

**Written Testimony of**

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**Before the  
United States House of Representatives  
Committee on Natural Resources  
Subcommittee on Fisheries, Wildlife, Oceans and Insular Affairs**

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**Hearing on: HR 2219 – An Act to Reauthorize the Integrated Coastal Ocean Observing Act of 2009. ,  
and HR 1399, A Bill To Reauthorize the Hydrographic Services Improvement Act**

Chairman Fleming, Ranking Member Sablan , Members of the Subcommittee, Ladies and Gentlemen,

Thank you for inviting me to talk about the reauthorization of the Integrated Coastal Ocean Observing Act of 2009, and the reauthorization of the Hydrographic Services Improvement Act.

My name is Edward J. Kelly, and I am the Executive Director of the Maritime Association of the Port of New York and New Jersey, an organization that represents over 500 paid members of the commercial maritime industry in the port, and has been presenting maritime information of the Harbor of NY/NJ to the public since 1873. I am also the Vice Chair of the Mid-Atlantic Regional Association Coastal Ocean Observing System (MARACOOS), one of 11 regional associations that comprise the non-federal component of the U.S. Integrated Ocean Observing System (IOOS).

I am grateful for the opportunity to tell you about what IOOS does for the maritime sector, with a particular focus on the Mid-Atlantic—as an example of what regional associations and their partnerships are doing—as well as what IOOS needs to be doing for us in the future for the economy and overall well-being of society. Additionally, I am pleased to confirm the vital role of NOAA’s Hydrographic Services.

The Mid-Atlantic region extends from Cape Cod to Cape Hatteras, 1000 kms (600 miles) and encompasses 10 states (Massachusetts, Rhode Island, Connecticut, New York, New Jersey, Pennsylvania, Delaware, Maryland, Virginia, North Carolina), and the District of Columbia. It includes 76 million people (about 25% of U.S. population), and is the region with the highest coastal population density in the United States. The Mid-Atlantic region includes 5 major estuarine systems, including the largest in the nation (Chesapeake Bay), the largest petroleum hub on the East Coast (NY/NJ), the largest naval base in the world at Norfolk Naval Station, 23% of U.S. waterborne commerce, commercial fishing catch exceeding \$1.2 billion, and tourism earnings for coastal counties approaching \$200 billion, and the offshore wind energy potential at about 330 Gigawatts (GW), potentially enough to power DC and 9 other states. We also face challenges from a century of industrialization, a growing coastal population, ongoing threats from tropical storms and nor’easters, and growing demands on the nation’s most congested electrical power grid. In other words, we have a lot going on in our region with a lot of potential for future growth, with many jobs and our economy dependent on the viability of our safe and efficient operations in the maritime space.

In my role in the maritime/ports community, I see on a day-to-day basis, the increasing traffic in tankers, container ships, fishing vessels, tugs and cargo ships that visit the Port area. Last year the NY/NJ Port handled 9,746 deep-draft vessel arrivals/departures, and the US Coast Guard Sector reported that our Port had over 400,000 vessel transits which include tugs, barges, ferries, excursion vessels, municipal craft, regulatory craft and recreational boats. In addition to the natural growth we are experiencing, when the Panama Canal Expansion Project is completed in 2015, we expect to experience increases in both the size and number of ships calling at East Coast ports.

The U.S. Department of Transportation estimates that the total value of marine freight is predicted to increase by 43% domestically and 67% internationally between 2010 and 2020. With an increase in ferry passenger transport, commercial fishing, military use, and recreational use as well, there is a clear need to manage in a way that handles these increasing demands so that freight and people move efficiently and safely.

Water transport remains the cheapest, and the most environmentally friendly way to move both people and freight, with the smallest impact on infrastructure. In order to maximize the benefits of water transport, we must find ways to operate our increasingly congested waterways in a safe manner.

The public often take for granted the complicated steps involved to get goods to arrive in our shops, or in this day and age of home delivery, right on our door steps. You may have heard in previous testimony that 95% of cargo enters this country in the hold of cargo ships that call our ports. This means jobs and a strong economy not just for the Ports of New York and New Jersey, but as well for the hinterland communities across the nation.

As the 3<sup>rd</sup> largest port system in the US and the largest on the East Coast, the effective and efficient operation of the Port of New York and New Jersey rely on the data and information products that are generated by IOOS and related programs, such as the Physical Oceanographic Real-Time System, or PORTS.

