

U.S. Nearshore Community Integrated Research Implementation Plan - The National Plan



October 2016

U.S. NEARSHORE RESEARCH COMMUNITY

NATIONAL INTEGRATED IMPLEMENTATION PLAN

October 2016

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EXECUTIVE SUMMARY

This National Integrated Implementation Plan (hereafter referred to as “National Plan”) summarizes ongoing federal and non-federal research efforts in long-term coastal evolution, extreme events, human and ecosystem health, and research infrastructure. These research themes were prioritized by the nearshore processes community as being both scientifically challenging and societally relevant (NPC, 2015). In this National Plan, an inventory of ongoing federal and non-federal research projects serves to identify areas of potential collaboration, as well as research gaps. Examples of successful interagency collaborations are highlighted to inform future collaborations. Recommendations are provided for immediate execution and long-term planning toward increased collaboration to gain efficiencies.

This National Plan recommends formation of a Federal **Leadership Council**, made up of senior leadership from the research arms of the agencies and organizations involved to serve in a steering and oversight capacity for the effort. The American Shore and Beach Preservation Association (ASBPA) “nationalized” the Federal Plan by collecting information on nearshore research conducted by non-Federal organizations such as academia, state governments, local communities, industry, and NGOs. This National Plan formalizes community recommendations, such as the formation of a Nearshore Advisory Council (NAC) and steps toward a U.S. Nearshore Research Program.

Over 260 relevant Federal agency research projects (Appendix B) and 90 non-Federal projects were categorized by basic research questions for each theme to identify areas for potential collaboration. Recommendations for immediate collaboration within the long-term coastal evolution, extreme events, and research infrastructure themes are provided. A key message of the National Plan and the recommendations is that the nearshore research community would benefit from diversification by working with researchers from other sciences such as biology, chemistry, ecology, and social science. Although this recommendation is particularly relevant within the interdisciplinary human and ecosystem health theme, the concept of a systems approach to nearshore research relates to all themes.

The following report recommendations will be used by the **Leadership Council** and the NAC to measure the success of the implementation effort in the future.

1. Expand nearshore processes research within all themes to integrate biology, ecology, chemistry, and social science, recognizing the importance of the inherent feedbacks and coupling within the nearshore system.

2. Identify and coordinate “experiments of opportunity,” long-term coastal change projects concerning large-scale processes, sediment budgets, and ecosystem services, as future interagency field experiments.
3. Implement a strategic, multi-agency extreme events data collection plan to provide much needed data for research.
4. Diversify within the nearshore human and ecosystem health theme specifically by engaging with coastal ecosystem and social scientists to inform research and management decisions.
5. Adopt standardized data frameworks and toolkits, community models, and modeling test beds to facilitate sharing and access for research.
6. Develop a cross-agency research asset management system to encourage instrumentation, field and lab facility sharing, and advocate for federal funding to support use of these facilities, similar to “ship time” in deep-water oceanographic research.
7. Create a web portal for easy discovery, linking, and distribution of nearshore data.
8. Convene Principal Investigators (PIs) from the subtopic areas from each of the four themes with the most significant current investment by several agencies in 2016 to develop integrated future research plans.
9. Unite a community of practice through an information sharing forum in conjunction with the recommended web portal.
10. Hold collaboration workshops annually, focusing on specific topic areas, and hold the Federal Technical Workshop every two years.
11. Utilize a new and/or existing collaborative funding mechanism for graduate student fellowships to foster the next generation of nearshore scientists and engineers.

1.0 INTRODUCTION

This report presents results of an initiative that began as a Federal Plan to inventory on-going nearshore processes research by Federal agencies, identify how present Federal programs and activities meet national strategic needs, and determine existing gaps. The Federal Plan further identifies opportunities for increased coordination and collaboration to more effectively deploy Federal resources, address identified gaps, and support a more comprehensive effort to provide data, knowledge, and tools required for effective policy, planning and management. This report has now evolved into a National nearshore processes research implementation plan (hereafter referred to as the “National Implementation Plan”) that fuses Federal research into an integrated plan led by academia and including non-Federal agencies and organizations.

Nearshore systems include the complex interactions of physical, biological, chemical, and human influences within the transition region across the land and the continental shelf, spanning (from onshore to offshore) coastal plains, wetlands, estuaries, coastal cliffs, dunes, beaches, surf zones, and the inner shelf. Worldwide, nearly 1 billion people live at elevations within 10 m of present sea level, many of whom are at risk due to changing climate and storm intensity. The nearshore is a societally relevant region that requires an improved understanding of the feedbacks and couplings that shape, sustain, and alter coastal landscapes.

The self-organized U.S. nearshore processes community held a workshop with over 70 participants from 32 organizations spanning Federal and State agencies, academia, industry and non-governmental organizations in the spring of 2014 to discuss and develop a nearshore processes research strategy. This strategy was published by the American Shore and Beach Preservation Association (ASBPA), *The Future of Nearshore Processes Research*, Winter 2015 (Shore & Beach, Vol. 83, No.1) (hereafter referred to as the *Nearshore Report*) (NPC, 2015). The *Nearshore Report* highlights three research themes and two community recommendations for long-term implementation.

Research Themes

1. Long-term coastal evolution due to natural and anthropogenic processes.
2. Extreme Events: Flooding, erosion, and the subsequent recovery.
3. The physical, biological and chemical processes impacting human and ecosystem health.

Community Recommendations

1. Establish a Nearshore Advisory Council (NAC) to represent the academic nearshore community.
2. Build a U. S. Nearshore Research Program - a sustained, coordinated program funded by multiple agencies.

The development of the *Nearshore Report* was initiated and led by a research community that, while spanning Federal and academic institutions, has a common focus on the physical processes (oceanographic, geologic) that shape, maintain, and threaten coastal landscapes. The broad themes identified represent an effort by this group to place their research priorities within a more comprehensive framework reflecting the diverse values and vulnerabilities of coastal communities and ecosystems. These themes provide a framework for a more comprehensive effort to provide the data, knowledge, and science-based tools required across the entire coastal zone from all relevant scientific disciplines. While the *Nearshore Report* is a product of a community that focuses on the “nearshore” and on physical “processes,” a clear consensus emerged that ensuring their science has the desired impact on issues of national importance requires a broader perspective and engagement with researchers in the life, engineering and social sciences.

In addition to identifying broad thematic priorities for nearshore research, the *Nearshore Report* further identifies a set of critical research questions that should be a focus of the coastal research community. These questions represent research needs where substantial and sustained efforts are required and where research advances in understanding would have broad impacts on coastal policy, planning, and management.

SUCCESSFUL NEARSHORE COLLABORATIONS

Workshop participants emphasized that several examples of long-term community collaboration toward objectives identified in the *Nearshore Report* have existed for decades. However, these earlier collaborations were formed mostly from researcher to researcher relationships rather than a strategic interagency science plan.

One excellent example is the many large-scale field experiments at the USACE Field Research Facility, in Duck, NC (e.g., SandyDuck '97, SUPERDUCK, DELILAH) which were funded through multiple agencies and included academic and international participation. Much of the data collected during those experiments are utilized even today.

Building on the success of efforts like the Duck experiments and others highlighted herein, development of the National Implementation Plan is a deliberate, strategic attempt to coordinate Federal and non-Federal research. The workshop consensus was that the Duck experiments and other previous collaborations are examples of community potential with multi-agency commitment toward a strategic research plan.

The *Nearshore Report* is a catalyst for the nearshore research community to leverage its strong existing relationships to enrich a heretofore distributed approach to U.S. nearshore research. The strategy addresses societally-relevant scientific and engineering challenges exacerbated by increased coastal urbanization and threats, such as sea level rise and strengthening storm patterns. Most of the themes and questions identified will require multidisciplinary, multi-organizational teams to develop new understanding and models of nearshore processes, while sharing data, results, and unique research facilities to produce the efficiencies envisioned by the community. However, this vision requires overcoming institutional inertia and long-standing business practices to forge a new, integrated approach and plan. At two recent Federal meetings, participants expressed unanimous willingness to commit to this effort. Fundamentally, it is clear that coastal landscapes and resources, and the diverse benefits they provide, are at risk. The costs and consequences of coastal change are huge and growing. While agency missions differ, there is a shared need for reliable, timely, and actionable science to ensure public safety, environmental and human health, and continued economic growth. Specific reasons for continued motivation to collaborate include the following.

- The U.S. requires enhanced science and engineering capacity to meet public and private-sector demands. In the aftermath of Hurricanes Katrina and Sandy, substantial investment was directed at foreign expertise. U.S. academic research and engineering programs need to be revitalized and expanded to ensure that the nation has the technical expertise and workforce needed to meet growing demands and to enjoy the economic and employment benefits of a vibrant and world-leading coastal engineering sector.
- Coastal research needs in terms of data, knowledge and tools span multiple agencies, and exceed the capacity of individual agencies. Shared efforts to address shared research needs should result in more effective use of resources and eliminate redundancy in Federal programs, whether real or perceived. By engaging more closely with the academic research community Federal agencies will have access to scientific expertise beyond agency core competencies.
- There are substantial opportunities for efficiencies in Federal programs from joint planning, sharing of facilities and infrastructure, coordinated mapping and monitoring, and closer integration of science and mission agencies. Existing agency investments can be applied to greater effect through this effort.
- Recent hurricanes, El Nino events, and the Deep Water Horizon oil spill have made clear that nearshore systems face multiple threats and that a comprehensive approach to protecting and preserving these systems, and the communities dependent on them, is required. This has resulted in a wide-spread embrace of “enhancing coastal resilience” as a unifying goal. Enhancing coastal resilience requires an integrated and systemic approach that is not reflected in

existing products and tools from Federal agencies. Coordination is required so the products of Federal research investments are as seamless and accessible as possible.

To develop the National Implementation Plan, the ASBPA has collaborated with both the nearshore community to establish an academia-based council, and the U.S. Army Corps of Engineers' Coastal Engineering Research Board (CERB), who facilitated the Federal collaboration. The academia-based council (Nearshore Advisory Council - NAC) provides a coordinating organization for academics to develop collaborative science plans and a united voice. The CERB, created in 1929 with legislation sponsored by ASBPA, was asked to facilitate developing the Federal Integrated Implementation Plan that has been shared and combined with academia, state and local governments, industry, and non-governmental organizations to produce a National Plan. This document summarizes Federal and non-Federal coastal research activities.

1.1 DEVELOPING A FEDERAL INTEGRATED IMPLEMENTATION PLAN

On February 9, 2016, the CERB facilitated a Federal Leadership Meeting that included the U.S. Geological Survey (USGS), Office of Naval Research (ONR), Bureau of Ocean Energy Management (BOEM), National Oceanic and Atmospheric Administration (NOAA), National Science Foundation (NSF), Nuclear Regulatory Commission (NRC), National Park Service (NPS), and the U.S. Army Corps of Engineers (USACE) (Table 1). To ensure coordination, a representative from the academic community and leader for the NAC was also present. The meeting included agency senior leaders and research coordinators to discuss how to collaboratively develop and implement an Integrated Implementation Plan across existing Federal research programs. The participants were unanimously willing to support this effort, with the following as first steps.

1. Developing an inventory of existing Federal research activities that addresses the strategic themes identified by the nearshore research report.
2. On the basis of that inventory, assessing synergies and gaps in Federal research activities and/or the *Nearshore Report*; identify where current activities (or gaps) provide opportunities for enhanced collaboration and efficiency.
3. Making recommendations on, if successful, how to sustain this collaboration into the future.

The participants also agreed that a Leadership Council of senior leaders from the research arms of the agencies and organizations in attendance (Table 1) would serve in a steering and oversight capacity for the effort.

The inventory and assessment efforts described above were proposed to lead to the development of a Federal Integrated Implementation Plan that would identify immediate areas for cross-agency planning and execution as part of a sustained effort. The participants agreed to complete the Federal Integrated Implementation Plan in October 2016 so a National Plan, engaging the non-Federal community, could be completed by fiscal year 2017.

Agency nearshore research program managers, appointed by the Leadership meeting members, were charged with completing the inventory of ongoing research activities related to the themes from the *Nearshore Report*. Agency programs, research activities, and capabilities were identified, categorized with respect to the previously established research themes, and entered into a spreadsheet (Appendix B) along with ancillary information including products, timelines for completion/delivery, points of contact, and Federal and non-Federal partners.

Participating agencies were asked to include activities that aligned with the themes of the *Nearshore Report*. In addition, respondents were asked to provide information on infrastructure, including those capabilities and facilities that provide foundational support across issues, research questions, and locations. The Federal agency participants, in the process of developing the inventory, identified developing community infrastructure – including research tools, expertise, modeling capabilities, and data and delivery systems – as a high priority for both Federal and national efforts. The intent is to identify and cooperatively support the common infrastructure elements required for effective research that also enhance the availability, use and usability of data and products.

Respondents represented the substantial majority of programs supporting nearshore physical processes research. The inventory resulting is most comprehensive in this research area. Agencies were encouraged to provide information reflective of the broader research requirements for coastal policy, management, and decision-making identified in the *Nearshore Report*. The inventory includes substantial information on Federal research activities in the life, social, and engineering sciences but is less comprehensive in those sectors.

Upon completion of the initial inventory, the participating agencies identified key program managers to participate in a three-day technical workshop held in March 2016. The goal of this workshop was to assess the over 260 separate research activities inventoried

During the Federal technical workshop, participants met in plenary and in breakout groups to work through a full agenda regarding agency research. The first breakout focused on categorizing agency projects based on basic research, applied research and relation to recommendations from the *Nearshore Report*. The second breakout session focused on identifying existing project areas for potential collaborations and technical subject matter expert meetings. The third breakout session identified gaps in existing research that should be the focus of collaborative planning. Each session included separate breakout groups for each of the three themes discussed in the *Nearshore Report* and a fourth team considering research infrastructure, such as data, observations, and models.

TABLE 1. ATTENDEES OF FEBRUARY 9, 2016 MEETING – SENIOR LEADERS FROM THE RESEARCH ARMS OF EACH ORGANIZATION WILL COMPRISE A LEADERSHIP COUNCIL

Name	Organization	Name	Organization
Renee Orr	BOEM	Tom Drake	ONR
John Haines	USGS	Nicole Elko	ASBPA
Candace Major	NSF	MG Jackson	USACE
Luis Rodriguez	FEMA	Jeff Lillycrop	USACE
Mary Erickson	NOAA	Jose Sanchez	USACE
Craig McLean	NOAA	Britt Raubenheimer	WHOI (NAC)
Cliff McCreedy	NPS	Joseph Kanney	NRC

1.2 THE FEDERAL INTEGRATED IMPLEMENTATION PLAN AND THE NATIONAL IMPLEMENTATION PLAN

This Federal portion of this report provides the details of the Federal Integrated Implementation Plan resulting from the inventory and assessment (workshop) activities. It is intended to be a living document, updated annually, and provide a catalyst for academia, industry, and non-governmental organizations to leverage and collaborate with Federal nearshore processes researchers. There was strong support for keeping the collaboration moving forward, beyond these initial steps, and also the realization that early successes are important to demonstrate value to the Leadership Council, the nearshore community, the agencies involved in this effort, and the public. With demonstrated success, agencies or programs that may have been missed in the initial plan development will ideally join the effort. The Federal Integrated Implementation Plan identifies clear opportunities for immediate linking of research. It also shows where there are Federal research gaps that academia, industry or non-governmental organizations (NGOs) can, or may already have, filled. Through this assessment of present activities, critical gaps will be identified, especially those that can be addressed through coordinated planning and execution among existing programs, projects and activities.

1.3 FEDERAL TECHNICAL WORKSHOP: SPREADSHEET SUMMARY

The inventory of ongoing Federal research related to the themes of the *Nearshore Report*, and the additional “infrastructure” category, are detailed in the spreadsheet provided in Appendix B. Breakout groups were tasked with further categorizing the 260 projects outlined in the spreadsheet by the basic research questions, which were specific to each theme in the *Nearshore Report*. Details of the basic research questions for each theme are provided in the subsequent sections. Federal research under the long-term coastal evolution and extreme events themes of the *Nearshore Report* was readily

***Recommendation #1:** Expand nearshore processes research within all themes to integrate biology, ecology, chemistry, and social science, recognizing the importance of the inherent feedbacks and coupling within the nearshore system.*

classified by the associated basic research questions.

However, Federal research under the human and ecosystem health theme was not as easily classified. Workshop participants concluded that the basic

research questions of this theme did not fully reflect research and user needs beyond the “nearshore processes” community focus, e.g., forecasting pollutant transport within estuaries and beaches.

Participants noted that the human and ecosystem health research at the Federal level is broader than depicted by the summary and associated basic research questions in the *Nearshore Report*, and was not fully represented by the workshop participants. This astute observation is reflected in Table 2 and also confirms that the nearshore research community may benefit from diversification for all research themes with researchers from other sciences such as biology, ecology, chemistry, and social science. A systems approach to nearshore research is critical. Spreadsheet contents are summarized in Table 2.

1.4 DEVELOPING A NATIONAL IMPLEMENTATION PLAN

Nearshore community organization over the last several decades has been sporadic (Holman et al. 2015). However, recently, in the wake of Hurricanes Katrina and Sandy, the community has gained an organizational momentum (NPC 2015). As mentioned above, about 70 attendees participated in a nearshore processes workshop in 2014, which has spawned this effort toward a long-term goal of a sustained, multi-agency funded nearshore research program and the formation of a community leadership council called the Nearshore Advisory Council (NAC). The research community also seeks continued engagement and affiliation through a new American Geophysical Union (AGU) focus group called the Nearshore Systems Science group.

TABLE 2. ONGOING FEDERAL RESEARCH PROJECTS CATEGORIZED BY THEMES FROM THE NEARSHORE REPORT. NOTE THAT THE TOTAL NUMBER OF PROJECTS IS GREATER THAN 260 (TOTAL LISTED IN APPENDIX B) BECAUSE MANY PROJECTS WERE CONSIDERED RELEVANT TO MORE THAN ONE REPORT THEME.

<i>Nearshore Report</i> Theme	Number of Projects Each
Long-term coastal evolution	64
Extreme events	61
Human and ecosystem health	120+
Modeling/observations infrastructure	90

1.4.1 NEARSHORE ADVISORY COUNCIL (NAC)

Members of the NAC are the editors of the *Nearshore Report* (NPC, 2015) and include Nicole Elko, Falk Feddersen, Diane Foster, Cheryl Hapke, Ryan Mulligan, H. Tuba Ozkan-Haller, Nathaniel Plant, & Britt Raubenheimer. These mid-career scientists are leaders in nearshore community organization. One role of NAC is the “Board of Directors” of the nearshore community. The members of this community, which have been engaged through this nearshore implementation effort, will ideally affiliate under the group described in the next section.

The NAC convenes annually in person and communicates throughout the year as needed in full, and subcommittees, by conference call. The NAC is comprised of 5 academics, 1 industry, and 1 agency representative. The chair of the NAC is an academic elected annually by the NAC to serve a one-year term. NAC members are elected by the community to serve three-year terms. This community election occurs during an annual conference call. In addition to elections, the NAC updates the community on new developments such as upcoming workshops, Leadership Committee meetings, grant opportunities, etc.

1.4.2. PROPOSED AGU GROUP

In May 2016, AGU considered a proposal for a stand-alone Nearshore Systems Science group. The following excerpts from the proposal highlight the intent of the new group and the present state of organization within the community.

Presently, the group exists as a community of practice, loosely held together by the American Shore and Beach Preservation Association (ASBPA), a listserv called *coastal_list* maintained by the University of Delaware (http://www.coastal.udel.edu/coastal/coastal_list.html), and AGU. However, there is no one organization with which all members of the community affiliate. We ... are challenged with getting community members to affiliate (pay dues and participate). This seems to be a common challenge among scientific community organizers today, so lessons learned from this pilot group may be helpful for other new and existing AGU groups. ...

The Nearshore Systems Science group is interdisciplinary. Our members include oceanographers, coastal scientists, and engineers, and disciplines span physics, geology and geophysics, biology, chemistry, ecology, and civil and mechanical engineering. ...

Our stakeholders are students in the nearshore systems science field, as well as practitioners and policy makers charged with managing coastal erosion and communities (ASBPA members). Our members are academic and agency scientists and engineers. We are committed to fostering the next generation of nearshore scientists (NRC 1999; ASBPA 2012). Extreme events, such as hurricane and tsunamis, long-term coastal evolution drivers (like sea level rise), and coastal pollution and ecosystem health are closely tied to the management of coastal communities. Our research is societally relevant, as it affects a large portion of the global population living along coasts. ...

The NAC will continue to work with AGU to make this new group a reality in the near future.

1.4.3 NATIONAL TECHNICAL STEERING COMMITTEE

To provide guidance and oversight at the Program Head level (below the Leadership Council but above the PI level), ASBPA convened a National Technical Steering Committee. This committee included members of the NAC and agency representation designated by the Leadership Council. The Steering Committee serves to convene these two groups who had been working independently.

The first objective of the Committee was to assist with planning 1st Annual Nearshore Collaboration Workshop, Oct 12-14, 2016, Kitty Hawk, NC. This workshop aims to continue the momentum of this nearshore implementation effort by developing national integrated, interdisciplinary research plans and discussing long-term collaborative national research plans toward community goals by identifying opportunities (gaps/efficiencies) for academic/non-federal engagement in the short- and long-term. The workshop will lead to some immediate national-scale collaborations on ongoing, funded research projects (i.e., early wins). The workshop has two main goals.

1. Develop ongoing 1-3 year research plans by identifying immediate areas of combined agency/PI collaboration that can address problems, gaps, and topics not already covered in ongoing projects. These proposed collaborations are not intended to modify ongoing or planned research, but rather to address problems and topics that would make significant advancements through combined agency/researcher collaboration. The idea is to agree on 3-5 actionable plans with achievable results. Examples might be a strategic extreme events data collection plan, a national assessment of the state of knowledge about the effect of climate change on long-term coastal change, or a journal paper documenting an inter-

comparison of several numerical models as applied by several organizations to the same coastal region.

2. Develop longer-term, strategic, 5+ year research plan(s) by identifying complementary strategic research goals of the agencies and the community to develop a community research project(s). Here, the goal is to begin to modify longer term agency and community research plans. The plans will both address research needs of the agencies and identify opportunities (gaps/efficiencies) for academic/non-federal engagement. The intent is to provide direction to federal and non-federal researchers and to lay the groundwork for future research and program directions (both within and between agencies) – where is the US nearshore research community going? It is hoped that one or two plans with achievable results can be agreed upon. Examples might be a coordinated field experiment of opportunity or a model test bed.

1.4.4 NATIONAL SPREADSHEET SUMMARY

Following development of the Federal Plan, the objective of the National Plan is to develop an inventory of existing non-Federal research activities that address the strategic themes identified by the *Nearshore Report*. Non-Federal research is defined as research being conducted by non-Federal PIs at universities, research institutes, NGOs, non-federal agencies, or industry with funding from any source (federal or non-federal). Overlap in projects listed by academics and funding agencies is unavoidable and expected. However, input from both helps ensure the list is comprehensive. This inventory is intended to become a living online tool feeding an annually-updated U.S. nearshore research plan to foster collaboration among federal and non-federal research entities.

ASBPA and the NAC requested input from academics and other non-federal researchers in October 2016. Non-federal PIs participating in the nationalization effort are listed in Tables 3 and 4.

Non-federal PIs submitted 92 nearshore research projects related to the themes of the *Nearshore Report*. In general, the non-federal research is similar to the scope, time scales, and topic areas represented in the Federal spreadsheet (Section 1.3); however, some differences are evident. For example, more non-federal research is focused on basic, rather than applied, science like hydrodynamics in the nearshore.

TABLE 3. PRINCIPAL INVESTIGATORS PARTICIPATING IN THE NATIONALIZATION EFFORT AND 27 ASSOCIATED RESEARCH INSTITUTES

Principal Investigator(s)	Institution
B. Raubenheimer, S. Elgar	Woods Hole Oceanographic Institution (WHOI)
T. Lippmann, L. Ward	University of New Hampshire
S. Mabee	University of Massachusetts
E.A. Cowen	Cornell
S. Farrell	Stockton University Coastal Research Center (NJ)
T. Herrington	Stevens Institute of Technology
T. Hsu, J. Puleo	University of Delaware
B. Casper	University of Pennsylvania
T. Allen	Old Dominion University
N. Stark	Virginia Tech
L. Moore, B. Murray	University of North Carolina, Chapel Hill
M. Overton, B. Sciaudone	North Carolina State University
A. Hannides	Coastal Carolina
M. Olabarrieta	University of Florida
F. Muller-Karger	University of South Florida
T. Roberts Briggs	Florida Atlantic University
Y. Wang, T. Miller	Florida State University
J. Donoghue	University of Central Florida
R. Feagin	Texas A&M
J. Breier	University of Texas, Rio Grande Valley
B. Webb	University of South Alabama
M. Moulton	University of Washington
R. Holman	Oregon State University
A. Boehm	Stanford
J. Fuhrman	University Southern California
B. Glazer	University of Hawaii
R. Mulligan	Queens University

TABLE 4. PRINCIPAL INVESTIGATORS PARTICIPATING IN THE NATIONALIZATION EFFORT AND ASSOCIATED NON-FEDERAL AGENCIES

PI	Agency
C. Williams	New Hampshire Sea Grant
N. Rucks	New York Department of State, Water Science Center
M. Gagliano, M. Kuhn	New Jersey Geological & Water Survey/ NJDEP
K. Ramsey	Delaware Geologic Survey
	Florida Department of Environmental Protection/Geological Survey
J. Cebrian	Dauphin Island Sea Lab (AL)
F. Chavez	Monterey Bay Aquarium Research Institute
	CB&I
N. Elko	American Shore and Beach Preservation Association

TABLE 5. ONGOING NON-FEDERAL RESEARCH PROJECTS CATEGORIZED BY THEMES FROM THE NEARSHORE REPORT.

<i>Nearshore Report</i> Theme	Number of Projects Each
Long-term coastal evolution	39
Extreme events	23
Human and ecosystem health	19
Modeling/observations infrastructure	11
TOTAL	92

2.0 LONG-TERM COASTAL EVOLUTION

2.1 INTRODUCTION

In recent years, the focus of long-term coastal change research has shifted from more localized, project-specific forcings, to broader drivers of global coastal change, such as sea level rise. It has been recognized by the scientific community that sea level rise will play a large role in the future of coastal evolution, and research efforts must be focused on anticipating how the coastal environment will respond to these impacts.

Many ongoing Federal projects focusing on the long-term evolution of coastlines have targeted the regions impacted by Hurricane Sandy, Hurricane Katrina and other coastal hazards. These geographic research hot-spots of the Northeast and Gulf Coast generate some clear groupings and potential collaborations among different Federal research entities. The distribution of projects illustrates how research tends to be driven and funded by catastrophic events, which results in the concentration of research into distinctly constrained geographic areas. Similarly, response and recovery projects resulting from these storms, such as beach nourishment or marsh restoration, provide research opportunities over the long-term that may also be geographically limiting. While much of this research potential arises from the funding, infrastructure, and opportunistic experiment prospects that these events provide, their distribution illustrates some of the biases influencing the current long-term coastal evolution research process.

In addressing long-term and persistent coastal change, and in response to extreme events, substantial investments are made in constructed projects designed to enhance public safety, protect and restore environmental health, and mitigate future impacts. The design and implementation of these projects is informed by current scientific understanding and capacity. These projects represent opportunities to test or current understanding, to evaluate models and tools, and to identify and address knowledge gaps. Substantial project investment provides scientific and fiscal opportunities to

evaluate project success, test and validate current understanding, and develop new tools and knowledge.

Table 3 summarizes the breakdown of ongoing Federal research in long-term coastal evolution by the fundamental research questions (identified by A, B, and C in the table) highlighted in the *Nearshore Report*. Generalizations on the amount of research underway in each of the topic areas are based on the classifications in Table 3. Factors influencing sediment budgets (“A”) exclusively or jointly relate to the majority of ongoing Federal research. Feedbacks between short- and long-term processes (“B”) also concern over 40% of ongoing research. Human drivers of long-term change (“C”) are the focus of less than 30% of Federal research, indicating a potential research need or gap.

TABLE 6. FEDERAL RESEARCH PROJECTS WITHIN THE LONG-TERM COASTAL EVOLUTION THEME GROUPED BY THE THREE BASIC RESEARCH QUESTIONS FROM THE NEARSHORE REPORT.

(A - Factors influencing long-term sediment budgets, B - Feedbacks between short- and long-term processes, C - Human intervention drivers/impacts)	Number of Projects Each
A	13
AB	8
ABC	4
AC	9
B	12
BC	4
C	14
TOTAL	64

2.2 EXISTING FEDERAL COLLABORATIONS

Several existing projects were identified that involve collaboration between Federal agencies and have a focus on long-term coastal evolution. Examples include a BOEM and USGS collaboration entitled “Gulf of Mexico Land Loss Change Assessment and Application to Louisiana Coastal Habitat Lost.” Generally, the result of this project is anticipated to be land loss rates of change along the Louisiana coast. NOAA and the USGS are currently working on a project to predict long-term Louisiana barrier island evolution in an effort to provide information useful to resource managers for determining response to storms, sea level rise, and climate. The USGS, USACE, and FWS are conducting a regional study of Fire Island, NY, to increase the understanding of the physical processes that cause coastal change, and ultimately improve the capability to predict the processes and their impacts. Responding to projected long-term changes, BOEM and USACE are developing a planning process for optimizing the dredging of sand resources while diminishing potential impacts. The project will

demonstrate the benefits and costs of this planning process by developing a draft borrow area management plan to optimize use of several Outer Continental Shelf (OCS) borrow areas characterized by frequent dredging and/or multiple users (i.e., Ship Shoal offshore Louisiana, Sandbridge Shoal offshore Virginia, and/or Canaveral Shoals offshore Florida).

The Joint Airborne Lidar Bathymetry Technical Center of Expertise (JALBTCX) is described in the next example box. JALBTCX is an excellent example of collaboration that has become part of federal agency infrastructure, promoting shared standards that have enabled research and more effective model development and application. A few specific outcomes from JALBTCX that would not have happened otherwise include enabling USGS to maintain the shoreline characterization needed to forecast shoreline erosion vulnerability to impending hurricanes, and allowing federal agencies to coordinate post-Sandy mapping, with joint prioritization and planning, eliminating duplication and leveraging multiple federal and non-federal interests to increase coverage.

All these collaboration examples provide models that could possibly be expanded to include additional federal and non-federal research partners and stakeholders.

2.3 POTENTIAL COLLABORATIONS

Although a number of projects that demonstrate interagency efforts have been identified, agencies and the research community would benefit from a concerted effort to increase future collaborations. It is apparent that long-term coastal evolution work requires larger

***Recommendation #2:** Identify and coordinate “experiments of opportunity,” long-term coastal change projects concerning large-scale processes, sediment budgets, and ecosystem services, as future interagency field experiments.*

scale efforts that will increasingly rely on more seamless interagency connectivity and willingness to link research and share data. In turn, these collaborations will improve at the Federal level only if different agencies document and acknowledge all data and collaborators. Data and research from multiple agencies can and should be integrated into products that may be delivered by different agencies. These final products, and the decisions and outcomes they support, represent the return on investment for all underlying data collection and research. It is critical that all contributions be captured so the value of the full spectrum of observations, research, data management, and delivery is recognized.

Table 7 is derived from the spreadsheet in Appendix B and highlights the sub-topic areas (the questions from the research report) with significant Federal investment, such

as large-scale processes and ecosystem services. It also brings to light critical research areas with minimal investment, such as mixed sediment transport and “experiments of opportunity” during routine restoration projects. Federal agencies agreed that collaboration could augment research capacity on existing U.S. coastal restoration projects and thereby maximize their value as research opportunities. Within the USACE, many monitoring programs required as a part of post-project assessment provide opportunities to advance nearshore science.

Topics with the largest number of ongoing projects, such as large-scale processes/sediment budget and ecosystem services (Table 7), are prime areas for immediate collaboration. If, for example, there are 16 Federal research activities addressing these topics, it is probable that interagency collaborations would lead to more efficient use of resources. Principal Investigators (PIs) from the areas with the most significant current investment by several agencies will convene in 2016 to develop integrated future research plans. Future workshops will also focus on these subtopics to foster additional collaboration among Federal and non-Federal researchers.

Conversely, some topics with low numbers of ongoing projects (e.g., mixed sediment transport and experiments of opportunity) were identified as important research needs as well, despite the apparent low investment. These topics will be the focus of future national workshops with the objective of fostering increased research investment through collaboration.

TABLE 7. SUB-TOPIC AREAS FOR POTENTIAL INTERAGENCY COLLABORATION WITHIN THE LONG-TERM EVOLUTION THEME. NOTE THE IMPORTANCE OF A NEARSHORE SYSTEMS APPROACH.

Subtopic Area	Number of ongoing projects in each area
Large-scale Processes/Sediment Budget	16
Ecosystem Services	16
Sand Resources	11
Relative SLR	7
Biogeomorphology	5
Inlets	3
Material flow/mixed sediment transport	2
Experiments of Opportunity	2
Other	2

EXAMPLE: SUCCESSFUL NEARSHORE COLLABORATIONS

JALBTCX

Looking at past sustained collaborations, we can identify and apply best practices to future initiatives. The Joint Airborne Lidar Bathymetry Technical Center of Expertise (JALBTCX) is another excellent example of an existing collaborative partnership, in this case between the U.S. Naval Meteorology and Oceanography Command (CNMOC), the National Oceanic and Atmospheric Administration (NOAA), the U.S. Geological Survey (USGS), and the U.S. Army Corps of Engineers (USACE). Its mission is to provide airborne coastal mapping and charting capability through operation of state-of-the-art systems, to promote the commercialization of lidar bathymetry, and to evolve lidar and complementary sensors and technologies in support of the partners' requirements.

The JALBTCX was created as an outgrowth of collaboration in research and development and field operations, beginning in the 1980's centering on a new promising technology called Light Detection and Ranging (lidar) for bathymetric measurements. The early years focused on developing lidar technology and transitioning it from theory to an operational prototype system in 1994. Through use of the prototype much was learned about bathymetric lidar, ancillary coastal measurements, and operational best practices.

In the 1990's the JALBTCX began to take shape, first informally and then in 1998 through a formal Memorandum of Agreement. Today, JALBTCX is the world leader in lidar bathymetry and an excellent example of successful research collaboration across four agencies with over 25 years of sustained collaboration.

Through the JALBTCX partnership a broader vision developed to facilitate the coordination of ocean and coastal mapping activities while avoiding duplication across the Federal sector and with State, industry, academic and non-governmental (NGO) mapping interests. **The Interagency Working Group on Ocean and Coastal Mapping (IWG-OCM)** was established by the Joint Subcommittee on Ocean Science and Technology (JSOST) of the National Science and Technology Council (NSTC) Committee on Environment and Natural Resources (CENR) and Committee on Science (CS).

The purpose of the IWG-OCM is to:

- Ensure an effective interface between managers responsible for ocean and coastal mapping and resource management at the federal, state, and local levels;
- Ensure ocean and coastal mapping and charting efforts are effectively coordinated, with input from the widest possible set of stakeholders, and ocean and coastal mapping activities;
- Coordinate plans and reports with the Ocean Research and Resources Advisory Panel (ORRAP) to obtain independent scrutiny of its efforts and with the Federal Geographic Data Committee (FGDC) to ensure effective and consistent development of ocean and coastal components of the National Spatial Data Infrastructure (NSDI) and coordinated development and delivery of geospatial data, metadata, tools, and services; and
- Facilitate interagency collaboration and partnerships that lead to effective use of resources and enhanced provision of ocean and coastal mapping data products and services.

Table 8 is derived from the non-federal spreadsheet in Appendix C and highlights the sub-topic areas with significant investment, such as large-scale processes and human/physical coupling. The non-federal sub-topic areas are quite similar to the areas of federal investment (Table 7) with two notable exceptions. Only two non-federal researchers submitted ongoing work related to ecosystem services, whereas eight researchers are looking into the effect of human interventions on long-term physical evolution.

TABLE 8. SUB-TOPIC AREAS FOR NON-FEDERAL RESEARCH WITHIN THE LONG-TERM EVOLUTION THEME. NOTE THE IMPORTANCE OF A NEARSHORE SYSTEMS APPROACH.

Subtopic Area	Number of ongoing projects in each area
Large-scale Processes/Sediment Budget	9
Human/Physical Coupling	8
Relative SLR	6
Biogeomorphology	5
Sand Resources	5
Monitoring	4
Ecosystem services	2
TOTAL	39

2.4 GAPS

Despite the significant advances in nearshore processes in recent years and the potential for additional breakthroughs in the near future, several significant gaps remain in the larger understanding of these processes. The *Nearshore Report* identified the following as fundamental research questions that need to be addressed.

- What are the most important factors influencing long-term sediment budgets and how can quantitative models incorporate geological constraints and ecological processes?
- What are the feedbacks and interactions between processes at short time-scales, such as storms, and long time-scales, such as sea-level rise?
- How can useful models of long-term evolution of the coastline be developed from models of short time-scale processes (e.g., storms and recovery)?
- What drives human interventions, how do mitigation strategies couple with natural processes and impact system dynamics and long-term sustainability, and how might these factors evolve as physical, economic, and policy forcings change?

The Federal Agencies identified several gaps in addition to those listed in the *Nearshore Report*. The majority of these gaps fall under the categories of sediment budgets and climate change. The gaps also include some of the larger overarching issues that have a significant impact on all studies performed within the coastal zone.

Knowledge gaps identified include the following.

- Beach Nourishment Profile Evolution:
 - How does sediment shift (equilibrate) after placement? How is the present calculation methodology affecting assessment of habitat impacts, mitigation requirements?
- Riverine Inputs:
 - What is the impact of dam removal on sediment budgets and ecosystem health on short and long time scales? How do inland waterways bring an influx of contaminants and sediment, and cause flooding? How do riverine/upland and coastal flooding interact?
- Terrestrial inputs:
 - How does bluff/cliff erosion add to the sediment budget? What controls the timing and magnitude of bluff/cliff failures?
- Return on Investment (ROI) for coastal projects:
 - What is the length of performance of a project, and what contributes to uncertainty in forecast life of performance? What is the persistent ROI or the true holistic evaluation of the “services” provided from these projects?
- Sediment availability:
 - What is the availability/inventory and demand for sediment resources that could be used for beach fill and ecosystem restoration?
- Sea Level Rise (SLR) and Great Lakes Fluctuating Water Levels:
 - Can uncertainties and projections be better conveyed with a common set of assumptions for the calculations? How does risk and vulnerability of communities change as a consequence of changing climate?
 - How can uncertainties, probabilities, and scenarios be communicated to improve management and project decisions?
 - How does risk and vulnerability change as a consequence of sea-level rise?
- Sediment budget connections:
 - What are the coastal/inner shelf and estuarine connections to the sediment budget? How do inlets affect the coastline? How does estuarine/back-barrier ecosystem health and shoreline stability depend on sediment exchange throughout the system?

Long-term coastal morphology will be driven by the interactions between physical, biological, chemical, and human processes. For example, the accretion (or lack thereof) of coastal marsh platforms is dependent on sediment dynamics and biological productivity. Significant gaps in understanding long-term coastal evolution include the coupling and feedbacks between these physical, biological, chemical, and human interactions over time, and possible mitigation activities (e.g., thin-layer sediment application on marshes).

3 EXTREME EVENTS

3.1 INTRODUCTION

As coastal population booms and climate changes, the need to understand how coastlines evolve in response to extreme events becomes increasingly important. Coastal-storm-related economic losses have increased substantially, largely due to increases in population and development in hazard-prone coastal areas (NRC 2014). Observations are limited and concentrated in regions impacted by recent extreme events, as described in Section 2.1. The topics of long-term coastal evolution and extreme events often require the same data collection and modelling while recognizing that time-scales and forcings may differ. For example, feedback loops are important, particularly those between short- and long-term geomorphologic evolution and episodic storm hydrodynamics. Long-term coastal evolution may drive changes in vulnerability to extreme events. Overall, Federal research projects are addressing, to some extent, the three extreme event related research questions identified in the *Nearshore Report*: 1) processes during extreme events vs. moderate events, 2) hydrodynamic feedback impacts on recovery, and 3) the effects of the built environment on flooding and erosion.

TABLE 9. FEDERAL RESEARCH PROJECTS WITHIN THE EXTREME EVENTS THEME GROUPED BY THE THREE BASIC RESEARCH QUESTIONS FROM THE NEARSHORE REPORT.

A - how do wave runup, setup, and sediment processes during extreme events differ from moderate conditions, B - how do feedbacks between hydrology and morphology affect flooding, erosion, and recovery of coastal areas, C - how do urban environment and human infrastructure affect flooding and erosion during extreme events and recovery	Number of Projects Each
A	6
AB	17
ABC	0
AC	7
B	14
BC	4
C	13
TOTAL	61

To illustrate this point, Table 9 summarizes the breakdown of ongoing Federal research in extreme events by the fundamental research questions (shown as A, B, C in the table) highlighted in the *Nearshore Report*. Generalizations on the amount of research underway in each of the topic areas are based on the classifications in Table 9. The effect of feedbacks between hydrology and morphology on extreme events (“B”) is directly or jointly related to the majority of ongoing federal research in this topic area. Research into nearshore processes during extreme vs. moderate events (“A”) also relates to nearly 50% of ongoing research. Effects of urban environments on extreme event processes (“C”) are the focus of 40% of federal research in this topic. Based on these generalizations, it appears that ongoing Federal research is reasonably well-rounded relative to the research questions identified in the *Nearshore Report*.

3.2 EXISTING FEDERAL COLLABORATIONS

An examination of the existing projects addressing nearshore processes associated with extreme events suggests that relatively few programs within agencies are tackling these issues alone. For example, when the National Weather Service predicts a U.S. hurricane landfall, additional agencies including USACE, USGS, and other branches of NOAA all coordinate in preparing, forecasting, and/or collecting data during and after the event. Facing other potential coastal catastrophes, the NRC and FEMA have worked with USGS and additional partners to investigate potential tsunami sources and how tsunamis impact coastal communities.

The Integrated Ocean Observing System (IOOS) has many collaborative efforts including the Coastal and Ocean Modeling Testbed (COMT) of Puerto Rico and the U.S. Virgin Islands. This effort is focused on surge and wave inundation modeling for the steep-sloped coastal environment of the Caribbean Islands. The collaborating team (including USACE, NOAA, University of Puerto Rico, and Notre Dame) are testing the efficiency and accuracy of several wave and surge models and validating the models with field measurements. Another IOOS testbed is focused on improving hurricane forecasts in the Gulf of Mexico using four storm surge models. Efforts are concentrated on model grid size and resolution, wind fields, and improvement of model physics.

NOAA also is developing an [inundation dashboard](#) to inform coastal managers about potential storm surge, which could be significantly improved by adding the total water level the USGS has calculated. NOAA OAR (Ocean and Atmospheric Research) Great Lakes Environmental Research Laboratory collaborates with the USACE, the Great Lakes Restoration Initiative, and the Cooperative Institute for Limnology and Ecosystem Research to produce the [Great Lakes Water Level Dashboard](#), an interactive

webportal that makes available to the public data on current lake level, monthly forecasts, and paleoclimate reconstructions.

The USACE's Coastal and Hydraulics Laboratory's Field Research Facility (FRF) continues to represent a catalyst for federal and non-federal collaboration (see next box). Presently a long-term wave model testbed is underway at the FRF for evaluating and ultimately improving nearshore wave models. Models that are included in this process are STWAVE, unstructured WaveWatchIII, and possibly an expansion to morphology models.

The North Atlantic Coast Comprehensive Study (NACCS), following Hurricane Sandy, considered steps to improve coastal resiliency of the multi-state region affected by the storm. The NACCS Task Force included HUD, FEMA, NOAA, USGS, USFWS, and EPA, and engaged state agencies, the public, and NGOs. NACCS funding was directed to identify the coastal storm and flood risk to vulnerable populations, property, and ecosystems, and how these risks may evolve with climate change. The study resulted in data, tools, numerical model calculations, and a systematic framework that can be leveraged and shared for this region.

Also following Hurricane Sandy, the USGS and USACE collaborated at Fire Island, NY, to examine the dynamics of the shoreline and monitor the continued response and recovery by collecting surveys using continuous alongshore differential global positioning system (DGPS) in conjunction with [cross shore profiles](#). Multiple shore-parallel and shore-oblique tracks were surveyed to capture the base of the dune, the mid-beach, and the upper and lower foreshore along the length of the island from Fire Island lighthouse to the western side of the Wilderness breach at Old Inlet. Initial surveys were conducted one day prior to landfall, and immediate post-storm surveys were conducted over the three days following Sandy. The beaches and dunes were resurveyed monthly from December 2012 through April 2013, and periodic surveys were collected through the fall of 2015 (Brenner et al. 2015).

The USACE's Mobile District has led a multi-agency response to Hurricane Katrina for the Mississippi Gulf Coast. The Mississippi Coastal Improvement Program, "MsCIP," included the USGS, Environmental Protection Agency, National Park Service, NOAA, BOEM, academia, State agencies, and industry. The MsCIP program evaluated post-storm response, designed collaborative solutions and developed post-construction monitoring plans for the region extending over multiple barrier islands, estuaries, and mainland coastal areas.

EXAMPLE: SUCCESSFUL NEARSHORE COLLABORATIONS

From wave runup studies to National model for coastal change

Over the past 50 years, sustained collaborations across federal and academic sectors have led to major advances in understanding the complexities of wave runup using lab and numerical studies, as well as coordinated series of field experiments. For example, the interagency field experiments conducted in the 1980s at the FRF in Duck, NC provided video measurements of maximum wave runup over time, which continued in a coordinated series of field experiments. In addition to scientific progress, technological advances were born out of the need to work in a challenging environment, where strong waves can be dangerous for scientists and expensive instrumentation. The advent of remote imaging systems capable of measuring the details of wave runup allowed for observations over a wide range of conditions and locations.

The collaborative studies resulted in a wide range of useful runup models - from detailed hydrodynamic simulations of individual swash events to simple parametric models that reduce swash elevations to the essential elements. Working with academics, USGS researchers furthered the understanding of wave runup and created an improved model that is used to estimate total water levels at the shoreline over large stretches of coast, in the United States and internationally.

Using the new runup model, the USGS began forecasting potential coastal changes by comparing parameterized total water levels to beach morphology. Application of the coastal change model over large stretches of coast required accurate, high-resolution morphology of the Nation's coastlines. Recognizing joint interest and shared expertise, USGS, USACE, NOAA and NASA collaborated on a national effort to map beaches and quantify beach morphology using airborne lidar (see JABLTCX example above), which NASA was originally using to measure the Greenland ice sheet. These data, combined with modeled total water levels, allowed for the first nationally consistent assessment of coastal vulnerability to erosion during future storm conditions, putting simple and important information about coastal processes into the hands of managers and planners.

These same models are also used real-time to assess the coastal impacts of landfalling storms. NOAA modeled waves and storm surge provide updated, storm-specific hydrodynamic forcing to calculate total water levels in affected areas and, ultimately, the coastal change that might be expected at landfall. As the event-specific forecasts gained greater exposure, researchers from federal agencies realized the breadth of applications for both the forecasts and the supporting data and models. For example, working with USFWS, NPS, and the North Atlantic LCC, these models were used in part of a large study on piping plover conservation to address the impacts of storms on the habitats and populations of the threatened species. In another example, USGS, NOAA NCEP and NOAA NWS are working together to incorporate USGS runup models into NOAA nearshore wave models, allowing for fully operational forecasts of total water level and coastal change at national scales, based on morphology measured by NOAA and USACE.

The Department of Homeland Security (DHS) Office of University Programs (OUP) Coastal Hazards Center of Expertise engages several federal agencies such as the USACE on an advisory committee charged with ranking and reviewing academic research related to nearshore processes during extreme events.

3.3 POTENTIAL COLLABORATIONS

A number of specific and immediate areas to expand Federal collaborations beyond the existing partnerships are apparent. For example, NOAA is interested in modeling barrier island breaches, the USGS has an active research project focused on Fire Island, and the USACE is developing predictive technologies for coastal breaches. FEMA has been updating flood maps nationwide and therefore could be interested in the ability of NOAA's annual climate assessment to support flood assessment as well as the ability of the USGS to model total water levels and the implications on urban flooding. ONR is beginning a small hindcasting effort for past storm events to determine where model failings occur and the nature of these failings, to be used in guiding future research investments. This may lead to collaborative data collection and modeling/forecast research opportunities for future extreme events.

A number of important subtopic areas also exist, such as impacts of extreme events on coastal urban environments and the interaction of nearshore processes with built human infrastructure. While the topic concerning impacts of coastal processes on urban environments is a relatively new area of research, federal agencies have a mandate to work in populated coastal regions.

Table 10 is derived from the spreadsheet in Appendix B and highlights the sub-topic areas with significant Federal investment, such as event geomorphology change and urban/human event processes. It also brings to light critical research areas with less investment, such as recovery and community vulnerability. Federal agencies also agreed that the incorporation of social science is a critical element to producing societally-relevant research. Input from social scientists is needed to help physical scientists better communicate risk and uncertainty to the public.

Topics with the largest number of ongoing projects such as event geomorphology change and urban/human event processes (Table 10) are prime areas for immediate collaboration. If, for example, there are 10-19 Federal research projects in this area, interagency collaborations toward efficiencies are highly probable. Agency PI meetings to discuss the details of their projects on a variety of extreme event topic areas, potential collaborations, lessons learned, and communicating risk to the public are needed. Principal Investigators (PIs) from the areas with the most significant current investment

by several agencies will be convened in 2016 to discuss the details of their projects, potential collaborations, lessons learned, communicating risk to the public, and to develop integrated future research plans. Future workshops will also focus on these subtopics to foster additional collaboration among Federal and non-Federal researchers.

TABLE 10. SUB-TOPIC AREAS FOR POTENTIAL INTERAGENCY COLLABORATION WITHIN THE EXTREME EVENTS THEME

Subtopic Area	Number of ongoing projects in each area
Event geomorphology change prediction/collection	19
Urban/Human Event Processes	10
Storm Surge/Coastal Flooding	7
Sea Level Rise/Tidal Flooding	6
Tsunami	5
Recovery/Restoration	5
Other	5
Community vulnerability and impact reduction	4

Conversely, some relevant topics with low numbers of ongoing projects (e.g., recovery and community vulnerability) were identified as important research needs. These topics will be the focus of future national workshops with the objective of fostering increased research investment through collaboration.

Table 11 is derived from the non-federal spreadsheet in Appendix C and highlights the sub-topic areas with significant investment, such as hydrodynamics. The non-federal sub-topic areas are quite different from the areas of federal investment (Table 10). Non-federal research in the extreme events topic area is more focused on hydrodynamics and small-scale processes with less focus on event geomorphology change prediction and data collection.

TABLE 11. SUB-TOPIC AREAS FOR NON-FEDERAL RESEARCH WITHIN THE EXTREME EVENTS THEME.

Subtopic Area	Number of ongoing projects in each area
Hydrodynamics	8
Biogeomorphodynamics	4
Event geomorphology change prediction/collection	3
Erosion/Recovery Cycles	3
Small-scale processes	3
Paleostorms	2
TOTAL	23

3.3.1 STRATEGIC, MULTI-AGENCY EXTREME EVENTS DATA COLLECTION PLAN

To foster Federal agency collaboration in extreme event research, all agencies should agree on the research and data needs. Each agency's operational mission could be informed by research needs, thereby realizing efficiencies to provide needed data to answer societally relevant research questions identified in the *Nearshore Report*. At present, coordination and collaboration between agencies are largely tied to personal relationships, and these relationships are not codified in any manner. It is important to develop a systematic method of sharing data, particularly event-driven data. Codifying or systematically organizing both the data and the relationships between agencies will improve the ability to apply these data to models as well as to provide support to others.

Recommendation #3: Implement a strategic, multi-agency extreme events data collection plan to provide much needed data for research.

Workshop participants suggested that a **strategic, multi-agency extreme events data collection plan** might consider the following steps.

- Define potential duplication of efforts as well as support opportunities for each agency's event-driven response needs, capabilities, and capacity; e.g., collaboration between FEMA and DOI Strategic Sciences Group.
- Extend collaborative data collection and research through the post-event recovery phase, including natural recovery as well as evaluation of recovery projects.
- Determine leadership roles and research implementation plans for agencies and academics.
- Codify the sharing of data beyond personal relationships.
- Data from the multi-agency response to event could become an "experiment of opportunity."
- Develop post-event (including past events) synthesis efforts integrating data and research results from across the community and guiding planning for research response to future events.

Implementation of such a data collection plan would improve national data availability and sharing by closing the gap in understanding what data are collected during emergency responses and what research questions need to be answered (collect a little more data, or in a slightly different manner). The existing Interagency Working Group (IWG) on Ocean and Coastal Mapping and the Interagency Ocean Observing Council (IOOC) may be appropriate vehicles for initiating such a plan.

3.4 GAPS

The Future of Nearshore Research report identified several fundamental research gaps, including hydrodynamics, sediment transport, and morphodynamics, and feedbacks between these processes, during extreme events. In particular, the report suggests that the following fundamental research questions need to be addressed to improve models for coastal resiliency and sustainability.

- How do wave, runup, setup, and sediment transport processes during extreme events differ from those during moderate storm conditions?
- How do feedbacks between the hydrodynamics and morphology affect flooding, erosion, and recovery of coastal areas?
- How do the urban environment and human infrastructure affect flooding and erosion during extreme events and the recovery afterwards?

The Federal Agencies identified additional gaps, which are similar to gaps described in the section on long-term coastal evolution, but at different spatial and temporal scales. Additional study is needed on the built environment's influence on flooding and erosion, to translate research to associated vulnerability. The ongoing collaborations mentioned above should be expanded for integrated coastal flood forecasts during extreme events (i.e., riverine-based and surge-based flooding). Collaborative research on both extreme event flooding and flooding associated with extreme high tides should be expanded.

The nearshore research community can increase ties with social scientists to ensure these aspects translate to risk. Federal agencies have historically struggled to adequately incorporate social science lessons, outreach, and risk communication as integral parts of their research. Extreme events often have life-altering consequences including loss of life, property, infrastructure, and one's overall way of life. Communicating to the public the potential hazards that may accompany an extreme event and what Federal agencies can do to reduce costs and inform and mitigate risk needs to be improved. Physical scientists and social scientists should convene regarding lessons learned from past extreme events and discuss best practices when communicating with the public. The Silver Jackets Program is an example of a successful state-led interagency approach that "brings together multiple state, federal, and sometimes tribal and local agencies to learn from one another in reducing flood risk and other natural disasters to enhance response and recovery efforts" through leveraging multiple programs to provide post-disaster solutions.

Federal agencies also need to engage citizen scientists in a meaningful way. Citizens can be engaged to supplement Federal research. One example of citizen science engagement

is the ongoing NOAA collaboration with the United States Lifesaving Association (USLA) and lifeguard groups to collect observations of rip currents and beach hazards. The visual observations by lifeguards help address an important nearshore data need that cannot be addressed by traditional instrumentation due to cost and infrastructure, and is vital to ongoing efforts to develop and implement an operational rip current forecast model. Another is the number of localities initiating King Tide programs where citizens use their smart-phones to photograph flooding from extreme tides/storms (e.g., <https://mycoast.org/sc/king-tides>).

Finally, geographic gaps in extreme event related research were also evident. Much of the extreme event related research of the workshop participants and in the *Nearshore Report* was Gulf and East Coast centric. West coast extreme events such as El Nino enhancing extreme event impacts, thawing permafrost, coastal cliff failure, landslides, and tsunamis must also be included. Similarly, gaps within Great Lakes coastal processes must be incorporated, such as ice-induced scour and erosion and bluff processes.

4 HUMAN AND ECOSYSTEM HEALTH

4.1 INTRODUCTION

Human and ecosystem health is an interdisciplinary area of research with many existing collaborations that extend beyond the nearshore zone. The extent of collaborative research potential among the involved Federal agencies and within several common interest areas may help drive and leverage future work related to the first two themes. Increased collaboration within and among agencies is needed to better define the societal needs and relevant nearshore research questions within the context of Sections 2 and 3.

The impacts of coastal change, both long-term and due to extreme events, extend beyond human lives and properties. Understanding the ecological and public health consequences of coastal hazards is required for a holistic approach to risk reduction and resilience enhancement. In turn, it is recognized that natural features (“green infrastructure,” “nature-based solutions”) can be effective elements in reducing risk while providing ecological and economic benefits in their own right. Integrating research on physical processes and landform response with ecological and social research will provide tools to more comprehensively evaluate coastal vulnerability and the value and effectiveness of policy and management actions. The capacity of the nearshore processes community to forecast the physical components of the ecosystem,

and the processes that shape it, are essential to the development of comprehensive ecosystem models.

The nearshore community has traditionally been focused on physical processes. In the future, it will be important to maintain and build community expertise in physical nearshore processes while collaborating with nearshore biologists, chemists, and other scientists and engineers to share expertise in physical processes and learn from the other research communities. The intent of this section is not to recommend full-scale diversification away from physical nearshore processes, but to encourage collaboration with other nearshore researchers in order to conduct more interdisciplinary research and address the societally relevant nearshore challenges that span these many fields.

