural output and produce benefits to the U.S. economy of \$275-\$300 million per year.

Another study estimated that the value to society of ENSO forecasts on corn storage decisions in certain years might be as high as \$200 million — or 1 to 2 percent of the value of U.S. agricultural production. A third study on the costs and benefits of ENSO forecasts concluded that for agricultural benefits alone, the real internal rate of return for federal investments in ENSO prediction is between 13 and 26 percent.¹⁴

- Benefits of accurate, reliable and up-to-date IOOS data go far beyond improved forecasts. Even small improvements (on the order of one percent) in efficiency could enhance search and rescue operations, providing life and property savings in excess of \$100 million per year.¹⁵ Better information on the marine environment also reduces per event costs in responding to catastrophic spills of oil or other hazardous materials. While the benefit of IOOS in protecting our ports and harbors from intentionally disruptive acts has not been studied, IOOS will provide data to more safely and efficiently evacuate ports in time of emergency.
- In the tourism industry, \$100 to \$200 million in savings each year could be realized through more precise information on water quality and transport to better inform beach closure decisions and improve health and safety.¹⁶ Some preliminary work also suggests that annual benefits for recreational boating (e.g., better trip planning with marine conditions forecasts) would be in the tens of millions of dollars annually.¹⁷
- Ocean observations made far out at sea can also help ensure beach safety. Waves generated by a storm beyond the horizon can create unsafe beach conditions, leading to major injury or drowning. Wave action along the coast can also change the shoreline, resulting in beach erosion and loss of property such as houses and piers. Wave and surface wind observations from buoys, ships, and satellites provide information that enable more accurate forecasts, informing and alerting people and communities and improving their ability to determine and take appropriate measures to protect property.

NOAA's Role in the Integrated Ocean Observing System:

NOAA is a national and international leader in the development, operation and advancement of environmental observations and serves on national and international oversight, planning, and organizational bodies. NOAA has extensive expertise in the operation and maintenance of complex, operational meteorological and oceanographic observing, data management and information delivery systems. NOAA is also at the forefront in employing Internet technologies, technical training, outreach, and education to improve public awareness and assist decision-makers in bridging the gap between science and management.

International cooperation is the key to GEOSS. *Interagency* cooperation is the key to IOOS. Interagency coordination is a complex and time-consuming task; it requires commitment to a larger goal. It challenges individuals and long-standing institutions to experiment with more adaptive and innovative approaches; approaches that are essential for the successful administration and management of complex systems. Interagency development of an IOOS plan has taken several years. Led by Ocean.US, this process is built upon other interagency experiences, such as those employed to coordinate federal climate and satellite programs. The Administration's new interagency ocean governance structure as directed by President Bush under Executive Order 13366 and in the U.S. Ocean Action Plan is also premised on advancing

interagency cooperation. It establishes several new interagency committees, subcommittees and working groups.

A significant challenge to making IOOS successful is committing to a sustained and integrated system. A sustained system will allow the tracking of change over time and provide information necessary to measure the progress and success of management actions. Integration is critical in ensuring implementation of a holistic system that is more than the sum of its parts and that can be integrated into global efforts. As noted earlier, bringing together existing international, national, regional, State, and local capabilities is a daunting task. NOAA will continue to promote this integration and will utilize new technologies to continuously improve the ability to do so. While the challenges are significant, advances in data management and sharing protocols and improvements in communications and observation capabilities are providing an opportunity to achieve what was barely understood to be possible a generation ago.

NOAA's Ocean Observation Capabilities

NOAA's broad mission "to understand and predict changes in the Earth's environment and to conserve and manage coastal and marine resources" is matched by an equally wide-ranging array of observation programs. Today, NOAA maintains about 100 operational observing systems, comprised of nearly 30,000 deployed platforms or stations and measuring more than 500 different ecological, meteorological, oceanographic, and related parameters.