To maintain and grow jobs and our economy into the future, it is critical that we maintain the foundation for a safe and efficient marine transportation system by not only maintaining the data and information products that we rely on today, but also by investing in the future of that data and information. This means significantly investing in IOOS and its ability to leverage and support multiple programs across the nation, like the PORTS program.

#### Importance of Data and Information Products

An important part in managing our marine transportation system is the data and information products used by the vessel operators. Improved data on currents, water levels, temperatures that feed into integrated navigational products for shippers support the safe transport of goods in our increasingly congested waterways. Helping us to understand and interpret the physical parameters of the maritime environment is a central part of what IOOS does. Currently, the maritime industry relies on the Physical Oceanography Real-Time System (PORTS) that was created before the establishment of the IOOS Program. Now that IOOS regions are producing additional datasets, models, and data products, PORTS needs to enhance and improve its program outputs through the incorporation of these products. To date, PORTS has not undertaken this critical modernization. Both funders and users of the present PORTSs recommend that the community revisit the Concept of Operations to develop a PORTS of the Future that leverages the IOOS-enabled maritime domain. IOOS can significantly improve PORTS.

The safe navigation of our coastal oceans and harbors is highly dependent on the availability of location-specific, real-time, and projected environmental data. IOOS partners are uniquely situated to provide such data which can then be standardized, consolidated, and used to create dynamic situational awareness, as

well as to create forecasting models for near-time usage. When combined with NOAA's existing Hydrographic Service products, a full suite of vital data can be made available to commercial mariners, recreational users, property managers, academics and others who have interest in the coastal marine environment. The key concept is to actively engage the IOOS community to develop a vibrant network of sensors and models that can be readily integrated and subsequently made available in user-friendly formats.

Specific implementation steps that are envisioned for the PORTS of the future require the data and information products that IOOS partners are able to provide. The importance of maritime transportation to the economy of this nation makes it imperative to invest in upgrades that equip the ports of this country such that we are the global standard. As a leader in information technology, data generation and assimilation, and modeling, it is critical for the United States to capture these capabilities for the benefit of one of its critical contributors to the economy—the ports and harbors of this nation. We need to enhance our information gathering capabilities.

Requirements include:

- (1) A broader array of water level gauges, current profile sensors, HF Radar surface current mapping networks, water property sensors, meteorological sensors and bridge airgap sensors for use in urbanized harbors.
- (2) New sensors in urbanized harbors, including navigation buoys and towers, and mobile platforms.
- (3) Improved communication networks for transmitting the data to shore-based data aggregation centers for quality control, processing and reformatting, and for transmitting data and model forecasts to ship-based operators.

We must operate continuously-updated atmosphere and ocean forecasts regarding future (out to 48-hours) conditions – weather, water levels, current, wave, temperature, salinity, etc., and improve data assimilation and accuracy of the forecasts.

What will the taxpayers receive for this investment?

- (1) Better forecasts and predictions based on quantitative analyses and ensemble modeling.
- (2) Leveraging of regional specificity into Federal model systems
- (3) MOST IMPORTANTLY, MORE COST-EFFECTIVE, SAFER, AND EFFICIENT MARITIME OPERATIONS.

The coordination hub for these activities is within IOOS and the 11 regional associations that comprise non-federal, federal, state and local government, and private sector partners operating on the front lines around the nation.

In the Mid-Atlantic region, MARACOOS – the Mid-Atlantic Regional Association Coastal Ocean Observing System has operated for the past 9 years, working together as data/forecast providers, users and funders under the theme of Safe Maritime Operations. As the mid-Atlantic component of the national IOOS, MARACOOS was established in 2004 as a non-profit (501(c)3) regional association of universities, government agencies, and private sector organizations to seek, discover, share and apply knowledge and understanding of our coastal ocean. MARACOOS serves ocean and coastal users and decision makers, by partnering/leveraging resources to provide them with data and decision tools to address their most critical challenges.

Ultimately, **MARACOOS partners** (as an example of how IOOS partners are operating around the nation) are:

→ **Helping protect lives, health, and property**

- **Promoting a strong economy and jobs**
- **Supporting a healthy environment**

MARACOOS partners are supporting these high level goals by leveraging investments and activities from across the region to:

### **1. Ensure maritime safety and resiliency through support for search and rescue as well as safe and efficient shipping.**

Specifically, MARACOOS is helping the U.S. Coast Guard save lives on Search and Rescue Missions:

- U.S. Coast Guard Search and Rescue responds to >28,000 incidents with >5,000 lives saved per year.
- USCG's Search and Rescue Optimal Planning System (SAROPS) relies on MARACOOS surface current data.
- MARACOOS data/forecasts reduces the Coast Guard 96-hour search area by 66%.
- USCG estimates 50 more lives will be saved/year after national implementation of current network.
- Benefits include: Decreased search area to 1/3 of standard USCG area with shortened search/rescue time; Increased chance of saving lives and property; Reduced taxpayer costs as a result of reducing the time a rotary-wing aircraft (\$9-14K/hour) is airborne or a cutter (\$3-15K/hour) is in a search area; and USCG assets can spend more time on law enforcement and homeland security missions.