4.2 EXISTING FEDERAL COLLABORATIONS

The breadth of ecosystem-related nearshore topics is vast. Topical areas with existing interagency collaborations in place include: harmful algal blooms (HABS), ocean acidification, endocrine disruptors, corals, water quality, ecosystem valuation, and ecosystem services.

A specific example is the U.S. Coral Reef Task Force (USCRTF), which was established in 1998 by Presidential Executive Order to lead efforts to preserve and protect coral ecosystems. The USCRTF includes representatives from 12 Federal agencies, 7 States, Territories, Commonwealths, and 3 freely-associated States. It helps build partnerships, strategies and support for action to conserve coral reefs. The USGS Coastal and Marine

EXAMPLE: SUCCESSFUL NEARSHORE COLLABORATIONS

The Watershed Partnership Initiative in Ka'anapali, West Maui is an example of bringing agencies together to address ecosystem health in the coastal zone. An integrated program was developed to support projects that addressed source and fate of pollutants, coastal planning, and community engagement. Begun in the late 1990's, this partnership includes the State of Hawaii Dept. of Land and Natural Resources, Hawaii State Department of Health, USACE, USGS, USEPA, NOAA, USDA, and the National Fish and Wildlife Foundation. Projects that have been completed include coastal use mapping, groundwater tracer studies, stream flow analysis, and development of watershed management plans.

Geology Coral Project works with partners from NPS, NOAA, FWS and local agencies to provide process-level science in support of coral conservation in priority areas identified by the USCRTF. This includes examining the effects of sediment stress, submarine groundwater discharge, carbonate system parameters, coral diseases, and more.

Another example of a successful collaboration within this theme occurred in 2009, when three USGS Science Centers, as well as Minerals Management Service (MMS; now BOEM), NPS, FWS, Exxon Valdez Oil Spill Trustee Council, the North Pacific Research Board, and the Monterey Bay Aquarium began a collaboration to evaluate north Pacific nearshore ecosystems. The project has since expanded to include additional American and Canadian partners. Like crime scene detectives, this team of scientists is using techniques including DNA analysis, forensic evidence, isotope chemistry, and satellite imagery to investigate the health of the Pacific nearshore ecosystem and one of its most recognizable organisms, the sea otter.

The Interagency Working Group on the Harmful Algal Bloom and Hypoxia Research and Control Act (IWG-HABHRCA) formed in October 2014, in response to the requirement in the June 2014 reauthorization of

EXAMPLE: SUCCESSFUL NEARSHORE COLLABORATIONS

A cross-agency response has been taken to address Harmful Algal Blooms (HABs), a critical issue in Lake Erie. EPA's Great Lakes Restoration Initiative (GLRI) helps support NOAA and USGS Lake Erie HAB monitoring programs, including the Environmental Sample Processor at NOAA's Great Lakes Environmental Research Laboratory's (GLERL) which is used for near-real-time detection of cyanotoxins and cyanobacteria. The Cyanobacteria Assessment Network (CyAN) Project is a multi-agency effort including NASA, NOAA, USGS, and EPA to develop an HAB early warning indicator system using historical and current satellite data. NOAA/GLERL also conducts hyperspectral flyovers to remotely sense Western Lake Erie HABs, with advanced equipment from EPA's GLRI. GLRI also supported development of NOAA's Experimental Lake Erie HAB Tracker, a near-term 3D HAB forecasting product based upon multi-agency monitoring data.

NCCOS researchers, with their partners at Heidelberg University, are initiating early season projections of the seasonal HAB in western Lake Erie. These bulletins are updated weekly until July when shorter term forecast are delivered. Early warning provides health officials, environmental managers and water treatment facility operators information to focus their testing to guide beach and shellfish bed closures or water treatment in a more appropriate time frame. They also allow the seafood and tourism industries to minimize impacts.

HABHRCA (P.L. 113-124) for an interagency group to coordinate and address concerns related to HABs and hypoxia nationally and with specific regards to the Great Lakes. The IWG-HABHRCA is intended to serve as the implementation arm of the legislation. Its primary tasks include producing a series of research plans and action strategies for addressing these water quality issues across the US; and coordinating interagency activities to understand and mitigate related causes, consequences, and impacts. The IWG-HABHRCA is co-chaired by NOAA and EPA.

4.3 POTENTIAL COLLABORATIONS

Building on these existing collaborations, several key areas were identified where targeted agency efforts would be particularly effective in advancing research. While agency researchers are already collaborating on certain topics such as HABs, potential workshops could especially aid the development of other subjects. For example, the study of contaminants could better connect microbial, chemical, and nutrient experts by having the issues discussed within more of a coastal frame of reference than is usually considered. By including modelers in these types of initiatives, data producers may also be better able to work with data consumers to enhance efficiency.

The group specifically identified a need to better tie nearshore process research back to stakeholder needs and priorities. Beyond targeted workshops, interagency ecosystem assessments could provide a mechanism for agency collaboration. A systems approach to coastal ecosystem service research could improve the value of benefits provided.

Table 12 is derived from the spreadsheet in Appendix B and details several topical areas tackling water quality, ecosystems and associated services, and associated community vulnerability. Table 12 also highlights the sub-topic areas with significant Federal investment, such as valuation of ecosystem services and chemical pollutants. It brings to light critical research areas with minimal investment, such as long-term ecosystem monitoring and citizen science. The human and ecosystem health theme is different from the two previous themes in that there has been limited involvement from the nearshore physical processes research community in the past. The tools, models and

Recommendation #4: Diversify within the nearshore human and ecosystem health theme specifically by engaging with coastal ecosystem and social scientists to inform research and management decisions.

capabilities of the nearshore community (e.g., physical models of nearshore waves and currents) have tremendous potential to inform research and management with respect to ecological and human health.

Topics with the largest number of ongoing projects, such as valuation of ecosystem services and chemical pollutants, as shown in Table 12 are prime areas for immediate collaboration. If, for example, there are over 20 Federal research projects in this area, interagency collaborations toward efficiencies are highly probable. Principal Investigators (PIs) from the areas with the most significant current investment by several agencies will be convened in 2016 to develop integrated future research plans. Future workshops will also focus on these subtopics to foster additional collaboration among Federal and non-Federal researchers.

Conversely, the topics with low numbers of ongoing projects (long-term ecosystem monitoring and citizen science) were identified as important research needs. These topics will be the focus of future national workshops with the objective of fostering increased research investment through collaboration.

TABLE 12. SUB-TOPIC AREAS FOR POTENTIAL INTERAGENCY COLLABORATION WITHIN THE HUMAN AND ECOSYSTEM HEALTH THEME.

Subtopic Area	Number of ongoing projects in each area
Valuation/Ecosystem services	27
Chemical Pollutants	20
Community Vulnerability	16
Fish	10
HABs	10
Marsh/Wetland Health	10
Water quality/Microbial Pollutants	10
Water availability	8
Long-term ecosystem monitoring	4
Invasive Species	3
Citizen Science	2
TOTAL	120+

Table 13 is derived from the spreadsheet in Appendix C and, much like Table 12, highlights the topical areas tackling water quality, ecosystems and associated services, and associated community vulnerability. According to the respondents, water quality is the subtopic area with the most non-federal research.

4.4 GAPS

The Future of Nearshore Processes report identified several gaps in understanding physical processes affecting ecosystem health, and listed the following fundamental research questions that need to be addressed to better predict ecosystem health.

1. What are the dominant physical mechanisms of exchange between estuaries, beach sands, surf zones, and inner-shelf regions so they can be modeled? For example, can polluted beach sediments act as a pathogen reservoir that is released during storm-induced erosion, and can this be accurately simulated?
2. How do the physical, chemical, and biological processes interact to regulate different pollutant concentrations? For example, what physical processes result in reduced surfzone fecal indicator bacteria mortality and can this be incorporated into models?

TABLE 13. SUB-TOPIC AREAS FOR NON-FEDERAL RESEARCH WITHIN THE HUMAN AND ECOSYSTEM HEALTH THEME.

Subtopic Area	Number of ongoing projects in each area
Water Quality	6
Marsh/wetland Health	4
Community Vulnerability/Planning	4
Chemical Pollutants	3
Biogeochemistry	1
Beach safety	1
TOTAL	19

Major gaps identified by the Federal Agencies included the ability to consider the interactions between fisheries, socioeconomic and geographic factors with ecosystems and associated human well-being. Fisheries, specifically aquaculture in the nearshore zone, will continue to influence the coast. Here, the systems view is particularly important to understanding the feedbacks and coupling between coastal geology, biology, chemistry, oceanography, and social science.

The nearshore processes community can engage both local communities and other Federal agencies by increasing communication. A greater understanding of community livelihoods tied to key ecosystem services and community vulnerability to storms and other coastal hazards would allow researchers to have greater impact and garner support. Additionally, input from EPA, NOAA, USFWS, NASA, DHS, Coast Guard, U.S. Department of Health and Human Services, National Institute of Environmental Health (NIEHS), and USDA (agricultural runoff, fish farming) is also needed to better understand the breadth of the human and ecosystem health theme.

In general, many coastal environment health issues are chronic in nature and therefore require support for long-term monitoring. Everything from endocrine disruptors to ocean acidification requires basic data to feed models and shape management decisions.

These efforts will enhance comprehension of all the ways the coastal zone is used. Each time a decision to use an area for one purpose is made (e.g., aquaculture), the other activities being precluded need to be recognized. These kinds of decisions cannot incorporate just present-day economics. Ecological trade-offs need to be included in the evaluation. Models need improved capability to capture those trade-offs and to enhance their capacity to quantify ecosystem valuation under new management scenarios.

5.0 RESEARCH INFRASTRUCTURE

5.1 INTRODUCTION

Progress toward advancing the state-of-the-art knowledge of the three topic areas described above (long-term coastal evolution, extreme events and human/ecosystem health) requires collaborative research as well as better operational communication and coordination between agencies. This section focuses on nearshore research infrastructure which includes data, models and tools, instrumentation, and facilities. Table 14 summarizes the breakdown of the present Federal investment in nearshore infrastructure based on the themes of the *Nearshore Report*. Meeting the challenges of the *Nearshore Report* will require increased collaboration and improved access and sharing of this research infrastructure.

TABLE 14. FEDERAL RESEARCH PROJECT GROUPINGS WITHIN THE MODELING/OBSERVATIONS INFRASTRUCTURE THEME.

Instrumentation/Observations	30
Modeling	31
Tools	17
Data Management/Applications	12
TOTAL	90

Much nearshore data are not easily discoverable or accessible, information about sensor capabilities and availability is not widely shared, accessibility to unique facilities is not widely known, models are often developed with a non-community approach, and applications are often developed in a home-grown fashion instead of leveraging community standards and best practices. Fortunately, in all these areas there are examples of standardization, openness, and sharing that the community can build on; building on successes that are already in place, with many advances that could be made in 1–2 years with minimal additional resources.

5.2 EXISTING AND NEEDED NEARSHORE RESEARCH INFRASTRUCTURE

5.2.1 NEARSHORE DATA

Federal agencies identified a need to work together to enhance collaborative data infrastructure. This might entail providing a data bank of free/available data such as DEMs, wave data, climate hindcasts and projections, assessment of sand resources, value of alternate uses, water level data, etc. This work will speed momentum at the start of projects and avoid the duplication of efforts.

All nearshore observed and model data should be discoverable and accessible using a standardized framework. Researchers or developers would be able to use tools in their programming language of choice to query catalogs like <http://www.data.gov>, specifying a bounding box and time period of interest, desired variables, and perhaps other information like institution or project identifier. The search query would return records with standard web services identified, from which data, images or geographic information system (GIS) layers could be extracted and used in either research or application workflows. This is the vision of the Open Government initiative (<https://www.whitehouse.gov/open>). This distributed approach, pioneered in weather forecasting and climate science where collaboration with big data is critical (e.g. Mattmann, 2013), not only makes research and end-user application development more efficient and effective by reducing “science friction” (e.g. Edwards et al, 2011), but holds the potential to enable new science and data workflows that were not previously possible (Abbott, 2009). Because there is nothing inherently discipline-specific about this approach, it has been adopted by other communities in the geosciences. For example, it was adopted by the U.S Integrated Observing System (IOOS), a NOAA-led collaboration of 17 Federal Agencies, and 11 Regional Associations made up of academic, commercial, and government partners (de La Beaujardière et al, 2010; Signell and Snowden, 2014). The nearshore community is poised to adopt this framework as well.

The nearshore community has a large amount of well-organized data that exist in data types that could easily be connected with the standardized data framework. Time-series measurements, profiles, acoustic Doppler current profiler (ADCP) measurements, images, autonomous underwater vehicles (AUVs), glider measurements, and numerical model output all have clear pathways to connect to existing systems like the one used by IOOS. All that is required for these datasets, many held in academic institutions, is to have scripts written that allow these collections to be transformed into standard database schema or standardized files (e.g., [NetCDF](#), [HDF5](#)) with appropriate metadata (e.g., [CF Conventions](#)).

There are also well-organized collections of data for which data standards still need to be developed; for example, spectral wave data and derived information from video systems like [Argus](#) and [Erdman](#). This would take additional effort – meeting with community members to identify important common metadata requirements, and then building and testing standards, tools, and workflows for these data types.

Further still there are collections of nearshore data that are not well organized. These are mostly the investigator- or project-specific datasets with no common structure or metadata. More resources are usually required to connect these datasets, usually referred to as the “Long Tail of Science” (e.g. Heidorn, 2008).

5.2.2 NEARSHORE MODELS AND TOOLS

The Future of Nearshore Processes Research report recommended the following research directions to improve simulations for nearshore interactions and evolution.

- Model coupled human and natural driven long-term coastal evolution, including improving parameterizations for sediment transport processes in models for long-term change, coupling with economic models, constraining models using data assimilation, and providing uncertainty estimates.
- Model extreme event-driven overland flow and corresponding erosion, including coupling ocean hydrodynamic, sediment transport, morphological, overland flow, and groundwater processes.
- Model nearshore material transport, including incorporating and coupling models for physical, biological, and chemical processes and assimilating new high-resolution observations.

Infrastructure needed to develop improved models includes the following.

- Nearshore modeling testbeds.
- Coupling of different types of models to facilitate new predictive capability.
- A real-time data-assimilating nearshore modeling system.

***Recommendation #5:** Adopt standardized data frameworks and toolkits, community models and modeling test beds to facilitate sharing and access for research.*

Additional potential opportunities identified by Federal Agencies within this topic area include the following.

- Developing standardized toolkits to discover and access nearshore data in the computational environments that researchers and developers already use, e.g., MATLAB, Python, ArcGIS, JavaScript. These toolboxes should help researchers and developers query and access data via standard web services, as well as provide for common interpolation or extraction needs, e.g., search for temperature data in a specified bounding box and time period, return a time series from a point.
- Encouraging the development of true community models, where a “community” model is defined as not only a model that is available to the community, but one that is developed in the open (as open source), e.g., GitHub, with user and community development engagement, testing and feedback. E-mail listserves are not community models. Delft3D, ADCIRC

(ADvanced CIRCulation), and COAWST models could all benefit from becoming true Community models. This activity could be regarded as responding to the

EXAMPLE: SUCCESSFUL NEARSHORE COLLABORATIONS

Both BOEM and NOAA routinely model the trajectory of oil spills in nearshore waters. BOEM does so primarily to [assess oil-spill risks associated with offshore energy activities](#), whereas NOAA typically does so in [response to spill events](#). The physics underlying the calculation of these trajectories—be it for planning or response—is substantially similar, and both BOEM and NOAA have taken advantage of this opportunity to collaborate.

A present example of this Federal partnership is the study [Assessing the Impact of Oil Spills to Subsurface Biota using 3-D Oil Spill Modeling](#). For this study BOEM is providing funding to NOAA to improve the subsurface capabilities of NOAA’s [General NOAA Operational Modeling Environment \(GNOME\)](#) and their [Trajectory Analysis Planner \(TAP\)](#), which will take ensembles of GNOME model runs to calculate the probabilities of an oil spill coming in contact with nearshore resources (e.g., shoreline, beaches, ports, rookeries, etc.).

The improvements to GNOME and TAP will benefit BOEM’s [Oil Spill Risk Analysis \(OSRA\)](#) modeling and NOAA’s own spill response and restoration efforts. The resultant computer code is also being made publicly available for [open source development via GitHub](#).

Office of Management and Budget's (OMB's) call for more Citizen Science: here citizen coding.

- Forming a nearshore modeling testbed. USACE, USGS, EPA, BOEM, Navy, and many academic and commercial groups have coastal, nearshore and particle tracking models. Nearshore modeling would benefit from some test cases, together with sample datasets. See discussion of Integrated Ocean Observing System's Coastal and Ocean Modeling Testbed, and a numerical modeling testbed at the USACE's Field Research Facility described in Section 3.2.
- Expanding participation in code sharing repositories for scientific workflows (e.g., MATLAB, Python, ArcGIS workflows) that demonstrate how to search, access, and visualize data from multiple sources to solve science, management, or end-user problems. These workflows could be used to reproduce science, serve as training materials, or templates to be expanded or modified to support new research and application development.

5.2.3 NEARSHORE INSTRUMENTATION

The Future of Nearshore Processes Research report recommended the following instrumentation needs required to improve and expand nearshore observations.

1. Develop new sensors and observing techniques, including those that will enable measurements of material exchange across the nearshore, of water column and near-bed processes and bathymetry during extreme events, and of pathogen and contaminant concentrations.
2. Expand long-term observing systems, conduct multi-agency interdisciplinary field studies, and develop new citizen-science opportunities.

In addition, the Federal Agencies suggested that the nearshore community aim to promote collaboration among Federal and non-Federal researchers through instrumentation sharing. Many researchers have invested in specialized instrumentation, both portable and stationary. Instrumentation owned by one institution may facilitate the research of others in the nearshore community. Instrumentation sharing is quite common in some other sciences, particularly the biomedical field, for example, where expensive research instruments can only be justified on a shared-use basis. A similar collaborative spirit within the nearshore community could make more efficient use of portable instrumentation that is not used year round. Longer-duration instrumentation deployments could be augmented with additional instruments, or different types of instruments, to take advantage of deployment teams and operational support.

Federal and non-Federal collaboration is also needed to develop new sensors and observing techniques.

5.2.4 NEARSHORE FACILITIES

Expansion of long-term observing systems and multi-agency interdisciplinary field and laboratory studies is needed. For example, the USACE Field Research Facility (FRF) in Duck, NC, the ERDC Headquarters' laboratories in Vicksburg, MS, the Naval Research Lab in Annapolis, MD, and Scripps Institution of Oceanography in La Jolla, CA, are just a few examples of the unique facilities that could be used by the nearshore community to conduct research and save duplication.

There is an opportunity to consider the University National Oceanographic Laboratory System (UNOLS) as an example for nearshore research. UNOLS includes an asset

Recommendation #6: Develop a cross-agency research asset management system to encourage instrumentation, field and lab facility sharing, and advocate for federal funding to support use of these facilities similar to “ship time” in deep-water oceanographic research.

management system of research vessel and equipment inventory for community use. In deep water oceanography research, it is common for federal agencies fund “ship time” in addition to other elements of non-federal research proposals.

A cross-agency asset management system that outlines the equipment and unique facilities of each agency, with schedules of equipment availability and planned “ship time” to facilitate field collaboration is recommended. For example, there is a need for small research vessels suitable for nearshore research in the 80-120 foot class. Laying out what facilities are available, their unique capabilities, planned experiments, and availability will permit the community to increase vessel utilization. Importantly, organizing collaborative experiments to coincide at specified times would create efficiencies in access and use by leveraging support staff, ancillary measurements, and other researchers.

5.3 POTENTIAL OPPORTUNITIES

The Federal Agencies recommend development of a nearshore community web portal to allow easy discovery of the registration of data, models and tools, instrumentation, and facilities. The opportunity relies on individuals and agencies creating metadata files for each research infrastructure category with sufficient information and links to existing websites to document the asset. This would enable greater collaboration and the ability to let the community know of new resources as they emerge.

To facilitate data access, IOOS and the NOAA National Centers for Environmental Information (NCEI) should explore NCEI accepting, storing and distributing nearshore data. Although IOOS traditionally has a focus on real time data, BOEM has funded IOOS to make historical data available. Creating a nearshore catalog system of nearshore data with services, populating it with a few large, well organized datasets (like the USACE Field Research Facility (FRF) long-term observational data), and generating a portal and some reproducible workflows in tools commonly used by researchers (MATLAB,

***Recommendation #7:** Create a web portal for easy discovery, linking, and distribution of nearshore data.*

Python) would facilitate research across the community. This catalog system would serve as a demonstration of the framework benefits for the nearshore community that

could grow over time, as more resources become available. This would also have the benefit of “moving from working version to working version,” one of Gray’s Laws (Szalay and Blakeley, 2009).

Cataloging instrument metadata and field experiments would allow leveraging measurements and field experiment collaborations across agencies. As many agencies already have some system for asset management, this might involve simply some semantic mediation or translation to create a system that would allow, for example, a USGS researcher to supplement a planned USACE or BOEM field study. The end-goal would be more measurements at lower cost and require only a database of which variables (e.g., current velocity) can be measured by which instruments (e.g., ADCPs, high-frequency radar) located in which areas (e.g., Gulf of Mexico) at what times (e.g. when storms are approaching or planned fieldwork) by which agencies (e.g., BOEM, USACE, and NOAA).

6.0 PLANNED COLLABORATION

Throughout this report, numerous collaborations have been identified to advance the Federal Integrated Implementation Plan. Of immediate importance is the recommendation to convene Principal Investigators (PIs) on a variety of key topics where Federal investment is significant. PIs from the subtopic areas from each of the

By focusing the initial collaboration effort on the subtopic areas with the most significant Federal investment, the effort should capitalize on obvious collaboration opportunities. This approach promotes some early wins. The October 2016 workshop will host over 100 PIs who will spend time in breakout groups with researchers from the same subtopic areas. Each subtopic area group will develop integrated research plans for implementation over

the next several years. The initial workshop will focus on the following subtopic areas: 1) large scale processes & sediment budgets; 2) ecosystem services; 3) event geomorphology change, prediction, collection; and 4) instrumentation and observations.

Recommendation #8: *Convene Principal Investigators (PIs) from the subtopic areas from each of the four themes with the most significant current investment by several agencies in 2016 to develop integrated future research plans.*

TABLE 15. SUBTOPIC AREAS WITH SIGNIFICANT AND MULTAGENCY FEDERAL INVESTMENT FROM EACH OF THE FOUR THEMES RECOMMENDED FOR WORKSHOPS IN OCTOBER 2016.

	Number of Ongoing Projects
Long-term coastal evolution:	
Large-scale Processes/Sediment Budget	16
Ecosystem Services	16
Extreme Events:	
Event geomorphology change prediction/collection	19
Coastal Flooding (storm surge, tidal/SLR)	13
Human/Ecosystem Health:	
Water quality/Pollutant transport	30
Valuation/Ecosystem services	27
Research Infrastructure:	
Instrumentation/Observations	30
Modeling	31

7.0 STRATEGIC EVOLUTION

7.1 OVERVIEW

The intent of this report is to identify potential Federal and non-Federal collaborations and current research gaps, highlight existing collaborations, and to encourage efficiencies for future nearshore research. The goal of this effort, and a key recommendation from the *Nearshore Report*, is to create this National Implementation Plan for integrated U.S. nearshore research. The inventory of ongoing Federal nearshore research has identified over 260 research projects (Appendix B) and the inventory of non-Federal research has identified 90 additional research projects (Appendix C). The spreadsheets in Appendix B and C will become living online tools feeding an annually-updated U.S. nearshore research plan to foster collaboration among Federal and non-Federal research agencies.

Collaboration and communication among the researchers and PIs toward integrated research plans on specific topic areas, as facilitated by the October 2016 workshop for

instance, will further refine the National Implementation Plan. The annually-updated nearshore research inventory and annual collaboration workshops will serve to foster collaboration among Federal and non-Federal research entities.

***Recommendation #9:** Unite a community of practice through an information sharing forum in conjunction with the recommended web portal.*

To facilitate sharing of the annual National Implementation Plan and other information outlined here, a community of practice is envisioned with an information sharing forum hosted by the ASBPA in conjunction with the recommended web portal (Recommendation #7). A community

webpage will include links to the final version of the Federal and national research plans, as well as the nearshore catalog system of nearshore data and other research infrastructure resources described in Section 5.

7.2 COLLABORATION WORKSHOPS

The first annual workshop to bring together Federal and non-Federal PIs will take place in October 2016. It is described in detail in Section 1.4.3. Future large, collaboration workshops will be hosted annually. The collaboration workshops, focusing on specific topic areas, will encourage interdisciplinary engagement at this level to address needs

***Recommendation #10:** Hold collaboration workshops annually, focusing on specific topic areas, and hold the Federal Technical Workshop every two years.*

outlined here and to develop collaborative research plans.

In addition, a recurring biennial workshop will take place in the big-picture research format of the

Federal Technical Workshop described in this report. The next workshop in this format will occur in 2018. Future workshops will also engage non-federal researchers and serve to sustain momentum at the programmatic and research coordinator levels. Program managers will have the opportunity to review integrated research plans developed during the workshops and provide guidance for future collaborative topic areas.

7.3 COMMUNITY STRUCTURE

Both the Leadership Council and Federal Technical Workshop participants discussed the future organization or structure of the interagency nearshore processes research effort. All agreed that over-formalization, e.g., congressional reporting or other hierarchical requirements of formalized research programs, might slow the present

momentum. Ideally, the effort will continue to advance because agencies, academics, and others find participation advantageous as opposed to it being an organizational requirement. Participants favor the present organization of decentralized networking over a formal hierarchy, but agree it needs sufficient agency leadership and commitment. This section outlines an informal charter to sustain the effort.

The Leadership Council (Table 1) with representation from nine or more Federal agencies, academia, and NGOs will serve as a catalyst, facilitating momentum for and steering this effort. This council may recommend, for example, focused committees, facilitated workshops, or other working groups on specific themes identified herein to assist with research and community collaboration. Nationalization of this effort will require expanding the Leadership Council to include representation from the non-Federal entities, such as academia, states, local communities, industry, and NGOs.

The Leadership Council will meet annually in Washington, D.C., prior to the initiation of the agencies' annual budget finalization, to be briefed on the progress of the research integration effort. Each year, a different agency will host the Leadership Council and highlight their agency research, collaboration successes, and future integration opportunities. In addition, all the Federal and non-Federal entities on the council will provide written updates for the council briefing packet on similar successes and recommendations.

The U.S. Army Corps of Engineer's Coastal Engineering Research Board (CERB) served as the catalyst and initial organizer of this effort. As stated in the initial invitations to participate in this effort, the CERB has a vested interest in meeting USACE coastal processes research requirements, but has limited resources, but by linking existing research across Federal agencies and with non-Federal organizations, the nation can more effectively address critical nearshore research needs. The agencies that are now engaged in this effort value the CERB's leadership and wish to continue to engage the CERB as part of the strategic evolution of this effort. Among other engagement opportunities, the Leadership Council will provide an annual update to the CERB, as well as other agencies or Federal Advisory Committees as requested.

7.3.1 INTERMEDIATE STEPS TOWARD A U.S. NEARSHORE RESEARCH PROGRAM

The vision of the *Nearshore Report* calls for a sustained, multi-agency funded nearshore research program to foster understanding and prediction of the research themes and to foster the next generation of nearshore scientists and engineers. One option for an organizational structure could be under the umbrella of the White House Subcommittee on Ocean Science and Technology (SOST), e.g., U.S. Global Change Research Program

(USGCRP). As noted in the *Nearshore Report*, substantial interagency collaboration will be required to develop the framework of this new U.S. nearshore research program. This organizational structure remains a long-term goal of the effort.

In the interim, a number of intermediate steps may facilitate movement in the direction of such a program. First, graduate student fellowships funded by the participating agencies would help to address the need of fostering the next generation. Agency-funded

***Recommendation #11:** Utilize a new and/or existing collaborative funding mechanism for graduate student fellowships to foster the next generation of nearshore scientists and engineers.*

academic research could be more transparent and coordinated through this effort. For example, the participating agencies may pool resources to fund academic research to address the gaps identified in this report and expanded upon during the October 2016 workshop.

Second, basic nearshore research can be encouraged by federal partnering to support facility use, similar to “ship time” per Recommendation #6.

Finally, as outlined in this report, there are a number of ongoing, interagency collaborations in nearshore science. All contracting and collaboration opportunities, such as the National Ocean Partnership Program (NOPP), should be explored to facilitate continued national progress toward addressing the scientific challenges presented here and in the *Nearshore Report*, and to move the community toward the long-term goal of a formalized U.S. nearshore research program.

8.0 SUMMARY OF RECOMMENDATIONS

The following recommendations represent the key action items of the report. This list should be used by the Leadership Council to measure the success of the implementation efforts in the future.

1. Expand nearshore processes research within all themes to integrate biology, ecology, chemistry, and social science, recognizing the importance of the inherent feedbacks and coupling within the nearshore system.
2. Identify and coordinate “experiments of opportunity,” long-term coastal change projects concerning large-scale processes, sediment budgets, and ecosystem services, as future interagency field experiments.
3. Implement a strategic, multi-agency extreme events data collection plan to provide much needed data for research.

4. Diversify within the nearshore human and ecosystem health theme specifically by engaging with coastal ecosystem and social scientists to inform research and management decisions.
5. Adopt standardized data frameworks and toolkits, community models, and modeling test beds to facilitate sharing and access for research.
6. Develop a cross-agency research asset management system to encourage instrumentation, field and lab facility sharing, and advocate for federal funding to support use of these facilities similar to “ship time” in deep-water oceanographic research.
7. Create a web portal for easy discovery, linking, and distribution of nearshore data.
8. Convene Principal Investigators (PIs) from the subtopic areas from each of the four themes with the most significant current investment by several agencies in 2016 to develop integrated future research plans.
9. Unite a community of practice through an information sharing forum in conjunction with the recommended web portal.
10. Hold collaboration workshops annually, focusing on specific topic areas, and hold the Federal Technical Workshop every two years.
11. Utilize a new and/or existing collaborative funding mechanism for graduate student fellowships to foster the next generation of nearshore scientists and engineers.

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APPENDICES

A: LIST OF ATTENDEES

Group 1 – Long-term Processes

Leighann Brandt (BOEM)
Katherine Brutsche (USACE)
David Kidwell (NOAA)
John Haines (USGS)
Douglas Piatkowski (BOEM)
Julie Rosati (USACE)
Alexander Renaud (USACE)
Deb Willard (USGS)

Group 2 - Extreme Events

Mary Cialone (USACE)
Colleen Roche (NOAA)
Jonathan Westcott (FEMA)
Joe Kanney (NRC)
Harry Jenter (USGS)
Hilary Stockdon (USGS)

Group 3 - Human and Ecosystem Health

Christina Kellogg (USGS)
Patricia Bright (USGS)
Lianne Ball (USGS)
Jimmy Moore (BOEM)
Peg Brady (NOAA)
Doug Lipton (NOAA)

Group 4 - Research Infrastructure

Greg Dusek (NOAA)
Linda Lillycrop (USACE)
Rich Signell (USGS)
Jonathan Smith (USGS)
Brian Zelenke (BOEM)

Additional Day 1 Participants

Geoffrey Wikel (BOEM)
Derek Brockbank (ASBPA)
Candace Major (NSF)
Jeff Reidenauer (BOEM)
Reggie Beach (ONR)

APPENDIX B: FEDERAL AGENCY RESEARCH SPREADSHEET

APPENDIX C: NON-FEDERAL AGENCY RESEARCH SPREADSHEET

Appendices B and C are on the following pages.

Long-term Coastal Evolution														
#	Agency	Theme	Research Question addressed, see below	Potential Sub-area/Collab area	Research Title	Agency & POC	Description	Product	Programmatic goals	Location	Data	Non-agency partners	Start and end dates	Other Notes (ie area etc)
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1	USGS	1	A	Relative SLR	Climate Change Impacts on Pacific and Arctic Coasts	USGS - CMG Program, John Haines	Understanding local and regional coastal response to forecasted changes.	developing rigorous research tools to understand the physical impacts that climate change and sea-level rise will have on dynamic geologic settings along Pacific and Arctic coasts	marine.usgs.gov see Understanding Coastal Change, https://walrus.wr.usgs.gov/climate-change/index.html	Pacific Arctic	National Assessment of Shoreline Change: A GIS Compilation of Vector Shorelines and Associated Shoreline Change Data for the North Coast of Alaska, U.S.-Canadian Border to Icy Cape USGS Open-File Report 2015-1030,	Native Alaskans Pacific Island Nations U.S. Fish and Wildlife Service (FWS) Arctic Landscape Conservation Cooperative (ALCC) USGS Alaska Science Center (ASC) Alaska State Division of Geological and Geophysical Surveys (DGGS) University of Alaska Anchorage (UAA) University of Alaska Fairbanks (UAF) NOAA Alaska ShoreZone	October 2012 - September 2017	
2	USGS	1	A	Relative SLR	East Coast Sea Level	USGS, Debra Willard, dwillard@usgs.gov , 703-648-5320	Document sea level variability along the east coast of North America during warm interglacial periods to understand background rates of the current Holocene interglacial; improve estimates of regional tectonic and isostatic adjustment by correlating Atlantic Coastal Plain records of sea level positions with global sea level curves from reefs, deep-sea oxygen isotope curves, and modeling.	Journal articles and dissertation documenting: southern Atlantic Coastal Plain sea levels during Marine Isotope Stage (MIS7-11); central/northern Atlantic Coastal Plain sea levels during MIS 5, 7, and 11; late Holocene sea level from Potomac and Rappahannock marshes	Initial field work and dating of corals and marsh sediments; initial reports presented at 2015 GSA and AGU meetings.	Virginia, North Carolina, South Carolina, Florida	Data will be available at NOAA National Centers for Environmental Information (https://www.ncdc.noaa.gov/data-access/paleoclimatology-data/datasets) upon publication of results.	Rensselaer Polytechnic Institute, Université du Québec à Montréal, University of Florida, University of Delaware, Woods Hole Oceanographic Institute, Bentley University	Research began in FY2015; journal articles should begin coming out early in FY 2017	
3	USGS	1	A	Relative SLR	Geologic Records of High Sea Level	USGS, Debra Willard, dwillard@usgs.gov , 703-648-5320	From sites on the Channel Islands, CA, Guantanamo Bay, Cuba, and Northern Marianas Islands, improve knowledge of: 1) the timing of sea-level high stands during past interglacials; 2) magnitudes of each high sea stand from field studies of paleo-sea level indicators; and 3) marine paleotemperatures during each high stand, which gives information about climatic conditions at the times of high sea level.	Journal articles that map marine terraces and elevation measurements in study sites	Publications include these recent papers: Sea level, paleogeography, and archeology on California's Northern Channel Islands (http://www.sciencedirect.com/science/article/pii/S0033589415000034); Quaternary sea-level history and uplift rates, Channel Islands National Park, California, USA (http://www.sciencedirect.com/science/article/pii/S0273791114003655).	Channel Islands, California; Guantanamo Bay, Cuba; Northern Marianas Islands	Data are contained within published reports.	Natural History Museum of Los Angeles County, University of Hawaii, US National Park Service, US Navy, Harvard University, University of Boulder, University of Queensland, Universidad de las Palmas de Gran Canaria	Project began in FY2013; some products are available now with more coming out in the next few years.	
4	USGS	1,3	A	Biogeomorphology	Forecasting Wetlands migration	USGS, Wetlands and Aquatic Research Center; Scott Wilson (wilson@usgs.gov), Greg Steyer (steyer@usgs.gov); Western Ecological Research Center; Keith Miles (Keith_Miles@usgs.gov); USGS Patuxent Research Center, John French (JBFrench@usgs.gov).	Forecasting the movement of wetlands and their dependant wildlife in response to sea level rise, subsidence, and restoration	Thorne et al. Effects of sea-level rise on tidal marshes along a latitudinal gradient in the Pacific Northwest: US Geological Survey OFR 2015-1204; Cahoon 2015. Estimating relative sea-level rise and submergence potential at a coastal wetland (https://www.pwrc.usgs.gov/Scientist/CoastWet.cfm); http://www.nwrc.usgs.gov/topics/landloss.htm	USGS research and products are provided as the scientific foundation upon which policymakers, natural resource managers, and the public make informed decisions about the management of natural resources on which they and others depend.	Coastal US	various	ongoing		
5	BOEM	1,2	A	Sand Resource	Hurricane Sandy Atlantic Sand Assessment Project (ASAP)	BOEM; jeffrey.reidnauer@boem.gov	Contract with Private Sector: CB&I	Atlantic shelf data acquisition; Geologic (250 vibrocore and 100 grab samples) and geophysical (5600 km) data acquisition to delineate OCS sand resources and map shelf geology. Generated associated Environmental Assessment Document.	**	Atlantic	**	ME DACF (Geological Survey, Maine Coastal Program); NH DES, UNH CCOM; UMASS Geosciences MA Geological Survey; RI CRMC, URI; NY DOS, SUNY Stony Brook; NJDEP Geological and Water Survey; Udel. Geological Survey; MD DNR Geological Survey; VA DMME, VIMS, NC Coastal Studies Institute, ECU, NC DCM; SC DNR - Geological Survey, SC DNR Marine Resources Research Institute, GA DNR, UGA Skidaway Institute of Oceanography; FDEP Geological Survey, FDEP DWRM	02-15-2015 to 10-15-2016	
6	BOEM	1,2	A	Sand Resource	Hurricane Sandy Coastal Recovery and Resiliency - Resource Identification, Delineation and Management Practices	BOEM; jeffrey.walder@boem.gov	Cooperative Agreements with 13 Atlantic Coastal States (ME, NH, MA, RI, NY, NJ, DE, MD, VA, NC, SC, FL)	Develop a geodatabase of existing nearshore and shelf geologic and geophysical data; Assess community, infrastructure and habitat vulnerability. Measure onshore coastal processes (erosion rates overwash etc.). Geologic mapping paleo-geomorphology, compile and analyze existing sand resources evaluation; identify data gap areas for future studies	**	Atlantic	**	ME DACF (Geological Survey, Maine Coastal Program); NH DES, UNH CCOM; UMASS Geosciences MA Geological Survey; RI CRMC, URI; NY DOS, SUNY Stony Brook; NJDEP Geological and Water Survey; Udel. Geological Survey; MD DNR Geological Survey; VA DMME, VIMS, NC Coastal Studies Institute, ECU, NC DCM; SC DNR - Geological Survey, SC DNR Marine Resources Research Institute, GA DNR, UGA Skidaway Institute of Oceanography; FDEP Geological Survey, FDEP DWRM	11-12-2015 to 10-30-2018	
7	BOEM	1,2,3	A	Large-scale processes/sediment Budget	Gulf of Mexico Land Loss Change Assessment and Application to Louisiana Coastal Habitat Loss	BOEM; bruce.baird@boem.gov	1) Evaluate recent (1984-2014) land loss change in the GOM coastal zone, 2) evaluate habitat chance in the Louisiana coastal zone from 2007-2014.	Land/classified datasets, change analysis and rates of change calculated, land loss change by state and hydrologic basin.	**	XGOM	**	USGS	08-08-2015 to 08-08-2019	
8	BOEM	1,2,3	A	Other	Assessment of Mud-Capped Dredge Pit Evolution on the Outer Continental Shelf of the Northern Gulf of Mexico	BOEM; michael.miner@boem.gov	Collect geophysical, geological, and physical oceanographic data to characterize mud-capped dredge pit evolution and validate/refine predictive numerical models	Observation-based characterization of dredge area evolution and recovery; improved predictive capability of offshore dredge area evolution; suggested operational considerations for dredge area design and post dredge monitoring.	**	GOM	**	Louisiana State University	08-05-2014 to 08-31-2017	

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9	BOEM	1,2,3	A	Sand Resource	Assessment of Ship Shoal Borrow Areas for Coastal Restoration of Louisiana Barrier Islands	BOEM; michael.miner@boem.gov	Collect geophysical, geological, and physical oceanographic data to characterize Gulf of Mexico sand shoal dredge area evolution and validate/refine predictive numerical models	Observation-based characterization of dredge area evolution and recovery; improved predictive capability of offshore dredge area evolution; suggested operational considerations for dredge area design and post dredge monitoring	**	GOM	**	Louisiana State University	n/a	
10	BOEM	1,3	A	Relative SLR	Surveying and testing Submerged Paleolandform Features in the Western Gulf of Mexico: The Sabine Pass Project	BOEM; melanie.damour@boem.gov; michael.miner@boem.gov	1) determine shelf response to sea level rise during late quaternary building on earlier studies supplemented with new geologic data and absolute dating 2) paleolandscape preservation potential of strata in Sabine Pass Area 3) test effectiveness of recommended mitigations for cultural resource avoidance	observational dataset, model, application/recommendations	**	GOM	**	TBD	n/a	
11	BOEM	1,3	A	Sand Resource	Late Quaternary Stream and Estuarine Systems to Holocene Sea Level Rise on the OCS Louisiana and Mississippi: Preservation Potential of Pre-Historic Cultural Resources and Sand Resources	BOEM; michael.miner@boem.gov	1) Characterize fluvial response to SLR during the late quaternary offshore West Louisiana, 2) Assess preservation potential of shelf fluvial deposits during transgression 3) Test utility of BOEM Lease Block hazards survey reports for mapping regional geologic features.	1) Better understanding of character fluvial deposits preserved on GOM inner shelf, 2) Conceptual model for paleolandscape preservation on the shelf, 3) Suggestions to improve nearshore shallow geologic mapping/interpretations with applications to prehistoric cultural resource potential.	**		**	Louisiana Geological Survey, Louisiana State University	08-17-2012 to 06-30-2016	
12	BOEM	1,4	A	Relative SLR	Developing Protocols for Reconstructing Submerged Paleocultural Landscapes and Identifying Ancient Native American Archaeological Sites in Submerged Environments	BOEM; brian.jordan@boem.gov	Enhance and refine our understanding of submerged paleocultural landscape distribution on the Atlantic OCS, especially landscapes of tribal significance. Understand and identify paleocultural landscapes of importance to regional Tribes through collaborative research.	This study has five phases and two types of fieldwork including: high-resolution marine geophysical survey and geotechnical sampling. Phase 1: Develop best-practice protocols, which will assist in identifying data needs for field survey and data analysis, developing modeling approaches for reconstructing submerged paleocultural landscapes, and identifying ancient Native American archaeological sites in submerged environments. Phase 2: Develop a methodology to incorporate Tribal knowledge into these best-practice protocols. This information will be used to develop a Paleocultural landscape model. Phase 3: Develop training materials and opportunities for field research. Phase 4: Field investigation, data acquisition, post-processing, analysis and interpretation, and the development of baseline data that will form the foundation of management recommendations. Phase 5: Development of a documentary film to assist in outreach efforts.	**	Atlantic	**	Cooperative Agreement, University of Rhode Island	07-30-2012 to 03-01-2018	
13	USACE	1,4	A	Large-scale processes/sediment Budget	Predictive Tools for Mixed-Sized Sediment Transport	ERDC-CHL Jarrell Smith	Mixed (fine clay, silts; coarser sand and gravel) transport under forcing from waves and currents.	Predictive tools for mixed-sized sediment transport	to advance the state of knowledge and develop engineering technology for predicting waves, current, sediment transport, and morphology change at and around inlets	General	Technical literature; historical data; ERDC laboratory studies	USACE Districts; Clarkson University	FY15-FY19	
14	USACE	1	AB	Inlets	Coastal Modeling System: Waves at Navigation Structures, Geomorphology of Coastal Inlets	ERDC-CHL Richard Styles	Long-term (months to years) morphology change at inlets, navigation channels, and shoals as a function of engineering activities (e.g., dredging and placement of sediment; deepening and widening channels; lengthening/shortening jetties) at inlets.	Coastal Modeling System (CMS): Morphology Change	to advance the state of knowledge and develop engineering technology for predicting waves, current, sediment transport, and morphology change at and around inlets	General	Technical literature; historical data; CIRP databases; USACE Dredging Information System databases	USACE Districts	FY14-FY17	Coastal Inlets Research Program
15	USACE	1	AB	Biogeomorphology	Dune Research Grants	ERDC-CHL Tanya Beck	Advance understanding of dune processes	Academic Research	Conduct R&D at the forefront of S&T in collaboration with others to reduce the Nation's risk from flood and coastal storm disasters while energizing the economy, sustaining environmental resources, and promoting community resilience.	General	Publication		FY16-FY17	Flood and Coastal Storm Damage
16	USGS	1	AB	Large-scale processes/sediment Budget	Barrier Island Evolution	USGS - CMG Program, John Haines	(1) Understand how different settings and materials respond to storms, slr, climate (2) Quantify processes associate with sediment transport along and across islands (3) Provide coastal management tools that incorporate thresholds between storm inundation and overwash	(1) Predictions of barrier-island behavior over time scales useful to resource managers (1-5 years). (2) Published data series for sediment/digital chirp sub-bottom/sibique aerial photographs and open file reports for change in length of sections of islands	marine.usgs.gov see Understanding Coastal Change http://coastal.er.usgs.gov/bier/	Gulf of Mexico, LA, AL, MS		NOAA, LADNR, USACE, UNO	October 2012 - September 2017	
17	USGS	1	AB	Large-scale processes/sediment Budget	National Assessment of Coastal Change Hazards- shoreline change mapping and analyses of erosion rates	USGS - CMG Program, John Haines	Consistent mapping, geomorphic characterization, and shoreline change quantification		http://coastal.er.usgs.gov/shoreline-change/	U.S.	http://coastal.er.usgs.gov/shoreline-change/	USACE, NOAA, DOI bureaus, Academic collaborators	October 2002 - September 2020	

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18	USGS	1	AB	Large-scale processes/sediment Budget	Sea Level Rise and Estuaries	USGS - CMG Program, John Haines	Assessing the physical controls of sediment and material exchange between wetlands and estuarine environments along the northern Gulf of Mexico and the Atlantic coast.	(1) Quantify sedimentation rates and sediment source to the estuary (2) Use sediment texture and bathymetric change to evaluate areas of the estuary that act as sinks (short-term vs long-term) or sources of sediment to the coastal ocean (3) Quantify decadal to centennial scale change in shoreline position and interior vegetative coverage	http://coastal.er.usgs.gov/ssi/es/	northern Gulf of Mexico (Grand Bay Alabama/Mississippi and Vermilion Bay, Louisiana) and the Atlantic coast (Chincoteague Bay, Virginia/Maryland)	Radioisotopic Data of Sediments http://pubs.usgs.gov/of/2012/1172/	USACE DOI Bureaus NOAA	October 2012 - September 2017	
19	BOEM	1.2	AB	Large-scale processes/sediment Budget	Shelf-Slope Sediment Exchange in the Northern Gulf of Mexico: Application of Numerical Models for Extreme Events	BOEM; guillermo.anad@boem.gov	This study will provide a comprehensive characterization of sediment transport along the northern Gulf of Mexico, turbidity currents included, and include an analysis of sediment deposition over the study area during extreme atmospheric and oceanic events.	The study will produce sediment profiles that qualitatively and quantitatively depict how sediment deposition is affected by turbidity currents, extreme events in river discharge, and from the varying intensity and paths of hurricanes.	**	GOM	**	Rutgers State University	09-22-2011 to 03-01-2016	
20	USGS	1.2	AB	Large-scale processes/sediment Budget	Fire Island Regional Study - long-term coastal evolution and storm response and recovery	USGS - CMG Program, John Haines	Increase our understanding of the physical processes that cause coastal change, and ultimately improve our capability to predict the processes and their impacts; includes studies of linkage of inner-shelf geology, morphology, and transport to coastal response and recovery	Geologic Framework: http://woodshole.er.usgs.gov/project-pages/coastal_change-study-sites-fire-island-geologic-framework.html	http://coastal.er.usgs.gov/fire-island/	New York		USACE, NPS, NFWS, Academic collaborators	2016	
21	USGS	1.2,3	AB	Large-scale processes/sediment Budget	Assateague Island Regional Study	USGS - CMG Program, John Haines	defines the geologic framework of the Delmarva coastal system through geophysical mapping of the inner continental shelf, with an initial focus on Assateague Island. Modeling and observational studies will link geologic controls and physical processes that govern coastal system evolution at storm-event and longer timescales.	Publications: http://woodshole.er.usgs.gov/project-pages/delmarva/publications.html	http://woodshole.er.usgs.gov/project-pages/delmarva/index.html	DE, MD, VA	Oceanographic Model and Data Portal http://cmgdata.usgsports.net/ Data Releases: http://woodshole.er.usgs.gov/project-pages/delmarva/datreleases.html	NPS NOAA, Academic partners USFWS	June 2013 - November 2016	
22	USACE	1	ABC	Sand Resource	Predicting Short-Long-term physical and environmental response to DMP	ERDC-EL Candice Ptecy	Beneficial use and other management approaches require the capability to make informed judgements about the short and long-term disposition of the sediment and its influence of the surrounding geomorphology of the system	Rapidly deployed modeling for characterizing short and long-term responses to dredged material placement	research is designed to balance operational and environmental initiatives and to meet complex economic, engineering, and environmental challenges of dredging and disposal in support of the navigation mission	General				DOER
23	USGS	3.1	ABC	Ecosystem Services	Atlantic and Gulf Coastal Plain Climate Variability	USGS, Debra Willard, dwillard@usgs.gov , 703-648-5320	Improve understanding of the late Holocene climate and land use history of the Atlantic and Gulf Coastal Plain and the impacts on terrestrial and coastal habitats. New high-resolution, multi-proxy terrestrial Holocene records from the Southeastern United States are being generated to establish baseline levels of climate and ecosystem variability.	Journal articles; collaboration with USGS project on tidally influenced freshwater forested wetlands in the Southeast to contribute data to Refuge and park managers	Publications include these recent papers: Contemporary Deposition and Long-Term Accumulation of Sediment and Nutrients by Tidal Freshwater Forested Wetlands Impacted by Sea Level Rise http://link.springer.com/article/10.1007/s12237-016-0066-4 ; Coastal and wetland ecosystems of the Chesapeake Bay watershed: Applying palynology to understand impacts of changing climate, sea level, and land use (DOI: 10.1130/2015.0040)	Georgia, South Carolina, Florida, Virginia, Louisiana	As publications come out, data will be posted to the Neotoma Paleocology Database (http://www.neotomadb.org/)	Texas State university, Franklin and Marshall College, Tufts University, University of Florida	The project began in FY2011; some publications already are complete, and others will be forthcoming as the research progresses.	
24	USGS	3.1	ABC	Biogeomorphology	Improving our ability to forecast tidal marsh response to sea level rise	USGS, Debra Willard, dwillard@usgs.gov , 703-648-5320	Understand what controls the vulnerability of coastal marshes to risks associated with climate change and rising sea levels	Journal articles; models of wetland vulnerability to sea level rise and other climate parameters;	Publications include these recent papers: Taking a systems approach to ecological systems (http://onlinelibrary.wiley.com/doi/10.1111/jv.12340/full); Response of plant productivity to experimental flooding in a stable and a submerging marsh (DOI: 10.1007/s10021-015-9870-0); New training website to help our partners learn and use statistical modeling methods (www.mvrc.usgs.gov/SEM)	Nova Scotia, New Brunswick, Maine, Connecticut, Delaware, Maryland, Virginia, South Carolina, Louisiana, Texas, Alaska, Washington	Data currently are available upon request from PIs; upon completion of the project, data will be posted online (site TBD).	Rachel Carson NWR, Stewart B. McKinney NWR, Bombay Hook NWR, Eastern Neck NWR, Smithsonian Environmental Research Center, Blackwater NWR, Fishing Bay State WMA, Saxis State WMA, North Inlet National Estuarine Research Reserve, Pearl River State WMA, Big Branch NWR, McFaddin NWR, Nisqually NWR	The current project began in FY2009; many publications already are complete, and others will be forthcoming as the research progresses.	
25	USGS	4.3	ABC	Large-scale processes/sediment Budget	Dam Removal Science Database and Dam Removal Information Portal	USGS, CSS, Core Science Analytics, Synthesis, and Libraries Program Daniel Wiefelich, dwiefelich@usgs.gov USGS Western Fisheries Research Center, Jeff Duda, jhduda@usgs.gov	Dams and an increasing frequency of dam removal projects due to aging infrastructure and other factors affect coastal ecosystems and processes. A USGS Powell Center project released a Dam Removal Science Database that was subsequently developed into a dynamic data system now online as part of the Biogeographic Information System and a portal interface for mapping and analytics. The system provides researchers and decision analysts a resource for understanding the types of scientific studies conducted on dam removal projects to aid in better future study design.	The Dam Removal Science Database is a distributed data system directed through ScienceBase. It provides a synthesis of research papers and government reports on the history of removed dams and the scientific studies and monitoring conducted as part of or in connection to the removal projects. Dam removals are an important dynamic affecting coastal systems, and increased scientific understanding of their impacts will aid in decision analysis.	Dam Removal Information Portal online at www.sciencebase.gov/drip/ ; Spatial Feature Registry in the Biogeographic Information System contains underlying information on removed dams tied to the NHD and augmented with linkages to other resources (National Inventory of Dams, etc.). Scientific publications from the Dam Removal Science project at the Powell Center and publication in prep on the Dam Removal Information Portal and future R&D.	Mostly U.S. dam removal projects with some international dams incorporated for reference	Source data are organized into the Biogeographic Information System - https://www.sciencebase.gov/catalog/item/54540d80e480e480d-779374504a . Data are aggregated to a CartoDB instance for use in the DRIP application - https://dwiefelich.cartodb.com/viz/182d408c-e06e-11e5-b917-06e4f53eb7d3/public_map . The CartoDB API is used to drive the web app - www.sciencebase.gov/drip/ - and are available for other analysis and visualization uses.	USGS partners with American Rivers to help in identifying additional dam removal projects for future analysis.	The first Dam Removal Science Database was published in 2015. The Dam Removal Information Portal and its current database were published in 2016. Work is ongoing to continuously feed new dam removal projects and literature syntheses into the operational system.	

