SENATE STANDING COMMITTEE ON INVESTIGATIONS AND GOVERNMENT OPERATIONS

REPORT ON THE HEARING HELD
January 17, 2013
On Rebuilding After Sandy

SENATOR CARL L. MARCELLINO, CHAIRMAN

SENATE STANDING COMMITTEE ON
INVESTIGATIONS AND GOVERNMENT OPERATIONS

COMPILED BY:
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SENATE STANDING COMMITTEE ON INVESTIGATIONS AND GOVERNMENT OPERATIONS

Public Hearing on Rebuilding After Sandy
Thursday, January 17, 2013
11 am
Legislative & Executive Chamber
Nassau County Office Building
1550 Franklin Avenue
Mineola, NY 11501

WITNESS LIST

Edward Mangano, County Executive
County of Nassau
Samuel Chu, Director of Operations
County of Suffolk

Todd Stewart, President
New York State Builders Association
Lewis Dubuque, Executive Vice President
New York State Builders Association
John Bachenski, Design Professional/NYC Director
International Masonry Institute

Elizabeth Sheargold, Associate Director
Columbia Center for Climate Change Law
James Rausse, AICP, President
American Planning Association, Metro New York Chapter
Michael Levine, Vice President for Government Affairs
American Planning Association, Metro New York Chapter

James Ammerman, Ph.D., Director
New York Sea Grant
Jay Tanski, Coastal Process Specialist
New York Sea Grant

Nate Woiwode, Policy Advisor, Marine and Coastal Team
The Nature Conservancy on Long Island
Douglas Hill, Consulting Engineer and Adjunct Lecturer
Stony Brook University

Jack Schnirman, City Manager
City of Long Beach
Joseph Madigan, Assistant Superintendent of Buildings and the Village's Floodplain Manager/Mitigation Coordinator
City of Freeport

Edward Mangano
County Executive
Nassau County

County Executive Mangano shared with the Committee that more than 70,000 homes and businesses in Nassau County were damaged, flooded and many were completely destroyed. Additional damaged was suffered by other critical infrastructure including the Long Island Power Authority, waste water treatment plants in Bay Park and Long Beach, hospitals, school, nursing homes, police precincts, roadways, waterways, beachfront and traffic lights.

The County is focused on recovery and rebuilding. They look forward to partnering with the State to address the following areas:

- Home Restoration
  - Assisting non-insured and under insured residents
  - Mold mitigation programs
  - Smart rebuilding analysis

- Business Recovery Assistance
  - Assistance is required beyond the traditional Small Business Administration loan

- Critical Infrastructure Restoration
  - Restoration and hardening is necessary to protect the health, safety and welfare of our citizens
  - Nassau County is working with State and Federal engineers to develop a regional solution to harden such critical infrastructure

- Environmental Restoration
  - Beach restoration and waterway cleanup programs are necessary to return our environment to pre-Sandy conditions and continue our restoration efforts

Samuel Chu
Director of Government Operations
Suffolk County

Suffolk County Director of Operations Samuel Chu shared with the Committee their insight from Superstorm Sandy. Over 25,000 structures in Suffolk County were damaged.

Mr. Chu informed the Committee that the Federal government has authorized in excess of $20 million to repair the beaches in Suffolk County. This funding includes:

- Beach erosion control and hurricane protection from Fire Island to Montauk Point
- Navigation and shore protection through the dredging of Fire Island Inlet with the placement of dredged sand on to Gilgo and westerly beaches
- Construction of Asharoken Sea Wall

Mr. Chu discussed the collaborative effort that municipalities and agencies are taking in this recovery effort. He hopes the Committee will consider steps to make such efforts easier in the future citing as a possible example the making of inter-municipal agreements more streamlined during an emergency, expediting the recovery efforts.

Although Suffolk County did not suffer the same degree of infrastructure damage as other jurisdictions during Superstorm Sandy, the damage to its bulkheads and beaches were so severe that should a similar or even lesser storm strike before the current damage is remedied, the destruction on the next storm will be more severe.

Suffolk County is awaiting updated guidelines from both New York State's Office of Emergency Management and FEMA on best practices for construction and reconstruction in Suffolk County flood zones in response to Sandy. Although under the Stafford Act many improvements will be funded by the federal government, local homeowners, communities and municipalities will make the final decisions on how to move forward. It is important that a regional approach be considered and uniform adoption across municipalities and jurisdictions encouraged to prevent disasters on the same scale as Superstorm Sandy.

Lewis Dubuque
Executive Vice President
New York State Builders Association

Mr. Dubuque informed the Committee that New York has the largest concentration of vulnerable and valuable property on the East Coast outside of Florida. As a result of the experiences and results of Superstorm Sandy, a review of our building codes and systems are necessary to insure that New York is prepared for future weather events.

As New York looks forward and rebuilds, it is important to gain an understanding of the types and causes of property damage sustained to intelligently address mitigation measures, including potential code changes.

Mr. Dubuque shared with the committee that many homeowners are now experiencing significant coverage gaps with their flood and insurance policies. He suggested a real property tax abatement program for impacted municipalities and targeted exclusively one to three-family homes damaged by Sandy which are either being reconstructed or undergoing major rehabilitation. As many of the residences destroyed or damaged will be subject to more stringent building code requirements, a tax abatement is appropriate to assist homeowners in meeting these additional costs especially due to the shortfall in insurance coverage.

Mr. Dubuque also addresses multi-family residential rental buildings that were damaged during the storm. Those multi-family building covered by rent regulations, are not able to access major capital improvement (MCI) rent increases for improvements without a waiver from the New York State Division of Housing and Community Renewal (DHCR) to exempt storm damage improvement from the applicable useful life schedule. He recommends that DHCR provide a blanket waiver to multi-family buildings for the useful life schedule where damage was caused by Sandy. This action would relieve DHCR of substantial paperwork burdens and enable owners to undertake Sandy related repairs immediately.

Another suggestion is to consider the benefits of establishing a hurricane damage mitigation program that would assist homeowners in identifying and making improvements to strengthen their residences against storms. Many homeowners want to prepare their homes for the next event and are searching for solid recommendations from reliable sources and are concerned with scammers preying on them. Mr. Dubuque directed the committee to Florida's home hardening program titled, "My Safe Florida Home." It provides home retrofit inspections of one- and two-family residences in the strike zones to determine recommended mitigation measures and whether potential insurance discounts are available for implementation of such measures.

Finally, Mr. Dubuque expressed the importance of any zoning or other development changes contemplated as a consequence of Superstorm Sandy should be done in the context of a comprehensive plan.

John C. Bachenski
Director of Marketing Development and
Technical Services
International Masonry Institute

John Bachenski pointed out a recent quote by Governor Cuomo suggesting that these 100 year Superstorms now seem to be happening every other year. In response, Mr. Bachenski notes that the State needs to establish policy guidelines that can be implemented through the building codes in shore communities that address this new reality. As a result, we need to rebuild our communities with sustainable, long lasting structures designed to more rigorous standards and incorporating green renewable materials that are resistant to both flood and wind.

Mr. Bachenski pointed out that masonry products and systems like, brick, block, stone are some of the oldest, most durable and resilient building materials in human history and should be strongly considered as rebuilding occurs. His organization is work with engineers and architects to develop masonry solutions that adapt construction methods used in other parts of the country prone to hurricanes to the local environments of Long Island and New York City.

New York State Senate Investigations and Government Operations Committee members Senator Martin Golden and Chairman Carl Marcellino participate in a panel on Sandy Recovery as part of the New York State Senate Bipartisan Task Force

Elizabeth Sheargold
Associate Director
Columbia University
Center for Climate Change

Ms. Sheargold briefly outlined the Center's directives. The Center develops legal tools to enable policy makers and practitioners to address climate change and as a result of Superstorm Sandy, the need to incorporate adaption considerations into New York's planning laws and regulations.

Ms. Sheargold shared with the committee three general comments:

- We have a tendency to be concerned with the last great disaster but must recognize that Sandy is only one example of a larger problem
- New York also needs to protect against other kinds of extreme weather events such as:
  - Extreme precipitation which causes massive flooding
  - Protracted heat waves
- New York must take a long-term approach to adaption

Ms. Sheargold conveyed to the Committee that New York should take this opportunity to re-build communities to be resilient to all three of these events: hurricanes, floods and heat events. The Center has proposed the following recommendations to make New York more resilient:

- Adapt infrastructure
  - Require agencies and companies to develop long-term adaption plans that evaluate the risks posed by climate change to their infrastructure
    - $1 of prevention today can avoid as much as $4 of post-disaster expense
- Incorporate adaption efforts into existing planning requirements
  - Climate change adaption should be integrated into existing processes
  - Agencies and companies could be required to consider not only how the actions will affect the environment, but also how the changing environment may affect their building in environmental impact statements
  - Decision-making for governmental funding and permitting should reflect expected sea levels and climatic conditions at the end of the useful life of the facility, not just the beginning.
- Implement the recommendations made by existing plans and task forces
  - Sea Level Rise Task Force
  - New York City Panel on Climate Change
  - New York State 2100 Commission
- Have the conversation now about how we will respond to future disasters

James Rausse, AICP
President
American Planning Association, Metro New York Chapter

Mr. Rausse shared with the Committee the Metro New York Chapter's activities to address the immediate and long term recovery and long-term resiliency needs to the Metro New York Region. In addition, the Chapter will be hosting a series of half-day panel workshops in the coming months and dedicating pro-bono teams of disaster planning experts to conduct visioning sessions in affect communities.

Further actions by the Metro New York Chapter include:

- Working with NYS Department of State, New York City, Professional organizations such as AIA and the regions planning sessions to develop a regional, comprehensive strategy to minimize the damages when a storm like Sandy occurs again
- Developed strategic partnerships with the Dutch Embassy and the National Disaster Preparedness Training Center to solicit expertise from those who face these challenges on a regular basis
- Submitted comments addressing coastal resources and land use to be considered in the Governor's report as requested by the Department of State – Some of these points included:
    - Where is it appropriate to rebuild v. retreat?
        - Not always in best interest to reconstruct exactly what we had
        - Cannot continue to expend State and Federal resources to backstop private investment decisions for what is inevitably a temporary period
        - Re-evaluate the National Flood Insurance Program
            - Discourage, not indemnify, those who take on the risk of building in flood prone areas
        - Consider establishing a fund to buy out property owners in areas that should not be rebuilt
    - Incorporating resiliency into zoning codes
        - Model floodplain overlay districts can be developed with incentives for their implementation
    - Establishing jurisdictional guidelines
        - Multi-jurisdictional regions with similar populations and geography should develop a comprehensive strategy that addresses the needs of like communities giving the State an opportunity to pool and consolidate resources
    - Where and how should the shoreline be hardened?
        - Re-evaluate the last two decades of shoreline softening, relying less on floodwalls and bulk heading and more on wetland plantings as storm surge penetrated several hundred feet inlands in areas without adequate shoreline protection

- Do we consider floodgates in New York Harbor? For East and Hudson River tunnels?
  - If not a full-scale walling off, then retrofitting tunnels with floodgates should be a priority
- Is it practical to elevate underground utility vaults?
- In non-flood prone areas, can we afford to bury power lines?
- Should we require backup generators at gas stations?
- Allocating funding sources
- Community Involvement
  - Strongly recommend a collaborative approach with affect communities
  - Establish an implementable participation framework to assure that affect communities are involved in every step of the process
- Sustainability

James W. Ammerman, Ph.D.
Director
New York Sea Grant

Dr. Ammerman shared with the committee the actions that Sea Grant has been taking as a result of Superstorm Sandy. They include:

- Long –term support of research on coastal hazards and related issues
- Rapid response small research grants
- Long-term extension and outreach to Long Island and Great Lakes communities and business concerning important coastal issues
- Additional extension and outreach to Sandy-impacted stakeholders

Dr. Ammerman noted a number of challenges in the wake of Sandy including the vulnerability of our coastal environments, the magnitude of coastal development and the resulting storm damage which required that we rebuild differently and more efficiently and the best available, and most current quantitative scientific information and its prompt distribution to those who need it by reliable sources. Furthermore, these coastal hazard problems are not new and there are useful sources of information going back to the 1980's which Sea Grant has had a role in.

Nate Woiwode
Policy Advisor and the Climate Team Co-Lead
The Nature Conservancy on Long Island

Nate Woiwode, Policy Advisor and Climate Team Co-Lead for the Nature Conservancy on Long Island pointed out to the Committee two recent documents that have been issued: The National Climate Assessment and Development Advisory Committee's draft climate report for public comment and Governor Cuomo's 2100 Commission Recommendations on Improving the Strength and Resiliency of the Empire State's Infrastructure. He instructed the committee that the State needs to make choices and they need to be made now.

On behalf of the Nature Conservancy, Mr. Woiwode reminded the committee that the organization has long been concerned with the pace of global climate change and the impact that this environmental crisis will have on our natural resources and human communities. They continue to advocate at the state, federal and international levels for policies that will reduce climate changing emissions. Further, New York and the nation must continue to provide financial incentives and advance policies that spur technological innovation to move us into a lower greenhouse gas future and increase efficiency to reduce the need for a new energy generation capacity.

The Nature Conservancy is examining how conservation solutions can address coastal threats. They have developed the Coastal Resilience Tool for Long Island and New York City areas which can be accessed at http://www.coastalresilience.org and the Climate Wizard at http://www.climatewizard.org. Both tools, which are accessible to the public can provide valuable information.

The Nature Conservancy has drafted a number recommendations to assist governments in prioritizing redevelopment and avoid rebuilding in a way that creates vulnerabilities. These recommendations can be found in attachment A of this report under Mr. Woiwode's testimony. In addition to these recommendations, Mr. Woiwode shared a number of legislative and regulatory shortcoming that have left important natural resources unprotected or inadequately protected and at risk. These proposals can also be found in attachment A of this report under Mr. Woiwode's testimony.

Finally, Mr. Woiwode suggested an immediately policy step that should be taken is to adopt the sea level rise projections by the State and the inclusion of those projections into various planning and permitting laws to ensure that the most up-to-date science is being used as coastal communities make development decisions.

Doug Hill, Eng., Sc.D., P.E.
Adjunct Lecturer
School of Marine and Atmospheric Sciences
Stony Brook University

Mr. Hill began his presentation by reviewing the actions of the Federal government as a result of Hurricane Katrina in New Orleans, led by the Chief of Engineers of the U.S. Army Corps of Engineers who established the Interagency Performance Evaluations Task Force (IPET). The IPET diagnosed the problems that occurred in New Orleans and established improved procedures for coastal risk planning. Mr. Hill recommended that the New York/New Jersey region develop its own Hurricane Protection System in light of the lessons of Katrina. He also pointed out the differences between Hurricane Katrina and Superstorm Sandy as well at the regions they impacted. He reviewed a number of those findings which included:

- Transitions between types and levels of protection and between protection structures and other featured created vulnerabilities to erosion and breaching and reduced the effectiveness of the protection
- No evidence of significantly reduced surge levels and wave heights in areas adjacent to wetlands and marshes
- Loss of life correlated with the poor, the elderly and the disabled, groups least likely to evacuate without assistance
- Most practical means to reduce risk is to keep people and property out of flood prone areas

Mr. Hill reviewed with the Committee steps that were necessary when considering the development of a Hurricane Protection System. This included:

- Risk Analysis – Develop a system-wide analysis of the capability of the Hurricane Protection System to protect against hurricane hazards.
- Storm Surge Barriers – evaluation of storm surge barrier in the waterways surrounding New York City
    - Barriers would be closed only when major storms approached

In summary, Mr. Hills suggests that the New York State Legislature support a comprehensive coastal risk analysis of the Metropolitan New York-New Jersey region by the U.S. Army Corps of Engineers for the purpose of establishing a Hurricane Protection System.

Jack Schnirman
City Manager
City of Long Beach

Jack Schnirman, City Manager of the City of Long Beach, shared with the committee his experiences during and after the storm and the damage his locality suffered as well as the daunting challenges that have resulted.

Mr. Schnirman issued a number of recommendations to the Committee. They include:

- Focus on mitigation, protection and hardening critical infrastructure
  - Protecting barrier islands
  - Addressing aging infrastructure
- Establishing a FEMA Match
  - Critical the State match is declared
    - Currently, with the 25% FEMA match, City would be responsible for $40 million – approximately half of entire annual city budget
- Cutting through the Red Tape
  - Quick pass through of FEMA funds
  - Streamlined reconstruction standards
- Office of Emergency Management
  - City of Long Beach does not have a local Office of Emergency Operations
    - Dependent on Nassau County and while helpful a local office would expedite necessary resources
  - Equipment
    - Office can assist coordination of first responders
    - Assistance in retrieval and dissemination of information
  - Grants needed for emergency response
- Communications
  - Centralized resident contact and information
  - Answer questions regionally
  - Ability to more effectively direct resources
- Cell Phone Services and Mobile Cell Towers
  - Dependent on technology – loss of reception is devastating

Joseph Madigan
Assistant Superintendent of Buildings and the
Village's Floodplain Manager/Mitigation Coordinator
Village of Freeport

Mr. Madigan shared with the Committee the overwhelming level of destruction that has occurred to the City of Freeport to its infrastructure and its homes. Many residents had just cleaned-up from Tropical Storm Irene when Superstorm Sandy hit. The City's three pump stations, which are located in the Village's flood zone, were flooded and were one day from having sewage back-up in resident's homes.

