RECOMMENDATIONS FOR BUILDING

RESILIENT COASTAL COMMUNITIES IN NEW JERSEY

RECOMMENDATIONS FOR BUILDING RESILIENT COASTAL COMMUNITIES IN NEW JERSEY

ACKNOWLEDGEMENTS

Written/Compiled by: The Monmouth University Urban Coast Institute

Contributors: Thanks to the many who gave their time, effort and experience to this project, with a special thanks to the following colleagues and project partners:

- Jacques Cousteau National Estuarine Research Reserve
- New Jersey Future
- Rutgers University Edward J. Bloustein School of Planning and Public Policy
- Sustainable Jersey
- Delaware Valley Regional Planning Association

Financial Assistance: Provided by the National Oceanic and Atmospheric Administration (NOAA) Coastal Resilience Networks Grant Program

Developed for: New Jersey Department of Environmental Protection, Coastal Management Program, Office of Coastal and Land Use Planning

New Jersey Department of Environmental Protection
Office of Coastal and Land Use Planning
P.O. Box 420, 401 East State Street
Mail Code 401-07C
Trenton, New Jersey 08625-0420
(609) 984-0058
NJCZM@dep.nj.gov

RECOMMENDATIONS FOR BUILDING RESILIENT COASTAL COMMUNITIES IN NEW JERSEY

TABLE OF CONTENTS

EXECUTIVE SUMMARY 1

INTRODUCTION 3

CHALLENGES TO COASTAL COMMUNITY RESILIENCE 5

RECOMMENDATIONS TO INCREASE COASTAL COMMUNITY RESILIENCE 7

I. IMPROVE COORDINATION OF RESILIENCE EFFORTS 8

1. Establish a Community Resilience Planning Program within the CMP to Continue and Enhance the CMP's Role in Coastal Community Resilience Planning 8

2. Facilitate the Use of the Best Available Resilience Science in Community Resilience Planning Efforts 9

3. Define the term "Resilience" and Establish the Goals and Standards through which it can be Achieved and the Metrics to Measure Progress. 9

4. Facilitate Coordination of Resilience-Related Projects 11

5. Enhance and More Effectively Utilize NJDEP Partnerships with Governmental and Non-Governmental Organizations Engaged in Resilience Activities 12

6. Work with Other State and Federal Agencies to Define Respective Roles and Responsibilities for Resilience Activities in the Coastal Zone 13

II. DEVELOP PROGRAMS AND POLICIES TO ESTABLISH THE FRAMEWORK NECESSARY TO ASSIST COASTAL COMMUNITIES IN THEIR LONG-TERM RESILIENCE PLANNING AND POST-STORM RECOVERY ACTIONS 13

1. Develop a Coastal Zone Resilience Plan that Clearly Identifies the CMP's Resilience Goals and Policies 14

2. Continue Ongoing Efforts to Develop a Collaborative Community-Based Planning Process that Provides Viable Alternative Scenarios and Lays the Foundation for Proactive Resilience Efforts. 20

3. Draft and Propose a Guidance Document that Compiles the Various Emergency Policy Directives to Guide Communities in their Post-Hazard Recovery Efforts 22

4. Develop an Enhanced Targeted Blue Acres Program That Provides Communities with the Information They Need to Make an Informed Decision and Facilitate Participation 22

5. Develop and Implement Educational Programs Regarding Resilience Science and Strategies 25

6. Engage in the Continuous Search for Opportunities, Resources, Planning and Other Measures That Improve Coastal Community Resilience, Including Ongoing and Proposed Pilot Projects 26

III. IDENTIFY, INCREASE THE CLARITY OF AND PROMOTE THE USE OF RESILIENCE-RELATED REGULATIONS IN RESILIENCE PLANNING AND COASTAL DECISION MAKING 28

1. Identify Opportunities in the Existing Coastal Rules to Advance Resilience Goals 28

2. Scope, Draft and Propose New Coastal Rules and/or Amendments to Existing Rules to Address Resilience Issues or Clarify Existing Standards 30

IV. PROVIDE INCENTIVES TO ENCOURAGE COASTAL COMMUNITY PARTICIPATION IN RESILIENCE EFFORTS 33

1. Identify and Provide General and Programmatic Incentives to Participation 33

2. Identify and Provide Financial Incentives to Participation 34

3. Facilitate the Professional Evaluation of Traditional and Innovative Financing Strategies to Fund Community Participation 34

CONCLUSIONS AND NEXT STEPS 35

APPENDICES

	Page
Appendix A – Persons and Sources Consulted	Appendices page 1
Appendix B - Sample Resilience Goals	Appendices page 8
Appendix C - Sample Resilience Standards and Metrics	Appendices page 9
Appendix D - Summary of NJDEP and Resilience Partner Projects	Appendices page 11
Appendix E – Examples of Ongoing Regional Resilience Efforts	Appendices page 12

EXECUTIVE SUMMARY

After Superstorm Sandy, most New Jersey communities were struggling with their immediate recovery efforts and were unable to consider the systemic changes necessary to enhance their long term resilience. To assist them with their long-term resilience efforts, the New Jersey Department of Environmental Protection's (NJDEP) Coastal Management Program (CMP) developed the Resilient Coastal Communities Initiative (RCCI) with a grant funded by the National Oceanographic and Atmospheric Administration (NOAA) through a competitive CRest award (June 1, 2014 – May 30, 2016).

Under the RCCI grant, CMP worked with several partners to provide coastal communities with planning assistance and technical support to enhance resilience and reduce their exposure to coastal hazards. RCCI was designed to leverage and supplement the ongoing work of the CMP and several project partners who were subcontractors to CMP under the grant, including the Rutgers University Edward J. Bloustein School of Planning and Public Policy, the Jacques Cousteau National Estuarine Research Reserve, the Monmouth University Urban Coast Institute, Sustainable Jersey, and New Jersey Future. The Delaware Valley Regional Planning Commission was subsequently included to provide a similar set of services using funds from the CMP's annual Coastal Zone Management award from NOAA.

Informed by the work of the RCCI project partners; interviews, meetings and workshops with community representatives, residents and other stakeholders; and the review of other state programs and additional sources, this report addresses the following questions, and provides recommendations for possible actions by CMP, NJDEP and other state agencies:

- What are the challenges to coastal resilience faced by New Jersey's coastal communities?

- What are the policy needs and solutions to address those challenges?

The recommendations, which reflect and address the experiences and needs of the coastal communities, are arranged in four categories: (I) Improve coordination of resilience efforts and opportunities; (II) Develop programs and systems necessary for coastal communities to address long-term resilience and post-storm recovery; (III) Increase certainty and understanding of relevant regulations; and (IV) Provide incentives for coastal community participation.

I. Improve coordination of resilience efforts:

- Continue and enhance NJDEP CMP coordination of coastal community resilience planning efforts through the establishment of a Community Resilience Planning Program within the CMP.

- Develop and facilitate the use of the best available resilience science in all relevant NJDEP programs and planning efforts.

- Define what "resilience" means to the New Jersey coastal zone and identify the goals and standards through which it can be achieved and the metrics to measure progress.

- Develop an inventory and facilitate the coordination of coastal community resilience-related projects.

- Enhance and more effectively utilize partnerships with governmental and non-governmental organizations engaged in resilience efforts.

II. Develop key programs and policies that establish the framework to assist coastal communities in their resilience efforts:

- Develop a Coastal Zone Resilience Plan to inform coastal communities of the CMP's resilience goals, policies and programs and guide them in their local and regional resilience efforts.

- Continue efforts to develop a collaborative, community-based planning process that incorporates resilience measures.

- Based on the policy changes implemented by NJDEP to guide communities in their post-Sandy recovery efforts, develop a guidance document compiling the policies that may be invoked in times of emergency.

- Encourage the development of an enhanced Blue Acres acquisition and mitigation program that includes a public information campaign, relocation assistance and options for management of the newly-created open space.

- Develop and implement training and educational programs regarding resilience strategies, risk communications and the best available science to enable coastal communities to engage in fully informed planning and recovery decisions.

- Engage in the continuous search for opportunities, resources, planning and other measures to enhance NJDEP and coastal community capacity to improve resilience.

III. Enhance and promote resilience-related regulations:

- Identify opportunities in the existing Coastal Zone Management Rules ("Coastal Rules") to advance resilience goals.

- Propose new or amended Coastal Rules as needed to address resilience issues.

IV. Provide incentives to encourage coastal-community participation in resilience efforts:

- Identify and provide general and programmatic incentives to community participation.

- Identify and provide financial incentives to community participation.

- Facilitate the professional evaluation of traditional and innovative financing strategies to support coastal community resilience planning and programs.

The NJDEP has already made progress in advancing many of the recommended actions under current and emerging rules, policies, and programs, the stakeholder comments received as part of the CMP Section 309 Assessment and Strategy, as well as in research and data compiled over the past decade by NJDEP, its project partners, and other organizations. By leveraging these efforts and its own expertise and resources combined with those of its many cooperating partners, NJDEP will be positioned to bring New Jersey substantially closer to the level of resilience it needs to thrive today and in the future.

INTRODUCTION

NEW JERSEY'S VULNERABILITY TO COASTAL HAZARDS

Hundreds of thousands of New Jersey residents live in areas vulnerable to coastal hazards. It is estimated that all of New Jersey's 130 miles of Atlantic coast and 1700 miles of tidal shoreline are at high risk from coastal storms and storm surge; 85% are at a high risk from coastal erosion; and 98% are at high risk from sea level rise.[1] In total, over 550,000 acres of the Garden State are characterized as highly vulnerable to the effects of coastal and riverine flooding, storm surge, shoreline erosion and sea level rise.[2]

The location and extent of flooding in New Jersey is dependent upon the type of storm. In 2011, Hurricane Irene brought with it a storm surge of three to five feet, causing moderate to severe flooding along the ocean and moderate tidal flooding along the Delaware Bay and River. However, Irene's record rainfall caused damaging riverine flooding in the highly populated areas along the Raritan, Millstone, Rockaway and Passaic Rivers, resulting in seven deaths and approximately $1 billion in damages.[3]

One year later, Superstorm Sandy brought less rainfall to the Jersey Shore, but record breaking high tides and wave action combined with sustained winds as high as 60 to 70 mph with gusts as high as 80 to 90 mph, battered the state.[4] With a storm surge measuring 8.9 feet at its Sandy Hook high point, Sandy destroyed or significantly damaged 30,000 homes and businesses, affected 42,000 additional structures, causing an estimated $29.4 billion in damage state wide.[5] Sandy was also responsible directly or indirectly for 38 deaths.[6] Although riverine flooding is the most common type of flooding experienced by New Jersey, Sandy was by far the single most costly natural disaster in the State.[7]

THE NEW JERSEY RESILIENT COASTAL COMMUNITIES INITIATIVE

After Superstorm Sandy, most New Jersey communities were struggling to manage their immediate recovery efforts and lacked the resources to consider the systemic changes necessary to protect against future storms.[8] To assist them with their long-term resilience efforts, the CMP, with funding from NOAA, established the Resilient Coastal Communities Initiative (RCCI).

The RCCI provided coastal communities in New Jersey's coastal zone[9] with planning assistance and technical support to identify their exposure to coastal hazards and take the initial steps to

---

[1] New Jersey Coastal Management Program Section 309 Assessment and Strategy 2016-2020 ("309 Assessment"), New Jersey Department of Environmental Protection, Office of Coastal and Land Use Planning, August 31, 2015, p. I-5, IV-93,94.
[2] 309 Assessment, p. 1-5; p. IV-92.
[3] 309 Assessment, p. IV-93-94
[4] State of New Jersey 2014 Hazard Mitigation Plan (NJ HMP), New Jersey Office of Emergency Management, Section 5.8, Hurricane and Tropical Storm, p. 5.8-23.
[5] NJ HMP, p. 5.8-23.
[6] NJ HMP, p. 5.8-23.
[7] NJ HMP p. 5.8-23; 309 Assessment, IV-93
[8] Kutner, "In Deep", p. 3.
[9] The term "coastal zone" as used throughout this report refers to the area as defined by the NJDEP's Coastal Management Program, and includes all municipalities that are tidally flowed and/or that are within the CAFRA area. The term "coastal communities" throughout this report refer to the municipalities within the coastal zone. For a map and narrative description of the coastal zone and CAFRA area boundaries, see http://www.state.nj.us/dep/cmp/

reduce their vulnerability through long-range planning. The program was designed to leverage and supplement the ongoing work of several project partners, including the Rutgers University Edward J. Bloustein School of Planning and Public Policy (Rutgers), the Jacques Cousteau National Estuarine Research Reserve (JCNEER), the Monmouth University Urban Coast Institute (UCI), Sustainable Jersey and New Jersey Future. The Delaware Valley Regional Planning Commission was subsequently included to provide a similar set of services using funds from the CMP's annual Coastal Zone Management award from NOAA.

Specific components of the RCCI include:

- **Coastal Vulnerability Assessment (CVA):** Development of a standardized assessment tool that enables municipalities to evaluate the impact of flooding scenarios on community assets, populations, and critical services. The resultant information allows for capital planning and land use/development decisions necessary to avoid catastrophic damage and losses in future events.

- **Getting To Resilience (GTR):** An interactive detailed questionnaire used in combination with a mapping tool to increase communities' understanding of how vulnerabilities can be addressed through hazard mitigation planning. GTR is designed to be a facilitated municipal self-assessment tool that identifies and links planning, mitigation and adaptation opportunities.

- **Local Recovery Planning Managers (LRPMs):** A pilot program that teamed resilience professionals with select Sandy-damaged towns to assist them with their long-term resilience efforts. Dispatched during the recovery effort and available to the towns for almost two years, the LRPMs secured approximately $8 million in funding for diverse projects, including living shorelines restoration, lagoon dredging, wastewater facilities' repair, and flood protection for a historic lighthouse.

