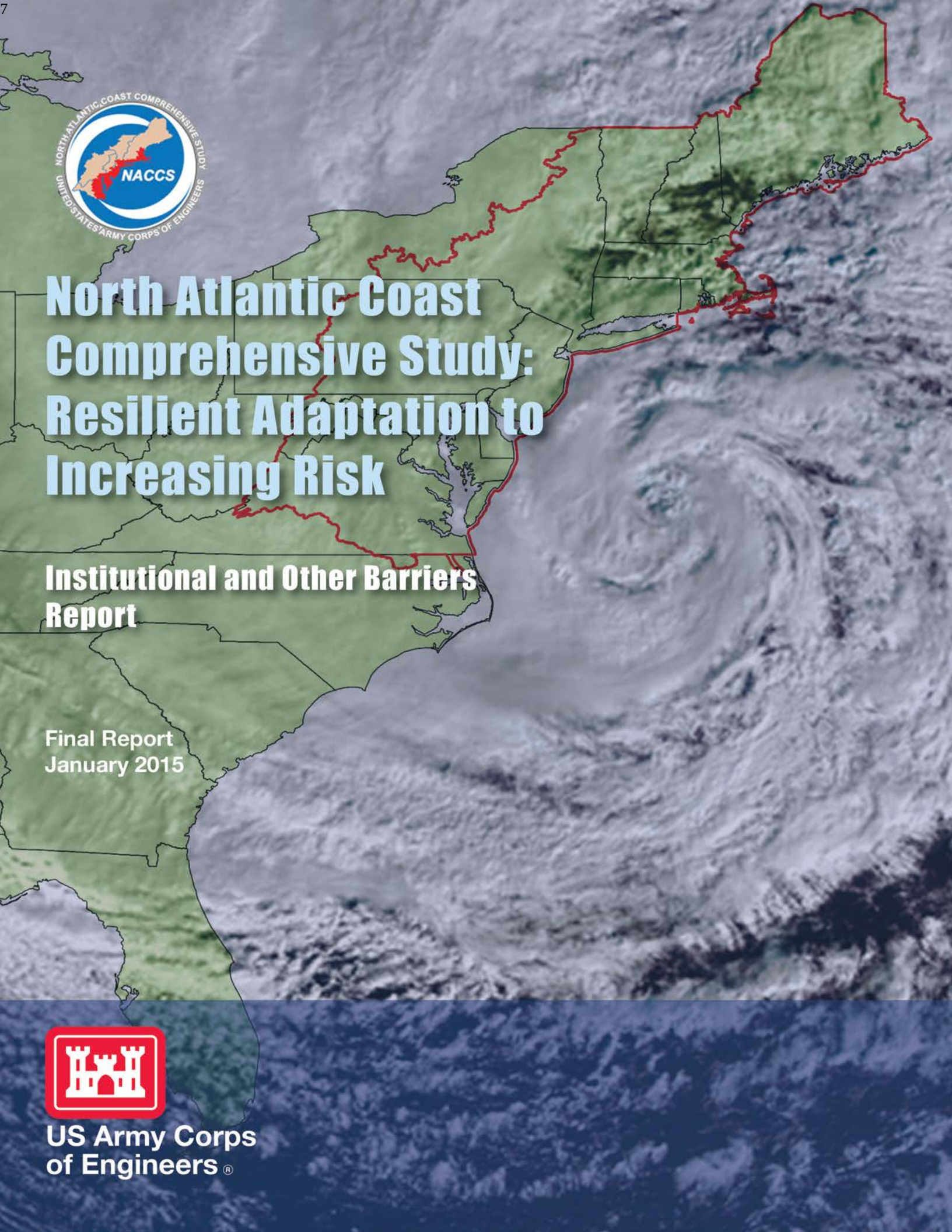

North Atlantic Coast Comprehensive Study: Resilient Adaptation to Increasing Risk

Institutional and Other Barriers Report

Final Report
January 2015

US Army Corps of Engineers®

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INSTITUTIONAL AND OTHER BARRIERS REPORT

NORTH ATLANTIC COAST COMPREHENSIVE STUDY

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I. Introduction

I.1. Authority and Study Goals

Under Public Law (PL) 113-2 of the Disaster Relief Appropriations Act of 2013, Chapter 4, the United States Army Corps of Engineers (USACE) was authorized to conduct the North Atlantic Coast Comprehensive Study (NACCS). The goals of the NACCS study were to:

1. Provide a risk management framework, consistent with National Oceanic and Atmospheric Administration (NOAA)/USACE Infrastructure Systems Rebuilding Principles.
2. Support resilient coastal communities and robust, sustainable coastal landscape systems, considering future sea level and climate change scenarios, to manage risk to vulnerable populations, property, ecosystems, and infrastructure.

The Act also states, as a part of the investigations, that, ***"…the Secretary shall identify those activities warranting additional analysis by the Corps, as well as institutional and other barriers to providing protection to the affected coastal areas…"***

I.2. Purpose

The purpose of this report is to document the collaboration, screening of major themes and identification of institutional and other barriers to providing protection to the affected coastal areas. This report incorporates the findings of the Performance Evaluation Report directed by PL 113-2. As used in this report, "institutional and other barriers" are defined as:

- **Institutional barriers** posed by agency silos, and overlapping or competing missions that inhibit necessary coordination and collaboration among agencies/levels of government, and/or that otherwise impede the attainment of NACCS goals.
- **Other barriers** such as laws, regulations, agency guidance and programs at Federal, state, or local levels that:
  - Contribute to vulnerability of coastal populations, ecosystems, and/or infrastructure;
  - Work at cross purposes with policies and measures that reduce risk and/or increase resilience;
  - Increase flood risk in the coastal zone (tidally influenced);
  - Conflict with the goals of improving coastal resilience or reducing risk;
  - Expose Federal investments or increase financial exposure of Federal taxpayers;
  - And public/political obstacles that impede the ability of decision makers, at all levels of community and political governance, to support or make hard decisions, pursue innovative solutions or lead change supportive of NACCS goals.