Mr. Madigan also shared with the Committee the problems his municipality is having with FEMA, although Freeport has been recognized as a pro-mitigation community. Issues have evolved around the replacement of bulkheads on residential properties and substantial damages estimates as well as the gap in funding to elevate homes, whose process costs approximately costs $100,000 but homeowners are only reimbursed $30,000 by FEMA and would be mandate to elevate. The village has elevated 26 houses in the past. Failure to elevate those home might endanger the communities participation in the National Flood Insurance Program.

Senator Marcellino discusses the impact of Superstorm Sandy on the Village of Freeport with Mayor Andrew Hardwick

• RECOMMENDATIONS •

On October 29, 2012, Superstorm Sandy hit Long Island and New York City with winds over 60 mph. The storm blew down trees, power lines and caused significant coastal flooding, resulting in 305,000 housing units destroyed or damaged. The damage from Sandy revealed serious flaws in the protection, placement and construction of our infrastructure and buildings. New York State and its municipalities need to discuss where we place our utilities and transportation networks, our construction techniques, and the future evolution of our communities. We must be prepared for larger storms with more catastrophic damage. The following are recommendations from the testimony submitted for the Hearing on Planning and Considerations for Rebuilding after Sandy.

PREPARING FOR LARGE STORMS

- There were suggestions on the planning for storm emergencies to improve government response:
    - Improve and streamline inter-municipal agreements on emergency response for first responders, highway crews and transportation agencies
    - Require generators at gas stations either through grants, low-interest loans, or tax-credits from the State
        - Others suggested the State should stockpile fuel for prolonged shortages
    - Strengthen local Offices of Emergency Operations
    - Develop plans for communicating with residents during emergencies
    - Plan for the use of mobile cell towers or to quickly restore power to permanent towers after the storm

PLANNING

- There was a consensus that:
    - Regional planning with Nassau and Suffolk Counties and New York City is needed
    - Planning should incorporate the expectation of larger storms than Sandy and for an increase in incidents of heat waves
- There was a consensus that localities need to conduct a risk assessment prior to investment in large projects
    - Risk assessments should include system performance, evaluation, and consequences of actions
    - The entire metro region, including New Jersey, should conduct a comprehensive coastal risk analysis
    - Decisions should result in reduced rebuilding costs in the future
- Support was given for agencies and businesses to develop long-term adaptation plans that evaluate the risks posed by rising sea levels to their infrastructure

- It was suggested that the State should identify areas that are "highly vulnerable" to the impacts of rising sea levels, and future planning and permitting should recognize these areas
- There was a consensus that localities need to have conversations with their residents about vulnerable areas regarding rebuilding, relocating, or retreating from the coast
    - There was a suggestion that the State consider a program to buy out people from vulnerable areas with a discussion of the high cost
- It was suggested that all planning include a collaborative approach with affected communities to ensure they are involved in every step of the process
- It was suggested that the region should form an Interagency Performance Evaluation Task Force (IPET) to review our federal, state and local policies that ensure the protection of public safety, health and welfare:
    - Qualifying risks
    - Rethinking the whole system at all levels (local, state, federal)
    - Identifying one person in charge of any regional protection systems
- There was a consensus that Federal Emergency Management Agency (FEMA) should update the flood maps and coastal erosion hazard maps more often to reduce uncertainty for municipalities adopting management policies
- It was suggested that adaption for sea level rise be incorporated into existing planning requirements, such as Waterfront Revitalization Plans, zoning law reforms, coastal permitting, and Environmental Impact Statements (EIS)
- It was suggested that municipalities with similar attributes (barrier island communities) work together to develop a comprehensive rebuilding strategy to pool and consolidate resources

REBUILDING GUIDELINES

- There was a consensus that stronger building codes are needed for rebuilding in vulnerable areas.
    - It was suggested that:
        - Localities incorporate stronger codes fully into zoning regulations, not just as an added chapter
        - Builders consider different building material, such as masonry
        - The State update the building code more often than every 3 years
        - The State model code changes after the southern coastal States, such as Florida
    - Some would like an assessment of how structures fared to see if the new building codes are working
        - The City of Long Beach found that those homes rebuilt to higher standards showed little damage
    - Some would like to see the State code include mold resistance materials
        - It was noted that there is no one in charge of checking levels or incidences of mold contamination
            - It was suggested that the Department of Health or building departments should be given oversight
- Some would like to see additional guidance from the State on local zoning improvements

- It was suggested that any local zoning changes should be done within a comprehensive plan
    - It was noted that the City of Long Beach revised their zoning regulations for elevating buildings, no longer requiring the Zoning Board of Appeals review
- It was noted that municipalities are still waiting for updated guidelines from the Office of Emergency Management & FEMA
    - It was suggested that the Division of Housing and Community Renewal (DHCR) provide a blanket waiver to multi-family buildings which suffered damage by Sandy to speed repairs
    - It was suggested that the State adopt a program similar to Florida's My Safe Home, that provided grants to strengthen homes against hurricanes and certified wind inspectors
- Support was given for all coastal communities to adopt FEMA flood plain regulations, as required for participation in the National Flood Insurance Program (NFIP)
- It was suggested that the State should create model floodplain overlay districts with incentives for implementation, based the overlay districts in NYC for growth and density

NATURAL ENVIRONMENT

- There was conflicting advice on whether the State Environmental Quality Review Act (SEQRA) should include an assessment or adaption to the threat of rising sea levels
- It was suggested that the State and localities should regularly delineate and update wetland and riparian floodplains maps, and release them promptly
- There was a discussion of shoreline protections
    - It was suggested that the State and Federal governments reinstate the study of shoreline locations threatened by erosion to aid in any decisions
    - It was noted that shoreline hardening increases damage to neighboring shore areas but that natural areas experienced further inland flooding
    - There was a suggestion to increase the use of green & natural infrastructure and the protections and buffer sizes of riparian floodplains
- There was a discussion of barrier islands and the protection of their beaches regarding their importance in protecting the south shore of Long Island
    - There was conflicting advice on the repair of new beach breeches
    - There was a request for the reappropriation of State and federal funds for previously authorized projects
    - There was a suggestion to conduct a study on how sand moves along the barrier island to get a baseline on how nature works
        - It was noted the biggest problem is sand moving along our barrier islands, not over it or eroding away
- There was a suggestion that surge gates be build to protect New York City
    - The high construction costs were discussed, as were the high costs of repairing future storm damage

INFRASTRUCTURE

- There was a discussion of using concrete power poles, and electric lines being buried in areas not vulnerable to flooding, which could be done piecemeal when roads have full depth reconstruction
- There was a consensus that New York City must develop plans to protect transportation tunnels from future flooding
- There was a discussion that many municipalities have aging infrastructure, which increases the costs of adaption
- It was suggested that the State support a tax abatement program for storm damaged structures, concern was raised about the costs
- There was a suggestion that permit requirements to operate power plants, sewage treatment plants, and other publicly regulated and financed infrastructure should include resiliency plans
- It was suggested that the State:
    - Develop model standards for local governments to adopt that will ensure new and replacement infrastructure is sized and designed to mimic natural processes
    - Develop model codes for local zoning that takes rising sea levels projections into consideration
    - Create a menu of incentives (e.g. streamlined permits, greater share of state funding for recovery) to encourage adoption of the model standards for codes and infrastructure development

REBUILDING

- There was consensus that the suggestions from previous sea level rise studies should be implemented
- There was a request to remove the local match needed to receive FEMA funds
- There was a suggestion to reduce red tape, speeding up the pass through of FEMA and State funds to get residents back in their homes and businesses reopened

• ATTACHMENT A •

SPEAKER'S TESTIMONY

EDWARD P. MANGANO

OFFICE OF THE COUNTY EXECUTIVE

THE THEODORE ROOSEVELT EXECUTIVE & LEGISLATIVE BUILDING

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Testimony by Nassau County Executive Edward P. Mangano

before the NYS Senate

Investigations and Government Operations Committee

January 17, 2013.

Members of the New York State Senate Investigations and Government Operations Committee, thank you for the opportunity to address you this morning on behalf of Nassau County's 1.3 million residents.

I would also like to thank New York State for your partnership with response and recovery efforts following Hurricane Sandy.

Clearly, Superstorm Sandy dwarfed our region, affecting the lives of nearly every resident. In fact, in excess of 70,000 homes and businesses were damaged, flooded and many were completely destroyed. Critical infrastructure including our power utility, wastewater treatment plants in Bay Park and Long Beach, hospitals, schools, nursing homes, police precincts, roadways, waterways, beachfront and traffic lights all suffered destruction.

Today, we focus on recovery and rebuilding. Your partnership in the rebuilding process will assist Nassau County in addressing the following areas:

- Home Restoration,
- Business Recovery Assistance,
- Critical Infrastructure Restoration, and

- Environmental Restoration

Each of the aforementioned areas of need require cooperation among County, State, Federal and Local municipalities.

Home rebuilding issues in Nassau County include:

- assisting non-insured and under insured residents,
- mold mitigation programs, and
- smart rebuilding analysis

Small businesses require assistance beyond the traditional Small Business Association loan in order to fully address small business restoration.

Critical infrastructure restoration and hardening is necessary in order to protect the health, safety and welfare of our citizens. Nassau County is working with State and Federal engineers in developing a regional solution to harden such critical infrastructure.

Beach restoration and waterway cleanup programs are necessary to return our environment to pre-Sandy conditions and continue our restoration efforts.

Thank you for your kind consideration and thoughtful partnership assisting residents in rebuilding their homes and businesses, hardening our critical infrastructure and restoring our environment through cooperative programing..

Respectfully submitted this 17th day of January, 2013,

Edward P. Mangano
Nassau County Executive

Standing Committee on Investigations and Government Operations

Testimony of Samuel Chu, Director of Operations, Suffolk County

January 17, 2013

Thank you for the opportunity to address this committee and provide you with information that will assist you responding to the needs and impact of Superstorm Sandy in Suffolk County.

To address the issues that this committee is raising today, and to provide you with insight into the situation in Suffolk County, I would like to bring to your attention the following:

- Barrier island beaches, including Fire Island, provide critical protection not just to the beaches themselves but to tens of thousands of homes on the mainland. They are as critical to protecting Suffolk County as levees are to New Orleans.
- During Sandy and in nor'easters and storms afterward, breaches at these beaches, including at Smith's Point, Old Inlet and Cupsogue, have led to significant mainland flooding in communities including Lindenhurst, Amityville and Mastic Beach. Sandy left, but the Atlantic Ocean continues to threaten and attack.
- Initial efforts by the U.S. Army Corps of Engineers, after Sandy, to repair breaches and wash-overs included re-nourishment of approximately 9 feet of sand in some of these affected areas, where previously stood about 15 feet of sand.

While the federal government has authorized in excess of $20 million to repair the beaches in Suffolk County including: Beach erosion control and hurricane protection from Fire Island to Montauk Point, navigation and shore protection through the dredging of Fire Island Inlet with placement of dredged sand on to Gilgo and westerly beaches, and construction of Asharoken sea wall. None of these project have commenced due to the inability to secure funding. The funding of these projects will provide the immediate and long term protection of the mainland.

County Executive Bellone, working with Governor Cuomo, helped initiate the Fire Island Debris Removal Task Force with county, town and village personnel, along with the Army Corps of Engineers, FEMA, the National Park Service, New York State OEM and multiple state agencies. Debris removal will be the first step in the overall mission of long-term restoration of Fire Island; to date, almost one thousand five hundred Fire Island residents have provided Rights of Entry to their town or village so the Army Corp cleanup project may begin.

All of these municipalities and agencies are collaborating on this effort because it is a shared recovery. If this committee could take steps to make such efforts in the future easier – such as making inter-municipal agreements more streamlined during an emergency – it could expedite the recovery efforts in the future.

Suffolk County did not suffer the same degree of infrastructure damage during Sandy as did our colleagues in other jurisdictions. However, the damage to bulkheads in Suffolk County and to

our beaches was so severe that should a similar, or even a lesser storm, strike before this damaged is fixed, the conversation we have here the next time will have a much different tone.

We continue to await updated guidelines from both New York State's Office of Emergency Management and FEMA on best practices for construction and reconstruction in Suffolk County flood zones in response to Sandy.

These guidelines may suggest a combination of structural elevation in areas of repeat flooding, or "strategic" elevation of heating and electrical systems from basements to ground level; acquiring destroyed properties and keeping some zones free from residential construction altogether; and fortifying infrastructure like water and sewer facilities and utilities beyond existing standards.

While we would agree that these would be reasonable guidelines and standards, and know that under the Stafford Act much of this will be funded by the federal government, it will be local homeowners, communities and municipalities themselves that make the final decisions on how to move forward. A regional approach to rebuilding must be considered and uniform adoption across municipalities and jurisdictions encouraged to prevent devastation as seen by the affects of Superstorm Sandy.

Many of these municipalities now are under an enormous strain. More than 25,000 structures in Suffolk County were damaged by Sandy. Local building departments are now faced with the task of accepting thousands of building permit applications, conducting thousands of inspections and ensuring that thousands of residential repairs are performed safely and as quickly as possible in accordance with local codes and laws. During this same time, they will be asked to review and consider new guidelines that will help protect against future disasters. And, all the while, residents who have been displaced from their homes will be running out of federal rental assistance dollars.

The clock is ticking, and anything this committee could propose to assist municipalities with this herculean effort could play a critical role.

Good Morning Chairman Marcellino. Senators and Guests. My Name is John Bachenski and I am the Director of Marketing and Technical Services for The International Masonry Institute NYC. The area I oversee consists of NYC and the outer boroughs, Long Island and NJ. I received a BA in Architecture from Temple University and a member of AIA/NYC. I am also a member of the Building Enclosure Council AIA – NYC I have been involved with the masonry industry for the last twenty years. Thank you for this opportunity to address the Committee today regarding construction and building in the wake of Hurricane Sandy.

Hurricane Sandy has devastated our shore communities from Montauk to the Rockaway's to lower Manhattan, Staten Island and New Jersey. This tragic event has forced us to rethink how we rebuild residential, commercial, health care and government structures in flood prone areas. As the Governor has painfully noted, 100-year superstorms now seem to be happening every other year. In response, we need to establish policy guidelines here that can be implemented through the building codes in shore communities that address this new reality. Our codes and standards around the state must be improved to - literally - meet the rising tide. We need to rebuild our communities with sustainable, long lasting structures designed to more rigorous standards and incorporate and rely on green renewable materials that are resistant to both flood and wind. The policy challenges we face in rebuilding are complicated but not insurmountable. Masonry Products and systems like brick, block, stone are some of the oldest, most durable and most resilient building materials in human history and should be an essential part of the solution to the challenges we face in rebuilding post-Sandy. For a variety of reasons, strategic use of masonry products will ensure that what we build today will last for generations. We are currently working with engineers and architects to develop masonry solutions that adapt construction methods used in other parts of the US prone to hurricanes to our local environment on Long Island, Staten Island, Manhattan and New Jersey. Our goal is not only build to last but to provide safe sustainable solutions that we hope can present a repeat of the devastation Sandy left along our shoreline.

According to the Army Corp. of Engineers and FEMA, flood-resistant building materials can withstand direct contact with flood waters for at least 72 hours without being significantly damaged. "significant damage" means any damage that requires more low-cost, cosmetic repair (Such as powerwashing and painting). Simply put, masonry is the primier choice in flood resistant material. Masonry can be used for walls, floors, and other parts of a building that are below the flood level and, as such, should be utilized to some extent in every masjor construction sector. Masonry is naturally resistant to mold and can be esisly powerwashed and disinfected one contaminated flood waters recede. Properly designed and implemented masonry systems can limit the volume of demolaition and debris as the result of natural disataters and bring buildings and communities back to life more quickly and efficiently.

Schools / Instatutional and Govermant Buildings – These buildings commonly serve as evacuation sites for citizens fleeing life threatening conditions in their own homes. In addition, they serve as staging facilities in repair and recovery efforts. As such, these structures must be built to endure the most serious weather conditions, along with the strength to resist fire, bombs, bullets, etc. In flood prone areas, load bearing masonry materials should be used for these structures

Health Care Facilities / Nursing Homes – These buildings house vulnerable populations and emergency evacuation can create its own serious dangers for these residents. Like schools and government building, these buildings need to be built to endure the most serious weather conditions and have the strength to resist fire, bombs, bullets, etc. Again, properly designed and implemented masonry systems are the logical choice for these structures.