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26	NOAA	1	AC	Projects as Experiments	THIN LAYER APPLICATION OF DREDGED SEDIMENT TO SALT MARSHES ON MARINE CORPS BASE CAMP LEJEUNE TO INCREASE COASTAL RESILIENCY	NOAA/NOS/NCCOS - Carolyn Currin (Carolyn.Currin@noaa.gov)	The NOAA/NOS/NCCOS Beaufort Laboratory will conduct and evaluate a thin-layer application of dredged material to salt marshes on Marine Corps Base Camp Lejeune (MCBCL). Coastal salt marshes have been shown to be effective at providing erosion and flood control to upland regions and are therefore a valuable form of natural infrastructure. Many coastal marshes are in danger of drowning in the coming century due to increasing rates of sea level rise. Modeling analyses indicate that marshes which exist higher in the tidal frame are more resilient to sea level rise thus, increasing a marsh's "elevation capital" may be the key to enhanced resilience of these important coastal ecosystems. This project will evaluate the beneficial re-use of dredged material as an adaptive management strategy for improved resilience of coastal salt marshes. Thin layer dredge disposal, the process of spreading dredged sediment on coastal marshes, has been used successfully to increase the elevation capital of marshes along the U.S. Gulf Coast, but has not been employed on a large scale in marshes of the Southeast Atlantic region. As a result there is currently no regulatory framework and very little scientific data to support the use of this adaptive management technique in the Southeast. The study area consists of low lying and highly fragmented marshes along the Atlantic Intracoastal Water Way (AIWW) that have previously been determined to be highly susceptible to sea level rise. The proposed sites are on either side of the AIWW as it traverses MCBCL and in close proximity to sites that have been studied intensively by the Defense Coastal Estuarine Research Program (DCERP), of which Currin is a member, for the past decade. As a result, the research plan is informed by monitoring data from long-term NOAA research sites and will benefit from nearby water level stations, and elevation benchmarks. The work will be performed in collaboration with the U.S. Army Corps of Engineers (USACE), who will provide assistance with permitting and regulatory compliance in the planning stages. Depending on funding and vessel availability, the USACE may also be involved in dredge disposal operation.	Anticipated outcomes of this research include: 1) development of the regulatory framework necessary to permit future thin layer projects in the southeast region; 2) a scientific evaluation of the efficacy of this adaptive management strategy for increasing resilience of coastal marshes in the southeast; 3) a technical memo detailing techniques/methods used for dredge material application and lessons learned, and; 4) the study plots will serve as demonstration sites allowing us and others to address a number of basic and applied scientific hypotheses regarding the impact of thin layer disposal on ecosystem services and long-term marsh resilience. This work addresses the NOS roadmap priority of supporting the implementation and use of nature based infrastructure approaches to enhancing coastal resilience. The data generated by this work will be of interest to USACE, OCM, NERRs and state coastal regulatory agencies throughout the Southeastern U.S.		North Carolina	JEFF RICHTER- Wilmington District USACE, Rebecca Ellin- NC National Estuarine Research Reserve, Steven Olmstead - Marine Corp Base Camp Lejeune	03/2016 - 09/30/2018		
27	USACE	1	AC	Material flow/mixed sediment	Nearshore Transport Experiment in LSTF for Nearshore Placement	CHL	This work improves the understanding of mixed sediment nearshore berm migration, constructed of dredged material, and creates a complete dataset to validate numerical models for application to District navigation projects	Parameterization methods for nearshore transport of mixed sand/silt/clay material for improved numerical models	research is designed to balance operational and environmental initiatives and to meet complex economic, engineering, and environmental challenges of dredging and disposal in support of the navigation mission	General				DOER
28	USACE	1	AC	Biogeomorphology	Evaluation of Strategic Placement to feed mudflats and marshes	ERDC-CHL Joe Gailani	Data and protocols to inform decision makers on process required for successful implementation of nearshore placement of mixed sand/silt/clay dredged sediment to nourish nearby resources.	Monitoring and protocols to obtain regulatory approval for direct or strategic placement of mixed sediment in nearshore	research is designed to balance operational and environmental initiatives and to meet complex economic, engineering, and environmental challenges of dredging and disposal in support of the navigation mission	General				DOER
29	USACE	1	AC	Sand Resource	Nearshore Berm Guidance	ERDC-CHL Katie Brusche/Brian McFall	Develop guidance for placement and evolution of Nearshore Berms. Berms are composed of dredged sediment that is placed in the nearshore for the purposes of reducing wave energy, migrating onshore to nourish beaches, and/or working with nature to selectively transport fines offshore and sand onto beaches.	Nearshore Berm Guidance	to advance the state of knowledge and develop engineering technology for predicting waves, current, sediment transport, and morphology change at and around inlets	General	Technical literature; CIRP databases; field studies in conjunction with ongoing District operations	USACE Districts	FY14-FY18	Coastal Inlets Research Program
30	BOEM	1,2,3	AC	Sand Resource	Best Practices for Physical Process and Impact Assessment in Support of Beach Nourishment and Coastal Restoration Activities	BOEM; geoffrey.wikel@boem.gov	Design and implement a morphological modeling approach in order to improve the present understanding of impacts to near-field and far-field physical processes (including morphologic response) related to the modification of offshore bathymetry due to dredging.	Test a suite of models (including ROMS Community Sediment Transport Model System, NearCOM, MIKE 21 Coastal Area Morphological Modeling Shell, and Coastal Modeling System) against observed wave, current, sediment transport and morphologic response. From this improved understanding of physical processes, BOEM may begin to develop analysis criteria and general guidelines that would describe when and why site-specific modeling and higher-cost shoreline impact assessments would be required or could be precluded.	**	ATL and GOM	**	None	09-23-2010 to 09-09-2016	
31	BOEM	1,2,3	AC	Sand Resource	Economic and Geomorphic Comparison of Outer Continental Shelf (OCS) Sand vs. Nearshore Sand for Coastal Restoration Projects	BOEM; michael.miner@boem.gov	Provide a better understanding and quantification of economic, ecologic, and geomorphic long term benefits and costs of using OCS sediment vs. nearshore sediment for coastal restoration projects.	1) Quantification of value of OCS sand to project effectiveness based on physical properties of sand. 2) Quantification of value of OCS sand to enhancing regional coastal sediment budget (vs nearshore where the sediment used for restoration comes from within system) over the long term, both within and outside of the project area.	**	GOM	**	Louisiana State University, University of New Orleans	09-16-2015 to 08-31-2018	

Long-term Coastal Evolution														
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32	BOEM	1,2,3	AC	Sand Resource	Managing Dredge Impacts by Optimizing the Use of Sand Resources	BOEM: paul.knorr@boem.gov	Develop a planning process for optimizing sand resources while diminishing potential impacts using a four-tiered approach to evaluate physical, environmental, and economic concerns in context with appropriate mitigation and monitoring measures to minimize issues. Demonstrate the benefits and costs of this planning process by developing a draft borrow area management plan to optimize use of two or three OCS borrow areas characterized by frequent dredging and/or multiple users (i.e., Ship Shoal offshore Louisiana, Sandbridge Shoal offshore Virginia, or Canaveral Shoal offshore Florida).	A multi-criteria decision analysis (MCDA) tool will be developed to support advanced borrow area planning under a systematic framework. Data compilation, literature review and syntheses, GIS analyses, and coordination with stakeholders will be conducted to inform the MCDA under the following four tiered approach: 1. Physical Resource Characteristics and Borrow Area Requirements, 2.Environmental Considerations, 3.Best Management Practices, and 4.Costs and Benefits of Borrow Area Use. Draft borrow area management plans will be developed for two to three OCS borrow areas.	**	ATL and GOM	**	USACE - ERDC	09-10-2015 to 09-09-2016	
33	USACE	1,4	AC	Large-scale processes/sediment Budget	Genecade regional beach and inlet model	ERDC-CHL Ashley Frey	Quantify shoreline change over regional spatial scales (multiple beaches and inlets) and long-term temporal scales (years to decades) as a function of multiple engineering projects (beach fill, dredging, placement, shoal mining). Research and develop predictive tools for quantifying resilience of navigation channels, navigation structures, and adjacent beaches.	Regional beach and inlet model, Genecade	to advance the state of knowledge and develop engineering technology for predicting waves, current, sediment transport, and morphology change at and around inlets	General	Technical literature; historical data; Dredging Information System databases	USACE Districts	FY12; tool available now	
34	USGS	3,1	AC	Ecosystem Services	Puget Sound Landscape Science Program and Coastal Habitats in Puget Sound (CHIPS)	USGS William Labiosa	USGS provides science to support ecosystem restoration and recovery in Puget Sound. Research on how combination of projected sea level rise, storm surge, and changing river flooding trends will influence restoration objectives and coastal community resilience.	http://puget.usgs.gov/news.html ; http://walrus.wr.usgs.gov/elwha/products.html ; http://www.usgs.gov/newsroom/article.asp?ID=3798&VuMGTf5dghA	1) to provide critical science supporting high-priority needs identified by Puget Sound ecosystem restoration partners; 2) to provide critical science supporting resilient coastal communities around Puget Sound; and 3) to demonstrate an efficient and successful project structure and process for conducting interdisciplinary ecosystem science that integrates across USGS science centers, funding programs, and partners.	Western WA		various		
35	BOEM	1	B	Relative SLR	Investigation of an Ancient Bald Cypress Forest in the Northern Gulf of Mexico, USA	BOEM: alicia.caporaso@boem.gov	Survey the remains of a Late Pleistocene cypress forest off the coast of Louisiana and to document the nature of sediment deposition and tree stump preservation. The chronology of the site's formation and preservation is being determined through laboratory analyses.	To produce a model indicating the preservation likelihood of similar sites along the Gulf of Mexico OCS and to place the submerged, preserved forest remains within the context of northern Gulf of Mexico sea level rise and coastal geomorphology.	**	GOM	**	Louisiana State University	09-04-2015 to 09-30-2018	BOEM National Studies List Reference # GM-14-03-07
36	NOAA	1	B	Ecosystem Services	EESLR: INTEGRATED MODELING FOR THE ASSESSMENT OF ECOLOGICAL IMPACTS OF SEA LEVEL RISE	NOS/NCCOS- David Kidwell david.kidwell@noaa.gov	The Gulf Coast provides critical habitats for a majority of the commercially important species in the Gulf of Mexico, which depend on inshore waters for either permanent residence or nursery area. The ecosystem services provided by these coastal habitats are at risk from rising sea level. A team led by the University of Central Florida will assess the risk to coasts and coastal habitats from SLR. The 5-year project will require collaboration among the Universities of Central Florida, Florida, and South Carolina, Florida State University, the Northwest Florida Water Management District, and Dewberry. The team will apply existing models of circulation, transport and biogeochemistry from the watershed to the sea, including waves. The ultimate prediction will be of sediment loadings to the estuary as a result of overland flow, shoreline and barrier island erosion, and salinity transport in numerous bay systems, all of which will be used to model the evolution of intertidal marshes (MEM II). These models will make use of existing bathymetric and topographic data (e.g. LiDAR) and related data sets, as well as numerous ongoing synergistic activities. Field and laboratory experiments will result in data needed to parameterize marsh and oyster habitat models. Over the five-year course of our research we will be simulating hydrodynamics and transport for all three NERRS reserves, including: Apalachicola, Weeks Bay and Grand Bay.	Decision support tools (e.g., mapping products) of current and projected marsh, oyster reef & SAV locations for all three NERRS. Decision support tools (e.g., mapping products) of incremental prediction of wetland stability for all three NERRS. Decision support tools to identify ideal restoration locations for marsh & oyster habitats for all three NERRS. Decision support tools for predicting future coastal erosion rates for managementspecified shorelines.		Apalachicola, Weeks Bay and Grand Bay NERRs	LSU, Florida State University, University of South Carolina, University of Central Florida, Grand Bay NERR, OCM	9/1/09-8/31/15		
37	NOAA	1	B	Ecosystem Services	EESLR: REFINING ECOSYSTEM MODEL INPUTS FOR SEA-LEVEL RISE VULNERABILITY IN THE SAN FRANCISCO BAY ESTUARY	NOS/NCCOS- David Kidwell david.kidwell@noaa.gov	This project builds on a strong foundation of existing data in the San Francisco Bay estuary by developing new targeted data collection to improve SLR models and implement targeted field experiments that improve the functionality and bay-wide relevance of SLR model results. This information will increase the confidence in local managers and decision makers in assessing and anticipating the climate change impacts on sensitive tidal marsh habitats. In particular, the scientific understanding and the modeling results developed here will help the U.S. Fish & Wildlife Service and California Department of Fish and Wildlife develop adaptation strategies for the continued conservation of listed marsh wildlife species from the near-term effects of episodic storms. In addition, other land managers such as California State Parks, East Bay Regional Parks, local land trusts, and county and city planners (e.g. Marin County) will be able to use this information in their planning and assessments for climate change along the coast.	The project objectives are: (1) development of improved estuary-wide LiDAR-derived data sets using remotesensed and on-the-ground vegetation and RTK GPS data, (2) assess the productivity and decomposition responses of major tidal marsh plant species to gradients in elevation and salinity in the San Francisco Bay estuary to improve productivity and decomposition functional relationships in SLR models, and (3) assess spatial and temporal patterns in sediment deposition as it relates to local plant species composition, season, storms and tidal elevation to improve parameterization of marsh SLR models.		San Francisco, CA	Bruce Duggar and Christopher Janousek, Oregon State University, Karen Thorne, USGS	9/1/15-8/31/18		

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38	NOAA	I	B	Relative SLR	EESLR: STORM SURGE AND SEA LEVEL RISE ON A CHANGING LANDSCAPE	NOS/NCCOS- David Kidwell david.kidwell@noaa.gov	The Hampton Roads region is rated second only to New Orleans as the most vulnerable area to relative sea level rise in the country. To address this issue and advance sea level rise/storm surge modeling, NCCOS is participating with NOS OCM and Virginia Sea Grant in the inter-Hampton Roads Sea Level Rise Preparedness and Resiliency Inter-governmental Pilot project to quantify the dynamic effects of sea level and projected landscape changes on storm surge. This project represents the first transition of the NCCOS-sponsored Dynamic Surge tool following its development in the Gulf of Mexico via NCCOS EESLR.	The objective of this project is to collaborate with NOAA and its partners to transition and apply the Dynamic Surge tool to the Hampton Roads region for quantifying the dynamic effects of sea level and projected landscape changes on storm surge.		Hampton Roads, VA		Scott Hagen, lead PI - LSU. Steven Ashby, Co-PI/NGI at MS State University, VA Sea Grant, OCM	9/1/15-8/31/16	
39	NOAA	I	B	Ecosystem Services	EESLR: UNDERSTANDING AND PREDICTING CHANGES IN COASTAL MARSH ECOSYSTEM SERVICES: REALIZING THE COMBINED EFFECTS OF SEA-LEVEL RISE, TIDES, AND STORM SURGE ON MARSHES AND THEIR CAPACITY TO PROTECT SHORELINES	NOS/NCCOS- David Kidwell david.kidwell@noaa.gov	Rising sea levels and changes in exposure to storms are aspects of global climate change that challenge the resilience of coastal ecosystems and human communities. This project will use 8 years of as yet unpublished continuous water-level data at two locations within the North Carolina (NC) Sentinel Site Cooperative (SSC), one on Bogue Sound with water level variations dominated by tides and the other on southern Pamlico Sound with water level variations dominated by wind. This research will quantify the contribution of different forcing mechanisms, including tides and wind, to water level variations at these sites. In addition, this project will combine a marsh transgression model with a marsh wave attenuation model to predict changes in shoreline protection associated with rising sea levels and changes in storm intensity. Finally, the King Tides Project will be implemented in NC with other outreach efforts to increase public awareness about coastal inundation issues and the value of natural assets.	By refining a model, wave attenuation model, that can be shown to accurately predict wave attenuation by coastal marsh plants, this project will provide a tool that coastal managers can use to show homeowners the degree to which retaining natural marsh helps protect developed structures from wave forces during storms and is often the most cost-effective shoreline management option. By simulating wave attenuation for present day and future scenarios across a range of expected water level and incident wave conditions, we will be able to predict how natural marshes of differing macrophyte composition will perform in attenuating waves of predicted magnitude built on varying water levels. This result has important emergency response implications during storms and publication of these results can have influence on how homeowners protect their marshes and how managers regulate marsh protections.		North Carolina	Christine Voss, Richard Leutlich, Charles Peterson, and Johanna Rosman - UNC Chapel Hill	9/1/15-8/31/18		
40	USACE	I	B	Ecosystem Services	Natural and Beneficial Functions of Coastal Landscape Features	CHLEL/JWR Julie Rosati	Refine predictive methodologies for calculating storm benefits (e.g., reduction in surge, waves, wind), and develop design and maintenance requirements for NNBF as natural coastal storm risk management measures	Advanced predictive models and tools; updated design and maintenance requirements; and development of rapid estimators for quantification of storm damage reduction services provided by coastal NNBFs	Conduct R&D at the forefront of S&T in collaboration with others to reduce the Nation's risk from flood and coastal storm disasters while energizing the economy, sustaining environmental resources, and promoting community resilience.	General	Historical performance data; ongoing laboratory and field measurements; numerical simulations	Universities (TBD)	FY16/FY17	Flood and Coastal Storm Damage
41	USACE	I	B	Inlets	Effects of Relative SLR on Navigation Projects (channels, structures, adjacent beaches)	ERDC-CHL Honghai Li	Calculation of wave height, transmission through structures, channel filling, and the potential for adjacent beach breaching (new inlet formation) investigated for various Relative Sea Level Rise (RSLR) scenarios.	Evaluate Effects of Relative Sea Level Rise on Navigation Projects (channels, structures, adjacent beaches)-----effect of SLR on breaching	to advance the state of knowledge and develop engineering technology for predicting waves, current, sediment transport, and morphology change at and around inlets	General	Technical literature; historical data	USACE Districts	FY14-FY17	Coastal Inlets Research Program
42	USACE	I	B	Large-scale processes/sediment Budget	Modeling Transport in Wetting/Drying and Vegetated Regions	ERDC-EL Earl Hayter	Beneficial use is expanding to include regions with vegetation. Advanced numerical methods are required to simulate transport in these regimes which also experience wetting and drying. This research will utilize data from other DOER research areas to improve the GSMB modeling system to include these processes, thus addressing a major gap in our numerical modeling capabilities.	Improved GSMB modeling system that includes wetting/drying algorithms as well as transport through vegetated regimes.	research is designed to balance operational and environmental initiatives and to meet complex economic, engineering, and environmental challenges of dredging and disposal in support of the navigation mission	General				DOER
43	NSF	1,2,3	B	Other	Coastal SEES Program	National Science Foundation (multiple)	Fundamental research on sustainability of coastal systems	individual research products (from funded PIs)	https://www.nsf.gov/funding/bgm_summ.jsp?piims_id=504816	distributed	various	distributed	launched 2011, ended 2015	
44	USACE	1,2	B	Ecosystem Services	Vegetative Effects on Dune Erosion and Overwash	ERDC-CHL Duncan Bryant, Mary Bryant, Candice Piercy, Anthony Priestas	Assessment framework for barrier island planning and management	Physical model investigating dune hydrodynamics and morphology change during erosion and overwash	Conduct R&D at the forefront of S&T in collaboration with others to reduce the Nation's risk from flood and coastal storm disasters while energizing the economy, sustaining environmental resources, and promoting community resilience.	General	Publication	ERDC-EL, Texas A&M	FY16/FY17	
45	USACE	1,2	B	Inlets	Resilience of coastal dunes	ERDC-CHL Kate Brodie/Nick Spore	Evaluate capability of beaches adjacent to inlets, including natural and engineered coastal dunes to withstand storms and recover via aeolian transport.	Resilience of coastal dunes	to advance the state of knowledge and develop engineering technology for predicting waves, current, sediment transport, and morphology change at and around inlets	General	Technical literature; field data collection; lidar data	Naval Research Laboratory; USACE Districts; American Shore and Beach Preservation Association	FY15-FY18	
46	USGS	1,2	B	Large-scale processes/sediment Budget	National Assessment of Coastal Change Hazards - integrating coastal response across erosion, storm, and sea-level rise time-scales	USGS - CMG Program, John Haines	Researching methods to integrate the numerous coastal processes that drive and impact coastal change. The goal is to combine advances from the individual research tasks within the NACCH Project (storms, shoreline change and sea-level rise) using state-of-the-art observations, numerical models and model-data assimilation techniques to better understand their cumulative effect on coastal change	Publications: http://marine.usgs.gov/coastalchangehazards/publications.html	marine.usgs.gov see Understanding Coastal Change http://marine.usgs.gov/coastalchangehazards/research/data-integration.html	National	Hurricane Induced Coastal Erosion Tool: http://olga.er.usgs.gov/hurricane_erosion_hazards/		ongoing	
47	USACE	1,3	BC	Ecosystem Services	Engineering with Nature for Sustainable Coastal Systems	ERDC-EL Todd Bridges	Capabilities to incorporate risk and uncertainties associated with climate change and sea level rise on coastal ecosystem restoration and multi-purpose projects that addresses the use of primary productivity, accretion, and wetlands creation.	Tools and Techniques for addressing risk and uncertainty associated with climate change	to address the need for ecosystem assessment, restoration, and management activities at the project level with cost-effective technologies	General	ERDC EWN Website	USGS / USFWS /	FY13-16	
48	USGS	3,1	BC	Large-scale processes/sediment Budget	San Francisco Bay	USGS - CMG Program, John Haines	(1) Identify the physical processes and anthropogenic influences that result in significant morphological changes to the San Francisco Bay Coastal System, at a range of spatial and temporal scales. (2) Assess future impact of sea level rise, climate change, and sediment management practices on the beaches, tidal wetlands, and submarine resources. (3) Understand sediment transport pathways from the delta mouth to the shelf.	(1) San Francisco Bay Basic Tide Model (2) Our Coast, Our Future (3) Coastal Storm Modeling System (CoSMoS) (4) San Francisco Bight Coastal Processes Study (5) Video: "Turbid Bay: Sediment in Motion"	https://walrus.wr.usgs.gov/coastal_processes/baycoastalsys/ also see Monterey Bay https://walrus.wr.usgs.gov/climate-change/scruz.html	California	Our Coast, Our Future http://data.pfbo.org/apps/ocof/ , CoSMoS https://walrus.wr.usgs.gov/coastal_processes/cosmos/index.html	NPS, SF Bay Delta Commission, Deltares	October 2009 - September 2020	

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49	USGS	3,1	BC	Ecosystem Services	Climate Mediated Retreat of Tidally Influenced Freshwater Forested Wetlands in the Southeast	USGS, Debra Willard, dwillard@usgs.gov, 703-648-5320	The project tests the working hypothesis that ecosystem productivity and C sequestration processes and rates vary in different coastal environments in predictable ways as tidal fresh-water forested wetlands (TFFW) convert to marsh. The project documents inter- and intra-annual variability in forest/marsh productivity along stress gradients in the Atlantic and Gulf Coastal Plains.	Journal articles; provide data to Refuge and park managers; develop porewater salinity model based on hydrologic processes and dynamics	Publications include these recent papers: Contemporary Deposition and Long-Term Accumulation of Sediment and Nutrients by Tidally Freshwater Forested Wetlands Impacted by Sea Level Rise (http://link.springer.com/article/10.1007/s12237-016-0066-4); Defining the next generation of individual-based modeling of coastal ecotone dynamics in response to global change (http://www.sciencedirect.com/science/article/pii/S030438015001647); Soil greenhouse gas emissions and carbon budgeting in a short-hydroperiod floodplain wetland. <i>Journal of Geophysical Research Biogeosciences</i> 120:77-95 (doi, 10.1002/2014JG002817)	Georgia, South Carolina, Louisiana	Data currently are available upon request from PIs; upon completion of the project, data will be posted online (site TBD).	Clemson University, Savannah NWR, Waccamaw NWR, Hobcaw Barony, Mandalay NWR, Bayou Teche NWR, Jean Lafitte National Historical Park and Preserve, Atchafalaya Basin (Natural Heritage Area)	The current project began in FY2009; many publications already are complete and others will be forthcoming as the research progresses.	
50	USGS	3,1,2	BC	Material flow/mixed sediment	Barnegat Bay	USGS - CMG Program, John Haines	(1) develop a hydrodynamic/inundation and sediment transport model of the region. (2) Produce an offline water-quality model. Different forcing scenarios have been tested to investigate the estuary's response in terms of residence time.	Tidal wetlands reports: http://woodshole.er.usgs.gov/project-pages/estuaries/tidalwetlands.html	http://woodshole.er.usgs.gov/project-pages/estuarine-physical-response/model-output/barnegat-bay.html	New Jersey	http://pubs.usgs.gov/ds/288/	NJ DEP, NPS, USFWS	October 2010 - September 2018	
51	BOEM	1	C	Ecosystem Services	Wind Energy Development on the Atlantic OCS: The Identification of Port Modifications and their Environmental and Socioeconomic Consequences	BOEM; amy.stillings@boem.gov	NEPA assessments to evaluate environmental and socioeconomic consequences to port areas of wind facility construction and required onshore infrastructure.	Database of port profiles with quantitative ranking metrics.	**	ATL	**	None	12-16-2014 to 04-15-2016	BOEM National Studies List Reference # AT-14-02
52	NOAA	1	C	Ecosystem Services	DEVELOPING GUIDANCE FOR INCORPORATING NATURAL INFRASTRUCTURE INTO EFFORTS TO INCREASE COASTAL RESILIENCY	NOAA/NOS/NCCOS - Carolyn Currin (Carolyn.Currin@noaa.gov)	The value of incorporating a 'natural infrastructure' approach to coastal community resilience has become increasingly evident after the disasters of Sandy and Katrina. Intertidal estuarine habitats, including salt marshes and oyster reefs, have the ability to attenuate waves, stabilize shorelines, and decrease storm surges, and are thus a key part of the natural infrastructure approach. However, these habitats are limited in their distribution by physical forces and geomorphological setting, and their resilience to SLR and wave erosion is site-specific. Understanding the factors that drive the distribution and resilience of these habitats is crucial to successfully incorporating natural infrastructure into coastal resiliency efforts. However, there is little specific guidance to help coastal resource managers and property owners determine how to best utilize natural infrastructure as a shoreline stabilization and coastal resilience strategy. We will focus on a data-rich area (the North Carolina Sentinel Site, NCCSS) to develop and test a model that would provide site-specific guidance on the type of natural infrastructure approach (e.g. Living Shoreline, marsh restoration) is appropriate for a given range of physical conditions. Results would be distributed in a form available to coastal resource managers, marine contractors and other stakeholders. The overall project would provide a framework and proof-of-concept example for national use.	Outcomes from this project include two deliverables and several products that collectively will provide science support and guidance for utilizing natural infrastructure to increase coastal resiliency within the NC SCS region. The approaches and results of this study will have wide application throughout the eastern and Gulf Coast of the U.S. where estuarine shorelines are dominated by marsh, sediment banks, and swamp forest. The project will fill one of the science needs that has been cited in several recent reviews and federal action plans on the use of coastal wetlands to protect coastal communities from storms-a lack of data on the risk reduction provided by marsh, oyster reefs and tidal flats in specific settings. Together, these results and products will help to create more resilient coastal communities and maintain the ecosystem services provided by natural coastal habitats.		North Carolina	NA	North Carolina National Estuarine Research Reserve	03/15/15 - 04/30/17	
53	NOAA	1	C	Large-scale processes	CLIMATE AND COASTAL HAZARD IMPACTS IN THE CHESAPEAKE BAY: SCIENCE SUPPORT FOR ADAPTATION PLANNING	NOAA/NOS/NCCOS - Maria Dillard (Maria.Dillard@noaa.gov)	There are a variety of ecological, social, economic, and cultural indicators that are of significance when considering the potential impacts of sea level rise and other climatic shifts (e.g., precipitation changes) on coastal communities. Using existing indicators of vulnerability (e.g., SoVI, Cutter, Boruff, and Shirley 2003), as well as novel approaches to indicator development and application for coastal communities (e.g., Dillard et al. 2013, Jepson and Colburn 2013), a set of appropriate metrics will be identified and/or developed for the assessment. This work will build upon a range of NOAA methods and products (e.g., CSC's Digital Coast, NMFS Social Indicators, NCCOS Community Well-being Indicators, NCCOS Hydrologic Modeling). Data collection is focused entirely on the compilation of existing data. The vulnerability metrics and data will span the following: Social/Economic – e.g. demographics of the population, economic characteristics, well-being, physical infrastructure. Cultural – e.g. historic resources, Ecological – e.g. hydrographic parameters (salinity, pH, DO), water quality (nutrients, pathogen indicators), Hydrological – e.g. land use, soil types, precipitation patterns. The scientific assessment will be done in parallel with community and stakeholder engagement to ensure that vulnerability and risk is being appropriately identified and translated in a way that will serve as a foundation for the community to address risk and identify adaptation strategies moving forward.	Outcomes include a vulnerability assessment tool and the corresponding data for a Chesapeake Bay, MD community. At the project's completion, the community, including state and local coastal managers, will have the tools and the science necessary to complete an assessment and develop an adaptation plan. The data in conjunction with a stakeholder process will aid a community in risk reduction and identifying adaptation and restoration strategies, which will ultimately allow for the production of an adaptation plan. Ultimately, the community will be better prepared for response, recovery, and resilience to climate and coastal hazard impacts.		Oxford, MD	SASHA LAND - MD DNR, Kate Skaggs - CoastSmart Program Representative, cheryl lewis - Town of Oxford, MD Representative	4/14- 03/30/2016		
54	NOAA	1	C	Ecosystem Services	EESLR: SEA-LEVEL RISE MODELING AS A CATALYST FOR EFFECTIVE ECOLOGICAL MANAGEMENT IN WEST HAWAII	NOS/NCCOS- David Kidwell david.kidwell@noaa.gov	Unique groundwater-fed anchialine pools, wetlands, and fishponds occur throughout the west Hawai'i Sentinel Site coastal corridor and support numerous endemic species as well as provide key ecosystem services to natural and human communities. Predicting the effect of sea-level rise (SLR) on these ecosystems requires models that incorporate groundwater levels which are elevated above sea levels and will exacerbate flooding in the porous basalt aquifer. This project will generate information and develop models to guide management and policy decisions for the west Hawai'i Sentinel Site Cooperative to predict the response of coastal ecosystems such as anchialine pools, wetlands, and fishponds to rising seas.	The project results will be used to update the South Kohala Conservation Action Plan (CAP) from 2011, which included input from more than 90 individuals representing government, non-profits, businesses, and private land-owners to include climate impacts. It is essential to revise the existing CAP to take climate change impacts into account so that ecosystem management actions and conservation planning is successful over the long term.		Hawaii	Charles Wiggins and Eric Conklin, Nature Conservancy Hawaii, Elizabeth Marrack, UC Berkeley	9/1/15-8/31/18		

Long-term Coastal Evolution														
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Column 2: Themes from nearshore report, 1) Long-term coastal evolution, 2) Extreme Events, & 3) Human and ecosystem health, 4) Infrastructure Column 3: Research Questions from the nearshore report: A - Factors influencing long-term sediment budgets, B - Feedbacks between short- and long-term, C - Human intervention drivers/impacts									**BOEM's Environmental Studies Program (ESP) conducts studies for the purposes of informing BOEM policy decisions and completing environmental assessments. All studies listed in this spreadsheet are either ongoing or are proposed to start between FY 2017-2019; therefore, no final reports or data are available for distribution at this point in time. All inquiries regarding interim products, data access, etc. should be made to the identified study POC. The ESP does not post preliminary study results, and study-related data cannot be shared until the respective final report is finished and posted to BOEM's Environmental Studies Program Information System (ESPIIS). All study profiles proposed in the FY 2017-2019 Studies Development Plan (SDP) will be posted on the BOEM website in late spring / early summer 2016. Additional information on BOEM's ongoing studies can be found at our studies website: http://www.boem.gov/Current-Research/Ongoing-Environmental-Studies/, and access to completed ESP products is available through ESPIIS at:					
55	USACE	1	C	Sand Resource	Ecologically-based design for beach nourishment	ERDC-EL Craig Fischenich	Products of this effort will promote more efficient and effective beach nourishment practices, minimize the adverse effects of Corps' operations, avoid jeopardizing the continued existence of listed species, and increase environmental benefits from Corps' projects.	Development of needed engineering criteria/guidance based on ecological requirements	research is designed to balance operational and environmental initiatives and to meet complex economic, engineering, and environmental challenges of dredging and disposal in support of the navigation mission	General				DOER
56	USACE	1	C	Ecosystem Services	Living shoreline design guidance	Kreitinger/Schroeder/Martin	Provides fundamental research into efficacy and feasibility of using alternative methods for shoreline stabilization using bioengineered methods	Design guidance for application of bioengineered approaches to shoreline stabilization	research is designed to balance operational and environmental initiatives and to meet complex economic, engineering, and environmental challenges of dredging and disposal in support of the navigation mission	General				DOER
57	USACE	1	C	Biogeomorphology	Sediment retention engineering to facilitate wetland development	Murray	This project provides a scientific basis for more cost effective restoration by efficiently harnessing geomorphic processes to minimize fetch and erosion, facilitate sediment accretion in subsided restoration sites, and thereby document a beneficial use of dredge material.	The results will be used to develop guidelines and best practices in the design of berms intended to speed accretion and habitat development in bay restoration projects.	research is designed to balance operational and environmental initiatives and to meet complex economic, engineering, and environmental challenges of dredging and disposal in support of the navigation mission	General				DOER
58	NOAA	1,2	C	Ecosystem Services	"Integrated Analysis of the Value of Wetland Services in Coastal Adaptation; Methodology and Case Study of Hampton-Seabrook Estuary, New Hampshire"	NOAA COCA Project. Lead PI: Paul Kirshen, University of New Hampshire.	This project is focused on the changes in the states of wetlands and barrier beaches under two scenarios of SLR that cover a wide range of plausible changes over the time periods of 2045 and 2075 will be determined. It will model green, gray and green/grey adaptation strategies as buffers to adverse effects to the built environment.	Develop and test adaptation actions and evaluate values of wetland services in adaptation.	The objective is to carry out an integrated assessment of the economic and social values of wetland ecosystem services as part of adaptation strategies to coastal climate change, specifically sea level rise and associated increases in erosion and coastal flooding.	New Hampshire			Funded in 2014 - Planned end date July 2016	
59	BOEM	1,2,3	C	Ecosystem Services	Ecological Function and Recovery of Biological Communities within Sand Shoal Habitats within the Gulf of Mexico	BOEM; jennifer.culbertson@boem.gov	Examine the relationship of human disturbance to ecosystem services in offshore sand shoal habitats. Determine if there are functional differences in borrow sites pre- and post-dredging by examining species distribution, diversity, habitat use, and population dynamics.	Pre-disturbance and post-disturbance physical and biological sampling will occur following a Before-After-Control-Impact (BACI) methodology. A met-ocean permanent observation station in the vicinity of Ship Shoal will be leveraged for important observational data. Additional sampling regimes will include multibeam sonar, Acoustic Doppler Current Profiler (ADCP) wave/current measurements, sediment cores, benthic grabs, benthic community analysis, trawls, acoustic telemetry, seasonal and diel observations, gut content analysis, stable isotope analysis, etc. These observations will also be integrated into an Ecosim model to assess the perturbation to the system. Observations over an extended time frame will allow for BOEM to identify the potential impacts of multiple sediment removal activities at Ship Shoal and determine the extent, nature, and process of disturbance and recovery to inform future sand resource management decisions.	**	GOM (Ship Shoal and nearby control sites of LA)	**	TBD	n/a	
60	BOEM	1,3	C	Projects as Experiments	Predicting the Consequences of Wave Energy Absorption from Marine Renewable Energy Facilities on Nearshore Ecosystems	BOEM; donna.schroeder@boem.gov	Existing data are being used to build a statistical model describing how wave energy may structure nearshore biological communities.	Data are being used to predict the ecological consequences of various siting options for proposed marine renewable energy facilities.	**	Pacific	**	USGS	n/a	
61	BOEM	1,3	C	Sand Resource	Potential Impacts to Cultural Resources at Significant Sand Extraction Areas	BOEM; douglas.jones@boem.gov	Survey and ground-truth prospective shipwreck sites that may have been impacted during sediment removal dredging activities following the 2010 Deepwater Horizon oil spill. In addition to assessing sites for possible nomination to the National Register of Historic Places, cores and other geomorphological data sets will be acquired to characterize associated sand resources. This will aid in monitoring dredge pit formation, evolution, and slope stability of sand deposits in the vicinity of submerged cultural resources.	Findings will improve the ability for Federal managers to assign effective dredge setback buffer distances from potentially buried cultural resources, as well as from sensitive areas including living hardbottom habitats, oil and gas pipelines, and other industry-related intrusions.	**	GOM	**	None	09-21-2012 to 09-20-2016	
62	USACE	1,3	C	Ecosystem Services	Quantifying the Effects of Beneficial Uses of Dredged Material	ERDC-EL Glenn Suir	Capability to quantify environmental benefits associated with the use of dredged sediments for ecosystem restoration and assess the ability of those applications to promote and protect naturally-occurring land building functions and resulting features.	Tools to compare the functional capacities of dredged sediments placement sites to naturally occurring wetlands or other restoration applications ... including the effects of episodic events.	to address the need for ecosystem assessment, restoration, and management activities at the project level with cost-effective technologies	General	ERDC EL	USGS / USFWS / NOAA	FY14-16	
63	USACE	1,4	C	Large-scale processes	Beach-fx Development	ERDC-CHL Mark Gravens	Capability to conduct joint probabilistic forcing and response analyses of coastal and riverine projects for risk-based project lifecycle planning.	Probabilistic Project Life-Cycle Cost Analysis, including emergency nourishment, complex morphology, shoreline response database, rule-based mobilization thresholds, probabilistic storm suite, economic impacts design document; Applications training.	Conduct R&D at the forefront of S&T in collaboration with others to reduce the Nation's risk from flood and coastal storm disasters while energizing the economy, sustaining environmental resources, and promoting community resilience.	General	CHL	USACE Districts	FY15/FY17	
64	USACE	1,4	C	Large scale processes	Assessing Barrier Islands Environmental Vulnerability to Climate Change and SLR	ERDC-EL Candice Piercy	Capability to utilize coastal system-level modeling technologies to assess ecosystem restoration projects for multiple benefits	Spatially-explicit screening-level tool to assess ecosystem vulnerability with minimal pre-existing data and/or existing storm data at a suite of storm events of specific magnitude.	to address the need for ecosystem assessment, restoration, and management activities at the project level with cost-effective technologies	General	ERDC EL	USACE Districts	FY14-17	

Extreme Events														
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1	FEMA	2	AC	Tsunami	Probabilistic Tsunami Analysis and Mapping	FEMA-FIMA Regions 9 and 10; Nicole Metzger (Michael Baker, Inc.) and Frank Gonzales (U. Washington); nmetzger@mbakerint.com, figonzal@u.washington.edu	Determine overlaid tsunami flood hazards that will be exceeded with a given annual probability to support mitigation activities	Methodologies and guidance for incorporating probabilistic tsunami hazards into FEMA flood hazard mapping	To develop a methodology for determining probabilistic tsunami hazards that can be incorporated into FEMA flood hazard mapping.	Primary focused on Crescent City, CA and Seaside, OR but results should be more widely applicable.	Final report available at: http://hdl.handle.net/1773/22366	FEMA, NOAA, CA, U. Washington, and other partners.	Began in 2013 (research already underway previously), results presently available, future efforts/pilots possible.	
2	NOAA	2	B	Storm Surge/Coastal Flooding	Extratropical Surge and Tide Operational Forecast Systems (ESTOFS)	NOAA/NOS/OCS/Coast Survey Development Laboratory POC: Jesse Feyen (301) 713-2801 x122	Extratropical storm surge forecast system for the East and Gulf coasts (Atlantic) and the West coast of the US, Gulf of Alaska, and Hawaii (Pacific). The Western Pacific Islands will be added in 2017. ESTOFS uses the ADCIRC model to make real-time forecasts of combined storm surge and tidal water levels using GFS atmospheric model forcing.	ESTOFS model result files are available in GRIB and NetCDF formats. Users can access water level forecasts of the storm surge, the tides, and the combined storm surge and tides.	ESTOFS runs operationally on NCEP's WCOSS high performance computing system. Reports describing the development and implementation are at http://www.nauticalcharts.noaa.gov/csdll/publications/TR_NOS-CSS2-FY14_01_Yuji_ESTOFS_SKILL_ASSESSMENT.pdf and http://www.nauticalcharts.noaa.gov/csdll/publications/TR_NOS_CS36_FY16_Xu_ESTOFS-Pacific_Report.pdf	Atlantic: East and Gulf coasts of the US, i.e. from Maine to Texas, and Puerto Rico. Pacific: Eastern North Pacific Ocean, including the West coast of the US, Gulf of Alaska, and Hawaii. Upcoming: Western Pacific Islands.	ESTOFS results can be viewed on the following webpage: http://www.opc.ncep.noaa.gov/estofsestofs_surge_info.shtml Model result files are available in GRIB and NetCDF formats via NOMADS: http://nomads.ncep.noaa.gov/	NOAA: NOS/OCS/CSDL and NWS/NCEP/EMC	ESTOFS Atlantic has been available since 2012. ESTOFS-Pacific has been available since 2015. ESTOFS-Western Pacific Islands should be available by 2018.	
3	NOAA	2	B	Storm Surge/Coastal Flooding	Hurricane Surge On-demand System (HSOFS)	NOAA/NOS/OCS/Coast Survey Development Laboratory POC: Jesse Feyen (301) 713-2801 x122	Develop a 250-500m resolution ADCIRC model of the East and Gulf coastal regions of the US, available to run with 5 ensemble variations of the official National Hurricane Center (NHC) hurricane track in an on-demand mode by NHC.	To better understand potential landfall impacts of hurricanes; to provide additional guidance to NHC in making real-time decisions during hurricane events, especially for response and recovery.	HSOFS is currently being transitioned to NCEP's WCOSS high performance computing system. It is intended to be available experimentally to only the NHC for the 2016 hurricane season.	East and Gulf coasts of the US, i.e. from Maine to Texas.	Experimental results from the model only be accessible by the NHC for two seasons.	NOAA: NOS/OCS/CSDL and NWS/NCEP/NHC.	HSOFS is a Sandy Snapp project, will be experimental for NHC during the 2016 hurricane season.	
4	NOAA	2	AC	Tsunami	Metetsunami forecasting in the Great Lakes	NOAA/OAR/GLERL, Eric J. Anderson (eric.j.anderson@noaa.gov)	To understand mechanisms behind metetsunami formation, and improve atmospheric and hydrodynamic forecast models to capture extreme events and high-frequency water level fluctuations (e.g. metetsunami waves)	Improved weather- and hydrodynamic-scale forecast models	Detection of historical metetsunamis, description of primary drivers behind inducing weather conditions, and unique dangers posed in enclosed basins such as the Great Lakes (http://onlinelibrary.wiley.com/resolve/doi/10.1002/2015JC010883)	Great Lakes	Observations via NOS/CO-OPS, hydrodynamic model output via OAR/GLERL.	University of Wisconsin-Madison, University of Michigan, NWS-Detroit, NWS-Cleveland, University of Illinois	Research began in 2013, data output is ongoing. Forecast model improvements TBD	
5	NOAA	2	B	Sea Level Rise/Tidal Flooding	EESLR: THE COASTAL RECOVERY FROM STORMS TOOL (CREST): A MODEL FOR ASSESSING THE IMPACT OF SEA LEVEL RISE ON NATURAL AND MANAGED BEACHES AND DUNES	NOS/NCCOS- David Kidwell david.kidwell@noaa.gov	This project will use the North Carolina Sentinel Site Cooperative (NCSSC) to employ a transdisciplinary team of coastal geomorphologists, ecologists, and managers proposes to transform the way in which vulnerability, resiliency, and the ecological effects of sea level rise are assessed in the NCSSC through the development of a new management instrument called the Coastal Recovery from Storms Tool (CREST). This innovative modeling system will couple an emerging understanding of the feedbacks between dune vegetation and sand transport with a recently developed coastal dune model to assess NC beaches and dune evolution in both natural and managed systems in response to SLR and extreme storms.	CREST will be user-inspired predictive tool—developed in collaboration with NCSSC, NPS, and Carteret County, North Carolina participants and staff—which will provide output to enable coastal managers to assess and compare a range of future management strategies.		Carteret County, NC	Peter Ruggieri, Oregon State University; Laura Moore, UNC-Chapel Hill, Sally Hacker, Oregon State University	9/1/15-8/31/16		

Extreme Events														
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6	NRC	2	AC	Tsunami	Tsunami Hazard Assessment for the U.S. East Coast Based on Generation, Propagation and Inundation Modeling	Nuclear Regulatory Commission, Dr. Rasool Anoooshehpour, Rasool.Anoooshehpour@nrc.gov, 301-415-2396	This study makes use of the Pacific Marine Environmental Laboratory (PMEL) pre-computed database of over a thousand synthetic tsunami sources to identify potentially hazardous tsunami events for the eastern U.S. coastline	Comprehensive study of tsunami hazard assessment for the Atlantic coast of the United States (U.S.) based on potential tsunami scenarios. Results will be summarized in a NRC NUREG Report	Provide the NRC staff with the means and criteria to assess evaluations and analyses provided by the licensees on their tsunami design for nuclear facilities.	U.S. Atlantic Coast	Results to be published in NRC NUREG Report. Contact NRC POC.	National Oceanic and Atmospheric Administration, Office of Oceanic and Atmospheric Research, Pacific Marine Environmental Laboratory (Dr. Vasily Titov)	11/2010 to 9/2016	
7	NRC	2	AC	Tsunami	Tsunami Sources with the Potential to Impact the U.S. Atlantic and Gulf Coasts	Nuclear Regulatory Commission, Dr. Rasool Anoooshehpour, Rasool.Anoooshehpour@nrc.gov, 301-415-2396	Evaluation of tsunami sources and their probability to impact the U.S. Atlantic and Gulf of Mexico coasts.	Reports summarizing evaluation of tsunami sources and their probability to impact the U.S. Atlantic and Gulf of Mexico coasts.	Provide the NRC staff with the means and criteria to assess evaluations and analyses provided by the licensees on their tsunami design for nuclear facilities.	U.S. Gulf and Atlantic Coasts	Results published as USGS Reports. Contact NRC POC.	USGS (Dr. Eric Geist), WHOI (Dr. Uri ten-Brink)	2006 to 2013	
8	USACE	2	C	Storm Surge/Coastal Flooding	Expedient Hurricane Inundation Prediction	CHL/ITL Jeff Melby	Leveraging Coastal Hazards System (CHS) database of high-fidelity model results and surrogate modelling techniques, develop tools and capability to predict storm response (surge, wave, wind) given storm parameters.	Develop tools & capability to provide accurate hurricane storm surge inundation predictions using surrogate models that produce results expeditiously.	Conduct R&D at the forefront of S&T in collaboration with others to reduce the Nation's risk from flood and coastal storm disasters while energizing the economy, sustaining environmental resources, and promoting community resilience.	General	CHS database	Notre Dame	FY15/FY18	Flood and Coastal Storm Damage
9	USACE	2	B	Storm Surge/Coastal Flooding	Wave Dissipation by Vegetation	ERDC-CHL Mary Bryant/Jane Smith	Develop techniques and guidance for evaluating the mitigating effects of storm surge and waves using natural features	Laboratory testing for friction coefficient formulations incorporated into numerical model for application to field sites	Conduct R&D at the forefront of S&T in collaboration with others to reduce the Nation's risk from flood and coastal storm disasters while energizing the economy, sustaining environmental resources, and promoting community resilience.	General	CHL/TR or email for data	Texas A&M Notre Dame	FY15/FY17	Flood and Coastal Storm Damage
10	USGS	2	AC	Other	El Nino impacts to California Coast	USGS - CMG Program John Haines	Create models of future climatic changes impacts to our coasts—a valuable tool for city planners, conservationists, and the tourism industry.	https://walrus.wr.usgs.gov/climate-change/pubs.html	https://walrus.wr.usgs.gov/climate-change/cruz.html	California	https://pubs.er.usgs.gov/publication/70157062	UC Santa Cruz	October 2009 - September 2020	
11	USGS	2	B	Event geomorphology change prediction/collection	National Assessment of Coastal Change Hazards - forecasting Hurricane and coastal storm impacts	USGS - CMG Program John Haines	1) Develop an understanding of the timing, magnitude, and variability of the impacts of hurricanes and extreme storms on the sandy beaches of the United States (2) Assess storm-induced coastal erosion hazards for the Gulf of Mexico, Atlantic and Pacific shorelines (3) Provide real-time response to storm events, including real-time prediction of beach response, post-event data collection (photograph and lidar), and analysis of storm-induced coastal change (4) Develop operational forecasts of total water levels and probabilities of coastal change (5) Provide public access to information related to storm-induced coastal change hazards	http://marine.usgs.gov/coastalchangehazards/research/storm-impacts.html	marine.usgs.gov see Understanding Coastal Change http://marine.usgs.gov/coastalchangehazards/	National	http://marine.usgs.gov/coastalchangehazardsportal/	NOAA - National Weather Service, USACE, Academic collaborators	ongoing	
12	USGS	2	BC	Event geomorphology change prediction/collection	National Assessment of Coastal Change Hazards - Hurricane and Storm Forecasts	USGS - CMG Program John Haines	to improve real-time and scenario-based predictions of coastal change to support management of coastal infrastructure, resources, and safety; provide erosion probability forecasts and post-storm data for hurricanes and major storms	Coast http://coastal.er.usgs.gov/coastal-change-hazards/ Portal http://marine.usgs.gov/coastalchangehazardsportal/	marine.usgs.gov see Understanding Coastal Change http://coastal.er.usgs.gov/hurricanes/	National	Oblique Aerial Photos: http://coastal.er.usgs.gov/hurricanes/data/photos.php Lidar: http://coastal.er.usgs.gov/hurricanes/data/lidar.php Beach Morphology: http://coastal.er.usgs.gov/hurricanes/data/beach-morphology.php	USACE NOAA DOI Bureaus	ongoing	

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13	USGS	2	AC	Tsunami	Sources and Impacts of Tsunamis on coasts and estuaries	USGS - CMG Program John Haines	(1) Use marine geophysics and sediment coring to define seismic zones and landslide features (2) Identify past tsunami deposits and limits of wave run up (3) Model large and extremely large tsunamis and impacts on coast using contemporary extreme events	(1) Reports on tsunami probabilities and impacts for Nuclear Regulatory Commission (2) Local tsunami evacuation route maps (3) Forecasts for liquefaction and landslides (4) Models for subsequent erosion and ground failure	(1) Caribbean studies for NRC c (2) SAFRR tsunami scenario - Impacts on California Ecosystems (3) Numerous papers on Estimation of submarine mass failure probability marine.usgs.gov see Geologic Hazards and Catastrophic Events http://woods Hole.er.usgs.gov/projects-pages/caribbean/tsunami.html https://walrus.wr.usgs.gov/research/projects/q_probforecast.html https://walrus.wr.usgs.gov/research/projects/tsunamiHaz.html	Pacific, Caribbean, Atlantic	SWATH bathymetry Puerto Rico: http://pubs.usgs.gov/of/2006/1210/ Tsunami and Earthquake research - modern events: https://walrus.wr.usgs.gov/tsunami/ Tsunami animations: https://walrus.wr.usgs.gov/tsunami/animations.html	NRC, FEMA, NOAA - Pacific Marine Lab, NPS/DOI, Virgin Islands American Samoa CA Geological Survey Universities: California (several) Georgia Tech Tohoku (Japan) Adam Micklewicz (Poland) New South Wales (Australia)	October 2011- September 2017	
14	USGS	2.1	DELETE?	Other	origin and triggers of coastal rockslides along the Oregon coast	U.S. Geological Survey, Bill Schulz, wschulz@usgs.gov	Improve understanding of the role of earthquake triggering and reactivation of rockslides along the Oregon coast	Journal articles	http://www.sciencedirect.com/science/article/pii/S0169555X11006404 http://eeg.geoscienceworld.org/content/17/4/315.short	Oregon Coast		Oregon Dept. of Transportation; Kyoto University; Oregon Dept. of Geology and Mineral Industries	Mid-2000s. No firm end date	
15	USGS	2.1	B	Other	Early warning for landslides on coastal bluffs	U.S. Geological Survey, Rex Baum, baum@usgs.gov	Improve understanding of hydrological triggers of coastal bluff landslides.	Early warning criteria for railway operation along bluffs between Seattle and Everett, WA	http://landslides.usgs.gov/monitoring/seattle/ http://landslides.usgs.gov/state_local/seattle.php	Puget Sound region, WA		National Weather Service, Sound Transit	2001: products will continue to be produced as results are obtained and analyses complete	
16	USGS	2.3	B	Storm Surge/Coastal Flooding	Impacts of large storms	USGS, Wetlands and Aquatic Research Center, Thomas Doyle (doylet@usgs.gov); Patuxent Wildlife Research Center (John French) (jbfrench@usgs.gov); Sandy Science Coordination Team Lead Holly Weyers (hsweyers@usgs.gov)	Multiple projects on impacts of large storms on coastal ecosystems; Hurricane Sandy Impacts on Coastal Wetland Resilience in the Northeast United States	http://www.nwrc.usgs.gov/research/nh/wetland_ecosystems.htm ; http://www.usgs.gov/hurricane/sandy/ E.g., What Role do Hurricanes Play in Sediment Delivery to Subsiding River Deltas? (http://www.nwrc.usgs.gov/pblctns.htm); http://www.usgs.gov/newsroom/article.asp?ID=3398 2015; Scientific Reports; Smith, J.E. Bentley, S.J. Snodden, G.A. White, C.	Improve planning and response by natural resource agencies to large scale storms to minimize damage to facilities and wildlife mortalities, predict impacts to fish and wildlife populations from modified disturbance regime	Gulf coast, Northeast-Southeast Coast	http://www.usgs.gov/hurricane/sandy/#data_tools.html	Various (http://www.usgs.gov/hurricane/sandy/#partners.html)	ongoing	
17	USGS	2.3	B	Community vulnerability and impact reduction	Forecasting effectiveness of how well restored wetlands mitigate flood risk	USGS, Wetlands and Aquatic Research Center; Scott Wilson (wilsons@usgs.gov), Greg Steyer (steyer@usgs.gov)	Forecasting effectiveness of flood risk mitigation from restored wetlands	http://www.nwrc.usgs.gov/research/ers/index.htm	Forecasting effectiveness of flood risk mitigation from restored wetlands	Gulf Coast		various		
18	USGS	2.4	AC	Storm Surge/Coastal Flooding	Surge, Wave and Tide Hydrodynamics (SWaTH) network	Office of Surface Water (Lead Contact: Harry Jenter, hjenter@usgs.gov, 703-648-5916	coastal gages augmented by ~800 pre-surveyed deployment brackets in which recording pressure sensors can be deployed rapidly	SWaTH network will provide water height and wave height and frequency	During large events, the USGS collects additional data (high-water marks, additional sensor deployments) to aid in documenting high-water events.	Northeast coast of the US (NC to ME)	Data is available on the web from the USGS on the Flood Event Viewer web site at http://water.usgs.gov/floods/FEV/ . Each flooding/storm event has a Short Term Network where the data is stored and processed.	NOAA with typically their tide gages.	Ongoing effort in response to Hurricane Sandy.	