NOAA is improving coordination across its mission goals, with other federal agencies, and with the developing regional associations, to begin addressing the most pressing needs for implementing the data management and communications plan (DMAC) for IOOS. DMAC and system interoperability are the nuts and bolts required to truly integrate different observing systems. We are working to take critical first steps in demonstrating the best prospects for success in the integration of different ocean observing systems. We have recently established a NOAA IOOS manager and coordination group and an IOOS data management and communications (DMAC) focal point for NOAA. While working to synthesize our internal capabilities, we continue to work externally, engaging with other agencies and various regional and local stakeholders to bring all the observational resources together in an organized manner and build a system that takes advantage of existing assets while assessing gaps and prioritizing for future investment.

NOAA's Coordination Activities

NOAA has joined national and international partners in placing a priority on integrating Earth observations. We have created two internal councils that assist with NOAA-wide coordination of observing systems activities. The NOAA Observing Systems Council (NOSC) is addressing integration by providing recommendations on observing system requirements, architectures, and acquisitions to meet NOAA, national, and international observing needs. The goal is to develop a NOAA Observing System Architecture (NOSA). The NOAA Ocean Council (NOC) is focused on, among other issues, NOAA's capability to contribute to the operational national backbone requirements of the IOOS, ensuring connectivity across the IOOS and the Global Ocean Observing System and NOAA support for the National Oceanographic Partnership Program. These two councils will provide policy guidance for the NOAA IOOS Coordination Group as it

works to define the most effective strategies for implementing IOOS across NOAA and with federal agencies.

Defining IOOS

IOOS is both a system of systems and a system within a system. It is a part of the Global Ocean Observing System, which is in turn a part of the effort to globally integrate ocean, climate and terrestrial observations into GEOSS. As a part of GOOS, IOOS contributes both to global and coastal observation components. The coastal component of IOOS includes a national “backbone” of federal systems and will incorporate regional systems focused primarily on the coast.

National Coastal Components of IOOS

The national backbone provides a core set of observations that support national requirements and interests, including commerce, health and conservation. These core observations provide baseline data over a large area, but may not always provide high-resolution data to meet unique regional and local requirements. Primarily operated by the federal government, the national backbone will be enhanced to meet national objectives and will be augmented by the integration of regional observing systems.

NOAA and other federal agencies maintain backbone systems that provide observational data on a routine and sustained basis. NOAA systems include the National Data Buoy Center’s moored buoys, the National Water Level Observing Network, the Physical Oceanographic Real-Time System (PORTS®), GPS Continuously Operating Reference Stations, the National Estuarine Research Reserve System Wide Monitoring Program, satellite and remote sensing capabilities, as well as living marine resource surveys, hydrographic surveys, and various mapping and charting efforts. In addition to these NOAA systems, other federal agencies contribute to the national backbone, for example, the United States Geological Survey stream gages. The national backbone is the skeletal structure upon which integration with regional (and global) systems will be built.

Regional Framework

Regional associations will provide the framework for local collaboration. They will be responsible for the design and operation of regional coastal ocean observing systems (RCOOSs) and for integration within the larger IOOS. RCOOSs will be user driven and are designed to meet the needs of multiple regional interests. An association may have more than one RCOOS operating within its region. They will involve both data providers (scientists and technicians from both private and public sectors) and users (government agencies, for profit and nonprofit corporations, individual private citizens, researchers and educational institutions). Their two broad goals will be to ensure efficient provision of data and information that meets the localized needs of user groups, and to ensure each RCOOS operates within the agreed upon framework of IOOS.¹⁸ Initial criteria have been developed and will need to be met for an association to become “certified.” Currently no formally certified regional associations exist. Eleven regions have been recommended for coordination and organizational work.

The regional coordination efforts are following guidelines established through the interagency Ocean.US office, and are striving to meet the initial criteria established for certification:

- Documentation of a legal structure,
- Adoption of a membership policy,
- Creation of a governing board, and
- Direct involvement by users or their representatives, some of who may also provide similar data and information products.

Regional planning activities are occurring concurrently with efforts to support existing regional observing systems. NOAA's Coastal Observation Technology System and other IOOS-related efforts, Office of Naval Research and other federal, state, and locally funded observing projects and systems are engaged in this process. In addition to efforts to tie the existing systems together, the regional coordination groups are conducting outreach to stakeholders.