Retail and Commercial - Buildings up to two stories should use masonry as the primary structure. Properly designed and implemented masonry systems provide mold resistance and durability that can help bring businesses back quickly by avoiding the necessity of large scale demolition and debris.

Multi-Family Residential Buildings – In addition to masonry's resilience in flooding – which I have already discussed at length -- the damage created by rising water can be reduced by constructing the interior walls on the first two floors with masonry. Compartmentalization design applied to masonry buildings can also decrease the risk of fire spread when fire systems are compromised.

Using structural masonry systems, masonry walls and other masonry materials create strong, fire and mold resistant building material. Masonry has one of the highest life cycle cost available today. If we are serious about minimizing flood damage using a masonry solution is the solution.

The New York State Builders Association's Testimony Before the Senate Standing Committee on Investigations and Government Operations

Planning and Considerations for Rebuilding After Sandy

Thursday, January 17, 2013
11:00 am
Legislative & Executive Chamber
Nassau County Office Building

Senator Marcellino and fellow Legislators, thank you for providing me the opportunity to discuss this important matter with all of you today. My name is Lew Dubuque, and I am the Executive Vic President of the New York State Builders Association.

The New York State Builders Association (NYSBA) is a not-for-profit trade association comprised of 16 local affiliates across the state. NYSBA represents 2,500 single and multi-family builders, remodelers, developers, and associate member firms. These members perform over $5 billion in single and multi-family residential construction annually and employ over 250,000 New Yorkers.

Several of our local home builder associations are located in areas that were effected by Superstorm Sandy and on behalf of all of us at NYSBA, I would like to express our heartfelt sympathies to the victims of Sandy and our gratitude to the first responders who performed so admirably under difficult circumstances.

New York has the largest concentration of vulnerable and valuable property on the East Coast outside of Florida. Superstorm Sandy requires a review of our building codes and systems to insure that New York is prepared for future catastrophic weather events.

It is important to gain an understanding of the types and causes of the property damage sustained by our built environment and supporting infrastructure to intelligently address mitigation measures including potential code changes. There are obviously different approaches to deal with flooding versus windstorm damage.

Property damage may be found to be more extensive among older buildings which were not constructed under the more stringent codes which are enforceable for new construction or on substantial rehabilitation. Residential building code provisions evolve with new design and construction requirements which often are a result of new construction products or system innovations.

Many homeowners in the affected storm areas are discovering significant coverage gaps when flood and other insurance coverages are tallied up. For families who want to rebuild or rehabilitate their damaged homes, an essential catalyst would be a real property tax abatement program provided by the impacted municipalities. This program would be targeted exclusively to one- to three-family homes damaged by Sandy which are either being reconstructed or undergoing major rehabilitation.

Many of the residences destroyed or damaged by Sandy will be subject to more stringent building code requirements on rebuilding or rehabilitation, so a tax abatement is appropriate to assist homeowners in meeting these additional costs, particularly because of the shortfall in insurance coverages experienced by many homeowners.

Under this proposed tax abatement program, a decreasing property tax exemption would be available to owner-occupants of newly constructed or substantially reconstructed one- to three-family residences damaged by Sandy. This program will encourage middle class families to remain in their neighborhoods and either rebuild or restore existing housing. The tight housing

market in New York City and Long Island does not have the affordable housing inventory available to permit families to easily relocate. This proposed tax abatement program would have a minimal cost impact on a municipality because the program is temporary. Without assistance, many homes may remain in a damaged state.

This tax abatement program would not only help storm victims but also increase economic activity in the residential construction industry, which remains in the doldrums in New York State.

Multi-family residential rental buildings were also damaged by Superstorm Sandy. Many buildings were flooded with damage to their boiler and heating systems. Multi-family buildings covered by rent regulations are not able to access major capital improvement (MCI) rent increases for improvements without DHCR processing a waiver request to exempt the storm damaged improvement from the applicable useful life schedule. An owner cannot recover for the improvement without MCI approval. DHCR should provide a blanket waiver to multi-family buildings for the useful life schedule where damage was caused by Sandy. The action relieves DHCR of a substantial paperwork burden and would enable an owner to undertake Sandy-related repairs immediately. There is no reason for delay as a waiver is a necessary predicate for a major capital repair.

The State should also consider the benefits of establishing a hurricane damage mitigation program. This program would help New York homeowners to identify and make improvements to strengthen their residences against hurricanes.

Many New York homeowners want to storm harden their residence after Sandy. These homeowners are searching for solid recommendations from a reliable resource and are concerned about home improvement scams, where scammers are preying upon uninformed homeowners. The Department of State website has a notification about this situation.

A home hardening program could be modeled after the "My Safe Florida Home" program. A home hardening program would provide home retrofit inspections of one- and two-family residences in the Sandy strike zone to determine recommended mitigation measures and whether potential insurance discounts were available for implementation of such measures. By connecting a homeowner with a legitimate inspector, it would enable a homeowner to make an informed decision on what actions to take to eliminate the future risk of property damage because of flooding, wind and other hurricane-related damage. If there were sufficient financial resources, the program could also provide grants for low-income homeowners to undertake recommended storm hardening measures.

Any zoning or other development changes contemplated as a consequence of Superstorm Sandy should be done in the context of a comprehensive plan. Zoning changes to revise coastal zoning to limit building in areas vulnerable to flooding should only be done in the context of a comprehensive plan for a municipality. Without a comprehensive plan approach, there is no assurance that a balance will be struck in the community's response. Consideration should be given to increasing density in areas equipped to accommodate smart growth.

Clearly there is a necessity to evaluate both infrastructure and land use policies in the context of the increased severity of weather events. Sandy should not, however, be used as a predicate to make climate change a component of SEQRA review, or as a rationale to expand the State's regulatory authority over freshwater wetlands.

As currently applied, SEQRA results in significant costs and project delays and to expand its scope so that residential development would be subject to climate change review would only exacerbate that situation. Similarly, to argue for the expansion of freshwater wetland regulatory authority based on tidal flooding does not justify any such action. DEC under existing law has the authority to regulate freshwater wetlands less than 12.4 acres which are determined to be unusual local importance. In addition, the Army Corps & Engineers has jurisdiction under the Clean Waters Act Section 404 without regard to any acreage limit.

Storm hardening should be the focus to limit the property damage from future weather related events. Sandy should not be used to expand unrelated regulatory authority.

Senator Marcellino, thank you again for providing the time to discus this vital issue with you today.

COLUMBIA UNIVERSITY
IN THE CITY OF NEW YORK
LAW SCHOOL

January 17, 2013

The Honorable Carl Marcellino
Chairman, Senate Standing Committee on Investigations and Government Operations
Nassau County Office Building
1550 Franklin Ave,
Mineola, New York 11501

Re: Planning and Considerations for Rebuilding after Sandy

Good morning Mr. Chairman and Members of the Committee:

Thank you for this opportunity to comment on New York's strategy to re-build after Sandy. My name is Elizabeth Sheargold, and I am an Associate Director of the Center for Climate Change Law at Columbia University. The Center develops legal tools to enable policy makers and practitioners to address climate change, and in the wake of Hurricane Sandy, we recognize the need to incorporate adaptation considerations into New York's planning laws and regulations.

I am here today to urge the Committee to view re-building after Hurricane Sandy as a larger opportunity to build resilient communities throughout New York and to create adaptation strategies that will protect New York well into the future.

As Hurricane Sandy so vividly demonstrated, we must expect more frequent and more intense climate events from now on. Infrastructure and neighborhoods that have historically been safe from extreme weather events cannot be assumed to be safe from future events. According to the New York State ClimAID report, due to sea level rise alone, a 100 year flood may be a 25 year flood by the end of the century.

We cannot change what the climate will look like in the next few decades. But we can change the way we respond to extreme weather events. We can be prepared.

I have three general comments, and then will provide some recommendations on actions the New York State legislature could consider in its strategy for building a more resilient state.

First, we have a tendency to be concerned with the last great disaster, but we need to recognize that Hurricane Sandy is only one example of a larger problem. Hurricane Sandy, despite its colorful title as a Superstorm, was not a worst case scenario. It was a Category 1 hurricane when it hit New York City. A Category 3 hurricane combined with high tides could have been much worse. Hurricane Sandy was also not a 100 year storm. There is debate as to whether it was a 20 year storm or a 30 year storm, but what is clear is that New York can expect to see this type of event much more frequently in the coming decades. So New York cannot just build protections against Hurricane Sandy – it needs to build protections against something far more severe.

Second, New York also needs protection against other kinds of extreme weather events. Hurricanes are not the only threat facing New York. Two other entirely plausible events are extreme precipitation that would cause massive flooding and protracted heat waves, with temperatures exceeding 100 degrees for weeks on end. The New York City Panel on Climate Change projects that by mid-century, New York City's average temperatures will rise by three to five degrees Fahrenheit, and sea levels could rise by more than two feet. Although hurricanes cause significant economic damage, heat events are the real killer: between 1970 and 2004 in the United States there were close to 4,000 deaths due to heat events, and less than 300 caused by hurricanes. New York should take this opportunity to re-build communities to be resilient not only to hurricanes but also to heat events and floods.

Third, New York must take a long-term approach to adaptation: a view that lasts at least as long as the infrastructure we invest in. How long do we expect the New York Subway expansion lines to last? That's how far in the future we need to plan for adaptation. A sea wall barrier may protect New York shorelines for 50 years, but not 100. What is our plan for when the barrier is no longer effective?

The course of action is not obvious. We have four general recommendations for the Committee on how to make New York more resilient.

1. Adapt infrastructure. Rather than focus solely on improving the response to disasters, focus on building infrastructure that will prevent another disaster. Require agencies and companies to develop long-term adaptation plans that evaluate the risks posed by climate change to their infrastructure. Adapting infrastructure is expensive, but according to the Global Facility for Disaster Reduction and Response, one dollar of prevention today can avoid as much as four dollars of post-disaster expense. In the long-run this will save money and build a better future for New York.

   As one example of this strategy, in December, the Center for Climate Change Law and several other groups petitioned the New York Public Service Commission to require utility companies to prepare and implement comprehensive hazard mitigation plans to address the anticipated effects of climate change. A copy of that petition is provided with the written copy of my testimony.

2. Incorporate adaptation efforts into existing planning requirements. State and city agencies conduct a wide variety of planning projects, and, rather than create a new and burdensome planning process, climate change adaptation should be integrated into existing processes. Some areas for obvious inclusion are: waterfront revitalization plans, community development projects, zoning law reforms, coastal area permitting regulations, stormwater management projects, State Hazard Mitigation Plans, and Environmental Impact Statements. In their environmental impact statements, agencies could be required to consider not only how their actions will affect the environment, but also how the changing environment may affect their building. The decision-making for governmental funding and permitting of all facilities should reflect the expected sea levels and climatic conditions at

the end of the useful life of the facility, not just at the beginning. Only in that way will we know that what we are building will probably last.

3. Implement the recommendations made by existing plans and task forces. Several task forces, commissions, committees, and panels have made recommendations on how New York State and New York City should adapt to climate change. Many, even most, of these recommendations have yet to be implemented.

   For example, the Sea Level Rise Task Force was created by the Legislature in 2007 and issued its report in 2010 with numerous recommendations on how state legislation could be modified to incorporate adaptation planning into on-going efforts, but these recommendations have yet to be implemented. The New York City Panel on Climate Change issued its report in 2010, with an entire chapter dedicated to an assessment of the laws and regulations that could be revised to address climate change planning. Most recently, the New York State 2100 Commission released its report on how to build resilience in New York.

   So New York has no shortage of studies and recommendations. What it needs now is action and implementation.

4. Have the conversation *now* about how we will respond to future disasters. Set expectations for communities that are re-building in vulnerable areas. How safe are they? What will happen when those neighborhoods are destroyed again? And again? How many tax dollars does the state want to invest in public works in vulnerable areas? When will we draw a line in the sand and say, no more?

   Having the conversation now about how we plan to respond to future disasters allows communities to make informed decisions and ensures the best allocation of resources throughout the state. As Governor Cuomo recognized in his State of the State Address, "In certain cases designating an area to use as parkland rather than for residential or commercial structures may protect the community from destruction." The Recreate NY - Home Buyout Program is one element, but this needs to be a much larger conversation about re-location away from vulnerable areas.

In closing, I would like to urge the Committee to take action now. Adaptation efforts – whether building a sea wall or relocating a community – will take time, and as Hurricane Irene and Hurricane Sandy have illustrated, we have no time to lose in making New York safe.

Thank you for your time.

COLUMBIA UNIVERSITY
IN THE CITY OF NEW YORK
LAW SCHOOL

December 12, 2012

Hon. Jaclyn A. Brilling
Secretary to the Commission
New York State Public Service Commission
Three Empire State Plaza
Albany, New York 12223

Re: Petition on Natural Hazard Planning

Dear Secretary Brilling:

This letter is a petition on behalf of the undersigned to the New York Public Service Commission, requesting that it use its regulatory authority to require all utility companies within its jurisdiction to prepare and implement comprehensive natural hazard mitigation plans to address the anticipated effects of climate change. While many utilities are currently required to develop and implement emergency response plans, these only cover short-term responses to storms or other disasters when they occur. Utilities are not currently required to engage in long-term hazard mitigation planning, which would consider future projections for the natural hazards that may affect New York State given changing climate conditions and then determine how best to mitigate risks to the reliable provision of utility services.

The Public Service Commission, fulfilling its duty to encourage the formulation of long-range programs, care for the public safety and ensure reliability of service, should require all utility companies within its jurisdiction to take these steps. This petition asks that the Public Service Commission take action as soon as possible to require New York's utilities to consider how their infrastructure and service delivery may be impacted by the extreme weather scenarios that are predicted to occur in the future and to develop plans for how those risks can best be mitigated.

The Problem

Extreme weather events threaten the reliable service of utilities to consumers throughout New York State. Hurricane Sandy, the most recent and devastating example in a series of storms affecting New York utilities, interrupted vital electrical, water, steam, and telecommunications services for over a million utility users throughout the state. Once interrupted, services may take weeks to reinstate, further exacerbating the human and economic costs of the storm.

Failed utilities affected more than just homes and residents. Emergency back-up generators at the New York University Langone Medical Center failed on Monday, October 29th, and in the absence of electrical power from the utility companies, 219 patients were forced to be

evacuated in the midst of the storm.[1] On the financial end, the New York Stock Exchange closed for two days during Sandy — the first time the exchange had closed for two consecutive days due to weather since 1888.[2] Con Edison Senior Vice President for Electric Operations John Miksad described Hurricane Sandy as "the largest storm-related outage in our history."[3]

While the severity of Hurricane Sandy may have been unique, its destructive effect on utility service is not. In 2011, Hurricane Irene left nearly 400,000 New York City residents without power.[4] The Public Service Commission's 2011 Electric Reliability Performance Report confirms the connection between utility outages and storm events.[5]

Million Customer Hours of Interruption (Total)				
2007	2008	2009	2010	2011
18 mil	32 mil	14 mil	34 mil	82 mil

Million Customer Hours Interruption Due to Storms				
2007	2008	2009	2010	2011
6.5 mil	23 mil	4 mil	25 mil	72 mil

Such outages occur at least in part because the critical infrastructure that supports New York utilities is vulnerable to storm surge and flooding. As described in the New York City Panel on Climate Change 2010 (NPCC 2010) Report, New York power plants have traditionally been located on shorelines in order to support water intake and discharge, and their proximity to the shore leaves them vulnerable to flooding due to storms and sea level rise.[6] Though underground utilities are generally thought to be less vulnerable than above-ground lines, New York City's PlaNYC 2011 discusses the vulnerability of the 90,000 miles of underground power cables — infrastructure that is "often immovable and was built for different environmental conditions than it is likely to face in the future".[7] Transmission lines are similarly vulnerable, according to NPCC 2010, because they enter the city from "relatively few directions" and

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[1] J. David Goodman, Patients Evacuated From City Medical Center After Power Failure, New York Times, 30 Oct 2012, http://www.nytimes.com/2012/10/30/nyregion/patients-evacuated-from-nyu-langone-after-power-failure.html.
[2] Mark Morales, "Apocalypse N.Y.: Hurricane Sandy kills 32, takes estimated $20 billion toll on the city after deadly two-day attack," New York Daily News, 31 Oct 2012, http://www.nydailynews.com/new-york/deadly-hurricane-sandy-takes-20b-tll-city-article-1.1195048#ixzz2BTNuL2ij.
[3] Millions of Tri-State Customers Without Power Following Superstorm Sandy, CBS New York, 30 Oct 2012, http://newyork.cbslocal.com/2012/10/30/superstorm-sandy-leaves-millions-without-power-across-tri-state-area.
[4] Power Outages in NYC Region as Hurricane Irene Arrives, 28 Aug 2011, http://gothamist.com/2011/08/28/power_outages_in_nyc_region_as_hurr.php.
[5] State of New York Department of Public Service, 2011 Electric Reliability Performance Report, June 2012, Figures 3 and 4, page 10-11. Figures are inexact as they are estimated from the graph provided in the report. Report available online at http://bit.ly/SWcXWb
[6] Rae Zimmerman and Craig Faris, Infrastructure impacts and adaptation challenges, in Annals of the New York Academy of Sciences 1196, New York City Panel on Climate Change 2010 Report, p63-86, May 2010, http://onlinelibrary.wiley.com/doi/10.1111/j.1749-6632.2009.05318.x/pdf.
[7] PlaNYC 2011, Climate Change Chapter, page 156, http://nytelecom.vo.llnwd.net/o15/agencies/planyc2030/pdf/planyc_2011_climate_change.pdf.