MARACOOS is ensuring maritime and fishing safety and resiliency through:

- Advances in port and harbor maritime safety through data integration into NOAA PORTS system and use by harbor pilots.
- Improving fishing safety by partnering with recreational fishers and NOAA's National Data Buoy Center (NDBC) to deploy a weather buoy that provides ocean/atmosphere environmental data.
- Development of MyMARACOOS.org computer and smart phone application to support fishing safety

MARACOOS is helping NWS provide daily rip current guidance to protect swimmers and beachgoers:

- U.S. Lifesaving Association estimates rip currents as primary cause of drowning along U.S. coasts.
- NWS Weather Forecast Offices provide daily rip current guidance to lifeguards through rip current warning system.
- Accuracy of NWS rip current forecasts depend on MARACOOS nearshore wave and current models.

### **2. Helping maintain water quality for public health, tourism and the economy by tracking pollution**

Specifically, MARACOOS is collaborating and leveraging at all levels to support water quality product delivery:

- At the federal level, collaboration with the National Water Quality Monitoring Network resulted in the initiation of the Delaware Bay Pilot Project.
- At the state level, the NJDEP and USEPA are funding dedicated glider deployments that leverage IOOS investments in the region.
- At the county level, the same MARACOOS HFR network that serves the USCG is used to monitor river plumes to warn of possible water quality impacts on recreational beaches.
- At the local level, the Stevens Institute and its MARACOOS partners supported the City of New York and NJ beach management officials as they managed their response to 120+ million gallon sewage release in the Hudson River in July 2011 that impacted coastal waters and beaches along New York and New Jersey's coasts.

MARACOOS is helping improve water quality by identifying priority observations:

- Collaborating with the National Water Quality Monitoring Network enabled product development such as the University of Delaware MARACOOS satellite-based chlorophyll product that was used in late August this year to detect a large phytoplankton bloom off coastal New Jersey.

- In cooperation with NJDEP Marine Monitoring and a grant from USEPA Region 2 to support glider deployments that provided critical subsurface data.
- USEPA and NJDEP used MARACOOS modeling support from the Stevens Institute to build a 4D representation of the huge algal bloom that identified potential water quality impacts throughout the water column.

MARACOOS utilizes data to find source of medical waste:

- Surface current observations and regional ocean model forecasts successfully backtracked the source of medical waste discovered off of an Atlantic County beach.

### **3. Aiding the potential development of offshore wind energy by supporting siting and efficient maintenance**

The Mid-Atlantic region has great potential for offshore wind energy. The co-location of large coastal populations with Class 4 winds offshore make the Mid-Atlantic the most viable U.S. location for offshore wind energy to succeed. Many Mid-Atlantic States already have plans for offshore wind resource development, with some exceeding the national target of 20% renewables by 2030.

- MARACOOS assessed ocean observing needs of participants from offshore wind industries throughout the region
- Developers and regulators require improved understanding of the wind resource derived from high-resolution sea-breeze resolving forecasts, delivered as maps, and used as input to state GIS systems for wind farm site planning.
  - Local estimates of the wind resource and environmental conditions must be delivered as time series for historical analyses, financing, permitting, construction, and operations.
  - Companies assessing the cost of operation and maintenance require wave height information to determine the number of days per month they can be working onsite and how much scour to expect around power cables and structures.
  - Once wind farms are operating, companies need detailed and accurate wind, boundary layer, wave and current observations, and, most importantly, accurate weather predictions to compete on the day-ahead market.
  - Benefits to society: improved estimates of the wind resource and environmental data for wind farm siting, improved construction/operation, and improved power generation forecasts.

MARACOOS and the NJ Board of Public Utilities (NJ BPU) collaborate to support offshore energy:

- The State of New Jersey is funding enhancement of MARACOOS to provide more detailed analysis of the wind resource for coastal and ocean planning efforts AND to develop state-of-the-art forecasting capability for the day-ahead energy market that ultimately will reduce utility costs for the NJ rate-payer.
- NJ BPU recommends state support for the Rutgers Univ. weather forecasts and a nested high-resolution HF Radar network covering the inner shelf of southern NJ.
- MARACOOS helps states make cost effective investments in observing system components to support offshore energy.