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19	NOAA	2.4	C	Sea Level Rise/Tidal Flooding	Recurrent tidal flooding monitoring and seasonal outlooks	NOS CO-OPS - W. Sweet william.sweet@noaa.gov; NESDIS NCEI - John Marra john.marra@noaa.gov; NOS OCM - Doug Marcy doug.marcy@noaa.gov	Determination of tidal flood indicators (flood frequencies, magnitudes and durations) at tide gauges based upon elevation and probability definitions important to sector-specific requirements	website: 1) real-time 2-day predictive alert and historical monitoring in the "inundation dashboard" and 2) via proposed national integrated coastal flood information system - NICFIS to provide seasonal, annual outlooks and quarterly event and trend-change summaries	Currently working through the NOAA Climate Coordination Team on establishing indicator data sets with user groups, identifying, archiving and dissemination of the info and assessing state of science in making seasonal-scale predictions.	Various locations nationwide	Data examined currently is tide gauge data (NOS CO-OPS with future NCEI archiving)		start: 2014; product TBD	
20	USACE	2.4	B	Event geomorphology change prediction/collection	CSTORM-MS Development	ERDC-CHL Chris Massey	Reduced uncertainty w/r prediction of coastal storms and coastal processes; coastal project design and risk assessment; coupled wind, wave, circulation and near-shore dynamics simulation with sediment transport	A tightly coupled system of hydrodynamic models, wave models and sediment transport library for simulation of coastal and near shore wave, storm surge and sediment propagation	<u>Conduct R&D at the forefront of S&T in collaboration with others to reduce the Nation's risk from flood and coastal storm disasters while energizing the economy, sustaining environmental resources, and promoting community resilience.</u>	General	CHL/CHS database	Env Agency of England Office South Africa UK Met CSIR - GFDL	FY15/FY17	Flood and Coastal Storm Damage
21	BOEM	1.2	B	Event geomorphology change prediction/collection	Shelf-Slope Sediment Exchange in the Northern Gulf of Mexico: Application of Numerical Models for Extreme Events	BOEM; guillermo.aauad@boem.gov	This study will provide a comprehensive characterization of sediment transport along the northern Gulf of Mexico, turbidity currents included, and include an analysis of sediment deposition over the study area during extreme atmospheric and oceanic events.	The study will produce sediment profiles that qualitatively and quantitatively depict how sediment deposition is affected by turbidity currents, extreme events in river discharge, and from the varying intensity and paths of hurricanes.	**	GOM	**	Rutgers State University	09-22-2011 to 03-01-2016	BOEM National Studies List Reference # NT-11-06
22	BOEM	1.2	B	Event geomorphology change prediction/collection	Hurricane Sandy Atlantic Sand Assessment Project (ASAP)	BOEM; jeffrey.reidenauer@boem.gov	Contract with Private Sector: CB&I	Atlantic shelf data acquisition:Geologic (250 vibracore and 100 grab samples) and geophysical (5600 km) data acquisition to delineate OCS sand resources and map shelf geology. Generated associated Environmental Assessment Document.	**	Atlantic	**	ME DACF (Geological Survey, Maine Coastal Program); NH DES, UNH CCOM; UMASS Geosciences MA Geological Survey; RI CRMIC, URI; NY DOS, SUNY Stony Brook; NJDEP Geological and Water Survey; Udel. Geological Survey; MD DNR Geological Survey; VA DMME, VIMS, NC Coastal Studies Institute, ECU, NC DCM; SC DNR- Geological Survey, SC DNR Marine Resources Research Institute, GA DNR, UGA Skidaway Institute of Oceanography; FDEP Geological Survey, FDEP DWRM	02-15-2015 to 10-15-2016	Hurricane Sandy

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23	BOEM	1,2	B	Recovery/Restoration	Hurricane Sandy Coastal Recovery and Resiliency - Resource Identification, Delineation and Management Practices	BOEM; jeffrey.waldner@boem.gov	Cooperative Agreements with 13 Atlantic Coastal States (ME, NH,MA, RI, NY, NJ, DE, MD, VA, NC, SC, FL)	Develop a geodatabase of existing nearshore and shelf geologic and geophysical data; Assess community, infrastructure and habitat vulnerability, Measure onshore coastal processes (erosion rates overwash etc.), Geologic mapping paleo-geomorphology, compile and analyze existing sand resources evaluation; identify data gap areas for future studies	**	Atlantic	**	ME DACF (Geological Survey, Maine Coastal Program); NH DES, UNH CCOM; UMASS Geosciences MA Geological Survey; RI CRMC, URI; NY DOS, SUNY Stony Brook; NJDEP Geological and Water Survey; Udel. Geological Survey; MD DNR Geological Survey; VA DMMME, VIMS, NC Coastal Studies Institute, ECU, NC DCM; SC DNR- Geological Survey, SC DNR Marine Resources Research Institute, GA DNR, UGA Skidaway Institute of Oceanography; FDEP Geological Survey, FDEP DWRM	11-12,2015 to 10-30-2018	Hurricane Sandy
24	FEMA	1,2	A	Sea Level Rise/Tidal Flooding	Sea Level Rise Mapping Pilot Projects	FEMA-FIMA HQ; Mark Crowell; mark.crowell@fema.dhs.gov	Determine cost-effective methodologies for mapping 100-year flood levels plus projected SLR	Methodologies and guidance for incorporating SLR into FEMA flood hazard mapping	To assist in understanding of how to best incorporate SLR into FEMA flood hazard mapping by comparing simple methods such as a bath tub approach with more complex modeling methods.	Pilot studies located in NY,NJ, CA, SW FL, and potentially others but results should be widely applicable.	Contact agency POC	FEMA, NOAA, USACE, USGCRP, other local partners	First pilot began in 2013. Additional pilots ongoing and future pilots expected. Preliminary results available currently but final results not expected until 2017.	
25	NOAA	1,2	B	Sea Level Rise/Tidal Flooding	"Integrated Analysis of the Value of Wetland Services in Coastal Adaptation; Methodology and Case Study of Hampton-Scarbrook Estuary, New Hampshire"	NOAA COCA Project. Lead PI: Paul Kirshen. University of New Hampshire.	This project is focused on the changes in the states of wetlands and barrier beaches under two scenarios of SLR that cover a wide range of plausible changes over the time periods of 2045 and 2075 will be determined. It will model green, gray and green/gray adaptation strategies as buffers to adverse effects to the built environment.	Develop and test adaptation actions and evaluate values of wetland services in adaptation.	"The objective it to carry out an integrated assessment of the economic and social values of wetland ecosystem services as part of adaptation strategies to coastal climate change, specifically sea level rise and associated increases in erosion and coastal flooding."	New Hampshire			Funded in 2014 - Planned end date July 2016	*NOTE ABOUT COCA entries. The Climate Program Office Coastal and Ocean Climate Applications (COCA) program addresses the needs of specific decision makers grappling with pressing climate-related issues in coastal and marine environments. This program strengthens initiatives by supporting interdisciplinary applications research aimed at addressing climate-related challenges in coastal communities as well as coastal and marine ecosystems. While the annual funding opportunity research priorities vary, most projects funded under the COCA address one or more of the FNPRs listed. Below I have provided three examples of COCA

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26	NOAA	1.2	BC	Community vulnerability and impact reduction	Decision-making for Coastal Adaptation: Sustaining Coastal Salt Marshes for Ecosystem Services along the Jersey Shore	NOAA COCA Project. Lead PI: Richard Lathrop, Rutgers University	1. Clarify the potential of coastal ecosystems, particularly "back-bay" tidal salt marshes and maritime forests, to buffer human communities (the built environment) from hazards 2. assess and quantify the degree to which ecosystems moderated the impact of Sandy-related storm surge on infrastructure (homes, etc.) 3. examine the costs associated with maintaining coastal ecosystems under future sea level rise in order to provide decision-makers with the information they need to make informed decisions about investments in coastal protection either in green or gray infrastructure	"Develop and pilot-test a process to aid coastal communities and decisionmakers in integrating scientific information on the predicted outcomes of "green infrastructure" practices vs. a no intervention alternative (the status quo) with an understanding of the value tradeoffs involved into coastal planning."	"The objective is to provide coastal decision-makers with the information needed to make choices concerning the maintenance and/or restoration of green infrastructure within coastal communities."	New Jersey	Jacques Cousteau National Estuarine research Reserve, Partnership for Delaware Estuary, Barnegat Bay Partnership	Funded in 2014 - Planned end date July 2016	Note about COCA entries: The Climate Program Office Coastal and Ocean Climate Applications (COCA) program addresses the needs of specific decision makers grappling with pressing climate-related issues in coastal and marine environments. This program strengthens initiatives by supporting interdisciplinary applications research aimed at addressing climate-related challenges in coastal communities as well as coastal and marine ecosystems. While the annual funding opportunity research priorities vary, most projects funded under the COCA address one or more of the FNPRs listed. Below I have provided three examples of COCA	
27	NOAA	1.2	C	Storm Surge/Coastal Flooding	Waves and dynamical water levels at NOS CO-OPS tide gauges	NOS CO-OPS - Gregory Dusek gregory.dusek@noaa.gov and William Sweet william.sweet@noaa.gov	1.) Local calibration of the 6-minute water level standard deviation at tide gauges to offshore and local wave heights and estimates of local "dynamical" water levels. 2.) observing waves directly with new Microwave Radar water level sensors	Web-access of locally measured waves and dynamical water levels at NOS CO-OPS tide gauges	Research and publications on the subject in conjunction with CO-OPS water level sensor and platform upgrades (to microwave radar technology)	U.S., sites TBD	NOS CO-OPS	USACE has expressed in interest in using "sigma" to quantify infragravity water level signal	start: 2014; Product TBD	
28	NOAA	1.2	AB	Event geomorphology change prediction/collection	SHOUT-River Forecast/NERRS	Robbie Hood/Robert Moorhead NGI	Use of Unmanned Aircraft Systems (UAS) to support National Estuarine Research Reserve System (NERRS) observation requirements including monitoring / restoration of coastal resources and measure effect of climate change	Digital Elevation Models (DEMs) and habitat maps to support a diversity of applications including: reducing the error of marsh DEMs to support sea level rise research and flood forecasts; evaluating the impact of specific vegetation management practices on elevation if marsh micro-environments; assessing beaches after storms for damage assessment and restoration purposes; and identifying high priority invasive and sensitive vegetation. Wildlife assessment and emergency response (including chemical spills) data are also important end-products.	Programatic goals include: providing high resolution geo-referenced imagery, providing additional multi-mission/multi-payloads including multi-spectral and lidar instruments, using data acquired for vegetation mapping, measuring the effects of climate change and preserving natural coastal resources.	Grand Bay National Estuarine Research Reserve, Grand Bay National Wildlife Refuge, and adjacent lands.	Test Data is available through the Northern Gulf Institute (NGI), and the NOAA Data Management Plan has been filed with the EDMC through the NOAA UAS Program (10/15).	NGL Mississippi State University	2015-TBD	
29	USACE	1.2	AB	Event geomorphology change prediction/collection	Coastal Ocean Data Systems (CODS)	ERDC-CHL	Data distribution for researchers	Modern data repositories, tools, and interfaces for the FRF observation, wave information studies, and coasts storm databases	Provide a unified system for use in preservation and dissemination of USACE coastal data and information	http://navigation.usace.army.mil/CHL_Viewer/FRF/				
30	USACE	1.2	AB	Event geomorphology change prediction/collection	Vegetative Effects on Dune Erosion and Overwash	ERDC-CHL Duncan Bryant, Mary Bryant, Candice Piercy, Anthony Priestas	Assessment framework for barrier island planning and management	Physical model investigating dune hydrodynamics and morphology change during erosion and overwash	Conduct R&D at the forefront of S&T in collaboration with others to reduce the Nation's risk from flood and coastal storm disasters while energizing the economy, sustaining environmental resources, and promoting community resilience.	General	Publication	ERDC-EL Texas A&M	FY16/FY17	Flood and Coastal Storm Damage

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31	USACE	1.2	AB	Event geomorphology change prediction/collection	Resilience of coastal dunes	ERDC-CHL Kate Brodie/Nick Spore	Evaluate capability of beaches adjacent to inlets, including natural and engineered coastal dunes to withstand storms and recover via aeolian transport.	Resilience of coastal dunes	to advance the state of knowledge and develop engineering technology for predicting waves, current, sediment transport, and morphology change at and around inlets	General	Technical literature; field data collection; lidar data	Naval Research Laboratory; USACE Districts; American Shore and Beach Preservation Association	FY15-FY18	Coastal Inlets Research Program
32	USGS	1.2	AB	Event geomorphology change prediction/collection	National Assessment of Coastal Change Hazards - integrating coastal response across erosion, storm, and sea-level rise time-scales	USGS - CMG Program John Haines	Researching methods to integrate the numerous coastal processes that drive and impact coastal change. The goal is to combine advances from the individual research tasks within the NACCH Project (storms, shoreline change and sea-level rise) using state-of-the-art observations, numerical models and model-data assimilation techniques to better understand their cumulative effect on coastal change	Publications: http://marine.usgs.gov/coastalchangehazards/publications.html	marine.usgs.gov see Understanding Coastal Change http://marine.usgs.gov/coastalchangehazards/research/data-integration.html	National	Hurricane Induced Coastal Erosion Tool: http://olga.er.usgs.gov/hurricane_erosion_hazards/		ongoing	
33	USGS	1.2	AB	Event geomorphology change prediction/collection	Fire Island Regional Study - long-term coastal evolution and storm response and recovery	USGS - CMG Program John Haines	Increase our understanding of the physical processes that cause coastal change, and ultimately improve our capability to predict the processes and their impacts; includes studies of linkage of inner-shelf geology, morphology, and transport to coastal response and recovery	Geologic Framework: http://woodshole.er.usgs.gov/projects/coastal_change/study-sites/fire-island-geologic-framework.html	http://coastal.er.usgs.gov/fire-island/	New York		USACE, NPS, NFWS, Academic collaborators	2016	
34	BOEM	1.2,3	AB	Event geomorphology change prediction/collection	Gulf of Mexico Land Loss Change Assessment and Application to Louisiana Coastal Habitat Loss	BOEM; bruce.baird@boem.gov	1) Evaluate recent (1984-2014) land loss change in the GOM coastal zone, 2) evaluate habitat change in the Louisiana coastal zone from 2007-2014.	Land/classified datasets, change analysis and rates of change calculated, land loss change by state and hydrologic basin.	**	XGOM	**	USGS	08-08-2015 to 08-08-2019	BOEM National Studies List Reference # GM-15-10
35	BOEM	1.2,3	AB	Event geomorphology change prediction/collection	Best Practices for Physical Process and Impact Assessment in Support of Beach Nourishment and Coastal Restoration Activities	BOEM; geoffrey.wielc@boem.gov	Design and implement a morphological modeling approach in order to improve the present understanding of impacts to near-field and far-field physical processes (including morphologic response) related to the modification of offshore bathymetry due to dredging.	Test a suite of models (including ROMS, Community Sediment Transport Model System, NearCOM, MIKE 21 Coastal Area Morphological Modeling Shell, and Coastal Modeling System) against observed wave, current, sediment transport and morphologic response. From this improved understanding of physical processes, BOEM may begin to develop analysis criteria and general guidelines that would describe when and why site-specific modeling and higher-cost shoreline impact assessments would be required or could be precluded.	**	ATL and GOM	**	None	09-23-2010 to 09-09-2016	BOEM National Studies List Reference # NT-10-x31
36	BOEM	1.2,3	DELETE	Community vulnerability and impact reduction	Ecological Function and Recovery of Biological Communities within Sand Shoal Habitats within the Gulf of Mexico	BOEM; jennifer.culbertson@boem.gov	Examine the relationship of human disturbance to ecosystem services in offshore sand shoal habitats. Determine if there are functional differences in borrow sites pre- and post-dredging by examining species distribution, diversity, habitat use, and population dynamics.	Pre-disturbance and post-disturbance physical and biological sampling will occur following a Before-After-Control-Impact (BACI) methodology. A met-ocean permanent observation station in the vicinity of Ship Shoal will be leveraged for important observational data. Additional sampling regimes will include multibeam sonar, Acoustic Doppler Current Profiler (ADCP) wave/current measurements, sediment cores, benthic grabs, benthic community analysis, trawls, acoustic telemetry, seasonal and diel observations, gut content analysis, stable isotope analysis, etc. These observations will also be integrated into an Ecosim model to assess the perturbation to the system. Observations over an extended time frame will allow for BOEM to identify the potential impacts of multiple sediment removal activities at Ship Shoal and determine the extent, nature, and process of disturbance and recovery to inform future sand resource management decisions.	**	GOM (Ship Shoal and nearby control sites of LA)	**	TBD	n/a	BOEM National Studies List Reference # 17-19 SDP
37	BOEM	1.2,3	A	Event geomorphology change prediction/collection	A Critical Real-Time Louisiana Coastal Ocean Observing Station	BOEM; jessica.mallindine@boem.gov	Continue (with updated instrumentation and software) long term physical oceanographic (i.e. waves, water level, currents) and meteorological observations at a permanently moored station on the Louisiana inner shelf in the vicinity of Ship Shoal. Provide long term observational record for input to dredge area evolution modeling at Ship Shoal and wave modeling along the Louisiana coast.	1) Reactivate and upgrade permanently moored observation station, 2) Real time (QA/QC'd) met-ocean and optical backscatter information, 3) Improved regional coastal ocean models.	**	GOM	**	Louisiana State University	09-24-2015 to 08-30-2018	BOEM National Studies List Reference # GM-14-03-08

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38	BOEM	1,2,3	A	Event geomorphology prediction/collection	Assessment of Mud-Capped Dredge Pit Evolution on the Outer Continental Shelf of the Northern Gulf of Mexico	BOEM; michael.miner@boem.gov	Collect geophysical, geological, and physical oceanographic data to characterize mud-capped dredge pit evolution and validate/refine predictive numerical models	Observation-based characterization of dredge area evolution and recovery; improved predictive capability of offshore dredge area evolution; suggested operational considerations for dredge area design and post dredge monitoring.	**	GOM	**	Louisiana State University	08-05-2014 to 08-31-2017	BOEM National Studies List Reference # GM-14-03-05
39	BOEM	1,2,3	AB	Recovery/Restoration	Economic and Geomorphic Comparison of Outer Continental Shelf (OCS) Sand vs. Nearshore Sand for Coastal Restoration Projects	BOEM; michael.miner@boem.gov	Provide a better understanding and quantification of economic, ecologic, and geomorphic long term benefits and costs of using OCS sediment vs. nearshore sediment for coastal restoration projects.	1) Quantification of value of OCS sand to project effectiveness based on physical properties of sand, 2) Quantification of value of OCS sand to enhancing regional coastal sediment budget (vs nearshore where the sediment used for restoration comes from within system) over the long term, both within and outside of the project area.	**	GOM	**	Louisiana State University, University of New Orleans	09-16-2015 to 08-31-2018	BOEM National Studies List Reference # GM-14-03-06
40	BOEM	1,2,3	A	Recovery/Restoration	Assessment of Ship Shoal Borrow Areas for Coastal Restoration of Louisiana Barrier Islands	BOEM; michael.miner@boem.gov	Collect geophysical, geological, and physical oceanographic data to characterize Gulf of Mexico sand shoal dredge area evolution and validate/refine predictive numerical models	Observation-based characterization of dredge area evolution and recovery; improved predictive capability of offshore dredge area evolution; suggested operational considerations for dredge area design and post dredge monitoring	**	GOM	**	Louisiana State University	n/a	BOEM National Studies List Reference # GM-14-03-TBD4
41	BOEM	1,2,3	AB	Recovery/Restoration	Managing Dredge Impacts by Optimizing the Use of Sand Resources	BOEM; paul.knoor@boem.gov	Develop a planning process for optimizing sand resources while diminishing potential impacts using a four-tiered approach to evaluate physical, environmental, and economic concerns in context with appropriate mitigation and monitoring measures to minimize issues. Demonstrate the benefits and costs of this planning process by developing a draft borrow area management plan to optimize use of two or three OCS borrow areas characterized by frequent dredging and/or multiple users (i.e., Ship Shoal offshore Louisiana, Sandbridge Shoal offshore Virginia, or Canaveral Shoal offshore Florida).	A multi-criteria decision analysis (MCDA) tool will be developed to support advanced borrow area planning under a systematic framework. Data compilation, literature review and syntheses, GIS analyses, and coordination with stakeholders will be conducted to inform the MCDA under the following four tiered approach: 1.Physical Resource Characteristics and Borrow Area Requirements, 2.Environmental Considerations, 3.Best Management Practices, and 4.Costs and Benefits of Borrow Area Use. Draft borrow area management plans will be developed for two to three OCS borrow areas.	**	ATL and GOM	**	USACE - ERDC	09-10-2015 to 09-09-2016	BOEM National Studies List Reference # NT-15-03
42	USGS	1,2,3	AB	Event geomorphology change prediction/collection	Assateague Island Regional Study	USGS - CMG Program John Haines	defines the geologic framework of the Delmarva coastal system through geophysical mapping of the inner continental shelf, with an initial focus on Assateague Island. Modeling and observational studies will link geologic controls and physical processes that govern coastal system evolution at storm-event and longer timescales.	Publications: http://woodshole.er.usgs.gov/project-pages/delmarva/publications.html	http://woodshole.er.usgs.gov/project-pages/delmarva/index.html	DE, MD, VA	Oceanographic Model and Data Portal http://cmgdata.usgsportsals.net/DataReleases ; http://woodshole.er.usgs.gov/project-pages/delmarva/datareleases.html	NPS NOAA, Academic partners USFWS	June 2013 - November 2016	
44	NOAA	1,2,3,4	BC	Event geomorphology change prediction/collection	Coastal Change Analysis Program (C-CAP) land cover mapping and change monitoring	NOAA OCM, Nate Herold, Nate.Herold@noaa.gov, 843-740-1183	operational land cover mapping and change monitoring for coastal U.S. 1996 to present	land cover data on 5 year update cycle, as well as spatial explicit change mapping. Includes coastal changes, changes pre-post extreme events, and upstream physical data.	C-CAP is an ongoing mapping program, and has been developing land cover monitoring products since the mid 90's. Work is currently underway to produce a 2016 update to this data.	Coastal CONUS, HI, Guam, American Samoa, CNMI, US Virgin Islands, and Puerto Rico	https://coast.noaa.gov/dataregistry/sarc/collect/info/ccapregional	C-CAP data production is coordinated with state CZM programs and federal agencies via FGDC and the Multi-Resolution Land Cover Characteristics (MRLC) Consortium	1996, 2001, 2006, and 2010 dates are currently available, 2015/16 updates will become available 2016-2018 (dependant on geography).	

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45	FEMA	1,2,4	C	Community vulnerability and impact reduction	DHS S&T OUP Coastal Resilience Center research projects (various)	DHS S&T OUP; Eleanor Hajian; eleanor.hajian@hq.dhs.gov	Research and education intended to help build resiliency to natural hazards in coastal areas	Multiple research projects with various outcomes	The center is in Year 1 of a 5 year grant. Progress on individual research projects varies.	The research focuses on coastal areas of the US and its territories.	http://coastal hazardscenter.org/coastal-resilience-center-july-2015/	The Center is located at UNC with 23 partners in academia (LSU, URI, UMD, etc.) and federal agencies.	2015-2020, but many of the research projects build off previous efforts.	
46	NSF	1, 2, 3	BC	Other	Coastal SEES Program	National Science Foundation (multiple)	Fundamental research on sustainability of coastal systems	individual research products (from funded PIs)	https://www.nsf.gov/funding/pgm_summ.jsp?pins_id=504816	distributed	various	distributed	launched 2011, ended 2015	
48	USGS	3, 2	A	Event geomorphology change prediction/collecton	Elwha River Restoration	USGS - CMG Program John Haines	Provide scientific monitoring and analyses of the fish, waters, and sediment before, during, and after this historic dam removal, including alterations of sediment distribution and transport in the adjacent coastal system	Many publications https://walrus.wr.usgs.gov/elwha/publications.html	https://walrus.wr.usgs.gov/elwha/index.html	Washington	Benthic habitat: http://pubs.usgs.gov/ds/220/ Beach surveys: http://pubs.usgs.gov/ds/288/	Olympic National Park Lower Elwha Klallam Tribe Bureau of Rec NOAA Elwha Restoration Consortium	October 2003 - September 2016	
49	USGS	3, 2	C	Urban/Human Event Processes	Anticipating environmental health implications of disasters affecting coastal areas such as tsunamis, earthquakes, and extreme storms	USGS, Geoff Plumlee, gplumlee@usgs.gov	Work with the USGS Science Applications for Risk Reduction (SAFRR) project to add an environmental health component to their interdisciplinary disaster scenarios	Disaster scenarios help anticipate the magnitude spatial extent, and duration of plausible impacts of future disasters, including physical damages, recovery, economic costs, other societal impacts, and environmental health implications.	ArkStorm, California Tsunami, and Shake Out earthquake scenario work has been completed. Hayward earthquake scenario in progress. ARKStorm: http://dx.doi.org/10.1061/%28ASCE%29NH.1527-6996.0000188 . CA Tsunami Scenario: http://pubs.usgs.gov/of/2013/1170/ .	Coastal California	SAFRR Project web site: http://www.usgs.gov/natural_hazards/safrr/ .	Wide range of Federal, State, and local partners (FEMA, CA Geol. Survey, CAL OES,	2008-2016 and beyond	
50	USGS	3, 2	C	Urban/Human Event Processes	The environmental and health implications of potentially hazardous materials produced by disasters	USGS, Geoff Plumlee, gplumlee@usgs.gov	The USGS has responded to a wide range of recent disasters to help understand the potential environmental and related health impacts of disaster materials.	A better understanding of the potential environmental and health impacts of a wide range of disaster materials, including: dusts from the World Trade Center collapse, mine wastes and tailings spills, the Gulf oil spill, wildfires, many volcanic eruptions, hurricanes, floods	A wide range of disaster materials have been described and characterized. See, for example Plumlee, G.S., Morman, S.A., Mesker, G.P., Hoefen, T.M., Hageman, P.L., and Wolf, R.E., 2014. The environmental and medical geochemistry of potentially hazardous materials produced by disasters. In Lollar, B.S.L. (ed.) <i>Treatise on Geochemistry</i> , v. 11, p. 247-304. http://www.sciencedirect.com/science/article/pii/B9780080959757009074	Global	http://minerals.cr.usgs.gov/projects/minerals_health/environmental-disasters.html	wide range of Federal, State, and local agency partners.	2000-present	
51	USGS	3, 2	C	Urban/Human Event Processes	The impact of onsite wastewater disposal systems on groundwater in areas inundated by Hurricane Sandy in New Jersey and New York	USGS, Irene Fisher, ifisher@usgs.gov	Evaluate exposure to emerging contaminants through discharge/release of wastewater from coastal onsite wastewater disposal systems	Source characterisation of onsite wastewater disposal systems and documentation of exposure pathway to estuarine habitats, baseline data for researchers and decision makers, JA	Data analysis complete, JA in press; USGS Environmental Health Mission Area Goal 1: Identify, prioritize, and detect contaminants and pathogens of emerging environmental concern. Goal 2: Reduce the impact of contaminants on the environment, fish and wildlife, domesticated animals; links in prep	Coastal NJ and NY	NWIS and forthcoming JA	Suffolk County Department of Health Services and Town of Hempstead	2013; data available now, JA available in 5/2016	
52	USGS	3, 2	C	Urban/Human Event Processes	Assess potential changes to human and wildlife exposure to contaminants on Shinnecock Nation lands and natural resources after Hurricane Sandy	USGS, Irene Fisher, ifisher@usgs.gov	Analysis of changes in contaminant concentrations in sediments and farmed oysters on Shinnecock Nation lands affected by Hurricane Sandy	Study will assess contaminant impacts of Hurricane Sandy on oysters and sediments, provides critical baseline data and aids DOI trust group manage resources, USGS report	All data collected and analyzed, draft manuscript prepared; USGS Environmental Health Mission Area Goal 4: Discover the complex interactions between, and combined effects of, exposure to contaminants and pathogens and Goal 5: Prepare for and respond to the environmental impacts and related health threats of natural and anthropogenic disasters; Links in prep	Shinnecock Nation, Long Island, NY	NWIS and forthcoming USGS report	Shinnecock Nation	2013; report available in 6/2016	

Extreme Events

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53	USGS	3, 2	C	Urban/Human Event Processes	Sediment chemistry and toxicity in Barnegat Bay, New Jersey: pre- and post-Hurricane Sandy, 2012-13	USGS; Kristin Romanok; kromanok@usgs.gov	Evaluate changes in sediment chemistry and toxicity in Barnegat Bay due to Hurricane Sandy	Document changes in sediment chemistry and toxicity due to Hurricane Sandy in Barnegat Bay, provides baseline data and improved understanding of hurricane impacts to estuaries with developed watersheds	Article in press, USGS Environmental Health Mission Area Goal 1: Identify, prioritize, and detect contaminants and pathogens of emerging environmental concern, Goal 2: Reduce the impact of contaminants on the environment, fish and wildlife, domesticated animals, and people and Goal 5: Prepare for and respond to the environmental impacts and related health threats of natural and anthropogenic disasters: Links in prep	Barnegat Bay, NJ	NWIS, https://pubs.er.usgs.gov/publication/ds56 and https://pubs.er.usgs.gov/publication/ofr20151188A and forthcoming JA	U.S. Army Corps of Engineers	2011; data available now, JA will be available in 5/2016	
54	USGS	3, 2	C	Urban/Human Event Processes	Definition of regional variability in concentrations of wastewater compounds, hormones, and other PAHs for portions of New York and New Jersey affected by Hurricane Sandy	USGS; Patrick Phillips; piphilli@usgs.gov	Evaluate regional variability in sediment-bound hormones and emerging contaminants in estuaries receiving discharge from wastewater treatment systems	Study will assess regional variability of sediment-bound hormones and emerging contaminants and examine relationships with waste treatment infrastructure compromised by Hurricane Sandy, provides critical baseline data and informs resiliency/mitigation, JA	Article in press, USGS Environmental Health Mission Area Goal 1: Identify, prioritize, and detect contaminants and pathogens of emerging environmental concern and Goal 5: Prepare for and respond to the environmental impacts and related health threats of natural and anthropogenic disasters: Links in prep	Coastal NJ and NY	NWIS, http://pubs.usgs.gov/ds/0905/ and forthcoming JA	Stoney Brook University, U.S. Environmental Protection Agency, New York State Department of Environmental Conservation, New York City Department of Environmental Protection, Suffolk County Department of Health Services, and Town of Hempstead	data available now, JA will be available in 5/2016	
55	USGS	3, 2	C	Urban/Human Event Processes	Effects of compromised infrastructure due to Hurricane Sandy on contaminant transfer to bottom sediments in the sensitive coastal ecosystems of Hempstead Bay, New York	USGS; Shawn Fisher; sfisher@usgs.gov	Source characterisation of compromised wastewater treatment systems and documenting exposure pathways to sediment-bound hormones and emerging contaminants in estuaries receiving discharge from wastewater treatment systems	Study assesses sediment-bound hormones and emerging contaminants and examine relationships with waste treatment infrastructure compromised by Hurricane Sandy, provides critical baseline data and informs resiliency/mitigation, JA	Article in press, USGS Environmental Health Mission Area Goal 1: Identify, prioritize, and detect contaminants and pathogens of emerging environmental concern and Goal 5: Prepare for and respond to the environmental impacts and related health threats of natural and anthropogenic disasters: Links in prep	Hempstead Bay, New York	NWIS and forthcoming JA	Stoney Brook University, U.S. Environmental Protection Agency, New York State Department of Environmental Conservation, and Town of Hempstead	2013; data available now, JA available in 5/2016	

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56	USGS	3, 2	C	Urban/Human Event Processes	Reconassance sampling of NY & NJ coastal bays and shorelines after Hurricane Sandy	USGS: Tim Reilly; treilly@usgs.gov	Collect sediment- and tissue- (young-of-year bluefish and mussels) quality data needed to evaluate potential long-lived environmental health issues present after Hurricane Sandy	Defines post-Sandy sediment and tissue-quality conditions in selected NJ and NY estuaries and coastlines; provides critical baseline data to evaluate impacts of future storms; 2 USGS Data Series Reports	Sample collection and analysis complete; USGS Environmental Health Mission Area Goal 5: Prepare for and respond to the environmental impacts and related health threats of natural and anthropogenic disasters; http://pubs.usgs.gov/ds/0905/ and https://pubs.er.usgs.gov/publication/ds/56	Coastal NJ and NY	http://pubs.usgs.gov/ds/0905/ https://pubs.er.usgs.gov/publication/ds/56	U.S. Environmental Protection Agency, National Oceanic and Atmospheric Administration, New Jersey Department of Environmental Protection, New York State Department of Environmental Conservation, New York City Department of Environmental Protection, Suffolk County Department of Health Services, and Town of Hempstead	Began in 2013. Products available now.	
57	USGS	3, 2	C	Urban/Human Event Processes	Assess potential changes to human and wildlife exposure to contaminants through consumption of seafood after Hurricane Sandy	USGS: Tim Reilly; treilly@usgs.gov	Analysis of changes in contaminant concentrations in marine fish and mussel tissue before and after Hurricane Sandy	Study will assess impacts of Hurricane Sandy on fish and mussel contaminant burdens, provides critical baseline data and introduces the use of menhaden and young-of-the-year bluefish as indicators of estuarine health, 3 JAs	Papers in press at Marine Pollution Bulletin; USGS Environmental Health Mission Area Goal 4: Discover the complex interactions between, and combined effects of, exposure to contaminants and pathogens and Goal 5: Prepare for and respond to the environmental impacts and related health threats of natural and anthropogenic disasters; Links in prep	Coastal NJ and NY	Forthcoming JAs and https://pubs.er.usgs.gov/publication/ds/56	National Oceanic and Atmospheric Administration, Seton Hall University	Began in 2013. Products will be available online in 5/2016	
58	USGS	4,1,2,3	AB	Event geomorphology change prediction/collection	Coastal Change Processes and Model Applications	USGS - CMG Program John Haines	1) improve the code of numerical sediment-transport models by implementing new or improved algorithms; 2) obtain measurements of coastal ocean processes to test and verify models; 3) develop new instruments or analysis techniques to make these measurements; and 4) develop software tools and standards to facilitate analysis, comparison, and visualization of observations and models.	(1) COAWST model forecasts (2) Combined Wave-Current Bottom Stress (3) Fetch- and Depth-Limited waves (4) Runup and Reverse Shoaling	marine.usgs.gov see Understanding Coastal Change http://woodshole.er.usgs.gov/project-pages/coastal_model/index.html	Atlantic Gulf of Mexico	http://woodshole.er.usgs.gov/project-pages/cccp/public/COAWST.htm http://stelwagen.er.usgs.gov/Seafloor-Stress-and-Sediment-Mobility-Database http://woodshole.er.usgs.gov/project-pages/mobility/	NPS NOAA	October 2006 - September 2017	
59	USGS	3, 1, 2	AB	Urban/Human Event Processes	Barnegat Bay	USGS - CMG Program John Haines	(1) develop a hydrodynamic/inundation and sediment transport model of the region. (2) Produce an offline water-quality model. Different forcing scenarios have been tested to investigate the estuary's response in terms of residence time.	Tidal wetlands reports: http://woodshole.er.usgs.gov/project-pages/estuaries/tidalwetlands.html	http://woodshole.er.usgs.gov/project-pages/estuaries-physical-response/model-output/barnegat-bay.html	New Jersey	http://pubs.usgs.gov/ds/288/	NJ DEP NPS USFWS	October 2010 - September 2018	
60	USGS	3, 1, 2	A	Event geomorphology change prediction/collection	Comparison of storm-derived changes to long-term trends in sediment quality.	USGS; Kathy Lee; klee@usgs.gov	Regional comparison of sediment contamination before and after Hurricane Sandy in conjunction with datasets collected as part of the National Coastal Assessment to compare storm-derived changes to long-term trends in sediment quality within the region.	Understanding of hurricane impacts to estuarine sediment quality within the context of long-term regional trends, fills knowledge gap for resource managers and informs regional monitoring programs, JA	Data analysis ongoing, JA in prep; Area Goal 1: Identify, prioritize, and detect contaminants and pathogens of emerging environmental concern, Goal 4: Discover the complex interactions between, and combined effects of, exposure to contaminants and pathogens and Goal 5: Prepare for and respond to the environmental impacts and related health threats of natural and anthropogenic disasters; Links in prep	Coastal NJ and NY	NWIS and NCAA; Forthcoming JA	U.S. Environmental Protection Agency	2013; data available now, JA available in 5/2016	
61	USGS	3, 1, 2, 4	B	Recovery/Restoration	Chesapeake Bay Restoration Program	USGS Chesapeake Bay Coordinator, Scott Phillips (sphil@usgs.gov)	Restoration and protection of this resource is a priority for designated agencies, and NGO stakeholders through the Chesapeake Bay Program (CBP). President Obama issued an Executive order for increased Federal leadership to restore and protect the Bay and its watershed.	http://chesapeake.usgs.gov/projectsandcontacts.html	The strategy has four essential goals and associated outcomes: <ul style="list-style-type: none"> • restore clean water • recover habitat • sustain fish and wildlife • conserve land and increase public access 	Mid-Atlantic	http://chesapeake.usgs.gov/data.html	Multiple states, Chesapeake Executive Council, local governments		

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62	USGS	3, 1, 2, 4	AB	Sea Level Rise/Tidal Flooding	Climate change adaptation for coastal National Wildlife Refuges	USGS Southeast Climate Science Center, Gerard McMahon, (gmcMahon@usgs.gov)	Understanding Conservation Management Decisions in the Face of Sea-Level Rise Along the U.S. Atlantic Coast; Global change and conservation triage on National Wildlife Refuges	https://www.doi.gov/csc/southeast	The Southeast CSC provides scientifically valid information and tools that can be used to adapt resource management to changing environmental conditions; and applies these tools to produce local and regional assessments that are widely used by policy makers, resource managers, and the public	Eastern US, Gulf Coast		North Carolina State University, DOI Landscape Conservation Cooperatives	ongoing	
64	USGS	4, 1, 2	AB	Event geomorphology change prediction/collection	3DEP in the Coastal Zone	Jeffery Danielson-daniels@usgs.gov	Research on creating seamless topo-bathymetric models in the coastal zone	Provides baseline source elevation data as well as possibilities for change detection	Models have been built for Mobile Bay, North Carolina, San Francisco Bay and in Hurricane Sandy affected regions	National	Data available via http://topotools.cr.usgs.gov/coned/index.php	USGS/NOAA/Others	Research began in 2011. Products available now	
65	USGS	4, 1, 2	AB	Event geomorphology change prediction/collection	Long-Term Streamgage Network	USGS Groundwater and Streamflow Information Program (GWSIP), Doug Yeskis, djyeskis@usgs.gov, 703-648-5046.	National Streamflow Network	1) Real-time presentation of data, 2) Various studies from time to time, and 3) Focused reports on specific droughts and floods.	The collection of streamflow in a nationally consistent manner to provide critical information during droughts and floods, assess the impacts of climate and land-use change, and other uses consistent with USGS and other funding partner goals and objectives	Throughout the US and territories	Data is available on the web from the USGS National Water Information System: http://waterdata.usgs.gov/nwis/sw	Many partners, including Federal, State, Local and Tribal.	Since pre-1900 and ongoing in the foreseeable future	
66	USGS	4, 1, 2	AB	Sea Level Rise/Tidal Flooding	Topographic Science	USGS, Jonathan H. Smith	Analysing elevation data characteristics supporting sea-level rise and storm surge impacts	Elevation characteristics datasets suitable for sea level rise and storm surge assessments	http://www.usgs.gov/climate_landuse/lcs/projects/srise.asp	national	http://topotools.cr.usgs.gov/	NOAA	On-going	
67	USGS	4, 1, 2, 3	ABC	Other	USGS Cooperative Matching Funds	USGS, State Water Science Centers throughout the nation	<u>The Mission of the USGS Cooperative Water Program is to provide reliable, impartial, and timely information needed to understand the Nation's water resources through a program of shared efforts and funding with State, Tribal, and local partners to enable decision makers to wisely manage the Nation's water resources.</u>	http://water.usgs.gov/coop/products/	The Cooperative Water Program monitors and assesses water in every State, protectorate, and territory of the U.S. in partnership with nearly 1,600 local, State, and Tribal agencies.	Distributed throughout the nation.		Many Local, State, Regional and Tribal Partners	Ongoing	
68	NOAA	2	ABC	Event geomorphology change prediction/collection	Emergency Response Imagery	NOAA/NOS/NGS Mike.Aslaksen@noaa.gov	Provides timely imagery to support NOAA national security and emergency response requirements. In addition, it is used for ongoing research efforts for testing and developing standards for airborne digital imagery.	Provide metric-quality vertical aerial photographs; Topographic lidar; Oblique Aerial Photographs	NOAA's Mission: Science, Service and Stewardship; to advance the state of knowledge and develop engineering technology; http://storms.ngs.noaa.gov/eri_page/index.htm	Contiguous United States	http://storms.ngs.noaa.gov/eri_page/index.htm	Federal partners including FEMA, USCG, USACE, NGA, and USGS	Ongoing	

Human and Ecosystem Health													
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1	BOEM	3	Chemical pollutants	(a) ANMIDA III- Arctic Kelp Communities in the Beaufort Sea: Sentinels of Long-Term Change; (b) ANMIDA III- Contaminants, Sources, and Bioaccumulation	BOEM; catherine.coon@boem.gov	Monitoring environmental changes and contaminants in the U.S. Beaufort Sea area of O&G activity.	Observational dataset	**	Alaska	**	None	5/14/2012 (a); 9/20/2013 (b) to 5/31/2017 (a); 9/19/2017 (b)	BOEM National Studies List Reference # AK-11-14a; AK-11-14b
2	USACE	3	Chemical pollutants	Nutrient Contaminant Release in Open Bay/Open Lake Placement	ERDC-EL Paul Schroeder	Evaluation framework and criteria on phosphorous availability and partitioning to evaluate water column impact to support open water placement of dredged material.	Improved evaluation methods of phosphorous releases during dredging operations as well as impacts to the regional nutrient budget	research is designed to balance operational and environmental initiatives and to meet complex economic, engineering, and environmental challenges of dredging and disposal in support of the navigation mission	General				DOER
3	USACE	3	Chemical pollutants	Demonstration of open water placement bioaccumulation control using activated carbon at Ashtabula	Kreitinger/Schroeder	Demonstrate effectiveness of activated carbon in managing PCBs bioaccumulation from dredged material placed in open water	Multiple products will demonstrate that implementation can be performed within the normal dredging operation using conventional equipment available in a navigation dredging project	research is designed to balance operational and environmental initiatives and to meet complex economic, engineering, and environmental challenges of dredging and disposal in support of the navigation mission	General				DOER
4	USACE	3	Chemical pollutants	RECOVERY Q-TEA Development	Ruiz/Rogers	Expanded capability to represent contaminant fate processes with the RECOVERY model. The added capability will support reduced management costs for contaminated dredged material through capping and beneficial use.	Update of RECOVERY model to perform contaminant fate analysis for dredging and capping projects.	research is designed to balance operational and environmental initiatives and to meet complex economic, engineering, and environmental challenges of dredging and disposal in support of the navigation mission	General				DOER
5	USGS	3	Chemical pollutants	Forecasting effect of human population expansion on coastal ecosystems	USGS, Wetlands and Aquatic Research Center; Scott Wilson (wilsons@usgs.gov), Greg Steyer (steyer@usgs.gov) West ern Ecological Research Center; Kevin Lafferty (klafferty@usgs.gov)	Forecasting impacts of contaminants, freshwater use, infrastructure etc on habitat quality	http://www.nwrc.usgs.gov/research/cca/ecosystem_modeling.html	Coastal restoration and protection managers need decision-support tools that model wetland community dynamics and responses to both natural processes and anthropogenic practices.	Coastal US				
6	USGS	3	Chemical pollutants	Environmental implications of the use of acid generating bay sediments for dune replenishment	USGS; Geoff Plumlee; gplumlee@usgs.gov	Evaluate potential for human and wildlife exposure to contaminants due to use of dredged sediments from back bays for beach and dune restoration	Understand exposure to contaminants associated with reuse use of dredged sediments from back bays for beach and dune restoration; informs resiliency/mitigation efforts, JA	Data analysis complete, JA in press; USGS Environmental Health Mission Area Goal 1: Identify, prioritize, and detect contaminants and pathogens of emerging environmental concern, Goal 2: Reduce the impact of contaminants on the environment, fish and wildlife, domesticated animals and Goal 5: Prepare for and respond to the environmental impacts and related health threats of natural and anthropogenic disasters; Links in prep ; links in prep	Coastal NJ and NY	Forthcoming JA	None	2013; JA available in 5/2016	
7	USGS	3	Chemical pollutants	Characterize potetial contaminant sources near coastal bays and shorelines	USGS; Tim Reilly; tjreilly@usgs.gov	Geospatial analysis of U.S. EPA (TRI and FRS), private business dataset and storm data to define contaminant sources proximal to coastal receptors	Outcome is a methodology and decision support tool; capability is ability to prioritize point locations on the basis of proximal contaminant sources and storm vulnerabilities utilizing public, nationally available data sources; products are mapper, USGS reports and journal articles	Initial decision support tool and methodology complete; USGS Environmental Health Mission Area Goal 4: Discover the complex interactions between, and combined effects of, exposure to contaminants and pathogens and Goal 5: Prepare for and respond to the environmental impacts and related health threats of natural and anthropogenic disasters; http://health.usgs.gov/scorr/ and https://pubs.er.usgs.gov/publication/ofr20151188A	Coastal counties from VA to ME	http://health.usgs.gov/scorr/ https://pubs.er.usgs.gov/publication/ofr20151188A	U.S. Environmental Protection Agency, Federal Emergency Management Agency and National Weather Service	Began in 2013. Products available now and additional products in development	
8	USGS	3	Chemical pollutants	Sediment-bound Contaminant Resiliency and Response (SCoRR) strategy	USGS; Tim Reilly; tjreilly@usgs.gov	Develop a strategy to define baseline and post-event sediment-bound environmental health (EH) stressors	A tiered, multimetric approach will be developed to (1) identify and map contaminant sources and potential exposure pathways for human and ecological receptors, (2) define the baseline mixtures of EH stressors present in sediments and correlations of relevance, (3) document post-event changes in EH stressors present in sediments, and (4) establish and apply metrics to quantify changes in coastal resilience associated with sediment-bound contaminants; Integration of this information provides a means to improve assessment of the baseline status of a complex system and the significance of changes in contaminant hazards due to storm-induced (episodic) and SLR (incremental) disturbances; USGS reports, app, JAs	Initial decision support tool, sampling SOP and methodology complete, data analysis and metric development underway; USGS Environmental Health Mission Area Goal 4: Discover the complex interactions between, and combined effects of, exposure to contaminants and pathogens and Goal 5: Prepare for and respond to the environmental impacts and related health threats of natural and anthropogenic disasters; http://health.usgs.gov/scorr/ https://pubs.er.usgs.gov/publication/ofr20151188A https://pubs.er.usgs.gov/publication/ofr20151188B	Coastal counties from VA to ME	http://health.usgs.gov/scorr/	U.S. Environmental Protection Agency, Federal Emergency Management Agency and National Weather Service	Began in 2013. Products available now and additional products in development	

Human and Ecosystem Health													
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9	USGS	3.2	Chemical pollutants	The environmental and health implications of potentially hazardous materials produced by disasters	USGS; Geoff Plumlee; gplumlee@usgs.gov	The USGS has responded to a wide range of recent disasters to help understand the potential environmental and related health impacts of disaster materials.	A better understanding of the potential environmental and health impacts of a wide range of disaster materials, including: dusts from the World Trade Center collapse, mine wastes and tailings spills, the Gulf oil spill, wildfires, many volcanic eruptions, hurricanes, floods	A wide range of disaster materials have been described and characterized. See, for example, Plumlee, G.S., Morman, S.A., Meeker, G.P., Hoefen, T.M., Hageman, P.L., and Wolf, R.E., 2014. The environmental and medical geochemistry of potentially hazardous materials produced by disasters. In Lollar, B.S.L. (ed.), Treatise on Geochemistry, v. 11, p. 257-304. http://www.sciencedirect.com/science/article/pii/B9780080959757009074	Global	http://minerals.er.usgs.gov/projects/minerals_health/environmental-disasters.html	wide range of Federal, State, and local agency partners.	2000-present	
10	USGS	3.2	Chemical pollutants	The impact of onsite wastewater disposal systems on groundwater in areas inundated by Hurricane Sandy in New Jersey and New York	USGS; Irene Fisher; ifisher@usgs.gov	Evaluate exposure to emerging contaminants through discharge/release of wastewater from coastal onsite wastewater disposal systems	Source characterisation of onsite wastewater disposal systems and documentation of exposure pathway to estuarine habitats, baseline data for researchers and decision makers, JA	Data analysis complete, JA in press; USGS Environmental Health Mission Area Goal 1: Identify, prioritize, and detect contaminants and pathogens of emerging environmental concern, Goal 2: Reduce the impact of contaminants on the environment, fish and wildlife, domesticated animals; links in prep	Coastal NJ and NY	NWIS and forthcoming JA	Suffolk County Department of Health Services and Town of Hempstead	2013; data available now, JA available in 5/2016	
11	USGS	3.2	Chemical pollutants	Assess potential changes to human and wildlife exposure to contaminants on Shinnecock Nation lands and natural resources after Hurricane Sandy	USGS; Irene Fisher; ifisher@usgs.gov	Analysis of changes in contaminant concentrations in sediments and farmed oysters on Shinnecock Nation lands affected by Hurricane Sandy	Study will assess contaminant impacts of Hurricane Sandy on oysters and sediments, provides critical baseline data and aides DOI trust group manage resources, USGS report	All data collected and analyzed, draft manuscript prepared; USGS Environmental Health Mission Area Goal 4: Discover the complex interactions between, and combined effects of, exposure to contaminants and pathogens and Goal 5: Prepare for and respond to the environmental impacts and related health threats of natural and anthropogenic disasters; Links in prep	Shinnecock Nation, Long Island, NY	NWIS and forthcoming USGS report	Shinnecock Nation	2013; report available in 6/2016	
12	USGS	3.2	chemical pollutants	Sediment chemistry and toxicity in Barnegat Bay, New Jersey; pre- and post-Hurricane Sandy, 2012-13	USGS; Kristin Romanok; kromanok@usgs.gov	Evaluate changes in sediment chemistry and toxicity in Barnegat Bay due to Hurricane Sandy	Document changes in sediment chemistry and toxicity due to Hurricane Sandy in Barnegat Bay, provides baseline data and improved understanding of hurricane impacts to estuaries with developed watersheds	Article in press, USGS Environmental Health Mission Area Goal 1: Identify, prioritize, and detect contaminants and pathogens of emerging environmental concern, Goal 2: Reduce the impact of contaminants on the environment, fish and wildlife, domesticated animals, and people and Goal 5: Prepare for and respond to the environmental impacts and related health threats of natural and anthropogenic disasters; Links in prep	Barregat Bay, NJ	NWIS, https://pubs.er.usgs.gov/publication/ds956 and https://pubs.er.usgs.gov/publication/ofr20151188A and forthcoming JA	U.S. Army Corps of Engineers	2011; data available now, JA will be available in 5/2016	
13	USGS	3.2	chemical pollutants	Definition of regional variability in concentrations of wastewater compounds, hormones, and other PAHs for portions of New York and New Jersey affected by Hurricane Sandy	USGS; Patrick Phillips; pjphilli@usgs.gov	Evaluate regional variability in sediment-bound hormones and emerging contaminants in estuaries receiving discharge from wastewater treatment systems	Study will assess regional variability of sediment-bound hormones and emerging contaminants and examine relationships with waste treatment infrastructure compromised by Hurricane Sandy, provides critical baseline data and informs resiliency/mitigation, JA	Article in press, USGS Environmental Health Mission Area Goal 1: Identify, prioritize, and detect contaminants and pathogens of emerging environmental concern and Goal 5: Prepare for and respond to the environmental impacts and related health threats of natural and anthropogenic disasters; Links in prep	Coastal NJ and NY	NWIS, http://pubs.usgs.gov/ds/0905/ and forthcoming JA	Stoney Brook University, U.S. Environmental Protection Agency, New York State Department of Environmental Conservation, New York City Department of Environmental Protection, Suffolk County Department of Health Services, and Town of Hempstead	data available now, JA will be available in 5/2016	
14	USGS	3.2	chemical pollutants	Effects of compromised infrastructure due to Hurricane Sandy on contaminant transfer to bottom sediments in the sensitive coastal ecosystems of Hempstead Bay, New York	USGS; Shawn Fisher; scfisher@usgs.gov	Source characterisation of compromised wastewater treatment systems and documenting exposure pathways to sediment-bound hormones and emerging contaminants in estuaries receiving discharge from wastewater treatment systems	Study assesses sediment-bound hormones and emerging contaminants and examine relationships with waste treatment infrastructure compromised by Hurricane Sandy, provides critical baseline data and informs resiliency/mitigation, JA	Article in press, USGS Environmental Health Mission Area Goal 1: Identify, prioritize, and detect contaminants and pathogens of emerging environmental concern and Goal 5: Prepare for and respond to the environmental impacts and related health threats of natural and anthropogenic disasters; Links in prep	Hempstead Bay, New York	NWIS and forthcoming JA	Stoney Brook University, U.S. Environmental Protection Agency, New York State Department of Environmental Conservation, and Town of Hempstead	2013; data available now, JA available in 5/2016	
15	USGS	3.2	Chemical pollutants	Reconnaissance sampling of NY & NJ coastal bays and shorelines after Hurricane Sandy	USGS; Tim Reilly; tjreilly@usgs.gov	Collect sediment- and tissue- (young-of-year bluefish and mussels) quality data needed to evaluate potential long-lived environmental health issues present after Hurricane Sandy	Defines post-Sandy sediment and tissue-quality conditions in selected NJ and NY estuaries and coastlines; provides critical baseline data to evaluate impacts of future storms; 2 USGS Data Series Reports	Sample collection and analysis complete; USGS Environmental Health Mission Area Goal 5: Prepare for and respond to the environmental impacts and related health threats of natural and anthropogenic disasters; http://pubs.usgs.gov/ds/0905/ and https://pubs.er.usgs.gov/publication/ds956	Coastal NJ and NY	http://pubs.usgs.gov/ds/0905/ and https://pubs.er.usgs.gov/publication/ds956	U.S. Environmental Protection Agency, National Oceanic and Atmospheric Administration, New Jersey Department of Environmental Protection, New York State Department of Environmental Conservation, New York City Department of Environmental Protection, Suffolk County Department of Health Services, and Town of Hempstead	Began in 2013. Products available now.	

Human and Ecosystem Health													
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25	NOAA	3	Community Vulnerability	COMMUNITY VULNERABILITY ASSESSMENT FOR THE CHESAPEAKE BAY, CHOPTANK HABITAT FOCUS AREA	NOAA-NOS-NCCOS - Maria Dillard (Maria.Dillard@noaa.gov)	Investigators will develop a set of integrated vulnerability metrics and collect data for a select community in the Chesapeake Bay Choptank Habitat Focus Area to evaluate vulnerability to the localized impacts of climate variability and change or other coastal hazards. Investigators will consolidate and analyze multiple types of data for the selected community. Ecological, hydrological, social, economic, and cultural vulnerabilities will be examined in relation to climate scenarios. The focus will be on vulnerabilities from the perspective of the human population. NCCOS scientists will develop metrics, collect and analyze data, and compile the findings into information products of utility for the community. The assessment will integrate socioeconomic and biophysical information in a way that enhances the community's ability to plan and prepare for coastal hazards. Results from the assessment will provide the selected community with the necessary tools to increase their resiliency as it pertains to coastal hazards, climate variability, and other unforeseen negative impacts. As an extension of the FY14 project "Science Support for Adaptation Planning for Climate and Coastal Hazard Impacts in the Chesapeake Bay", this project would serve as a second application of the methodological approach.	The purpose of this project is to develop appropriate metrics and collect data for a vulnerability assessment of a Chesapeake Bay community in order to provide the community with the information necessary to complete a community-led assessment, develop an adaptation plan, and execute this plan. Overall, this information will improve the community's ability to be resilient to climate and coastal hazard impacts, which will, in turn, decrease the community's vulnerability to future events. Outcomes include a vulnerability assessment and the corresponding data for the selected Choptank HFA community. At the project's completion, the community, including state, county, and local coastal managers, will have the tools and the science necessary to develop an adaptation plan and determine priority future adaptation actions for the community.		Oxford, MD		SASHA LAND - MD DNR, Kate Skaggs - CoastSmart Program Representative, cheryl lewis - Town of Oxford, MD Representative	6/15-11/30/16	
26	USGS	3	Community Vulnerability	Best Management Practices (BMP) for water management	USGS, Jonathan H. Smith	Aid communities plan on managing urban runoff and prevent flooding	Studies assessing best management practices for water management in urban and suburban areas	http://www.usgs.gov/climate_landuse/lcs/projects/urban.asp	Eastern US	http://egsc.usgs.gov/bmp.html	Maryland, Virginia, local municipalities	On-going	
27	USGS	3	Community Vulnerability	Risk and Vulnerability Assessments	USGS, Jonathan H. Smith	Assessing risk and vulnerability of coastal communities to natural hazards	Studies and decision-support tools promoting community sustainability and resiliency	http://www.usgs.gov/climate_landuse/lcs/projects/riskh.asp	Multiple	http://geography.wr.usgs.gov/science/vulnerability/index.htm	NOAA, Washington State, Oregon	On-going	
28	BOEM	1,3	Community vulnerability	Predicting the Consequences of Wave Energy Absorption from Marine Renewable Energy Facilities on Nearshore Ecosystems	BOEM; donna.schroeder@boem.gov	Existing data are being used to build a statistical model describing how wave energy may structure nearshore biological communities.	Data are being used to predict the ecological consequences of various siting options for proposed marine renewable energy facilities.	**	Pacific	**	USGS	n/a	BOEM National Studies List Reference # PC-13-05
29	BOEM	1,3	Community vulnerability	Archaeology and Coast in Crisis: Traditional Cultural Properties at Risk	BOEM; scott.sorset@boem.gov	1) Document perspectives of descendant communities and Tribal groups on the investigations of archaeological sites and traditional cultural properties endangered by coastal erosion, subsidence, and sea-level rise along southern Louisiana; 2) Conduct archaeological investigations of a select number of identified by the State of Louisiana, descendant communities, and Tribal groups as being critically endangered of being destroyed by sea level transgressions.	The proposed study will develop strategies for managing at-risk archaeological sites along Louisiana's coast, incorporate Tribal community involvement, and recommend how BOEM should incorporate such considerations into its consultations and NEPA analyses.	**	GOM	**	TBD	n/a	BOEM National Studies List Reference # 17-19 SDP
30	USACE	1,3	Community vulnerability	Quantifying the Effects of Beneficial Uses of Dredged Material	ERDC-EL Glenn Suir	Capability to quantify environmental benefits associated with the use of dredged sediments for ecosystem restoration and assess the ability of those applications to promote and protect naturally-occurring land building functions and resulting features.	Tools to compare the functional capacities of dredged sediments placement sites to naturally occurring wetlands or other restoration applications ... including the effects of episodic events.	to address the need for ecosystem assessment, restoration, and management activities at the project level with cost-effective technologies	General	ERDC EL	USGS / USFWS / NOAA	FY14-16	Ecosystem Management and Restoration
31	USACE	1,3	Community vulnerability	Engineering with Nature for Sustainable Coastal Systems	ERDC-EL Todd Bridges	Capabilities to incorporate risk and uncertainties associated with climate change and sea level rise on coastal ecosystem restoration and multi-purpose projects that addresses the use of primary productivity, accretion, and wetlands creation.	Tools and Techniques for addressing risk and uncertainty associated with climate Change	to address the need for ecosystem assessment, restoration, and management activities at the project level with cost-effective technologies	General	ERDC EWN Website	USGS / USFWS /	FY13-16	Ecosystem Management and Restoration
32	USACE	1,3	Community vulnerability	Guide to Engineering with Nature for Native Plant Community Development on DMP Areas	P. Bailey/Sekoni	Provide well documented, sufficient vegetative treatments, planting regime and/or guidance to stabilize and promote ecosystem development on placement areas	Produce a guidance document that will provide guidance on establishing appropriate native plant communities that are effective, low cost solutions, to stabilize DMPs, CDFs, and provide other benefits and ecosystem services	research is designed to balance operational and environmental initiatives and to meet complex economic, engineering, and environmental challenges of dredging and disposal in support of the navigation mission	General				DOER
33	BOEM	3,4	Community vulnerability	Assessment of Multiple Ocean Circulation Models to Support Ensemble OSRA Experiments	BOEM; heather.crowley@boem.gov	Evaluation of the strengths and weaknesses of multiple ocean models in the context of BOEM's oil-spill risk assessment program.	Deliverables would include a report outlining the strengths and weakness of each developed model in relation to processes relevant to oil spill trajectory analysis, as well as short-term surface circulation fields from the suite of models.	**	Alaska	**	TBD	n/a	BOEM National Studies List Reference # 17-19 SDP
34	BOEM	3,4	Community vulnerability	Cumulative Impacts of Human Activity on Coastal and Marine Resources of the Gulf of Mexico	BOEM; TBD*	Assess cumulative impacts to biological, physical, and cultural resources; establish benchmark conditions that quantify these cumulative impacts, and estimate vulnerabilities while performing NEPA-focused analyses	In addition to a final report, data sets corresponding to cumulative impacts and drivers would be produced	**	GOM	**	TBD	n/a	BOEM National Studies List Reference # 17-19 SDP
35	NOAA	3,4	Community vulnerability	Rip current forecast model	NOS CO-OPS - Gregory Dusek, gregory.dusek@noaa.gov; NWS OSTI MDL - Michael Churma, michael.charma@noaa.gov	Validate and operationalize a statistical rip current forecast model utilizing hydrodynamic wave and water level model input.	An operational rip current forecast model used by WFOs nationwide to provide forecast guidance on the likelihood of hazardous rip currents occurring	Journal and conference articles detailing research/approach. Initial implementation and validation at multiple WFOs. Anticipated NOAA RTAP funding to beginning in FY17	nationwide	Forecast model output now being generated as part of NWS NWPS WCOSS implementation	NWS; Lifeguard agencies throughout U.S.; USGS utilizes similar numerical model input for statistical wave run-up model	Started at NOAA 2011. Operational product - 2019	
36	USGS	3	Community vulnerability	Flood Inundation	Office of Surface Water (Lead Contact: Harry Jenter, hjenter@usgs.gov, 703-648-5916	Flood Inundation surfaces are developed and tied to a local streamgage	A flood inundation map library is a set of maps that shows where flooding may occur over a range of water levels in the community's local stream or river.	Partner with local communities to assist with the development and validation of flood inundation map libraries and provide online access to flood inundation maps along with real-time streamflow data, flood forecasts, and potential loss estimates.	Throughout the US and territories, currently at 88 locations	http://wincloud.usgs.gov/apps/FIM/FloodInundationMapper.html	Many partners, including Federal, State, Local and Tribal.	Initial efforts started around 2000, but the larger Flood Inundation coordination efforts began around 2009.	