- **The RCCI Policy Recommendations** - As part of the RCCI effort, this report makes recommendations to the CMP regarding policy, regulatory and management practices that will increase resilience opportunities for New Jersey and its coastal communities. Building upon the work of the RCCI project partners, the policy recommendations address the following questions:

    - What are the challenges to coastal resilience faced by New Jersey's coastal communities?

    - What are the policy needs and solutions that will address those challenges?

In addition to the experiences and needs of the coastal communities identified through the work of the project partners,[10] the policy recommendations were informed by the review of relevant studies, reports and data sets; participation in panels, discussions and workshops with members of the impacted communities, resilience practitioners and climate scientists; the review of the resilience programs, statutes and regulations of other states; and one-on-one

[10] Because of the differences in geography, size, organizational structure and financial circumstances of the participating coastal communities, there were variations in the experiences of the coastal communities. This report attempts to capture and address the experiences that were common to many of the coastal communities and that impacted their resilience efforts or opportunities.

interviews with the project partners and other professionals and experts in relevant fields.[11] A summary of interviews and other sources consulted is set forth in **Appendix A.**

CHALLENGES TO COASTAL COMMUNITY RESILIENCE

The challenges to coastal community resilience fall into four broad categories, with several sub-issues contributing to each. They present opportunities to adjust or enhance current practices that will lead to meaningful improvements in current resilience efforts.

I. Coordinate Resilience Efforts Both within NJDEP and Between NJDEP and other State Agencies and Organizations to Avoid Inconsistent Results

1. The various NJDEP programs engaged in resilience efforts, as well as the array of resilience and recovery guidance from multiple state and federal agencies and non-governmental organizations, could better serve communities through coordination of their efforts.

2. State-endorsed, scientifically supported sea level rise projections and storm and flooding probabilities would improve land use planning and development decisions in the coastal communities (including negating the inappropriate use of FEMA maps to inform future planning).

3. Increased coordination between or common oversight of the numerous resilience and mitigation projects underway would reduce duplication of effort, create opportunities for collaborative or more regionally-based efforts, and create the ability to track the impacts of the projects both on resilience and on each other.

4. A means to effectively enlist the timely assistance of other governmental and non-governmental organizations to provide post-disaster and resilience planning support would provide communities with much needed expertise.

II. Leverage Opportunities Presented During Post-Storm Recovery to Better Advance Community-Level Resilience Efforts, Including Projects, Planning and Education

1. Increased pre-storm community planning and a better understanding of resilience needs and opportunities would provide towns with additional and more resilient rebuilding alternatives during post-storm recovery.

2. Increased awareness and understanding of the specific purposes of and opportunities provided by existing resilience programs and tools would increase their use in coastal communities. Additionally, the NJDEP's identification and endorsement of the best available tools would negate the hesitancy to rely upon the tools displayed by some communities and the professional planners and engineers that serve them.

[11] This effort focuses on challenges that can be addressed by policies and regulatory measures established within the New Jersey Coastal Management Program and co-implemented by other NJDEP programs that engage in resilience efforts in New Jersey. While many other challenges remain, they are beyond the scope of this project.

3. Funding disbursements that focus on more collaborative and regionally-based recovery projects (rather than small-scale single town or site-specific projects) would reduce duplication of effort and potential conflicts between neighboring towns, and better enable the achievement of long-term resiliency goals.

4. Although appreciative of the information, coastal communities found confusing the various administrative orders, enforcement alerts and other notices identifying the temporary policies that were in effect in the aftermath of Superstorm Sandy.

5. An increase in the coastal communities' understanding of the important flood and storm mitigation functions of wetlands and other natural features would facilitate their protection and increase the consideration of nature-based solutions in resilience planning and projects.

6. A unified vision for long-term coastal community planning and a commitment to ongoing engagement and education would reduce highly localized development patterns, and negate the need for coastal communities to draw their own (sometimes incorrect) conclusions about the NJDEP's goals and intentions.

III. Clarify and Promote Resilience-Related Regulatory Standards and Ensure they Reflect NJDEP's Strong Commitment to Resilience

1. The identification and promotion of the numerous resilience-related standards within the existing Coastal Rules would increase their consideration in community planning efforts and in the coastal decision-making process.

2. NJDEP's commitment to facilitate resilience measures in the coastal zone, and the importance with which it regards natural coastal features as a means to protect communities from coastal hazards, could be better reflected in the Coastal Rules.

IV. Address the Financial Disincentives to Community Engagement In Sound Resilience Efforts and Identify and Promote Additional Incentives to Participation

1. Many municipalities lack the capacity to engage in resiliency planning and adaptation efforts.

2. The potential economic benefits of resilience measures, as well as the costs associated with no action, must be better understood by the coastal communities to enable them to engage in fully informed planning efforts and decision-making.

3. A sustainable source of funding is needed to ensure the continuation and long-term success of community resilience projects (most of the post-Sandy funding was disbursed as grants and not loans, negating the opportunity to replenish the limited pool of funds).

4. The need to maintain tax ratables, the robust real estate market for storm-damaged coastal properties, misunderstandings about NJDEP programs, and a lack of funding, time and staff can deter community engagement in resilience opportunities.

RECOMMENDATIONS TO INCREASE COASTAL COMMUNITY RESILIENCE

Each challenge provides an opportunity to respond in a manner that increases the coastal communities' preparedness for existing and emerging coastal hazards and long-term resilience. These opportunities are represented in the following list of recommendations. The list is followed by a more in-depth explanation of each recommendation. More specific examples and details are set forth in various appendices as indicated.

II. Improve Coordination of Resilience Planning and Recovery Efforts

1. Continue and enhance NJDEP CMP coordination of coastal community resilience planning efforts through the establishment of a Community Resilience Planning Program within the CMP.

2. Facilitate use of the Best Available Science into the CMP's community resilience planning efforts and other DEP and state agency planning efforts, programs and policies in the coastal zone.

3. Define what "resilience" means to the New Jersey coastal zone, and identify the goals and standards through which it can be achieved and the metrics to measure progress.

4. Develop an inventory and facilitate coordination of all resilience-related projects and community planning and monitor outcomes and impacts.

5. Enhance and more effectively utilize NJDEP partnerships with governmental and non-governmental organizations engaged in resilience.

6. Work with other state and federal agencies to better coordinate resilience programs and projects.

II. Develop Key Programs and Policies that Establish the Framework Necessary to Assist Coastal Communities in their Resilience Efforts

1. Develop a Coastal Zone Resilience Plan to inform coastal communities of the CMP's resilience goals, policies and programs and to guide them in their local and regional resilience recovery and planning efforts.

2. Continue ongoing efforts to develop a collaborative, community-based planning process that provides viable alternative scenarios and lays the foundation for proactive resilience efforts.

3. Based on the policy changes implemented by the NJDEP to guide communities in their post-storm recovery efforts, develop a guidance document compiling the policies that may be invoked in times of emergency.

4. Encourage the development of an enhanced Blue Acres acquisition and mitigation program that includes a public information campaign, relocation assistance and options for management of the newly-created open space.

5. Develop and implement training and educational programs regarding resilience strategies, risk communications and the best available science to enable coastal communities to engage in fully informed planning and recovery decisions.

6. Engage in the continuous search for opportunities, resources, planning and other measures to enhance NJDEP and coastal community capacity to improve resilience.

III. Identify, Increase Clarity and Promote the Use of Resilience-Related Regulations in Resilience Planning and Coastal Decision Making

1. Identify and promote opportunities in the existing Coastal Rules to advance resilience goals.

2. Scope, draft and propose amendments to existing Coastal Rules and new Coastal Rules as necessary to address resilience issues.

IV. Identify, Develop and Promote Incentives for Coastal Community Participation

1. Identify and promote general programmatic incentives to participation.

2. Identify and promote financial incentives to participation.

3. Identify and assess the use of traditional and innovative financing strategies to support coastal community resilience planning and programs.

I. IMPROVE COORDINATION OF RESILIENCE EFFORTS

Many of the issues identified as barriers to coastal community resilience directly relate to a need for better coordination between the programs and projects that are underway. Improved coordination will generate significant benefits including the unified promotion of ongoing resilience programs and projects so communities are aware of existing opportunities, ensuring that resilience programs are focused on the achievement of common goals, avoiding duplication of effort and allowing for the best and most efficient use of existing resources. Such coordination is critical to the overall success of resilience efforts.

The following recommendations seek to facilitate the coordination necessary to allow for a more focused and cohesive resilience program. Most important, implementation of these recommendations will aid the coastal communities in identifying and achieving their resilience goals, including realization of economic, social and environmental benefits.

1. Establish a Community Resilience Planning Program within the CMP to Continue and Enhance the CMP's Role in Coastal Community Resilience Planning

It is recommended that a Community Resilience Planning Program is established within the CMP to enable the CMP to continue and enhance the resilience activities developed under the RCCI, and to allow the CMP to continue to serve as the lead coordinating entity and point of contact for community resilience planning efforts in the coastal zone. The establishment of such

a program is a fundamental and core recommendation of this report as it is the essential step in addressing all of the challenges to coastal community resilience planning described above.

The Community Resilience Planning Program will provide the mechanism for consistency and coordination of resilience efforts within the NJDEP, as well as establish the CMP as a common point of contact for coastal communities, other state and federal agencies and all those seeking assistance and information regarding resilience needs and opportunities. It is contemplated that, through the Community Resilience Planning Program, the CMP will take the lead in prioritizing, planning for and undertaking the recommendations that follow, in collaboration with other NJDEP programs, state and federal agencies and non-governmental resilience partners.

2. Facilitate the Use of the Best Available Resilience Science in Community Resilience Planning Efforts

In order for coastal communities to engage in meaningful and consistent resilience planning, they must have the best available information regarding existing and future coastal hazards, including climate science projections. Development of this climate science is underway in New Jersey. The New Jersey Climate Adaptation Alliance convened a panel of climate scientists to analyze projections for storm severity, type and frequency, storm surges, geologic subsidence, and sea level rise. Consensus points were identified and values applicable to New Jersey were estimated and presented for review to a comprehensive panel of resilience professionals. Adjustments were made to facilitate the practical application of the science in community planning, restoration and development scenarios, and the resultant science is currently under review.

The resultant science, including sea level rise projections, can be incorporated into all NJDEP resilience efforts, including community and regional planning, the development or enhancement of regulatory standards (including, but not limited to, the Coastal Rules), and efforts to enhance and protect natural resources important to resilience, such as wetlands, shorelines, beaches, and dunes. It can also be made available and its use encouraged in the resilience efforts of other state and federal agencies that are in or that impact New Jersey's coastal zone.

Development of the best available science is an ongoing process, and policies and standards, including those based upon climate projections, must be continually reviewed and updated as the science evolves. Further, gaps in existing science must be identified, including those recently noted by the CMP, such as the combined impacts of storms and sea level rise, and modeling to predict future riverine flooding events.[12] The NJDEP should make a firm commitment to support efforts to close those gaps and can rely upon the outreach and training provided by its project partners to make the science widely available.[13]

3. Define the term "Resilience" and Establish the Goals and Standards through which it can be Achieved and the Metrics to Measure Progress

To facilitate the coordination necessary to achieve community resilience, a multi-pronged approach is recommended that (a) defines what the term "resilience" means; (b) establishes

[12] 309 Assessment, p. IV-94, 95

[13] Such project partners include JCNERR and the National Estuary Programs, as well as the New Jersey Sea Grant Consortium's Coastal Processes Specialists and Climate Adaptation Specialists.

resilience goals; and (c) identifies the standards and metrics that will guide and measure the progress of resilience programs and projects.

a. Define the term "resilience"

The term resilience means different things to different people, as is evidenced by the sheer number of definitions that exist.[14] The work of the CMP and its project partners has demonstrated that the scope of a comprehensive resilience effort in New Jersey includes much more than protections against flooding and storm damage. Resilience also pertains to the character and economic vitality of the State's coastal communities, the physical and mental health of its citizens and the protection of its natural resources. These elements must be captured in New Jersey's definition of resilience. To accomplish this, some states present their definition of resilience as a mission statement or as a declaration of what a resilient state would look like.[15]

As a starting point, the following definition, which was developed by the National Academies of Science and adopted by the NOAA National Ocean Service, is offered for consideration:

> *Resilience is the ability to prepare and plan for, absorb, recover from, and more successfully adapt to adverse events.*[16]

In addition, the following complementary declaration is offered to convey the breadth of the resilience effort in New Jersey:

> *A resilient New Jersey will be achieved by identifying and anticipating risks, planning to limit impacts, learning from past adverse events, engaging in adaptation strategies to support recovery and growth, and working towards the common goals of safety, community, economic vitality and health and well-being.*[17]

A definition recommended by the CMP for use at the state and local level and across multiple sectors (e.g., environment, transportation, energy) will lend significant support to efforts to facilitate consistent action within the coastal communities.

b. Establish Resilience Goals

In addition to the CMP, numerous other NJDEP programs are involved in resilience efforts, including the Engineering and Construction program[18], the Green Acres program, and the Division of Land Use Regulation. To facilitate coordination between NJDEP programs, it is

---

[14] See, e.g., Community and Regional Resilience Institute, "Definitions of Community Resilience: An Analysis," 2013, Table I, p. 3-9, and 38 definitions set forth therein.

[15] State of Vermont's "Roadmap to a Resilient Vermont" as quoted in "Building Resilient States: A Framework for Agencies", Smartgrowth America, October 2015, p. 8.

[16] "Disaster Resilience: A National Imperative", National Academies of Science, Committee on Increasing National Resilience to Hazards and Disasters; Committee on Science, Engineering and Public Policy, 2012, p. 14.

[17] Adapted in part from the definition of resilience developed by the NJ Resiliency Network, as set forth in the Sustainable Jersey "Post Sandy Municipal Needs Assessment for Long Term Recovery and Resiliency Planning, Summary Report," March 2015, p. 2.