National and Regional Coordination

The complex process to integrate the national and regional components will take time. But the federal government and regional interests are taking steps towards realizing the "I" in IOOS. The efforts of Ocean.US and the multitude of contributors to the draft Initial IOOS Development Plan have us moving in the right direction. Regions are organizing, becoming better coordinated and involving stakeholders from all sectors. Ocean.US, NOAA, and regional groups are all seeking the participation of the private sector. As we work to integrate existing assets, we acknowledge the need for continual reassessment as we plan for the future. Ocean.US, the supporting federal agencies, and regional representatives will gather in early May for the 2nd Annual IOOS Implementation Conference. This annual meeting is the opportunity for the IOOS community to identify priority actions for coordinated development of the system.

Comments on H.R. 1489, the "Coastal Ocean Observing System Integration and Implementation Act of 2005"

The legislation accompanying your letter of invitation would establish a Coastal Ocean Observation System as a subset of a broader Integrated Ocean Observing System. In general, NOAA supports the purposes and objectives of this legislation and provides the following initial comments.

The bill defines and references the interagency National Ocean Research Leadership Council (NORLC). NOAA supports interagency coordination with respect to IOOS but notes that the NORLC coordinates only research. The requirements and purposes of IOOS extend beyond research and include operational systems and the delivery of products and services. In December the President issued Executive Order 13366 and released the U.S. Ocean Action Plan in response to the report of the U.S. Commission on Ocean Policy. Executive Order 13366 and the U.S. Ocean Action Plan outline a new interagency governance structure and subsequent steps have been taken to implement this structure. The new cabinet level Committee on Ocean Policy held its first meeting on April 6, 2005 and subordinate bodies also have convened initial meetings. The Administration will work with the Subcommittee to resolve and accommodate the future relationship between pre-existing institutions and the new governance structure. For the purposes of this testimony we will reference the "interagency committee" instead of the NORLC.

The bill relegates the interagency committee to a consultative role and does not acknowledge Ocean.US, which is the interagency IOOS planning office. The draft legislation vests most authorities to NOAA through the Secretary of Commerce. NOAA has and will continue to play a leadership role in the development of IOOS. However, consistent with the U.S. Ocean Action Plan, interagency coordination is essential for all ocean science and technology priorities and in particular for planning and implementation of IOOS. As such, an interagency body should provide high-level oversight for the IOOS, and an interagency program office should develop plans and requirements for that interagency body's ultimate approval. Each agency that participates in IOOS brings different capabilities and areas of expertise to the program. The roles and responsibilities of each agency need to be clearly defined and explicitly outlined. The Administration, through the Joint Subcommittee on Ocean Science and Technology of the National Science and Technology Council and the Committee on Ocean Policy, is currently working to address this issue.

Interagency cooperation has been essential in coordinating IOOS activities across the federal government. The legislation does not prohibit continuation of these interagency activities and it would be NOAA's intent to work through the interagency committee and to sustain Ocean.US as the interagency planning office. However, for the purposes of implementation and operation of IOOS, the Department and the Administration recognize the importance of having a clear point of accountability. As such, the Department and the Administration believe that NOAA should be the lead federal agency for the administration and implementation of IOOS.

The legislation uses the term "units of the system" not "regional associations" to identify entities that may have an operational function within the observing system. The regions have done a considerable amount of work toward establishment of a regional infrastructure for IOOS. The legislation does not prohibit this approach and it would be NOAA's intent to continue to work with regional interests, including designation of regional "units of the system."

Section 5 of the draft legislation authorizes the Secretary to "designate units of the system," including designating other federal agencies that operate observing systems as units. As worded, the legislation may suggest or imply encroachment by the Department of Commerce upon the functions and observing programs of other agencies. This approach is not consistent with the ongoing cooperative interagency effort in support of IOOS. We recommend clarifying the legislation to indicate that designation of federal systems as units of IOOS provides the Commerce Department no authority over other agencies or the systems they operate, and that other federal agency systems are not subject to the criteria for designation provided for in Section 5(b). NOAA recommends separating the designation of other federal agencies from the designation of non-federal units, and that the interagency committee have the authority to designate the federal units.