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37	USGS	2,3	Community vulnerability	Impacts of large storms	USGS, Wetlands and Aquatic Research Center, Thomas Doyle (doylet@usgs.gov); Patuxent Wildlife Research Center (John French (jbfrench@usgs.gov); Sandy Science Coordination Team Lead Holly Weyers (hsweyers@usgs.gov)	Multiple projects on impacts of large storms on coastal ecosystems; Hurricane Sandy Impacts on Coastal Wetland Resilience in the Northeast United States	http://www.nwr.usgs.gov/research/nh/wetland_ecosystems.htm ; http://www.usgs.gov/hurricane/sandy/ E.g., What Role do Hurricanes Play in Sediment Delivery to Subsiding River Deltas? (http://www.nwr.usgs.gov/pblctrs.htm); http://www.usgs.gov/newsroom/article.asp?ID=3398 2015; Scientific Reports; Smith, J.E. Bentley, S.J. Snedden, G.A. White, C.	Improve planning and response by natural resource agencies to large scale storms to minimize damage to facilities and wildlife mortalities, predict impacts to fish and wildlife populations from modified disturbance regime	Gulf coast, Northeast-Southeast Coast	http://www.usgs.gov/hurricane/sandy/#data_tools.html	Various (http://www.usgs.gov/hurricane/sandy/#partners.html)	ongoing	
38	FEMA	1,2,4	Community vulnerability	DHS S&T OUP Coastal Resilience Center research projects (various)	DHS S&T OUP: Eleanor Hajian; eleanor.hajian@hq.dhs.gov	Research and education intended to help build resiliency to natural hazards in coastal areas	Multiple research projects with various outcomes	The center is in Year 1 of a 5 year grant. Progress on individual research projects varies.	The research focuses on coastal areas of the US and its territories. FL, Keys, Caribbean, VI, PR, Pacific Islands	http://coastal hazardscenter.org/coastal-resilience-center-july-2015/	The Center is located at UNC with 23 partners in academia (LSU, URI, UMD, etc.) and federal agencies.	2015-2020, but many of the research projects build off previous efforts.	
39	USGS	3	Corals	Corals	USGS - CMG Program John Haines	(1) Focus on processes that influence the health and sustainability of coral reefs (2) conduct site specific long-term observations	FL/Caribbean Publications (100s) : http://coastal.er.usgs.gov/crest/publications/ Pacific Publications (100s): http://coralreefs.wr.usgs.gov/nubs.html	Florida and Caribbean http://coastal.er.usgs.gov/crest/ Pacific http://coralreefs.wr.usgs.gov/	USGS Coastal and Marine Geoscience Data System: http://cmgds.marine.usgs.gov/	NPS NOAA USFWS States and Territories	October 2007 to September 2018		
40	BOEM	3	Fish	Assessing biological processes that drive fisheries productivity on New England Sand Shoals, determining costs to fisheries as a result of sand mining.	BOEM; jacob.levenon@boem.gov	Leverage existing spatial, fisheries, oceanographic data and model frameworks to evaluate the potential environmental and economic impacts to sand dredging in New England by: a) Quantifying habitat use patterns of commercial and ecologically important fisheries, b) identifying driving factors for abundance (biomass) fluctuations of these key prey species, c) Understand larval dispersal patterns and life-stages in sand borrow areas for forage species to identify optimal dredge windows, d) Combine existing long-term fisheries data with life history results of this study (i.e. spatial/temporal variation in prey species dynamics) into a framework to predict impacts to fisheries resulting from various dredge scenarios.	Leverage existing comprehensive benthic sampling data that has been completed by USGS, UMass Dartmouth, NMFS, etc. Collect finer scale benthic grabs to ground truth sampling; SEABOSS sediment grabs for live forage fishes and collection of water quality data; otolith microstructure analysis. A dynamic ecosystem model will be employed (i.e. MIMES or EcoSIMM). The results could be applied to determine how dredging disturbance and physical oceanography alter larval dispersion.	**	ATL (Offshore New England)	**	TBD. Potential opportunity to leverage a cooperative agreement between BOEM and the University of Massachusetts at Dartmouth.	BOEM National Studies List Reference # 17-19 SDP	
41	USACE	3	Fish	Nearshore resource response to turbidity		Capability to compare turbidity from non-dredge sources to turbidity from dredge sources to quantify response (effects) on nearshore habitat	Database and model to predict turbidity from non-dredge sources	research is designed to balance operational and environmental initiatives and to meet complex economic, engineering, and environmental challenges of dredging and disposal in support of the navigation mission	General				DOER
42	USGS	3	Fish	Pacific Nearshore Project	USGS Western Ecological Research Center (Keith Miles (Keith_Miles@usgs.gov)	The effect of urbanization, water diversions and restoration on factors that affect shellfish habitat, sustainable populations and human health	E.g., Comparing sea otter population status indicators from around the northeastern Pacific Rim, will begin the process of defining factors of coastal ecosystem health in this broad region http://www.werc.usgs.gov/Projects/SubWebPage.aspx?SubWebPageID=1&ProjectID=221	Better understanding of factors that shape coastal ecosystems such as the combination of neighboring ocean and land management land.	Canada to California coast		FWS, UC Davis, UC Santa Cruz, U of Idaho, Monterey Bay Aquarium, Seattle aquarium, Canadian Ministry of Agriculture and Agri-Food, Bureau of Ocean and Energy Management	ongoing	
43	USGS	3	Fish	Modeling ability of rehabilitated ecosystems to support near-shore migratory fish and wildlife populations	USGS, Wetlands and Aquatic Research Center, Scott Wilson (wilsons@usgs.gov), Greg Steyer (steyer@usgs.gov)	Modeling ability of rehabilitated ecosystems to support near-shore migratory fish and wildlife populations	(http://www.scopus.com/record/display.uri?eid=2-s2.0-84943637390&origin=inward&txid=0) Recurrence intervals of spatially simulated hydrologic metrics for restoration of Cape Sable seaside sparrow (<i>Ammodramus maritimus mirabilis</i>) habitat 2016; Ecological Indicators: Pearltine, L. Lo Galbo, A. Reynolds, G. Holly Parsons, J. Dean, T. ...	<u>Natural resource managers use USGS scientific information to protect, restore and enhance our natural resources, and ensure that healthy ecosystems, and the services they provide, will be here for generations to come.</u>	Coastal US		various		
44	USGS	3	Fish	Impacts of development on coastal trophic systems	Western Ecological Research Center (Keith Miles (Keith_Miles@usgs.gov) ; Kevin Lafferty (klafferty@usgs.gov)	Impacts of development on coastal trophic systems	Dunne JA, Lafferty KD, Dobson AP, Hechinger RF, Kuris AM, Martinez ND, et al. (2013) Parasites Affect Food Web Structure Primarily through Increased Diversity and Complexity. PLoS Biol 11(6): e1001579. doi:10.1371/journal.pbio.1001579	Improve predictions and understanding of impacts of activities on trophic systems in nearshore environment	Pacific Coast		various		
45	USGS	3,1	Fish	Forecasting changes in distribution of fish & wildlife trust species	USGS, Wetlands and Aquatic Research Center, Scot Wilson (wilsons@usgs.gov); USGS Southeast Climate Science Center, Gerard McMahon; USGS Patuxent Wildlife Research Center John French (jbfrench@usgs.gov), Western Ecological Research Center (Keith Miles (Keith_Miles@usgs.gov)	Forecasting changes in distribution of fish & wildlife trust species due to natural and anthropogenic factors, including climate change	models, papers (e.g., Climate Change and Patch Dynamics: Implications for the Conservation of Amphibians in Tropical Environments) https://globalchange.ncsu.edu/seccs/projects/climate-change-and-patch-dynamics-implications-for-the-conservation-of-amphibians-in-tropical-environments/ (http://fl.biology.usgs.gov/index2.html)	Forecasting changes in distribution of fish & wildlife trust species due to natural and anthropogenic factors, including climate change	LA, WA, OR, CA, FL, MS, TX, MD, VA, SC, Puerto Rico, Caribbean		various		

Human and Ecosystem Health													
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46	USGS	3.1	Fish	Forecasting effect of climate change on sea birds in the Pacific Northwest	USGS: Alaska Science Center (Mark Shasby shasby@usgs.gov); Western Ecological Research Center (Keith Miles (Keith_Miles@usgs.gov); National Wildlife Health Center Jonathan Sleeman (jsleeman@usgs.gov), Patuxent John French	Predicting effects of warming waters on forage fish populations that support seabirds (e.g., common murre etc)	population models linking fish and seabirds, identifying causes of mass mortality events http://alaska.usgs.gov/science/biology/seabirds_foragefish/index.php ; https://www.pwrc.usgs.gov/resshow/perry/scote/rs/	The Department of Interior (DOI) is mandated by the Migratory Bird Treaty Act and the Endangered Species Act to conserve and protect all seabirds. Seabirds also serve as practical indicators of change in the marine environment— natural or human induced	West Coast Canada and US	http://alaska.usgs.gov/science/biology/seabirds_foragefish/index.php	various	1999-ongoing	
47	USGS	3.2	Fish	Elwha River Restoration	USGS - CMG Program John Haines	Provide scientific monitoring and analyses of the fish, waters, and sediment, before, during, and after this historic dam removal, including alterations of sediment distribution and transport in the adjacent coastal system	Many publications https://walrus.wr.usgs.gov/elwha/publications.html		Washington	Benthic habitat: http://pubs.usgs.gov/ds/320/ Beach surveys: http://nubs.usgs.gov/ds/288/	Olympic National Park Lower Elwha Klallam Tribe Bureau of Rec NOAA Elwha Restoration Consortium	October 2003 - September 2016	
48	BOEM	1.3	Fish	Archaeological and Biological Assessment of Submerged Landforms off the Pacific Coast	BOEM; david.ball@boem.gov	1) Refine the understanding of submerged cultural landscape distribution along the Pacific OCS; 2) determine the potential associations of these landforms with essential fish habitat or other biologically sensitive areas; 3) refine local sea-level curve models for the Southern California Bight and Central Oregon; 4) develop a model for historic climate change patterns in the study area.	Complete synthesis of all recovered field data and a final report and model showcasing paleolandform formation, preservation, and post-glacial sea level changes throughout the study areas.	**	Pacific	**	San Diego State University	08-18-2015 to 08-31-2019	BOEM National Studies List Reference # PC-14-04
49	USGS	3.4	Fish	National Fish Habitat Partnership Assessment	USGS, CSS, Core Science Analytics, Synthesis, and Libraries Program Daniel Wiefelrich, dwiefelrich@usgs.gov	The NFHP Assessment is conducted every 5 years and includes a specific coastal assessment component led by NOAA. The Assessment produces a measure of fish habitat degradation through a Habitat Condition Index at the catchment level of watersheds, identifying the most pervasive and most severe disturbance types from human activities.	In order to conduct the 5 year assessments, many datasets that quantify human activities causing fish habitat disturbance (e.g., point source pollutants, agricultural practices, etc.) are integrated and synthesized. USGS provides the hosting platform for the data and software behind the assessment, making the data and processing algorithms available for other uses. The NFHP Data System and the interactive online report (starting with the 2015 report) are products produced and served by the USGS.	2010 "Through a Fish's Eye" report available through fishhabitat.org. NFHP Data System - http://ecosystems.usgs.gov/fishhabitat/ . 2015 NFHP Assessment report is an interactive online tool patterned on the 2014 National Climate Assessment. It is in final prep for delivery in April 2016.	U.S., including Alaska, Hawaii, and a special focus on Gulf of Mexico and all US coastlines.	NFHP data system (http://ecosystems.usgs.gov/fishhabitat/) powered by ScienceBase (Data%20downloads%20and%20geospatial%20services">https://www.sciencebase.gov/catalog/item/b07f02bd47e24111>Data downloads and geospatial services).	Federal and state fish and wildlife agencies - http://fishhabitat.org/contacts-map	First assessment in 2010, second in 2015 and slated for every 5 years thereafter. Continuous integration of new datasets and processing methods in the NFHP Data System Model development began in 07/2014, product is available in an experimental real-time mode during HAB season. Expected transition to operations (product development complete) in 2019	
50	NOAA	3	HABs	HAB Tracker	NOAA/OAR/GLERL, Eric J. Anderson (eric.j.anderson@noaa.gov)	To develop a real-time 3D HAB forecast model for Lake Erie	Develop a 3D HAB particle model that can simulate vertical mixing and advection of algal bloom through improved mixing, buoyant migration, and total biomass approaches	<u>The HAB Tracker has been run in an experimental real-time mode for the 2015 HAB season in Lake Erie, providing useful information in addition to the Lake Erie HAB Bulletin.</u> (http://www.glerl.noaa.gov/res/HABs_and_Hypoxia/habTracker.html)	Lake Erie	Model output available via OAR/GLERL.	OAR/GLERL, NOS/NCCOS, NOS/CO-OPS		
51	NOAA	3	HABs	COMBATING THE EMERGING IMPACTS OF HARMFUL ALGAL BLOOMS (HABs) ON DESALINATION PLANTS: BLOOM DETECTION, FORECASTING, AND STRATEGIES FOR IMPACT REDUCTION	NOS/NCCOS - Richard Stumpf, richard.stumpf@noaa.gov	Many arid areas are increasingly reliant on seawater desalination for drinking water. An emerging threat to this critical societal need is from harmful algal blooms (HABs). The project involves developing satellite indices for early warning, numerical modeling of transport of potential blooms to the area of desalination intakes, development of an approach to combine satellite data with the model, demonstration of the potential value of this integrated product, and development of methods and training to transfer the approaches and algorithms to the region.	The forecast and early warning capabilities will provide the operators with a broader view of their environment, allowing them to observe and understand algal blooms that are approaching, therefore allowing more adaptive management and informed decision-making. A Manual of Operations will also be prepared to provide information about HABs and their impacts on desalination plants, and to recommend action plans and specific options to mitigate impacts.				WHOI, UC Santa Cruz, Regional Organization for the Protection of the Marine Environment, MEDRC	4/1/17-9/30/17	
52	NOAA	3	HABs	CYANOBACTERIA ASSESSMENT NETWORK (CYAN) FOR FRESHWATER SYSTEMS: AN EARLY WARNING INDICATOR FOR TOXIC AND NUISANCE BLOOMS USING OCEAN COLOR SATELLITES	NOS/NCCOS - Richard Stumpf, richard.stumpf@noaa.gov	The project goals are to: (1) develop a standard and uniform approach for early identification of algal blooms that is useful and accessible to stakeholders of freshwater systems using the new set of satellites: Ocean Land Colour Instrument (OLCI) on Sentinel-3, Landsat-8 and future NASA missions; (2) develop an information dissemination system for expedient public health advisory postings; and (3) better understand the connections between health, economic, and environmental conditions to cyanobacteria and phytoplankton blooms.	Upon successful completion of the project, an unprecedented means will have been developed to monitor freshwater systems for algal blooms that pose environmental and health risks. It is anticipated that broad application of this approach will yield immediate and cost-effective results across a range of spatial and temporal scales never before feasible with field-based monitoring. The project will establish and demonstrate validation procedures to allow future maintenance of a robust capability. It will formulate the framework for merging economic, ecological and human health research in developing threshold indicators that could be used to develop an aquatic and human health early warning system.				EPA, USGS, NASA	4/1/15-TBD	

Human and Ecosystem Health													
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53	NOAA	3	HABs	DEVELOPING A HAB FORECAST AND EARLY WARNING SYSTEM: CYANOBACTERIA MONITORING AND FORECASTING- LAKE ERIE AND FLORIDA	NOS/NCCOS - Richard Stumpf, richard.stumpf@noaa.gov	Developing a HAB forecast to be transitioned operations in Lake Erie and Florida.	Operational HAB forecast system in Lake Erie and Florida		Lake Erie, Florida		CO-OPS, CSDL, GLERL, WHOI	9/1/99-TBD	
54	NOAA	3	HABs	HAB FORECAST INITIALIZATION: TEXAS AND THE GULF OF MAINE	NOS/NCCOS - Richard Stumpf, richard.stumpf@noaa.gov	Developing a HAB forecast to be considered for operations in Texas and the Gulf of Maine.	Bring the model sponsored by NCCOS, developed at WHOI/NC State, into the NOAA computing environment, evaluate its potential for transition (via a skill assessment), make changes to the model structure as necessary, and work to transfer to CO-OPS. Looks like this will also include production of seasonal forecast for 2016.		Gulf of Mexico and Gulf of Maine		CO-OPS, CSDL	9/1/99-9/30/17	
55	USGS	3	HABs	Distribution of Cyanotoxins and HABs and Relative Potential Environmental Health Impacts	USGS, Keith Loftin, kloftin@usgs.gov	Human and Environmental Health Exposure to Harmful Algal Blooms and Associated Toxins	Characterization of the national occurrence of cyanotoxins and Harmful Algal Blooms, characterize relative environmental health risks in all surface water types (2006 Midwestern Lake Reconnaissance, 2007 National Lakes Assessment, 2011 National Wetlands Assessment, 2015 National Coastal Assessment, 2016 National Wetlands Assessment, USGS Regional Stream Quality Assessment Surveys (RSQA, 2013 - 2018)); provides the ability to understand potential for cyanotoxin exposure and characterize the scale of the exposures; Products are a series of Federal Reports and peer-reviewed journal articles.	Studies completed and published for 2006 Midwestern Lakes Reconnaissance, 2007 National Lakes Assessment, 2014 Southeastern Stream Quality Assessment; Data acquisition completed for 2011 National Wetland Assessment, 2013 Iowa RSQA, 2015 Pacific Northwest RSQA, Puerto Rico, Hawaii, Guam, Puerto Rico Survey, USGS Environmental Health Mission Area Goal 1: Identify, prioritize, and detect contaminants and pathogens of emerging environmental concern and Goal 3: Reduce the impact of pathogens on the environment, fish and wildlife, domesticated animals, and people; http://pubs.acs.org/doi/abs/10.1021/es1008938 , http://www.sciencedirect.com/science/article/pii/S1568988314000444 , http://onlinelibrary.wiley.com/doi/10.1002/etc.3391/pdf	United States, Commonwealths, Protectorates, and Territories	http://www.epa.gov/national-aquatic-resource-surveys/data-national-aquatic-resource-surveys https://www.sciencebase.gov/catalog/item/569972c5e4b0ec051295ec51 http://pubs.acs.org/doi/abs/10.1021/es1008938	U.S. Environmental Protection Agency, National Oceanic and Atmospheric Administration, U.S. Fish and Wildlife, U.S. Army Corp of Engineers, States, Tribes, Universities; Stakeholder Committees (https://www.epa.gov/nutrient-policy-data/inland-hab-discussion-group, http://www.whoiedu/page.do?pid=13935)	2006; Products available now and additional products in development	
56	USGS	42463	HABs	Local and Regional Assessment of Water Quality	USGS National Water Quality Program (Contact: Steve Moulton, smoulto@usgs.gov, 703-648-6874; National Water Quality Assessment Project (Lead Contact: Gary Rowe, glrowe@usgs.gov, 303-236-1461).	Harmful Algal Bloom (HABs) studies	Monitoring data, interpretative studies on causes of HABs, and development of near-real-time predictions of algal toxin events for freshwater recreational beaches, inland lakes, and drinking water intakes.	Fulfills overall goal of the National Water Quality Program to assess water quality conditions, track conditions over time, and understand the factors influencing these conditions	Local and regional scale studies in about a dozen states, the Great Lakes, and Chesapeake Bay	http://cida.usgs.gov/quality/rivers/home	Multiple Federal, state, local	Ongoing	

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57	NOAA	1,3	HABs	Development of a Decision Support Tool for Harmful Algal Bloom Monitoring	NOAA COCA Project. Lead PI: T. Wang, Pacific Northwest National Laboratory.	This project focuses on linkages between climate change, harmful algal blooms, and correlations to public health in the Pacific Northwest region. It will specifically examine linkages to shellfish harvest, which is very economically important to the region.	A decision support tool will be developed to help the state health department to monitor conditions ripe for potential future outbreaks.	The proposal will project future changes in climate and how this impacts the risk of human exposure to shellfish disease.	Washington		NOAA's Northwest Fisheries Science Center, University of Washington Climate Impacts Group, Washington State Department of Health	Funded in 2015 - planned end date is 2017	Note about COCA entries. The Climate Program Office Coastal and Ocean Climate Applications (COCA) program addresses the needs of specific decision makers grappling with pressing climate-related issues in coastal and marine environments. This program strengthens initiatives by supporting interdisciplinary applications research aimed at addressing climate-related challenges in coastal communities as well as coastal and marine ecosystems. While the annual funding opportunity research priorities vary, most projects funded under the COCA address one or more of the FNPRS listed. Below I have
58	USGS	3,4	HABs	Improving Tools for Monitoring Multiple HAB Toxins and the Land-Sea Interface in Coastal California (HAB-SICC)	USGS, Keith Loflin, klofin@usgs.gov	Measure freshwater and marine toxins at the land-sea interface of Coastal California, develop a culture library used for further testing and to evaluate passive samplers to measure time-integrated toxin loads.	Determine the predominance and extent of both marine and freshwater HAB species and toxins present at the land-sea interface, validate a passive toxin sampling tool and demonstrate how it can be incorporated into existing monitoring programs as a time-integrated, cost effective approach and facilitate the incorporation of an integrated HAB monitoring strategy at the land-sea interface into existing HAB and water quality monitoring programs; JAs	Workplanning complete; USGS Environmental Health Mission Area Goal 1: Identify, prioritize, and detect contaminants and pathogens of emerging environmental concern and Goal 3: Reduce the impact of pathogens on the environment, fish and wildlife, domesticated animals, and people; links in progress	Coastal California	Currently being generated	Southern California Coastal Water Research Project (SCCWRP), Univ of Southern California, Univ of California-Santa Cruz	2016-2020	
59	USGS	3,4	HABs	Cyan: Cyanobacteria Assessment Network	USGS, Keith Loflin, klofin@usgs.gov; interagency effort between EPA (Blake Schaeffer), NASA (Jeremy Wendell), NOAA (Rick Stumpf), and USGS (Keith Loflin)	Development of a nationally consistent remote sensing portfolio for detection of Harmful Algal Blooms (HABs) across the Lakes/Reservoirs of the United States	A national pilot demonstrating HAB detection from space using remote sensing validated/calibrated against field data. Data will be disseminated by webpage(s), mobile application (cell phone), and outreach to train states how to process and use data; Products will include models, mobile applications, website(s), and JAs.	Study design completed and collection and analysis underway; USGS Environmental Health Mission Area Goal 1: Identify, prioritize, and detect contaminants and pathogens of emerging environmental concern and Goal 3: Reduce the impact of pathogens on the environment, fish and wildlife, domesticated animals, and people; https://eos.org/project-updates/agencies-collaborate-develop-a-cyanobacteria-assessment-network	Continental U.S.	Currently being generated	U.S. Environmental Protection Agency, National Aeronautics and Space Administration, National Oceanic and Atmospheric Administration, U.S. Fish and Wildlife, U.S. Army Corp of Engineers, Bureau of Reclamation, U.S. National Parks Service, States, Tribes	2015-2020	
60	USACE	3	Invasive Species	Evaluating Grass Specific Herbicides to Enhance Aquatic Restoration Projects	USACE-ERDC-EL; Dr. Mike Netherland	Determine the feasibility and efficacy of grass-specific herbicides for use in aquatic plant management.	Improved capability to restore areas dominated with invasive grasses. Expected products: Journal Articles, Technical Reports, Data to support Experimental Use Permits (EUP) (USEPA). Guidance on herbicide use patterns for aquatic ecosystem restoration and improved invasive species management.	Completed screening of available grass-specific herbicides for activity on invasive grass species; Initiated evaluation of impacts to native species; EUPs approved for two herbicides for use in Florida.	Focus is ecosystem restoration projects in the southeast, but results applicable throughout the U.S.	Data found in reports, journal articles	Collaborating with University of Florida	Start date 2013, ends 2018. Journal article and ERDC Technical Note currently in review; follow on reports available as project moves forward.	Aquatic Plant Control
61	USACE	3	Invasive Species	Economic and Environmental Benefits of Invasive Aquatic Plant Management	USACE-ERDC-EL; Mr. Nathan Harris	Develop methods for analyzing benefits of quantifying and characterizing environmental goods and services (EGS) as a result of aquatic plant management activities and research.	Developed methods will provide a framework for assessing EGS and cost-benefit analyses of aquatic plant management operations.	Completed an assessment of ecosystem service benefits of water hyacinth control in Louisiana. Completed ERDC Information Exchange Bulletin and Technical Report (both currently in review).	Applicable throughout the U.S.	Data found in reports, journal articles	Collaborating with University of Maryland	Start date 2014; ends 2017. Products available as completed	

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62	USGS	3	Invasive Species	Research: Minimizing spread and establishment of invasive species from restoration activities	USGS Invasives Program, Cynthia Kolar (ckolar@usgs.gov)	How do restoration activities (e.g., sediment moved between states) increase the vulnerability of coastal ecosystems to invasive species establishment and impacts	http://www.usgs.gov/ecosystems/invasive_species/index.html	USGS invasive species research encompasses all significant groups of invasive organisms in terrestrial and aquatic ecosystems in all regions of the United States. Working with partner agencies and organizations, USGS provides tools, technology, and information to prevent, contain, control, and manage invasive species.	Coastal US		various	ongoing	
63	NSF	3	Long-term ecosystem monitoring	Long term ecological research (LTER): Plum Island Ecosystems	National Science Foundation (Dave Garrison)	Focuses on how several aspects of global change influence organic matter and inorganic nutrient biogeochemistry and estuarine foodwebs. The inputs of organic matter and nutrients from land, ocean and marshes interact with the external drivers (climate, land use, river discharge, sea level) to dictate the extent and degree of nutrient and organic matter processing and determine the spatial patterns of estuarine productivity and trophic structure.	time series, ecosystem monitoring	https://www.lternet.edu/sites/pie	Massachusetts	http://pie.lternet.edu/content/data	Marine Biological Laboratory	launched 1998; ongoing	
64	NSF	3	Long-term ecosystem monitoring	Long term ecological research (LTER): Santa Barbara Coastal	National Science Foundation (Dave Garrison)	Effects of land use and ocean forcing on the processing and transport of nutrients and carbon to giant kelp forests. Role of climate change/variability and disturbance on nearshore population dynamics, community structure, and ecosystem processes. Controls on reef food webs.	time series, ecosystem monitoring	https://www.lternet.edu/sites/sbc	Southern California	http://sbc.lternet.edu/data/	University of California, Santa Barbara	launched April, 2000; ongoing	
65	NSF	3	Long-term ecosystem monitoring	Long term ecological research (LTER): Virginia Coast Reserve	National Science Foundation (Henry Gholz)	Examine how ecosystem and landscape dynamics and land use patterns within the watersheds of the VCR are controlled by the vertical position of the land, the sea, and the freshwater table surfaces	time series, ecosystem monitoring	https://www.lternet.edu/sites/vcr	Virginia	http://www.vcr.lter.virginia.edu/home/?q=dataCatalog	University of Virginia	launched 1987; ongoing	
66	NSF	3	Long-term ecosystem monitoring	Long term ecological research (LTER): Florida Coastal Everglades	National Science Foundation (Saran Twombly)	Investigating how variability in regional climate, freshwater inputs, disturbance, and perturbations affect the coastal Everglades ecosystem.	time series, ecosystem monitoring	https://www.lternet.edu/sites/fce	South Florida	http://fcelter.fiu.edu/data/	Florida International	launched April, 2000; ongoing	
67	USACE	3	Marsh/wetland health	Development of Insect Biocontrol Agents for Phragmites and Flowering Rush	Centre for Agriculture and Bioscience International (CABI)-Switzerland; Dr. Harriet Hinz (ERDC POC - Dr. Linda Nelson)	Identify and develop insect biological control agents to improve the management of the invasive aquatic plants, phragmites (<i>Phragmites australis</i>) and flowering rush (<i>Butomus umbellatus</i>)	There are currently no biological control insects approved for release on these two invasive weed species in the U.S.	Completed host-specificity studies with identified insect agents under development against phragmites; developed rearing techniques for phragmites agents; supplied data for permit review by USDA-APHIS; Initiated overseas searches for insect agents against flowering rush.	Applicable wherever these plants are established. [Phragmites is problematic in wetlands (inland and coastal) throughout the U.S.; flowering rush is problematic in the Pacific northwest, midwest and New England states]	Data found in reports, journal articles	CABI Switzerland (through a BAA)	Start date 2014, ends 2017; ERDC Technical Report currently in review summarizing 2014-2015 progress/results. Follow on reports due annually.	
68	USGS	3	Marsh/wetland health	Developing quantitative management objectives	USGS, Wetlands and Aquatic Research Center; Scott Wilson (wilsons@usgs.gov); Greg Steyer (steyer@usgs.gov)	Development of regional quantitative wildlife objectives based on amount and configuration of habitat		Development of regional quantitative wildlife objectives based on amount and configuration of habitat	Gulf Coast		Various	ongoing	
69	USGS	3	Marsh/wetland health	Climate Change and the Physiological Ecology of Coastal Forests	USGS, Wetlands and Aquatic Research Center; Scott Wilson (wilsons@usgs.gov); Greg Steyer (steyer@usgs.gov); Ken Krauss (Kraussk@usgs.gov)	How to use hydrologic management to rehabilitate mangrove forests	https://profile.usgs.gov/kraussk	research group conducts ecological, hydrological, and eco-physiological research on coastal forests and on transitions between forested wetlands and marsh. Our primary goal is fostering a better understanding of the impacts and consequences of climate and land use change on coastal wetlands and watersheds, and on the role that restoration may play in restoring ecosystem services that these wetland ecosystems provide.	Southeastern US		Various		
70	USGS	3,1	Marsh/wetland health	Climate Mediated Retreat of Tidally Influenced Freshwater Forested Wetlands in the Southeast	USGS, Debra Willard, dwillard@usgs.gov, 703-648-5320	The project tests the working hypothesis that ecosystem productivity and C sequestration processes and rates vary in different coastal environments in predictable ways as tidal fresh-water forested wetlands (TFFW) convert to marsh. The project documents inter- and intra-annual variability in forest/marsh productivity along stress gradients in the Atlantic and Gulf Coastal Plains.	Journal articles; provide data to Refuge and park managers; develop porewater salinity model based on hydrologic processes and dynamics	Publications include these recent papers: Contemporary Deposition and Long-Term Accumulation of Sediment and Nutrients by Tidal Freshwater Forested Wetlands Impacted by Sea Level Rise (http://link.springer.com/article/10.1007/s1237-016-0066-4); Defining the next generation of individual-based modeling of coastal ecotone dynamics in response to global change (http://www.sciencedirect.com/science/article/pii/S0304380015001647); Soil greenhouse gas emissions and carbon budgeting in a short-hydroperiod floodplain wetland. Journal of Geophysical Research Biogeosciences 120:77-95 (doi, 10.1002/2014JG002817)	Georgia, South Carolina, Louisiana	Data currently are available upon request from PIs; upon completion of the project, data will be posted online (site TBD).	Clemson University, Savannah NWR, Waccamaw NWR, Hobcaw Barony, Mandalay NWR, Bayou Teche NWR, Jean Lafitte National Historical Park and Preserve, Atchafalaya Basin (Natural Heritage Area)	The current project began in FY2009; many publications already are complete and others will be forthcoming as the research progresses.	

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#	Agency	Theme	Potential Sub-area/Collab area	Research Title	Agency & POC	Description	Product	Programatic goals	Location	Data	Non-agency partners	Start and end dates	Other Notes (ie area etc)
<p>Column 2: Themes from nearshore report, 1) Long-term coastal evolution, 2) Extreme Events, & 3) Human and ecosystem health 4) Infrastructure</p>													
71	USGS	3.1	Marsh/wetland health	Improving our ability to forecast tidal marsh response to sea level rise	USGS, Debra Willard, dwillard@usgs.gov, 703-648-5320	Understand what controls the vulnerability of coastal marshes to risks associated with climate change and rising sea levels	Journal articles; models of wetland vulnerability to sea level rise and other climate parameters;	Publications include these recent papers: Taking a systems approach to ecological systems (http://onlinelibrary.wiley.com/doi/10.1111/jvs.12340/full); Response of plant productivity to experimental flooding in a stable and a submerging marsh (DOI: 10.1007/s10021-015-9870-0); New training website to help our partners learn and use statistical modeling methods (www.nwrc.usgs.gov/SEM)	Nova Scotia, New Brunswick, Maine, Connecticut, Delaware, Maryland, Virginia, South Carolina, Louisiana, Texas, Alaska, Washington	Data currently are available upon request from PIC; upon completion of the project, data will be posted online (site TBD).	Rachel Carson NWR, Stewart B. McKinney NWR, Bombay Hook NWR, Eastern Neck NWR, Smithsonian Environmental Research Center, Blackwater NWR, Fishing Bay State WMA, Saxix State WMA, North Inlet National Estuarine Research Reserve, Pearl River State WMA, Big Branch NWR, McFaddin NWR, Nisqually NWR	The current project began in FY2009; many publications already are complete, and others will be forthcoming as the research progresses.	
72	USGS	3.1	Marsh/wetland health	Research: How is climate change affecting wetland vegetation communities?	USGS, Wetlands and Aquatic Research Center; Scott Wilson (wilsons@usgs.gov), Greg Steyer (steyerg@usgs.gov), Ken Krauss (kraussk@usgs.gov), Patuxent (John French jbfrench@usgs.gov)	How are the abiotic changes due to climate change (e.g., salt water) affecting vegetation recruitment?	LOVELOCK, C.L., D.R. CARROLL, D.A. PRESS, G.K. Guntenspergen, K.W. Krauss, R. Reef, K. Rogers, M. Saunders, F. Sklik, A. Swales, N. Sainthill, L.X. Thuyen, & T. Triet. 2015. The vulnerability of Indo-Pacific mangrove forests to sea level rise. <i>Nature</i> 526: 559-563. Sapflow and water use of freshwater wetland trees exposed to saltwater incursion in a tidally influenced South Carolina watershed (Georgetown, South Carolina, USA) [Can. J. For. Res. 40, 525-535]	Tidal Freshwater Forested Wetland Research focuses on the consequences of habitat change from forested states to marsh with sea-level rise, salt water intrusion, microtopography loss, and biogeochemical alteration.	Southeastern US, Indo-Pacific	various	ongoing		
73	USGS	3.1	Marsh/wetland health	Biologic Carbon Sequestration Assessment (LandCarbon)	USGS, Zhiliang Zhu	Assess coastal wetland carbon stocks and evaluate carbon sequestration potential as an ecosystem service	Journal articles, process and empirical models for gas flux, transport, carbon balance in coastal environment. Ecosystem service models. Spatial data products.	http://water.usgs.gov/nrp/blue-carbon/nasa-blue-cnms/ http://www.usgs.gov/climate_landuse/land_carbon/	CONUS and Pacific Islands	www.landcarbon.org	CCIWG, FWS, NASA	Ongoing	
74	USGS	1.3	Marsh/wetland health	Forecasting Wetlands migration	USGS, Wetlands and Aquatic Research Center; Scott Wilson (wilsons@usgs.gov), Greg Steyer (steyerg@usgs.gov); Western Ecological Research Center; Keith Miles (Keith_Miles@usgs.gov); USGS Patuxent Research Center, John French	Forecasting the movement of wetlands and their dependant wildlife in response to sea level rise, subsidence, and restoration	Thorne et al. Effects of sea-level rise on tidal marshes along a latitudinal gradient in the Pacific Northwest: US Geological Survey OFR 2015-1204; Cahoon 2015. Estimating relative sea-level rise and submergence potential at a coastal wetland (https://www.pwrc.usgs.gov/Scientist/CoastWet.cfm); http://www.nwrc.usgs.gov/topics/landloss.htm	USGS research and products are provided as the scientific foundation upon which policymakers, natural resource managers, and the public make informed decisions about the management of natural resources on which they and others depend.	Coastal US	various	ongoing		
75	USGS	2.3	Marsh/wetland health	Forecasting effectiveness of how well restored wetlands mitigate flood risk	USGS, Wetlands and Aquatic Research Center; Scott Wilson (wilsons@usgs.gov), Greg Steyer (steyerg@usgs.gov)	Forecasting effectiveness of flood risk mitigation from restored wetlands	http://www.nwrc.usgs.gov/research/ers/index.htm	Forecasting effectiveness of flood risk mitigation from restored wetlands	Gulf Coast		various		
76	USGS	3.4	Marsh/wetland health	Decision Analysis	USGS, Wetlands and Aquatic Research Center; Thomas Doyle (doylet@usgs.gov); Patuxent Wildlife Research Center (John French jbfrench@usgs.gov), Climate Center Gerard McMahon (gcmcmahon@usgs.gov) Western Ecological Research Center; Keith Miles (Keith_Miles@usgs.gov); USGS, Wetlands and Aquatic Research Center; Thomas Doyle (doylet@usgs.gov)	Application of decision analysis to elicit stakeholder objectives, identify alternative actions, assist in decision trade-offs, and improve management outcomes	Neckles et al. Identification of Metrics to Monitor Salt Marsh Integrity on National Wildlife Refuges In Relation to Conservation and Management Objectives (https://www.pwrc.usgs.gov/moorevideo/index.cfm)	Adaptive management provides clear roles for management, research, monitoring, and stakeholder input, and it offers a natural framework for their integration	Coastal US		Various	ongoing	
77	USGS	3	Marsh/wetlands health	Research: genetic diversity of restored vegetation	USGS, Wetlands and Aquatic Research Center; Thomas Doyle (doylet@usgs.gov)	Landscape genomic models can identify populations with genomic adaptations best suited to projected conditions under warming scenarios.	Landscape genomics: A tool for guiding native plant restoration http://www.werc.usgs.gov/ProductDetails.aspx?ID=5453	How to best maintain genetic diversity of vegetation as it is relocated for restoration	Coastal US		Various	ongoing	
78	BOEM	3	Valuation/Ecosystem services	Testing the Use of Unmanned Aircraft Systems for Intertidal Surveys – proof of concept	BOEM; richard.raymond@boem.gov	Evaluation the potential for use of unmanned aircraft to efficiently conduct biological surveys of coastal and intertidal areas.	methodology	**	Alaska	**	None	n/a	BOEM National Studies List Reference # AK-13-03-08
79	USGS	3	Valuation/Ecosystem services	Estuarine Processes	USGS - CMG Program John Haines	To quantify and understand estuarine processes through observations and numerical modeling. Both the spatial and temporal scales of these mechanisms are important, and therefore require modern instrumentation and state-of-the-art hydrodynamic models	Prodigious publications: http://woodhole.er.usgs.gov/project-pages/estuaries/publications.html	http://woodhole.er.usgs.gov/project-pages/estuaries/index.html	Atlantic Coast Pacific Coast	Oceanographic Model and Data Portal http://cmgdata.usgsports.net/	NPS USFWS		
80	USGS	3	Valuation/Ecosystem services	Ecosystem Services Valuation	USGS, Jonathan H. Smith	Assessing value of ecosystem services	Studies and decision-support tools assessing the economic and social values of ecosystems	http://www.usgs.gov/climate_landuse/lcs/projects/ecosysav.asp	Multiple	http://gec.cr.usgs.gov/projects/esav/	USFS, NPS, BLM, F&WS	On-going	

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Column 2: Themes from nearshore report, 1) Long-term coastal evolution, 2) Extreme Events, & 3) Human and ecosystem health 4) Infrastructure								**BOEM's Environmental Studies Program (ESP) conducts studies for the purposes of informing BOEM policy decisions and completing environmental assessments. All studies listed in this spreadsheet are either ongoing or are proposed to start between FY 2017-2019; therefore, no final reports or data are available for distribution at this point in time. All inquiries regarding interim products, data access, etc. should be made to the identified study POC. The ESP does not post preliminary study results, and study-related data cannot be shared until the respective final report is finished and posted to BOEM's Environmental Studies Program Information System (ESPIS). All study profiles proposed in the FY 2017-2019 Studies Development Plan (SDP) will be posted on the BOEM website in late spring / early summer 2016. Additional information on BOEM's ongoing studies can be found at our studies website: http://www.boem.gov/Current-Research-Ongoing-Environmental-Studies/ , and access to completed ESP products is available through ESPIS at: http://www.data.boem.gov/homepg/data_center/other/espis/espisfront.asp .					
81	USGS	3	Valuation/Ecosystem services	Forecasting impacts of restoration activities (sand restoration etc) on quality of wildlife habitat	USGS, Wetlands and Aquatic Research Center; Scott Wilson (wilsons@usgs.gov), Greg Steyer (steyer@usgs.gov)	predicting likely response by wildlife populations to restoration activities	http://www.nwrc.usgs.gov/research/ers/index.htm	evaluate the use of restored habitat by wildlife and thereby provide data on the effectiveness of restoration for fish and wildlife communities	Coastal US		various		
82	USGS	3.1	Valuation/Ecosystem services	San Francisco Bay	USGS - CMG Program John Haines	(1) Identify the physical processes and anthropogenic influences that result in significant morphological changes to the San Francisco Bay Coastal System, at a range of spatial and temporal scales. (2) Assess future impact of sea level rise, climate change, and sediment management practices on the beaches, tidal wetlands, and submarine resources. (3) Understand sediment transport pathways from the delta mouth to the shelf.	(1) San Francisco Bay Basic Tide Model (2) Our Coast, Our Future (3) Coastal Storm Modeling System (CoSMoS) (4) San Francisco Bay Coastal Processes Study (5) Video: "Turbid Bay: Sediment in Motion"	https://walrus.wr.usgs.gov/coastal_processes/sfbaycoastals/ also see Monterey Bay https://walrus.wr.usgs.gov/climate-change/scruz.html	California	Our Coast, Our Future http://data.prbo.org/apps/ocof/CoSMoS https://walrus.wr.usgs.gov/coastal_processes/cosmos/index.html	NPS Commission SFBay Delta Deltares	October 2009 - September 2020	
83	USGS	3.1	Valuation/Ecosystem services	Coastal Carolinas Focus Area Study (FAS)	USGS Water Availability and Use Science Program (WAUSP), Sonya Jones sjones@usgs.gov; 678-524-1544	WAUSP FAS projects are designed to address stakeholder needs by developing tools that evaluate water availability for both human and ecological needs.	Population and Land Use Change scenario development; Variable density Groundwater flow Model and DSS; SWAT model for PeeDee and Cape Fear River basins and associated ecological flow models;	Development of tools for stakeholder use in water management decisions	Coastal North and South Carolina	data will be published via the NWC Data Portal (http://cida.usgs.gov/nwc/)	Many local partners, including Federal and State agencies	October 2015 - September 2018	
84	USGS	3.1	Valuation/Ecosystem services	Puget Sound Landscape Science Program and Coastal Habitats in Puget Sound (CHIPS)	USGS William Labiosa	USGS provides science to support ecosystem restoration and recovery in Puget Sound. Research on how combination of projected sea level rise, storm surge, and changing river flooding trends will influence restoration objectives and coastal community resilience.	http://puget.usgs.gov/news.html ; http://walrus.wr.usgs.gov/elwha/products.html ; http://www.usgs.gov/newsroom/article.asp?ID=3798#_VuMGTSfdghA	1) to provide critical science supporting high-priority needs identified by Puget Sound ecosystem restoration partners; 2) to provide critical science supporting resilient coastal communities around Puget Sound; and 3) to demonstrate an efficient and successful project structure and process for conducting interdisciplinary ecosystem science that integrates across USGS science centers, funding programs, and partners.	Western WA	various			
85	USGS	3.1	Valuation/Ecosystem services	Atlantic and Gulf Coastal Plain Climate Variability	USGS, Debra Willard, dwillard@usgs.gov, 703-648-5320	Improve understanding of the late Holocene climate and land use history of the Atlantic and Gulf Coastal Plain and the impacts on terrestrial and coastal habitats. New high-resolution, multi-proxy terrestrial Holocene records from the Southeastern United States are being generated to establish baseline levels of climate and ecosystem variability.	Journal articles; collaboration with USGS project on tidally influenced freshwater forested wetlands in the Southeast to contribute data to Refuge and park managers	Publications include these recent papers: Contemporary Deposition and Long-Term Accumulation of Sediment and Nutrients by Tidal Freshwater Forested Wetlands Impacted by Sea Level Rise (http://link.springer.com/article/10.1007/s1237-016-0066-4); Coastal and wetland ecosystems of the Chesapeake Bay watershed: Applying palynology to understand impacts of changing climate, sea level, and land use (DOI: 10.1130/2015.0040)	Georgia, South Carolina, Florida, Virginia, Louisiana	As publications come out, data will be posted to the Neotoma Paleocology Database (http://www.neotomadb.org/)	Texas State university, Franklin and Marshall College, Tufts University, University of Florida	The project began in FY2011; some publications already are complete, and others will be forthcoming as the research progresses.	
86	USGS	3.1	Valuation/Ecosystem services	hindcasting and forecasting the potential impacts of sea-level rise in coastal ecosystems	USGS, Wetlands and Aquatic Research Center, Thomas Doyle (doylet@usgs.gov); USGS Southeast Climate Science Center, Gerard McMahon, (gcmcmahon@usgs.gov)	Description & categorization of suite of data, methods, and models and their design, structure, and application for hindcasting and forecasting the potential impacts of sea-level rise in coastal ecosystems.	Doyle et al. Sea-level rise modeling handbook: Resource guide for coastal land managers, engineers, and scientists (https://pubs.er.usgs.gov/publication/pp1815)	The Southeast CSC provides scientifically valid information and tools that can be used to adapt resource management to changing environmental conditions; and applies these tools to produce local and regional assessments that are widely used by policy makers, resource managers, and the public	Coastal US	various			
87	USGS	3.2	Valuation/Ecosystem services	Anticipating environmental health implications of disasters affecting coastal areas such as tsunamis, earthquakes, and extreme storms	USGS, Geoff Plumlee, gplumlee@usgs.gov	Work with the USGS Science Applications for Risk Reduction (SAFRR) project to add an environmental health component to their interdisciplinary disaster scenarios	Disaster scenarios help anticipate the magnitude, spatial extent, and duration of plausible impacts of future disasters, including physical damages, recovery, economic costs, other societal impacts, and environmental/health implications.	ARkStorm, California Tsunami, and Shake Out earthquake scenario work has been completed. Hayward earthquake scenario in progress. ARkStorm: http://dx.doi.org/10.1061/%28ASCE%29NH.1527-6996.0000188 . CA Tsunami Scenario: http://pubs.usgs.gov/of/2013/1170/f/ .	Coastal California	SAFRR Project web site: http://www.usgs.gov/natural_hazards/safrr/ .	Wide range of Federal, State, and local partners (FEMA, CA Geol. Survey, CAL OES,	2008-2016 and beyond	
88	USGS	4.3	Valuation/Ecosystem services	Biodiversity Information Serving Our Nation (BISON)	USGS, CSS, Core Science Analytics, Synthesis and Libraries Program. Gerald Guala, Branch Chief for Eco-Science Synthesis, gguala@usgs.gov	BISON (bison.usgs.ornl.gov) holds more than 260 million occurrence records for nearly all species in the US, and geographically covers all of the approximately 10 million square kilometers of land, coastline and jurisdictional waters, both marine and freshwater in the US and its territories.	BISON provides documented species point distribution data going back more than 100 years and includes nearly all terrestrial and coastal marine plants and animals. This means that for species with sufficient data density, their potential distributions can be modelled both forward and backward in time. A pilot project to do just that is currently underway.	Initial Release: http://www.usgs.gov/newsroom/article.asp?ID=3566#_U5XctijDVA0 Fact Sheet: http://pubs.er.usgs.gov/publication/gip160 Mendeley Group (publications): https://www.mendeley.com/groups/3876461/biodiversity-information-serving-our-nation-bison/	All US and territories land and coastal waters.	BISON is at (bison.usgs.ornl.gov). All data are free for viewing, analysis and download. There is an extensive API for machine access and a significant community of users has built a wide variety of applications and tools (especially in R) for extraction and analysis of the data.	BISON includes more than 1500 data sets from 380 institutions around the world. Ten Federal agencies have data in BISON.	BISON was officially released in April 2013, it is a continuing resource.	