[18] Recently, the Office of Engineering and Construction was elevated from its place within the Natural and Historic Resources program to be its own program managed by an assistant commissioner. The new Engineering and Construction program now consists of three existing organizational areas: The Office of Flood Hazard Risk Reduction Measures, the Bureau of Dam Safety and Flood Control, and the Bureau of Coastal Engineering.

important to establish the common resilience goals these programs will strive to achieve (hereafter referred to in this report as "Resilience Goals"). The starting point to identify such Resilience Goals is the Coastal Zone Management Act, the federal statute under which the CMP was established and which sets forth the elements that must be included in all state coastal management programs. Other sources are the state statutes and implementing regulations that comprise the enforceable policies of New Jersey's CMP, including CAFRA, the Coastal Rules, the Wetlands Act and the Freshwater Wetlands Protection Act. Collectively, these coastal management authorities provide objectives that could serve as the basis for the CMP's resilience goals**.** Examples of potential Resilience Goals are set forth in **Appendix B**.

c. Identify and/or develop the standards and metrics that will guide and measure resilience-related decisions in the coastal zone

To foster consistency between NJDEP programs and other resilience efforts throughout the State, the standards that will be applied to coastal decision-making and the metrics to measure resilience progress must be more clearly identified. Many of these standards and metrics already exist in the Coastal Rules and the rules implemented by various NJDEP programs. Other new and emerging standards and metrics are under development through ongoing projects of the CMP and its project partners, or have been proposed as part of the CMP 309 Strategy and Assessment for 2016-2020. They range from high-level standards and metrics that apply to all coastal decision making to those that are applied to specific actions, decisions, locations or resources.

To implement this recommendation, an analysis of the existing Coastal Rules, the CMP, and other NJDEP rules, programs and initiatives should be conducted to identify existing regulatory and scientific standards and metrics that are or can be appropriately applied to resilience-related actions or that can measure progress made towards the Resilience Goals. This same analysis should compare the existing standards to the Resilience Goals to identify the Goals for which inadequate or no standards exist.

In preparation of this report, a preliminary review of existing rules and ongoing programs was conducted to identify the various standards and metrics that already exist or are under development**.** Examples of resilience standards and metrics are set forth in **Appendix C**.

4. Facilitate Coordination of Resilience-Related Projects

The lack of coordination between the numerous resilience and mitigation projects underway was noted not only by the coastal communities, but also by the various organizations implementing the projects. Due in significant part to the fact that there is currently no source of information identifying all of the ongoing and proposed projects, this has led to frustrations in communities that have been approached multiple times by different organizations seeking to engage them in resilience activities. It has also resulted in numerous mitigation and restoration projects along the coast with no understanding of whether these projects may impact each other, or if they might have been more effective through collaborative efforts.

It would be productive if ongoing and proposed resilience projects and planning efforts in the coastal zone were tracked, including their location, entities involved in their implementation and the goals they seek to achieve. This information could be made available in a database and/or website to coastal communities, planners, engineers and other agencies and organizations involved in resilience efforts. In addition to compiling this information, the coordination of these

projects would identify opportunities to avoid duplication of effort, ensure that the projects further the state's Resilience Goals as well as the specific goals of the community involved, identify opportunities for projects to be combined or implemented on a larger geographic scale and make sure each project does not interfere with other ongoing resilience efforts. The compilation of information regarding and oversight of all ongoing resilience projects and community planning activities will allow for an ongoing analysis of the cumulative effect of these efforts and for all involved to keep an eye on the bigger resilience picture.

5. Enhance and More Effectively Utilize NJDEP Partnerships with Governmental and Non-Governmental Organizations Engaged in Resilience Activities

Partnerships between NJDEP and organizations with expertise in the numerous resilience-related subject matters have proven effective for program development, implementation and community outreach. The breadth and substance of the innovative programs established through such partnerships are worth noting, and are summarized in **Appendix D**.

Through their post-Sandy recovery efforts, the coastal communities and the RCCI project partners noted that the earlier involvement of an expert partner would have significantly benefited the communities and saved considerable resources. For example, several towns submitted grant proposals for resilience projects, including for shoreline restoration and other mitigation efforts. However, project partners with relevant expertise were not engaged until after the funding was awarded, at which time it was determined that a different type of project, including natural-resource mitigation or restoration projects, would have more effectively and economically served the town's needs.

The opportunities for partnerships between the NJDEP and other organizations to implement resilience efforts are many, including those that exist for exploring and carrying out the recommendations in this report. NJDEP's resilience program should include a mechanism to make more effective use of the relationships between the CMP and its project partners, and to identify partnership needs and the appropriate partner in a timely manner. To facilitate these efforts, the following should be considered:

- Commit to the continuation and enhancement of the CMP's community resilience planning efforts and its facilitation of the sharing of information, needs and resources between the partners and the communities seeking assistance.

- Develop a common vision, principles for coordination and appropriate charter or other agreement between the CMP and its resilience project partners to affirm their commitment to the collaborative pursuit of resilience efforts and to share information and resources.

- Develop criteria and a process for the rapid deployment of entities with demonstrated expertise and/or relevant local experience to serve as project partners for specific types of activities, including community planning, public outreach, wetlands mitigation and restoration, shorelines restoration, ecosystem service valuations, workshops and training.

- Provide a database of potential project partners categorized by areas of expertise to assist agency personnel and coastal communities seeking assistance with resilience projects, including preparation of proposals for funding to ensure the project as proposed fits their needs.

6. Work with Other State and Federal Agencies to Define Respective Roles and Responsibilities for Resilience Activities in the Coastal Zone

In the aftermath of Superstorm Sandy, municipalities and citizens expressed confusion regarding the "alphabet soup" of agencies involved in recovery efforts, including DEP, DCA, OEM, FEMA and HUD. One purpose of designating the CMP as the lead coordinating entity is to alleviate this confusion by providing a central contact for those seeking assistance and information. However, it is also necessary to avoid confusion and duplication or inconsistent efforts *between* these agencies. To facilitate such coordination, the following is recommended:

- Advise all state and federal agencies as applicable that the CMP is the point of contact and source of information for state resilience efforts in the coastal zone.
- Provide the agencies with the CMP's Resilience Goals and note that decisions will be made and actions taken to achieve these Goals.
- Work with other agencies to review their policies, programs and regulations to determine if there are any inconsistencies between them and the CMP's Resilience Goals and, if so, advise that the CMP will continue to work with them to resolve such inconsistencies.
- Request that the CMP be notified of any proposed mitigation or resilience-related projects sponsored, funded or undertaken by the agencies within the coastal zone or that might impact the coastal zone, to render a determination if such project is consistent with the Resilience Goals and other projects proposed in the area.
- Explore the opportunity to incorporate projects supported with federal post-storm disaster relief funds into the NJDEP CZMA Consistency Program. This may result in NJDEP's notification of such projects in their earlier planning stages, allowing for a determination of whether they are compatible with ongoing or proposed projects and to ensure that the funds are applied to more regionally-based and collaborative efforts. If warranted, NJDEP may also render a determination as to whether the projects are consistent with the enforceable policies of the CMP.[19]

II. DEVELOP PROGRAMS AND POLICIES TO ESTABLISH THE FRAMEWORK NECESSARY TO ASSIST COASTAL COMMUNITIES IN THEIR LONG-TERM RESILIENCE PLANNING AND POST-STORM RECOVERY ACTIONS

In researching and interviewing stakeholders about their experiences during the post-Sandy recovery effort, it was apparent that they had difficulty identifying and assessing the various response, recovery and resilience opportunities available to them. As such, they were unable to make fully informed decisions that would not only help them with their immediate recovery, but

[19] Several states utilize this opportunity to ensure that projects proposed with federal post-storm disaster relief funds are consistent with their CMPs. For example, both New York and New Hampshire specifically identify activities funded by DOA Watershed Protection and Flood Prevention Loans and HUD Community Development Block Grants as activities subject to state CZMA Consistency Program review. This would provide the opportunity if circumstances arose where it was deemed advantageous or necessary, for NJDEP to determine if proposed projects supported with these funds were consistence with the enforceable policies of the CMP, including the Coastal Goal of "safe, healthy and well-planned coastal communities" which, in turn would enable NJDEP to ensure the funds supported regionally-based collaborative projects.

could contribute to their long-term resiliency needs. These issues highlighted the opportunity to put in place the policies and programs that will establish the framework necessary to assist communities in their future recovery and planning efforts and ensure they have the information necessary to make the best choices. Such policies and programs include:

- A unified vision for coastal community resilience planning in the coastal zone that clearly articulates the long-term Resilience Goals and related policies to guide communities in their own planning efforts.

- A community-based collaborative planning process that provides viable progressive alternative scenarios for future resilience and to lay a foundation for proactive resilience efforts.

- Improved community communication and outreach regarding policies to be implemented in the aftermath of a hazard event that set the stage and parameters for the development of emergency regulations and standards.

- NJDEP identification and endorsement of resilience tools and programs that embody best practices and improved community outreach, education and access to such resilience tools and programs.

- Education and outreach regarding the important flood and storm mitigation functions of wetlands and other natural features and technical guidance for enhancing, restoring or mitigating these features.

The following recommendations are intended to increase coastal communities' awareness and understanding of the NJDEP's Resilience Goals and the opportunities available to communities to meet them, explain why resilience measures are important, and demonstrate how their local efforts fit into and facilitate the overall goals for the state coastal zone. Most important, these recommendations are intended to enable communities to act, both in preparation for the next coastal storm or flooding event and, in the aftermath of such an event, to better protect residents, property and natural resources.

1. Develop a Coastal Zone Resilience Plan that Clearly Identifies the CMP's Resilience Goals and Policies

The project partners and the coastal communities they work with agree that planning is necessary to identify the coastal zone's short and long term risks from coastal hazards, as well as the investment and policy priorities the NJDEP will employ to reduce and prepare for those risks. This conclusion was supported by a 2014 NJDEP stakeholder survey in which respondents asserted that the lack of regional planning and associated mapping is one of the greatest roadblocks to reducing risks from coastal hazards.[20]

The development of a plan and the clear articulation of the NJDEP's resilience goals and policies will provide a single source of information for coastal communities to better understand both the NJDEP's bigger resilience picture and to serve as a guide for their own resilience planning and recovery efforts. Such a plan will also prevent the coastal communities from drawing their own incorrect conclusions about the NJDEP's intentions for the coastal zone.

[20] 309 Assessment, p. VII-157.

For example, some of the rural Delaware Bayshore communities want to revitalize their historic working waterfronts or develop new water-dependent industries to revive their economies. This desire is in complete alignment with the CMP's goals and policies as stated in the current Coastal Rules (see, *e.g.,* Coastal Goal 4, promoting "sustained and revitalized water-dependent uses" and "the redevelopment of inactive and underutilized waterfront facilities for water-dependent uses")[21]. Unaware of these goals, the communities, which are also rich in important natural resources including wetlands, instead believe that the NJDEP wants the area to "revert back to its natural state", and that the agency will achieve this result by refusing to provide the necessary approvals for any waterfront revitalization efforts.

Developing a plan that articulates the NJDEP's goals and policies, including those regarding water dependent uses and working waterfronts, natural resources conservation and mitigation and that identifies areas appropriate for such revitalization and conservation, will take the guesswork out of the equation and provide the coastal communities with the information necessary to engage in their own community-based planning.

To facilitate these efforts, the development of a Coastal Zone Resilience Plan is recommended that presents a unified vision for the coastal zone and demonstrates to the coastal communities as well as other state and federal agencies how the CMP's policies and programs will actually play out in the coastal zone ("the Plan"). The Plan can be implemented by updating an existing plan, such as the New Jersey Shore Protection Master Plan, or through the development of a new plan, and should clearly articulate the Resilience Goals that the CMP strives to achieve and the standards and policies that will be applied in the coastal decision making process. All key elements should be identified both in the document text and in an accompanying visual/mapping component. The resultant enhanced or new Plan should be characterized as a living document that will continually be informed by updates of the best available resilience science, enhancements to state programs, policies and rules, and the progress of ongoing community and regional resilience planning and projects.

Suggested elements for inclusion in the Plan are:

- Definition of the term "resilience" and the components of a resilient New Jersey (see recommendation I-3, above).
- The CMP's Resilience Goals, the regulatory standards (including the Coastal Rules) through which they will be achieved and the metrics that will measure success (see recommendation I-3, above).
- The coastal hazards and other resilience challenges facing the coastal zone (much of this information is compiled in the New Jersey State Hazard Mitigation Plan).
- Identification and categorization of the major state assets of concern (natural and man-made/structural, also set forth in the NJ Hazard Mitigation Plan).
- Summary of the best available climate science regarding storm and flooding event probabilities and impact projections, and sea level rise impact projections (see recommendation I-2, above).

[21] N.J.A.C. 7:7-1.1 (c)(4) and (5).

- Identification and discussion of the gaps in existing science (*e.g.*, the combined impacts of storms and sea level rise; modeling to predict future riverine flooding events) and confirmation of the CMP's commitment to support efforts to fill those gaps.

- A mapping component that visually displays areas of concern, including those most vulnerable to coastal hazards, their respective levels of vulnerability, as well as the location of important natural resources important to resilience.

- Designation of "Sea Level Rise Vulnerability Zones," "Coastal Hazard Vulnerability Zones" and "Riverine Flooding Vulnerability Zones" in the coastal zone, and an explanation that development and other activities in those zones will be regulated through the appropriate application of the Coastal Rules and in a manner that facilitates the Resilience Goals (see new Rules proposed in recommendation III-2, Resilience Goals in recommendation I-3 and Appendix B).

- Identification and summary of the applicable NJDEP programs, policies and regulations through which the Resilience Goals will be achieved.

- Identification of other agencies involved in the resilience effort and their respective roles, policies and standards.

- Details regarding the Blue Acres Program, including areas most appropriate for acquisition and relocation (see proposed program enhancements in recommendation II-4, below).