provide "little flexibility should any of these lines be compromised."[8] Vulnerable electrical infrastructure can have far-reaching consequences, as many other critical services in New York rely on the city's power grid.[9]

For the most part, utility companies are already aware of the risks posed by storms and other extreme weather events, and many take steps to prevent unnecessary loss of service and damage to infrastructure. In advance of Hurricane Sandy hitting New York City, Consolidated Edison shut off power to sections of lower Manhattan in order to better protect underground equipment.[10] The substation located near the East River in southeast Manhattan withstood a storm surge of 9.5 feet during Hurricane Irene, and, according to news reports, the company had planned its defense measures based on the record high of 11 feet of storm surge recorded in 1821,[11] but Hurricane Sandy created a 14 foot storm surge that flooded into the substation and destroyed underground equipment, leaving about 250,000 customers without power.[12] "We designed our equipment to be over almost a foot and a half above the highest high tide ever seen before," John McAvoy with Con Edison told reporters.[13]

As Hurricane Sandy demonstrated, infrastructure that has historically been safe from extreme weather events cannot be assumed to be safe from future events. As climate change continues, extreme weather events are predicted to become more frequent and more severe. According to the New York State ClimAID report, "Due to sea level rise alone, flooding at the level currently associated with the 100-year flood may occur about four times as often by the end of the century, based on the more conservative IPCC-based sea level rise scenario. The rapid ice melt scenario, should it occur, would lead to more frequent flood events."[14] The New York City Panel on Climate Change projects that by mid-century, New York City's average temperatures will rise by three to five degrees Fahrenheit, and sea levels could rise by more than two feet.[15] Brief, intense precipitation events that cause inland flooding are also likely to increase and storm-related coastal flooding due to sea level rise is very likely to increase.[16] Each of these different categories of extreme weather events creates potential hazards for utility infrastructure and service delivery.

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[8] Zimmerman, supra note 6.
[9] Zimmerman, supra note 6.
[10] Cara Buckley, Power Failures and Furious Flooding Overwhelm Lower Manhattan and Red Hook, 29 Oct 2012, http://www.nytimes.com/2012/10/30/nyregion/red-hook-residents-defy-evacuation-warnings-drinks-in-hand.html?pagewanted=all.
[11] Dave Carpenter, Associated Press, Atlanta Journal-Constitution, NYC utility prepped for big storm, got even bigger, 31 Oct 2012, http://www.ajc.com/ap/ap/top-news/coned-prepped-for-big-storm-got-even-bigger-1/nSr6H/
[12] Carpenter, supra note 11.
[13] Millions of Tri-State Customers Without Power Following Superstorm Sandy, CBS New York, 30 Oct 2012, http://newyork.cbslocal.com/2012/10/30/superstorm-sandy-leaves-millions-without-power-across-tri-state-area.
[14] ClimAID, Report 11-18 Response to Climate Change in New York State, Chapter 1 Climate Risks, page 35, http://www.nyserda.ny.gov/Publications/Research-and-Development/Environmental/EMEP-Publications/Response-to-Climate-Change-in-New-York.aspx.
[15] PlaNYC 2011, supra note 7.
[16] New York City Panel on Climate Change, Climate Risk Information, 2009, http://www.nyc.gov/html/om/pdf/2009/NPCC_CRI.pdf.

In the past two years alone, New York City has been hit by two of the largest hurricanes in history (Irene and Sandy). "In just 14 months, two hurricanes have forced us [New York City] to evacuate neighborhoods — something our city government had never done before," New York City Mayor Bloomberg wrote in an editorial for Bloomberg View.[17] "If this is a trend, it is simply not sustainable."

As Governor Cuomo recognized:

> Extreme weather is a reality. It is a reality that we are vulnerable. And if we're going to do our job as elected officials, we're going to need to think about how to redesign, or as we go forward, make the modifications necessary so we don't incur this type of damage.... For us to sit here today and say this is a once-in-a-generation and it's not going to happen again, I think would be short-sighted.... I think we need to anticipate more of these extreme weather type situations in the future and we have to take that into consideration in reforming, modifying, our infrastructure.[18]

These statements from Mayor Bloomberg and Governor Cuomo demonstrate that the highest levels of government in New York are aware of the risks posed by climate change and that new plans and approaches are needed to mitigate those risks.

Fortunately, the costs of extreme weather events can be reduced through smart planning. By taking climate change into account when making plans for the future, communities will be better prepared to invest in cost-effective, proactive hazard mitigation strategies. As Mayor Bloomberg wrote in the 2010 NPCC Report, "Planning for climate change today is less expensive than rebuilding an entire network after a catastrophe. We simply can't wait to plan for the effects of climate change."[19]

Recommended Approach

The Commission, through its responsibility to oversee utility companies and under its duty to promote the formulation of long-range programs for the performance of public service responsibilities with care for the public safety, can and should require electricity, natural gas, steam, telecommunication, and water utility companies to compile existing information on and predictions of future natural hazards; prepare plans to ensure infrastructure is built, operated, and maintained to cope with future hazards; and implement those plans to ensure safe and reliable provision of service. These plans should form the basis for a larger effort by utility companies to incorporate climate change considerations into their infrastructure investment decisions.

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[17] Michael Bloomberg, A Vote for a President to Lead on Climate Change, Bloomberg View, 1 Nov 2012, http://www.bloomberg.com/news/2012-11-01/a-vote-for-a-president-to-lead-on-climate-change.html.

[18] Ken Lovett, Hurricane Sandy Death Toll in NY at 26; Gov. Cuomo Blames Climate Change for Increase in Storms, New York Daily News, 31 Oct 2012, http://www.nydailynews.com/blogs/dailypolitics/2012/10/hurricane-sandy-death-toll-in-ny-at-26-gov-cuomo-blames-climate-change-for-inc.

[19] Michael Bloomberg, Forwards to Climate Change Adaptation in New York City: Building a Risk Management Response, Annals of the New York Academy of Sciences, 1196, 2010 Report of the New York Panel on Climate Change, 24 May 2010, http://onlinelibrary.wiley.com/doi/10.1111/j.1749-6632.2009.05415.x/pdf.

Each electric, gas, steam, telecommunications, and water utility should be required to develop and implement a natural hazard mitigation plan, and to either prepare a corresponding disaster response plan, or to modify existing emergency response plans to account for future climate predictions.

The Commission has the legal authority to require utilities to undertake this planning exercise. As the primary regulator of the state's electric, gas, steam, telecommunications, and water utilities, the Commission is charged with ensuring that safe and reliable service is provided by New York's utilities. Section 5[2] of the N.Y. Public Service Law states that the Commission "shall encourage all persons and corporations subject to its jurisdiction to formulate and carry out long-range programs, individually or cooperatively, for the performance of their public service responsibilities . . . ." Similarly, the Public Service Law makes it clear that reliable provision of utility service is a policy of the State of New York. Section 30 of that Law, which applies to residential gas, electric and steam services, states that "continued provision of [such services] to all residential customers without unreasonable qualifications or lengthy delays is necessary for the preservation of the health and general welfare and is in the public interest." Section 66 of that Law mandates that the Commission will "require every electric corporation to submit storm plans to the commission for review and approval at such times and in such detail and form as the commission shall require. . . ." This is the authority under which the Commission currently requires electric utilities to prepare emergency response plans for storms and storm-like events (16 NYCRR Part 105). Adequately planning for storms, as required under the Public Service Law, requires long-term assessment of risks and mitigation planning, in addition to short term emergency response planning.

Requiring utilities to undertake adequate hazard mitigation and response planning is clearly relevant to the fulfillment of the identified mission:

> The primary mission of the New York State Department of Public Service is to ensure safe, secure, and reliable access to electric, gas, steam, telecommunications, and water services for New York State's residential and business consumers, at just and reasonable rates. The Department seeks to stimulate innovation, strategic infrastructure investment, consumer awareness, competitive markets where feasible, and the use of resources in an efficient and environmentally sound manner.[20]

Evaluating risks to existing infrastructure and taking account of future climate predictions are essential to ensuring safe, secure and reliable access to utility services for the residents and businesses of New York. Failure to ensure that this planning takes place will lead to increasing frequency of service outages in the future and a significant degradation of utility reliability in certain areas. As outlined earlier in this petition, outages due to extreme weather events are already increasing in frequency, making the need for action to mitigate risks all the more urgent.

[20] New York State Public Service Commission Website, Mission Statement, http://bit.ly/WgDtub (last accessed 19 Nov 2012).

Studies and plans should incorporate four main elements: (1) They should incorporate both hazard mitigation and disaster response planning efforts, which should include an evaluation of infrastructure; (2) They should be based on future predictions of climate rather than historic observations; (3) They should be created in coordination with other utility companies and state and city officials, with full opportunity for input by all stakeholders, so as to form a coherent overarching plan for New York State utility security; and (4) They should incorporate a review at regular intervals to reflect new information on climate predictions as it becomes available and to assess the adequacy of mitigation planning.

Hazard Mitigation and Disaster Response

All utility companies should be required to create both hazard mitigation plans, detailing their plans to relocate or protect infrastructure and withstand extreme weather events, and disaster response plans, illustrating their anticipated methods to respond after a disaster has occurred and the utilities have failed. These two plans are distinct and yet interrelated. In an ideal world, the hazard mitigation plan would render the disaster plan obsolete, but as Hurricane Sandy has reminded us, no extreme weather event can be predicted with certainty.

Many utilities are already required to have emergency response plans, which set out how that utility would respond to storms or similar events. For example, as noted above, under 16 NYCRR Part 105, electric utilities are required to file an emergency plan with the Commission which includes information about that utility's training programs, preparatory measures which would be implemented in anticipation of a storm and service restoration procedures. While these plans are extremely important, we suggest that emergency preparedness requires both mitigation and response.

As Consolidated Edison's Report on Preparation and System Restoration Performance during Hurricane Irene demonstrates, existing emergency plans are focused on anticipation and response to disasters in the short-term, rather than long-term evaluation of the potential hazards posed to utility infrastructure by extreme weather and changes in the climate. The Con Edison report contained no evaluation of how frequently storms such as Hurricane Irene (or more severe storms) were likely to occur in the future, and what long term changes in infrastructure could best minimize the risk of power outages or equipment failures.[21]

Several other utility companies also submitted several reports to the Commission following on from the outages caused by Hurricane Irene and Tropical Storm Lee. Analysis of these reports confirms that they share the short-term approach outlined in the Consolidated Edison report mentioned above. None of the reports mention climate change, and any mention of "mitigation" refers exclusively to short-term disaster response procedures designed to combat imminent, named storms rather than general hazard mitigation strategies. The "lessons learned" sections of these reports contain no analysis of the effectiveness of long-term hazard mitigation strategy in limiting the impact of the storms in question. Furthermore, there is no discussion of

[21] Consolidated Edison Company of New York, Inc.: Report on Preparation and System Restoration Performance, Hurricane Irene August 27 through September 3, 2011, 14 Nov 2011, available at http://documents.dps.ny.gov/public/Common/ViewDoc.aspx?DocRefId={29C5874D-7E8B-4455-9432-C542B2CBB68B}.

the relationship between disaster response and hazard mitigation. The main deficiency of these reports is therefore their short-term approach, which privileges event-specific measures ("disaster response") at the expense of long-term, general measures ("hazard mitigation").

Therefore, we suggest that hazard mitigation plans should include an evaluation of risks to existing capital and infrastructure. Studies and plans that incorporate future natural hazards will inform infrastructure development, operation, and maintenance decisions to ensure the greatest possible future reliability.

Natural hazard mitigation plans and disaster response plans should be made public to inform customers how the utility company plans to prioritize its resources and what its contingency plans are. This would encourage collaboration between companies and ensure the implementation of best practices.

Future Predictions

A common weakness in existing natural hazard mitigation planning is its failure to account for the predicted severity of future storms and its reliance instead on historic trends. Past records are no longer expected to be the upper limit of storm surge, rainfall, and wind intensity. In fact, available evidence indicates that storm surge and rainfall will be greater in the future than what has been seen historically.

In order to prepare natural hazard mitigation plans, it would not be necessary for utilities to take on the burden of engaging consultants to predict future climatic conditions in the state. Various expert reports which project future climate conditions have already been prepared, or are forthcoming. These include:

- The New York City Panel on Climate Change's Report, "Climate Change Adaptation in New York City: Building a Risk Management Response" (2010);
- New York State's Climate Action Plan (2010);
- New York State Sea Level Rise Task Force Report (2010);
- U.S. Global Change Research Program's National Climate Assessment (forthcoming 2013);
- Intergovernmental Panel on Climate Change (IPCC's) Fifth Assessment Report (forthcoming 2014).

New York State and City planners already recognize the importance of climate change and extreme weather events in their planning efforts. The scientific predictions outlined above, which have been used in these state and city planning methods, should be incorporated in utility company plans

Examples of how climate change can be incorporated into utility planning can be found in other jurisdictions. In Colorado, Denver Water has a Drought Response Plan that addresses future predictions for water shortage and identifies how the company expects to address those

challenges.[22] Other water utility companies have conducted climate vulnerability assessments, including East Bay Municipal Utility District, City of Boulder Utilities Division, Portland Water Bureau, Massachusetts Water Resources Authority, Lower Colorado River Authority, and Seattle Public Utilities.[23] On a national scale, the EPA's Climate Ready Water Utilities (CRWU) initiative provides resources for the water sector to adapt to climate change.[24]

Hazard mitigation plans, while preparing for future climate conditions and doing so in a timely manner, should not be allowed to degrade the existing environment without due consideration of alternatives. Hazard mitigation measures should be evaluated not only on their cost-effectiveness and ability to withstand future weather events but also on their impact on the current environment.

Review Period

Public utility companies are already accustomed in the wake of a disaster to accounting for what went wrong and understanding where they can improve. Even the best preparations can often have flaws and should be reviewed regularly to ensure they are as complete as possible. Therefore, the natural hazard mitigation plans to address future environmental threats from extreme weather events should be reviewed on a periodic basis to incorporate new scientific information, updated predictions, and an evaluation of the success of adaptation and hazard mitigation strategies.

Conclusion

As part of its mission to promote safe, reliable provision of utilities to New York State, the Commission should require all utility companies under its jurisdiction to:

1) Compile existing information on and predictions of future natural hazards;
2) Prepare natural hazard mitigation plans to ensure infrastructure is built, operated, and maintained to cope with future hazards; and
3) Implement those plans to ensure safe and reliable provision of utilities

Natural hazard mitigation plans should incorporate predictions on the future state of the climate, as assessed by numerous studies and commissions which make projections for New York State, should be conducted in coordination with other utility companies and government agencies, and should be reviewed periodically to assess their continued adequacy. Such actions would prepare utility infrastructure throughout the state for future extreme weather events, which are expected to be more severe than those seen in the past, and to ensure the reliable provision of vital service to New York citizens.

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[22] Denver Water, Drought and Climate Change, http://www.denverwater.org/SupplyPlanning/DroughtInformation (last accessed 19 Nov 2012).

[23] Environmental Protection Agency, Office of Water, *Climate Change Vulnerability Assessments: A Review of Water Utility Practices*, August 2010, available at http://water.epa.gov/scitech/climatechange/upload/Climate-Change-Vulnerability-Assessments-Sept-2010.pdf.

[24] Environmental Protection Agency, Climate Ready Water Utilities, http://water.epa.gov/infrastructure/watersecurity/climate (last accessed 19 Nov 2012).

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New York Metro Chapter
Making Great Communities Happen

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Post-Sandy Testimony to New York State Senate

Senators, We thank you for the giving the New York Metro Chapter of the American Planning Association (APA-NYM) an opportunity to comment on shaping how New York State rebuilds and recovers from the devastating toll Superstorm Sandy took on our communities, and in developing a strategy on how to prevent such devastation from happening again. Joining me today are Michael Levine, AICP from the Town of North Hempstead and APA-NYM's Vice President for Intergovernmental Affairs, and Anthony Drummond, one of our Economic Development Committee's co-Chairs.