Section 6(c) provides that the Secretary shall ensure data collection activities conducted through the system "do not compete with private sector activities." This language could have significant and unintended consequences on the ability of the federal government to independently conduct coastal observation activities, including issuing forecasts and warnings to protect public health, safety, infrastructure, and the environment. Under Section 5(a), federal agencies may be

designated as units of the system. If designated, observation activities of such agencies could be challenged as improperly competing with similar private sector activities. Additionally, such language could limit the type of information and products regional associations are able to develop, since they would be precluded from activities that compete with private sector entities that are not part of the system. NOAA recommends the bill clarify the intent and scope of this section and is willing to assist the Subcommittee in such an effort.

Section 7 of the draft bill extends federal protections from certain civil liabilities to designated units of the system. Last year, the Department of Justice opposed similar language in a Senate bill because it concluded the language threatened a significant expansion of federal liability with inadequate federal control over the regional associations or their employees. NOAA and the Department of Commerce are willing to work with the Subcommittee to develop alternative language to address the need to provide liability protections for designated units. We recommend developing criteria, standards, and protocols under Section 5 of the bill that would provide adequate federal control and oversight, which would severely curtail risk to the government.

Section 10 authorizes the Secretary to develop the process for funding the transition of technologies from research to operations. It should be made clear that this section applies only to those activities funded under this Act, and that this section does not include other research, including existing activities conducted by NOAA and other agencies. Section 10 limits research funding to only research supporting development of new data collection technologies. Federal agencies, including NOAA, support other IOOS-related research. NOAA and the Department of Commerce recommend that this section be clarified to mean that any restriction to research on new data collection technologies would apply only to research funded through the authority of the legislation, not other IOOS-related research.

Section 11 on Contracts and Grants does not provide the authority needed to achieve the objectives of the draft legislation. NOAA and the Department of Commerce agree that contracts, agreements and grants are required tools to implement a system that by definition will rely on interagency and external partnerships. As drafted, however, the language could unintentionally restrict NOAA's activities. Of particular concern are the use of the term "cooperative agreements," and the restriction that the Department may only enter into contracts, agreements or make grants to designated units of the system. This requirement is not consistent with Sections 9 and 10 of the bill. First, these sections foresee that the Department will provide grants to support research and pilot efforts being conducted by institutions that may not be designated units of the system such as academic and other institutions for research and pilot-related activities. Second, the Department requires authority to enter reimbursable agreements with other entities whether they are units of the system or not.

The bill does not provide the larger context or otherwise recognize the ongoing international efforts for GOOS and GEOSS to which IOOS will contribute. The Administration supports broader objectives for development of a Global Earth Observation System of Systems (GEOSS) as reflected in documents and subsequent actions emanating from the first-ever Earth Observation Summit held in Washington, D.C., on July 31, 2003. NOAA recommends including some reference to these efforts in the purposes of the legislation.

Concluding Remarks

The evidence that IOOS benefits will exceed its costs is mounting. We have the science and technology to implement a system and are committed to continued research and development to enhance the system's capabilities over time. NOAA will continue to work internally, with other agencies, and with the full range of international and regional governmental and nongovernmental partners to advance a sustained and integrated system. Reaching concurrence on governance issues—defining roles and responsibilities, communication, cooperation, and coordination—now is holding our intention. Internally NOAA has established new governance mechanisms (NOSC, NOSA, NOC, etc.). Externally NOAA is supporting the new infrastructure outlined in the U.S. Ocean Action Plan, Ocean.US, and the efforts of regional interests to coordinate their interests and systems.

Mr. Chairman, this concludes my testimony. I would be pleased to answer any questions that you or other Members may have.

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¹⁵ Kite-Powell, H., C. Colgan, and R. Weiher. The Economics of Sustained Ocean Observations. March, 2002.

¹⁶ Weiher, R. Preliminary results of an ongoing research effort (subject to revision).

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