I.3. Understanding Community Resilience and Risk Management

To frame the issues of coastal storm risk management in the context of the policy landscape, the NACCS goals of community resilience and coastal storm risk management must be understood. **Resilience** is defined by the Hurricane Sandy Rebuilding Strategy report as "***the ability to anticipate, prepare for, and adapt to changing conditions and withstand, respond to, and recover rapidly from disruptions***" (Hurricane Sandy Rebuilding Task Force, 2013). Recent literature

(NRC, 2014 and Aerts et. al., 2014) suggests that the future of resilience in coastal communities could be tied to the concept of share responsibility. The concept calls for a whole community effort by Federal, State, Tribal, local, and individual stakeholders to understand, assess, and prepare for current and future risks.

Figure II-1 illustrates that significant coastal storm risk management can be achieved through nonstructural measures, such as zoning, building codes, risk communication, and evacuation plans. A combination of nonstructural measures, floodproofing, wise use of floodplains, managed retreat, and insurance can further reduce the residual risk. In Figure II-1, the left-most bar represents the initial risk faced by a community. Moving to the right, each bar shows the actions that can be used to manage and reduce the initial risk. The entities that are responsible for the actions and policies are also shown (Federal, State, and local governments and homeowners and business owners). The right-most bar shows that risk cannot be completed eliminated.

Figure II-2 outlines a risk management process that can be used by decision-makers and policymakers to manage risk and build resilience. The process is an adaptive cycle beginning with hazard identification and risk assessment, continuing with strategy development and implementation, and concluding with policy development and adjustment.

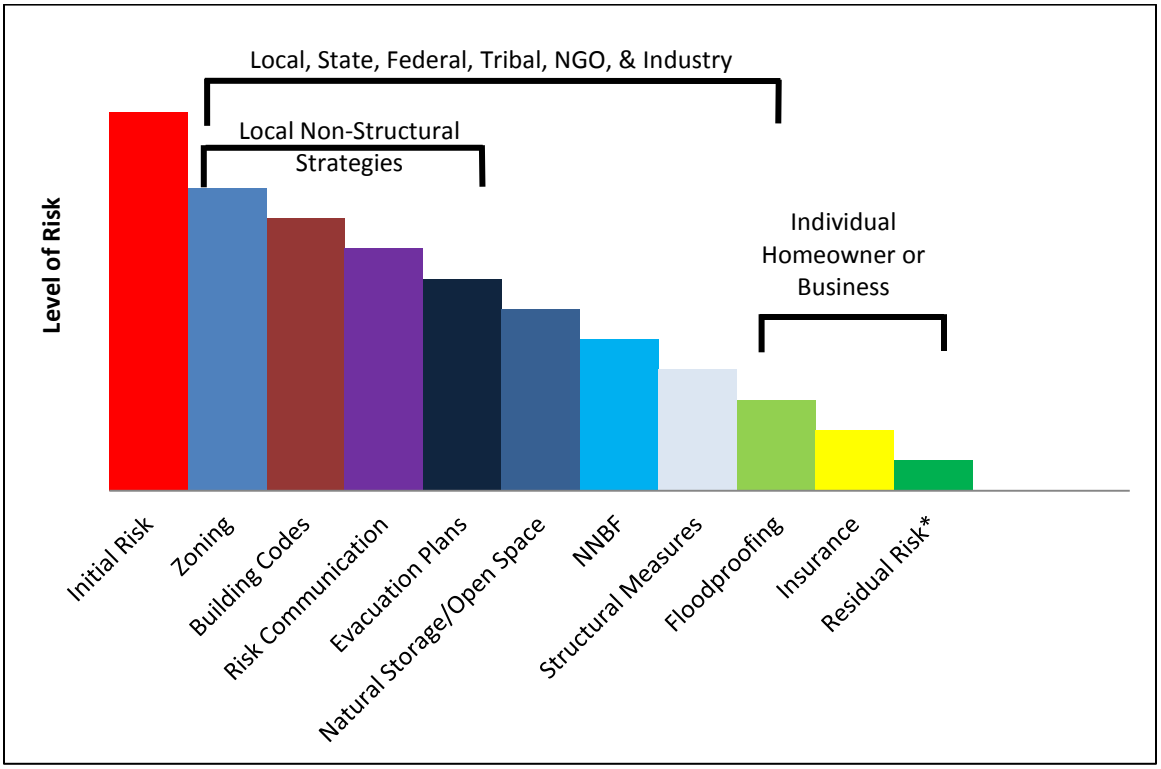

Figure II-1. Coastal Storm Risk Management Measures. (Source: National Research Council, 2013 modified by USACE)

II. Synthesis and Assessment

The analysis of institutional and other barriers is descriptive and qualitative in nature relying on information obtained through literature reviews of studies, review of Federal (USACE, FEMA) testimony

from hearings pertinent to sound coastal management policies and best practices; and interviews with coastal management experts, agencies and stakeholders in the NACCS area. Key questions addressed in the analysis included:

- What are the most significant "institutional and other barriers to providing protection to the affected coastal areas" or that complicate or impede the attainment of NACCS goals?
- What policies are facilitating the attainment of NACCS goals?
- What are the opportunities for action to address institutional and other barriers?

II.1 Approach

Three primary means of data collection were employed in this analysis:

- **Literature Reviews**: Research was focused on identifying and describing existing policies and programs that address coastal storm risk management and resilience issues. A summary of coastal policy literature review is available upon request. Section IV provides a list of referenced documents used for this research.
- **Expert Interviews**: The second data collection effort included interviews with national coastal management experts; and Federal, state, and local officials and representatives from stakeholder organizations who are knowledgeable about coastal policy in their respective regions. Key findings and overarching themes from these interviews are presented herein.
- **Working Meeting, Webinar and Interagency Validation**. The Institute for Water Resources hosted a Working Meeting titled "Policy Challenges to Using Natural and Nature-Based Features for Risk Reduction and Resiliency" on November 20, 2013. Further, as part of the Interagency Webinar Series, a presentation of the above data collection and an open forum (with approximately 130 participants), contributed to the comprehensive compilation of institutional and other barriers. Finally, in March 2014, the NACCS draft analyses were shared with over 500 agencies and stakeholders for validation of data collected to-date. This provided another opportunity for input and clarification of data and findings related to NACCS, including institutional and other barriers.