APA-NYM is a professional, educational, and advocacy organization representing approximately 1,400 practicing planners and policy makers in fourteen counties comprised of New York City and its surrounding suburbs in the State of New York. We are part of a national association with a membership of almost 40,000 professionals and students who are engaged in programs and projects related to the physical, social and economic environment. In our role as a professional advocacy organization, we offer insights and recommendations on policy matters affecting issues such as housing, transportation and the environment. We are in a unique position of creating a vision and developing guidelines as a matter of standard practice. This is of fundamental significance as we build a more resilient region.

The chapter has been actively working with municipalities and community organizations to address the immediate recovery and long-term resiliency needs for our region. Our first major initiative has been working with the Rockaway Development and Revitalization Corporation to develop a sustainable business recovery strategy that will help reopen the 70% of 1,100 businesses that are currently closed in the Rockaway's three commercial districts. This initiative is led by our Economic Development and Housing Committees. We have been in touch with leaders on Long Island from Montauk and East Hampton to Long Beach to help assess how APA can be helpful. We have also offered assistance to Occupy Sandy in their efforts to assist Coney Island and Sheepshead Bay, the areas most devastated in Brooklyn. In collaboration with the APA National Organization, the Chapter will be hosting a series of half-day panel workshops in the coming months and dedicating pro-bono teams of disaster planning experts to conduct visioning sessions in affected communities over the next two years.

We have been working closely with the New York Department of State, New York City, professional organizations such as the AIA and the region's four planning schools, Hunter, Pratt, Columbia and NYU, to develop a regional, comprehensive strategy to minimize the damages if a storm like Sandy should occur again. We have developed strategic partnerships with the Dutch Embassy and the National Disaster Preparedness Training Center located at the University of Hawai'I to solicit expertise from those who face these challenges on a regular basis. At the request of the Department of State, we submitted comments addressing coastal resources and land use to be considered for the Governor's report. Below are some of the points we emphasized in that submission, with additional comments for your consideration.

Questions and Comments:

1) Where is it appropriate to rebuild vs. retreat?

Following a catastrophic loss, there is often a determination to rebuild exactly what once stood as a sign of strength and resiliency and almost an air of defiance. However, it is not always in our best interests to reconstruct exactly what we had. From hillside homes in California that are vulnerable to recurring mudslides to the waterfront houses of Fire Island, certain forces of nature are unstoppable. Add to that the nearly universal projections that sea levels will steadily rise and future storm surges are a certainty. We cannot continue to expend State and Federal resources to backstop private investment decisions for what is inevitably a temporary period. Re-evaluation of the National Flood Insurance Program (NFIP) should be undertaken to discourage, not indemnify, those who take on the risk of building in floodprone areas. The State might consider establishing a fund to buy out property owners in areas that should not be rebuilt. Though expensive, this may prove less costly over time than continually rebuilding areas that are damaged or destroyed.

2) Incorporating resiliency into zoning codes

This is a crucial issue that the Chapter feels is of utmost importance. Communities who participate in the NFIP are already required to adopt FEMA's floodplain regulations, but often this is a separate chapter not integrated into the zoning ordinance nor is floodplain development part of a comprehensive strategy. Instead, floodplain regulations tend focus on the development and protection of individual sites. While it is not likely, nor necessary, that municipalities will cede zoning authority to state agencies, model floodplain overlay districts can be developed with incentives for their implementation. Such overlay districts could address such topics as lowest floor grade, elevating critical equipment and infrastructure, floodwalls and gates for private properties, sacrificial floors such as below-grade (and partially below-grade) parking levels and, for larger properties, relief from height and setback limits on the "high ground" part of a property in order to shift development from the floodplain portion.

3) Establishing jurisdictional guidelines

The definition of community is a delicate issue and needs to be defined up front. We recommend identifying municipal jurisdictions with coastal zone codes that would help differentiate the damages amongst the municipalities. There are questions as to the State's jurisdictional approach to New York City, which already has an established power structure regarding disaster recovery that spreads across multiple agencies, and whether working solely at a County or municipal level outside of New York City is the soundest approach. Furthermore, power has been consolidated in the Mayor's Office under the Housing Recovery unit, which has been moving at a rapid pace in terms of assessment and plan of action. We recommend that multi-jurisdictional regions with similar populations and geography are created (i.e., Rockaways and Long Island Barrier Islands), to develop a comprehensive strategy that addresses the needs of like communities. This gives the State an opportunity to pool and consolidate resources as corresponding issues arise between jurisdictions. This is also an issue to consider with power entities and facilities, many of which lie in separate jurisdictions from the affected areas.

4) Where and how should the shoreline be hardened?

A trend over the last two decades in many coastal communities is to soften shorelines, relying less on floodwalls and bulkheading and more on wetland plantings, such as Spartina Alterniflora,

with the emphasis on habitat restoration and the dissipation of wave energy. However, this approach may have to be re-evaluated as the storm surge penetrated several hundred feet inland in areas without adequate shoreline protection.

The addition of floodwalls, however, is a double-edged sword as communities beyond the protected zone become even more vulnerable. A clear example is in Louisiana where new flood barriers erected in the aftermath of Katrina served New Orleans well during Hurricane Isaac in August 2012. However the downstream community of Plaquemines Parish was nearly devastated by the diverted waters. The decision to render certain areas sacrificial for the benefit of others is extremely difficult under any circumstances, much less in an area that has strong, often competing, local government interests.

5) Do we consider floodgates in NY Harbor? For East and Hudson River tunnels?

London famously constructed the Thames Barrier in the 1970s, as have Rotterdam other low lying cities around the world. In the months since the storm, serious discussions are taking place as to the practicality (and cost benefit) of closing off NY Harbor in the event of a tidal surge. If not a full-scale walling off of NY harbor, then retrofitting vehicular and subway tunnels with floodgates should be a priority. Similarly to floodwalls, if constructed, will floodgates sacrifice other communities from diverted water flow?

6) Is it practical to elevate underground utility vaults?

Unlike the Long Island and New Jersey suburbs, most of NYC does not have overhead power lines that caused thousands of outages when taken down by falling tree limbs or cracked poles. However, subsurface infrastructure proved just as vulnerable to damage from floodwaters. Dozens of major buildings in lower Manhattan had critical mechanical rooms in the basement. These and many public utility installations may now have to be elevated to an upper floor or an elevation at least twenty feet above sea level. This has a potentially enormous cost burden. Furthermore, is this cost fully borne on the property owner, or does the State consider assistance in retrofitting existing building systems? Consideration should be given in changing regulations and building codes to address this issue in new construction.

7) In non-flood prone areas, can we afford to bury power lines?

Consideration should still be given to burying lines in areas less vulnerable to flooding. While it is unlikely that lines that run through residential backyards will ever be buried, lines that run along the main roads can be. It would have to be a piecemeal, gradual effort but lines could be buried whenever a road is scheduled for full-depth reconstruction. Ensuring that the main streets remain powered can be critical to maintaining access to food and supplies in case of a prolonged neighborhood outage. For municipalities with compromised resources, the cost in constructing a new submerged energy infrastructure may be too much to bear.

8) Should NY require backup generators at gas stations?

This idea was floated after a number of service stations had a supply of fuel but could not operate their electric pumps. Cost estimates run about $30,000 for each, an arguably minimal sum for most operators. One option is to consider grants or low-interest loans to businesses for purchasing.

9) Allocating funding sources

It is critical that New York State identify its own funding sources to assist communities in a comprehensive manner. FEMA funding only goes so far and lasts so long. It does not address infrastructure unique to the region, such as the high prevalence of multi-family rental housing. This will require interagency coordination with a regional focus. A regional focus is needed as

municipalities may have obstacles with staff resources in a still difficult economy. As previously mentioned, many municipalities have similar geography and infrastructure, thus making it strategic and efficient to utilize funding in an inclusive fashion. It is also important to establish timeframes, if new taxes or fees would be required, and identify if funding will be ongoing or through a static RFP.

10) Community Involvement

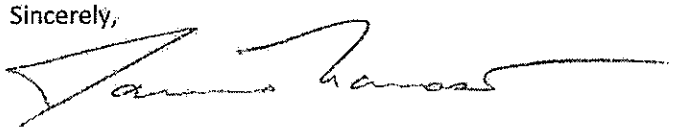
We strongly recommend a collaborative approach with affected communities. Local municipalities and neighborhoods know best what their community needs are. Any established body addressing recovery and resiliency must establish an implementable participation framework to assure that affected communities are involved in every step of the process.

11) Sustainability

APA-NYM recognizes that the only way to rebuild is to rebuild sustainably. Sustainability and green development are now considered mainstream concepts that have become significantly less expensive over the last decade. Sustainable concepts address neighborhood pattern design as well as green infrastructure and buildings by creating resilient communities with an economically sound long term approach. Redesigning in such a way is not only sound planning principle, it assures more efficient maintenance of facilities and infrastructure, and complements the natural environment.

On behalf of my members, I would again like to thank the New York State Senate for the chance to testify on post-Sandy strategy. We are available to answer any and all questions or comments.

Sincerely,



James Rausse, AICP
President
American Planning Association
New York Metro Chapter

New York Sea Grant

James W. Ammerman, Ph.D., Director

Testimony for NY Senate Committee on Investigations and Government Operations

January 17, 2013

Introduction

1. What is New York Sea Grant?-- New York Sea Grant (NYSG) is a statewide network of integrated coastal research, education, and extension services helping to promote and protect the State's marine and Great Lakes resources. New York Sea Grant supports high-quality, university-based, natural and social science research combining scientific rigor with rapid practical application. Since 1971 NYSG has provided over $120M for such coastal research, education, and outreach projects. As one of network of 33 Sea Grant programs in every coastal state, NYSG is accountable to its Federal source of funding, the National Oceanic and Atmospheric Administration (NOAA) in the US Department of Commerce, as well as to the State of New York.

2. What is NYSG doing in the wake of Hurricane Sandy?
   a. Long-term support of research on coastal hazards and related issues, including the "Storm Surge Research Group" at Stony Brook University and others
   b. Rapid response small research grants in response to Sandy
   c. Long-term extension and outreach to Long Island and Great Lakes communities and business concerning important coastal issues, including storm hazards and related concerns
   d. Additional extension and outreach to Sandy-impacted stakeholders, three of our NYSG Long Island extension specialists are working closely with municipalities, coastal businesses, and other stakeholders in the wake of the storm
   e. In particular, Jay Tanski, NY Sea Grant's coastal processes specialist, who is here today, has been addressing issues of coastal hazards on Long Island's South Shore since the 1980s
   f. NYSG is continually providing the best available scientifically-based information on important coastal issues to a variety of stakeholders, this has become even more important after Sandy
   g. My testimony to follow will provide numerous examples of the above

3. The challenges in the wake of Sandy
   a. Sandy has amply demonstrated the vulnerability of our coastal environments
   b. The magnitude of coastal development and the resulting storm damage requires that we rebuild differently and more efficiently
   c. This requires the best available and most current quantitative scientific information and its prompt distribution to those who need it by reliable sources

4. Coastal hazard problems are not new, and there are useful sources of information going back to the 1980s, some examples are listed below, NYSG has had a role in most of them.
   a. 1989 Proposed Long Island South Shore Hazard Management Program--illustrated the vulnerabilities of Long Beach
   b. 1996 New York Governor's Coastal Erosion Taskforce Report—a response to the 1992 Nor'easter, clearly articulated the need to support adequate research and develop a public awareness program on coastal hazards
   c. 2001 Impacts of Barrier Island Breaches on Selected Biological Resources of Great South Bay, New York (New York Sea Grant Report)—the most authoritative report on the biological impacts of breaches, demonstrating both benefits and losses
   d. 2012 (revised) Long Island's Dynamic South Shore (New York Sea Grant, Jay Tanski)—Subtitle: A Primer on the Forces and Trends Shaping Our Coast
   e. 2013 NYS 2100 Commission: Recommendations to Improve the Strength and Resilience of the Empire State's Infrastructure—a commission appointed by the Governor of NY in the wake of Hurricane Sandy, NYSG participated through the SUNY experts team

5. NYSG responses to coastal hazard issues raised by the above reports including the post-Sandy NYS 2100 Commission
   a. 1996 Report called for a systematic monitoring program of shoreline locations threatened by erosion. NYSG designed the Atlantic Coast of NY Monitoring Program and it was conducted with the collaboration of the NYS DOS and the USACE, however it was discontinued in 2004, so no data is available since then. This monitoring program should be re-instated.
   b. NYS 2100 Report says "the State should monitor the impact of the Fire Island Wilderness breach on the barrier island, the bay, and the mainland to determine whether or not to close that breach in the near future". NYSG funded a Stony Brook researcher by late November 2012 to study the physical oceanographic impact of the breach and significant data is already available. NYSG was nimble enough to enable breach impact measurements

quickly after the storm when other groups could not. In addition the NYSG 2001 Breach Report remains the authoritative source for biological impact information and we are currently evaluating a research proposal for studies of the biological impacts of this new breach.

c. NYS 2100 Report also encourages the use of green and natural infrastructure, including "provid(ing) incentives for creation of soft shorelines and wetlands", and "including building living shorelines, new wetlands," and similar structures. Jay Tanski from NYSG is conducting a workshop on the uses of living shorelines and related methods in the spring of 2013.
d. NYS 2100 Report encourages further development of probabilistic hazards and risk mapping which includes forecasts of climate change and allows communities to visualize risks. NYSG has previously supported researchers who can address these issues as well as the important questions about the predicted frequency of a storm like Sandy (every 100 years, 700 years, etc.).
e. As part of developing a resilience strategy for New York Harbor, as called for by the NYS 2100 report, the report suggests "Conduct(ing) a comprehensive storm surge barrier assessment for New York Harbor". NYSG funded the original modeling research that suggested that storm surge barriers or flood gates could be feasible.
f. Finally, all of the following restoration recommendations of the NYS 2100 Commission below require a better understanding of local conditions and uses to make the best decisions about how to implement such repairs and restoration. This is the kind of information that NYSG can help acquire, analyze, and distribute quickly to those who need it.

    - Restore damaged dunes, beaches, and barrier islands
    - Repair and strengthen critical hard infrastructure along the coast
    - Repair and protect wastewater infrastructure
    - Repair important public recreational infrastructure

Thank you!

Testimony of The Nature Conservancy before the
Senate Standing Committee on Investigations and Government Operations Committee
January 17. 2013
Nassau County

Thank you, Chairman Marcellino and other members of the Committee, for the opportunity to testify before you today. My name is Nate Woiwode, and I am a Policy Advisor and the Climate Team Co-Lead for The Nature Conservancy in New York.

Our climate is changing. This is no longer up for debate. Widely accepted science has shown that global greenhouse gas emissions are at a level that is causing our climate to change in ways that severely impact life on Earth. We have every reason to believe that the type of extreme weather we have witnessed here in New York repeatedly in the last two years, with Hurricane Irene and Tropical Storm Lee in 2011 and "Super-storm" Sandy in 2012, will become more and more common.

These types of events used to be thought of as 100-year storms, or once-in-a-lifetime possibilities. The tragic and catastrophic consequences of these storms – lives lost, lower Manhattan under water, entire communities on Long Island and upstate devastated, thousands of New Yorkers without power for weeks on end – used to be unthinkable. These were the things that happened in other places, not here. Yet it has happened, and we are fooling ourselves if we believe it will not happen again. So even as we work to recover from the disastrous consequences of Sandy, the time has come to ensure that New York is more resilient, that our communities are made safer and – before it is too late -- we must also address the causes of climate change to avoid the worst of the projected impacts.

On Friday of last week, two important documents were issued that I would urge the Committee to review. The National Climate Assessment and Development Advisory Committee issued its draft climate report for public comment, and Governor Cuomo released the 2100 Commission Recommendations on Improving the Strength and Resiliency of the Empire State's Infrastructure. These reports are extremely comprehensive and cover a lot of ground, but there is an important common theme: *we need to make choices, and we need to make them now*.

The devastation that followed the recent storms resulted in large part from the choices we made in the past about where we build, what we build, and how we build. We have the opportunity right now to make new choices – smart choices – that realistically recognize and address vulnerabilities and risks, and that ensure our communities are resilient and safe in the future.

The Nature Conservancy has long been concerned with the pace of global climate change, and the impacts that this environmental crisis will have on our natural resources and human communities. We continue to advocate at the state, federal and international levels for policies that will reduce climate changing emissions. Governor Cuomo's 2013 State of the State address included encouraging language about lowering the cap for the Regional Greenhouse Gas Emissions Program, which would re-establish New York as a leader in addressing climate change. In addition, New York and the nation must continue to provide financial incentives and advance policies that spur technological innovation to move us into a lower greenhouse gas future and increase efficiency to reduce the need for new energy generation capacity.