- A summary of opportunities for coastal communities to engage in resilience programs, the mapping and assessment tools available, and the identification of governmental and non-governmental partners that can assist in these efforts (see further discussion in recommendation II-1-e, below).

- The programmatic and financial incentives available to communities that engage in resilience activities and programs, including potential tax incentives, funding sources, monies saved (e.g., reduced flood insurance premiums through the NFIP CRS program) and professional planning and technical assistance that would be provided. (see recommendation IV, below).

- An explanation of the purpose and import of regional and community resilience planning and the expectations regarding content and development of these plans.

- Confirmation that the Coastal Zone Resilience Plan will serve as a guide for the development of community-based resilience plans (local and regional).

- A public information campaign promoting the Plan and, by association, the CMP Community Resilience Planning Program.

Some of the more significant elements that should be included in the Plan and will impart important information to the coastal communities are as follows:

a. *Identify areas most vulnerable to coastal hazards and for which Blue Acres Acquisition is most appropriate*

The combination of FEMA repetitive loss data and the best available climate science would allow for the identification of communities that will be continually damaged by flooding under current typical storm conditions, under increasingly severe storm conditions and as a result of sea level rise. This provides the opportunity to identify and prioritize areas appropriate for strategic acquisition (as well as areas appropriate for other hazard mitigation actions). This information should be included in the Coastal Zone Resilience Plan so coastal communities know whether and which parts of their towns are implicated and can plan accordingly. Although some communities are not expected to experience sea level rise impacts until 2030, 2050 or later, the sooner such information is openly presented and discussed the better. Conveying this information now will enable municipal officials and citizens to familiarize themselves with the issues they are facing and set realistic expectations.

Because of misconceptions expressed by coastal communities about the Blue Acres program, including the belief that the State may resell a property acquired through the program for a profit, it is recommended that the Plan also includes an overview of the program. The overview should clarify the program's purpose, the restrictions placed upon acquired land, and the eligibility criteria and should incorporate the recommendations to enhance the Blue Acres program subsequently discussed in this report.

b. *Identify natural resources that should be protected and/or restored and the existing regulatory standards to do so*

The Plan should identify natural resources throughout the coastal zone that serve as natural barriers against coastal hazards, provide important habitat for coastal species and for which protection and/or restoration efforts are warranted. The Plan should also make it clear that many if not all of these resources can be protected under the existing Coastal Rules, and should identify the specific Coastal Rules and other regulatory authorities that, applied individually or in combination, are critical to this effort.

Many of these important and vulnerable resources have been identified or are currently being assessed through the ongoing resilience programs of NJDEP and its project partners. Examples of such resources include:

- The extensive network of tidal freshwater, brackish and saltwater marshes, beaches, and tidal flats of the Delaware Estuary and other parts of the Delaware River Basin.
- Coastal Wetlands in the Hudson River and Hackensack River estuaries.
- Areas adjacent to and upland of wetlands for preservation and/or vegetation to provide the appropriate buffer for upland and inland migration of wetlands.
- Contiguous coastlines and other coastal systems that are subject to erosion and/or that must be protected in the future from natural coastal hazards and manmade structures that cause erosion.

- Critical habitat linkages and wildlife corridors identified through the Statewide Habitat Connectivity Plan being developed by the NJDEP Division of Fish and Wildlife and its multi-agency, multi-disciplinary working group partners.

- The unconfined Kirkwood-Cohansey aquifer that, in coastal areas, can interact with the ocean, bays, tidal streams and tidal marshes, rendering saltwater intrusion a potential concern.

- Coastal Forests.

- Dune systems or areas where such systems could be appropriately located.

- Undeveloped flood plains, riparian areas and greenways that can absorb flood waters, rainfall and serve as aquifer recharge areas.

c. Identify opportunities to engage in regional resilience efforts

The RCCI project partners, climate scientists and other professionals consulted are unanimous in their agreement that, where appropriate, resilience programs and projects must consider the influences of relevant watershed, fluvial and coastal processes and, where feasible, be implemented on a regional scale. This effort will allow for the more efficient use of scarce resources and, more importantly, lead to more meaningful results.[22]

To facilitate regional resilience efforts, the Plan should identify communities for which collaborative efforts make sense due to commonalities such as geographic location, shared natural resources, vulnerability to the same hazards (e.g., Atlantic Ocean storm surge versus Delaware Bay flooding versus Raritan River flooding), and shared opportunities for recovery, mitigation and planning. Opportunities for collaboration can start with the most basic efforts, such as shared services and equipment agreements, joint evacuation plans and/or the preparation of a Program for Public Information under the NFIP Community Rating System.

In the aftermath of Sandy, many regional alliances formed between coastal communities, such as the Atlantic-Cape Coastal Coalition, a group of 12 southern New Jersey waterfront communities that meet monthly to discuss their common resilience issues and devise shared solutions. In addition, previously-established alliances are taking their collaborative efforts even further, such as the 15 Monmouth County "Two River" towns for which a regional resilience plan known as "NJ Fostering Regional Adaptation through Multiple Economic Scenarios (NJ FRAMES)" is being developed by NJDEP and its partners JCNERR, engineering consultant Louis Berger and the Rutgers Climate Institute.[23]

At the same time, the NJDEP is developing several programs that move away from the traditional site-by-site method of natural resource management, including efforts to apply

[22] As used throughout this report, the term "regional" does not connote a specific geographic area or size; instead, its meaning depends upon the context in which it is used. For example, the Regional Resilience Plan being developed in Monmouth County encompasses 15 municipalities, while the regional shoreline mitigation project in Ocean County includes the shorelines of two towns. The term as applied should recognize the natural connections, benefits and consequences of the action being taken, problem being solved or the solution being developed.

[23] In addition, many existing state resource management programs rely on such groupings, and could serve as the basis for identification of regional resilience designations. Examples include New Jersey's 12 Water Quality Management Planning Areas, 20 Watershed Management Areas, the five larger Water Regions that consist of several watersheds combined or the six NJDEP Landscape Regions.[23]

wetland policies on an eco-regional and watershed basis, and a living shorelines strategy that recognizes such projects are more effective when applied over larger areas.[24] A more comprehensive list of ongoing regional resilience efforts is set forth in **Appendix E.**

d. Identify communities most appropriate for the revitalization of historic working waterfronts or for other water-dependent uses

It is a major goal of New Jersey's CMP to promote water-dependent uses and to assist in the redevelopment of deteriorating waterfronts and ports.[25] New Jersey's history is replete with communities that once hosted thriving waterfront industries, such as oystering, shipbuilding, ship repair and commercial fishing. Some of these communities have waterfronts that remain relatively undeveloped, such as Maurice River Township along the Delaware Bay in Cumberland County. Others have managed to maintain their water-dependent industries but are struggling, such as Belford on the Raritan Bay in Monmouth County. Both of these communities would likely welcome the opportunity to revitalize their waterfronts by reviving their historic water-dependent industries or establishing new water-dependent industries such as ecotourism or aquaculture. The NJDEP's intent to support these efforts, and all of the communities and waterfronts where such efforts would be appropriate, should be included in the Plan.

e. Codify or otherwise officially endorse existing tools and programs that exemplify best resilience practices and provide important resources to communities

The RCCI project partners noted that coastal communities, and in some cases the professional planners and engineers that assist them, are not fully aware of the opportunities provided by existing resilience programs and tools or are not able to fully distinguish between them. In addition, some communities and professionals are hesitant to rely upon the tools because they have not been sanctioned by the NJDEP through inclusion in a resilience guidance document, plan or other formal acknowledgment or endorsement. To remedy this circumstance, a section of the Plan should be dedicated to resilience tools and programs to:

- Identify the resilience tools and programs that the CMP considers beneficial to community resilience efforts and formally sanction or endorse their use in a guidance document and in the Coastal Zone Resilience Plan.
- Explain the purpose of each program and tool, distinguish between them and identify the goal or circumstances for which each is best suited.
- Identify limitations associated with the use of the resilience tools, and how efforts can be enhanced by using two or more tools together.
- Identify how the programs and tools can be accessed and provide contact information for persons or entities that can provide assistance and additional information.

---

[24] "New Jersey Wetland Program Plan 2014-2018", New Jersey Department of Environmental Protection, First Iteration December 2013, p. 3; "Living Shorelines Strategic Directions", Jacobus, Steven, Section Chief, New Jersey Department of Environmental Protection Office of Coastal and Land Use Planning, Draft, September 16, 2015, p 12.

[25] See the Coastal Goals, set forth in the Coastal Rules at N.J.A.C. 7:7-1.1(c), articulating the CMP's commitment to "ensure the viability of suitable waterfront areas for water dependent activities" and "create vibrant coastal communities and waterfronts" and "maintain, enhance and encourage maritime uses."

Examples of tools that should be considered for inclusion are those developed and offered by the RCCI project partners, such as Getting to Resilience, New Jersey Flood Mapper, the Coastal Vulnerability Assessment, NJ ADAPT, as well as those developed and offered by various federal agencies, such as the Community Vulnerability Assessment Tool (NOAA), the Risk and Vulnerability Assessment Tool (NOAA), the Hazard Assessment Tool (FEMA), HAZUS (FEMA) and the Coastal Flood Risk Assessment (FEMA Region 2). Examples of programs that should be included are other NJDEP programs, such the Engineering and Construction program (and its three organizational areas, the Office of Flood Hazard Risk Reduction Measures, the Bureau of Dam Safety and Flood Control, and the Bureau of Coastal Engineering) and the Green Acres program, as well as programs of other state and federal agencies, the former-RCCI project partners and other non-governmental organizations as deemed appropriate by the CMP.

2. Continue Ongoing Efforts to Develop a Collaborative Community-Based Planning Process that Provides Viable Alternative Scenarios and Lays the Foundation for Proactive Resilience Efforts

The development of a local resilience plan provides dual benefits to a community: it can prepare a community for long-term resilience needs and also ensure that a community is equipped to integrate resilience into actions it takes after a storm or other disaster. Conversely, the lack of a local plan can be a significant barrier to these benefits.

There are numerous types of local plans and planning tools that coastal communities can utilize on their own for resilience planning. However, it is critical for the CMP to develop a collaborative and incentive-driven planning process to ensure coastal community engagement, CMP participation and meaningful results.

Since 2000, the CMP, in cooperation with the State Planning Commission, has relied on the Plan Endorsement (PE) Process for community planning, a process that utlizes the Coastal Rules for the designation of Coastal Planning Areas, CAFRA Centers, impervious cover limits and the protection of natural resources.[26] However, the CMP is currently facilitating a pilot program that has the potential to replace or leverage and enhance the PE Process.

a. The Sustainable + Resilient Coastal Communities Pilot Program

Currently being implemented in Tuckerton Borough, Little Egg Harbor Township and Toms River Township and overseen by RCCI project partner New Jersey Future, this pilot project seeks to develop a more targeted, streamlined collaborative process to address community planning and development, coastal resilience and resource protection.[27] It is anticipated that the resultant process will serve as a model for coastal communities to shape long term growth and development patterns and will meet the following objectives:

- Identify appropriate municipal actions in response to specific coastal hazards.
- Protect and enhance the state's coastal resources.

[26] 309 Assessment, p. IV-41; N.J.A.C. 7:7-13.15 – 13.19.
[27] "Proposal to Develop a Comprehensive Coastal Hazard Mitigation Strategy for Little Egg Harbor Township/Tuckerton Borough", NJ Future, February 23, 2015, p. 2.

- Inform potential changes to the Coastal Rules' current approach of coordinating state and local land use and infrastucture decisions.

- Establish a timely, replicable and predicitable process for the joint municipal and state review of development proposals within the CAFRA zone.[28]

The Sustainable + Resilient Coastal Communities Pilot Project should be supported and provided with expertise or resources as needed, *e.g.*, additional NJDEP or non-governmental shoreline restoration or mitigation expertise; regulatory or legal expertise to interpret statutes or Coastal Rules implicated or for which amendments might be necessary; additional engineering or planning expertise to review the proposed development scenarios; or assistance facilitating or documenting community meetings.

b. The Redevelopment Zone Permit

The process for obtaining a Redevelopment Zone Permit, also referred to as a sector permit, could serve as the basis for a separate pilot project in a select coastal community, or as part of the Sustainable + Resilient Coastal Communities Pilot Project. These permits are issued on a city or community-wide basis, such as that issued to the City of Long Branch, and require significant up-front effort on the part of the applicant, including the designation of a Redevelopment Zone and the preparation of a comprehensive Redevelopment Plan for that zone.

In Long Branch, the Redevelopment Plan was reviewed by the City Planning Board, the City Council and the NJDEP and, upon approval, was incorporated into a City Redevelopment Plan Ordinance and a NJDEP Redevelopment Zone Permit. In addition, the NJDEP Permit and specific conditions identified by the agency were codified in the Coastal Rules (see, Long Branch Redevelopment Zone Permit at N.J.A.C. 7:7-7.1). The Long Branch Permit "*authorizes the construction of any development regulated under [CAFRA] within the Redevelopment Zone*" as long as it complies with the permit conditions.

Incorporating lessons learned from the Long Branch experience, this process could be applied on a smaller scale in a coastal community that is particularly vulnerable to coastal hazards and in need of resilience planning and economic revitalization.

c. Continuation and enhancement of the Plan Endorsement Process

In the interim period, meaning while the community planning pilot project is underway and other community planning processes are being considered and developed, the PE Process can be utilized by the NJDEP and coastal communities, in conjunction with the more recently-developed resilience programs and tools, to develop community-based municipal resilience plans.

[28] 309 Assessment, p. IV-98.