Institutional and other barriers, opportunities for action, and successes in reducing or eliminating the barriers were identified by analyzing relevant reports and interagency webinars and by interviewing key players at the local, State, and Federal levels. The identification of barriers was based on two criteria: the frequency of which the institutional barrier was mentioned and the severity of the impact/consequences of the barrier on coastal storm risk management and/or resilience.

II.2. Institutional and Other Barriers Analysis and Results

Institutional Landscape

The highest level of institutional significance is through laws, Executive Orders (EO), and Presidential Policy Directives (PPD) and then by regulation, agency directives and guidelines, implementation policy, and practice. While Federal departments and agencies are responsible for executing the laws enacted by Congress, EOs, and PPDs, these agencies and departments also issue thousands of regulations and directives that provide internal policy guidance, delegate authority, establish programs, define procedures, and assign responsibilities. When these requirements are coupled with collaboration among State, regional, Tribal, local, and other policies, the impact on individuals, communities and regions can

be even more complex and challenging.

Hundreds of policies and programs influence coastal storm risk management and the achievement of community resilience. Table II-1 is a list of the significant Federal acts, PPDs, EOs, and one program that affects long-term recovery and coastal resilience in the Hurricane Sandy-affected areas. State and local governments and programs and policies related to land use, zoning, and building codes heavily influence coastal storm risk management and are too numerous to list. Since Hurricane Katrina and Hurricane Sandy, many Federal and State agencies have been trending toward supporting a more prepared and resilient Nation.

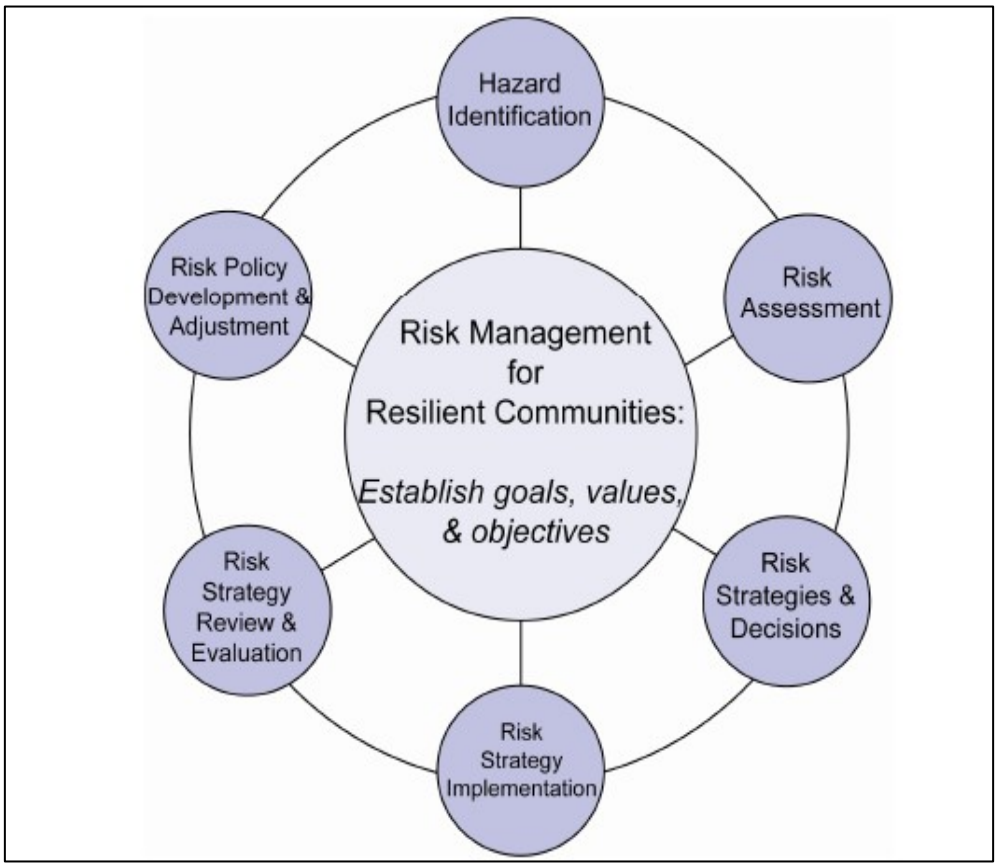

Figure II-2. The Risk Management Process (NRC, 2012, used with permission)

Table II-1. Federal Acts, Programs, PPDs, and Eos that Affect Coastal Storm Risk Management in Areas Affected by Hurricane Sandy	
Policy	**Purpose**
Biggert-Waters Flood Insurance Reform Act of 2012	Long-term reauthorization and reform of the NFIP. Raised insurance rates on certain properties that had been previously discounted in order to achieve actuarial soundness and included provisions for evaluating future risk
Grimm-Waters-Richmond Flood Insurance Affordability Act (2014)	Delays rate increases for some property types until and affordability assessment and new maps are completed
Community Development Block Grant Disaster Recovery Program (2013)	Appropriated funds for necessary expenses related to disaster relief, long-term recovery, restoration of infrastructure and housing, and economic revitalization in the most impacted and distressed areas resulting from a major disaster declared pursuant to the Robert T. Stafford Disaster relief and Emergency Assistance Act of 1974 (42 U.S.C. 5121 et seq.) due to Hurricane Sandy and other eligible events in calendar years 2011, 2012, and 2013
Coastal Zone Management Act of 1972	Appropriated Federal funds to 34 State programs through NOAA to “preserve, protect, develop, and where possible, to restore or enhance the resources of the nation’s coastal zone”
Disaster Relief Appropriations Act of 2013	Appropriated funds and set guidance for recovery and rebuilding after Hurricane Sandy
PPD-8, National Preparedness (2011)	Directed the development of a national preparedness goal that would include national planning frameworks for protection, prevention, mitigation, response, and recovery
National Disaster Recovery Framework (FEMA 2013) and the Mitigation Framework (FEMA 2014)	Two of the five planning frameworks required by PPD-8
PPD-21, Critical Infrastructure Security and Resilience	Mandated that critical infrastructure be hazard resilient
Post-Katrina Emergency Reform Act of 2006	Provided funding for FEMA Risk Mapping, Assessment, and Planning
FY2010 Department of Homeland Security Appropriations Act	Appropriated funding for FEMA Risk Mapping, Assessment, and Planning
Water Resource Development Acts (1974 through 2007)	Authorized major water resource projects and provided for updating planning guidance and a national vulnerability assessment and strategy
Executive Order 11988. Floodplain Management (1977)	Required Federal agencies to avoid to the extent possible the long- and short-term adverse impacts associated with the occupancy and modification of floodplains
Coastal Barrier Resources Act (1982)	Identified and mapped undeveloped coastal barriers with the intention of discouraging development in areas vulnerable to storm damage and therefore minimizing the loss of human life, wasteful expenditures, and damage to natural resources

