
Review&Forecast

Partnerships Will Encourage Novel Tech Development, Innovation

By Rep. Eddie Bernice Johnson (D-Texas)
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When all the data have been analyzed, 2017 is expected to be one of the hottest years on record, continuing three consecutive years of record-breaking warmth globally. These warmer global temperatures have led to warmer ocean temperatures, with a myriad of impacts ranging from coral bleaching to sea level rise. Warmer oceans also mean that the 2017 hurricane season is likely a harbinger of what we can expect to see in coming years with increased severity of storms and longer hurricane seasons that will have broad and long-lasting impacts on Americans. We don't yet know the full costs of Hurricanes Harvey and Irma, but according to NOAA's National Centers for Environmental Information (NCEI), Superstorm Sandy alone cost more than \$70 billion.



These impacts can negatively affect the resources that make up our coastal and ocean economy, which in just the year 2014 contributed more than \$352 billion to the U.S. GDP and provided 3.1 million jobs. Additionally, approximately 39 percent of the nation's population lives in counties that are directly on shorelines, which comprise more than 95,000 mi. along coastal states, the Great Lakes and outlying U.S. territories. These coastal industries and population are heavily reliant on ocean health measurements and timely and accurate predictions for climate and weather events that are made possible by observations and monitoring. The ability to monitor changes in the oceans and predict with detail and accuracy the path of storms and their potential rainfall is essential.

The federal government is one of the largest users of ocean data. Moreover, the technology currently used by federal agencies to track and monitor ocean data is the gold standard. However, as our environment rapidly changes in ways that we have not seen before, additional innovation in these technologies will be needed. Federal R&D investments in the research and development of novel marine technologies in partnership with nonfederal partners from the private sector and academia can help to drive that innovation.

Many cutting-edge marine technologies that likely would not have been funded by the private sector alone are beneficiaries of federal collaborations or investments that helped incentivize and speed their development. Federal research grants from agencies such as NOAA, NASA and the National Science Foundation can contin-

ue to provide seed funding for projects without the need for researchers to first demonstrate a proof of concept, a high barrier to entry for many researchers seeking to gain funding from nonfederal sources. New marine technologies are not only beneficial to large users of ocean observation data such as the federal government, but can also have broader impacts through the development of tools that can aid niche economic markets or entire sectors. For example, monitoring technologies that were initially developed through federal research grants, and later made commercially available, have been instrumental in a vast array of industries, such as improving the ability of West Coast shellfish to bounce back from significant die-offs.

In addition to traditional research grants, there are other existing avenues for collaboration between federal agencies and nonfederal partners. NOAA's Cooperative Institutes co-locate academic and nonprofit institutions to encourage high-level, collaborative research. Cooperative Research and Development Agreements (CRADAs) at NOAA and other agencies are partnerships between agencies and private companies on specific projects that allow for sharing of intellectual property and technical resources and help speed the commercialization of agency-developed products. This allows novel technologies to move swiftly from the lab bench into the hands of end-users, such as commercial fishermen.

Regional partnerships between federal partners and nonfederal entities, such as the U.S. Integrated Ocean Observing System, or IOOS, provide a robust set of ocean observations that allow for increased understanding of regional marine circumstances. The IOOS program successfully integrates federal observations and monitoring with nonfederal resources. These integrated capabilities allow for more informed decision making, and allow access to this data in near-real time, putting essential resources directly in the hands of the public.

Novel marine technologies provide the opportunity to augment our existing observations and monitoring systems. This allows for more robust data collection, which leads to more informed decisions at the federal level. Federal investments not only drive the development of novel technologies, but can also help in the commercialization of technology that could be valuable to local fishermen and shellfish growers. Entities ranging from Fortune 500 companies to start-up companies to individual researchers have all benefitted from federal investments and collaborations to help support their research and technology development at almost every stage. Cutting the budget for external research grants at federal agencies would stifle organic and innovative approaches to our most urgent challenges.