As we work to address the causes of climate change, we are also engaging with governments, corporations, conservation partners and other stakeholders to reduce risk to communities. We know that natural infrastructure can help secure food, water, and safety for people in the face of impacts from our changing climate, and have been applying proven conservation methods and

testing new approaches to make the natural systems we all rely on more resilient to climate change. For example, around the world, The Nature Conservancy is examining how conservation solutions can address coastal threats. Right here in New York, we have developed the Coastal Resilience Tool for the Long Island and New York City areas. This web-based tool, which can be accessed by all at www.coastalresilience.org, is a decision support tool that can be used to ensure future development and re-development is sited and designed in a way that protects people and valuable public and private investments.

We have also developed the Climate Wizard (http://www.climatewizard.org) which enables technical and non-technical audiences alike to access leading climate change information and visualize the impacts anywhere on Earth. The first generation of this web-based program allows the user to choose a state or country and both assess how climate has changed over time and to project what future changes are predicted to occur in a given area. Providing transparent and accessible tools based in science to decision makers and the public is one of our highest priorities. We strongly believe that our policy solutions and funding decisions must be informed by scientific information so that our investments are protected from future impacts and provide the most benefit to the public.

What we have learned, through our work to develop and build on climate science is that *we are not doomed to a future of extreme weather-related catastrophes*. There are immediate steps we can take to reduce disaster risk, and first among those is taking advantage of our natural defenses. Among the many benefits of natural systems, including reefs, wetlands, floodplains and dunes, is that they serve to reduce risk and mitigate against weather-related disasters. It is paramount that we work to protect and conserve these systems so that they are intact and able to provide important benefits to people, as well as continue to act as part of functional and valuable ecosystems. These benefits and the risks associated with degradation of resources

that can protect us is the focus of the *2012 World Risk Report* led by the Alliance for Development Works, United Nations University, and The Nature Conservancy. (http://www.nature.org/ourinitiatives/habitats/oceanscoasts/howwework/2012-world-risk-report.xml)

The report released just a few days ago by the 2100 Commission similarly recognizes the value of natural infrastructure. Very significantly, the report recognizes that 'infrastructure' includes not just man-made things like roads and bridges, but also the natural systems that both protect our communities and provide many important co-benefits. Just as we have to protect our vulnerable roads and bridges, we also have to protect our vulnerable wetlands, floodplains, dunes, and river systems; and just as we have to invest in our roads and bridges, we also have to invest in our natural systems and other 'green' infrastructure.

Here in New York, there are key steps that we can take to institute policies that will protect valuable natural resources, public investments, and people from some of the impacts of our changing climate. Attached to this testimony are a series of "principles" that The Nature Conservancy has drafted to help lay out how governments should prioritize redevelopment and avoid rebuilding in a way that creates new vulnerabilities.

In addition, there are legislative and regulatory shortcomings that have left important natural resources unprotected or inadequately protected, and are allowing development to occur in places that put people and investments at risk. For example:

- Our freshwater and tidal wetland protections must be strengthened and our mapping and delineations must be updated so that we can protect their hydrologic integrity and reduce loss of systems that buffer communities from flooding. When maps have been completed, they should be released, and not held for political analysis.

- Our Coastal Erosion Hazard Area mapping must be updated and our standards for permissible development and redevelopment in the coastal zones of New York must be amended.
- Our riparian floodplains should be better protected through the use of appropriately sized buffers and updated floodplain maps that are integrated into planning and permitting decisions.

While some of these changes will need to take place at the local and regional levels, state and federal funding and policies can assist localities and stakeholders in driving important change. We have attached a preliminary list of laws and regulations that could be amended to better protect New Yorkers from future extreme weather, and ensure that natural systems are prioritized as part of efforts to reduce risk.

Finally, one immediate policy step that should be taken is the adoption of sea level rise projections by the state, and the inclusion of those projections into various planning and permitting laws to ensure that the most up-to-date science is being used as coastal communities make development decisions. Sea level rise is not only widely recognized and accepted, but are global and local projections are being regularly updated and published. For coastal communities, these projections should have significant impact on decisions including siting of public and private facilities. Yet our laws governing coastal permitting and planning do not account for this new, readily available scientific information. Accordingly, an excellent "starting place" for New York State as we work to reduce future vulnerability and risk through our planning and other government decision-making would be the adoption of sea level rise projections and the integration of those projections into key laws that govern local decision making. As development is, by and large, controlled by the localities, this level of guidance will ensure all have the information to protect their citizens from climate risks, and protect public investments from literally washing away.

Thank you again for the opportunity to testify before you today on potential actions to mitigate the man-made factors which contribute to extreme weather events and impacts. The Nature Conservancy is committed to continuing our collaboration with local, state and federal officials, conservation partners, corporations, and other stakeholders to inform policy with science and ensure that we are using natural systems to protect our communities. We look forward to working with the Committee to this end, and would welcome follow up questions today or in the future on any of the materials we have presented you.

Attachments

1) Policy principles
2) List of legislative and regulatory recommendations
3) Using Nature to Reduce Climate and Disaster Risks brochure

For more information, contact:

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Recommendations:

- Update all natural resource related maps statewide and delineate a time in which the maps are required to be released.

- Develop and adopt science based projections for climate change impacts, including sea level rise. Require that the adopted projections are periodically reviewed and updated.

- Identify and designate areas of the state that are "highly vulnerable" to the impacts of climate change. Further restrict development in highly vulnerable areas in planning and permitting requirements

- Incorporate climate projections into state laws and regulations wherever relevant to ensure that these impacts are fully considered in planning and development including, but not limited to:

  - Article 7 of the Village Law, Article 16 of the Town Law, and Article 3 of the General City Law, to:
    - Require that towns study and include climate related impacts and vulnerabilities in plans for communities, particularly in those places that are identified as highly vulnerable
    - Establish and prioritize natural buffer areas and/or other land use based protection strategies in the zoning of vulnerable areas in comprehensive plans

  - Article 8 of the ECL-SEQRA:
    - Include climate related risks in project reviews
    - Require a findings statement that certifies climate resiliency
    - Develop guidance for environmental review to require that decisions in high vulnerability areas consider potential flooding and other effects of climate change for the expected "lifetime" of the project, structure or facility
    - Identify projects that fall within defined high vulnerability areas and include in the Type 1 list

  - Article 24 of the ECL – Freshwater Wetlands Act:
    - Give DEC jurisdiction over wetlands smaller than 12.4 acres
    - Expand the definition of unusual local importance to include not only high quality wetlands, but rare occurrences, such as urban wetlands
    - Streamline process to relieve burden on agencies

  - Article 25 of the ECL – Tidal Wetlands:
    - Define sea level rise and adopt projections of future sea levels, or cite them to the extent that they exist elsewhere in the NYS code
    - Develop criteria to inventory and map tidal wetland migration areas resulting from sea level rise and incorporate such criteria into the mapping protocols for tidal wetlands

    - Revise the Tidal Wetlands Act to define and include tidal wetland migration areas
    - Ensure that the reasonable "lifetime" of any project, and potential future wetland locations, are accounted for when any permit is reviewed
    - Expand minimum buffers and establish rolling buffers that will advance with the migration of tidal wetlands as sea levels rise
    - Reduce or eliminate the allowance of variances
  - Amend the ECL to:
    - Establish appropriate buffers in riparian areas to ensure the healthy functioning of riverine systems. To achieve that, such legislation should specify that:
      - Seventy-five percent of stream length should be naturally vegetated
      - Riparian buffers should be established with an area of undisturbed natural vegetation, as well as setbacks for construction and septic systems.

- Require that public and private developers provide evidence that vulnerability was considered for the lifetime of the project, both in terms of location and design.

- Require resiliency plans as a permit requirement to operate power plants, sewage treatment plants, and other publicly regulated and financed infrastructure.

- Local governments in New York State own and control much of any community's vulnerable infrastructure, ranging from roads and bridges, to landfills and sewage treatment plants. Incentivize local government to take action on climate resiliency:
  - Develop model standards for local governments to adopt that ensure that new and replacement infrastructure is sized and designed to mimic natural processes.
  - Develop model codes for local zoning that takes climate projections into consideration.
  - Create a menu of Incentives (e.g. streamlined permits, greater share of state funding for recovery) to encourage adaptation of the model standards for codes and infrastructure development

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- **Utilize natural infrastructure as an effective long-term solution to make people, infrastructure and natural systems less vulnerable.** While risk reduction strategies will vary based on location, natural infrastructure can provide a cost effective means of reducing overall risk to infrastructure and people. Utilizing natural infrastructure for climate resilience can include augmenting existing habitats through conservation strategies; protecting and restoring habitats to enhance flood mitigation and ecosystem services; creating new habitat such as oyster reefs and artificial wetlands; and integrating natural systems into hard infrastructure (and vice versa) to provide long-term ecological and climate benefits. In addition to flood control, ecosystems provide many economically beneficial services that support and protect humans and nature such as filtering pollutants, erosion control, production of fish and shellfish, and clean drinking water. Moreover, natural infrastructure has lower maintenance long-term maintenance costs than "grey" infrastructure.

- **Value and protect natural systems as a critical component of infrastructure.** Natural resources provide essential benefits to communities: clean water and air, significant economic activity, and a reduction in the overall damage from a natural disaster. While there are places along the Northeast coast that will need to build hard infrastructure, shorelines hardened by concrete walls, groin fields and other "grey" infrastructure can cause significant harm to valuable natural systems like barrier beaches that reduce the strength of storm surges and tidal marshes that hold flood waters. Unnecessary impacts to natural infrastructure should be avoided.

- **Consider and integrate knowledge of likely future climate impacts when rebuilding infrastructure**. Existing infrastructure that failed and must be rebuilt (e.g. sewage treatment plants flooded in NY and NJ) should be rebuilt with measures in place to reflect future climate risks. Most power plants, hospitals, bridges, roads, sewage treatment plants and other public infrastructure have design lifetimes of decades. The best available science tells us that we should expect further rises in sea level and increasingly intense storms over those same timeframes. The Northeast will also experience more extreme rain events and severe heat waves. These changes should be reflected in the design and siting of rebuilt infrastructure.

- **Anticipate and plan for changes in barrier beaches, dune systems and other natural features.** The movement of barrier beaches inland during storms like Sandy is a natural occurrence magnified by sea level rise and related increased storm surge. We can expect future coastal storms will have the same effect, houses and infrastructure in flood zones and on or near beaches will be damaged and destroyed. Great thought should be given to any rebuilding efforts so that mistakes of the past are not repeated again in the next storm. Barrier beaches and dune systems by their very nature constantly changing, and this should be taken into account when decisions are made where to invest when rebuilding lost structures and infrastructure.

- **Clearly communicate and accurately portray risk and vulnerability**. With increasing coastal development and projections for both stronger coastal storms and increasingly rapid sea level rise, we need to fully understand the future risks and to plan with those in mind. This includes accounting for the impacts of a changing climate –rising sea levels, changing precipitation patterns, increased droughts, and heat waves– and providing up to date information on the status of built infrastructure, natural resources and current vulnerabilities to flooding and storms. This information must be made available in easy to access data, tools and maps to allow state and local officials and private property owners information they need to complete hazard mitigation plans.

- **Empower local governments and communities to address storm risk and vulnerability.** Local governments own much of a community's infrastructure, ranging from roads and bridges, to landfills and sewage treatment plants. Local governments must have the ability to plan, protect, mitigate, and recover from extreme storms. Federal and state agencies should provide local governments with training, up to date science and data, and decision support tools to properly guide storm related disaster decision making. In particular local communities need to be informed about the full range of solutions to protecting their coastal infrastructure, including the benefits of using natural infrastructure. Such information should inform hazard mitigation and land use plans and local ordinances.

Using Nature to Reduce Climate and Disaster Risks

The Nature Conservancy
Protecting nature. Preserving life.®

Across the nation, and most recently in the wake of Hurricane Sandy, communities face difficult decisions preparing for and recovering from natural disasters. How do we balance safety and cost efficiency with respect for people, property and nature?

Coastal storms, flooding and sea level rise endanger millions of Americans, and threaten infrastructure, industry, tourism and trade. In the U.S., the heaviest rainfall events have gotten even heavier over the last 50 years (67% heavier in the Northeast), making communities more vulnerable to flooding. Without action to reduce these risks, the losses to local and national economies will only continue to increase.

When it comes to disaster risks, an ounce of prevention is worth a pound of cure. A study by the Multihazard Mitigation Council found every $1 spent on preparedness saves $4 in natural disaster costs. **The good news is that *natural defenses*—like oyster and coral reefs, salt marshes, dunes, barrier islands, floodplains, wetlands, forests and mangroves—can help protect us from the damaging impacts of storms and floods.**

Poor coastal development decisions and climate change are putting more people and property at risk. Economic disruption and property damage from natural hazards like storms and flooding are increasing significantly. In 2011, global losses from natural disasters reached an all-time high of $380 billion.

Nature is part of the solution

The Nature Conservancy is working to demonstrate the role of natural infrastructure in reducing risks to people and property. **We need a smart portfolio—one that includes natural defenses to natural disasters—as well as engineered solutions.**

The Conservancy has led evidence-based reviews of the role of coastal habitats in risk reduction with key agency and academic partners. This global data shows that **marshes, for example, clearly play important roles in absorbing storm surge, reducing erosion and stabilizing shorelines.**

We have also shown that **coral reefs can reduce wave energy approaching coasts by more than 85 percent,** helping to reduce risks to the nearly 200 million people worldwide that live in low, at-risk coastal areas.

Inland, as well, natural areas help protect against flooding. Floodplains that remain connected to rivers retain high water, reducing downstream flooding. Forests hold soil in place and allow rainfall to seep underground instead of running off to swell rivers.

Compared to the cost and maintenance of engineered or structural flood protection, nature's infrastructure can provide a cost-effective first line of defense against storms.

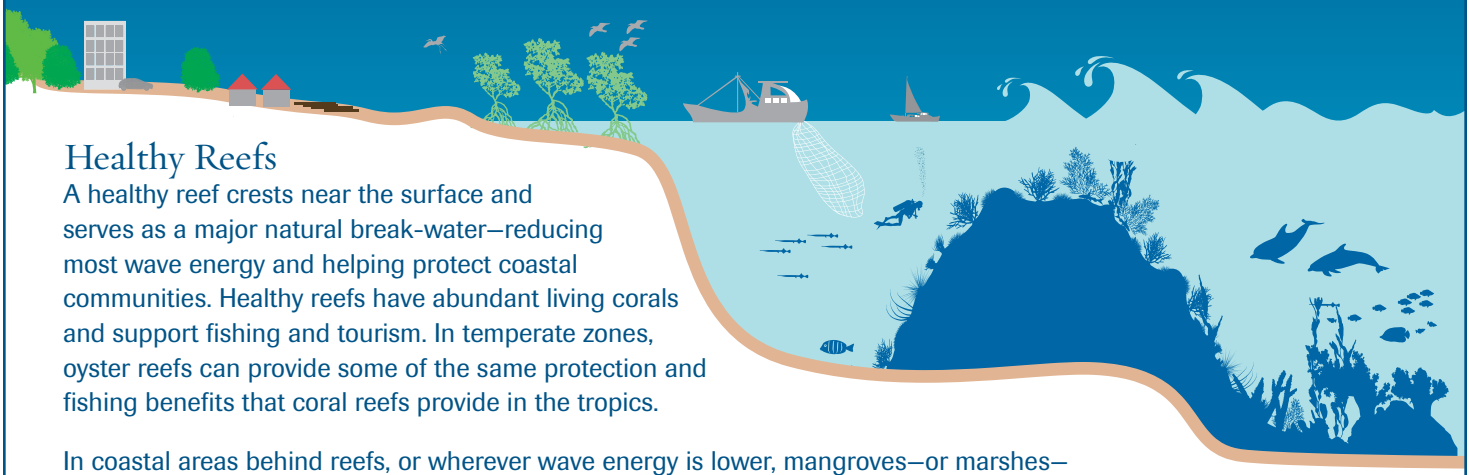
The Nature Conservancy is working with partners at all levels to:

- Demonstrate where, when and how healthy or restored natural systems can contribute to cost-effective solutions that address current and growing risk from natural hazards and climate change;
- Help provide communities, developers and government planners with the knowledge and tools to make decisions and take actions to reduce risks and enable climate-resilient development;
- Develop the partnerships and political will needed to promote the use of effective natural solutions in climate preparedness and disaster risk reduction.

Artificial reef structures at oyster restoration site in Alabama, Gulf of Mexico. © Andrew Kornylak; Strong roots anchor mangroves in Bahamas. © Mark Godfrey/TNC; Bass Creek saltmarsh at Shelter Island, New York. © Doug Wechsler

How Much Can Nature Protect?

With lives and livelihoods at stake, The Nature Conservancy is working with partners to move beyond anecdotal information to answer the tough questions about the role nature can play in reducing risk. For each major coastal habitat—coral reefs, oyster reefs, mangrove forests and salt marshes—we are documenting and quantifying the risk reduction benefits that these habitats can provide. By developing the same information about habitats that engineers provide about sea walls and other built defense structures, we can analyze and identify when and where coastal ecosystems are effective for reducing the risks from natural hazards.