### **4. Supporting fishermen's ability to catch their full quota and avoid by-catch**

Specifically, MARACOOS works closely with fisheries communities to develop useful products that:

- Support an industry with commercial fish landings valued at over \$1 billion/year, and annual spending on recreational fishing estimated at \$7.4 billion.
- Enable offshore recreational fishers to fish more safely.
- Help commercial fishers to fish with reduced by-catch, less disruption to the environment, and more fuel-efficient operations.

MARACOOS is linking habitat data with biological fish data to advance fisheries understanding and provide data in accessible, user-friendly formats:

- Working with different sectors of the fishing community to define and build more useful data products and web-based interfaces, including for satellite sea-surface temperature products.
- Leveraging ocean observing assets and research support in the Mid-Atlantic to construct models that link fish abundance with specific oceanic habitats. Through direct interaction with the management community, these models are now being applied to reduce butterfish by-catch in the squid fishery throughout the Mid-Atlantic → resulting in Economic and Environmental Benefits.

## **5. Protecting against coastal inundation through predicting storm flood levels and storm intensity**

Specifically, coastal and estuarine inundation (storm surge) modelers use MARACOOS real-time data to improve their forecasts:

- Modelers apply MARACOOS ensembles (collections of multiple models) to improve their modeling and forecasting efforts, because they assimilate real-time MARACOOS observations to improve estimates of what is actually going on in and under the upper ocean layers, which is very important for forecasting storm surge and storm intensity
- Reduce forecast uncertainties by exploiting the full ensemble of MARACOOS atmospheric products.

MARACOOS is supporting the Chesapeake Inundation Prediction System (CIPS) to manage inundation:

- CIPS constructed a real-time forecasting system with storm-surge visualizations down to street-level spatial resolution (see figure 1).
- CIPS formed a government, academic, and private-sector partnership to produce forecasts and deliver the information to emergency managers to enhance their ability to respond to surges or sea-level rise, successfully using a MARACOOS partner ensemble approach that improved the accuracy of both atmospheric and water-level forecasts.
- One of the primary goals of CIPS was to take the lessons learned from the local Chesapeake case to expand inundation forecasting throughout the entire Mid-Atlantic Region.

MARACOOS is applying data to aid inundation efforts:

- Facilitating local and regional inundation efforts through delivery of regional modeling products and working with local emergency managers.
- Improving accuracy of surface wind fields through continuing collaboration of WeatherFlow and the regional NWS Weather Forecast Offices, with an ultimate goal of building high resolution and accurate gridded wind fields for meteorological applications.

### Selected Examples of Impacts from Superstorm Sandy

We learned firsthand during Superstorm Sandy how important regional data are in developing precise weather forecasts are – accurately forecasting the trajectory and **intensity** of these storms saves property and saves lives. Evacuating the wrong neighborhoods and communities costs between \$1 million to \$50 million per mile of coastline; but not evacuating leaves lives and property at risk. Decision makers at all levels, ranging from the private sector to US Navy Headquarters, relied on IOOS information.

MARACOOS supported our marine transportation system: Prior to landfall, the marine transportation industry began to make preparations based on forecast products derived from IOOS observations. In the Port of NY and NJ, all vessels were moved from anchorages in the Harbor. Many vessels were diverted from the Port of NY and NJ to other east coast ports that had the capacity to handle the cargo volumes and types. In just two ports, more than 23,000 TEUs were safely delivered and then trucked or shipped via rail to the NY-NJ metropolitan region. This ensured that the critical Christmas shopping season occurred without disruption. Further, 6700 containers

were diverted to Virginia due to Hurricane Sandy.

MARACOOS supported our military readiness: The US Navy's Atlantic Fleet Headquarters sortied approximately 80 ships out of Hampton Roads ports and shipyards at a cost of 10M 2-3 days prior to the onset of 50 knot sustained winds associated with Sandy. All safely exited with no damage or loss of life. NOAA advanced warnings from IOOS observations were deemed crucial to a safe evacuation in a timely and orderly fashion. Based on historic damage to the fleet from past hurricanes, a storm of Sandy's magnitude otherwise could have caused \$500M in damage to ships and pier facilities. Sustained winds of 50 knots or greater causes damage to both the pier and the ship (Marine Technology Society TechSurge Event 2012).