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89	USGS	4,3	Valuation/Ecosystem services	GAP Land Cover/LANDFIRE Mapping and the National Vegetation Classification System	USGS, CSS, Core Science Analytics, Synthesis, and Libraries Program AND the FGDC Vegetation Subcommittee Alexia McKerrow, amckerrow@usgs.gov	USGS and the LANDFIRE program are combining forces to produce the most detailed, high resolution vegetation map of the nation starting with 2016 LANDSAT 8 imagery. The product includes detailed classification of coastal vegetation (in partnership with NOAA) important to wildlife habitat studies, human infrastructure protection, extreme event mitigation, and other coastal processes.	The mapping product complements, with more detailed classification, the NLCD map through advanced web services that support robust scientific analysis of coastal and other vegetation classes. Starting with 2016 imagery, the new product between USGS and LANDFIRE will support change analysis with new mapping every two years.	USGS/LANDFIRE collaboration under the Multi-Resolution Land Characteristics interagency consortium - http://www.mrlc.gov/ GAP Land Cover 2001 - http://gapanalysis.usgs.gov/gaplandcover/ (2011 product in review) LANDFIRE vegetation products - http://www.landfire.gov/vegetation.php	All US and territories land and coastal waters.	GAP Land Cover and LANDFIRE products are online for download and as geospatial services in the public domain. User communities have built scientific workflows and other tools for use of these data products in a variety of ways.	The Multi-Resolution Land Characteristics Consortium (MRLC) includes the major civilian agencies involved in land cover mapping - http://www.mrlc.gov/about.php Non-fed partners include the GreenInfo Network and others	USGS GAP Land Cover and LANDFIRE both began operations in the early 2000s and are continuing projects. New joint product development has begun in 2016 with an initial release in 2018 and then every 2 years thereafter.	
90	USGS	4,3	Valuation/Ecosystem services	Ocean Biogeographic Information System-USA	USGS, CSS, Core Science Analytics, Synthesis, and Libraries Program Abby Benson, abenson@usgs.gov	OBIS-USA integrates marine biology data and information into a standardized data system of observations and measurements. OBIS-USA is the U.S. national node to the International OBIS and assembles data from other U.S. agencies (NOAA, BOEM, Navy, etc.) and federally funded research projects. The OBIS-USA objective is to produce high quality data for integrated research studies and resource management decision analysis.	OBIS-USA provides marine species observations and measurements, including presence/absence data, abundance, and other measurements through a data source aligned with the Darwin Core standard and served via download and streaming data services. Current R&D activities aim to align biological data with environmental data (physical and chemical oceanographic data) for trends analysis, distribution modeling, and other value-added products.	OBIS-USA is currently online and available in the public domain with regular data integration occurring from both USGS and other agency partners. Current data flows being developed for the pilot Marine Biodiversity Observation Network projects into OBIS-USA. http://www.usgs.gov/obis-usa/	Focus of OBIS-USA on U.S. territorial waters with higher data concentration in the Exclusive Economic Zone but extending globally through U.S. funded projects. iOBIS contains global records from all OBIS nodes.	OBIS-USA data are available via a web site and through an advanced online service interface (ERDDAP) providing multiple access and analysis methods.	Major close partners for OBIS-USA include NOAA, BOEM, and Navy along with the federally funded (NOAA, NASA, and BOEM) MBON projects. OBIS-USA shares a developing relationship on techniques and methods with the NSF-funded BCO-DMO facility.	OBIS-USA and iOBIS began with the Census of Marine Life project and continue as a live operational data system into the foreseeable future.	
91	USGS	4,3	Valuation/Ecosystem services	USGS ScienceBase and the Biogeographic Information System	USGS, CSS, Core Science Analytics, Synthesis, and Libraries Program Steve Aulenbach, saulenbach@usgs.gov	The production and publication of scientific information useful for policy and resource management decision analysis requires scientific synthesis across domains and scientific rigor in the organization of traceable findings and conclusions. The CSASL Program is currently developing a Biogeographic Information System patterned on the Global Change Information System developed by the US Global Change Research Program as a platform for continuously developing robust integrated scientific assessments.	The Biogeographic Information System is a specialized collection in ScienceBase, a research infrastructure developed and maintained by the USGS. It organizes scientific data, software, and scientific findings into a robust infrastructure that supports multidimensional analyses, scientific provenance, and the publication of results through diverse web applications and other media.	The Biogeographic Information System has initially been used as the underpinning for the 2015 NFHP Assessment (in review) and the Dam Removal Information Portal (www.sciencebase.gov/drip/).	U.S. national asset with nationwide and global data coverage	The BIS itself is online via ScienceBase - https://www.sciencebase.gov/catalog/item/54540d80e4b0dc779374504a . It is accessible via the ScienceBase web interface, with applications being driven by the ScienceBase API.	The Biogeographic Information System is currently a USGS R&D project with developing partnerships between CSASL and USGS Ecosystems programs	Research and development began in FY2016 and will continue into the foreseeable future. The technology base in ScienceBase began in 2010.	
92	USGS	4,3,1	Valuation/Ecosystem services	Expertise in developing and implementing ecological monitoring programs	USGS, Wetlands and Aquatic Research Center, Thomas Doyle (doylet@usgs.gov); Patuxent Wildlife Research Center (John French jbfrench@usgs.gov), Climate Center Gerard McMahon (gcmahon@usgs.gov); Patuxent Wildlife Research Center (John French	Expertise in monitoring of coastal wetlands (e.g., habitat, water quality, subsidence, wildlife)	E.g., Coastwide Reference Monitoring System (CRMS) http://acoast.gov/cms2/home.aspx ; https://www.pwrc.usgs.gov/populations/	To provide expertise on how to develop, implement and interpret a robust scientific monitoring project to inform DOI management and regulatory decisions	Coastal US	http://www.mbr-pwrc.usgs.gov/software.html	various	ongoing	
93	BOEM	1,3	Valuation/Ecosystem services	<u>DOI Partnership: Distinguishing Between Human and Natural Causes of Changes in Nearshore Ecosystems Using Long-term Data from DOI Monitoring Programs</u>	BOEM; donna.schroeder@boem.gov	To understand the natural range and sources of variability in the kelp forest ecosystem to generate predictions on how it will respond to environmental change and to enable scientists and managers to evaluate possible impacts from offshore oil, gas, and alternative energy production and to develop options to mitigate these impacts.	The following determinations will be made: 1) the influence of short and long-term climate oscillations on the abundance, species composition, and trophic structure of kelp forest communities; 2) resilience of the community to varying levels of disturbance; and 3) the periodicity / causes in shifts of community state. Compiled data will be archived in formats facilitating future syntheses and environmental analyses.	**	Pacific	**	University of California at Santa Barbara	09-22-2011 to 03-31-2017	BOEM National Studies List Reference # PC-11-02
94	BOEM	1,3	Valuation/Ecosystem services	BOEM-MARine (Multi-Agency Rocky Intertidal Network)	BOEM; lisa.gilbane@boem.gov	Monitoring of rocky intertidal shores.	Observational dataset	**	Pacific	**	University of California at Santa Cruz, Smithsonian	05-01-2015 to 04-30-2020	BOEM National Studies List Reference # PC-15-02
95	BOEM	1,3	Valuation/Ecosystem services	Pacific Region Intertidal Sampling and Monitoring (PRISM) Study	BOEM; lisa.gilbane@boem.gov	Monitoring of rocky intertidal shores.	Observational dataset	**	Pacific	**	University of California	10-01-2011 to 06-30-2016	BOEM National Studies List Reference # PC-12-03
96	BOEM	3,4	Valuation/Ecosystem services	A Demonstration Marine Biodiversity Observation Network (BON) for Ecosystem Monitoring	BOEM; ann.bull@boem.gov	Develop a prototype ecosystem-based marine biodiversity network, across a range of habitats, looking at multiple trophic levels and species, and informed by historical data and past modeling efforts to the extent possible.	Establish long-term, sustainable monitoring through partnerships. An ecosystem-based marine biodiversity network prototype will be developed.	**	Pacific	**	National Oceanographic Partnership Program (NOPP)	07-07-2015 to 06-30-2020	BOEM National Studies List Reference # PC-15-05

Human and Ecosystem Health													
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97	BOEM	3,4	Valuation/Ecosystem services	Extension of the Arctic Marine Biodiversity Observing Network (AMBON) for Ecosystem Monitoring	BOEM: catherine.con@boem.gov	Build on emerging Distributed Biological Observatories (DBOs) and the initial phase of the AMBON project by developing a prototype ecosystem-based marine biodiversity network over the Chukchi Sea Planning Area, monitoring multiple trophic levels and species. The network will: expand upon planned and recently-launched observing sites, systems, and programs; employ innovative techniques for data discovery and methods that dynamically interrelate data sets to add value to existing monitoring data; and collaborate with the U. S. Integrated Ocean Observing System (IOOS) participants and funding agencies to optimize data management and modeling capabilities.	Monitoring biodiversity in the NE Chukchi sea. Sustained biodiversity observations will inform assessments of OCS energy development, management and decision-making related to oil and gas lease sales and potential future exploration, development and production, as well as monitoring of resources for invasive species and climate-induced changes that affect ecosystem functioning.	**	Alaska	**	National Oceanographic Partnership Program (NOPP), NOAA-IOOS	n/a	BOEM National Studies List Reference # AK-15-01; 17-19 SDP
98	BOEM	3,4	Valuation/Ecosystem services	Geospatial Mapping – A Geodatabase and Visualization Tool Set	BOEM: catherine.con@boem.gov	Development of tools to facilitate synthesis and analysis of large volumes of diverse biological and physical data	Data visualization, access, analysis needs for BOEM will be established	**	Alaska	**	TBD	n/a	BOEM National Studies List Reference # 17-19 SDP
99	USACE	3,4	Valuation/Ecosystem services	Tools to Rapidly Predict and Quantify Ecosystem Benefit	ERDC-EL Carl Cerco	Modeling capability that links ecosystem hydrology & hydraulics data to ecological outputs	Enhanced technologies that link H&H tools and ecosystem assessments	to address the need for ecosystem assessment, restoration, and management activities at the project level with cost-effective technologies	General	ERDC EL	USACE Districts	FY14-16	Ecosystem Management and Restoration
##	USGS	3,4	Valuation/Ecosystem services	Land Use and Land Cover Changes	USGS, Jonathan H. Smith	Aid states and communities to maintain ecosystem health in the Chesapeake Bay	Land Cover/use datasets, models and studies assessing their impacts on communities and ecosystems	http://www.usgs.gov/climate_landuse/lcs/projects/luchbay.asp	Chesapeake Bay Region	http://egsc.usgs.gov/CCsum.html	NOAA, EPA, USFS, Maryland, Virginia, Pennsylvania	On-going	
##	BOEM	1,2,3	Valuation/Ecosystem services	Gulf of Mexico Land Loss Change Assessment and Application to Louisiana Coastal Habitat Loss	BOEM: bruce.baird@boem.gov	1) Evaluate recent (1984-2014) land loss change in the GOM coastal zone, 2) evaluate habitat chance in the Louisiana coastal zone from 2007-2014.	Land/classified datasets, change analysis and rates of change calculated, land loss change by state and hydrologic basin.	**	XGOM	**	USGS	08-08-2015 to 08-08-2019	BOEM National Studies List Reference # GM-15-10
##	BOEM	1,2,3	Valuation/Ecosystem services	Ecological Function and Recovery of Biological Communities within Sand Shoal Habitats within the Gulf of Mexico	BOEM: jennifer.culbertson@boem.gov	Examine the relationship of human disturbance to ecosystem services in offshore sand shoal habitats. Determine if there are functional differences in borrow sites pre- and post-dredging by examining species distribution, diversity, habitat use, and population dynamics.	Pre-disturbance and post-disturbance physical and biological sampling will occur following a Before-After-Control-Impact (BACI) methodology. A met-ocean permanent observation station in the vicinity of Ship Shoal will be leveraged for important observational data. Additional sampling regimes will include multibeam sonar, Acoustic Doppler Current Profiler (ADCP) wave/current measurements, sediment cores, benthic grabs, benthic community analysis, trawls, acoustic telemetry, seasonal and diel observations, gut content analysis, stable isotope analysis, etc. These observations will also be integrated into an Ecosim model to assess the perturbation to the system. Observations over an extended time frame will allow for BOEM to identify the potential impacts of multiple sediment removal activities at Ship Shoal and determine the extent, nature, and process of disturbance and recovery to inform future sand resource management decisions.	**	GOM (Ship Shoal and nearby control sites of LA)	**	TBD	n/a	BOEM National Studies List Reference # 17-19 SDP
##	BOEM	1,2,3	Valuation/Ecosystem services	<u>Economic and Geomorphic Comparison of Outer Continental Shelf (OCS) Sand vs. Nearshore Sand for Coastal Restoration Projects</u>	BOEM: michael.miner@boem.gov	<u>Provide a better understanding and quantification of economic, ecologic, and geomorphic long term benefits and costs of using OCS sediment vs. nearshore sediment for coastal restoration projects.</u>	1) Quantification of value of OCS sand to project effectiveness based on physical properties of sand. 2) Quantification of value of OCS sand to enhancing regional coastal sediment budget (vs nearshore where the sediment used for restoration comes from within system) over the long term, both within and outside of the project area.	**	GOM	**	Louisiana State University, University of New Orleans	09-16-2015 to 08-31-2018	BOEM National Studies List Reference # GM-14-03-06
##	USGS	3, 1, 2, 4	Valuation/Ecosystem services	Climate change adaptation for coastal National Wildlife Refuges	USGS Southeast Climate Science Center, Gerard McMahon, (gmcMahon@usgs.gov)	Understanding Conservation Management Decisions in the Face of Sea-Level Rise Along the U.S. Atlantic Coast; Global change and conservation triage on National Wildlife Refuges	https://www.doi.gov/csc/southeast	The Southeast CSC provides scientifically valid information and tools that can be used to adapt resource management to changing environmental conditions; and applies these tools to produce local and regional assessments that are widely used by policy makers, resource managers, and the public	Eastern US, Gulf Coast		North Carolina State University, DOI Landscape Conservation Cooperatives	ongoing	
##	USGS	1, 2, 3, 4	Water availability	USGS Water Resources Research Institutes	Earl Greene; 443-498-5505; eagreene@usgs.gov	The state water resources research institutes authorized by the Act are organized as the National Institutes for Water Resources (NIWR). NIWR cooperates with the USGS to support, coordinate and facilitate research through the Annual Base Grants, National Competitive Grants, Coordination Grants, and in operating the NIWR-USGS Student Internship Program.	http://water.usgs.gov/wri/index.php	Plans, facilitates, and conducts research to aid in the resolution of State and regional water problems; Promotes technology transfer and the dissemination and application of research results; Provides for the training of scientists and engineers through their participation in research; and Provides for competitive grants to be awarded under the Water Resources Research Act.	Nationally Distributed in universities in each state		Academic Institutions	Ongoing since 1984	

Human and Ecosystem Health													
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##	USGS	4, 1, 2, 3	Water availability	USGS Cooperative Matching Funds	USGS, State Water Science Centers throughout the nation	<u>The Mission of the USGS Cooperative Water Program is to provide reliable, impartial, and timely information needed to understand the Nation's water resources through a program of shared efforts and funding with State, Tribal, and local partners to enable decision makers to wisely manage the Nation's water resources.</u>	http://water.usgs.gov/coop/products/	The Cooperative Water Program monitors and assesses water in every State, protectorate, and territory of the U.S. in partnership with nearly 1,600 local, State, and Tribal agencies.	Distributed throughout the nation.		Many Local, State, Regional and Tribal Partners	Ongoing	
##	USGS	4.1,3	Water availability	Floridan Aquifer Groundwater Availability Assessment	USGS Water Availability and Use Science Program (WAUSP), Sonya Jones sajones@usgs.gov; 678-524-1544	The overall objective for the current study is to assess the availability of water in the Floridan Aquifer System. Achieving this objective includes quantifying the groundwater resource by creating water budgets both spatially and temporally as well as evaluating the groundwater resource changes over time. Additionally, tools will be provided to assess the future impacts of humans and environmental changes (such as climate) on the Floridan Aquifer System and aid in designing groundwater monitoring networks. More information is available at http://fl.water.usgs.gov/floridan/	1) quantify the current groundwater resources of one of the Nation's priority aquifer systems; 2) evaluate how this resource has changed over time; and 3) provide the tools needed to forecast how this aquifer system may respond to future human and environmental stresses.	The USGS is undertaking a series of regional groundwater availability studies to improve our understanding of groundwater availability in major aquifers across the Nation. Process-oriented groundwater science is being used to assess the long-term availability of groundwater supplies while also addressing the environmental effects of groundwater development on land and surface-water resources. The management and policy questions that drive regional assessments of groundwater availability do, in turn, drive and identify fundamental process-oriented groundwater science that can vary across different geographic and hydrogeologic settings.	Parts of Florida, Georgia and Alabama	Data for this project available on the USGS Water NSDI node at http://water.usgs.gov/ogw/grp/activities/gspdata/Studies/Floridan.html	Many local partners, including Federal and State agencies	will be complete September 2018	
##	USGS	4,3	Water availability	Groundwater Networks	USGS National Groundwater Monitoring Network, William Cunningham, Office of Groundwater, wccunning@usgs.gov , 703-648-5005; and USGS Groundwater and Streamflow Information Program (GWSIP), Doug Yeskis, djyeskis@usgs.gov , 703-648-5046, Doug Yeskis	The National Ground Water Monitoring Network (NGWMN) is designed to take advantage of long-term monitoring done by partner "data providers" to create a nationwide, long-term groundwater quantity and quality monitoring network.	The NGWMN will provide access to comparable groundwater data across the United States through a data portal, in addition to data available through those wells measured by the USGS	Long term monitoring of groundwater levels that would provide information necessary for sustainable management of groundwater supplies to meet current and future human water needs, and ecosystem requirements.	Throughout the US and territories	http://groundwaterwatch.usgs.gov/	Many partners, including Federal, State, Local and Tribal.	Ongoing	
##	USGS	4,3	Water availability	North Atlantic Coastal Plain Groundwater Availability Study	USGS Water Availability and Use Science Program (WAUSP), Sonya Jones sajones@usgs.gov; 678-524-1544	<u>The focus is on improving fundamental knowledge of the water budget of this aquifer system, including the flows, storage, and use by humans and the environment. An improved quantitative understanding of the aquifer system's water budget not only provides key information about water quantity, but also is essential for assessments of water quality and ecosystem health. More information is available at http://nv.water.usgs.gov/projects/NACP/</u>	1) quantify the current groundwater resources of one of the Nation's priority aquifer systems; 2) evaluate how this resource has changed over time; and 3) provide the tools needed to forecast how this aquifer system may respond to future human and environmental stresses.	The USGS is undertaking a series of regional groundwater availability studies to improve our understanding of groundwater availability in major aquifers across the Nation. Process-oriented groundwater science is being used to assess the long-term availability of groundwater supplies while also addressing the environmental effects of groundwater development on land and surface-water resources. The management and policy questions that drive regional assessments of groundwater availability do, in turn, drive and identify fundamental process-oriented groundwater science that can vary across different geographic and hydrogeologic settings.	Coastal North Carolina to New York	Data for this project will be available on the USGS Water NSDI node. Examples of type of data available can be found at http://water.usgs.gov/ogw/grp/activities/gspdata/Studies/Floridan.html	Many local partners, including Federal and State agencies	will be complete September 2016	
##	USGS	4,3	Water availability	Delaware River Basin FAS	USGS Water Availability and Use Science Program (WAUSP), Sonya Jones sajones@usgs.gov; 678-524-1544	<u>WAUSP FAS projects are designed to address stakeholder needs by developing tools that evaluate water availability for both human and ecological needs. More information is available at http://water.usgs.gov/watercensus/delaware.html</u>	Surface-water model capable of evaluating impacts of land-use change, climate change, and changes in water demand; ecological flow in both tributaries and mainstem; DSS for management of mainstem fish species	Development of tools for stakeholder use in water management decisions	Delaware River Basin	data will be published via the NWC Data Portal (http://cida.usgs.gov/nwc/)	Many local partners, including Federal and State agencies	will be complete September 2016	
##	USGS	4,3	Water availability	North and South Carolina Atlantic Coastal Plain Aquifer System	USGS Water Availability and Use Science Program (WAUSP), Sonya Jones sajones@usgs.gov; 678-524-1544	The principal objective of this study is to provide a tool for assessing groundwater availability in the Coastal Plain aquifer system of North and South Carolina. Specifically, the study will develop a model that will improve our understanding of the aquifer-system flow paths and recharge; evaluate ground- and surface-water interaction and the potential for base-flow reduction in streams as a result of increased ground-water withdrawals; and provide a scientifically based management tool for optimizing conjunctive water-use strategies. In addition to providing scientists with an improved database and better understanding of the ground-water-flow system, the model will provide a framework for facilitating natural-resource protection and water-management decisionmaking, and a tool for regulatory agencies to test the effects of alternative management scenarios before enactment.	1) quantify the current groundwater resources of one of the Nation's priority aquifer systems; 2) evaluate how this resource has changed over time; and 3) provide the tools needed to forecast how this aquifer system may respond to future human and environmental stresses.	The USGS is undertaking a series of regional groundwater availability studies to improve our understanding of groundwater availability in major aquifers across the Nation. Process-oriented groundwater science is being used to assess the long-term availability of groundwater supplies while also addressing the environmental effects of groundwater development on land and surface-water resources. The management and policy questions that drive regional assessments of groundwater availability do, in turn, drive and identify fundamental process-oriented groundwater science that can vary across different geographic and hydrogeologic settings.		Data for this project available on the USGS Water NSDI node at http://water.usgs.gov/ogw/grp/activities/gspdata/Studies/NSCCoastal.html	Many local partners, including Federal and State agencies	completed	

Human and Ecosystem Health													
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##	USGS	4,3	Water availability	Hawaiian Volcanics Groundwater Availability Assessment	USGS Water Availability and Use Science Program (WAUSP), Sonya Jones sajones@usgs.gov; 678-524-1544	The study plan includes defining the hydrogeologic framework, quantifying components of the groundwater budget, and developing conceptual models of groundwater flow for Kauai, Oahu, Maui and the Big Island. The plan includes construction of three separate whole-island numerical groundwater models for Kauai, Oahu, and Maui. The models together with input from the groundwater budget will be used to assess changes in groundwater availability in Hawaii. Visit the Hawaii Volcanic-Rock Aquifer study web site (http://hi.water.usgs.gov/studies/CWRAP/) for a complete bibliography and more information.	Provide an updated assessment of groundwater availability in Hawaii Assess the current condition of Hawaiian volcanic-rock aquifers and show how groundwater resources have changed as a result of natural and human stresses Provide a tool to assess responses to future stresses Evaluate the adequacy of the current data network for assessing groundwater resources in the future	The USGS is undertaking a series of regional groundwater availability studies to improve our understanding of groundwater availability in major aquifers across the Nation. Process-oriented groundwater science is being used to assess the long-term availability of groundwater supplies while also addressing the environmental effects of groundwater development on land and surface-water resources. The management and policy questions that drive regional assessments of groundwater availability do, in turn, drive and identify fundamental process-oriented groundwater science that can vary across different geographic and hydrogeologic settings.		Data for this project will be available on the USGS Water NSDI node. Examples of type of data available can be found at http://water.usgs.gov/ogw/gwrp/activities/gspdata/Studies/Florida.html	Many local partners, including Federal and State agencies	will be complete September 2018	
##	NOAA	3	Water quality/Microbial pollutants	Water Temperature Climatology	NOS CO-OPS - Chris Zervas, chris.zervas@noaa.gov	Provide daily average water temperature climatology for US coastal waters and the Great Lakes.	The products would consist of the daily-averaged water temp, the average seasonal cycle, the residual series, and a real-time water temperature anomaly map.	Data QC is nearly complete. Technical report to be written.	Various locations nationwide	Original 6-minute water temperature data is available from the NOS CO-OPS website.		Started 2013. Product TBD	
##	NOAA	3	Water quality/Microbial pollutants	CHESAPEAKE/DELAWARE PATHOGEN PILOT	NOS/NCCOS - John Jacobs, john.jacobs@noaa.gov	The EFR Pathogens team has been developing guidance products for the shellfish and public health community around the nation. Many of these tools are predictive models for harmful bacteria of the genus <i>Vibrio</i> . Two models predicting probability of occurrence of <i>Vibrio vulnificus</i> in Chesapeake and Delaware Bays have been running in an operational setting within NWS NCEP for several years and have been available to the public health community. However, both had stalled in demonstration requiring completion of additional steps to continue along the transition pathway.	Complete vibrio sample processing, a skill assessment of a model running in Chesapeake Bay using input from the Chesapeake Bay Operational Forecast System (CBOFS), and a draft transition plan. Also the collection and processing of samples for a similar model running at NCEP for Delaware Bay. A completed skill assessment for the Delaware model, and a combined transition plan for both regional models.		Chesapeake Bay and Delaware River	National Weather Service, CSDL, Delaware River Basin Commission, MD DNR	4/1/15-10/1/16		
##	NOAA	3	Water quality/Microbial pollutants	Vibrio Forecasting	NOS/NCCOS - John Jacobs, john.jacobs@noaa.gov	The ability to accurately predict the occurrence and abundance of <i>Vibrio</i> has enormous implications for the shellfish industry, state level managers, and the general public. Daily forecasts and secondary products developed based on specific customer requirements can allow for decision making at several levels. FDA and states can use the models to determine the timing of specific harvesting regulations for growing areas in concert with their mandated <i>Vibrio</i> control plans. Individual harvesters can determine which days or which locations are better to harvest to minimize risk of product contamination. Coupled with time-temperature models, a harvest plan can be enacted for any given day to bring products to refrigeration well before <i>Vibrio</i> levels approach FDA risk criteria. Individuals who recreate in coastal waters can also determine individual risk based on the forecast products and their health status. The outcomes and impacts of this project will be apparent Nationally, and are measurable through the reduction in illnesses and shellfish bed closures in states or regions using these forecasts.	The overall objective of the project is to meet the needs of Federal regulators, state resource managers and health officials, the oyster industry, and general public in providing early warning of elevated <i>Vibrio</i> concentrations to reduce risk of illness and economic hardship. Through the EFR, the goal is to develop and apply fully operational forecasts or modeled guidance on a National scale.		Chesapeake Bay	NMFS, NESDIS, CSDL, NWS, USDA, MDDHMH, MDMD, WDOH, UMES, NCEI, CT Dept of Agriculture, MARACOOS.	10/1/12-10/1/17		
##	NSF	3	Water quality/Microbial pollutants	Long term ecological research (LTER): Georgia Coastal Ecosystems	National Science Foundation (Dave Garrison)	Goal of the GCE LTER is to understand the mechanisms by which variation in the quality, source and amount of both fresh and salt water create temporal and spatial variability in estuarine habitats and processes, in order to predict directional changes that will occur in response to long-term shifts in estuarine salinity patterns.	time series, ecosystem monitoring	https://www.lternet.edu/sites/gce	Georgia	http://gce-lter.marsci.uga.edu/public/data/data.htm	University of Georgia	launched April, 2000; ongoing	
##	USGS	3, 1.2	Water quality/microbial pollutants	Barnegat Bay	USGS - CMG Program John Haines	(1) develop a hydrodynamic/inundation and sediment transport model of the region. (2) Produce an offline water-quality model. Different forcing scenarios have been tested to investigate the estuary's response in terms of residence time.	Tidal wetlands reports: http://woodhole.er.usgs.gov/project-pages/estuaries/tidalwetlands.html	http://woodhole.er.usgs.gov/project-pages/estuarine-physical-response/model-output/barnegat-bay.html	New Jersey	http://pubs.usgs.gov/ds/288/	NJ DEP USFWS NPS	October 2010 - September 2018	
##	USGS	4,3	Water quality/microbial pollutants	National Assessment of Water Quality	USGS National Water Quality Program (Contact: Steve Moulton, smoulto@usgs.gov, 703-648-6874; National Water Quality Assessment Project (Lead Contact: Gary Rowe, glrowe@usgs.gov, 303-236-1461).	Surface Water & groundwater quality networks	Web-based annual reporting of surface water quality conditions	Fulfills overall goal of the NAWQA Project assess water quality conditions, track conditions over time, and understand the factors influencing these conditions	Conterminous US		Multiple Federal, state, local	Ongoing through 2023	
##	USGS	4,3	Water quality/microbial pollutants	Real-Time Water-Quality Networks	USGS Office of Water Quality (Lead Contact: Brian Pellerin, bpeller@usgs.gov,		1) Real-time presentation of data and 2) Various studies from time to time.		Throughout the US and territories	http://waterwatch.usgs.gov/wqwatch/	Many partners, including Federal, State, Local and Tribal.	Ongoing	

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##	USGS	3,4	Water quality/microbial pollutants	Great Lakes Beach Health	Jim Morris, MIOH Water Science Center, jmorris@usgs.com, 614-430-7702	The overall mission is to provide science-based information and methods that allow more accurate beach closure and advisory decisions, understand the sources and physical processes affecting beach contaminants, and understand how science-based information can be used to mitigate and restore beaches and protect the public.	Many products, including papers, USGS reports and websites such as: http://www.ohionowcast.info/index.asp ; Bibliography available through this website: http://greatlakesbeaches.usgs.gov/	The work consists of four science elements—real-time assessments; pathogens and microbial source tracking; coastal processes; and data analysis, interpretation, and communication	Great Lakes nearshore	Some data is available through: http://greatlakesbeaches.usgs.gov/data.html	USEPA and many state and local partners		Project has been ongoing, although in a low ebb of funding currently. Some small projects are ongoing.
##	USGS	3,4	Water quality/microbial pollutants	Local and Regional Assessment of Water Quality	USGS National Water Quality Program (Contact: Steve Moulton, smoulto@usgs.gov, 703-648-6874; National Water Quality Assessment Project (Lead Contact: Gary Rowe, glrowe@usgs.gov, 303-236-1461).	Beach NOWCAST work	Web-based forecasts of recreational water quality at selected beaches based on climate, water-quality, and microbiological testing	Fulfills overall goal of the National Water Quality Program to assess water quality conditions, track conditions over time, and understand the factors influencing these conditions	Ohio	http://www.ohionowcast.info/	Multiple Federal, state, local	Ongoing	
##	USGS	3, 1, 2, 4	Other	San Francisco Bay/Delta, Pudget Sound, Gulf, Everglades, Chesapeake, New Jersey and Long Island, and Great Lakes	Various points of contact for different locations, examples being Scott Phillips for Chesapeake Bay and Norm Grannemann for Great Lakes		http://ca.water.usgs.gov/projects/baydelta/ ; http://puget.usgs.gov/ ; http://chesapeake.usgs.gov/ ; etc.	Programatic goals vary	Local Regional studies.		USEPA and others		
##	USGS	3,4	Other	The new Landsat 8 potential for remote sensing of Colored Dissolved Organic Matter (CDOM)	USGS; Terry Slonecker; tslonecker@usgs.gov				Coastal NJ and NY (with potential for expansion to nationwide)	Forthcoming JA	None	2013; JA available in 5/2016	
##	NSF	1,2,3	Other	Coastal SEES Program	National Science Foundation (multiple)	Fundamental research on sustainability of coastal systems	individual research products (from funded Pis)	https://www.nsf.gov/funding/pgm_summ.jsp?pins_id=504816	distributed	various	distributed	launched 2011, ended 2015	
##	NOAA	1,2,3,4	Other	Coastal Change Analysis Program (C-CAP) land cover mapping and change monitoring	NOAA OCM, Nate Herold, Nate.Herold@noaa.gov, 843-740-1183	operational land cover mapping and change monitoring for coastal U.S. 1996 to present	land cover data on 5 year update cycle, as well as spatial explicit change mapping. Includes coastal changes, changes pre-post extreme events, and upstream physical data.	C-CAP is an ongoing mapping program, and has been developing land cover monitoring products since the mid 90s. Work is currently underway to produce a 2016 update to this data.	Coastal CONUS, HI, Guam, American Samoa, CNMI, US Virgin Islands, and Puerto Rico	https://coast.noaa.gov/dataregistry/search/collection/info/ccapregional	C-CAP data production is coordinated with state CZM programs and federal agencies via FGDC and the Multi-Resolution Land Cover Characteristics (MRLC) Consortium	1996, 2001, 2006, and 2010 dates are currently available. 2015/16 updates will become available 2016-2018 (deendant on geography).	
##	USGS	3,1,4	Other	San Francisco Bay Delta Restoration	USGS, Pacific Regional Office, Mike Chotkowski (mchotkowski@usgs.gov)	Development of unbiased scientific information and synthesis to improve the state of scientific knowledge on issues critical for managing the Bay-Delta system.	http://deltacouncil.ca.gov/delta-plan-0	Reduce knowledge gaps, accelerate scientific discovery to inform management decisions, and build the science infrastructure and capacity to achieve the vision of One Delta, One Science	Central coastal California	http://deltacouncil.ca.gov/	Various		
##	USGS	3, 1, 2, 4	Other	Chesapeake Bay Restoration Program	USGS Chesapeake Bay Coordinator, Scott Phillips (swphill@usgs.gov)	Restoration and protection of this resource is a priority for designated agencies, and NGO stakeholders through the Chesapeake Bay Program (CBP). President Obama issued an Executive order for increased Federal leadership to restore and protect the Bay and its watershed.	http://chesapeake.usgs.gov/projectsandcontacts.html	The strategy has four essential goals and associated outcomes: <ul style="list-style-type: none"> • restore clean water • recover habitat • sustain fish and wildlife • conserve land and increase public access 	Mid-Atlantic	http://chesapeake.usgs.gov/data.html	Multiple states, Chesapeake Executive Council, local governments		

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1	BOEM	4	M	<i>Expansion of West Coast Oceanographic Modeling Capability</i>	BOEM; susan.zaleski@boem.gov	Update General NOAA Operational Modeling Environment (GNOME) software, use it along with external ROMS model results to project 2-D/3-D spill trajectories in the Pacific region, and document software and results.	Software, documentation, ensembles of model forecast oil spill trajectories, ocean model fields	**	Pacific	**	NOAA, University of California at Los Angeles	09-03-2014 to 08-25-2017	<ul style="list-style-type: none"> Improvement in model physics and parameterizations. Data assimilation and uncertainty estimation.
2	BOEM	1,4	D	<i>Developing Protocols for Reconstructing Submerged Paleocultural Landscapes and Identifying Ancient Native American Archaeological Sites in Submerged Environments</i>	BOEM; brian.jordan@boem.gov	Enhance and refine our understanding of submerged paleocultural landscape distribution on the Atlantic OCS, especially landscapes of tribal significance. Understand and identify paleocultural landscapes of importance to regional Tribes through collaborative research.	This study has five phases and two types of fieldwork including: high-resolution marine geophysical survey and geotechnical sampling. Phase 1: Develop best-practice protocols, which will assist in identifying data needs for field survey and data analysis, developing modeling approaches for reconstructing submerged paleocultural landscapes, and identifying ancient Native American archaeological sites in submerged environments. Phase 2: Develop a methodology to incorporate Tribal knowledge into these best-practice protocols. This information will be used to develop a Paleocultural landscape model. Phase 3: Develop training materials and opportunities for field research. Phase 4: Field investigation, data acquisition, post-processing, analysis and interpretation, and the development of baseline data that will form the foundation of management recommendations. Phase 5: Development of a documentary film to assist in outreach efforts.	**	Atlantic	**	Cooperative Agreement; University of Rhode Island	07-30-2012 to 03-01-2018	<ul style="list-style-type: none"> Metadata (ISO/FGDC).
3	BOEM	1,4	M	<i>Wave and Hydrodynamic Modeling in the Nearshore Beaufort Sea</i>	BOEM; warren.horowitz@boem.gov	Evaluation of wave and hydrodynamic conditions in the U.S. Beaufort Sea area of O&G activity	A new wave model will be developed to better simulate nearshore wave conditions within the Beaufort Sea; researchers will validate the model against field-deployed moorings	**	Alaska	**	TBD	n/a	<ul style="list-style-type: none"> Improvement in model physics and parameterizations. Models coupled across disciplines and scales.
4	BOEM	3,4	I	<i>A Demonstration Marine Biodiversity Observation Network (BON) for Ecosystem Monitoring</i>	BOEM; ann.ball@boem.gov	Develop a prototype ecosystem-based marine biodiversity network, across a range of habitats, looking at multiple trophic levels and species, and informed by historical data and past modeling efforts to the extent possible.	Establish long-term, sustainable monitoring through partnerships. An ecosystem-based marine biodiversity network prototype will be developed.	**	Pacific	**	National Oceanographic Partnership Program (NOPP)	07-07-2015 to 06-30-2020	<ul style="list-style-type: none"> Remote sensing. Fixed-location <i>in situ</i>. Process-study field and lab experiments.
5	BOEM	3,4	I	<i>Extension of the Arctic Marine Biodiversity Observing Network (AMBON) for Ecosystem Monitoring</i>	BOEM; catherine.coon@boem.gov	Build on emerging Distributed Biological Observatories (DBOs) and the initial phase of the AMBON project by developing a prototype ecosystem-based marine biodiversity network over the Chukchi Sea Planning Area, monitoring multiple trophic levels and species. The network will expand upon planned and recently-launched observing sites, systems, and programs; employ innovative techniques for data discovery and methods that dynamically interrelate data sets to add value to existing monitoring data; and collaborate with the U.S. Integrated Ocean Observing System (IOOS) participants and funding agencies to optimize data	Monitoring biodiversity in the NE Chukchi sea. Sustained biodiversity observations will inform assessments of OCS energy development, management and decision-making related to oil and gas lease sales and potential future exploration, development and production, as well as monitoring of resources for invasive species and climate-induced changes that affect ecosystem functioning.	**	Alaska	**	National Oceanographic Partnership Program (NOPP), NOAA-IOOS	n/a	<ul style="list-style-type: none"> Remote sensing. Fixed-location <i>in situ</i>. Process-study field and lab experiments.

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6	BOEM	3,4	D	<i>Geospatial Mapping – A Geodatabase and Visualization Tool Set</i>	BOEM; catherine.coon@boem.gov	Development of tools to facilitate synthesis and analysis of large volumes of diverse biological and physical data	Data visualization, access, analysis needs for BOEM will be established	**	Alaska	**	TBD	n/a	<ul style="list-style-type: none"> • Web service. • Metadata (ISO/FGDC). • Web application.
7	BOEM	3,4	M	<i>Assessment of Multiple Ocean Circulation Models to Support Ensemble OSRA Experiments</i>	BOEM; heather.crowley@boem.gov	Evaluation of the strengths and weaknesses of multiple ocean models in the context of BOEM's oil spill risk assessment program.	Deliverables would include a report outlining the strengths and weakness of each developed model in relation to processes relevant to oil spill trajectory analysis, as well as short-term surface circulation fields from the suite of models	**	Alaska	**	TBD	n/a	<ul style="list-style-type: none"> • Data assimilation and uncertainty estimation.
8	BOEM	3,4	I	<i>Cumulative Impacts of Human Activity on Coastal and Marine Resources of the Gulf of Mexico</i>	BOEM; TBD*	Assess cumulative impacts to biological, physical, and cultural resources; establish benchmark conditions that quantify these cumulative impacts, and estimate vulnerabilities while performing NEPA-focused analyses	In addition to a final report, data sets corresponding to cumulative impacts and drivers would be produced	**	GOM	**	TBD	n/a	<ul style="list-style-type: none"> • Process-study field & lab experiments. • Citizen science.
9	BOEM	3,4	I	<i>Mapping the Late Pleistocene Landscapes of the Gulf of Mexico through 3D Seismic Analysis</i>	BOEM; TBD*	Perform a seismic analysis along the northern GOM shelf with the late Quaternary Mississippi River incised valley using existing industry-produced 3D seismic datasets coupled with higher-resolution geophysical and geologic data	A final report and geospatial models that can be imported into GIS	**	GOM	**	TBD	n/a	<ul style="list-style-type: none"> • Remote sensing. • Process-study field & lab experiments.
10	BOEM	3,4	D	<i>OCS-Related Coastal Infrastructure Fact Book Update</i>	BOEM; TBD*	Improve and expand compiled information concerning oil-and gas-related infrastructure facilities and to inform the ongoing analytical task of developing forecast scenarios for resources analyses, which, in turn, are included in BOEM environmental impact statements and assessments	A compilation of primary and secondary information from published sources and a synthesis of available GIS metadata	**	GOM	**	TBD	n/a	<ul style="list-style-type: none"> • Web service. • Metadata (ISO/FGDC). • Well organized data collection (database or collection of files).
11	BOEM	1,3,4	I	<i>Effects of Oil Contamination on Wetland Loss</i>	BOEM; TBD*	This will be a compliment study to the polarimetric synthetic aperture radar (PolSAR) image methodology implemented by a separate USGS-NASA research effort; this new study will combine PolSAR and photographic shoreline data to increase the holistic assessment of oil spill impacts and their long-term consequences to coastal wetland resilience	A synthesis of coastal shoreline changes from the late 2000s to 2015	**	GOM	**	TBD	n/a	
12	FEMA	1,2,4		<i>DHS S&T OUP Coastal Resilience Center research projects (various)</i>	DHS S&T OUP; Eleanor Hajian; eleanor.hajian@hq.dhs.gov	Research and education intended to help build resiliency to natural hazards in coastal areas	Multiple research projects with various outcomes	The center is in Year 1 of a 5 year grant. Progress on individual research projects varies.	The research focuses on coastal areas of the US and its territories.	http://coastalharzardscenter.org/coastal-resilience-center-july-2015/	The Center is located at UNC with 23 partners in academia (LSU, URI, UMD, etc.) and federal agencies.	2015-2020, but many of the research projects build off previous efforts.	

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13	NOAA	4	T	<i>Economic Valuation of Shoreline Protection Provided to Coastal Communities by the Natural Infrastructure Found in an NOS "Special Place."</i>	NOAA/NCCOS- John Christensen (John.Christensen@noaa.gov)	Researchers will estimate the economic value of shoreline protection provided by shoreline habitats (such as marshes) to a coastal community vulnerable to impacts from climate change and hazardous natural events. The coastal community will be within or adjacent to the Jacques Cousteau NERR. An economic valuation of shoreline protection will be accomplished by first identifying and mapping the current area, extent and type of shoreline habitats as well as lands vulnerable to environmental threats such as storm surge and sea level rise. Then, researchers will estimate the amount of shoreline protection provided by existing shoreline habitats in other	The outcome of the analysis will be an estimate of the current ecosystem service value of shoreline protection provided by shoreline habitats in the Jacques Cousteau NERR. Local planners and natural resource managers can incorporate the ecosystem service value of shoreline habitats into planning scenarios for future development, siting new living shoreline or marsh restoration projects, and/or estimating the value of protection provided to important cultural resources by shoreline habitats. These efforts will help the community be better prepared for climate and coastal hazard impacts such as sea level rise, erosion, flooding and storm surge. The managers and local community planners will receive a report of the methods and results of the project, as well as any data layers collected during the analysis.		Jacques Cousteau NERR		Jacques Cousteau NERR	6/1/15-12/31/16	
14	NOAA	4	T	<i>VDatum vertical datum transformation software</i>	NOAA/NOS/NGS: POC and Program Manager Stephen White (301) 713-1428 x167 NOAA/NOS/OCS: POC Ed Myers (301) 713-2809 x107 NOAA/NOS/CO-OPS: POC Michael Michalski 240-533-0564 x155	that allows users to transform data across tidal, geodetic, and ellipsoid-based vertical datums. The transformations are based on scientific models and are constrained to match CO-OPS and NGS data	The java-based software is available for download from the VDatum webpage. The download package also includes grid files containing all of the vertical datum transformations in a binary format.	VDatum is currently available for the contiguous US and Puerto Rico / US Virgin Islands. Documentation of VDatum development for various regions of coverage can be found at http://vdatum.noaa.gov/support.html	VDatum is currently available for the contiguous US and Puerto Rico / US Virgin Islands.	VDatum software and transformation files can be accessed at http://vdatum.noaa.gov/download_agreement.php	NOAA/NOS/NGS NOAA/NOS/OCS NOAA/NOS/CO-OPS	VDatum development for geographic regions has been ongoing since 2000.	
15	NOAA	4	M	<i>Operational Forecast Systems (OFS) for various estuaries and coastal waters of navigational importance to the US.</i>	NOAA/NOS/OCS: Coast Survey Development Laboratory; POC Ed Myers (301) 713-2909 x107 NOAA/NOS/CO-OPS: Oceanographic Division; POC Carolyn Lindley (240) 533-0590	Hydrodynamic models driven by real-time data and meteorological, oceanographic, and/or river flow rate forecasts form the core of these end-to-end systems. Model results are primarily aimed at the navigation community, although the forecasted variables can also be used for other applications such as hazardous spill response, search and rescue, links to ecological forecasting, and more.	The OFS perform nowcast and short-term (0 hr. - 48 hr.) forecast predictions of pertinent parameters (e.g., water levels, currents, salinity, temperature, waves) and disseminate them to users.	OFS are currently operational in the following locations: Chesapeake Bay, Columbia River, Delaware Bay, the Great Lakes, New York/New Jersey, Northern Gulf of Mexico, San Francisco Bay, St. Johns River, and Tampa Bay. Descriptions of each of these models can be found at http://www.tidesandcurrents.noaa.gov/models.html	OFS are currently operational in the following locations: Chesapeake Bay, Columbia River, Delaware Bay, the Great Lakes, New York/New Jersey, Northern Gulf of Mexico, San Francisco Bay, St. Johns River, and Tampa Bay.	Model results from each OFS are available on the following CO-OPS webpage: http://www.tidesandcurrents.noaa.gov/models.html Results in netCDF format are also available on a CO-OPS THREDDs server: http://opendap.cco-ops.nos.noaa.gov/thredds/catalog	NOAA/NOS/OCS: CSDL develops the models, and NOAA/NOS/CO-OPS/OD implements the models operationally on NCEP's high performance computing system.	OFS models have, and are still, being developed since 1999.	

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16	NOAA	4	D	nowCOAST mapping portal and map services	NOAA/NOS/OCS; POC John Kelley (603-862-1628)	GIS-based web mapping portal displaying near real-time observations, analyses, tide predictions, model guidance, watches/warnings, and forecasts. Thousands of geo-referenced hyperlinks to observations, forecasts, forecast guidance, and forecast discussions. nowCOAST™ map services (REST and WMS) allow users to obtain maps from nowCOAST™ and create mashups with their own map layers.	Web maps and services for coastal data	Operational web map portal and web services	United States	http://nowcoast.noaa.gov/ and http://nowcoast.noaa.gov/help/#/section=mapperservices	NOAA: NOS/OCS and NWS/IDP	Has been available since 2002. Upgraded in 2015.	Web services, organized collection of data, web application
17	NOAA	2.4	T	Recurrent tidal flooding monitoring and seasonal outlooks	NOS CO-OPS - W. Sweet william.sweet@noaa.gov; NESDIS NCEI - John Marra john.marra@noaa.gov; NOS OCM Doug Marcy doug.marcy@noaa.gov	Determination of tidal flood indicators (flood frequencies, magnitudes and durations) at tide gauges based upon elevation and probability definitions important to sector-specific requirements	website: 1) real-time 2-day predictive alert and historical monitoring in the "inundation dashboard" and 2) via proposed national integrated coastal flood information system - NICFIS to provide seasonal, annual outlooks and quarterly event and trend-change summaries	Currently working through the NOAA Climate Coordination Team on establishing indicator data sets with user groups, identifying, archiving and dissemination of the info and assessing state of science in making seasonal-scale predictions.	Various locations nationwide	Data examined currently is tide gauge data (NOS CO-OPS with future NCEI archiving)		start: 2014; product TBD	
18	NOAA	3.4	T	Rip current forecast model	NOS CO-OPS - Gregory Dusek, gregory.dusek@noaa.gov; NWS OSTI MDL - Michael Churma, michael.churma@noaa.gov	Validate and operationalize a statistical rip current forecast model utilizing hydrodynamic wave and water level model input.	An operational rip current forecast model used by WFOs nationwide to provide forecast guidance on the likelihood of hazardous rip currents occurring	Journal and conference articles detailing research/approach. Initial implementation and validation at multiple WFOs. Anticipated NOAA RTAP funding to beginning in FY17	nationwide	Forecast model output now being generated as part of NWS NWPWS WCOSS implementation	NWS; Lifeguard agencies throughout U.S.; USGS utilizes similar numerical model input for statistical wave run-up model	Started at NOAA 2011. Operational product - 2019	Collaboration, citizen science, models coupled across disciplines and scales, communication to stakeholders
19	NOAA	1,2,3,4	O	Coastal Change Analysis Program (C-CAP) land cover mapping and change monitoring	NOAA OCM, Nate Herold, Nate.Herold@noaa.gov, 843-740-1183	operational land cover mapping and change monitoring for coastal U.S. 1996 to present	land cover data on 5 year update cycle, as well as spatial explicit change mapping. Includes coastal changes, changes pre-post extreme events, and upstream physical data.	C-CAP is an ongoing mapping program, and has been developing land cover monitoring products since the mid 90s. Work is currently underway to produce a 2016 update to this data.	Coastal CONUS, HI, Guam, American Samoa, CNMI, US Virgin Islands, and Puerto Rico	https://coast.noaa.gov/dataregistry/search/collection/info/ccapregional	C-CAP data production is coordinated with state CZM programs and federal agencies via FGDC and the Multi-Resolution Land Cover Characteristics (MRLC) Consortium	1996, 2001, 2006, and 2010 dates are currently available. 2015/16 updates will become available 2016-2018 (dependent on geography).	
20	NOAA	1,2,4	O	Waves and dynamical water levels at NOS CO-OPS tide gauges	NOS CO-OPS - Gregory Dusek gregory.dusek@noaa.gov and William Sweet william.sweet@noaa.gov;	1.) Local calibration of the 6-minute water level standard deviation at tide gauges to offshore and local wave heights and estimates of local "dynamical" water levels. 2.) observing waves directly with new Microwave Radar water level sensors	Web-access of locally measured waves and dynamical water levels at NOS CO-OPS tide gauges	Research and publications on the subject in conjunction with CO-OPS water level sensor and platform upgrades (to microwave radar technology)	U.S. sites TBD	NOS CO-OPS	USACE has expressed interest in using "sigma" to quantify infragravity water level signal	start: 2014; Product TBD	Develop new sensors and observing techniques
21	NSF	4	D	Ocean Observatories Initiative, Endurance Array	National Science Foundation (Lisa Clough)	multi-scaled array utilizing fixed and mobile assets to observe cross-shelf and along-shelf variability in the coastal upwelling region of the Oregon and Washington coasts. The array also provides an extensive spatial footprint that encompasses a prototypical eastern boundary current regime and connectivity with the Cabled Array	real time oceanographic data streaming	http://oceanobservatories.org/array/coastal-endurance/	Oregon/Washington	http://oceanobservatories.org/data/	multiple	launched 2015, ongoing	

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22	NSF	4	D	<i>Ocean Observatories Initiative - Pioneer Array</i>	National Science Foundation (Lisa Clough)	Examine exchanges between the shelf and slope and the shelf ecosystem, as well as provide broader insight into the issues of air-sea gas exchange, including Carbon Dioxide	real time oceanographic data streaming	http://oceanobservatories.org/array/coastal-pioneer/	New England	http://oceanobservatories.org/data/	multiple	launched 2015, ongoing	
23	NSF	4	M	<i>Community Surface Dynamics Modeling System (CSDMS)</i>	National Science Foundation (Richard Yureich)	Diverse community of experts promoting the modeling of earth surface processes by developing, supporting, and disseminating integrated software modules that predict the movement of fluids, and the flux (production, erosion, transport, and deposition) of sediment and solutes in landscapes and their sedimentary basins.	modeling; coupled models	https://csdms.colorado.edu/wiki/Main_Page	no field location	https://csdms.colorado.edu/wiki/Data_portal	University of Colorado, Boulder	ongoing	
24	USACE	4	M	<i>Coastal Navigation Structure/Wave Response</i>	ERDC-CHL Chris Kees	Develop high-fidelity capabilities to evaluate breakwater/jetty design options and predict structure response, reducing uncertainties in current modeling techniques	JP, Web app, model	to develop integrated tools and methods to aid in the planning, design, construction, and management of present and future ports and waterways	Not location specific; more of a laboratory / testing tool.	test cases for model development. Some workbooks are available for people to use as starting place for their model efforts.	HR Wallingford	FY13/FY16	Improve
25	USACE	4	M	<i>ADH Development</i>	ERDC-CHL Corey Trahan	Development of the USACE enterprise-level multi-scale and multidisciplinary hydrodynamic simulation tool, linking coastal and estuarine processes with riverine, watersheds and groundwater. Code modernization, redesign and development of test bed for next generation verification and validation studies.	ADH: Adaptive Hydraulics - enterprise hydrodynamic simulator for Riverine, Estuarine, Ocean simulation of 2D, 3D and 2D/3D mixed domains w/ wetting and drying, variable density and salinity transport capabilities	Conduct R&D at the forefront of S&T in collaboration with others to reduce the Nation's risk from flood and coastal storm disasters while energizing the economy, sustaining environmental resources, and promoting community resilience.	General	3D test cases: see Guarav Savant	Univ of Texas at Austin; Institute for Computational Engineering Sciences	FY15/FY17	improve, couple
26	USACE	4	M	<i>Unstructured Wave Model Development</i>	ERDC-CHL Jane Smith	Develop an updated capability for phase-averaged nearshore wave generation and propagation modeling within the CSTORM-MS framework	Unstructured Wave Model development	Conduct R&D at the forefront of S&T in collaboration with others to reduce the Nation's risk from flood and coastal storm disasters while energizing the economy, sustaining environmental resources, and promoting community resilience.	General	FRF test bed	NOAA/NCEP German univ -- changed to company	FY15/FY17	improve
27	USACE	4	DT	<i>Coastal Hazards System</i>	ERDC-CHL Jeff Melby	Enterprise coastal storm database and standard storm processing toolbox for planning, design and emergency management	Development of a national repository of coastal storm response data to facilitate development of extremal statistics of peak responses, storm characteristics and expedient high-fidelity storm response prediction	Conduct R&D at the forefront of S&T in collaboration with others to reduce the Nation's risk from flood and coastal storm disasters while energizing the economy, sustaining environmental resources, and promoting community resilience.	General	CHL and CHS database	USACE Districts/South Atlantic Division	FY15/FY17	database, metadata?, web-service?
28	USACE	4	T	<i>SAGA; Sediment Analysis Geo-Application</i>	ERDC-CHL Linda Lillycrop	Develop 3D sediment analysis tools. FY14 partially supported development of the Sediment Analysis Geo-Application (SAGA), a Corps-wide sediment database that will be accessible via webtools.	Sediment Analysis Geo-Application (SAGA)	to advance the state of knowledge and develop engineering technology for predicting waves, current, sediment transport, and morphology change at and around inlets	General	District study reports; District sediment analyses	USACE Districts	FY14-FY17	database, web-app, metadata, web-service

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29	USACE	4	M	Quantifying Ship Wake Effects	ERDC-CHL Matt Malej	Boussinesq-based tools integrated into the Surface Modeling System (SMS) to enable project analyses with less uncertainty	Boussinesq Model for navigation support	to develop integrated tools and methods to aid in the planning, design, construction, and management of present and future ports and waterways	Not location specific; applicable for shorelines near navigation channels	No. Under development		FY16/FY18	uncertainty estimation
30	USACE	4	M	Phase Resolving Wave Model Development	ERDC-CHL Matt Malej/Jane Smith	Develop a new phase-resolving (Boussinesq-type) numerical wave model for simulation of nearshore wind-wave propagation, harbor entrances, nonlinear shoaling, rump & overtopping, land inundation, tsunamis and ship waves	Boussinesq numerical modeling for flood risk management	Conduct R&D at the forefront of S&T in collaboration with others to reduce the Nation's risk from flood and coastal storm disasters while energizing the economy, sustaining environmental resources, and promoting community resilience.	General	Lab datasets Field data - Chrisfield, Maryland	University of Delaware Notre Dame	FY15/FY18	improve physics
31	USACE	4	M	ADH Testing and Enhancement	ERDC-CHL Ray Chapman	Demonstrate and assess the operational applicability of the 2D and 3D ADH hydrodynamic modules as applied to geophysical scale hydrodynamic, sediment and water quality transport projects	ADH Testing & Enhancement: Independent review, testing and enhancement of 3D ADH surface water model as applied to geophysical scale transport	Conduct R&D at the forefront of S&T in collaboration with others to reduce the Nation's risk from flood and coastal storm disasters while energizing the economy, sustaining environmental resources, and promoting community resilience.	General	V&V test cases	USACE Districts	FY15-FY17	uncertainty estimation
32	USACE	4	T	Long-term geomorphologic inlet indicators	ERDC-CHL Richard Styles	Evaluate inlet classification based on long-term morphologic change data sets.	Long-term geomorphologic inlet indicators	to advance the state of knowledge and develop engineering technology for predicting waves, current, sediment transport, and morphology change at and around inlets	General	Technical literature; historical data; CIRP databases	USACE Districts	FY14-FY18	
33	USACE	4	M	Improved numerical methods for Particle Tracking Model (PTM) application		PTM has been used predominantly to track the fate of fine grained sediment. Increasing district demand for sand transport capabilities lead to this effort so that PTM can now reliably track fate and transport of sand, silt, and clay fractions of dredged material released into the water column.	PTM with improved sand transport algorithms. PTM that runs faster because of more efficient numerical methods.	research is designed to balance operational and environmental initiatives and to meet complex economic, engineering, and environmental challenges of dredging and disposal in support of the navigation mission	General				improve physics
34	USACE	1.4	M	Gencade regional beach and inlet model	ERDC-CHL Ashley Frey	Quantify shoreline change over regional spatial scales (multiple beaches and inlets) and long-term temporal scales (years to decades) as a function of multiple engineering projects (beach fill, dredging, placement, shoal mining). Research and develop predictive tools for quantifying resilience of navigation channels, navigation structures, and adjacent beaches.	Regional beach and inlet model, Gencade	to advance the state of knowledge and develop engineering technology for predicting waves, current, sediment transport, and morphology change at and around inlets	General	Technical literature; historical data; Dredging Information System databases	USACE Districts	FY12; tool available now	physics, coupling, uncertainty
35	USACE	1.4	M	Predictive Tools for Mixed-Sized Sediment Transport	ERDC-CHL Jarrell Smith	Mixed (fine clay, silts, coarser sand and gravel) transport under forcing from waves and currents.	Predictive tools for mixed-sized sediment transport	to advance the state of knowledge and develop engineering technology for predicting waves, current, sediment transport, and morphology change at and around inlets	General	Technical literature; historical data; ERDC laboratory studies	USACE Districts; Clarkson University	FY15-FY19	physics, parameterization
36	USACE	1.4	M	Beach-fx Development	ERDC-CHL Mark Gravens	Capability to conduct joint probabilistic forcing and response analyses of coastal and riverine projects for risk-based project lifecycle planning.	Probabilistic Project Life-Cycle Cost Analysis, including emergency nourishment, complex morphology, shoreline response database, rule-based mobilization thresholds, probabilistic storm suite, economic impacts design document; Applications training.	Conduct R&D at the forefront of S&T in collaboration with others to reduce the Nation's risk from flood and coastal storm disasters while energizing the economy, sustaining environmental resources, and promoting community resilience.	General	CHL	USACE Districts	FY15-FY17	physics, parameterization

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37	USACE	1,4	M	Assessing Barrier Islands Environmental Vulnerability to Climate Change and SLR	ERDC-EL Candice Piercy	Capability to utilize coastal system-level modeling technologies to assess ecosystem restoration projects for multiple benefits	Spatially-explicit screening-level tool to assess ecosystem vulnerability with minimal pre-existing data and/or existing storm data to a suite of storm events of specific magnitude.	to address the need for ecosystem assessment, restoration, and management activities at the project level with cost-effective technologies	General	ERDC EL	USACE Districts	FY14-17	
38	USACE	1,4	T	Coastal Geomorphic and Thematic Coverage model V&V	ERDC-EL Safra Altman	This tool provides integrated geomorphic and thematic information that enables project planning and project functional performance assessment. V&V provides assessment of the tool's ability to identify uncertainty in model results	Systematic Coastal Land Cover Product/Tool	to develop integrated tools and methods to aid in the planning, design, construction, and management of present and future ports and waterways	Applicable to all shorelines and barrier islands	Alpha version of model is completed. V&V test sets	CERL (Jim Westervelt), National Parks Service, US Fish and Wildlife, University of Georgia	FY13/FY16	
39	USACE	2,4	M	CSTORM-MS Development	ERDC-CHL Chris Massey	Reduced uncertainty w/r prediction of coastal storms and coastal processes; coastal project design and risk assessment; coupled wind, wave, circulation and near-shore dynamics simulation with sediment transport	A tightly coupled system of hydrodynamic models, wave models and sediment transport library for simulation of coastal and near shore wave, storm surge and sediment propagation	Conduct R&D at the forefront of S&T in collaboration with others to reduce the Nation's risk from flood and coastal storm disasters while energizing the economy, sustaining environmental resources, and promoting community resilience.	General	CHL/CHS database	Env Agency of England Office South Africa UK Met CSIR - GFDL	FY15/FY17	physics
40	USACE	3,4	M	Tools to Rapidly Predict and Quantify Ecosystem Benefit	ERDC-EL Carl Cerco	Modeling capability that links ecosystem hydrology & hydraulics data to ecological outputs	Enhanced technologies that link H&H tools and ecosystem assessments	to address the need for ecosystem assessment, restoration, and management activities at the project level with cost-effective technologies	General	ERDC EL	USACE Districts	FY14-16	physics
41	USACE New		T	Landscape Metrics	ERDC-CHL/EL/SAM	Tools to understand changes in landscape based on lidar elevation data and hyperspectral imagery.					USACE Districts		
42	USGS	4	O	USGS Hydrologic Instrumentation Facility	USGS http://water.usgs.gov/hif/ ; (800) 382-0634;	The HIF warehouse and laboratory facilities provides hydrologic instruments, equipment, and supplies for USGS as well as Other Federal Agencies (OFA) and USGS Cooperators. The HIF also tests, evaluates, repairs, calibrates, and develops hydrologic equipment and instruments. The HIF Hydraulic Laboratory facilities include a towing tank, jet tank, pipe flow facility, and tilting flume. The HIF provides training and technical support for the equipment it stocks.	http://water.usgs.gov/hif/publications/	The HIF supports the hydrologic data collection efforts of USGS scientists in all 50 States, Puerto Rico and several other U.S. Territories. USGS hydrologic scientists measure and monitor streamflow, ground water levels and water quality at thousands of locations.	Hydrologic Instrumentation Facility Building 2101 Stennis Space Center, MS 39529		Many	Ongoing for many years	
43	USGS	4	D	National Hydrography Dataset; Watershed Boundary Dataset	USGS - area@usgs.gov	Foundational hydrographic information for the United States; the NHD represents the drainage network with features such as rivers, streams, canals, lakes, ponds, coastline, dams, and streamgages. The WBD represents drainage basins as enclosed areas in eight different size categories.	vector geospatial database (http://nhd.usgs.gov/data.html)	To provide foundational and authoritative hydrographic network information for the nation	National	Data available at http://nhd.usgs.gov/data.html	Federal/State/Local	Project ongoing	web services metadata web app (tmm)