Healthy Reefs

A healthy reef crests near the surface and serves as a major natural break-water—reducing most wave energy and helping protect coastal communities. Healthy reefs have abundant living corals and support fishing and tourism. In temperate zones, oyster reefs can provide some of the same protection and fishing benefits that coral reefs provide in the tropics.

In coastal areas behind reefs, or wherever wave energy is lower, mangroves—or marshes—can grow and further stabilize shorelines, reduce erosion, and provide nursery habitat for fish, shrimp and crabs.

Real Solutions for Reducing Social, Economic and Environmental Risks

Condemned house in Westbrook, CT after Sandy. © Adam Whelchel/TNC

The Nature Conservancy recognizes the challenges and trade-offs that communities face every day; addressing the issues of conservation, economic development and risk management all at once is a formidable task.

Using interactive tools backed by the best available science—such as the Conservancy's ***Coastal Resilience*** tool—we enable planners, elected officials, managers and citizens to visualize current and future risk using digital maps, and then help identify a suite of solutions that best reduces social and economic risks while maximizing the benefits that nature provides.

Natural solutions may include: protecting or restoring area salt marshes as buffers; developing hybrid approaches that link natural and artificial defense structures; removing incentives to build in high-risk areas; and even designing restored oyster reefs to serve as breakwaters tailored to community needs.

BRIDGEPORT, CONNECTICUT

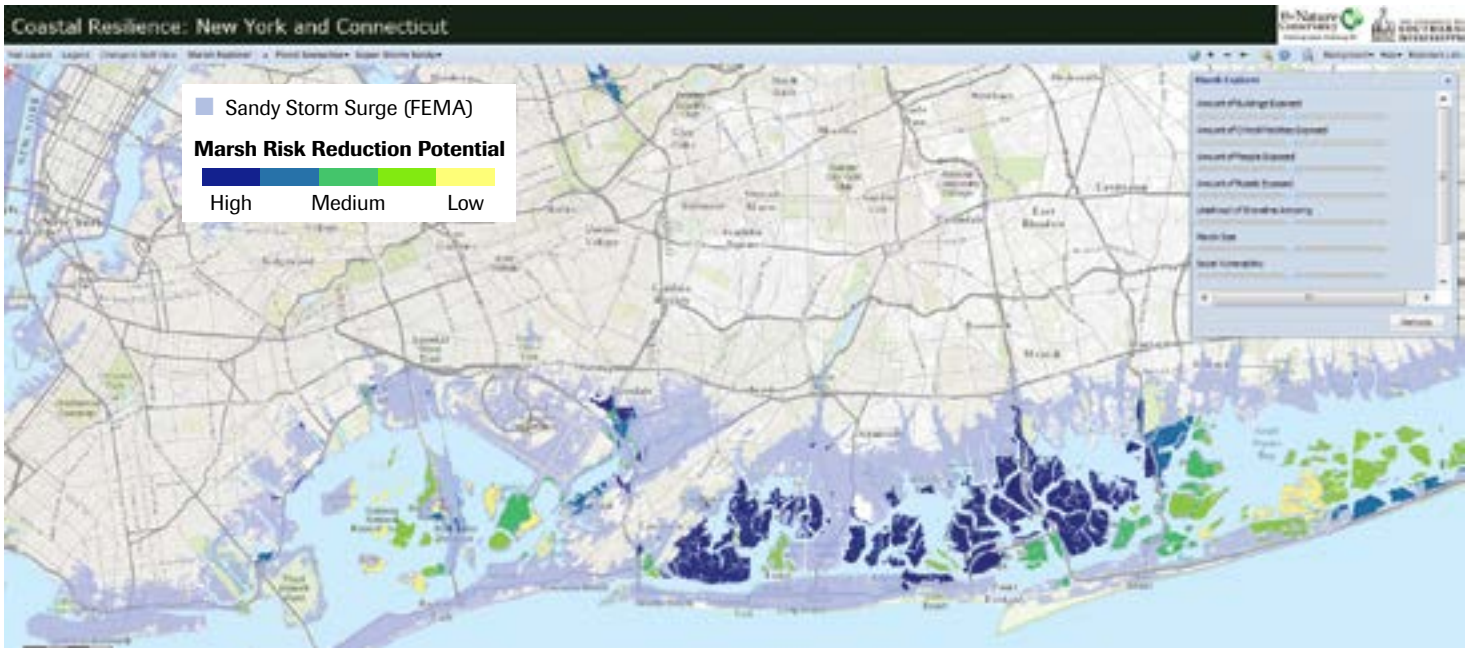
After living through Tropical Storm Irene, the 2011 Halloween Nor'easter and even a 2010 tornado, residents of Bridgeport—Connecticut's most populous city—decided to better prepare for disasters. Partnering with The Nature Conservancy and others, city leaders held Climate Preparedness workshops in early 2012 to advance a community-driven dialogue on risk, choices, and actions.

This was before Hurricane Sandy carried an unprecedented 11-foot storm surge, coupled with inland flooding, over vulnerable areas of the city. Along Connecticut's coast, homes owned for generations were condemned. One restaurant owner who had just reopened with support from community fundraisers, now faced another nine months of repairs.

But Bridgeport, at least, had a head start in identifying its risks, vulnerabilities and strengths. Using the National Oceanic and Atmospheric Administration's Roadmap for Adapting to Coastal Risk and The Nature Conservancy's *Coastal Resilience* tool, **the city mapped exposure from projected flooding due to hurricanes combined with sea level rise, and prioritized actions to reduce risk.**

Now, as residents rebuild after Sandy, Bridgeport is working to enroll in the Federal Emergency Management Agency's Community Rating System, which offers private property owners a premium reduction through the National Flood Insurance Program in return for community-wide hazard mitigation. Other city priorities include adjusting building codes and land use policy, incorporating nature-based solutions such as marsh advancement zones and natural infrastructure for managing storm water, and factoring climate change into redevelopment and infrastructure plans.

www.lis.coastalresilience.org The *Coastal Resilience* tool, originally created for Long Island, New York City and Connecticut, helps decision makers examine the social, ecological and economic vulnerabilities from current and future risks from storm surge and sea level rise scenarios. Users can interactively identify where marshes may have the highest potential to reduce risks to people and property so they can focus conservation and restoration based on their own priorities.



The Nature Conservancy is working with partners and planners to incorporate social, economic and environmental risk into coastal development policies and decisions.

Natural Defenses at Work

Building on 60 years of addressing local problems with tangible solutions, The Nature Conservancy is demonstrating how nature can be incorporated into development, adaptation and hazard management decisions in vulnerable flood-prone environments.

As we proceed with efforts to reduce the risks to people and nature from sea level rise and flooding along our rivers and coasts, we can never forget that **our decisions before and after storm events directly affect the magnitude of impacts from future events.**

People live and work in these places along rivers and by the sea and have cherished their homes and traditions for generations. Many will decide to rebuild in the same vulnerable places. **We now have an opportunity to rebuild smarter,** taking advantage of nature's protective buffers where we can, and using lessons from storms Irene and Sandy to plan wisely for a more resilient future.

Migratory bird refuge, Cape May, New Jersey. © Erika Nortemann/TNC

THE RIVERS OF NEW YORK STATE

The New York State Department of Transportation (NYSDOT) oversees 15,000 miles of state-owned highway. Beneath those state roads are approximately one million culverts connecting thousands of streams. When it comes to culverts, size matters. Undersized—or poorly placed—culverts can lead to flooding during heavy rain events, like Tropical Storm Irene in 2011. In addition to threatening safety and property, inadequate culverts can damage the health of our rivers as well, for example, blocking cold-water brook trout from finding refuge.

Replacing such culverts with fish- and wildlife-friendly designs that can also withstand periodic high water volumes is a win-win method to improve river and community resiliency. Using scientific data on stream condition, habitat needs for fish, and other ecological criteria, The Nature Conservancy developed a prioritization tool that is now being used statewide to help NYSDOT focus its limited resources toward culvert upgrades that will help keep people and property safer while improving conditions for rivers and wildlife.

SOUTH CAPE MAY MEADOWS, NEW JERSEY

Just off the southern tip of New Jersey, South Cape May's cottages lie beneath the waves, the scattered remnants of a Victorian-era resort town overtaken by the ocean in the 1950s. The lost town became South Cape May Meadows, a 212-acre Nature Conservancy preserve with wetlands, ponds and a beach important for migrating birds. But as the area lost 15 feet of shore to erosion per year, and storms breached and overtopped the preserve dunes, the nearby towns of Cape May City and Cape May Point began to experience severe flooding in the 1990s.

The towns approached the Conservancy, Army Corps of Engineers and the state, which owns the adjacent Cape May Point State Park, to seek common solutions. The result was a $15 million ecological restoration project including both natural infrastructure (reconstructing dunes for bird nesting, restoring freshwater channel and foraging ponds, and creating islands in the wetlands) and engineered aspects (levees and water control structures).

Completed in 2006, the restored Meadows withstood a series of severe storms, including Irene in 2011 and Sandy in 2012, when waves did not breach the dunes, and wetlands remained intact. The project was also deemed a success as local communities experienced only minor flooding from Sandy. In the long run we'll need to allow wetlands and beaches to retreat in the face of sea level rise, but where the location of homes and communities prevents that retreat, natural solutions can still help reduce risks.

coastalresilience.org
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Testimony to the Public Hearing on *Rebuilding After Sandy* before the New York State Senate Investigations and Government Operations Committee, Mineola, New York, January 17, 2013

Douglas Hill, Eng.Sc.D., P.E.

THE NEW YORK-NEW JERSEY METROPOLITAN REGION NEEDS ITS OWN IPET

> Committee charge: "To consider possible infrastructure and construction improvements, zoning changes and beach protection when rebuilding in the aftermath of Superstorm Sandy to prevent destruction from the next big storm."

My name is Douglas Hill. I am a professional engineer licensed in New York State. I hold the degree of Doctor of Engineering Science from Columbia University. I am an adjunct lecturer in the School of Marine and Atmospheric Sciences at Stony Brook University.

Before Superstorm Sandy in New York/New Jersey in 2012, there was Hurricane Katrina in New Orleans in 2005. In response to the Katrina disaster, the Chief of Engineers of the U.S. Army Corps of Engineers established the Interagency Performance Evaluation Task Force (IPET) to determine what should be done.[i] Over the next 3½ years IPET not only diagnosed the problems in New Orleans but established improved procedures for coastal risk planning.

With a budget of over $25 million, IPET engaged 150 experts and another 150 supporting personnel from 8 public agencies, 23 private sector firms, and 25 universities to study what went wrong and how to fix it. The on-going work was regularly reviewed by committees of the National Academy of Engineering and National Research Council[ii] and the American Society of Civil Engineers.[iii] The final report numbered 7,500 pages.

The principal finding is that the Hurricane Protection System (HPS) for New Orleans was a system in name only. This is especially true of the sections that had not been completed, transitions between types of protection that differ in capability (thereby representing weak points), and differences in the relative levels of reliability that created areas with greater likelihood of failure.[iv] "This situation was a product of the overall water resources development process, the magnitude of the investments needed to accomplish such projects, the piecemeal allocation of resources, the time and complex processes required to resolve differences in local and federal priorities, and the traditional step-by-step construction process for structures."[v]

The challenge to the New York/New Jersey region is to develop its own Hurricane Protection System in the light of the lessons of Katrina. Some of IPET's notable findings:

- *Transitions* between types and levels of protection and between protection structures and other features created *vulnerabilities* to erosion and breaching and reduced the effectiveness of the protection.[vi]

Figure 1. Failure at transition between protection structures.[vii]

- There was no evidence of significantly reduced surge levels and wave heights in areas adjacent to wetlands and marshes.[viii]
- 70% of deaths were people over the age of 60; loss of life correlated with the poor, the elderly and the disabled, the groups least likely to evacuate without assistance.[ix]
- The most practical means to reduce risk is to keep people and property out of flood prone areas, although this is in fact difficult to achieve within the reality of our current political system.[x]

New York is not New Orleans, and Sandy was not Katrina. Most of New Orleans is below sea level; only subways and tunnels are in New York. The cost of Katrina was about $130 billion; for Sandy the estimate is about $80 billion. Katrina killed 1,300 people; Sandy only 140. In Katrina, about 400,000 people evacuated New Orleans. In Sandy, Mayor Bloomberg ordered the mandatory evacuation of 375,000 in Zone A, although there are 2.3 million New Yorkers living in an evacuation zone susceptible to storm-surge flooding.[xi] In each case, those left behind were the old; the handicapped and the poor. New Orleans has a Hurricane Protection System, however flawed. New York ***needs*** a Hurricane Protection System.

Risk Analysis

The development of a Hurricane Protection System requires risk analysis. A significant part of the IPET effort was aimed at developing a system-wide risk analysis of the capability of the HPS to protect New Orleans against hurricane hazards. The goal of analyzing risk is to facilitate rational decision making. The decisions that risk analysis supports include the following:[xii]

- Policy-level decisions on how best to expend resources to minimize the risk of flooding from hurricanes
- Planning-level decisions concerning the relative vulnerability of different areas to focus efforts on areas of greatest risk
- Understanding the sources of risk to include the least capable structures and the most exposed population or assets
- Insights for design-level decisions on the location and character of structures
- Communicating risk to the public, supporting personal decisions on how to prepare for and respond to the possibility of flooding from hurricanes.

Risk analysis consists of a series of steps:[xiii]

Step 1: The hazard is the surge and wave conditions caused by hurricanes and severe storms. To assess the hazard, it is first necessary to identify the range, character, and frequency of hurricanes and nor'easters that may strike the coast.

Step 2: System performance is assessed by modeling the reliability of the HPS under loads generated by surge and wave. This leads to an estimate of the likelihood that the HPS can withstand those loads and, correspondingly, to an estimate of the chance of flooding at various places across the city and region.

Step 3: The consequences of flooding, measured by potential loss of life and property damage, are estimated by defining the distribution of people and structures within each locality, the elevations of all structures and the surrounding land, and the value of the properties; and then by applying actuarial information and models to approximate losses.

Step 4: Risk is calculated by combining the *chance* of undesirable consequences occurring with the *magnitude* of those consequences should they occur. This allows an estimate of risk by locality, based on the character of the HPS and other measures that may influence who and what is exposed to flooding. Losses can be expressed as potential loss of life or potential loss of property. Ideally, this can be extended to environmental and social losses.

Storm Surge Barriers

Central to the risk analysis should be the evaluation of storm surge barriers in the waterways surrounding New York City. In 2004, Stony Brook University published a report of model results demonstrating that such a barrier system would work.[xiv] Barriers, similar to those in place in New England and Europe, would be placed at the upper end of the East River, across the Narrows, and at the mouth of the Arthur Kill separating Staten Island from New Jersey. Alternatively, a barrier could extend from Sandy Hook to Rockaway, replacing the latter two. At a 2009 conference sponsored by sections of the American Society of Civil Engineers and the New York Academy of Sciences, four major engineering firms presented conceptual designs of barriers at these locations, and a fifth described the geotechnical aspects of their placement, thus establishing their technical feasibility.[xv]

To protect against storm surges, the barriers would be closed only when major storms approached. The fixed structure in the waterways would nevertheless affect flushing of New York Harbor, and the environmental effects need to be evaluated. A possible additional use of the barriers, however, would be to use them daily as tide gates to augment the flushing of the harbor[xvi] and even possibly to limit sea level rise within the barriers.

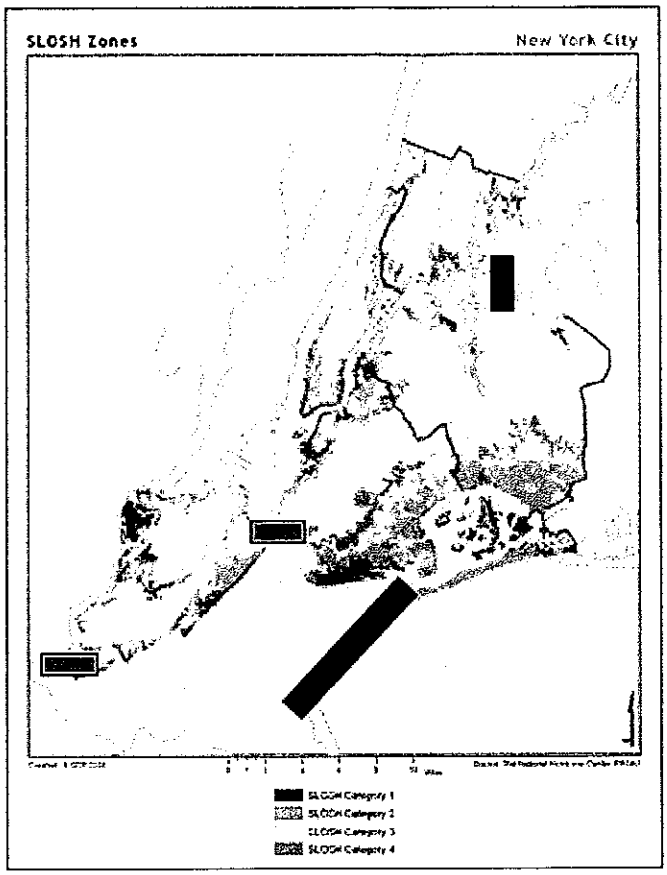


Figure 2. New York City hurricane flooding map[xvii] and candidate storm surge barrier locations.