MARACOOS supported our local communities: In Hoboken, New Jersey, 1,700 buildings were severely flooded, impacting up to 34,000 people. These people were spared discomfort, injury, or worse from advanced warnings provided by NOAA. All information came from (IOOS) high- resolution storm surge forecasts. The Mayor ordered an evacuation of "all ground floor apartments" by midnight Sunday night. This single decision saved a significant number of lives, because there are thousands of street-level and basement-level apartments in the city. The Mayor also advised against leaving cars in low-lying areas of town – advice that saved thousands of cars from damage, as any car left on all but a few streets in the city were at least partially submerged in salt water (Marine Technology Society TechSurge Event 2012).

MARACOOS supported our energy sector: Buckeye Partner Pipeline in NJ was the first utility company to come back online, within 48 hours. Per Patrick Hodgins, Houston –based Director, Buckeye Partners Pipeline was the only utility to use an industry service provider, Impact Weather ([www.impactweather.com](http://www.impactweather.com)), to lead their prep work, which started 7 days prior. Impact Weather, like the vast majority of private firms, does not collect their own data but relies exclusively on NOAA products and services (Marine Technology Society TechSurge Event 2012).

Superstorm Sandy was unprecedented in its size and impact on the mid-Atlantic and northeastern regions of our country. We can all hope that this type of storm is not a new normal. Both before and during the storm U.S. IOOS provided critical data that helped emergency managers prepare to protect lives and property, and enabled scientists and weather forecasters to better understand the storm's track, intensity and the resulting storm surge.

The Port of NY/NJ was able to minimize disruption to vital local waterway operations by using PORTS and IOOS data to monitor waterway conditions post-storm, and made extensive usage of NOAA hydrographic survey vessels to ensure that the navigable channels were clear of obstructions. The rapid re-opening of the Port allowed the renewed flow of commerce including the re-supply of fuel and other vital commodities. This is of tremendous economic consequence as the Port of NY/NJ commercial maritime operations in 2010 handled \$175.8 billion of General Cargo, 693, 031 vehicles, 5,292,020 TEUS, and created 279,200 full time job equivalents, \$11.6 billion in personal income, \$37.1 billion in business income, \$3.6 billion in federal tax revenue, and \$1.6 billion in local and state tax revenue.

However, our understanding and forecasts of hurricane and extratropical storm *intensity* must be improved. While significant gains have been made in recent years to forecasts of storm tracks, little improvement has been demonstrated over the past 20 years for storm intensity – **in large part due to a lack of real-time data along the storm paths**. Recent extreme events, including Superstorm Sandy and last year's Hurricane Irene, tragically reflect the need for enhancement of the nation's observing and forecasting capabilities to meet the growing demands for accurate predictions of impacts.

**MARACOOS as an example of 11 regional systems across the nation**

MARACOOS is one of the 11 regional systems from Alaska, the Pacific, and the West Coast, to the Gulf of Mexico, the Caribbean, the East Coast and the Great Lakes. These regional associations of academic, research, industry, non-profit, regional, tribal, state and local entities partner with 17 Federal agencies as part of the Integrated Ocean Observing System – IOOS – to provide services to the entire coastline of the U.S., including the Great Lakes. Regional systems like MARACOOS are uniquely equipped to leverage public and private resources to meet regional needs improving the nation’s economy, navigation safety and ocean ecosystems. These partnerships work.

### Deepwater Horizon Oil Spill

IOOS also demonstrated its value during the tragic Deepwater Horizon Oil Spill. The IOOS data management system rapidly and efficiently allowed for the seamless integration of data from non-federal sources for use by the Unified Area Command. Prior to this, valuable non-federal information collected by universities, state agencies or private companies was not assessable to federal responders. The IOOS data management system, based on interoperable standards and services, now allows for the integration of data from all relevant sources. In fact, approximately 75% of the data now served by NOAA’s National Weather Service through the National Data Buoy Center is from non-federal sources, most of which is directly attributable to the work being done and supported by the Regional Associations.

Information on surface currents from regional radars and models were provided to NOAA to assist with their daily projection of the location of the oil slick. Much of the oil from the spill remained subsurface where, despite the availability of technology, we lacked the ability to readily monitor the flow of oil. IOOS, through its regional network, redeployed several underwater gliders from around the country to assist with subsurface monitoring efforts. This unique and flexible capability is one of the hallmarks of the IOOS system.