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44	USGS	4	D	Coastal and Marine Data Management System	USGS - CMG Program Haines John	Provide one-stop access to coastal and marine data holdings	(1) CMGVP Video and Photography Portal Server and GIS Data (2) Internet Map (3) National Archive of Marine Surveys (4) Sediment/Core Archive (5) Information for Marine Planners and Resource Manager	http://cmgds.marine.usgs.gov/	world wide	http://cmgds.marine.usgs.gov/		Ongoing	web services metadata web app
45	USGS	4	T	Compendium of tools and technology	USGS - CMG Program Haines John	Centralized source for tools	(1) mapping techniques (2) Data modeling & visualization (3) Labs (4) Software (5) Instruments & Equipment - including: sea-floor mapping (sidescan, sub-bottom, multi-beam), laboratory analyses (sediment, geochemical, isotope, chronology), coring (piston, vibrocore, push-cores), oceanographic instrumentation (moorings, buoys, and tripos) for flow, transport and geochemistry, ground-based lidar, GPS mapping.	http://marine.usgs.gov/technology-tools/	all encompassing			ongoing	
46	USGS	4	O	3D Elevation Program	USGS - jstoker@usgs.gov	Foundational 3D information for all terrestrial areas in the Conterminous US, Islands, Alaska and Territories	Lidar point clouds, Bare earth DEMs, IFSAR models, and services from these data	To provide foundational base 3D data for the United states over terrestrial areas	National	Data available via http://nationalmap.gov/3DEP	Federal/State/Local	3DEP became operational in 2015. Goal is to collect national 3-D data on an 8-year cycle	Need web services
47	USGS	4	D	National Map/US Topo	USGS - Irdavis@usgs.gov	Delivery of topographic mapping products and services to the nation	7.5 minute quad-based multi-layered topo map products; available as GeoPDF	The US Topo project repackages data from national GIS databases as traditional maps, primarily for the benefit of non-GIS users. US Topo maps are mass-produced from secondary sources, on a rapid refresh cycle, using the best available data at the time of production.	National	Data available at http://viewer.nationalmap.gov	Federal/State/Local	The project was launched in late 2009, and the term "US Topo" refers specifically to quadrangle topographic maps published in 2009 and later. Ongoing	web services metadata web app
48	USGS	4	T	USGS Center for Integrated Data Analytics	USGS Morgan Schneider, CIDA Director, 8505 Research Way Middleton, WI 53562; 608-821-3820; moschnei@usgs.gov	CIDA is committed to advancing USGS science by integrating disparate data across scales and domains, improving access to data and research, developing tools for analysis and visualization, and fostering collaboration with the international community	http://cida.usgs.gov/products.html		Madison, WI	http://cida.usgs.gov/partners.html		Ongoing for many years	
49	USGS	4	M	SPARROW Modeling	USGS National Water Quality Program (Contact: Steve Moulton, smoulto@usgs.gov, 703-648-6874; National Water Quality Assessment Project (Lead Contact: Gary Rowe, glrowe@usgs.gov, 303-236-1461).	Predicting loads of nitrogen, phosphorus, organic carbon, dissolved solids and sediment to streams, rivers, and estuaries	Models; decision support systems	Fulfills overall goal of the NAWQA Project assess water quality conditions, track conditions over time, and understand the factors influencing these conditions	Conterminous US	http://water.usgs.gov/nawqa/sparrow/	Multiple Federal, state, local	Ongoing through 2023	
50	USGS	4	M	WARP Modeling	USGS National Water Quality Program (Contact: Steve Moulton, smoulto@usgs.gov, 703-648-6874; National Water Quality Assessment Project (Lead Contact: Gary Rowe, glrowe@usgs.gov, 303-236-1461).	Predicting concentrations of over pesticide compounds and selected degradates in streams and rivers including those flowing into coastal estuaries.	Models; decision support systems	Fulfills overall goal of the NAWQA Project assess water quality conditions, track conditions over time, and understand the factors influencing these conditions	Conterminous US	http://cida.usgs.gov/warp/home/	Multiple Federal, state, local	Ongoing through 2023	
51	USGS	4	M	Estimation of flow at unengaged locations	USGS Water Availability and Use Science Program (WAUSP), Sonya Jones sajones@usgs.gov; 678-524-1544	Managers need techniques that allow them to accurately estimate water availability - including metrics such as peak daily average flows or low flows - at specific unengaged locations. This is an important tool for decision-making, allowing managers to evaluate proposed water management scenarios in greater detail.	Estimates at the HUC12 nationally, estimates will be provided for the most recent 30-year historical period.	While estimated time series will have larger uncertainty than time series measured at a streamgauge, these estimates can provide needed information for water managers to make decisions and for ecologists to evaluate ecological water requirements.	National	data are currently available for the SE US via the NWC Data Portal (http://cida.usgs.gov/nwc/); new regions will be published as they become available	none	ongoing	
52	USGS	4	O	National Land Cover Database (NLCD)	USGS, Jonathan H. Smith	Land Cover Monitoring	Land Cover/use datasets	http://www.usgs.gov/climate_landuse/lc/projects/nlcd.asp	National	www.mrlc.gov	NOAA, EPA, USFS, NPS, BLM, F&WS	Earlier iterations are available, 2016 is being initiated	
53	USGS	4, 1, 2	O	3DEP in the Coastal Zone	Jeffery Danielson-daniels@usgs.gov	Research on creating seamless topobathymetric models in the coastal zone	Provides baseline source elevation data as well as possibilities for change detection	Models have been built for Mobile Bay, North Carolina, San Francisco Bay and in Hurricane Sandy affected regions	National	Data available via http://topotools.cr.usgs.gov/coned/index.php	USGS/NOAA/Others	Research began in 2011. Products available now	

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54	USGS	4, 1, 2	O	<i>Long-Term Streamgauge Network</i>	USGS Groundwater and Streamflow Information Program (GWSIP), Doug Yeskis, djyeskis@usgs.gov, 703-648-5046.	National Streamflow Network	1) Real-time presentation of data. 2) Various studies from time to time, and 3) Focused reports on specific droughts and floods.	The collection of streamflow in a nationally consistent manner to provide critical information during droughts and floods, assess the impacts of climate and land-use change, and other uses consistent with USGS and other funding partner goals and objectives	Throughout the US and territories	Data is available on the web from the USGS National Water Information System: http://waterdata.usgs.gov/nwis/s/w	Many partners, including Federal, State, Local and Tribal.	Since pre-1900 and ongoing in the foreseeable future	
55	USGS	4, 1, 2	O	<i>Topographic Science</i>	USGS, Jonathan H. Smith	Analysing elevation data characteristics supporting sea-level rise and storm surge impacts	Elevation characteristics datasets suitable for sea-level rise and storm surge assessments	http://www.usgs.gov/climate_landuse/lcs/projects/slrise.asp	national	http://topotools.cr.usgs.gov/	NOAA	On-going	
56	USGS	4, 1, 2, 3	O	<i>USGS Cooperative Matching Funds</i>	USGS, State Water Science Centers throughout the nation	The Mission of the USGS Cooperative Water Program is to provide reliable, impartial, and timely information needed to understand the Nation's water resources through a program of shared efforts and funding with State, Tribal, and local partners to enable decision makers to wisely manage the Nation's water resources."	http://water.usgs.gov/coop/products/	The Cooperative Water Program monitors and assesses water in every State, protectorate, and territory of the U.S. in partnership with nearly 1,600 local, State, and Tribal agencies.	Distributed throughout the nation.		Many Local, State, Regional and Tribal Partners	Ongoing	
57	USGS	4, 1, 3	O	<i>Floridan Aquifer Groundwater Availability Assessment</i>	USGS Water Availability and Use Science Program (WAUSP), Sonya Jones sajones@usgs.gov; 678-524-1544	The overall objective for the current study is to assess the availability of water in the Floridan Aquifer System. Achieving this objective includes quantifying the groundwater resource by creating water budgets both spatially and temporally as well as evaluating the groundwater resource changes over time. Additionally, tools will be provided to assess the future impacts of humans and environmental changes (such as climate) on the Floridan Aquifer System and aid in designing groundwater monitoring networks. More information is available at http://fl.water.usgs.gov/floridan/	1) quantify the current groundwater resources of one of the Nation's priority aquifer systems; 2) evaluate how this resource has changed over time; and 3) provide the tools needed to forecast how this aquifer system may respond to future human and environmental stresses.	The USGS is undertaking a series of regional groundwater availability studies to improve our understanding of groundwater availability in major aquifers across the Nation. Process-oriented groundwater science is being used to assess the long-term availability of groundwater supplies while also addressing the environmental effects of groundwater development on land and surface-water resources. The management and policy questions that drive regional assessments of groundwater availability do, in turn, drive and identify fundamental process-oriented groundwater science that can vary across different geographic and hydrogeologic settings	Parts of Florida, Georgia and Alabama	Data for this project are available on the USGS Water NSDI node at http://water.usgs.gov/ogw/gwrp/activities/gspdata/Studies/Florida.html	Many local partners, including Federal and State agencies	will be complete September 2018	
58	USGS	4, 3	O	<i>Groundwater Networks</i>	USGS National Groundwater Monitoring Network, William Cunningham, Office of Groundwater, wcunning@usgs.gov, 703-648-5005; and USGS Groundwater and Streamflow Information Program (GWSIP), Doug Yeskis, djyeskis@usgs.gov, 703-648-5046. Doug Yeskis	The National Ground Water Monitoring Network (NGWMN) is designed to take advantage of long-term monitoring done by partner "data providers" to create a nationwide, long-term groundwater quantity and quality monitoring network.	The NGWMN will provide access to comparable groundwater data across the United States through a data portal, in addition to data available through those wells measured by the USGS	Long term monitoring of groundwater levels that would provide information necessary for sustainable management of groundwater supplies to meet current and future human water needs, and ecosystem requirements.	Throughout the US and territories	http://groundwaterwatch.usgs.gov/	Many partners, including Federal, State, Local and Tribal.	Ongoing	

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59	USGS	4, 3	O	National Assessment of Water Quality	USGS National Water Quality Program (Contact: Steve Moulton, smoulto@usgs.gov, 703-648-6874; National Water Quality Assessment Project (Lead Contact: Gary Rowe, growe@usgs.gov, 303-236-1461).	Surface Water & groundwater quality networks	Web-based annual reporting of surface water quality conditions	Fulfills overall goal of the NAWQA Project assess water quality conditions, track conditions over time, and understand the factors influencing these conditions	Conterminous US		Multiple Federal, state, local	Ongoing through 2023	
60	USGS	4, 3	O	Local and Regional Assessment of Water Quality	USGS National Water Quality Program (Contact: Steve Moulton, smoulto@usgs.gov, 703-648-6874; National Water Quality Assessment Project (Lead Contact: Gary Rowe, growe@usgs.gov, 303-236-1461).	Harmful Algal Bloom (HABs) studies	Monitoring data, interpretative studies on causes of HABs, and development of near-real-time predictions of algal toxin events for freshwater recreational beaches, inland lakes, and drinking water intakes.	Fulfills overall goal of the National Water Quality Program to assess water quality conditions, track conditions over time, and understand the factors influencing these conditions	Local and regional scale studies in about a dozen states, the Great Lakes, and Chesapeake Bay	http://cida.usgs.gov/quality/river/home	Multiple Federal, state, local	Ongoing	
61	USGS	4, 3	O	Real-Time Water-Quality Networks	USGS Office of Water Quality (Lead Contact: Brian Pellerin, bpeller@usgs.gov).		1) Real-time presentation of data and 2) Various studies from time to time.		Throughout the US and territories	http://waterwatch.usgs.gov/wqw/atch/	Many partners, including Federal, State, Local and Tribal.	Ongoing	
62	USGS	4, 3	M	North Atlantic Coastal Plain Groundwater Availability Study	USGS Water Availability and Use Science Program (WAUSP), Sonya Jones sajones@usgs.gov; 678-524-1544	The focus is on improving fundamental knowledge of the water budget of this aquifer system, including the flows, storage, and use by humans and the environment. An improved quantitative understanding of the aquifer system's water budget not only provides key information about water quantity, but also is essential for assessments of water quality and ecosystem health. More information is available at http://my.water.usgs.gov/projects/NACP/	1) quantify the current groundwater resources of one of the Nation's priority aquifer systems; 2) evaluate how this resource has changed over time; and 3) provide the tools needed to forecast how this aquifer system may respond to future human and environmental stresses.	The USGS is undertaking a series of regional groundwater availability studies to improve our understanding of groundwater availability in major aquifers across the Nation. Process-oriented groundwater science is being used to assess the long-term availability of groundwater supplies while also addressing the environmental effects of groundwater development on land and surface-water resources. The management and policy questions that drive regional assessments of groundwater availability do, in turn, drive and identify fundamental process-oriented groundwater science that can vary across different geographic and hydrogeologic settings.	Coastal North Carolina to New York	Data for this project will be available on the USGS Water NSDI node. Examples of type of data available can be found at http://water.usgs.gov/ogw/gwpr/activities/gspdata/Studies/Florida.html	Many local partners, including Federal and State agencies	will be complete September 2016	
63	USGS	4, 3	M	Delaware River Basin FAS	USGS Water Availability and Use Science Program (WAUSP), Sonya Jones sajones@usgs.gov; 678-524-1544	WAUSP FAS projects are designed to address stakeholder needs by developing tools that evaluate water availability for both human and ecological needs. More information is available at http://water.usgs.gov/watercensus/delaware.html	Surface-water model capable of evaluating impacts of land-use change, climate change, and changes in water demand; ecological flow in both tributaries and mainstem; DSS for management of mainstem fish species	Development of tools for stakeholder use in water management decisions	Delaware River Basin	data will be published via the NWC Data Portal (http://cida.usgs.gov/nwc/)	Many local partners, including Federal and State agencies	will be complete September 2016	

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64	USGS	4, 3	M	<i>North and South Carolina Atlantic Coastal Plain Aquifer System</i>	USGS Water Availability and Use Science Program (WAUSP), Sonya Jones sajones@usgs.gov; 678-524-1544	The principal objective of this study is to provide a tool for assessing ground-water availability in the Coastal Plain aquifer system of North and South Carolina. Specifically, the study will develop a model that will improve our understanding of the aquifer-system flow paths and recharge; evaluate ground- and surface-water interaction and the potential for base flow reduction in streams as a result of increased ground-water withdrawals; and provide a scientifically based management tool for optimizing conjunctive water-use strategies. In addition to providing scientists with an improved database and better understanding of the ground-water-flow system, the model will	1) quantify the current groundwater resources of one of the Nation's priority aquifer systems; 2) evaluate how this resource has changed over time; and 3) provide the tools needed to forecast how this aquifer system may respond to future human and environmental stresses.	The USGS is undertaking a series of regional groundwater availability studies to improve our understanding of groundwater availability in major aquifers across the Nation. Process-oriented groundwater science is being used to assess the long-term availability of groundwater supplies while also addressing the environmental effects of groundwater development on land and surface-water resources. The management and policy questions that drive regional assessments of groundwater availability do, in turn, drive and identify fundamental process-oriented groundwater science that can vary across different geographic and hydrogeologic settings.		Data for this project are available on the USGS Water NSDI node at http://water.usgs.gov/ogw/gwrp/activities/gspdata/Studies/NSCC_coastal.html	Many local partners, including Federal and State agencies	completed	
65	USGS	4, 3	M	<i>Hawaiian Volcanics Groundwater Availability Assessment</i>	USGS Water Availability and Use Science Program (WAUSP), Sonya Jones sajones@usgs.gov; 678-524-1544	The study plan includes defining the hydrogeologic framework, quantifying components of the groundwater budget, and developing conceptual models of groundwater flow for Kauai, Oahu, Maui and the Big Island. The plan includes construction of three separate whole-island numerical groundwater models for Kauai, Oahu, and Maui. The models together with input from the groundwater budget will be used to assess changes in groundwater availability in Hawaii. Visit the Hawaii Volcanic-Rock Aquifer study web site (http://hi.water.usgs.gov/studies/GWRP/) for a complete bibliography and more information.	Provide an updated assessment of groundwater availability in Hawaii Assess the current condition of Hawaii volcanic-rock aquifers and show how groundwater resources have changed as a result of natural and human stresses Provide a tool to assess responses to future stresses Evaluate the adequacy of the current data network for assessing groundwater resources in the future	The USGS is undertaking a series of regional groundwater availability studies to improve our understanding of groundwater availability in major aquifers across the Nation. Process-oriented groundwater science is being used to assess the long-term availability of groundwater supplies while also addressing the environmental effects of groundwater development on land and surface-water resources. The management and policy questions that drive regional assessments of groundwater availability do, in turn, drive and identify fundamental process-oriented groundwater science that can vary across different geographic and hydrogeologic settings.		Data for this project will be available on the USGS Water NSDI node. Examples of type of data available can be found at http://water.usgs.gov/ogw/gwrp/activities/gspdata/Studies/Florida.html	Many local partners, including Federal and State agencies	will be complete September 2018	

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66	USGS	4, 3	T	<i>Biodiversity Information Serving Our Nation (BISON)</i>	USGS, CSS, Core Science Analytics, Synthesis and Libraries Program - Gerald Guala, Branch Chief for Eco-Science Synthesis. gguala@usgs.gov	BISON (bison.usgs.gov) holds more than 260 million occurrence records for nearly all species in the US, and geographically covers all of the approximately 10 million square kilometers of land, coastline and jurisdictional waters, both marine and freshwater in the US and its territories.	BISON provides documented species point distribution data going back more than 100 years and includes nearly all terrestrial and coastal marine plants and animals. This means that for species with sufficient data density, their potential distributions can be modelled both forward and backward in time. A pilot project to do just that is currently underway.	Initial Release: http://www.usgs.gov/newsroom/article.asp?ID=3566&USXctjDVA0 Fact Sheet: http://pubs.er.usgs.gov/publication/gip160 Mendeley Group (publications): https://www.mendeley.com/groups/3876461/biodiversity-information-serving-our-nation-bison/	All US and territories land and coastal waters.	BISON is at (bison.usgs.gov). All data are free for viewing, analysis and download. There is an extensive API for machine access and a significant community of users has built a wide variety of applications and tools (especially in R) for extraction and analysis of the data.	BISON includes more than 1500 data sets from 380 institutions around the world. Ten Federal agencies have data in BISON.	BISON was officially released in April 2013, it is a continuing resource.	web services metadata web app
67	USGS	4, 3	M	<i>GAP Land Cover/LANDFIRE Mapping and the National Vegetation Classification System</i>	USGS, CSS, Core Science Analytics, Synthesis, and Libraries Program AND the FGDC Vegetation Subcommittee Alexa McKerrow, amckerrow@usgs.gov	USGS and the LANDFIRE program are combining forces to produce the most detailed, high resolution vegetation map of the nation starting with 2016 LANDSAT 8 imagery. The product includes detailed classification of coastal vegetation (in partnership with NOAA) important to wildlife habitat studies, human infrastructure protection, extreme event mitigation, and other coastal processes.	<u>The mapping product complements, with more detailed classification, the NLCD map through advanced web services that support robust scientific analysis of coastal and other vegetation classes. Starting with 2016 imagery, the new product between USGS and LANDFIRE will support change analysis with new mapping every two years.</u>	USGS/LANDFIRE collaboration under the Multi-Resolution Land Characteristics interagency consortium - http://www.mrlc.gov/ GAP Land Cover 2001 - http://gapanalysis.usgs.gov/gaplandcover/ (2011 product in review) LANDFIRE vegetation products - http://www.landfire.gov/vegetation.php	All US and territories land and coastal waters.	GAP Land Cover and LANDFIRE products are online for download and as geospatial services in the public domain. User communities have built scientific workflows and other tools for use of these data products in a variety of ways.	The Multi-Resolution Land Characteristics Consortium (MRLC) includes the major civilian agencies involved in land cover mapping - http://www.mrlc.gov/about.php Non-fed partners include the GreenInfo Network and others	USGS GAP Land Cover and LANDFIRE both began operations in the early 2000s and are continuing projects. New joint product development has begun in 2016 with an initial release in 2018 and then every 2 years thereafter.	
68	USGS	4, 3	O	<i>Ocean Biogeographic Information System- USA</i>	USGS, CSS, Core Science Analytics, Synthesis, and Libraries Program Abby Benson, albenson@usgs.gov	OBIS-USA integrates marine biology data and information into a standardized data system of observations and measurements. OBIS-USA is the U.S. national node to the International OBIS and assembles data from other U.S. agencies (NOAA, BOEM, Navy, etc.) and federally funded research projects. The OBIS-USA objective is to produce high quality data for integrated research studies and resource management decision analysis.	<u>OBIS-USA provides marine species observations and measurements, including presence/absence data, abundance, and other measurements through a data source aligned with the Darwin Core standard and served via download and streaming data services. Current R&D activities aim to align biological data with environmental data (physical and chemical oceanographic data) for trends analysis, distribution modeling, and other value-added products.</u>	OBIS-USA is currently online and available in the public domain with regular data integration occurring from both USGS and other agency partners. Current data flows being developed for the pilot Marine Biodiversity Observation Network projects into OBIS-USA. http://www.usgs.gov/obis-usa/	Focus of OBIS-USA on U.S. territorial waters with higher data concentration in the Exclusive Economic Zone but extending globally through U.S. funded projects. iOBIS contains global records from all OBIS nodes.	OBIS-USA data are available via a web site and through an advanced online service interface (ERDDAP) providing multiple access and analysis methods.	Major close partners for OBIS-USA include NOAA, BOEM, and Navy along with the federally funded (NOAA, NASA, and BOEM) MBON projects. OBIS-USA shares a developing relationship on techniques and methods with the NSF-funded BCO-DMO facility.	OBIS-USA and iOBIS began with the Census of Marine Life project and continue as a live operational data system into the foreseeable future.	

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69	USGS	4, 3	T	<i>USGS ScienceBase and the Biogeographic Information System</i>	USGS, CSS, Core Science Analytics, Synthesis, and Libraries Program Steve Aulenbach, saulenbach@usgs.gov	The production and publication of scientific information useful for policy and resource management decision analysis requires scientific synthesis across domains and scientific rigor in the organization of traceable findings and conclusions. The CSASL Program is currently developing a Biogeographic Information System patterned on the Global Change Information System developed by the US Global Change Research Program as a platform for continuously developing robust integrated scientific assessments.	The Biogeographic Information System is a specialized collection in ScienceBase, a research infrastructure developed and maintained by the USGS. It organizes scientific data, software, and scientific findings into a robust infrastructure that supports multidimensional analyses, scientific provenance, and the publication of results through diverse web applications and other media.	The Biogeographic Information System has initially been used as the underpinning for the 2015 NHP Assessment (in review) and the Dam Removal Information Portal (www.sciencebase.gov/drip/).	U.S. national asset with nationwide and global data coverage	The BIS itself is online via ScienceBase - https://www.sciencebase.gov/catalog/item/54540d80e4b0dc779374504a . It is accessible via the ScienceBase web interface, with applications being driven by the ScienceBase API.	The Biogeographic Information System is currently a USGS R&D project with developing partnerships between CSASL and USGS Ecosystems programs	Research and development began in FY 2016 and will continue into the foreseeable future. The technology base in ScienceBase began in 2010.	on going - web services metadata web app
70	USGS	4, 3	O	<i>Hyperspectral remote sensing of coastal environmental hazards</i>	USGS, Raymond Kokaly, raymond@usgs.gov	The USGS has applied hyperspectral remote sensing to map the spatial extent and environmental degradation of diverse contaminants in the coastal and marine environment.	Multiple products related to mapping of the impacts of the Gulf oil spill on coastal marshes	Peterson, S.H., Roberts, D.A., Beland, M., Kokaly, R.F., and Ustin, S.L., 2015, "Oil Detection in the Coastal Marshes of Louisiana Using MESMA Applied to Band Subsets of AVIRIS Data." Remote Sensing of Environment. http://www.sciencedirect.com/science/article/pii/S003442571400501X	Gulf coast	http://speciab.cr.usgs.gov	wide range of Federal, State, and local agency partners.	2010 to present	
71	USGS	4, 3, 1	D	<i>Dam Removal Science Database and Dam Removal Information Portal</i>	USGS, CSS, Core Science Analytics, Synthesis, and Libraries Program Daniel Wiefierich, dwiefierich@usgs.gov USGS Western Fisheries Research Center, Jeff Duda, jduda@usgs.gov	Dams and an increasing frequency of dam removal projects due to aging infrastructure and other factors affect coastal ecosystems and processes. A USGS Powell Center project released a Dam Removal Science Database that was subsequently developed into a dynamic data system now online as part of the Biogeographic Information System and a portal interface for mapping and analytics. The system provides researchers and decision analysts a resource for understanding the types of scientific studies conducted on dam removal projects to aid in better future study design.	The Dam Removal Science Database is a distributed data system directed through ScienceBase. It provides a synthesis of research papers and government reports on the history of removed dams and the scientific studies and monitoring conducted as part of or in connection to the removal projects. Dam removals are an important dynamic affecting coastal systems, and increased scientific understanding of their impacts will aid in decision analysis.	Dam Removal Information Portal online at www.sciencebase.gov/drip/ ; Spatial Feature Registry in the Biogeographic Information System contains underlying information on removed dams tied to the NHD and augmented with linkages to other resources (National Inventory of Dams, etc.). Scientific publications from the Dam Removal Science project at the Powell Center and publication in prep on the Dam Removal Information Portal and future R&D.	Mostly U.S. dam removal projects with some international dams incorporated for reference	Source data are organized into the Biogeographic Information System - https://www.sciencebase.gov/catalog/item/54540d80e4b0dc779374504a . Data are aggregated to a CartoDB instance for use in the DRIP application - https://dwiefierich.cartodb.com/viz/182d408c-c06e-11e5-b917-0ecfd53eb7d3/public_map . The CartoDB API is used to drive the web app - www.sciencebase.gov/drip/ - and are available for other analysis and visualization	USGS partners with American Rivers to help in identifying additional dam removal projects for future analysis.	The first Dam Removal Science Database was published in 2015. The Dam Removal Information Portal and its current database were published in 2016. Work is ongoing to continuously feed new dam removal projects and literature syntheses into the operational system.	?
72	USGS	4, 3, 1	M	<i>Expertise in developing and implementing ecological monitoring programs</i>	USGS, Wetlands and Aquatic Research Center, Thomas Doyle (doylet@usgs.gov); Patuxent Wildlife Research Center (John French jbfrench@usgs.gov), Climate Center Gerard McMahon (gcmcmahon@usgs.gov); Patuxent Wildlife Research Center (John French jbfrench@usgs.gov)	Expertise in monitoring of coastal wetlands (e.g., habitat, water quality, subsidence, wildlife)	E.g., Coastwide Reference Monitoring System (CRMS) http://lacoast.gov/crms2/home.aspx ; https://www.pwrc.usgs.gov/populations/	To provide expertise on how to develop, implement and interpret a robust scientific monitoring project to inform DOI management and regulatory decisions	Coastal US	http://www.mbr-pwrc.usgs.gov/oftware.html	various	ongoing	

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73	USGS	4.1,2,3	M	Coastal Change Processes and Model Applications	USGS - CMG Program Haines John	1) improve the code of numerical sediment-transport models by implementing new or improved algorithms; 2) obtain measurements of coastal ocean processes to test and verify models; 3) develop new instruments or analysis techniques to make these measurements; and 4) develop software tools and standards to facilitate analysis, comparison, and visualization of observations and models.	(1) COAWST model forecasts (2) Combined Wave-Current Bottom Stress (3) Fetch- and Depth-Limited waves and Reverse Shoaling (4) Runup	marine.usgs.gov see Understanding Coastal Change http://woodshole.er.usgs.gov/project-pages/coastal_model/index.html	Atlantic Gulf of Mexico	COAWST http://woodshole.er.usgs.gov/project-pages/cccp/public/COAWST.htm Oceanographic Time Series http://stellwagen.er.usgs.gov/SeafloorStressandSedimentMobilityDatabase http://woodshole.er.usgs.gov/project-pages/mobility/	NPS NOAA	October 2006 - September 2017	
74	USGS	1, 4	M	Flood Inundation	Office of Surface Water (Lead Contact: Harry Jenter, hjenter@usgs.gov , 703-648-5916)	Flood Inundation surfaces are developed and tied to a local streamgage	A flood inundation map library is a set of maps that shows where flooding may occur over a range of water levels in the community's local stream or river.	Partner with local communities to assist with the development and validation of flood inundation map libraries and provide online access to flood inundation maps along with real-time streamflow data, flood forecasts, and potential loss estimates.	Throughout the US and territories, currently at 88 locations	http://wimcloud.usgs.gov/apps/FIM/FloodInundationMapper.html	Many partners, including Federal, State, Local and Tribal.	Initial efforts started around 2000, but the larger Flood Inundation coordination efforts began around 2009.	
75	USGS	2, 4	O	Surge, Wave and Tide Hydrodynamics (SWaTH) network	Office of Surface Water (Lead Contact: Harry Jenter, hjenter@usgs.gov , 703-648-5916)	coastal gages augmented by ~800 pre-surveyed deployment brackets in which recording pressure sensors can be deployed rapidly	SWaTH network will provide water height and wave height and frequency	During large events, the USGS collects additional data (high-water marks, additional sensor deployments) to aid in documenting high-water events.	Northeast coast of the US (NC to ME)	Data is available on the web from the USGS on the Flood Event Viewer web site at http://water.usgs.gov/floods/FEV/ . Each flooding/storm event has a Short Term Network where the data is stored and processed.	NOAA with typically their tide gages.	Ongoing effort in response to Hurricane Sandy.	
76	USGS	3, 4	O	Great Lakes Beach Health	Jim Morris, MIOH Water Science Center, jmorriss@usgs.com , 614-430-7702	The overall mission is to provide science-based information and methods that allow more accurate beach closure and advisory decisions, understand the sources and physical processes affecting beach contaminants, and understand how science-based information can be used to mitigate and restore beaches and protect the public.	Many products, including papers, USGS reports and websites such as: http://www.ohionowcast.info/index.asp ; Bibliography available through this website: http://greatlakesbeaches.usgs.gov/	The work consists of four science elements—real-time assessments; pathogens and microbial source tracking; coastal processes; and data analysis, interpretation, and communication	Great Lakes nearshore	Some data is available through: http://greatlakesbeaches.usgs.gov/data.html	US EPA and many state and local partners	Project has been ongoing, although in a low ebb of funding currently. Some small projects are ongoing.	
77	USGS	3, 4	O	Local and Regional Assessment of Water Quality	USGS National Water Quality Program (Contact: Steve Moulton, smoulto@usgs.gov , 703-648-6874; National Water Quality Assessment Project (Lead Contact: Gary Rowe, glrowe@usgs.gov , 303-236-1461).	Beach NOWCAST work	Web-based forecasts of recreational water quality at selected beaches based on climate, water-quality, and microbiological testing	Fulfills overall goal of the National Water Quality Program to assess water quality conditions, track conditions over time, and understand the factors influencing these conditions	Ohio	http://www.ohionowcast.info/	Multiple Federal, state, local	Ongoing	

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78	USGS	3, 4	O	National Fish Habitat Partnership Assessment	USGS, CSS, Core Science Analytics, Synthesis, and Libraries Program Daniel Wiefierich, dwiefierich@usgs.gov	The NFHP Assessment is conducted every 5 years and includes a specific coastal assessment component led by NOAA. The Assessment produces a measure of fish habitat degradation through a Habitat Condition Index at the catchment level of watersheds, identifying the most pervasive and most severe disturbance types from human activities.	In order to conduct the 5 year assessments, many datasets that quantify human activities causing fish habitat disturbance (e.g., point source pollutants, agricultural practices, etc.) are integrated and synthesized. USGS provides the hosting platform for the data and software behind the assessment, making the data and processing algorithms available for other users. The NFHP Data System and the interactive online report (starting with the 2015 report) are products produced and served by the USGS.	2010 "Through a Fish's Eye" report available through fishhabitat.org. NFHP Data System - http://ecosystems.usgs.gov/fishhabitat/ . 2015 NFHP Assessment report is an interactive online tool patterned on the 2014 National Climate Assessment. It is in final prep for delivery in April 2016.	U.S., including Alaska, Hawaii, and a special focus on Gulf of Mexico and all US coastlines.	NFHP data system (http://ecosystems.usgs.gov/fishhabitat/) powered by ScienceBase (https://www.sciencebase.gov/catalog/items?item=ax=20&folderId=-44e4773e4b07f02db47e241) - Data downloads and geospatial services.	Federal and state fish and wildlife agencies - http://fishhabitat.org/contacts-map	First assessment in 2010, second in 2015 and slated for every 5 years thereafter. Continuous integration of new datasets and processing methods in the NFHP Data System throughout.	
79	USGS	3, 4	T	Land Use and Land Cover Changes	USGS, Jonathan H. Smith	Aid states and communities to maintain ecosystem health in the Chesapeake Bay	Land Cover/use datasets, models and studies assessing their impacts on communities and ecosystems	http://www.usgs.gov/climate_landuse/lcs/projects/lucbay.asp	Chesapeake Bay Region	http://egsc.usgs.gov/CCCSum.html	NOAA, EPA, USFS, Maryland, Virginia, Pennsylvania	On-going	On going
80	USGS	3, 4	T	Improving Tools for Monitoring Multiple HAB Toxins and the Land-Sea Interface in Coastal California (HAB-SICC)	USGS, Keith Loftin, kloftin@usgs.gov	Measure freshwater and marine toxins at the land-sea interface of Coastal California, develop a culture library used for further testing and to evaluate passive samplers to measure time-integrated toxin loads.	Determine the predominance and extent of both marine and freshwater HAB species and toxins present at the land-sea interface, validate a passive toxin sampling tool and demonstrate how it can be incorporated into existing monitoring programs as a time-integrated, cost effective approach and facilitate the incorporation of an integrated HAB monitoring strategy at the land-sea interface into existing HAB and water quality monitoring programs.	Workplanning complete; USGS Environmental Health Mission Area Goal 1: Identify, prioritize, and detect contaminants and pathogens of emerging environmental concern and Goal 3: Reduce the impact of pathogens on the environment, fish and wildlife, domesticated animals, and people; links in progress	Coastal California	Currently being generated	Southern California Coastal Water Research Project (SCCWRP), Univ of Southern California, Univ of California Santa Cruz	2016-2020	?
81	USGS	3, 4	O	CyAN: Cyanobacteria Assessment Network	USGS, Keith Loftin, kloftin@usgs.gov; interagency effort between EPA (Blake Schaeffer), NASA (Jeremy Werdehl), NOAA (Rick Stumpf), and USGS (Keith Loftin)	Development of a nationally consistent remote sensing portfolio for detection of Harmful Algal Blooms (HABs) across the Lakes/Reservoirs of the United States	A national pilot demonstrating HAB detection from space using remote sensing validated/calibrated against field data. Data will be disseminated by webpage(s), mobile application (cell phone), and outreach to train states how to process and use data; Products will include models, mobile applications, website(s), and JAs.	Study design completed and collection and analysis underway; USGS Environmental Health Mission Area Goal 1: Identify, prioritize, and detect contaminants and pathogens of emerging environmental concern and Goal 3: Reduce the impact of pathogens on the environment, fish and wildlife, domesticated animals, and people; https://eos.org/project-updates/agencies-collaborate-develop-a-cyanobacteria-assessment-network	Continental U.S.	Currently being generated	U.S. Environmental Protection Agency National Aeronautics and Space Administration, National Oceanic and Atmospheric Administration, U.S. Fish and Wildlife, U.S. Army Corp of Engineers, Bureau of Reclamation, U.S. National Parks Service, States, Tribes	2015-2020	
82	USGS	3, 4	M	Petroleum assessments near shore	USGS, Tina Roberts-Ashby troberts-ashby@usgs.gov, Ofori Pearson opearson@usgs.gov, Kate Whidden kwhidden@usgs.gov	Derive petroleum system models for U.S. state waters and international waters beyond OCS	Assessed quantities of undiscovered, technically recoverable hydrocarbon accumulations	USGS conducts research on oil, gas, and alternative energy potential, production, consumption, and environmental effects.	Gulf Coast	energy.usgs.gov	BOEM	Ongoing more than a decade with many interim products. Concludes end of FY 2017	
83	USGS	3, 4	T	Decision Analysis	USGS, Wetlands and Aquatic Research Center, Thomas Doyle (doylet@usgs.gov); Patuxent Wildlife Research Center (John French jfrench@usgs.gov), Climate Center Gerard McMahon (gcmcmahon@usgs.gov)	Application of decision analysis to elicit stakeholder objectives, identify alternative actions, assist in decision trade-offs, and improve management outcomes	Neckles et al. Identification of Metrics to Monitor Salt Marsh Integrity on National Wildlife Refuges In Relation to Conservation and Management Objectives (https://www.pwrc.usgs.gov/moorevideo/index.cfm)	Adaptive management provides clear roles for management, research, monitoring, and stakeholder input, and it offers a natural framework for their integration	Coastal US		Various	ongoing	?
84	USGS	3, 4	O	The new Landsat 8 potential for remote sensing of Colored Dissolved Organic Matter (CDOM)	USGS, Terry Slonecker, tslonecker@usgs.gov				Coastal NJ and NY (with potential for expansion to nationwide)	Forthcoming JA	None	2013; JA available in 5/2016	
85	USGS	3, 4, 1	T	"Coastal Ecosystem Responses to Influences from Land and Sea"	USGS: Alaska Science Center (Mark Shasby shasby@usgs.gov); Western Ecological Research Center (Keith Miles (Keith_Miles@usgs.gov))	Multi-agency, multinational project led by USGS. Conducting research to inform management decisions regarding coastal water quality, stormwater pollution, fisheries, marine reserves, endangered species and climate change.	http://www.werc.usgs.gov/ProjectSubWebPage.aspx?SubWebPageID=11&ProjectID=221	Multiagency, multinational project led by USGS Conducting research to inform management decisions regarding coastal water quality, stormwater pollution, fisheries, marine reserves, endangered species and climate change.	Canada to southern CA		Monterey Bay Aquarium, UC Davis, UC Santa Cruz, U of Idaho, U of Wyoming, Seattle Aquarium, WA Dept of Fish & Wildlife		?

Research Infrastructure													
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86	USGS	3, 1, 4	O	<i>San Francisco Bay Delta Restoration</i>	USGS, Pacific Regional Office, Mike Chotkowski (mchotkowski@usgs.gov)	Development of unbiased scientific information and synthesis to improve the state of scientific knowledge on issues critical for managing the Bay-Delta system. The state water resources research institutes authorized by the Act are organized as the National Institutes for Water Resources (NIWR). NIWR cooperates with the USGS to support, coordinate and facilitate research through the Annual Base Grants, National Competitive Grants, Coordination Grants, and in operating the NIWR-USGS Student Internship Program.	http://deltacouncil.ca.gov/delta-plan-0	Reduce knowledge gaps, accelerate scientific discovery to inform management decisions, and build the science infrastructure and capacity to achieve the vision of One Delta, One Science	Central coastal California	http://deltacouncil.ca.gov/	Various		
87	USGS	1, 2, 3, 4	O	<i>USGS Water Resources Research Institutes</i>	Earl Greene; 443-498-5505; eagreene@usgs.gov	Restoration and protection of this resource is a priority for designated agencies, and NGO stakeholders through the Chesapeake Bay Program (CBP). President Obama issued an Executive order for increased Federal leadership to restore and protect the Bay and its watershed.	http://water.usgs.gov/wri/index.php	Plans, facilitates, and conducts research to aid in the resolution of State and regional water problems; Promotes technology transfer and the dissemination and application of research results; Provides for the training of scientists and engineers through their participation in research; and Provides for competitive grants to be awarded under the Water Resources Research Act.	Nationally Distributed in universities in each state		Academic Institutions	Ongoing since 1984	
88	USGS	3, 1, 2, 4	O	<i>Chesapeake Bay Restoration Program</i>	USGS Chesapeake Bay Coordinator, Scott Phillips (swphilli@usgs.gov)	Understanding Conservation Management Decisions in the Face of Sea-Level Rise Along the U.S. Atlantic Coast; Global change and conservation triage on National Wildlife Refuges	http://chesapeake.usgs.gov/projectsandcontacts.html	The strategy has four essential goals and associated outcomes: <ul style="list-style-type: none"> • restore clean water • recover habitat • sustain fish and wildlife • conserve land and increase public access 	Mid-Atlantic	http://chesapeake.usgs.gov/data.html	Multiple states, Chesapeake Executive Council, local governments		
89	USGS	3, 1, 2, 4	T	<i>Climate change adaptation for coastal National Wildlife Refuges</i>	USGS Southeast Climate Science Center, Gerard McMahon, (gmcMahon@usgs.gov)	To survey our nation's coastal regions to provide accurate, consistent, up-to-date national shoreline to promote safe navigation	https://www.doi.gov/csc/southeast	The Southeast CSC provides scientifically valid information and tools that can be used to adapt resource management to changing environmental conditions; and applies these tools to produce local and regional assessments that are widely used by policy makers, resource managers, and the public	Eastern US, Gulf Coast		North Carolina State University, DOI Landscape Conservation Cooperatives	ongoing	?
90	USGS	3, 1, 2, 4	M	<i>San Francisco Bay/Delta, Puget Sound, Gulf, Everglades, Chesapeake, New Jersey and Long Island, and Great Lakes</i>	Various points of contact for different locations, examples being Scott Phillips for Chesapeake Bay and Norm Grannemann for Great Lakes	To allow conversion of elevation and height data from various sources into a common reference system.	http://ca.water.usgs.gov/projects/baydelta/ ; http://puget.usgs.gov/ ; http://chesapeake.usgs.gov/ ; etc.	Programatic goals vary	Local Regional studies.		USEPA and others		
91	NOAA	4	O	<i>Coastal Mapping Program</i>	NOAA/NOS/NGS Mike Aslaksen@noaa.gov	The application and models to transform and fuse diverse elevation data benefiting coastal applications including inundation modeling (e.g., storm surge, tsunami, sea level rise impacts), ecosystem management and coastal planning, nautical charting products, and coastal intelligence, resilience and place-based conservation applications	Develop a survey project based spatial database of attributed shoreline vectors; metric-quality vertical aerial photographs; Topobathy lidar; Oblique Aerial Photographs	Most U.S. shoreline, with the exception of Alaska, has been mapped. However, roughly 40% of U.S. shoreline has not been mapped since 1960; NOAA's Mission: Science, Service and Stewardship; to advance the state of knowledge and develop engineering technology; http://www.ngs.noaa.gov/RSD/coastal/	Coastal US	http://www.ngs.noaa.gov/NSDE/	NOAA partners with federal, state, and local governments and non-governmental organizations to develop mapping standards and techniques, improve data management and access, and implement cooperative projects.	Ongoing	
92	NOAA	4	D	<i>Vertical Datum Transformation (Vdatum)</i>	NOAA/NOS/NGS Stephen.A.White@noaa.gov		The contiguous U.S. coastal regions, Alaska, Hawaii, and territories; NOAA's Mission: Science, Service and Stewardship; http://vdatum.noaa.gov/welcome.html ;		Contiguous Coastal US, Much of Alaska, Hawaii, and territories await for additional water level stations	http://vdatum.noaa.gov/	NOAA Center for Operational Oceanographic Products and Services, National Geodetic Survey, and Office of Coast Survey	Ongoing	

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93	NOAA	4	D	<i>Continually Updated Shoreline Product</i>	NOAA/NOS/NGS Mike.Aslaksen@noaa.gov	To deliver continuous shoreline with frequent updates to support various GIS applications including coastal and marine spatial planning, tsunami and storm surge modeling, hazard delineation and mitigation, environmental studies and may assist in nautical chart updates.	Develop a spatial database of the most up-to-date attributed shoreline vectors	49% of Coastal US; NOAA's Mission: Science, Service and Stewardship; http://shoreline.noaa.gov/data/datasheets/cusp.html	Coastal US	http://www.ngs.noaa.gov/NSDE/	Shoreline providers who wish to contribute their data to CUSP are encouraged to contact us.	Ongoing	

Long-term Coastal Evolution										
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1	Biogeomorphology	Collaborative Research: The Role of Ecomorphodynamic Feedbacks in the Role of Ecomorphodynamic Feedbacks in Barrier Island Response to Climate Change	UNC Chapel Hill, PI Laura Moore, laura.moore@unc.edu; Funded by GLD at NSF	Address questions including: How does vegetation affect the formation and evolution of barrier island topography? How do overwash events affect topographic recovery and colonization of vegetation following storms? How does climate change affect the development of topography via ecomorphodynamic feedbacks?	Improved understanding of dune formation; ability to simulate coastal dune formation; coastal dune model (Duran and Moore, 2013; Duran Vincent and Moore, 2015);	Publications and presentations including: *Goldstein, E.B. and Moore, L.J., 2015, Stability, bistability, and periodic behavior in a one-dimensional model of coastal foredune height. JGR-Earth Surface. *Rogers, L., Moore, L.J., *Goldstein, E.B., Hein, C., Lorenzo-Trueba, J., and Ashton, A., 2015. Anthropogenic controls on overwash deposition: Evidence and consequences. Journal of Geophysical Research-Earth Surface. *Durán Vincent, O. and Moore, L.J., 2016. Reply to Comment on Bistability of barrier islands induced by biophysical interactions. Nature Climate Change, v. 6, p. 6. * Durán Vincent, O. and Moore, L.J., 2015. Bistability of barrier islands induced by biophysical interactions. Nature Climate Change, v. 5, pp. 158-162. DOI:10.1038/nclimate2474. * Durán Vincent, O. and Moore, L.J., 2013. Vegetation controls on the maximum size of coastal dunes. Proceedings of the National Academy of Sciences, v. 110, n.43, pp. 17217-17222. DOI:10.1073/pnas.1307580110.	vegetation field experiment is being conducted in the VCR-LTER; guidance for model parameterizations of dune grass growth; model experiments developed to apply broadly	Duran and Moore (2013) model available on CSDMS web site (http://csdms.colorado.edu/wiki/Model:Coastal_Dune_Model); field experiment data to be available on the VCR-LTER data repository within 2 years of project completion.	UNC Chapel Hill and Virginia Commonwealth University (Don Young); funding from the Geomorphology and Landuse Program at NSF	August 2013 - August 2017
2	Biogeomorphology	Investigating the effects of climate change on dune building mechanisms	NSF GRFP award; Elsemarie deVries, under direction of Laura Moore (POC, laura.moore@unc.edu)	(1) the relative vulnerability of different islands to storms (2) how plant location relative to the shoreline and the (fresh) groundwater table influences vegetation growth, and therefore dune growth (3) how the species composition of dune-building vegetation influences dune shape	Anticipated to be three journal articles which will constitute a PhD thesis. Data distributed to open source sites, posters presented at national conferences such as AGU	Not yet available	Barrier Islands along the U.S. Atlantic Coast	data and analysis code will be available VCR-LTER website, FigShare, and GitHub	UNC-Chapel Hill	May 2016-May 2019
3	Biogeomorphology	Evaluating the relationship between beach morphodynamics and critical sea turtle nesting habitat in South Florida: Determining the potential implications of storm activity and sea-level rise	Florida Atlantic University, Tiffany Roberts Briggs, Ph.D.	1) Examining risks of SLR on the terrestrial phase of the sea turtle life cycle (i.e., nest inundation). 2) evaluating correlation between beach morphodynamics (e.g., storms, seasonal cycles) and critical nesting habitat, and 3) evaluating the correlation between SLR, beach morphology, and ecological risks to sea turtle nests.	Data: Time-series topographic surveys, beach flooding data, nesting patterns, embryonic development assessments; JA		Boca Raton, FL	FAU (Geosciences & Biology)	FAU, City of Boca Raton, Gumbo Limbo Nature Center	2016 Sea turtle nesting season (Mar-Oct)
4	Biogeomorphology	Coastal dune dynamics	Thomas Miller, Dept. of Biological Science, Florida State University	Understand dynamics of coastal dune vegetation	long-term dataset on vegetation	long-term data set on vegetation, see http://bio.fsu.edu/~7emiller/HOMEPAGE/newgeorge.html	St. George Island, FL	http://bio.fsu.edu/~7emiller/HOMEPAGE/newgeorge.html	none	1989, products available now
5	Biogeomorphology	Wind Tunnel Analysis of Vegetation Species Differences in Sand Capture Efficiency for Natural & Nature-Based Dune Accretion & Management	University of Pennsylvania & USACE, PI Brenda Casper bcasper@sas.upenn.edu, POC Bianca Charbonneau bcharbon@sas.upenn.edu	Test how plant morphology and configuration feeds back on dune morphology and growth rate with mid-Atlantic dune stabilizing species.	We are building a field-comparable moveable bed wind tunnel to test our questions. The wind tunnel can be used for other projects and is being built in ways to maximize its use for this in the future. Wind tunnel should be able to hit wind speeds of 0 to 12 m/s, will be 2m high, and 9m long.	The space (OCVTS Waretown Building) and funding (USACE ERDC contract) have been secured and we are currently working to order all necessary parts for construction in the third or 4th week of August 2016. You can email Bcharbon@sas.upenn.edu for updates or go on thedunegoon.com/weebly.	mid-Atlantic plants being tested, but can use species from other geographic ranges.	At this time, data are private as they are part of the ongoing dissertation of Bianca Charbonneau.	University of Pennsylvania, USACE, Island Beach State Park, Marine Academy of Technology and Environmental Science (MATES), NJ Ocean County Vocational Technical School (OCVTS), Air Systems Engineering Inc., Save Barnegat Bay, Clean Ocean Action, Coastal Transplants, Pinelands Nursery, The American Littoral Society, Phoebe Zarnetske - Michigan State University	Work for the wind tunnel began in May 2016 and testing of research questions will be carried out in September 2016 and 2017. The wind tunnel will be fully functional by September 2016 and will exist in perpetuity of this research to be used as a learning tool by MATES high school and for outside research.
6	Ecosystem services	Living Shorelines: A synthesis of coastal restoration projects	Dauphin Island Sea Lab; Dr. Just Cebrian (DISL) jcebrian@disl.org 251.861.2141 x7568	A comprehensive synthesis of a variety of living shoreline projects varying in aim and scope in order to summarize findings and lessons learned.	Publication to supplement existing research. Create a management decision-making tool	Sampling is completed. Data is in review for publication and release	Bayou la Batre, AL; Alabama Port, AL; Coffee Island, AL	Housed at DISL, contact PI for access	ADCNR SLD, TNC	Nov 2008 - TBD
7	Ecosystem services	NFWF Building Ecological Solutions to Coastal communities	DOI NFWF, Elizabeth Semple (NJDEP), Elizabeth.sempel@dep.nj.gov	Design, Construction and Monitoring of Living Shoreline projects in NJ	Assessment of ecosystem based infrastructure through the siting, design, construction and monitoring of 11 living shoreline projects for future green infrastructure adoption	Assess the ability of green infrastructure to protect critical habitat and people in a cost-effective manner through monitoring of multiple projects	NJ		NJDEP, Stevens, NJ Sea Grant, Sustainable New Jersey, National Wildlife Federation, US Army Corps of Engineers	3/2015 to 3/2017
8	Human/physical coupling	Building a Coastal Resilience Tool for the Eastern Shore of Virginia: Barrier Island and Inlet Evolution	UNC Chapel Hill, PI Laura Moore, laura.moore@unc.edu; Funded by NFWF Hurricane Sandy Resilience Fund, The Nature Conservancy	to assess the effect of climate change and management actions on the future evolution of a coastline in the presence of multiple stakeholders each having different and contrasting management goals	Development of a coupled coastline evolution model (Aston and Murray, 2001) and barrier island model (McNamara and Werner, 2008) for assessing coastal evolution. Apply the new coupled model to assess the effect of different climate change and management scenarios on coastline evolution	final report, model results to be served via The Nature Conservancy's Coastal Resilience Tool; masters thesis and manuscript (Jones et al.) to be submitted summer 2016; model to be contributed to CSDMS; model output to be served on the TNC coastal resilience tool	study site = Assateague Island, MD to Fisherman's Point, VA; many results and implications apply to barrier island coastlines more broadly	data and models not yet available; contact Laura Moore at laura.moore@unc.edu; See TNC Coastal Resilience Tool for results in Fall 2016; coupled model to be shared via CSDMS	UNC Chapel Hill; UNC Wilmington, Duke University, Randolph Macon College, The Nature Conservancy; Funding from NFWF Hurricane Sandy Resilience Fund and TNC	August 2014 - December 2016
9	Human/physical coupling	Long-term coastal evolution due to natural and anthropogenic processes	NSF supported; Brad Murray POC	Coastline shapes are influenced by the wave climate (angular distribution of influences on alongshore sediment flux). As storm statistics and consequently wave climates shift (either decadal shifts or warming related) coastline shapes tend to adjust, which involves intensification of erosion (or accretion) in some areas.	papers, e.g.: Moore, L. J., McNamara, D. E., Brenner, O., and Murray, A.B., 2013. Observed changes in hurricane-driven waves explain the dynamics of modern cusped shorelines. Geophys. Research Lett., 40, 5867-5871, doi:10.1002/2013GL057311; Barkwith, A., C. W. Thomas, P. W. Limber, M. A. Ellis, and A. B. Murray, 2014, Assessing the vulnerability of a pinned, soft-cliff coastline - Part I: Assessing the natural sensitivity to wave climate. Earth Surface Dynamics (ESurf), 2, 295 - 308. doi:10.5194/esurf-2-295-2014.		case studies: Carolina Capes, US; Holderness coast, UK		Duke Univ. (Brad Murray); UNC-CH (Laura Moore); UNC-W (Dylan McNamara, Kenay Ellis); U FL (Pete Adams); USGS (Pat Limber); WHOI (Andrew Ashton); British Geological Survey (Mike Ellis, Andy Barkwith, Martin Hurst, Chris Thomas)	