Many of the key studies, reports, and research, which address coastal storm risk management and community resilience, are listed in Table II-2. Within this literature are also many lessons learned, recommendations and detailed data.

Table II-2. Studies and Reports Focusing on Coastal Risk Management and Resilience

Study/Report	Agency/Author
Hurricane Sandy Rebuilding Strategy	Hurricane Sandy Rebuilding Task Force (2013, August)
Hurricane Sandy Coastal Projects Performance Evaluation Study	U.S. Army Corps of Engineers (2013, November 6)
Recommendations to Improve the Strength and Resilience of the Empire State's Infrastructure	New York State's 2100 Commission (2013)
Sharing the Challenge: Floodplain Management into the 21st Century	Interagency Floodplain Management Review Committee (1994, June)
Disaster Resilience: a National Imperative	National Research Council: Committee on Increasing National Resilience to Hazards and Disasters, Committee on Science, Engineering, and Public Policy (2012)
The President's Climate Action Plan	Executive Office of the President (2013, June)
The National Climate Assessment: Climate Change Impacts in the United States	U.S Global Change Research Program (2014)
Reducing Coastal Risk on the East and Gulf Coasts	National Research Council (2014)

Notwithstanding the already complex policy landscape, the institutional and political landscape at the Federal level is marked by the presence of numerous Congressional committees with responsibilities for authorizing and funding Federal agencies and programs. Table II-3 shows at least nine Federal agencies with responsibilities for various parts of coastal management, and several Congressional subcommittees responsible for authorization of programs, and appropriation of funds for coastal management.

There are a number of forums that operate at Federal levels to facilitate coordination among agency programs, principally the Federal Interagency Floodplain Management Task Force (FIFMTF) and through interagency agreements and Memoranda of Understanding to support coordination; however, there are not comparable coordination forums or mechanisms at other levels.

Table II-3. Principle Federal Agencies with Coastal Management Responsibilities

Department	Water Resources Agency / Bureau	Mission	Authorizing Committee		Appropriations Sub-Committee	
			House	Senate	House	Senate
Commerce	National Oceanic and Atmospheric Agency (NOAA)	Understand and predict changes in Earth's environment and conserve and manage coastal and marine resources to meet our nation's economic, social, and environmental needs.	Natural Resources; Science, Space, and Technology	Commerce, Science, and Transportation; Environment and Public Works	Commerce, Justice, Science, and Related Agencies	Commerce, Justice, Science, and Related Agencies
Defense	U.S. Army Corps of Engineers (USACE)	Contribute to the national welfare and serve the public by providing the nation and the Army with quality and responsive development and management of the nation's water resources, protection, restoration, and management of the environment, disaster response and recovery, and engineering and technical services in an environmentally sustainable, economic, and technically sound manner through partnerships.	Transportation and Infrastructure	Environment and Public Works	Energy and Water Development, and Related Agencies	Energy and Water Development
Environmental Protection Agency (EPA)		Protect human health and the environment.	Energy and Commerce; Science, Space, and Technology	Environment and Public Works	Interior, Environment, and Related Agencies	Interior, Environment, and Related Agencies

Table II-3. Principle Federal Agencies with Coastal Management Responsibilities						
Department	**Water Resources Agency / Bureau**	**Mission**	**Authorizing Committee**		**Appropriations Sub-Committee**	
			House	**Senate**	**House**	**Senate**
Homeland Security	Federal Emergency Management Agency (FEMA)	Reduce the loss of life and property and protect the nation from all hazards, including natural disasters, acts of terrorism, and other man- made disasters, by leading and supporting the nation in a risk-based, comprehensive emergency management system of preparedness, protection, response, recovery, and mitigation.	Transportation and Infrastructure	Environment and Public Works	Homeland Security	Homeland Security
Interior	Fish and Wildlife Service (FWS)	Working with others to conserve, restore, and enhance fish, wildlife, and plant habitats of Federal trust species, on public and private lands and waters, for the continuing benefit of the American people.	Natural Resources	Environment and Public Works; Energy and Natural Resources	Interior, Environment and Related Agencies	Interior, Environment, and Related Agencies
	National Park Service (NPS)	Preserve unimpaired the natural and cultural resources and values of the national park system for the enjoyment, education, and inspiration of this and future generations.	Natural Resources	Energy and Natural Resources	Interior, Environment and Related Agencies	Interior, Environment, and Related Agencies

Table II-3. Principle Federal Agencies with Coastal Management Responsibilities

Department	Water Resources Agency / Bureau	Mission	Authorizing Committee		Appropriations Sub-Committee	
			House	Senate	House	Senate
	US Geological Service (USGS)	Provide reliable scientific information to describe and understand the Earth; minimize loss of life and property from natural disasters; manage water, biological, energy, and mineral resources; and enhance and protect our quality of life	Natural Resources	Energy and Natural Resources	Interior, Environment and Related Agencies	Interior, Environment, and Related Agencies
Housing and Urban Development (HUD)		Create strong, sustainable, inclusive communities and quality, affordable homes for all.	Financial Services	Banking, Housing, and Urban Affairs	Transportation, HUD, and Related Agencies	Transportation, HUD, and Related Agencies
	Small Business Administration	Created in 1953 as an independent agency of the Federal government to aid, counsel, assist and protect the interests of small business concerns, to preserve free competitive enterprise and to maintain and strengthen the overall economy of our nation	Small Business	Small Business and Entrepreneurship	Financial Services and General Government	Financial Services and General Government