In my role as the ranking member for the House Committee on Science, Space, and Technology, I strive to find ways for Congress to develop solutions for our most pressing needs as a nation. When the problem is as big as a changing climate, it is essential that we get all hands on deck to help us observe, monitor and prepare ourselves for the future. This means encouraging creative solutions by individual researchers, universities and private

companies with support and investment by the federal government. Without continued engagement by federal agencies in these collaborations, we will not reach our full potential.

It is imperative for Congress to continue to support existing programs and partnerships with proven track records of success. Whether it is public-private partnerships, regional collaborations or federal research grants to universities and individual researchers, none of the collaborative processes I have described occur in a vacuum. Congress has a vital role to play in continuing to advance marine observation and monitoring technologies in the private sector and academia to help federal agencies achieve their mission objectives, which ultimately benefits the American people. **ST**

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A Changing Tide in Congress

*By Rep. Salud Carbajal (D-Calif.)
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U.S. Congressional Oceans Caucus
U.S. House Armed Services Committee*

Throughout my first year serving in Congress, I have often gotten into debates with colleagues over my belief that I represent—without a doubt—the most beautiful district in America. The Central Coast of California is a special corner of the world, and preserving our unique coastal ecosystem is a top priority of mine.



Raising my children in Santa Barbara and now watching them have children of their own, close to the natural beauty of our oceans, constantly reminds me of the urgent need to preserve and protect our natural environment.

Healthy, sustainable oceans and our nation's economic growth are not mutually exclusive. In fact, they go hand in hand. Our oceans and natural resources are renowned on the Central Coast and serve as economic hubs that generate tourism dollars, sustain our commercial and recreational fisheries and host diverse marine wildlife that is essential to preserving vital ecosystems.

The health of our oceans is not a partisan issue, and while in the minority party in Congress, I have worked with my colleagues across the aisle to advocate for commonsense solutions to protect our marine habitat. I have partnered with colleagues on work to reduce harmful NOx emissions, curb ocean acidification and strengthen our National Ocean Policy. The tides seem to be shifting in Congress, and there is a new sense of bipartisan agreement surrounding the need to act to mitigate the impacts of climate change.

Earlier this year, Congressman Mike Gallagher, a fel-

low Marine and a Republican representing Wisconsin, and I joined the bipartisan Climate Solutions Caucus to prioritize the need to address climate change. The caucus serves as a working group dedicated to finding solutions and advancing proposals to mitigate and reduce the impacts of climate change while continuing to grow our economy.

In this effort, I partnered with Congressman Carlos Curbelo (R-Fla.), the Climate Solutions co-chair, to introduce the bipartisan Coastal State Climate Preparedness Act. This legislation instructs the secretary of commerce to establish a coastal climate change adaptation program, as well as a response grant program to protect our coastal resources.

Additionally, I serve on the House Armed Services Committee. As a Marine Corps Reserves veteran, I am proud to support our military servicemen and women. In my role on the committee, I have met with high-ranking military officers concerned about the risk that climate change poses to our national security. On one occasion, at Elmendorf Air Force Base outside of Anchorage, Alaska, the commanding general shared with us one of his main concerns that significant Arctic sea melt will mean more navigable pathways for foreign enemies.

“Ocean acidification will cost the world economy more than \$1 trillion annually by 2100. In Alaska, where half of the seafood caught in the United States originates, the acidification of the cold water is endangering 70,000 jobs.”

In this year's defense authorization bill, along with my colleague Rep. Jim Langevin (D-R.I.), I successfully advocated for an amendment requiring the Department of Defense (DoD) to produce a report on climate change. This report will detail the threat climate change poses to our military operations and installations, as well as requiring DoD to propose mitigation strategies.

Currently, coastal counties account for 39 percent of the United States population and produce \$6.6 trillion in gross domestic product. It is important that coastal states start planning now for the harmful impacts that climate change will have on the public health of our communities and our economy.