3. Draft and Propose a Guidance Document that Compiles the Various Emergency Policy Directives to Guide Communities in their Post-Hazard Recovery Efforts

In the aftermath of Superstorm Sandy, the NJDEP was faced with unprecedented circumstances and addressed issues as they arose to assist communities in their recovery efforts. The NJDEP addressed these issues in a variety of ways, including through an Administrative Order waiving the NJDEP permitting requirements of the Flood Hazard Area Control Act Rules, the Coastal Permit Program Rules, and the Freshwater Wetlands Protection Act Rules for certain replacement and repair development activities; additional emergency amendments to the Coastal Rules and the Flood Hazard Area Control Act Rules; notices referring local governments and property owners to the rules governing the process for obtaining emergency CAFRA, Waterfront Development and coastal wetlands permits; guidance documents related to post-storm beach and dune restoration and maintenance activities; Enforcement Alerts advising that certain equipment, including wood chippers and vegetative waste grinders and emergency generators, could be operated temporarily without obtaining air permits; and Frequently Asked Questions documents relating to specific recovery efforts, such as the process for municipalities to receive temporary approvals to engage additional unlicensed waste haulers and drivers.

While appreciative of these efforts, municipal officials found the numerous and differing types of information confusing and difficult to keep up with. They noted that, going forward, it would be their overwhelming preference to have a single set of emergency rules at hand that would address all of the issues facing the coastal communities in the aftermath of a disaster. However, as each disaster is different and has unique impacts, development of rules that would apply to all future disasters would be difficult, and may even hamper response and recovery efforts if they do not address the specific characteristics of the disaster in question.

As such, based on these comments and a review of the various post-Sandy directives issued by the NJDEP, it is recommended that the NJDEP develop and propose the adoption of a suite of policy directives that would inform emergency rules while still providing the NJDEP with the flexibility to modify them as necessary and appropriate. The suite of policy directives could be compiled in a single guidance document and, in the aftermath of a disaster, the specific directives implicated could be identified and easily accessed by the impacted communities and entities. Such a guidance document would also provide the potentially affected communities and entities with the ability to prepare local plans consistent with these policies, negating some of the confusion experienced after Sandy.

4. Develop an Enhanced Targeted Blue Acres Program That Provides Communities with the Information They Need to Make an Informed Decision and Facilitate Participation

The Blue Acres Program is administered by the NJDEP and allows for the acquisition of flood-prone properties with state and federal funds. It is a voluntary program and offers buy-outs only when the following conditions are met:

- Severe flooding damage from Hurricane Sandy or repeated flood damage from previous storms has occurred.

- Residents of the impacted area are willing sellers.

- Local government is supportive of the effort.
- Clusters of flood-prone homes or entire neighborhoods can be purchased.
- The proposed buyouts are cost effective (as required by FEMA guidelines).
- Significant environmental impact and/or improvement to public health, safety and welfare can be achieved.[29]

Once property is acquired through the Blue Acres Program, on-site structures are demolished and the land becomes deed-restricted open space.[30]

Since 2012, Blue Acres has purchased 543 properties in seven counties and 12 municipalities that were affected by Superstorm Sandy.[31] Misconceptions about the program exist, including that the State may resell a Blue Acres acquired property at a profit for new residential construction. At the same time, many legitimate concerns exist, including how buy-outs impact a community's tax base and character, where the displaced residents will go, what are the management requirements and costs of the newly-created open space, and what recourse is available for communities that want to participate in the program but do not meet the minimum number of home requirements.

Additional important insight into the program was gained during a recent study of the impacts that a Blue Acres buy-out scenario would have upon the residents of Little Egg Harbor: First, the residents conveyed that they are not adverse to participation in a buy-out program, and would have welcomed the opportunity had a detailed plan been in place and ready to implement immediately after Sandy; and second, they conveyed that they and the community as a whole need some "visioning" of what will replace the bought-out properties as well as a management plan for the newly created green space going forward.

The goals of New Jersey's Blue Acres program are to remove citizens and properties from harm's way and create natural buffer areas to protect the rest of the community from coastal hazards. The NJDEP should remain committed to these important goals. However, the program should seek to achieve the additional complementary goals of maintaining the population, character and economic viability of the impacted communities, and providing the information and incentives necessary to change the dynamic from a willing seller only program to one that strongly encourages the participation of vulnerable communities. Most important, the communities most appropriate for such acquisitions must be identified and, as stated by the Little Egg harbor residents, detailed plans for those acquisitions must be developed and be ready to implement when the opportunity arises.

To accomplish these additional goals, the following enhancements to the Blue Acres program are recommended:

- **Develop a public information campaign** that clearly conveys information regarding areas that are subject to repeated and increased flooding as well as those that are expected to

[29] Lowrie, Karen; Kutner, David; and Von Hagen, Leigh Ann, "Mystic Island Voluntary Buyout Health Impact Assessment, Assessing outcomes of Post-Sandy Decision Making", February 2016, p. 6-7.
[30] However, infrastructure, including roads and sewers, are not demolished or removed as part of the process.
[31] Woods, Don E., "First Sandy, Now Blue Acres Buyout could be nail in coffin for NJ Shore Town", NJ.com, February 3, 2016.

experience total inundation from sea level rise. Although some areas are not expected to experience sea level rise impacts until 2030, 2050 or later, the sooner such a campaign can be implemented the better. Make residents aware of the benefits of acquisition as well as the dangers and costs associated with remaining in vulnerable areas. Conveying the information now will enable municipal officials and citizens to familiarize themselves with the troubling issues they are facing and set realistic expectations.

- **Develop plans for relocating residents**, a crucial component for gaining pubic support, maintaining community character and for long-term economic development. This has been shown to result in more cost-effective programs.[32] NJDEP can work with the most vulnerable communities now to identify areas within or close to the same community where development is preferred.

- **Ensure the plan addresses the new use for the community green space created** through the buy-out, e.g., natural habitat, a greenway, a public park, and the reasonable means to maintain it, and does so in a visual way. Facilitate partnerships between the communities and non-governmental organizations that can assist with this effort.

- **Incorporate financial incentives for residents to relocate within the same town or county** to maintain the local tax base and preserve the community. New York's post-Sandy buy-out program paid owners an additional 5% above market value if they relocated within the same county. In the wake of 1993 Mississippi River floods, Ames Iowa paid 10% above value plus $8,500 to residents who relocated in Ames. The City of Cherokee, Iowa provided low income residents with up to $22,000 for down payments on homes in new subdivisions designed by the City in safe locations within the City.[33]

- **Partner with the communities, professional planners and, eventually, developers to plan new housing developments to replace the target homes**, and make an effort to ensure the new developments are similarly structured and priced. If suitable land is available, plan for the relocation of residents and businesses as a group to relocate or build in a similar pattern to the old neighborhood.

- In areas where it is not possible for residents to relocate within the impacted community, **work with the legislature to create tax incentives to alleviate municipal concerns** over losses to their tax ratable base, including sustaining the pre-buyout tax base for a fixed-year period after acquisition.

- **Disseminate information about existing tax incentives**, including the 2014 law exempting Blue Acres properties from county, school, and fire district taxes immediately upon acquisition. Previously, if the Blue Acres property was acquired before October 1st, taxes had to be paid through the end of the year; if acquired after October 1st, taxes were due through the end of the following year.[34]

- **Include the difficult but necessary policy directive** that, as a result of continued destructive coastal events, assistance such as funding and permits for rebuilding, infrastructure support, utilities and other services to these areas will gradually diminish and

[32] Siders, Ann, "Managed Coastal Retreat: A Legal Handbook on Shifting Development Away from Vulnerable Areas," Columbia Law School center for Climate Change, October 2013, p 114.
[33] Managed Coastal Retreat, p. 121, 125
[34] New Jersey Public Law 2013, Chapter 261, effective January 17, 2014.

eventually cease. The most vulnerable areas to which this policy applies should be identified in the recommended Coastal Zone Resilience Plan discussed earlier in this report.

- **Consider the feasibility of amending the eligibility criteria,** establishing an off-shoot of the program or a different program entirely to allow communities with vulnerable properties that are less than a "cluster" or entire neighborhood of homes to participate. A survey or analysis of the number of communities that would benefit from revised criteria, their proximity to each other and the total number of properties involved could determine if a collaborative or regional approach to dealing with such properties would be feasible.

- **Rebrand what is now considered a "buy-out program"** to better represent the goals and opportunities of the program, such as a "Resilience Relocation Assistance Program."

5. Develop and Implement Educational Programs Regarding Resilience Science and Strategies

A comprehensive resilience program requires the cooperation and participation of a number of different sectors, including municipal governments, citizens, state agencies and other programs within the NJDEP. Generally speaking, people are more likely to participate if there is an understanding of why certain things are being asked of them, and if the benefits of taking action and the risks and downside of non-action are fully understood.

To ensure the successful implementation of a resilience program and the informed participation of the necessary parties, it is recommended that the following issues are addressed through new or additional training and education:

- Explanations of the best available climate science, including flooding and storm frequency and severity and sea level rise, and its practical application to development and redevelopment decisions, as well as resilience planning.

- Identification of the specific hazards to which each community is most vulnerable, the anticipated impacts on their communities today, and the anticipated increase of those impacts with sea level rise and increased storm activity over time.

- The benefits of resilience measures and the costs of no action should be quantified and conveyed to communities. Utilizing sources such as FEMA's repetitive loss data and HAZUS methodology in combination with tools such as FloodMapper, Coastal Vulnerability Assessments and Getting to Resilience, demonstrate the potential economic losses to a community both before and after it implements the resiliency strategies.

- The role and limitations of the FEMA Flood maps in resilience efforts, including an explanation that they represent static conditions at the time the maps were prepared, and that they significantly underrepresent future conditions and associated risks.

- Additional outreach and education regarding the FEMA Community Rating System to demonstrate the flood insurance savings realized by specific resilience measures. Highlight the actual savings of New Jersey CRS communities and the resilience measures they took to obtain them.

- Guidance documents and training for citizens, organizations and municipalities on the availability and use of the resiliency and assessment tools, and the specific purpose or effort to which each is best applied.

- Promotion of and incentives for participation in the training developed for local floodplain managers and code officials regarding the complex and often overlapping state regulations and FEMA National Flood Insurance program requirements.[35]

- Education for citizens on basic storm preparation, such as keeping debris out of yards (general debris as well as securing/moving typical items such as sheds, grills, lawn furniture), and the placement of larger items such as boats, cars and oil and propane tanks.

- Education and training regarding the importance of natural resources generally and to hazard protections specifically, including wetlands, beaches, dunes, shorelines, and bay islands. Such training should include how these coastal features function, coexist and move, their dependence upon sediment transport to maintain their structure and resilience, and their dependence upon each other within the littoral zone in which they exist. The negative impacts that hardened protective measures cause to the natural functions of these coastal features should be included.

- Preparation and presentation of an overview for all NJDEP personnel (and possibly municipalities) involved in coastal decision making regarding the "big picture" CMP issues, including CZMA mandates that state CMPs address sea level rise and coastal hazards; existence and application of regulatory tools to do so and the need to continually improve and update the CMP pursuant to the CZMA 309 Assessment and Enhancement requirements.

- Training and education of NJDEP personnel, municipalities, other agencies and all impacted persons and organizations regarding the tools and programs developed through the RCCI and the ongoing effort through the CMP's Community Resilience Planning Program.

- Training must include methodologies for municipal officials to convey necessary information to their communities in a manner that accounts for elderly and other populations without computer access and residents that do not speak English.

6. Engage in the Continuous Search for Opportunities, Resources, Planning and Other Measures That Improve Coastal Community Resilience, Including Ongoing and Proposed Pilot Projects

The projects developed and overseen by the CMP through the RCCI and other programs, the CMP's ability to secure funding and establish relationships with appropriate project partners to carry them out and the resultant contributions to ongoing and future resilience efforts are significant and should be continued and expanded. To ensure the continuation and enhancement of these efforts, the following is recommended:

- Continued support for the ongoing and proposed pilot projects seeking to refine the science and identify the mechanisms and best practices to implement ecologically-based hazard mitigation strategies. Such projects include, but are not limited to:

[35]This is particularly important in light of the additional responsibility placed on these local officials through the expanded Permit-by-Rule provision of the Flood Hazard Area Control Act Rules (N.J.A.C. 7:13-7).

- The Marsh Futures pilot program examining stressors to wetlands to develop a rapid assessment tool and best management practices to maintain healthy wetlands and prevent further losses of these important natural resources. The project is being implemented by the Partnership for the Delaware Estuary.

- The Resilient Coastlines initiative, overseen by The Nature Conservancy, to develop and monitor ecologically-based living shoreline pilot projects within coastal and bayshore catchment (drainage) areas from Sandy Hook in Monmouth County to the Delaware River Estuary in Salem County.

➢ Continued support for the ongoing efforts to develop best practices for community-based and regional resilience planning, including:

- The Sustainable + Resilient Coastal Communities Pilot Planning Project currently underway in Little Egg Harbor Township, Tuckerton Borough and Toms River Township. The project, which includes plan elements for growth and economic development as well as a shoreline strategic plan, is being overseen by a New Jersey Future team of professional planners, ecologists and engineers.

- The NJ Fostering Regional Adaptation through Multiple Economic Scenarios (NJ FRAMES) planning project through which a regional resilience plan to address the impacts of coastal hazards, including sea level rise, will be developed for 15 Monmouth County municipalities in the “Two River” area by NJDEP and its partners JCNERR, engineering consultant Louis Berger and the Rutgers Climate Institute.

➢ Support the CMP’s efforts to continually search for opportunities to improve coastal community resiliency, including by supporting the CMP enhancements discussed in the Section 309 Assessment & Strategy 2016 – 2020.

➢ Identify opportunities to incorporate ecosystem service valuations into the CMP, such as resilience and mitigation projects, regional and community resilience plans and its coastal decision making process. Just a few examples of where this methodology could be critical are the evaluation of whether a non-structural shoreline protection measure is “feasible” under the Coastal Engineering Rule and the development and review of projects proposed under the Living Shorelines Rule and the Mitigation Rules.