Recurring Institutional and Other Barriers Themes

Two key criteria were used to identify the recurring institutional and other barriers themes: frequency of which the institutional barrier was mentioned, and the severity of the impact/consequences of the barrier on coastal risk management and/or resilience. The themes that follow are in no order of priority:

- Theme 1: Risk/Resilience Standards
- Theme 2: Communication and Outreach
- Theme 3: Risk Management
- Theme 4: Science, Engineering, and Technology
- Theme 5: Leadership and Institutional Coordination
- Theme 6: Local Planning and Financing

For each of the themes, three general categories of results emerged:

- **Institutional and Other Barriers**: These are institutional, public, and political barriers that complicate or impede "providing protection to affected coastal areas." Numerous institutional and other barriers were identified through this analysis.
- **Opportunities for Action:** Suggestions made in the literature and through interviews, webinars, working meetings and interagency validation were synthesized and presented.
- **Successes**: Policies, programs, and institutional arrangements that were cited as working well in reducing risk and increasing resilience. The rationale for including successes in the analysis is that key elements that may help explain such success may be identified and used as "lessons learned" or key principles for improving other policies and institutional arrangements.

Theme 1: Risk/Resilience Standards

Institutional and Other Barriers

The terms risk and resilience, as they pertain to natural hazards, are widely defined, and standards, if available, are non-uniform and often disputed. Perspectives from the individuals, communities and organizations represented in the study identified a need to have a national approach while respecting the needs of the individuals and communities of those most affected. The principal institutional and other barriers were identified as those policies or programs that limited or lacked the following:

1) Standards to define acceptable levels of risk.
2) A national/regional policy or strategy for coastal storm risk management and/or flood risk management.
3) Flexibility in federal agency rules to promote rebuilding of community infrastructure to higher risk and resilience standards. Analysis (e.g. Smith and Grannis, 2013) and interviews suggest that some agency programs (e.g. FEMA Public Assistance Program, among others) may restrict the ability of communities to use federal grant program funds for risk management improvements to infrastructure or facilities damaged in disasters.

The challenges contributed to confusion and individual misperception of the real risks, including

residual risk and long-term sustainable options to recover from Hurricane Sandy and to mitigate future risk. Some standards, such as project design levels (50-yr, 100-yr, etc.), or the 1-percent-annual standard for flood insurance rate maps, represent standards that may not be appropriate considering all the economic, social, and environmental consequences of a large natural disaster in a region. Nor do these standards look to future risks to provide long-term comprehensive planning scenarios.

Opportunities for Action

There were many ideas to promote better interagency and community understanding of the many existing policies, laws, regulations, and other guidance criteria. Several examples are listed below and some are underway or are currently authorized:

1) Develop risk-informed decision-support methods.
2) Develop standards for "tolerable" risk, risk reduction, performance metrics, vulnerability, resilience, etc.
3) As authorized in WRDA 2007, conduct a national vulnerability study.
4) Develop a national strategy for flood risk management and/or a national coastal policy.
5) Develop a national resilience scorecard.
6) Regionally plan coastal storm risk management projects and include broader benefits (beyond benefit-cost ratios).
7) Assemble a team of Federal leaders, governors, and regional/local champions for resilience to develop the national strategy for coastal storm risk reduction and resilience.
8) Add criteria in federal agency grant programs to provide funding for improvements to community infrastructure damaged by disasters to increase their long-term resilience.

Successes

A number of policies and reports identified activities designed to meet the challenges associated with establishing and implementing better standards to manage risk and increase resilience. These policies and initiatives serve to provide a more holistic approach to coastal storm risk management and community resilience, embracing collaborative and integrated water resources planning and management opportunities, forming interagency and inter-governmental teams, and setting standards. Several interviewees noted that when these types of initiatives were employed, the regional approaches that integrated government programs assisted in improved recovery efforts.

At the national level, several initiatives are underway that support strategy integration and standard setting. In March 2013, "The Principles and Requirements for Federal Investments in Water Resources" was released pursuant to the Water Resources Development Act (WRDA) of 2007 (PL 110-114) to supersede the 1983, Economic and Environmental Principles and Guidelines for Water and Related Land Resources Implementation Studies. This document sets a Federal objective for all key Federal agencies with water resource missions that investments will maximize public benefits that encompass environmental, economic, and social goals. The President's Climate Change Report (Executive Office of the President, 2013) along with EO 13514 (Executive Office of the President, 2009) set a standard for requiring federally funded projects to reflect a consistent approach that accounts for sea level change and other factors affecting flood risk management. Further, the Hurricane Sandy

Rebuilding Strategy (Hurricane Sandy Rebuilding Task Force, 2013) recommended a minimum flood risk reduction standard be adopted during recovery for major Federal investments that set the Advisory Base Flood Elevation plus one foot as the rebuilding standard. This standard, or even more stringent standards, were adopted by many states and local communities in the North Atlantic region.

The FIFMTF identified a priority need to develop or update the national strategic vision for floodplain management that was established in the Unified National Program (FIFMTF, 1994). The newly established Mitigation Federal Leadership Group (MitFLG), established under PPD 8, will work toward implementing the National Mitigation Framework (FEMA, 2014). This framework is about helping communities understand their risk and building their capacity to be resilient. The MitFLG is an organization led at the White House that will include relevant Federal, state, and tribal agencies and organizations to assess the effectiveness of the mitigation capabilities as they are developed and deployed across the nation.

There are also some important non-Federal initiatives looking at national risk. New York State (NYS 2100 Commission, 2013) identified the need to promote planning and development criteria for integrated decision making for capital investments across agencies. Former New York Mayor, Michael Bloomberg, announced in October 2013 the establishment of an initiative, Risky Business, to prepare the nation for extreme weather events like Hurricane Sandy (Bloomberg Philanthropies et al., 2013). The initiative will evaluate the risks imposed by climate change on the entire U.S. economy, and will help individuals, communities and the nation understand and prepare for risk.