We must learn from these experiences and invest in critical observing assets so that when the next event – a spill, a hurricane, a flood - happens, we are able to provide emergency managers and others with the best possible information. Without this capability, response and recovery operations will be negatively impacted, and federal responders will be forced to deploy people and ships during the event at much higher cost, and with higher risks to lives and property.

### Wise Investment

An independent cost estimate of the IOOS system, conducted by the Jet Propulsion Laboratory Science and Technology Directorate and submitted to Congress on November 9, 2012, estimates that the fully developed system – federal and regional, including weather and ocean satellites -- to address key societal needs in next 15 years cost \$54 billion. The regional component, as identified in regional build out plans, is estimated at \$534 million annually to fulfill needs of users for timely and quality information. At current funding levels for the regional systems near \$30 million a year, we are only beginning to build the capacity necessary to meet user demands.

### IOOS Leads to Innovative Solutions

In tight fiscal times, IOOS provides a pathway for bringing forward new solutions, and will play an ever-increasing role in meeting our Nation’s need for coastal ocean data and information. IOOS is a flexible system that can facilitate the transition from research and development to operations. IOOS’s capability to move vital observing assets from research institutions into operations in support of federal response missions has been demonstrated, and will continue to be deployed to address unexpected events around the country. Regional observations are efficiently filling critical gaps not currently being met by our federal partners. IOOS is harnessing the flexibility and innovation of private and academic research and development capability.

The networked capability represented by IOOS works, and has repeatedly demonstrated its value. IOOS is unique; IOOS is efficient; and IOOS is the future.

The ICOOS Act provides the framework for building a “system of systems” that links and enhances our existing observing capacity. It is an innovative approach for government, one that relies on partnerships to be cost-effective and responsive. And, it is working. The 11 regional systems, including MARACOOS, rely on partnerships to address the societal needs of safe commerce and navigation, coastal inundation and hazards, ecology and fisheries, water quality, and energy. They do so in close partnership with universities, private companies, government agencies and others. IOOS links together partners at the regional level and leverages resources. IOOS is a cost-effective, flexible, responsive and innovative.

On behalf of the Maritime Industry, I strongly urge the reauthorization of the ICOOS Act of 2009 to ensure that the nation’s ocean, coastal and Great Lakes observing systems are sustained and enhanced.

We also strongly recommend a funding authorization level that is commensurate with the critical importance of IOOS to our jobs, the economy, and the safety and well being of our region and the nation. We are extremely concerned about the language in H.R. 2219 that would limit appropriations for the program from 2014 to 2018 to \$ 29.6 million per year. Appropriations at this level would severely restrict our nation’s ability to prepare and respond to society’s needs.

IOOS links and leverages resources at the regional level to cost-effectively meet the needs for coastal data products. The regional systems have been operating for nearly a decade and require much needed repairs and upgrades. Enhancements are needed to ensure the systems are storm-ready and that critical gaps are filled. Longer-term plans were developed in line with the requirement for an Independent Cost Estimate put forward by the Congress. Based on the needs of the many end users in both the private and public sectors, requirements-based plans were developed to fill gaps, provide additional leveraging, and build out the regional systems to address societal needs. Full development of the regional build out plans to address societal benefits for the next 15 years is estimated to cost \$534 million per year or \$2.7 billion over the next 5 years for the non-federal component of the Integrated Ocean Observing System (as prepared by NASA’s Jet Propulsion Lab). While this sounds like a large investment, one only needs to consider the cost if the investment were not made---to our nation’s economy, national security, and safety of its citizens. The ability to develop accurate decision models exists; as a global leader in information technology, it is incumbent upon us to take advantage of that ability to better forecast the impacts of marine and coastal conditions. A measured approach to implementing the integrated regional plans would foresee \$238.5 million in total for the regional associations over the next 5 years (roughly 8.8% of the Independent Cost Estimate) and \$76.5 million for the first five years of the national program, as follows: Year 1: \$34.5 million total for all 11 regions together and \$6.5 million for the national program; Year 2: \$39 million total for all 11 regions and \$10 million for the national program; Year 3: \$44 million total for all 11 regions together and \$15 million for the national program; Year 4: \$55 million total for all 11 regions together and \$20 million for the national program; and Year 5: \$66 million total for all 11 regions together and \$25 million for the national program.

IOOS is critical to our economy and national well-being. The ICOOS Act must allow for the reasonable and justifiable growth of the program.

The Hydrographic Services Improvement Act is also vital to the safety, security, and sustainability of our waterways, and should also be approved.

Thank you for the opportunity to testify before the sub-committee on this important legislation.