➢ Identify criteria to assess the outcome of resilience projects and programs, including the Vulnerability Assessment, Getting to Resilience and the Local Recovery Planning Manager programs. Determine whether and how to expand these programs to additional communities, and whether they should be formally incorporated into the CMP’s Community Resilience Planning Program. In doing so, assess the feedback of communities, including:

- Towns with LRPMs were extremely grateful, while those without expressed a strong desire and need for similar one-on-one professional assistance. It must be determined if a team of LRPMs can be assembled in advance for dispatch on an as-needed basis, and whether such a program is feasible. In that the LRPM program stemmed from a recommendation in the FEMA National Disaster Recovery Framework, consultation with FEMA regarding its future potential is recommended.

- Towns engaged in the Getting to Resilience program expressed concern that other towns were not participating, particularly with respect to adjacent towns whose non-action could negate the work of participating towns. It is contemplated that education and training regarding the economic benefits of participation in resilience efforts generally, and of collaborating with neighboring towns, increased incentives and financing of participation as well as the development of resilience plans and opportunities for regional collaborations, all of which are recommended in this report, will address these concerns.

➢ Commit to the development of information, tools and data necessary to fill gaps in the CMP that are critical to resilience efforts, including:

  - Mapping of coastal resources and, in particular, areas identified as "Special Areas" to establish a baseline of these land and water features to assist in regional and local planning, the tracking and control of cumulative and secondary impacts, and the identification of potential Aquaculture Development Zones.

  - Information and modeling necessary to accurately project future riverine flooding events.

  - Continuing work with the New Jersey Climate Adaptation Alliance and climate scientists to enhance best available climate science as it relates to the synergistic effects of sea level rise and other coastal hazards, such as increased wave heights and storm surges, that will result from climate change.

  - Continued development of pilot projects to identify and assess the stressors to wetlands and shorelines and to develop ecologically-based hazard mitigation strategies.

III. IDENTIFY, INCREASE THE CLARITY OF AND PROMOTE THE USE OF RESILIENCE-RELATED REGULATIONS IN RESILIENCE PLANNING AND COASTAL DECISION MAKING

Critical to the protection of citizens and property in the coastal zone are the standards that apply to development and redevelopment. In New Jersey, these decisions are, for the most part, governed by the Coastal Rules. Every opportunity that exists in the current Coastal Rules to facilitate resilience should be identified and utilized by those involved in the decision making process. In addition, where necessary, the Coastal Rules should be amended or new rules should be proposed to clarify or address gaps in the existing standards.

1. Identify Opportunities in the Existing Coastal Rules to Advance Resilience Goals

The Coastal Rules incorporate numerous opportunities for the NJDEP to address coastal hazards in the decision-making process and to prevent activities that subject residents and property to coastal hazards. These opportunities apply not only to existing coastal hazards, such as development in high hazard areas, but also take into account future and emerging issues such as sea level rise, increased flooding and storm surges and wetlands inundation and migration. Such opportunities include the application of the following Coastal Rules, individually or in combination, to all proposed actions in the coastal zone:

- **The Coastal Goals** (N.J.A.C. 7:7-1.1(c)) - The New Jersey CMP and the Coastal Rules are founded on eight broad coastal goals that "express the results that the NJ CMP strives to attain." Each goal is supplemented by related policies that set forth the means to realize that goal. The coastal goals and their supplemental policies are incorporated in the Coastal Rules *and are enforceable policies of the CMP*. Coastal Goal 6 is "Safe, Healthy and Well-planned Coastal Communities" and is to be achieved through application of the following policies to coastal decisions:

  - Minimize the threat of natural hazards to life and property.
  - Preserve and enhance beach and dune systems and wetlands, and manage natural features to protect the public health from natural hazards.
  - Promote public safety, health and welfare.
  - Promote and implement strategies that eliminate or reduce risks to human health and the ecosystem from coastal activities.

If a proposed project does not meet these policies, NJDEP can deny the permit application or recommend that the project be amended to achieve compliance.

- **Standards for Evaluating Permit Applications/CAFRA Section 10 Findings** (N.J.A.C. 7:7-1.4(b)) - These requirements originated in the CAFRA statute, are restated in their entirety in the Coastal Rules and are particularly important in the resilience context. They provide that a permit can be issued "only upon a finding that the activity. . .is located or constructed so as to neither endanger human life or property nor otherwise impair the public health, safety and welfare." Thus, even if a proposed project meets every single Coastal Rule, if it is going to place life or property in danger due to coastal hazards (either today or in the future due to changing conditions such as sea level rise), the NJDEP has the discretion to deny the permit and/or work with the applicant to develop a more resilient project.

- **The Basic Location Rule** (N.J.A.C. 7:7-14.2: The Basic Location Rule provides that, even if a location is deemed acceptable under all other applicable rules and regulations, the NJDEP may reject or conditionally approve the proposed project to promote the public health, safety and welfare; protect public and private property, wildlife and marine fisheries; and preserve, protect and enhance the natural environment.

- **Purpose of Coastal Rules/NJDEP Discretion** (N.J.A.C. 7:7-1.1(c)): This Rule encourages NJDEP to rely on its professional judgment and to exercise discretion in the interpretation of and application of the Coastal Rules. It states that the interpretation of terms such as "prudent," "feasible," "minimal," "practicable," and "maximum extent," may vary depending upon the context of the proposed use, location and project design.

The Wetlands Buffer Rule provides just one example of how these authorities can be applied to facilitate resilient coastal management decisions. It states that the NJDEP can require a wetlands buffer of "up to" 300 feet.[36] NJDEP personnel advised that the maximum 300-foot buffer is typically only required when there are threatened or endangered species or wildlife

[36] N.J.A.C. 7:7-9.28

habitat on site. However, reviewing this Rule with the Resilience Goals in mind, and applying any or all of the Existing Resilience Rules described above, the maximum buffer could also be required to allow for better protection of the site or adjacent properties from storm surges and floods, and to allow for the inland migration of wetlands.

These standards, including the Coastal Goals, are relatively unknown to the regulated community and appear to be underutilized in the coastal decision making process. Therefore, in addition to the need to routinely incorporate these important standards into development decisions in the coastal zone, the existence of these standards and their relationship to the resilience effort should be highlighted and publicly disseminated.

2. Scope, Draft and Propose New Coastal Rules and/or Amendments to Existing Rules to Address Resilience Issues or Clarify Existing Standards

a. Draft and propose a new "Coastal Hazards Vulnerability Rule"

To assist coastal communities in their resilience efforts, and to ensure the ability for consistent and meaningful resilience planning across the State, a Coastal Hazards Vulnerability Rule could be drafted that:

- Acknowledges sea level rise as a significant threat to New Jersey's citizens, property, natural resources, health and economy.
- Acknowledges other coastal hazards, such as flooding, storm surge and shoreline erosion associated with hurricanes, nor'easters, extra-tropical storms and, in some locations, "nuisance flooding" from routine coastal storms and rainfall.
- Acknowledges the significant, frequent and damaging riverine flooding experienced by New Jersey (including flooding from rivers, creeks, and streams).
- Sets forth sea level rise projections based upon the best available climate science developed by the New Jersey Climate Adaptation Alliance and currently under review.
- Sets forth projections regarding the anticipated frequency, severity and impacts of coastal storms and their associated hazards (also based upon the best available climate science).
- Based on past repetitive loss and other relevant data, identifies locations that have experienced riverine flooding and indicates the severity of past events (the CMP acknowledges the need for information and modeling to develop riverine flooding projections, and has proposed same in the 309 Assessment and Strategy 2016-2020).
- Establishes criteria for and designates Sea Level Rise Vulnerability Zones, Coastal Hazards Vulnerability Zones and Riverine Flooding Vulnerability Zones based upon the experienced and projected extent and locations of impacts. Identify these zones both in the text of the Rule and in an accompanying visual/mapping component.
- Declare it the policy of the NJDEP that coastal activities in the Vulnerability Zones will be regulated based upon their vulnerability to sea level rise, coastal hazards and riverine

flooding and that such regulation will be accomplished through the application of the Coastal Rules in a manner that takes protection of life, property and natural resources into consideration to the maximum extent allowable, including through application of the existing resilience-related Coastal Rules previously described in this report.

- States that the Vulnerability Zones will be incorporated into and will further inform the Coastal Zone Resilience Plan (recommendation II-1) as well as community-based resilience planning efforts.

- Emphasizes the fact that sea level rise will increase the impacts of other coastal hazards, that the synergistic impacts of all coastal hazards must be determined and that the CMP is committed to working with other agencies and non-governmental partners to develop this science.

b. Draft and propose amendments to the Special Areas Rules to clarify the importance of these areas to resilience

The Special Areas Rules set forth the policies and standards that apply to areas that are so naturally valuable, sensitive to impact or particular in their planning requirements that they require focused attention.[37] Special Areas include dunes, overwash areas, bay islands, beaches, riparian zones, wetlands, and wetlands buffers - - features that provide natural protection against coastal hazards. The Special Areas Rules are set forth in a separate subchapter of the Coastal Rules.

Despite acknowledging their special status, these natural features are addressed through separate Rules that don't entirely recognize their functional interdependence or the larger ecosystem in which they exist. As such, they do not distinctly reflect the CMP's commitment to facilitate resilience measures in the coastal zone through the enhancement and protection of these natural coastal features. For example, although shorelines are comprised of many of the important coastal features characterized as "Special Areas," they are not considered Special Areas in and of themselves, and the Living Shorelines rule is not part of the Special Areas subchapter. In addition, the existing Living Shorelines rule relates entirely to a "management practice" and addresses projects to restore or create living shorelines, but does not directly address the protection of these features in the first instance.

In addition, while some of the specific Special Areas Rules include a thorough explanation of the value of these resources to resiliency, others do not.

To place shorelines and other Special Areas in the appropriate resilience and ecosystem-based context, the following steps are recommended for consideration:

- **Characterize shorelines as a Special Area and develop a new "Shorelines Rule"** that describes their importance, the Special Areas of which they are comprised, how they function, and the policies that will protect them. This new Rule should be incorporated in the Special Areas subchapter of the Coastal Rules.

[37] N.J.A.C. 7:7-9.1

- **Define the "Littoral Zone" to emphasize the connections between the Special Areas** that comprise this zone. The "littoral zone" is mentioned at least eight times in the Coastal Rules, including in the definition of Living Shorelines, but is not in itself defined or explained.[38]

- **Enhance the "rationale" section of certain Special Areas Rules** to include a thorough explanation of the manner in which these features function as a system, their relationship to other Special Areas, and their abilities to protect property and other natural resources from coastal hazards. Utilizing the well-written and comprehensive rationale sections for the Wetlands Rule and the Dune Rule as guidance, opportunities for such enhancements include the following Special Areas Rules: Beaches (N.J.A.C. 7:7-9.22); Riparian Zones (N.J.A.C. 7:7-9.26); Endangered or Threatened Wildlife or Plant Species Habitats (N.J.A.C. 7:7-9.36) and Critical Wildlife Habitat (N.J.A.C. 7:7-9.37).

c. Draft and propose amendments to the Secondary Impacts Rule

Secondary and cumulative impacts are a high priority for the CMP, and have been identified as a source of continued degradation of the State's coastal zone. The most significant of these impacts are forest cover loss and fragmentation, habitat loss, freshwater wetlands loss and the degradation of surface water quality.[39] The CMP notes that such impacts are caused by unplanned uncoordinated development and a lack of resource protections or consideration of these impacts at the local level.[40]

As described in the existing rule, secondary impacts are the indirect effects of additional development that is likely to occur as a result of a development project. Secondary impacts can also include increases to traffic, recreational demand or any other offsite impacts generated by the initial project.[41]

Equally important as secondary impacts are the cumulative impacts of a project, meaning the incremental impacts resulting from the project when added to the impacts of past, present, and reasonably foreseeable or probable future projects. Cumulative impacts can result from individually minor but collectively significant projects taking place over a period of time.

Although the Secondary Impacts Rule mentions cumulative impacts in the rationale section, it does not define this term or require their consideration in the decision making process. As such, it is recommended that the Secondary Impacts Rule be amended to be called the "Secondary and Cumulative Impacts" Rule that includes:

- A clearer definition of secondary impacts with examples.

- A definition of cumulative impacts with examples.

- A statement that both secondary and cumulative impacts will be considered in all project proposals.

---

[38] See, e.g., references to the littoral zone on pages 22, 209, 116, 177, 138, 207 and 276 of the Coastal Rules, and to littoral drift on page 1124.
[39] 309 Assessment , p. IV-99,100
[40] 309 Assessment , p. IV-99, 100
[41] N.J.A.C. 7:7-14.3

- A summary of the import of tracking and addressing these impacts, i.e., a description of the degradation they have caused and otherwise continue to cause.

This revised Rule, combined with the planning efforts proposed above and the CMP's proposed baseline mapping of Special Areas so that changes can be better detected and tracked[42], will allow the CMP to move toward its goal of developing standards and criteria to address the secondary and cumulative impacts. [43]

IV. PROVIDE INCENTIVES TO ENCOURAGE COASTAL COMMUNITY PARTICIPATION IN RESILIENCE EFFORTS

Municipal participation is critical to the success of a New Jersey resilience program, from the development and implementation of regional and community plans to the application of the relevant policies and standards to local development decisions. However, every community the project partners approached identified a lack of capacity as the single largest barrier to their participation in resilience planning and preparedness efforts. To facilitate municipal participation in New Jersey's resilience efforts, the following approach is recommended:

1. Identify and Provide General and Programmatic Incentives to Participation

- Develop an educational module that demonstrates the short and long term cost benefits of resilience efforts and, equally important, the costs associated with a failure to engage in such efforts.

- Continue to educate municipalities and residents about the financial advantages of the National Flood Insurance Program's Community Rating System (CRS). Actively encourage more municipalities to participate by highlighting the reduced flood insurance premiums actually experienced by CRS communities. Although it has proven to be a very strong incentive to engage communities in resilience efforts, FEMA data demonstrate that a significant number of New Jersey municipalities are still not participating.