Theme 2: Risk Communication

Institutional and Other Barriers

A critical aspect to reducing risk and creating resilient communities is often the ability to communicate risk to the individuals, community leaders, and decision makers who are responsible for proactive land use and evacuation planning, and implementing effective mitigation actions. Public acceptability of risk management measures, difficulties of individuals and communities in understanding their risk, and lack of community engagement about risk management options were all cited as obstacles to implementing good coastal management strategies.

For instance, some coastal communities, even though inundated by Hurricane Sandy, were reluctant to accept flood risk management measures that limited their view or accessibility to the beach. In some cases, the urgency of rapid recovery and administration of some of the recovery programs dis-incentivized resilience. Also, individuals and communities were sometimes resistant to include hazard resilient measures because they equate these measures with economic loss (i.e., losses to tax base from relocation). While the local economy may suffer in the short-term, communities may not have the resources to assess the real economic impacts over the long-term for repeated and rising coastal risks and to quantify the total benefits of risk management measures. In many areas mitigation of homes using floodproofing, elevation and/or retreat were considered adverse options and may be prevented by “legacy” zoning or building codes. Some of this is due to a miscommunication of standards. For instance, many homeowners believe the “100-year” event is an unlikely event and particularly, if such an event just occurred, it is not likely to happen again. Yet, the reality is that the

1-percent-annual-chance of flooding means that there is a one in four chance that a home will flood over the 30-year life of a mortgage. That risk is potentially higher in coastal areas due to increasing risk associated with forecasted sea level and climate change impacts.

Opportunities for Action

Community involvement, engagement, and transparency, were identified to better communicate risk to stakeholders and convey how best to manage their risks. Additionally, risk communication resources were suggested to help the public understand risk. Some specific ideas were to conduct public participation sessions to identify the needs of the community and of vulnerable populations, develop programs to educate the public about the hazards, use FEMA flood risk maps to better communicate risk, and deploy knowledgeable staff to help communities better understand applicable recovery programs.

Successes

Many programs are already focused on public engagement and education activities. Following Hurricane Sandy, these programs geared up to help affected communities. NOAA's Sea Grant programs, connected to 33 states through universities and colleges, are a trusted source of information regarding conservation and practical use of coastal and marine areas. Post-Sandy, the Sea Grant programs in the northeast stepped up to play a key role in disseminating information, educating the public on Federal and state programs, and providing important scientific information regarding coastal restoration and climate change.

On a more local level, under EPA's National Estuary Program (NEP), the Barnegat Bay Partnership (BBP) represents 1 of 28 estuaries of "national significance." A partnership of Federal, state, county, municipal, academic, business, and private stakeholders in the Barnegat Bay watershed, BBP collectively supported the Superstorm Sandy Federal Recovery Support Strategy and used its mission to research, educate and provide public engagement and education resources in New Jersey.

Theme 3: Risk Management

Institutional and Other Barriers

The largest number of issues identified in this analysis that could impact providing protection to affected coastal areas were programmatic in nature and dealt with coastal flood risk management. The complexity of programs and policies, the myriad of agencies administering the programs, and the sometimes inconsistent and/or conflicting execution of these programs at the local level has resulted in frustrations for individuals and communities. While there were many specific issues identified, six key sub-themes are as follows:

1) Dealing with rising insurance rates and new flood risk maps.
2) Balancing both old and newly emerging floodplain management ordinances regarding land use and building codes with an urgent need to move ahead.
3) Integrating the varied requirements and applications of Federal dollars for rebuilding infrastructure with local recovery plans.
4) A lack of capacity and capability at the local level to develop and integrate resilience plans

with other regional and local development plans. The major programs involved were FEMA's Public Assistance and Hazard Mitigation Grant Programs, the National Flood Insurance Program's (NFIP) insurance, floodplain management and mapping programs, HUD's Community Development Block Grant Disaster Recovery (CDBG-DR) program and a large mix of state and local policies regarding land use and building codes.

5) Further complicating the landscape were pressures to rebuild infrastructure quickly and expedite permitting and regulatory requirements for environmental and historic preservation. A recent study by Georgetown Climate Center identifies the opportunities and barriers for using disaster relief funds in rebuilding resilient communities for future risk. Many of the challenges identified in that report link to the findings in this analysis of institutional and other barriers (Smith and Grannis, 2013).

6) Compassion-driven approaches to disaster recovery avoid the tough issues of risk management and building resilience. While it is not the intent to deprive people of post-disaster assistance, providing Congressional disaster relief funds with "no strings attached" contributes to a focus on response and recovery and not on planning and proactive implementation.

Opportunities for Action

Many priorities for action were identified both by those interviewed and in key reports. In dealing with the NFIP, it was recommended that future risk be incorporated or accounted for in flood mapping and insurance programs. Because of the impact of rising insurance rates, affordability of premiums should be addressed to create a safety net for low income and vulnerable policy holders. While the impacts of floodplain management decisions called for hard decisions and had local economic impacts, it was generally indicated that the floodplain management policies should be strengthened and enforced to include current and future risks. With that in mind, alternative and improved flood risk management strategies that consider historic developments, the current socio-economic drivers of the community, and the natural capital of the area are also needed.

Federal programs should adhere to existing mandates, such as EO 11988, "Floodplain Management" (Executive office of the President, 1977) and improve use of policies and authorities, such as FEMA's 406 Mitigation policy to encourage resilient recovery and long-term sustainability. A key focus should be on protecting major infrastructure (transportation, water, and energy as well as hospitals, schools, and emergency facilities) while applying infrastructure resilience guidelines when planning for new or replacement infrastructure. Federal and state programs should provide technical assistance and support to local risk management and resilience planning to include strategic post-disaster recovery and mitigation planning, and regional and community development planning.

The overarching sentiment: untangle and simplify complicated institutional barriers and programs to help communities develop proactive strategic plans, considering future risk, and rebuild smarter and stronger.