Long-term Coastal Evolution										
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10	Human/physical coupling	Long-term coastal evolution due to natural and anthropogenic processes	NSF supported; Brad Murray POC	Humans stabilize shorelines in response to coastline change (related to SLR, and to changing wave climates through gradients in net alongshore sediment flux). Conversely, even local shoreline stabilization can affect coastline change regionally. Thus the need for shoreling stabilization results as much from economic decisions made in other locations as they do from physical forcing. On a developed coastline, human dynamics and coastline evolution cannot be studied independently.	Papers, e.g.: Smith, M. D., Murray, A. B., Gopalakrishnan, S., Keeler, A. G., Landry, C. E., McNamara, D., and Moore, L. J., 2015, Chapter 7 – Geoengineering Coastlines? From Accidental to Intentional, in Coastal Zones, Solutions for the 21st Century, Elsevier, doi: 10.1016/B978-0-12-802748-6.00007-3; Williams, Z. C., McNamara, D. E., Smith, M. D., Murray, A. B., and Gopalakrishnan, S., 2013, Coupled Economic-Coastline Modeling with Suckers and Free Riders, J. Geophysical Research, 118, 887-899, DOI: 10.1002/jgrf.20066.; Murray, A.B., S. Gopalakrishnan, D. E. McNamara, and M. D. Smith, 2013, Progress in Coupling Models of Human and Coastal Landscape Change, Computers and Geosciences, 53, 30-38, 10.1016/j.cogeo.2011.10.010; McNamara, D., Murray, A. B., and Smith, M.D., 2011, Coastal sustainability depends on how economic and coastline responses to climate change affect each other, Geophysical Research Letters, 38, L074, doi: 10.1029/2011GL047207.; Gopalakrishnan, S., Smith, M., Slott, J and Murray, A.B., 2010, The Value of Disappearing Beaches in North Carolina: A hedonic pricing model with endogenous beach width, Journal of Environmental Economics and Management, 61, 297-310, doi:10.1016/j.jeem.2010.09.003.; Slott, J.M., Smith, M.D., and Murray, A.B., 2008, Synergies Between Adjacent Beach-Nourishing Communities in a Morpho-economic Coupled Coastline Model, Journal of Coastal Management, 36,374 - 391.	case study; developed coastlines in the SE US			Duke Univ. (Brad Murray, Marty Smith); UNC-CH (Laura Moore); UNC-W (Dylan Menamara, Kenny Ellis); The Ohio State U (Sathya Gopalakrishnan); WHOI (Andrew Ashton); U. Southampton (Eli Lazarus); UNC-Institute of Marine Science (Andy Keeler); U GA (Craig Landry)	
11	Human/physical coupling	RADE: A Risk Analytics Discovery Environment	UNC Research Opportunities Initiative NCSU PI: Casey Dietrich jcdietrich@ncsu.edu	Coastal property values are sensitive to many factors, including environmental stressors related to changing regional climate and changing sea levels. Predictions of property value changes are essential for coastal planning and development, and form a central part of understanding our state's exposure to long-term coastal hazards, particularly the co-occurrence of tropical cyclones and rising sea levels. Essentially, can we predict long-term changes in coastal property values and quantify associated uncertainty? What are the impacts of various levels of sea level increase on present and future coastal property values?	This use case will develop a predictor of coastal property values in RADE, and then use that predictor to examine changes under future scenarios of climate and sea level changes.	Work is ongoing	North Carolina	Data will be available upon publication	RENCI, UNC Charlotte	01 Jul 2015 through 30 Jun 2017
12	Human/physical coupling	Disaster Resilience	PI: Bret Webb, University of South Alabama, bwebb@southalabama.edu; NIST (through Colorado State)	Develop disaster and risk model for built infrastructure exposed to natural hazards	A fully integrated model that describes damage and recovery of built infrastructure to natural hazards	Improve community resilience to natural hazards	Nationwide	Contact lead agency (Colorado State University)	Colorado State, Oregon State, Texas A&M, UIUC, Rice University, U. Oklahoma, etc.	Began 2015, white papers available
13	Human/physical coupling	National Coastal Resilience Network	ASBPA, Nicole Elko, nicole.elko@asbpa.org	Development of a new community resilience index integrating several federal agency's coastal processes research and data collection efforts	a GIS-based tool to analyze coastal system resilience by linking federal databases through empirical and analytical relationships, numerical models, and management/policy scenarios.	Interagency collaboration toward improved resilience: http://asbpa.org/get-involved/science-technology/	Nationwide	USGS Coastal Hazards Portal to provide data	USGS CMGP, USACE ERDC	2016-2018
14	Human/physical coupling	Changes in actual and perceived coastal flood risks due to river management strategies	NCSU Beth Sciaudone, Margery Overton; NSF - Coastal SEES - Robert Twilley	Exploring the co-evolution of deltaic landscapes and human responses	Significant field data, numerical models, predicted maps of deltaic plain	Modeling and understanding variation between watersheds of MRDP and the subsequent effects on humans	Mississippi River Delta Plain	Data will be available upon publication	LSU, IU, UCF,	September 1, 2014 - August 31, 2018
15	Human/physical coupling	Disaster Resilience	PI: Bret Webb, University of South Alabama, bwebb@southalabama.edu, NIST (through Colorado State)	Develop disaster and risk model for built infrastructure exposed to natural hazards	A fully integrated model that describes damage and recovery of built infrastructure to natural hazards	Improve community resilience to natural hazards	Nationwide	Contact lead agency (Colorado State University)	Colorado State, Oregon State, Texas A&M, UIUC, Rice University, U. Oklahoma, etc.	Began 2015, white papers available
16	Lg-scale processes	Drifter Study of Circulation near Indian River Inlet, DE	DNREC, Jack Puleo, University of Delaware, jpuleo@udel.edu	use drifters and numerical models to determine circulation patterns downdrift of an inlet	improved estimates of sediment transport pathways		DE			2014-2017
17	Lg-scale processes	LTER: Drivers, dynamics and consequences of non-linear change in coastal barrier systems	Lead PI of VCR-LTER Program, Karen McGlathery (UVA:kjm4k@eservices.virginia.edu); multiple PIs across multiple institutions; POC is Laura Moore (UNC CH: laura.moore@unc.edu) for nearshore related work on coastal barrier evolution (laura.moore@unc.edu)	NCSSC personnel, which will integrate an emerging understanding of biophysical	Nearshore related: improved understanding of barrier island response to changing climate; coupled barrier island-marsh model; coastal dune formation model	Publications and presentations including: *Walters, D., Moore, L.J., *Duran, O., Fagherazzi, S., and Mariotti, G. 2014. Interactions between barrier islands and backbarrier marshes affect island system response to sea level rise: Insights from a coupled model. Journal of Geophysical Research—Earth Surface, v. 119, pp. 2013-2031, DOI: 10.1002/2014JF003091 *Brenner, O.T., Moore, L.J. and Murray, A.B., 2015. The complex influences of backbarrier deposition, substrate slope and underlying stratigraphy in barrier island response to sea level rise: Insights from the Virginia Barrier Islands, Mid-Atlantic Bight, U.S.A. Geomorphology, v. 246, n. 1, pp. 334-350, DOI:10.1016/j.geomorph.2015.06.014. Durán Vinent, O. and Moore, L.J., 2016. Reply to Comment on Bistability of barrier islands induced by biophysical interactions. Nature Climate Change, v. 6, p. 6. * Durán Vinent, O. and Moore, L.J., 2015. Bistability of barrier islands induced by biophysical interactions. Nature Climate Change, v. 5, pp. 158-162, DOI:10.1038/nclimate2474. * Durán Vinent, O. and Moore, L.J., 2013. Vegetation controls on the maximum size of coastal dunes. Proceedings of the National Academy of Sciences, v. 110, n.43, pp. 17217-17222, DOI:10.1073/pnas.1307580110.	VCR-LTER: many results apply to low-lying barrier coastlines generally	GEOMBEST+ barrier-marsh model available on CSDMS (http://csdms.colorado.edu/wiki/Model:GEOMBEST); coastal dune model available on CSDMS (http://csdms.colorado.edu/wiki/Model:Coastal_Dune_Model); data available at LTER data repository	UVA, UNC-CH, VIMS, Boston University, (Duke U. involved in marsh-barrier couplings)	November 2012- November 2018
18	Lg-scale processes	Mixed energy inlet sediment transport bypass processes	NSF/University of Florida, Maitane Olabarrieta, maitane.olabarrieta@essie.ufl.edu	Analyze and update sediment transport and bypassing processes in mixed-energy inlets	Measurements of the bathymetry of the inlet for 4 years, hydrodynamic measurements, COAWST model development, INWAVE development	The project started few months ago so we still do not have outcomes	Matanzas Inlet, Florida	Data will be collected during the project	Dr. John Warner, Prof. Arnoldo Valle Levinson, Dr. Xavier Bertin, Dr. Giovanni Cocco, Dr. Nelson Melo	Begin: 03/01/2016, End:03/01/2021
19	Lg-scale processes	Geotechnical investigation of Cannon Beach and Yakutat Bay with regard to sediment transport and potential wave energy harvesting	Nina Stark, Virginia Tech, ninas@vt.edu	1) geotechnical site characterization; 2) correlation to sediment transport processes; 3) correlation to recent mass sediment deposits from earthquake triggered landslides and the surrounding glaciers	1) data sets from three field surveys; 2) publications (Stark et al. 2015; Albalat et al. in prep)	1) 3 field surveys; 2) publication of preliminary data in the framework of conferences	Yakutat, Alaska	contact PI soon available on VT's data repository	1) Chris Zobel (VT); 2) Ali Albalat (PhD student VT); 3) City& Borough of Yakutat; 4) Resolute Marine Energy	1) Project start July 2014; 2) More publications and upload of data to repository is planned for end of 2016

Long-term Coastal Evolution											
#	Subtheme	Research Title	Agency/Org & POC	Description	Product	Programmatic goals	Location	Data	Partners	Start and end dates	
20	Lg-scale processes	US-GERMANY workshop and joined field survey in the Arctic: Initiating a new collaboration with the COPER group (Alfred-Wegener-Institute) through a joined field survey (NSF IIA-142661)	Nina Stark, Virginia Tech, ninas@vt.edu	1) geotechnical characterization of nearshore sediments around Herschel Island, Yukon; 2) correlation to sediment distribution; 3) identification of sediment erosion areas, sediment deposits and transport paths; 4) geotechnical characterization of most recent sediment deposits in the nearshore zone	1) Stark et al. (2015a), Coastal Sediments'15; 2) Stark et al. (2015b), OMAE'15; 3) Stark et al. (2016), abstract & poster Ocean Sciences Meeting; 4) Stark et al. (submitted); 5) Radosavljevic et al. (in prep); 5) data set from field survey	1) one field survey; 2) 3 conference presentations including two papers;	Herschel Island, Yukon, Canada	contact PI; soon available on pangaea.de	1) Hugues Lamuit (AWI); 2) Boris Radosavljevic (AWI); Gavin Manson (BIO)	1) Project start July 2014; 2) More publications and upload of data to repository is anticipated end of 2016;	
21	Lg-scale processes	Circulation ... at the MRC	Rob Holman, OSU	study tidal circulation in the MCR using Argus wave-averaged movies	discovery and input info to improve models	pretty poorly understood region	MCR, large energetic estuary.	Argus data archives on public FTP	Haller at OSU.	ongoing since 2012, grant ends 12/31/16, but data collection will be ongoing	
22	Lg-scale processes	Pamlico Sound Marine Geology/Hydrodynamics	NSF, Marine Geology and Geophysics, David Mattinson (East Carolina University) and Ryan Mulligan, Dept. Civil Engineering, Queen's University, Kingston ON, Canada, mulligar@queensu.ca	Marine geology and coastal hydrodynamics of Pamlico Sound, NC, over the long-term (Future of Nearshore Processes Research Focus Area 1)	Journal publications, graduate student theses, trained students	several journal papers, student theses and trained students	North Carolina	East Carolina University and Queen's University, contact the Pis	multiple Pis at 2 universities	2012, will be complete in late 2016	
23	Lg-scale processes	Monitoring the Coastal Processes near Little Lagoon Pass	Alabama Department of Transportation (funding agency) Pt. Bret Webb, University of South Alabama, bwbb@southalabama.edu	Evaluate impacts of stabilized tidal inlet on coastal processes in Gulf Shores, AL	A 2D coupled hydrodynamic model of tides, waves, sediment transport, and morphology has been developed. A sediment budget is in development. Analysis of groundwater impacts is ongoing.	A 2D model has been developed, three years of survey data have been collected.	Gulf Shores, Alabama	Contact PI	N/A	Began 2013, some data available now	
24	Lg-scale processes	Modeling Shoreline Evolution	NSF & NOAA SeaGrant:Elgar&Raubenheimer	models and theories for morphological change during extreme events and over decadal time scales	PhD, JA	model running, data obtained, paper published	Martha's Vineyard, MA	not yet, WWW in future		2014-2018	
25	Monitoring	New Hampshire Volunteer Beach Profile Monitoring Program	New Hampshire Sea Grant; Alyson Eberhardt, Coastal Ecosystems Specialist; alyson.eberhardt@unh.edu	To quantify changes in beach contours over time to provide increased understanding of responses to storms as well as seasonal and long-term trends of erosion and accretion.	Results will provide municipal and state decision-makers with important information on coastal processes for guiding beach management. In addition, beach profiles will provide critical data to inform storm surge forecasting models currently in development by the National Weather Service.	Project is scheduled to begin July 1, 2016. Limited work in support of project has been done to date.	New Hampshire's Atlantic beaches	Project scheduled to begin July 1, 2016. Beach profile data is expected to reside with New Hampshire Geological Survey with link to data from NH Sea Grant web site.	New Hampshire Coastal Program is providing funding. Partners include NH Sea Grant, University of New Hampshire Center for Coastal and Ocean Mapping, and New Hampshire Geological Survey. Future collaboration with National Weather Service is anticipated.	Project is scheduled to begin July 1, 2016. Anticipate that it will take a year to establish beach monitoring sites, develop beach profiling methodology, develop plan to recruit and train volunteers, conduct meetings and outreach, and train volunteers. Data products not likely available until Fall of 2017 at earliest.	
26	Monitoring	Monitoring changes on ocean and bay shoreline/nearshore and tidal inlets	Stockton University Coastal Research Center, Stewart C. Farrell, Executive Director, 30 Wilson Ave., Port Republic, NJ 08240 (stewart.farrell@stockton.edu) or Kimberly McKenna Director of Sponsored Programs (kimberly.mckenna@stockton.edu)	Monitoring changes on ocean and bay shoreline/nearshore and tidal inlets	Determine seasonal and long term trends in shoreline position and beach/dune/nearshore volume change and determine shoreline stability and borrow zone monitoring within tidal inlets.	Reports and peer-reviewed papers are available at http://intraweb.stockton.edu/eoyos/page.cfm?siteID=149&pageID=125	coastal New Jersey-Raritan Bay, Atlantic Ocean, Delaware Bay	data available upon request through the New Jersey Department of Environmental Protection	project funded by the New Jersey Department of Environmental Protection, Bureau of Coastal Engineering	NJ Beach Profile Network monitoring began in 1986 and continues biannually. Annual reports are posted on the CRC website each spring.	
27	Monitoring	Monitoring of Beach Restoration via Coupled Unmanned Aerial System and Topographic Surveys	Florida Atlantic University, Tiffany Roberts Briggs, Ph.D.	Geomorphic evolution of beach nourishment (and response/recovery to subsequent storms), utilizing both traditional land-surveying and remote sensing by an Unmanned Aerial System	Data: Time-series topographic surveys, Digital Terrain Models, Digital Surface Models; JA		Boca Raton, FL	FAU (Geosciences)	FAU, City of Boca Raton	This project initiated in March of 2016 with an expected one-year duration (2016-17)	
28	Monitoring	Project Title: New Hampshire Volunteer Beach Profile Monitoring Program	Center for Coastal and Ocean Mapping University of New Hampshire Larry Ward Chase Ocean Engineering Lab 24 Colovos Road, Durham, NH 03824 larry.ward@unh.edu	Develop a volunteer beach profiling program for selected beaches in New Hampshire. This is the first year of a longer program. This years goals include developing the profiling network and creating the infrastructure.	A long term database of beach change based on volunteers efforts, along with academic, state, ad local interactions and support.	In development	New Hampshire Coast	In development	New Hampshire Geological Survey and New Hampshire Coastal Program (NHCP). NHCP is the funding agency.	Start Date: July 2016 End Date: June 2017	
29	Relative SLR	multi-hazard vulnerability assessment of coastal development	Michael Flynn Coastal Resources Management, PhD Student East Carolina University flynm113@students.ecu.edu 609-462-4739	To develop a multi-hazard vulnerability assessment of coastal development from the following hazards: coastal erosion, storm surge, and sea level rise.	GIS-based desktop assessment tool that will provide planners and decisions makers with the ability to prioritize mitigation actions at the building footprint level.	GIS-based mapping of historical coastal erosion, SLOSH output and SLR scenarios. Report is currently being developed and data layers are being prepared for display on www.NCCoastalAtlas.org	Cape Hatteras National Seashore, NC	https://coast.noaa.gov/digitalcoast/ and http://deq.nc.gov/about/divisions/coastalmanagement/coastal-management-data and http://www.nbe.noaa.gov/surge/slosh.php	National Park Service	June 2014 - June 2017	
30	Relative SLR	Earthcasting deltaic land area change in the Mississippi River Deltaic Plain	NCED2 - Postdoctoral Synthesis Program - Doug Edmonds, edmondsd@indiana.u. 812.855.4512	Understanding how much deltaic land area within Miss. River Delta Plain is constructed for given sediment supply and relative SLR	Numerical modeling and better understanding of delta response to SLR	Creating a dynamic vegetation model in Delta3D	Mississippi River Delta Plain	Data will be available through CSDMS upon publication of results	NCED, LSU, IU	January 1, 2016 - Dec. 31, 2016	
31	Relative SLR	Testing the mass-balance model for deltaic land loss under rising relative sea-level	NSF - GLD (proposed agency) - Doug Edmonds, IU	Identifying deltas globally and quantifying landloss with quantifying coastal retreat and topset fragmentation of deltas	Global delta database, dataset of deltaic land change over the last 30 years, theory for predicting where landloss is occurring on deltas	Are deltas primarily losing land at the coastline edge or within the delta topset	Global	Data will be available upon publication	IU, NCSU	Proposed start date May 1, 2017	
32	Relative SLR	Coastal Adaptation Impacts on Jamaica Bay Water Quality, Waves and Flooding	Principal Investigator (PI): Philip Orton, Stevens Institute of Technology (Stevens), Hoboken, NJ Email: philip.orton@stevens.edu, Phone: 201-216-80 Funded by the Department of Interior and National Parks Service	This project aims to improve mathematical modeling capabilities for Jamaica Bay, the largest natural open space left in New York City, in order to better quantify the impacts of coastal adaptation on flooding, waves, and water quality. We use the Stevens Estuarine and Coastal Ocean Model (sECOM) coupled with a water quality model to run experiments to study climate change, sea level rise, and coastal adaptation impacts on flooding, water quality, and residence time. We also use sECOM coupled with a spectral wave model to quantify the contribution of waves, especially wave setup, on coastal flooding.	A revised high-resolution version of the Jamaica Eutrophication Model calibrated and validated against hydrodynamic and water quality data sets. Jamaica Bay Science and Resilience Institute consortium access to utilize all the models and their calibrated Jamaica Bay settings at CUNY's HPPCC, with model user guides. Reports detailing the calibration/validation of the hydrodynamic/water quality models in Jamaica Bay, as well as the results from the model experiments performed as part of this study. Submission of a peer-reviewed publication comparing green and grey coastal flood adaptation impacts on waves, flooding and water quality. An online mapping tool that demonstrates how coastal flood zones and waves will change with sea level rise and each coastal adaptation scenario.	We have developed and implemented a 3D vegetation model within the hydrodynamic, turbulence closure, and wave models of sECOM to consider the effect of vegetation on currents, turbulence quantities, and wave energy. We have utilized our models to quantify the influence of wetlands on circulation, residence time, storm surge, and waves in estuaries and coastal waters including Jamaica Bay. The vegetation-wave-hydrodynamic model and its water quality model of Jamaica Bay have been calibrated and validated using data collected by the Jamaica Bay Science and Resilience Institute consortium, NOAA, and USGS in Jamaica Bay as well as coastal waters in New York Harbor.	New Jersey New York	National Park Service, and Jamaica Bay Science and Resilience Institute Consortium.	Co-PI: Nickitas Georgas, Stevens, Nickitas.Georgas@stevens.edu Co-PI: Alan Blumberg, Stevens, Alan.Blumberg@stevens.edu Co-PI: James Fitzpatrick, HDR, Inc. Collaborator: Paul Muzio, CUNY/CSI High Performance Computing Center Collaborators: (no funding): John McLaughlin, New York City Department of Environmental Protection (NYC-DEP); Christopher Schubert, USGS; On separate linked proposal - Brett Branco, Brooklyn College.	November 2014 - November 2016	

Long-term Coastal Evolution

#	Subtheme	Research Title	Agency/Org & POC	Description	Product	Programatic goals	Location	Data	Partners	Start and end dates
33	Relative SLR	Understanding the evolution of coastal landforms using geophysical methods: implications for past and present sea level rise in South Florida	Florida Atlantic University, Tiffany Roberts Briggs, Ph.D.	Inference of potential regions of higher SLR vulnerability and coastal flooding based on ground penetrating radar (GPR) profiles to determine subsurface architecture of coastal environments in south Florida	Data: GPR, granulometric analyses, topographic survey; JA		South Florida (Miami-Dade County)	FAU (Geosciences)	FAU	Project will commence in Summer 2016
34	Relative SLR	Potential for persistence: Marsh and mangroves under simulated rapid sea level rise	Dauphin Island Sea Lab; Dr. Just Cebrian (DISL) jcebrian@disl.org 251.861.2141 x7568	Simulate sea level rise conditions in order to document effects on marsh vegetation and black mangroves	Publication to supplement existing research	Sampling is currently ongoing	Port Fourchon, LA	Housed at DISL, contact PI for access		Dec 2015 - May 2018
35	Sand resources	Multi-year assessment of sand sources used in beach nourishment project in Palm Beach County, FL	Florida Atlantic University, Tiffany Roberts Briggs, Ph.D.	Multi-year assessment of sand sources used in beach and dune restoration and the correlation between sediment characteristics, sand temperature and sea turtle nesting	Data: Granulometric analyses of project sediments, temperature/moisture data, sea turtle nesting patterns; JA		Palm Beach County, FL	Palm Beach County Department of Environmental Resources Management (PBC ERM)	FAU, PBC ERM	Initial study conducted by PBC ERM (2015); Second year-assessment (2016) is an ongoing collaboration between FAU and PBC ERM
36	Sand resources	Beach Nourishment Design Practice in Delaware: Modifications to Beach and Surf Zone Characteristics	DNREC, Jack Puleo, University of Delaware, jpuleo@udel.edu+D2	determine variability in beach slope, grains size and wave characteristics associated with beach nourishment activity along the DE coast	Recommendations for future beach nourishment activities		DE			2014-2016
37	Sand resources	Project Title: Assessment of Offshore Sources of Sand and Gravel for Beach Nourishment in New Hampshire	Center for Coastal and Ocean Mapping University of New Hampshire Larry Ward Chase Ocean Engineering Lab 24 Colovos Road, Durham, NH 03824 larry.ward@unh.edu	Synthesize the understanding of potential sand and gravel deposits on the New Hampshire and vicinity continental shelf based on previous geological and seismic studies. Develop seafloor surficial geology maps of the study area. Describe the geotechnical characteristics of the New Hampshire beaches. Assess the long-term stability of New Hampshire coast based on historical charts and images and more recent lidar surveys.	Development of geodatabases of existing continental shelf geologic and geophysical research, beach sediment geotechnical characteristics, and shoreline stability. Syntheses of existing sand resources research. Identification of need for future studies.	Products are in development or review. Web assessable geodatabases and reports, BOEM Technical Reports, and publications.	New Hampshire and vicinity continental shelf and coast.	In development. The databases and reports will be web served.	BOEM and the New Hampshire Geological Survey BOEM is funding agency.	Start Date: July 2014 End Date: September 2018 Products available periodically
38	Sand resources		Florida Geological Survey (FGS) and Florida Fish and Wildlife Commission Fisheries Independent Monitoring Program (FWC-FIM) FWC. The FGS point of contact is Daniel C. Phelps, dan.phelps@dep.state.fl.us	The research objective is to image selected portions of the seafloor in the Gulf of Mexico for multiple purposes.	Outcomes vary, for the Florida Geological Survey it will be the geological mapping of the seafloor. For FWC-FIM it will be the management of various species. For the FGS the anticipated capability will be to tie geological mapping of the seafloor with mapping on land, for FWC-FIM it will be better management of species of concern. The forms have not been set.	The collection of approximately one terabyte of side scan sonar (SSS) data to date. In addition, a substantive amount of video and still photography has been collected. The mission objective for the FGS is the geological mapping of the seafloor, for the FWC-FIM it is the management of various species. No direct links are currently available.	Gulf of Mexico offshore of Florida	The SSS data is available from the FGS. Contact FWC_FIM St. Petersburg Florida for access to the full data volume.	FGS, FWC-FIM	Data collection has been ongoing for roughly the past five years. Data collection is anticipated to continue for the next few years. No date has been set for when product will be available.
39	Sand resources	Atlantic Sand Assessment Project (ASAP)	Delaware Geologic Survey, PI: Kelvin Ramsey, kwr@udel.edu	Sand resource delineation and shallow stratigraphic framework	Technical report, Geologic map including resource areas, volume estimates, and textural analyses. Submission of journal article.	Synthesis of vibrocore data offshore Delaware to generate DGS' preliminary geologic map. 2015_ASAP midatlantic vibrocores in house for added value analyses. Awaiting geophysical data for processing/interpretation.	3-8nm offshore Delmarva from Cape May, NJ to Cape Charles, VA.	Project deliverables have not been published, but data, analyses, and products will be available upon request as projects progress.	Bureau of Ocean Energy Management (BOEM) Marine Minerals Program (MMP), United States Geological Survey (USGS), New Jersey Geological and Water Survey (NJGWS), Maryland Geological Survey (MGS), and Virginia Department of Mining, Minerals, and Energy (VADMME).	The DGS Cooperative agreement with BOEM began 06/2014 and has been extended through 06/2019.

Extreme Events										
#	Subtopic Area	Research Title	Agency/Org & POC	Description	Product	Programatic goals	Location	Data	Partners	Start and end dates
1	Biogeomorphodynamics	Study of Wetland Erosion Due to Storms through Combined Field, Laboratory, and Numerical Investigations	Dr. Rusty A. Feagin, Texas A&M AgriLife Research, feaginr@tamu.edu	(1) Identify wave height, wave power, and velocity thresholds for wetland edge erosion; (2) identify relationship of wetland edge erosion to grain size; (3) identify wetland potential for wave and surge damping	Numerical model of marsh erosion as function of wind waves, other basic science	1 manuscript sent for review; creation of outreach materials and interactive experiment at K-5 schools	Texas	feaginr@tamu.edu	Texas A&M Sea Grant funded Investigators are Rusty Feagin, Kuang-An Chang, James Kalluto	02/01/2016 – 01/31/2018
2	Biogeomorphodynamics	Can Vegetation Reduce Sand Dune Erosion in the Gulf of Mexico? A Bi-national Research Experiment and Student Exchange	Dr. Rusty A. Feagin, Texas A&M AgriLife Research, feaginr@tamu.edu	(1) Identify aboveground vs. belowground effects of dune plants on wave erosion; (2) Produce catalog of dune plant biophysical parameters, for wave attenuation	Quantitative knowledge of aboveground versus belowground effects of vegetation on sand dune erosion, Catalog of dune plant biophysical parameters, other basic science	2 manuscripts sent for review to journals; 3 presentations at conferences	Mexico, Texas	feaginr@tamu.edu	CONCACyT (Consejo Nacional de Ciencia y Tecnología, Mexico) funded (Investigators are Rusty Feagin, Marisa Martinez, Rodolfo Silva)	08/01/14 to 12/31/16
3	Biogeomorphodynamics	Coastal Dynamics: Wave erosion of dunes	Dr. Rusty A. Feagin, Texas A&M AgriLife Research, feaginr@tamu.edu	(1) Produce catalog of dune plant biophysical parameters, for wave attenuation,	Quantitative knowledge of aboveground versus belowground effects of vegetation on sand dune erosion, other basic science	2 manuscripts sent for review to journals; 3 presentations at conferences	Mexico, Texas	feaginr@tamu.edu	State of Yucatan, Mexico funded (Investigators are Rusty Feagin, Marisa Martinez, Kuang-An Chang, James Kalluto)	01/01/15 to 08/31/16
4	Biogeomorphodynamics	Evaluating the relationship between beach morphodynamics and critical sea turtle nesting habitat in South Florida: Determining the potential implications of storm activity and sea-level rise	Florida Atlantic University, Tiffany Roberts Briggs, Ph.D.	1) Examining risks of SLR on the terrestrial phase of the sea turtle life cycle (i.e., nest inundation), 2) evaluating correlation between beach morphodynamics (e.g., storms, seasonal cycles) and critical nesting habitat, and 3) evaluating the correlation between SLR, beach morphology, and ecological risks to sea turtle nests.	Data: Time-series topographic surveys, beach flooding data, nesting pattern embryonic development assessments; JA		Boca Raton, FL	FAU (Geosciences & Biology)	FAU, City of Boca Raton, Gumbo Limbo Nature Center	2016 Sea turtle nesting season (Mar-Oct)
5	Erosion/recovery	Quantification of Hydrodynamic Forcing and Burial, Exposure and Mobility of Munitions on the Beach Face	SERDP, Jack Puleo, University of Delaware, jpuleo@udel.edu	Determine scenarios that lead to munitions burial, transport or re-exposure on the beach face	Determine the important hydrodynamic parameters that govern munitions transport		DE, MD, NJ		USGS	Sept, 2015
6	Erosion/recovery	Collaborative Research: Ridge-Runnel, Post-Storm Beach Recovery	NSF, Jack Puleo, University of Delaware, jpuleo@udel.edu	Investigate hydrodynamics and foreshore processes during post-storm recovery	improved understanding of the processes driving beach recovery		DE	UD data server		2014-2017
7	Erosion/recovery	(EESLR 2015) The Coastal Recovery from Storms Tool (CREST): A Model for Assessing the Impact of Sea Level Rise on Natural and Managed Beaches and Dunes	Oregon State University and UNC Chapel Hill; PI Peter Ruggiero (pruggier@coas.oregonstate.edu), Co PI Sally Hacker (OSU), Co-PI Laura Moore (UNC-CH; laura.moore@unc.edu) Funded by NOAA ESRLR	Objectives include: 1. Develop the Coastal Recovery from Storms Tool (CREST), in consultation with NCSSC personnel, which will integrate an emerging understanding of biophysical processes by explicitly coupling SLR, sediment transport processes, and the dynamics of dune-building beach grasses to assess the time and space scales of beach and dune evolution in both natural and managed systems. 2. Apply CREST to Cape Lookout National Seashore (CREST-CALO) to estimate recovery and vulnerability to future storm events under a variety of SLR, storm change, and management scenarios. 3. Apply CREST to Bogue Banks (CREST-BB), in particular examining the impact of extensive beach nourishment programs on dune recovery following storms as well as under various SLR, storm change, and management scenarios.	a coupled dune and nearshore evolution model that simulates the full cycle of dune formation and erosion (coupling of XBeach and the Coastal Dune Model of Duran and Moore, 2013); parameterized versions of the coupled model for Bogue Banks, NC and for Core Banks, NC	Products to come: Final report, masters theses, Ph.D. dissertation chapter, manuscripts	NOAA Sentinel Site, North Carolina Coast; North and South Core Banks, Shackleford Banks, Bogue Banks; insights to apply more broadly	OSU and UNC-CH; (with participation by Delft University and UNESCO-IHE, Dano Roelvink, Sierd deVries and others on model coupling efforts); NOAA and other stakeholders, Funding from NOAA ESRLR Program	August 2015-August 2018	
8	Hydrodynamics	South Atlantic Bight Tide-Surge interactions	NSF/University of Florida, Prof. Arnoldo Valle-Levinson, maitane.olabarrieta@essie.ufl.edu	Characterize tide-surge interactions in the South Atlantic Bight during extreme storms	Increase understanding of the processes driving tide/surge interactions and implications for the total water level predictions.	The project has generated one journal publication in Estuarine and Continental Shelf Research	South Atlantic Bight	We used data from tidal gauge measurements from NOAA	Dr. Maitane Olabarrieta	Begin: 08/15/2013, End: 07/31/2016
9	Hydrodynamics	Rip Currents	NSF: Elgar (selgar@whoi.edu) and Moulton (mmoulton@apl.uw.edu)	Improving understanding of dynamics of rip currents generated by local bathymetry using observations and numerical models of field observations	journal articles on dynamical study of local-bathy controlled rip currents	improved understanding	Duck, NC	Will be available via email	Collaboration with Kumar (Scripps), Warner (USGS). Also collaborating with Dusek (NOAA) on related work.	2016-2019
10	Hydrodynamics	Runups of unusual size	Rob Holman, OSU	measure and understand extreme runup	hazard prediction tools	issue for many including NWS?	anywhere but field sites are Agate Beach Oregon and Duck, NC	argus data archives on public FTP	Ozkan-Haller and Ruggiero	-07/01/15-06/30/18
11	Hydrodynamics	Interactions between Waves, Flooding and Beach Morphology during Storm Events	NC Sea Grant NCSU PI Casey Dietrich jcdietrich@ncsu.edu	Our goal is to improve simulations of coastal flooding in regions where the beach morphology is highly dynamic during a storm event. The feedback between waves, surge and morphology must be better linked, specifically through the extension and coupling of state-of-the-art numerical models. Although most morphology models are limited in their geographic extents, we will extend and apply a process-driven model to represent erosion and breaching at larger scales. And, although most wave, surge and morphology models are coupled with one-way communication, we will develop an automated system to map information in both ways.	This research will produce modeling technologies that will benefit coastal communities within North Carolina, and we will share these technologies and findings with stakeholders.	Work is ongoing	North Carolina	Data will be available upon publication	NC Emergency Management	01 Feb 2016 through 31 Jan 2018
12	Hydrodynamics	National Security Science & Engineering Faculty Fellowship	ASD(R&E):Elgar	surfzone hydrodynamics, field observations, modeling	p-doc,PhDs,JA	improved understanding	Duck, NC and others	none yet		2016-2021
13	Hydrodynamics	Analysis and modeling of inlet observations	ONR: Elgar&Raubenheimer	graduate student support, determine importance of tides, winds, waves, bed stress, geometry in and near inlets	PhDs, JA	theses in progress, paper published	WHOI-MIT Joint program	WWW		2016
14	Hydrodynamics	Alongshore Advection Acceleration in the Surf Zone	NSF: Raubenheimer&Elgar	models and theories for surfzone hydrodynamics and mixing	p-doc, JA	field data obtained, model built, paper published	Duck, NC	not yet, WWW in future		2013-2017
15	Hydrodynamics	Groundwater from Sound to Sea	Raubenheimer&Elgar	determine groundwater processes across a barrier island	PhDs,JA	field data being collected; improved understanding	Duck, NC	in progress		2014-ongoing
16	Paleo storms	Understanding linkage between hydrodynamics and geologic processes in the nearshore	NSERC - Natural Sciences and Engineering Research Council of Canada, Ryan Mulligan, Dept. Civil Engineering, Queen's University, Kingston ON, Canada, rmulliga@queensu.ca	Coastal engineering and nearshore oceanography - understanding linkage between hydrodynamics and geologic processes in the nearshore (Future of Nearshore Processes Research Focus Area 2)	Journal publications, graduate student theses, trained students	several journal papers, student theses and trained students	North Carolina, New York, Ontario	Queen's University, contact the PI	sole PI	2012, ongoing
17	Paleo storms	Reconstruction of paleo-storm history using geochemical proxies in coastal lake sediments	Funded by National Science Foundation, Principal Investigators Yang Wang (Florida State Univ.) and Joseph Donoghue (Univ. Central Florida)	The project goal is to investigate extreme events in the geologic record of coastal sediments over the past several millennia. A long-term climate record will be developed, along with new methods of detecting major storms in the sedimentary record.	Technical reports, professional journal articles	Several coastal lakes have been sampled. Sediments are in the process of analysis for sedimentologic, geochemical and geochronologic parameters.	Atlantic and Gulf coasts of Florida	Project data will be published as technical papers in professional journals and will be available from principal investigators	Florida State University, University of Central Florida, Merritt Island National Wildlife Refuge, Florida Department of Environmental Protection (FDEP)	Project dates: 4/1/16 - 3/31/19

Extreme Events

#	Subtopic Area	Research Title	Agency/Org & POC	Description	Product	Programatic goals	Location	Data	Partners	Start and end dates
18	Small-scale processes	Collaborative Research: Large-scale Laboratory Investigation and Numerical Modeling of Sheet Flow Sediment Transport Dynamics across a Surf Zone Sand Bar	NSF, Dan Cox, Oregon State University, dan.cox@oregonstate.edu	investigate sheet flow and suspended sediment transport processes across a sand bar	improved numerical models of turbulence induced sediment events in the surf zone		DE, OR	UD data server		2014-2017
19	Small-scale processes	Turbulent Sediment Suspension Absent Mean Flow-Induced Shear	NSF/CBET/Fluid Mechanics/EA Cowen eac20@cornell.edu	understand the physical process of sediment suspension purely by turbulence	Data sets, analytic models for turbulent stress and that can be incorporated into computational models	Characterized turbulence absent mean flows at boundaries absent sediment and with sediment for a range of turbulence conditions - currently significantly expanding that range. We have also developed improved turbulence generation capability absent mean flows.	Cornell University	Currently on external hard drives - contact Cowen.	Blair Johnson (PhD student - finishing summer 2016), Prof. James T Jenkins (Cornell)	Began 8/15/12. Some data available already - all should be available by fall 2016
20	Small-scale processes	A 3D Coupled Euler-Lagrangian Numerical Modeling Framework for Poly-dispersed Sediment Transport Simulations	ONR/Hsu Tian-Jian, Civil & Env Eng, University of Delaware	Develop a multi-dimensional Eulerian Two-Phase Model for various sediment transport applications. Develop and validate a finite-volume Euler-Lagrangian solver, CFEDM, for sediment transport applications, including transport with wide grain size distribution and non-spherical grains.	An open source numerical model for sediment transport based on Eulerian and Euler-Lagrangian framework will be developed. Model will be used to study wave-induced transport, armoring/winningoing and grain shape effects.	Eulerian model is completed and used to study momentary bed failure in sheet flow. Model is distributed as open source code via Community Surface Dynamics Modeling System model repository	Delaware	https://cdms.colorado.edu/wiki/ModelTwoPhaseEulerSedFoam	Joseph Calantoni, Naval Research Laboratory; Julien Chauchat, LEGI-ING (France)	June 2014-May 2016
21	Storm-induced morphodynamic change	Storm morphodynamic changes to mixed energy inlets	USGS/University of Florida, Maitane Olabarrieta, maitane.olabarrieta@essie.ufl.edu	Test and improve the modelling of morphodynamic changes due to storms of mixed-energy inlets	COAWST and INWAVE devopment for the modelling of the morphodynamics of inlets	As a first step we have analyzed if the long term morphodynamic model's results (applied to idealized estuaries) agree well with empirical relations of the ebb tidal delta volume, inlets sectional area,...	Matanzas Inlet Florida	Data will be collected during the project	Dr. John Warner	Begin: 07/15/2015, End-07/15/2017
22	Storm-induced morphodynamic change	NH Flooding/Erosion Forecasts	Tom Lippmann, UNH	1. improve coastal inundation and flooding forecasts; 2. provide institutional analysis of living shoreline approaches within NH tidal waters	improve flooding forecast capabilities in NH; improve understanding of present approaches to coastal erosion efforts in NH	Just starting. See http://fvcom.smast.umassd.edu ; and https://seagrant.unh.edu/news/managing-nh-shoreline	New Hampshire	N/A	NOAA, NERACOOS, NH DES	Summer 2016 start. Ends in 2018.
23	Storm-induced morphodynamic change	Interactions between Waves, Flooding and Beach Morphology during Storm Events	NC Sea Grant NCSU PI Casey Dietrich jcdietrich@ncsu.edu	Our goal is to improve simulations of coastal flooding in regions where the beach morphology is highly dynamic during a storm event. The feedback between waves, surge and morphology must be better linked, specifically through the extension and coupling of state-of-the-art numerical models. Although most morphology models are limited in their geographic extents, we will extend and apply a process-driven model to represent erosion and breaching at larger scales. And, although most wave, surge and morphology models are coupled with one-way communication, we will develop an automated system to map information in both ways.	This research will produce modeling technologies that will benefit coastal communities within North Carolina, and we will share these technologies and findings with stakeholders.	Work is ongoing	North Carolina	Data will be available upon publication	NC Emergency Management	01 Feb 2016 through 31 Jan 2018

Human and Ecosystem Health										
#	Subtopic Area	Research Title	Agency/Org & POC	Description	Product	Programatic goals	Location	Data	Partners	Start and end dates
1	Beach safety	Surf Zone Injuries and Beach Safety Along The Delaware Coast	Delaware Sea Grant, Jack Puleo, University of Delaware, jpuleo@udel.edu	quantify the environmental factors that affect beach injury	relate injuries to environmental and human through statistical inference		DE		DNREC, Beebe HealthCare, NWS	Feb. 2016
2	Chemical pollutants	Carbon and Nitrogen pathway shifts with encroachment of Avicennia germinans into Spartina alterniflora marsh	Dauphin Island Sea Lab; Dr. Just Cebrian (DISL) jcebrian@disl.org 251.861.2141 x7568	Evaluate the effects of vegetative community shifts in marshes on carbon storage and nutrient uptake	Publication to supplement existing research, Create decision making tool for managers	Sampling is currently ongoing	Port Fourchon, LA	Housed at DISL, contact PI for access		Mar 2016 - May 2018
3	Chemical pollutants	Gulf of Mexico Research Initiative: Wetlands Group; Ken Heck (DISL), kheck@disl.org	Gulf of Mexico Research Initiative: Wetlands Group; Ken Heck (DISL), kheck@disl.org	Evaluate the long-term effects of the Deepwater Horizon oil spill on marsh and nearshore habitat	Publication to supplement existing research, Collect data for modeling applications	Sampling is currently ongoing	Chandeleur Islands, LA	Housed at DISL, contact PI for access	ACER	Jun 2015 - TBD
4	Chemical pollutants	USC Microbial Observatory, also Dimensions in Biodiversity	Jed Fuhrman USC is lead PI. Project funded by NSF Dimensions in Biodiversity, fuhrman@usc.edu	human impacts of Los Angeles Harbor on marine food webs in comparison to more pristine sites offshore and by Catalina Island	Mostly microbial ecology data on differences in biomass and community composition, different rates of productivity, specific processes like PAH degradation or harmful algal blooms	Numerous papers. See NSF reports and lab websites https://domsife.usc.edu/labs/usc-microbial-observatory/ http://domsife.usc.edu/labs/fuhrmanlab/	Los angeles to Catalina Island	Own website https://domsife.usc.edu/spat/ BCO DMO website http://www.bco-dmo.org/dataset/537137	USC Labs; Fuhrman, Caron, Heidelberg, Sun, Wrigley Institute	ongoing time series since 2000
5	Marsh/wetland health	Black mangrove expansion into the Gulf Island National Seashore: Will climate change result in significant ecosystem level changes?	Dauphin Island Sea Lab; Dr. Just Cebrian (DISL) jcebrian@disl.org 251.861.2141 x7568	To document the effects of black mangrove encroachment on marsh and nearshore habitat.	Publication to supplement existing research	All data collection and analysis complete.	Horn Island, MS	Housed at DISL, contact PI for access	US Fish and Wildlife	Apr 2013 - Sept 2014
6	Marsh/wetland health	Mangrove Migration Network	Dauphin Island Sea Lab; Dr. Just Cebrian (DISL) jcebrian@disl.org 251.861.2141 x7568	Supplement current data set tracking the expansion of black mangroves in the northern Gulf of Mexico and their effect on vegetation composition and soil characteristics	Publication to supplement existing research, Collect data for modeling applications	Sampling is currently ongoing	Chandeleur Islands, LA; Cat Island, MS	Housed at DISL, contact PI for access		Oct 2014 - TBD
7	Marsh/wetland health	Reducing runoff pollution in coastal waters through marsh restoration: a decision support tool for stakeholders	Dauphin Island Sea Lab; Dr. Just Cebrian (DISL) jcebrian@disl.org 251.861.2141 x7568	Restroe and monitor approximately 100m of shoreline in Weeks Bay. Evaluate design and results to add to larger collaborative effort	Publication to supplement existing research, Create a management decision-making tool	Project in is implementation stage with sampling to begin thereafter	Weeks Bay, AL	Housed at DISL, contact PI for access	EPA Wetlands, Weeks Bay NERR	Mar 2016 - TBD
8	Marsh/wetland health	Ecosystem model for Laguna Madre	School of Earth, Environmental and Marine Sciences, Univ Texas Rio Grande Valley, John Breier	Ecosystem model for Laguna Madre	Calibrated model	just starting	south Texas	NA	NA	Aug 2016-Dec 2017
9	Planning	Bayou la Batre Watershed Management Plan	Dauphin Island Sea Lab; Dr. Just Cebrian (DISL) jcebrian@disl.org 251.861.2141 x7568	Compile a comprehensive report of the Bayou la Batre watershed and discuss future management plans and implications	Publication to supplement existing research, Create a management decision-making tool	Sampling is currently ongoing	Bayou la Batre, AL	Housed at DISL, contact PI for access	MBNEP, Dewberry	Sept 2015 - Aug 2016
10	Planning	Fowl River Watershed Management Plan	Dauphin Island Sea Lab; Dr. Just Cebrian (DISL) jcebrian@disl.org 251.861.2141 x7568	Compile a comprehensive report of the Fowl River Watershed and discuss future management plans and implications	Publication to supplement existing research, Create a management decision-making tool	Sampling is completed. Data is in review for publication and release	Mobile County, AL	Housed at DISL, contact PI for access	MBNEP, GMC	Sept 2014 - July 2015
11	Planning	Changes in actual and perceived coastal flood risks due to river management strategies	NCSU Beth Scaudone, Margery Overton; NSF - Coastal SEES - Robert Twilley	Exploring the co-evolution of detair landscapes and human responses	Significant field data, numerical models, predicted maps of detairic plain	Modeling and understanding variation between watersheds of MRDP and the subsequent effects on humans	Mississippi River Delta Plain	Data will be available upon publication	LSU, IU, UCF,	September 1, 2014 - August 31, 2018
12	Planning	Coastal management plan	School of Earth, Environmental and Marine Sciences, Univ Texas Rio Grande Valley, Hudson DeYoe	Coastal management plan	Implement management plan	just starting	south Texas	NA	Texas A&M Univ- Kingsville, Texas Parks & Wildlife, Texas Commission for Environmental Quality, U.S. Fish & Wildlife Service	42614
13	Water quality	Assessing a gradient of anthropogenic impact in five shallow embayments in the northern Gulf of Mexico	Dauphin Island Sea Lab; Dr. Just Cebrian (DISL) jcebrian@disl.org 251.861.2141 x7568	Document fluxuations in health and resilience of coastal embayments across a gradient of anthropogenic impact and spatial variability	Publication to supplement existing research, Collect data for modeling applications	Sampling is currently ongoing. Data to date has been published in peer-reviewed journals	Port St Joe, FL; Perdido Key, FL; Bayou la Batre, AL	Housed at DISL, contact PI for access	NOAA CDDC	Jan 2001 - TBD
14	Water quality	A survey of marine debris in the northern Gulf of Mexico	Dauphin Island Sea Lab; Dr. Just Cebrian (DISL) jcebrian@disl.org 251.861.2141 x7568	To assist in the initial survey of marine debris and microplastics found in the northern Gulf of Mexico, describe temporal and spatial variability, and observe effects on coastal systems.	Publication to supplement existing research, Create a baseline for the northern Gulf of Mexico, Collect data for modeling applications	Sampling is currently ongoing	Pensacola, FL; Dauphin Island, AL; Petit Bois Island, MS; Horn Island, MS; Cat Island, MS; Chandeleur Island, LA	Housed at DISL, contact PI for access	NOAA Marine Debris Program	Apr 2015 - TBD
15	Water quality	Environmental DNA (eDNA) in National Marine Sanctuaries as part of the Marine Biodiversity Observation Network (MBON)	Monterey Bay Aquarium Research Institute (MBARI), Stanford University, University of South Florida, Fish and Wildlife Research Institute, Frank Muller-Kargel - carib@usf.edu, Francisco Chavez - chfr@mbari.org, Ali Boehm - aboehm@stanford.edu, Mya Breitbart - mya@usf.edu, Kate Hubbard, Katherine.Hubbard@MyFWC.com	Detect biodiversity associated with nearshore National Marine Sanctuaries from IL of seawater.	Improvement of molecular detection and potential, less invasive management tool.	http://www.marinebon.org	Monterey Bay, Florida Keys, Floral Garden Banks	http://www.ioos.us	Federal: NOAA, NASA, BOEM	December 2014 - 2019
16	Water quality	South Shore Estuary Reserve (SSER) Coordinated Water Resources Monitoring Strategy (CWRMS)	New York Department of State, Office of Planning and Development, Nancy Rucks, nancy.rucks@dos.ny.gov; U.S. Geological Survey, New York Water Science Center, Shawn Fisher, sfisher@usgs.gov	In cooperation with the U.S. Geological Survey (USGS), compilation of relevant resources information related to water monitoring and ecological assessments in the bays, tributaries, and groundwater of the SSER watershed will be done to generate a strategy document and project website and mapper.	Document providing stakeholder input on data collection efforts, data gaps, and recommendations for future monitoring to address current and future water-quality concerns of the SSER.	Created project website (sserwaterquality.us); drafting CWRMS document	South Shore Estuary Reserve (Nassau and Suffolk Counties, New York)	Datasets reside with organizations/agencies that collect the data--mapper points user to link for download or contact info for data request.	USGS	Project began October 1, 2014; Online mapping, ongoing; CWRMS document by September 30, 2016
17	Water quality		NSF-OCE-OTIC; Brian Glazer, glazer@hawaii.edu	develop a robust, novel, inexpensive, and open-source instrument sensor system and data workflow to enable an understanding of the processes affecting water quality and biogeochemistry in coastal environments.	This research will build upon a new but proven technology that uses open source hardware components and custom software scripts that can be assembled, tested, deployed, and maintained by high school and undergraduate students, environmental management organizations, or the technologically-savvy citizen scientist, engaging their interest in STEM fields.	http://www.soest.hawaii.edu/oceanography/glazer/Brian_T_Glazer/research/DataLoggers/PolH/Heeia/DataHome	Oahu, Hawaii	http://www.soest.hawaii.edu/oceanography/glazer/Brian_T_Glazer/research/DataLoggers/PolH/dbDownload		2015 - 2017
18	Water quality	Coastal Adaptation Impacts on Jamaica Bay Water Quality, Waves and Flooding	Principal Investigator (PI): Philip Orton, Stevens Institute of Technology (Stevens), Hoboken, NJ Email: philip.orton@stevens.edu, Phone: 201-216-80 Funded by the Department of Interior and National Parks Service	This project aims to improve mathematical modeling capabilities for Jamaica Bay, the largest natural open space left in New York City, in order to better quantify the impacts of coastal adaptation on flooding, waves, and water quality. We use the Stevens Estuarine and Coastal Ocean Model (sECOM) coupled with a water quality model to run experiments to study climate change, sea level rise, and coastal adaptation impacts on flooding, water quality, and residence time. We also use sECOM coupled with a spectral wave model to quantify the contribution of waves, especially wave setup, on coastal flooding.	A revised high-resolution version of the Jamaica Eutrophication Model calibrated and validated against hydrodynamic and water quality data sets. Jamaica Bay Science and Resilience Institute consortium access to utilize all the models and their calibrated Jamaica Bay settings at CUNY's IPCC, with model user guides. Reports detailing the calibration/validation of the hydrodynamic/water quality models in Jamaica Bay, as well as the results from the model experiments performed as part of this study. Submission of a peer-reviewed publication comparing green and grey coastal flood adaptation impacts on waves, flooding and water quality. An online mapping tool that demonstrates how coastal flood zones and waves will change with sea level rise and each coastal adaptation scenario.	We have developed and implemented a 3D vegetation model within the hydrodynamic, turbulence closure, and wave models of sECOM to consider the effect of vegetation on currents, turbulence quantities, and wave energy. We have utilized our models to quantify the influence of wetlands on circulation, residence time, storm surge, and waves in estuaries and coastal waters including Jamaica Bay. The vegetation-wave-hydrodynamic model and its water quality model of Jamaica Bay have been calibrated and validated using data collected by the Jamaica Bay Science and Resilience Institute consortium, NOAA, and USGS in Jamaica Bay as well as coastal waters in New York Harbor.	New Jersey New York	National Park Service, and Jamaica Bay Science and Resilience Institute Consortium.	Co-PI: Nickitas Georgas, Stevens, Nickitas.Georgas@stevens.edu Co-PI: Alan Blumberg, Stevens, Alan.Blumberg@stevens.edu Co-PI: James Fitzpatrick, HDR, Inc. Collaborator: Paul Muzio, CUNY/CSI High Performance Computing Center Collaborators: (no funding): John McLaughlin, New York City Department of Environmental Protection (NYC-DEP); Christopher Schubert, USGS; On separate linked proposal - Brett Branco, Brooklyn College.	November 2014 - November 2016

Human and Ecosystem Health

#	Subtopic Area	Research Title	Agency/Org & POC	Description	Product	Programatic goals	Location	Data	Partners	Start and end dates
19	Biogeochemistry	Sand biogeochemistry program at CCU	Dr. Angelos Hannides, Dept of Marine Science, Coastal Carolina University, ahannides@coastal.edu	We study nearshore sandy habitats from estuaries and dunes to the shallow ocean. We focus on organic matter production/decomposition and nutrient regeneration/uptake in this highly permeable, highly dynamic habitat that provides a still-underappreciated ecosystem service to estuaries, beaches, coral reefs and the inner shelf.	Scientific presentations and publications	More information will soon be available online at: http://ww2.coastal.edu/ahannides/research.html	Coral reef environments (Hawaii), Atlantic land-ocean margin (South Atlantic Bight)	By contacting the PI, or through published articles	Academic partners at Coastal Carolina University and other institutions	carbonate sands from coral reef settings (Hawaii) is ongoing. South Atlantic Bight work begins August 2016;

Research Infrastructure										
#	Subtopic Area	Research Title	Agency/Org & POC	Description	Product	Programmatic goals	Location	Data	Partners	Start and end dates
1	Data collection	North Head Argus station	Rob Holman, OSU	install and operate an Argus station in the north head lighthouse, looking at the coast immediately north of the MCR north jetty	extended data set on coastal behavior in the pacific NW adjacent to a major jetted estuary	better understanding for better management	SW Washington coast	Argus data archives on public FTP	Portland district USACE	04/11/16 to indefinite?
2	Data collection	BathyDuck: Altimeter measurements	USACE:Raubenheimer&Elgar	field data with FRF/USACE colleagues	data, analysis	improved bathymetric estimates, nearshore models	Duck, NC	FRF has the data		2015-2016
3	Instrumentation	Development of an active layer seafloor sampler as an add-on unit for portable free-fall penetrometers (NSF OCE-1434938)	Nina Stark, Virginia Tech, ninas@vt.edu	development of an active layer seafloor sampler as an add-on unit for portable free-fall penetrometers	1) fully operational active layer seafloor sampler as add-on unit for portable free-fall penetrometer; 2) publications	1) three different prototypes have been designed and manufactured; 2) first controlled tests started;	Virginia	contact PI will be uploaded to VT data repository	1) Cagdas Bilici (VT PhD student)	1) Project start: January 2015
4	Model development	NJ Transit Coastal Storm Surge Emergency Warning System	NJ Transit, Alan Blumberg, Alan.Blumberg@stevens.edu	Operational Dynamic Overland Inundation Forecast Model	72 hour flood alerting at 2 NJT critical transit facilities at a resolution of 3m horizontal. Real-time water level data at each facility location	Protect life, property and infrastructure through advanced warning and pre-event mitigation	Hoboken, NJ and Kearny, NJ	Real-time water level data available at: http://hudson.dl.stevens-tech.edu/SFAS/	NA	5/2016 to 4/2018
5	Model development	Development of High-resolution Storm Surge Forecasts for Port Authority of NYNJ Facilities Vulnerable to Flood Waters	Port Authority of NYNJ, Alan Blumberg, Alan.Blumberg@stevens.edu	Operational Dynamic Overland Inundation Forecast Model	72 hour flood alerting at critical PA facilities at a resolution of 3m horizontal. Real-time water level data at each facility location	Protect life, property and infrastructure through advanced warning and pre-event mitigation	NY Harbor	Real-time water level data available at: http://hudson.dl.stevens-tech.edu/SFAS/	NA	8/2014 to 6/2019
6	Tool development	NJ Resilient Coastal Communities Initiative	NOAA, Patty Doerr (TNC), pdoerr@TNC.ORG	Development of a web-based Coastal Restoration tool for coastal communities and organizations	Georeferenced site analysis based on global shoreline change, wind, tide, wave, wakes, subsurface geology data for use in the identification of appropriate shoreline restoration options	Improve resilience of coastal habitats and surrounding coastal communities to coastal hazards and sea level rise through providing resources to practitioners, officials, and community leaders to implement coastal restoration/enhancement projects	NJ	Restoration Explorer Web-based tool is available at: http://maps.coastalresilience.org/newjersey/	The Nature Conservancy, Partnership for the Delaware Estuary, Ny/NJ Bay Keeper, Stevens, Barnegat Bay Partnership, American Littoral Society, Rutgers, NJDEP, NOAA	7/2004 to 5/2016
7	Tool development	New Jersey Coastal Protection Technical Assistance Service (CPTAS)	NJ Department of Environmental Protection, Tom Herrington, Thomas.Herrington@stevens.edu	Applied Coastal Research in support of State and Federal Shore Protection Projects	Short and Long-term field data, long-term shoreline monitoring, storm impact analysis, physical modeling, technical and design reports, Journal Articles	Provide, upon request, information and advice to counties and municipalities on coastal protection methods in order to assist coastal counties and municipalities in making decisions and undertaking projects to protect, preserve, restore, enhance, and create beaches, dunes, and other coastal area resources and in constructing and maintaining coastal protection structures and devices such as jetties, bulkheads, sea walls, groins, piers, and boardwalks.	State of NJ	Reports and data are publically available through CPTAS	NA	Founded in 1993. Research results and data are available continuously
8	Tool development	ROSSI	Florida Department of Environmental Protection	To maintain a working database of beach compatible sand resources offshore of the State of Florida.	Identification of sand resources available. Inventory known borrow areas and provide a geologic description of each borrow area. Serve as a research tool in the planning phase of sand searches.	Reconnaissance level data and potential borrow areas have been identified offshore of the Gulf and Atlantic shorelines of Florida; Plans and Specs level data is available where applicable; Data is available for download; ROSSI will continue to be enhanced and updated as data becomes available and funding allows; http://rossi.urs-uly.com/	Offshore State of Florida	Via the ROSSI website (FTP site, reports/ data download pages, and MapServer)	This has been and will be an FDEP funded website. Currently we have funding from BOEM for work centered on the Atlantic Coast. We receive data from the project sponsors including local governments and the USACE. They, however, do not provide funding for ROSSI.	Project began in 2001 and is publicly available; updated as funding allows
9	Tool development	NJGS version of ROSSI	New Jersey Geological & Water Survey/NJDEP, Michael Gagliano 609-633-1057 mike.gagliano@dep.nj.gov Michelle Kuhn 609-633-1055 michelle.kuhn@dep.nj.gov	Between 1995 and 2016 1995 and 2016 NJGWS has collected a total of 526 seismic profiles and 291 Vibracores which has played a critical role in discovering, delineating and characterizing offshore sand resources needed for past, present and future Beach Replenishment projects	Geologic maps, volumetric contours and calculations for beach replenishment, reports, presentations	Beach Replenishment, geologic mapping. Data can be found at http://www.nj.gov/dep/njgs/	Cape May, NJ to Sandy Hook, NJ	Data exists at the NJGWS and on the MMPGIS at BOEM. Please contact NJGWS for any data request.	NJGWS, NJDEP Office of Engineering & Construction, USACE Philadelphia & New York, BOEM	Ongoing, with a start in 1995. We have over 20 years worth of data available.
10	Tool development	Project Description: Acoustic Techniques for Aiding in the Identification and Management of Marine Mineral Resources	Center for Coastal and Ocean Mapping University of New Hampshire Larry Ward Chase Ocean Engineering Lab 24 Colovos Road, Durham, NH 03824 larry.ward@unh.edu	Evaluation and development of tools and protocols for using high resolution acoustics (multibeam echosounder bathymetry and backscatter, seismics) and ground truth for identifying and managing sand and gravel deposits on the continental shelf.	Acoustic techniques for aiding in the identification and management of marine mineral resources.	In development	Western Gulf of Maine	In development	NOAA (Funding Agency)	Start Date: January 2016 End Date: December 2020

October 2016

U.S. Nearshore Community Integrated Research Implementation Plan -

The National Plan