- Identify opportunities to incorporate ecosystem services valuation into coastal decision making to improve understanding of the value of the benefits to society from an ecosystem. In the coastal resilience context, such valuations could be used to compare one management alternative to another, such as a structural versus non-structural shoreline protection project.

- Keep apprised of and leverage the recent acknowledgement by the municipal bond rating companies that resilience efforts and vulnerability to coastal hazards will be considered in future ratings.[44]

---

[42] 309 Assessment, p. IV-103

[43] The NJDEP could also consider a link between the proposed amended Secondary and Cumulative Impacts Rule and the Stormwater Management Rules in an effort to lessen degradation of wetlands and surface waters caused by runoff to storm drains and combined sewer overflows. See, Stormwater Management Rules at N.J.A.C. 7:8; See also discussion of water quality issues caused by stormwater runoff in the 309 Assessment, p. IV-54-IV-57. It is anticipated that this issue will be the subject of further consideration as part of the aforementioned Sustainable + Resilient Coastal Communities Pilot Program, the results of which may help inform changes to the Coastal Rules' approach to coordinating state and local land use and infrastructure decisions (309 Assessment, p. IV-98).

[44] A recent statement from Standard & Poors captured this intent: "*We regularly publish extensive research on the implications of environmental and climate-related risks for entities that we rate, and our evaluation of environmental, social and governance*

2. Identify and Provide Financial Incentives to Participation

Any and all financial incentives that will motivate community participation in resilience planning and projects should be identified and promoted (and included in the Coastal Zone Resilience Plan discussed in recommendation II-1, above), including:

- State, county and federal grants and funding sources available for resilience or hazard mitigation projects, planning, and natural resource mitigation and restoration.
- Private grants and funding sources available for resilience planning and projects, natural resource mitigation and restoration and other resilience-related projects.
- Opportunities to participate in pilot projects implemented by the CMP, other NJDEP programs and/or their governmental and non-governmental resilience partners.
- Technical assistance (e.g., planning, assessment, design and implementation of natural resource mitigation projects, assistance with grant proposals) that might be available from the CMP and/or its governmental and non-governmental resilience partners.
- Existing tax incentives, including the 2014 law exempting Blue Acres properties from county, school, and fire district taxes immediately upon acquisition.[45]

3. Facilitate the Professional Evaluation of Traditional and Innovative Financing Strategies to Fund Community Participation

Although beyond the scope of this report, it is recommended that as a separate effort, a panel of economic, land use, tax and resilience professionals is convened to consider both traditional and innovative funding and financing strategies and identify those that would be appropriate (i.e., feasible and implementable) in New Jersey. Such strategies could include Transfer of Development Rights (TDR), a "societal benefits" charge on gas and electric utilities, both of which have been utilized in other contexts in New Jersey. Also appropriate for consideration are "resilience bonds" a recently developed insurance product that enables a community or utility that invests in protective infrastructure to capture the insurance savings or reduction in cost from one year to the next. These saving can then be used to finance additional resilience projects during the term of the bond.[46]

New Jersey could also consider the establishment of a resilience trust fund with independent oversight through which projects and programs could be transparently funded. In addition to government and private grants, the trust could seek contributions from industries that benefit from the resilience efforts, including the ports, shipping and boating sector that benefit from living shorelines programs that utilize dredged sediment; the restaurant industry that benefits from revival of historical sea-food operations or new aquaculture programs; planners, engineers,

---

risks is a key part of our ratings methodology. We continue to review the relevance of climate risk for creditworthiness and how we assess and present it as a risk factor in our analysis." .Burton, Paul, "Advocates Say Climate Right for Resilience Ratings" the Bond Buyer, August 6, 2015.

[45] New Jersey Public Law 2013, Chapter 261, effective January 17, 2014; Previously, if the Blue Acres property was acquired before October 1st, taxes had to be paid through the end of the year; if acquired after October 1st, taxes were due through the end of the following year.

[46] Selby, Shawn, "Resilience Bonds Unveiled as Way to Help Disaster Prone Cities", propertycasualty360.com, December 2015.

developers and realtors that benefit from opportunities created by the Blue Acres relocation program; and the insurance industry, which benefits from all resilience measures. Funding provided by the trust could be structured as loans where appropriate to ensure the replenishment of the limited pool of resilience funding.

For a more in-depth discussion of funding strategies, see the analysis prepared on behalf of the New Jersey Climate Adaptation Alliance entitled "Climate Change Preparedness and Resiliency: Funding and Financing Strategies for New Jersey".[47]

CONCLUSIONS AND NEXT STEPS

Through the RCCI and its other resilience-related programs, the NJDEP has made significant progress in increasing the understanding and implementation of resilience measures in New Jersey's coastal communities. Nevertheless, numerous opportunities exist to enhance preparedness for current and emerging coastal hazards throughout the coastal zone. NJDEP's consideration of the recommendations in this report and prioritization of the recommendations it wishes to implement will assist its efforts to achieve the level of resilience necessary to ensure the safety and long-term economic, social and environmental well-being of all of its coastal communities.

[47] McGrath, Kevin M. "Climate Change Preparedness and Resiliency: Funding and Financing Strategies for New Jersey", prepared for the New Jersey Climate Adaptation Alliance., June 2014, http://njadapt.rutgers.edu/docman-lister/working-briefs/114-climate-additional-report/file

Appendix A – Persons and Sources Consulted

INTERVIEWS OF PROJECT PARTNERS AND OTHERS CONSULTED

Name	Affiliation	Title	Date	Location
Lisa Auermuller	JCNERRS	Watershed/Outreach Coordinator	08/13/15	Tuckerton NJ
Mike Schwebel	UCI	Climate Adaptation Specialist	09/22/15	W. Long Branch, NJ
David Kutner	NJ Future	Recovery Planning Manager	11/10/15	Trenton, NJ
Nick Graviano	NJ Future	LRPM Commercial, Maurice Twshps	11/19/15	Holmdel, NJ
Leah Yasenchak	NJ Future	LRPM, Little Egg Harbor, Tuckerton	12/02/15	Manasquan, NJ
Steve Nelson	NJ Future	LRPM, Highlands, Sea Bright	12/04/15	New Hope, PA
Jenna Gatto	JCNERRS	Resilient Community Specialist	12/15/15	Tuckerton, NJ
Chris Huch	JCNERRS	Resilient Community Specialist	12/15/15	Tuckerton, NJ
Chris Linn	DVRPC	Manager, Office of Environmental Planning	02/10/16	Via teleconference
Melissa Andrews	DVRPC	Environmental Planner	02/10/16	Via teleconference
Linda Weber	Sustainable Jersey	Director, Resiliency Program	02/11/16	Via teleconference
Jack Heide	Sustainable Jersey	Resiliency Manager	02/11/16	Via teleconference
John Miller	NJ Assoc. of Floodplain Managers	Professional Engineer, Certified Floodplain Manager	02/05/16	Via teleconference
Andrew Provence	Litwin & Provence LLC	Attorney	02/09/16	Trenton, NJ
Tim Dillingham	American Littoral Society	Executive Director	02/24/16	Via teleconference
Gordon Litwin	Litwin & Provence LLC	Attorney	03/05/16	Via electronic mail
Greg Remaud	NY NJ Baykeeper	Deputy Director	03/29/16	Via teleconference

Appendix A – Persons and Sources Consulted

Name	Affiliation	Title	Date	Location
Danielle Kreeger	Partnership for the Delaware Estuary	Science Director	04/07/16	Via teleconference
Tony MacDonald	UCI	Director	Numerous	West Long Branch, NJ
Jeanne Herb	Rutgers Bloustein, EAC	Associate Director	Numerous	New Brunswick, NJ; via teleconference; via electronic mail

WORKSHOPS, PANELS AND MEETINGS

Resilience Professionals Retreat (JCNERRS) Tuckerton, September 30, 2015

Resilience Café Workshop (Rutgers Bloustein) Atlantic Cape County College, October 15, 2015

Climate Scientist Panel (Rutgers Bloustein) New Brunswick, October 30, 2015

Resilience Practitioner Panel (Rutgers Bloustein) New Brunswick, November 30, 2015

Resilience Practitioner and Climate Scientists Follow-up Webinar, December 10, 2015

Climate Adaptation Alliance Meeting, New Brunswick, January 29, 2016

GTR Questionnaire Update, (JCNERR), Tuckerton, February 3, 2016

NJDEP Adaptation and V-Zone Subcommittee Meeting, February 22, 2016

New Jersey Post-Sandy Workshop, (JCNERRS), Tuckerton, April 25, 2016

Presentation of Post Sandy Health Impact Assessments (Rutgers Bloustein), May 17, 2016

REPORTS, JOURNALS, ARTICLES AND BOOKS CONSULTED

In addition to the tools and reports generated by the Project Partners in association with this RCCI effort, the following information has been collected and reviewed to date (does not include statutes, rules/regulations):

New Jersey Coastal Management Program Section 309 Assessment and Strategy, 2016-2020 (and related documents); New Jersey Coastal Management Program Section 309 Assessment and Strategy, 2011-2015 (and related documents); New Jersey Coastal Management Program Section 309 Assessment and Strategy, 2016-2010 (and related documents)

New Jersey Future, In Deep: Helping Sandy-Affected Communities Address Vulnerability and Confront Risk, October 2015

New Jersey Climate Adaptation Alliance, Integrating Science into Risk-Based Decision Making Regarding Sea Level Rise and Coastal Storms Affecting New Jersey: An Expert Panel to Identify Options for New Jersey, October 2015, DRAFT – Deliberative and Confidential, Not for Circulation

Kopp, Robert E., et al., Past and Future Sea-Level Rise Along the Coast of New Jersey USA, October 12, 2015 DRAFT – Not for Circulation

Leichenko, Robin, McDermott, Melanie and Bezborodko, Ekatarina: Barriers, Limits and Limitations to Resilience, Journal of Extreme Events, Bol. 2, No. 1 (2015)

New Jersey Resiliency Network, A program of Sustainable New Jersey, Coastal Vulnerability Assessment, Draft Pilot Guidance Document for Municipalities, September 3, 2015

Department of Community Affairs, Program Guidelines and Procedures (Revised), Post-Sandy Planning Assistance Grants for Municipalities and Counties, September 2015

Burton, Paul, Advocates Say Climate Right for Resilience Ratings, the Bond Buyer, August 6, 2015.

New Jersey Resiliency Network, a Program of Sustainable New Jersey, Post-Sandy Municipal Needs Assessment for Long Term Recovery and Resiliency Planning, Summary Report, March 2015.

New Jersey Resiliency Network, a Program of Sustainable New Jersey, Post-Sandy Municipal Needs Assessment for Long Term Recovery and Resiliency Planning, Appendices, March 2015

New Jersey Department of Environmental Protection, Disaster Debris Management Planning Tool Kit for New Jersey Municipalities, March 2015

Smartgrowth America, Building Resilient States: A Framework for Agencies, October 2015.

Rutgers University, New Jersey Future and the College of New Jersey, Health Impact Assessment in New Jersey: Assessing Health Outcomes of Post Sandy Decision Making, Project Overview (assessment completion February 2016), September 2015.

Selby, Shawn, Resilience Bonds Unveiled as Way to Help Disaster Prone Cities, PROPERTYCASUALTY360.com, December 2015.

Kopp, Robert and Miller, Kenneth: Coastal Zone Management Rules, N.J.A.C. 7:7E, and Coastal Program Permit Rules, N.J.A.C. 7:7, Proposed Consolidation with Amendments, Letter to Gary J. Brower, Esq., NJ DEP, July 27, 2014

New Jersey Climate Adaptation Alliance, Resilience: Preparing New Jersey for Climate Change, Policy Considerations from the New Jersey Climate Adaptation Alliance, June 2014

McGrath, Kevin M., Climate Change Preparedness and Resiliency: Funding and Financing Strategies for New Jersey, June 2014

New Jersey Climate Adaptation Alliance, Climate Change Preparedness in New Jersey: Best Practices for Public Health Officials, May 2014

New Jersey Climate Adaptation Alliance, A Summary of Climate Change Impacts and Preparedness Opportunities for the Coastal Communities in New Jersey, April 2014

New Jersey Climate Adaptation Alliance, A Summary of Climate Change Impacts and Preparedness Opportunities Affecting Natural Resources in New Jersey, March 2014

New Jersey Climate Adaptation Alliance, A Summary of Climate Change Impacts and Preparedness Opportunities For Telecommunication and Energy Utilities in New Jersey, March 2014

New Jersey Climate Adaptation Alliance, A Summary of Climate Change Impacts and Preparedness Opportunities for the Agriculture Sector in New Jersey, March 2014

New Jersey Climate Adaptation Alliance, A Summary of Climate Change Impacts and Preparedness Opportunities for the Water Resources Sector in New Jersey, March 2014

New Jersey Climate Adaptation Alliance, A Summary of Climate Change Impacts and Preparedness Opportunities for the Public Health Sector in New Jersey, March 2014

New Jersey Climate Adaptation Alliance, A Summary of Climate Change Impacts and Preparedness Opportunities for the Transportation Sector in New Jersey, March 2014

New Jersey Climate Adaptation Alliance, An Analysis of NJ Climate Adaptation Alliance Coastal Recommendations Relative to Recent Programs and Legislation for Climate Adaptation in Delaware, Maryland, and New York. Edited by Matt Campo, New Brunswick, New Jersey: Rutgers University, 2014

M.R. Greenberg, M.D. Weiner, R. Noland, J. Herb, M. Kaplan and A.J. Broccoli, Public Support for Policies to Reduce Risk After Hurricane Sandy. Risk Analysis, Vol. 34, No. 6, 2014

Community and Regional Resilience Institute, Definitions of Community Resilience : An Analysis, 2013.