Successes

The Hurricane Sandy Recovery Task Force and its Rebuilding Strategy (Hurricane Sandy Rebuilding Task Force, 2013) had numerous recommendations for improving task force

programmatic issues and made substantial progress in implementing them. The task force encouraged communities and homeowners to promote existing programs such as the Institute for Business and Home Safety's (IBHS) program for Fortified Homes, embrace green building practices and adopt the latest International Building Codes (IBC) and International Residential Codes (IRC). The task force called for establishing a Sandy Regional Infrastructure Permitting and Review team to help expedite projects. States adopted amendments through Coastal Zone Management programs to include climate change in coastal development and revitalization plans and encouraged "soft approaches" to coastal protection projects. Several states also supported the policy for using the Advisory Base Flood Elevations plus additional elevations to address risk and uncertainty associated with forecasted sea level change scenarios to build back more resilient. FEMA's Community Rating System helped communities reduce their insurance premiums by incentivizing good floodplain management.

Many efforts were focused on regional approaches to resilience. The National Disaster Recovery Framework and the Mitigation Framework help to institutionalize regional approaches and capacity building. Some initiatives, like Rhode Island's developing Center for Coastal Adaptation and Resilience, are intended to provide "extension service" one-on-one type assistance to communities and homeowners in understanding risk and risk management approaches.

Theme 4: Science, Engineering and Technology

Institutional and Other Barriers

A key enabler to successful comprehensive coastal storm risk management is credible and accurate science, engineering, and technology. While many aspects of coastal storm risk management can be met with existing analyses and capabilities, there are still unmet challenges. Critical gaps, including risk and uncertainty, still exist (and will remain, in some cases) regarding climate change, environmental enhancement and protection, natural and nature-based features, blended solutions, watershed and integrated water resources management solutions, decision-support resources, and data to support these challenges.

In the Hurricane Sandy Project Performance Evaluation Study (USACE, 2013, November 6), some specific barriers to USACE projects included limited consideration of coastal watersheds to include impacts in back bays, concurrent flooding and limited consideration of the inter-relationship of certain coastal features. For environmental features and natural and nature-based features, few criteria exist for design, and it is difficult to quantify benefits. Further, it is technically challenging to predict the maintenance requirements for dynamic or geomorphic features such as dunes, beaches and barrier islands. These challenges lead to a tendency by engineers and homeowners to use traditional structural or hardening methods of protection over innovative or more natural and nature-based features.

Additionally, the USACE dredged material disposal policy 'least cost' requirement can result in missed opportunities for beach nourishment. USACE dredged material is disposed of according to the least cost alternative as measured by economic benefit-cost analysis. The benefit-cost analysis procedure generally does not consider coastal storm risk management and other benefits or the long-term consequences of disposal options. Even though USACE policy requires consideration of beneficial uses as well as least cost disposal practices, provisions for cost sharing of a more costly beneficial use

option require identification of a capable cost sharing partner. This is not well understood and not widely used in practice. In addition, compliance with Coastal Zone Management requirements and other considerations can make beneficial use difficult depending on the nature of the material or the scope of the work. As a result, opportunities to use sand for beach nourishment purposes may be lost (USACE Coastal Systems Portfolio Initiative (CSPI), 2012).

There are data gaps in emerging areas like climate change, social science, and/or environmental benefits as well as in more traditional areas such as wave, wind, and elevation data. Exacerbating the issue, data collection, management resources, and standards are often not coordinated across agencies, nor optimized in a timely way to inform decision makers, coastal planners, scientists, and engineers.

Opportunities for Action

Whether to improve design guidance, expand the knowledge base, or fill data gaps, many recommendations were provided. Opportunities for action to address science, engineering, and technology include the following:

1) Better coordinated pre- and post-storm data collection and development of standards.
2) More rigorous instrumentation and monitoring of existing projects to help address operation and maintenance and adaptive management requirements.
3) Creating a centralized climate change resilience resource for improving the accuracy of modeling and mapping true exposure to hazards.
4) Development of better design guidance for coastal storm risk management and natural and nature-based alternatives.
5) Integrated approaches that combine risk management measures and address regional and watershed solutions.

Successes

A number of positive technology and data advances have been achieved. Following Hurricane Sandy, NOAA, in partnership with FEMA and the USACE, created a set of map services to help communities, residents, and other stakeholders consider risks from future sea level change in planning for reconstruction which was endorsed by and is found on the US Global Science Change Research Program website (U.S. Global Science Change Research Program, n.d.). The work also continues on understanding natural and nature-based approaches. The Nature Conservancy has been partnering with many governments, non-government, and academic partners to develop guidelines for natural and nature- based designs (The Nature Conservancy, n.d.) and also recently released a coastal resilience mapping resource to help communities evaluate alternatives (The Nature Conservancy, et al., n.d.).

Another initiative led by USACE, NOAA, and FEMA is the Systems Approach to Geomorphic Engineering (SAGE) which engages a diverse set of experts and partners to develop and apply innovative alternatives to coastal resilience using both natural and nature-based (green) and structural (gray) elements. The President launched a program called “Rebuild By Design,” (Rebuild By Design, 2013) a public-private partnership with the Rockefeller Foundation and others, to promote innovation in regionally scalable solutions.

Theme 5: Leadership and Institutional Coordination

Institutional and Other Barriers

One of the more significant challenges identified from the analysis is the complexity of institutional governance and the need for coordination and leadership at all levels. Creation and administration of laws, regulations, and policies starting at the Congressional and Executive levels of Federal government can create substantial confusion by the time these policies are implemented at the local levels. The Federal policy landscape is marked by the presence of numerous Congressional committees with responsibilities for authorizing and funding Federal agencies and programs. There are at least 9 agencies with responsibilities for various parts of coastal management (refer to Table II-1), and several Congressional subcommittees responsible for authorization of programs, and appropriation of funds for coastal management. The principal challenges identified were:

1) Lack or limited coordination and leadership across Congressional committees.
2) Lack or limited coordination between and within agencies.
3) Inconsistent implementation of planning laws, policies, and procedures, and permitting requirements at all levels.

Similar challenges were identified at the state, regional, and local levels. The number of agencies, elected officials, and rules to coordinate and navigate grows exponentially as coastal resilience policies are filtered down to executing authorities at the local level or if/when political priorities change. One consequence of this complex governance structure is that hard policy decisions are often deferred down to the local level where there may be little administrative, technical, or public support. Those interviewed repeatedly referred to the lack of "political will" or reluctance of elected officials at all levels to make hard decisions about long-term coastal storm risk management solutions, particularly if they might impact voters. Activities such as relocation, planned retreat, or increasing flood premiums for those living in high risk areas were perceived as threats due to the near term economic or political impacts of such measures.

Opportunities for Action

There were not a lot of recommendations provided for this theme, but as described above, there are a number of current interagency efforts working to improve this barrier. Potential opportunities for action that were identified included the following:

1) Encourage Congress to work across committee lines to focus on a national flood risk reduction strategy (see Theme 1).
2) Enhance institutional coordination.
3) Seek process improvements for Federal program rules to encourage greater efficiency and ease of use (an example might include simplifying a grant process application).
4) Empower government participants to help local authorities make decisions.
5) Leverage public-private partnerships and interagency funding.
6) Promote pre-disaster planning and NNBF, blended and non-structural solutions in support of community resilience and coastal storm risk management.

7) Incorporate NNBF and blended solutions into existing decision support and communication resources.

8) Develop a guidebook with information on NNBF and blended solutions that could be implemented during the recovery process following a disaster.

Successes

Recently, Congress passed the Water Resources and Reform Development Act (WRRDA) of 2014. Under PPD 8, both the National Disaster Recovery Framework and the Mitigation Framework have functions that support horizontal and vertical integration of programs and community engagement. As part of the Mitigation Framework, the MitFLG has been established to coordinate interagency policies for disaster reduction in coordination with state, local, territorial, and tribal governments. Additionally, the Federal Interagency Floodplain Management Task Force has developed a focused work plan to improve coordination, collaboration and transparency among Federal agencies (FIFMTF, 2013).

Progress is also being made in incentivizing regional planning within federal grant programs. For example, under its CDBG-DR, HUD requires that grantees use a regional and cross-jurisdictional approach to foster shared goals and best practices for building resilience (Pirani and Tolkoff, 2014). Additionally, programs of a number of federal agencies have provisions that disincentivize development in hazardous areas. For example, the Department of Interior's Coastal Barrier Resources Act (CBRA) restricts federal spending on undeveloped coastal barrier islands.

Additionally, the Steering Committee on Federal Infrastructure Permitting and Review has been established to lead the development of a plan to modernize the federal permitting and review process for major infrastructure projects to reduce the time and uncertainty for such projects and to ensure that appropriate environmental and other safeguards are accommodated (Steering Committee, 2014).

Theme 6: Local Planning and Financing

Institutional and Other Barriers

The issue of funding and resources was an often repeated challenge during interviews conducted as part of this analysis. However, beyond budgets and staffing, policies or authorities can cause unintended economic stressors, limit the ability to pool resources or incentivize good coastal storm risk management, or make executing programs difficult in a certain window of time or at a particular geographic scale. Several key challenges identified were as follows:

1) Federal project authorizations and appropriations are not conducive to more comprehensive, regional, or watershed solutions.

2) Investment to prepare for and mitigate future disasters provides a much higher taxpayer return to the taxpayer than investment in disaster recovery. For example, in a 2007 report the Government Accountability Office (GAO) concluded that a comprehensive strategic framework establishing joint strategies and leveraging resources across agencies for addressing natural hazard mitigation to reduce or eliminate long-term risks to life and property would provide greater benefit than disaster recovery (GAO, 2007). Similarly, a cost-benefit analysis performed by the National Institute of Building Sciences found that a dollar

invested in mitigating the effects of natural hazards saved society an average of $4 in disaster recovery costs (National Institute of Building Sciences, 2005).

3) Authorities that justify projects are too focused on least cost or benefit-cost ratios, limiting the ability to consider environmental benefits or other regional and local benefits.
4) Funding has variable time-related spending requirements that complicate the recovery process (e.g. annual appropriations resulting in the need to spend recovery funds quickly, or execution is complicated by the presence of environmental windows).
5) Various diverse rules and policies regarding Federal and non-Federal cost share requirements make it difficult for innovative financing and partnerships.

Opportunities for Action

Some opportunities for action include the following:

1) Prioritize and complete authorized projects. Reevaluate and complete authorized or planned projects in a comprehensive systems approach as funds become available. The opportunity to reformulate previously authorized projects should include evaluation of new concepts such as NNBF, incorporation of sea level change and/or climate change, and other changing needs of the community and the region.
2) Create new tax and market-based incentive programs that encourage resilient behavior and reduce vulnerabilities.
3) Encourage agencies to share resources and equipment.
4) Provide resources that help quantify benefits and defray any increase in costs of comprehensive coastal projects.
5) Explore means to ensure non-Federal cost share partners have the capacity and capability to sustain long-term maintenance and operation of projects. While USACE partners have an obligation for continual operation and maintenance on cost share projects, not all organization that work in the coastal area have the same requirement. Explore means to ensure projects are funded to sustain long-term operation, maintenance, monitoring, and adaptive management, including use of public-private partnerships. For NNBF, strive to restore natural processes where feasible, which will reduce long-term maintenance needs.
6) Explore means to allow non-Federal sponsors to contribute funding toward the federal cost share.
7) Align funding and spending time tables to better meet requirements for the recovery process (e.g., annual appropriations result in the need to spend recovery funds quickly).

Successes

One key to improving coastal risk reduction and resilience in the northeast is the authorization of funds through the Disaster Relief Appropriations Act. New legislation such as WRRDA 2014 also focused on encouraging and enabling public-private partnerships of Federal projects. Public-private partnerships are already becoming an option of choice for communities looking to replace certain water, energy, or transportation infrastructure systems. The updated Principles and Requirements

(2013) have put more emphasis on giving equal weight to natural, social, and economic benefits. Specific programs such as USACE's Coastal Structures Asset Management Program are assessing coastal storm risk projects to help identify priority for operation and maintenance, and recapitalization.

III. Summary

The institutional landscape and hierarchy of decision-makers, policymakers, and those who enforce the decisions is complex. The six institutional and other barriers identified in the NACCS are consistent with challenges identified in other recent initiatives. Opportunities for action are summarized such that decision-makers and policymakers across all levels of government, NGOs, and the private sector can come together as a coastal community committed to coastal storm risk management and resilience.

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