Kopp, et al., A Geologic Perspective on Sea Level Rise and its Impacts Along the U.S. Mid- Atlantic Coast, Earth's Future, December 5, 2013

Siders, Ann, Managed Coastal Retreat: A Legal Handbook on Shifting Development Away from Vulnerable Areas, Columbia Law School center for Climate Change, October 2013

Rutgers School of Public Affairs and Administration Newark, The Impact of A Superstorm Sandy on New Jersey Towns and Households, October 2013

New Jersey Department of Community Affairs, Community Development Block Grant Disaster Recovery Action Plan, Approved by HUD April 29, 2013, and subsequent amendments.

New Jersey Climate Adaptation Alliance, Climate Change Preparedness in New Jersey: Best Practices for Local Planners, December 2013

New Jersey Climate Adaptation Alliance, Climate Change Preparedness in New Jersey: Best Practices for Watershed Management, September 2013

Rutgers Climate Institute, State of the Climate: New Jersey 2013

Rutgers Climate Institute and Georgetown Climate Center, Understanding New Jersey's Vulnerability to Climate Change, November 2013

Department of Homeland Security, Office of the Inspector General, FEMA's Initial Response to Hurricane Sandy in New Jersey, September 2013

Miller, Kristen L., et al, Sea-Level Rise Adaptation Policy in Various States, Connecticut Office of Legal Research, September 2012 (summary of ten state initiatives)

Vermont Law School Land Use Clinic, New Floodplain Maps for a Coastal New Hampshire Watershed and Questions of Legal Authority, Measures and Consequences, June 2012

National Academies of Science, Committee on Increasing National Resilience to Hazards and Disasters; Committee on Science, Engineering and Public Policy, Disaster Resilience: A National Imperative, 2012.

Federal Emergency Management Agency, Substantial Damage in the Disaster Recovery Environment, Substantial Improvement Substantial Damage Desk Reference, Chapter 7, 2010.

Evants, Tim, Chasing Their Tails: Municipal "Ratables Chase" Doesn't Necessarily Pay, Special Report, New Jersey Future, July 2010.

Psuty, Norbert P. and Ofiara, Douglas D., Coastal Hazard Management: Lessons and Future Directions from New Jersey, 2002 (Book)

New Jersey Shore Protection Master Plan, Volume 1 – The Plan, New Jersey Department of Environmental Protection, October 1981

COASTAL PROGRAMS, RESILIENCE EFFORTS AND REGULATORY/LEGISLATIVE INITIATIVES OF OTHER STATES

California

Connecticut

Delaware

Florida

Maryland

New Hampshire

New York

Oregon

Vermont

Virginia (Hampton Roads Region)

COASTAL RESILIENCE DATA

Superstorm Sandy CDBG-DR Dashboard, State of New Jersey, Department of Community Affairs

New Jersey Sandy Transparency, State of New Jersey, Office of the State Comptroller (funding opportunities by Department/Agency; State Sandy Contracts; Funds Tracker – statewide, by county and by municipality, http://nj.gov/comptroller/sandytransparency/index.shtml

New Jersey Hurricane Insurance Fact File, Insurance Information Institute, includes estimated value of insured coastal properties vulnerable to hurricanes by state, leading writers of homeowners, commercial and private passenger vehicle insurance in New Jersey, http://www.iii.org/article/new-jersey-hurricane-insurance-fact-file

FEMA Modeling Task Force Hurricane Sandy Analysis, and County Impact Analysis http://fema.maps.arcgis.com/home/webmap/viewer.html?webmap=307dd522499d4a44a33d7296a5da5ea0

Project WNYC Areas Where Flooding Occurred vs. Where Flooding was Predicted, http://project.wnyc.org/flooding-sandy-new/index.html#12.00/40.7378/-74.0702

Appendix A – Persons and Sources Consulted

Assessing Damage from Hurricane Sandy, Number of Damaged Homes, Town by Town (based on Data from NJ Department of Community Affairs)

Sandy's Monetary Damages, Average Damage Assessment (FEMA Housing Assistance Data)

FEMA Total Individual and Public Assistance Finds Disbursed in NJ to Date

Sandy Related Insurance Claims by Town (data from NJ Department of Banking and Insurance)

See related spreadsheet – Sandy Insurance Claims by Zip Code

Sandy Related Insurance Payouts by Town (data from NJ Department of Banking and Insurance)

Sandy recovery Loans, by Town (data from U.S. Small Business Administration)

New Jersey Spotlight Hurricane Sandy Resources

Appendix B – Sample Resilience Goals

The following sample Resilience Goals were derived from the declarations and objectives of the Coastal Zone Management Act (CZMA), the Coastal Area Facility Review Act (CAFRA), the Coastal Zone Management Rules (Coastal Rules), the Wetlands Act (WA) and the Freshwater Wetlands Protection Act (FWPA):

Resilience Goal 1: Develop land and water use programs for the coastal zone that include unified policies, criteria, standards, methods and processes for making land and water use decisions of more than local significance. (CZMA, CAFRA)

Resilience Goal 2: Anticipate and develop plans that provide for the improved protection of life and property in hazardous areas, including areas likely to be affected by sea level rise and land subsidence. (CZMA)

Resilience Goal 3: Protect natural resources that are vital to protection against coastal hazards including wetlands, floodplains, estuaries, beaches, dunes, barrier islands, coral reefs and fish and wildlife habitat within the coastal zone. (CZMA, CAFRA, WA, FWPA)

Resilience Goal 4: Manage coastal development to minimize the loss of life and property caused by improper development in hazardous areas, including areas that are flood prone, subject to storm surge or erosion, likely to be impacted by sea level rise, salt water intrusion or land subsidence, and that will result in the destruction of natural protective features. (CZMA, CAFRA)

Resilience Goal 5: Give priority consideration to water-dependent uses. (CZMA, Coastal Rules)

Resilience Goal 6: Assist in the redevelopment of deteriorating waterfronts and ports, and the preservation and restoration of historic, cultural and esthetic coastal features. (CZMA, Coastal Rules)

Resilience Goal 7: Develop a planning process to assess the effects of and ways to control or lessen the impacts of shoreline erosion, and to restore areas adversely affected by such erosion. (CZMA, Coastal Rules)

Resilience Goal 8: Promote the many important flood and storm damage protection functions of the state's tidal and freshwater wetlands, and prevent their further deterioration and destruction. (CAFRA, Coastal Rules, WA, FWPA)

Resilience Goal 9: Develop policies and programs that enable the state to respond to changing circumstances affecting the coastal environment and coastal resource management. (CZMA)

Resilience Goal 10: Provide public access to coastal resources for recreational purposes (CZMA)

Resilience Goal 11: Include the participation and cooperation of the public, Federal, state and local governments, other interstate and regional agencies and vitally affected interests in these efforts. (CZMA)

Appendix C – Sample Resilience Standards and Metrics

SAMPLE RESILIENCE STANDARDS				
Standard Type	**Applies to**	**Standard & Source**	**Purpose**	**Resilience Goals Implicated** (see Appendix B)
Existing General	All coastal decisions	Basic Location Rule, N.J.A.C. 7:7-14.2	Allows NJDEP to reject or conditionally approve a proposal to protect public health, safety and welfare, public and private property and the natural environment	, 8, 9
Existing Specific	Coastal decisions that may impact dunes	Dunes Special Areas Rule N.J.A.C. 7:7-9.16	Prohibits development on dunes and the removal of vegetation from dunes, with certain exceptions	,6,9
Emerging (under development) Specific	Wetlands assessment, protection	Water Quality Standards for Wetlands, Wetland Program Plan 2014-2018	To measure the ecological integrity of wetlands, the potential impacts of an action on wetlands and to establish the goals of wetlands mitigation and enhancement projects	1, 2, 3, 4, 7, 9
Emerging (proposed) General	All coastal Decisions	Guidelines and criteria to address cumulative and secondary Impacts, 309 Assessment and Strategy 2016-2020	Will be developed from proposed baseline mapping of "Special Areas" to track and protect against cumulative and secondary impacts of development	1, 3, 4, 7, 8
Gap No Standards	Non-structural vs. hybrid vs. structural shore protection measures	Absent from Coastal Engineering Rule N.J.A.C. 7:7-15.11	Criteria for determining feasibility of and prioritizing different types of shore protection measures	1, 2, 3, 4, 7, 8

Appendix C – Sample Resilience Standards and Metrics

SAMPLE RESILIENCE METRICS		
Metric Type and Source	**Measures**	**Resilience Goals Implicated (see Appendix B)**
Existing: NOAA CZMA Performance Measures (reported annually by all CMP states)	# acres coastal habitat restored/being restored # acres coastal habitat protected by easement or acquisition # education activities and training events related to coastal habitat and number of participants in each # communities that have completed projects to reduce future damage from hazards # communities have completed projects to increase public awareness of coastal hazards	2,3,4
New: The Nature Conservancy Ecosystem Services Valuation	Change in ecosystem valuation benefits of salt marsh, living shoreline, and oyster reef restoration projects	2,3,4
Under Development: Partnership for Delaware Estuary Living Shorelines Monitoring	Variety of citizen monitoring metrics for long term measurement of living shorelines projects	1,3,4,7,9
Gap: Getting to Resilience	Specialist has been engaged by JCNERR to assist with development of metrics to measure progress or "success" of Getting to Resilience program	1, 2, others TBD

Appendix D – Summary of NJDEP and Resilience Partner Projects

Program	NGO Partner(s)	Community Partners
Vulnerability Assessments	Sustainable Jersey	Can be utilized by all NJ communities
Getting to Resilience	JCNERR, UCI, Sustainable Jersey, New Jersey Future, DVRPC	More than 40 communities throughout the state, program is ongoing
Local Recovery Planning Managers	New Jersey Future	Sea Bright, Highlands, Little Egg Harbor, Tuckerton, Commercial Township, Maurice River Township
RCCI Policy Recommendations	Rutgers Edward J. Bloustein School of Planning and Public Policy (Rutgers), UCI	Recommendations for all communities in the coastal zone
Best Available Climate Science	New Jersey Climate Adaptation Alliance	Recommendations for all communities in the coastal zone
Comprehensive Community Resilience Planning Pilot Program	New Jersey Future	Tuckerton, Little Egg Harbor, Toms River
Ecosystem Services Valuation	The Nature Conservancy (New Jersey Chapter)	Includes Lowe Cape May case study, but can be utilized by all NJ
Marsh Futures (wetland assessment technique/tool) Pilot Program	Partnership for the Delaware Estuary	NJDEP pilot location to be determined; tool will assist all NJ communities
Resilient Coastlines Initiative	The Nature Conservancy, Rutgers University Center for Remote Sensing and Spatial Analysis	Pilot project locations to be determined
Two Rivers 15-Community Regional Resilience Plan	JCNERR, Rutgers Climate Institute	Eatontown, Fair haven, Highlands, Little Silver, Long Branch, Middletown, Monmouth Beach, Ocean Township, Oceanport, Red Bank, Rumson, Sea Bright, Shrewsbury Borough, Tinton Falls and West Long Branch
Living Shorelines Citizen Science Monitoring Metrics	Delaware Bay Partnership, Partnership for the Delaware Estuary	All shoreline communities will benefit
Building Ecological Solutions to Coastal Community Hazards Program (local government guide, outreach and education, citizen monitoring, school and youth programs, natural resource restoration pilot programs)	National Wildlife Foundation, Sustainable Jersey, New Jersey Sea Grant Consortium, Stevens Institute of Technology, Barnegat Bay Partnership, Partnership for the Delaware Estuary	Atlantic City, Brigantine, Downe Township, Lower Township, Margate, Secaucus, Somers Point, Spring Lake, Upper Township, Cape May County
Mystic Island Voluntary Buyout Health Impact Assessment	Rutgers, New Jersey Future	Little Egg Harbor Township

Shared Services Agreements: After Superstorm Sandy, the towns of Keyport, Union Beach and Hazlet entered into an agreement that allows them to share services, equipment and decision-making responsibilities, and adopted the provisions as an ordinance. When a house collapsed in Union Beach while the code official was out of town, the agreement enabled officials in Hazlet to step in and take the necessary emergency measures in his absence.

Joint CRS Efforts: Several Long Beach Island towns, including Long Beach Township, Ship Bottom, Harvey Cedars, Surf City and Barnegat Light, are developing a multi-jurisdictional Public Information Program under the NFIP's Community Rating System. Some of these same towns are also developing a joint NJDEP Public Access Plan and an island wide Coastal Vulnerability Assessment with NJDEP support.

Regional Resilience Planning: 15 Monmouth County municipalities are developing a regional plan to address the impacts of coastal hazards. The effort, known as NJ Fostering Regional Adaptation through Multiple Economic Scenarios (NJ FRAMES), will be overseen by the Two River Council of Mayors, a group representing municipalities along the Shrewsbury and Navesink Rivers, in partnership with the NJDEP CMP, JCNERR and the Rutgers Climate Institute. The participating towns are Eatontown, Fair Haven, Highlands, Little Silver, Long Branch, Middletown, Monmouth Beach, Ocean Township, Oceanport, Red Bank, Rumson, Sea Bright, Shrewsbury Borough, Tinton Falls and West Long Branch.

Shoreline Restoration: The CMP and its project partner, New Jersey Future, are currently engaged in a pilot project that will develop and implement a comprehenisve community planning process in Tuckerton Borough and Little Egg Harbor Township. The project will inlcude an assessment of the municipalities' contiguous shorelines and the development of a shoreline strategic plan that identifies stabilization and restoration strategies.

Collaborative Solutions to Resilience Problems: The Atlantic-Cape Coastal Coalition is a group of southern New Jersey waterfront communities that meets monthly to discuss common municipal resilience issues and solutions. Formed in the aftermath of Superstorm Sandy, the meetings include elected officials, county and municipal staff as well as select professionals. Among their objectives is lowering residents' flood insurance premiums through FEMA's CRS program. Current active members are Atlantic City, Brigantine Beach, City of Pleasantville, Ventnor City, Margate City, Longport Borough, Ocean City, Sea Isle City, Stone Harbor Borough, Avalon Borough and West Wildwood.