A few miles of barriers would replace hundreds of miles of otherwise exposed coastline in New York City, the Hudson Valley, Newark Bay and the New Jersey rivers emptying into the harbor.

ASCE Calls-to-Action

In its summary review of the IPET analysis, the ASCE External Review Panel made these recommendations:[xviii]

- All responsible agencies in New Orleans ***and throughout the nation*** should re-evaluate their policies and practices to ensure that protection of public safety, health and welfare is the top priority for the infrequent but potentially devastating impacts from hurricanes and flooding.
- Quantify the risks.
- Rethink the whole system: Local, state and federal leaders should review the overall strategy and systems approach, integrating hurricane protection tactics, land use considerations, and emergency response strategies into a coherent and well thought-out system.

- Put someone in charge: Local, state and federal leaders should agree to assign to a single individual the responsibility for managing critical hurricane and flood protection systems such as the one in the New Orleans area.
- Place safety first.

Recommendations

The New York State Legislature should support a comprehensive coastal risk analysis of the metropolitan New York – New Jersey region by the U.S. Army Corps of Engineers for the purpose of establishing a Hurricane Protection System.

The Committee's charge "to consider possible infrastructure and construction improvements, zoning changes and beach protection" can be an important contribution to such a regional risk analysis. As part of a piecemeal approach, however, not so much. The metropolitan region needs its own IPET.

Notes

[i] IPET (Interagency Performance Evaluation Task Force). 2008. Performance Evaluation of the New Orleans and Southeast Louisiana Hurricane Protection System: Final Report of the Interagency Performance Evaluation Task Force. U.S. Army Corps of Engineers.

[ii] National Academy of Engineering and National Research Council. 2009. The New Orleans Hurricane Protection System: Assessing Pre-Katrina Vulnerability and Improving Mitigation and Preparations. The National Academies Press.

[iii] American Society of Civil Engineers, Hurricane Katrina External Review Panel. 2007. The New Orleans Hurricane Protection System: What Went Wrong and Why. American Society of Civil Engineers.

[iv] IPET, P. i-127

[v] IPET, p. I-29

[vi] IPET, p. I-123

[vii] ASCE, p. 65.

[viii] IPET, p. I-122

[ix] IPET, p. I-124

[x] IPET, p.I-130

[xi] New York City Office of Emergency Management. 2006. Natural Hazard Mitigation Plan, Section 3f, p. 92 of 179.

[xii] IPET, p. I-58

[xiii] IPET, p. I-61

[xiv] Bowman, M.J., B. Colle, R. Flood, D. Hill, R.E. Wilson, F. Buonaiuto, P. Cheng and Y. Zheng. 2004. Hydrological Feasibility of Storm Surge Barriers to Protect the Metropolitan New York – New Jersey Region, Summary Report. Stony Brook University. November.

[xv] D.Hill, M.J. Bowman and J.S. Khinda (eds). 2013. Storm Surge Barriers to Protect New York City: Against the Deluge. American Society of Civil Engineers.

[xvi] M.J. Bowman. 1994. Tide Gates and Their Effect on Water Quality. In D.Hill (ed) The East River Tidal Barrage. Annals of the New York Academy of Sciences, Volume 742.

[xvii] NYCOEM, Section 3f, p. 84 of 179.

[xviii] ASCE, pp. 74-82.

NYS Senate Investigations and Government Operations Committee
Public Hearing on Rebuilding after Sandy

THE NEW YORK-NEW JERSEY METROPOLITAN REGION NEEDS ITS OWN IPET

(Interagency Performance Evaluation Task Force)

Douglas Hill, EngScD, P.E.
17 January 2013

IPET created to investigate Katrina

- 2005 -2008
- >$25 million
- 150 experts
- 150 supporting personnel
- 8 public agencies
- 23 private sector firms
- 25 universities

New Orleans HPS a system in name only

- Incomplete in 2005
- Transitions created vulnerabilities
- Water resources development process faulty
- Costs a deterrent
- Piecemeal allocation of resources
- Different local and federal priorities
- Step-by-step construction procedures

Failure at transition between protection structures

Some IPET findings

- No evidence of significantly reduced surge levels and wave heights adjacent to wetlands and marshes
- Loss of life correlated with the poor, elderly and disabled, those least likely to evacuate
- 70% of deaths were those over 60
- Most practical means to reduce risk is to keep people and property our of flood-prone areas

Sandy compares to Katrina

Katrina	Sandy
$130 billion	$80 billion
1,300 dead	140 dead
400,000 evacuated	375,000 ordered evacuated from Zone A 2.3 million in Zones A, B and C
Hurricane Protection System flawed	Hurricane Protection System absent

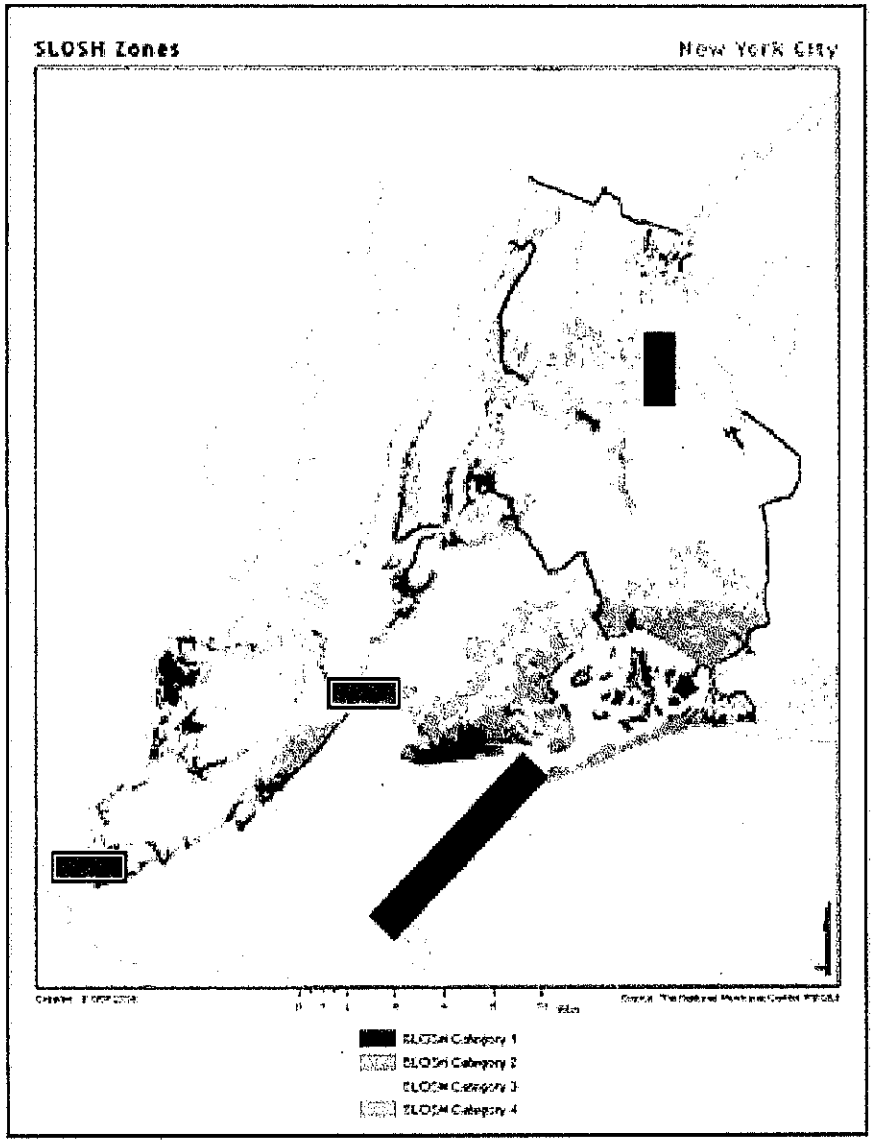
IPET developed Risk Analysis

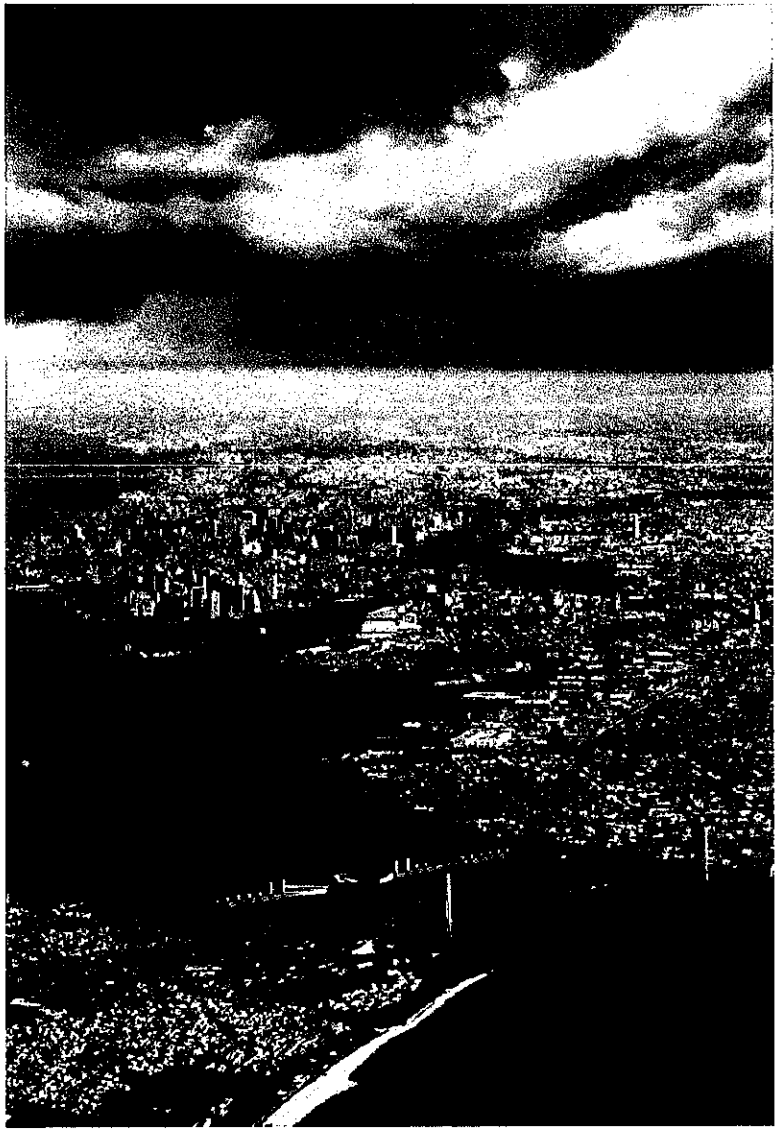
- Informs policy-level decisions on resource expenditures
- Informs planning-level decisions to identify vulnerabilities
- Identifies sources of risk
- Informs design-level decisions on structures
- Informs personal decisions on preparing

Steps in Risk Analysis

1. Assess the hazard: range, character and frequency of hurricanes and nor'easters
2. Assess system performance by modeling reliability of HPS to withstand storm surge
3. Assess consequences measured by loss of life and property damage +
4. Calculate risk as probability x magnitude of consequences

Storm surge barriers should be central





ASCE Calls-to-Action

- All responsible agencies in New Orleans ***and throughout the nation*** should **re-evaluate their policies** and practices to ensure that protection of public safety, health and welfare is the top priority for the infrequent but potentially devastating impacts from hurricanes and flooding.
- **Quantify the risks**.
- **Rethink the whole system**: Local, state and federal leaders should review the overall strategy and systems approach, integrating hurricane protection tactics, land use considerations, and emergency response strategies into a coherent and well thought-out system.
- **Put someone in charge**: Local, state and federal leaders should agree to assign to a single individual the responsibility for managing critical hurricane and flood protection systems such as the one in the New Orleans area.
- **Place safety first**.

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- The New York State Legislature should support a comprehensive coastal risk analysis of the metropolitan New York – New Jersey region by the U.S. Army Corps of Engineers for the purpose of establishing a Hurricane Protection System.
- The Committee's charge "to consider possible infrastructure and construction improvements, zoning changes and beach protection" can be an important contribution to such a regional risk analysis. As part of a piecemeal approach, however, not so much.
- The metropolitan region needs its own IPET

CITY OF LONG BEACH

1-17-13
City Manager Jack Schnirman's remarks
As Prepared

Senate Investigations and Government Operations Committee Testimony

Opening Remarks

- I'm honored to have this opportunity to provide recommendations.
- On behalf of Long Beach & other affected coastal communities about storm preparedness, response, recovery, and mitigation.
- Thanks all around to New York State, Department of Homeland Security, OEM, Nassau County, as well as Nassau County Executive Ed Mangano, State Senator Skelos, & Assemblyman Weisenberg
    - So many visits to us met with real immediate aid and assistance.
        - He visited Long Beach Several times.
- Sandy- One of a kind Super Storm
    - Thorough preparation efforts began several days prior to storm & advanced notice to our residents to evacuate (robocalls, texts, emails, radio, television, newspapers, website, and social media).
    - The Ocean met the Bay, resulting in catastrophic flooding.
    - Our recovery effort began immediately, securing assistance from all levels of government.
    - Sandy brought about many obstacles.
        - There was a complete Communications cutoff.
            - In a world were so many rely so much on their cell phone, TV, and computer for communication, we had to resort to extremely alternate forms of communication (e.g., flyers, bullhorns, large signs).
        - We were still a "new" administration (together only 10 months prior to the storm).
            - City personnel united quickly and all stepped up.
                - Without the heroic efforts of our city personnel, our City would not be standing.
- Long Beach is a unique community.

- We are the only City in New York State located entirely on a barrier island.
- Our emergency response was successful – good coordination under unified Long Beach command, a disciplined battle rhythm, and marshaling tremendous resources and assets.
- And now, as we address C/T recovery, we have identified six recommendations for this committee to assist Long Beach and other affected communities. These recommendations address both our long-term needs, mitigation, and preparation for future storms.

Recommendations

- I have the following 6 recommendations.

1. **Focus on Mitigation, protecting and hardening critical infrastructure**
    - Must protect our barrier islands if we want to protect the south shore of Long Island.
    - Aging Infrastructure needs to be addressed as we build a Smarter, Stronger and Safer Long Beach.
        - One of the City of Long Beach's major issues before, during, and after the storm is the aging infrastructure of the city.
            - The Sewer Plant went down.
            - The Water Plant went down.
            - Essential City Buildings sustained substantial damage.
            - Up and running now in makeshift and masses. We need a long-term real fix, hardening.
2. **Establishing the FEMA Match**
    - It is absolutely crucial that the State % match is declared.
        - Currently, with the entire 25% FEMA match, the City would be responsible for 40 Million which is almost ½ of our entire annual budget.

- We are still hopeful for a 100 percent reimbursement between federal and state government.
- Over 700 million in damage compared to $2 million in Irene on an $85 million budget.

3. **Cutting through the Red Tape**

- It is imperative that there is a quick pass through of FEMA funds to those who are most in need.
    - We cannot have red tape holding up the process - there is simply no time. Senator Schumer and Governor Cuomo set a fantastic precedent for this.
- Economic Development Funds will assist in rebuild – flexible and necessary for business and city assets.
- Our businesses need help to be up and running and residents need expedited funds to get back on their feet.
- Coordinated Planning & Emergency Training among government entities is essential.

4. **OEM**

- The City of Long Beach does not have a local Office of Emergency Operations.
    - We are dependent on Nassau County and while helpful a local OEM would greatly assist in expediting necessary resources.
- Equipment
    - OEM can assist coordination of 1st responders.
    - We also would need assistance in the retrieval and dissemination of information.
- Grants needed for emergency response.

5. **Communications**

- Support 211 services

• ATTACHMENT B •

WRITTEN TESTIMONY

Dr. Gregory Letica
Mayor, Village of Asharoken

Dear Senator Marcellino:

I have a few recommendations that I would like to share:

1-The DEC should be encouraged to expedite their approval process for coastal dredging and expedite all studies that need to be done prior to commencing work. This is very important because these projects need to be completed quickly prior to the next storm.

2-There needs to be an evaluation of the need to pay prevailing wage. As I have written to you earlier, our village hall was flooded, deemed unusable and needs replacement. The costs to do so are prohibitive with prevailing wage unless one builds a modular building in another state and just assembles it onsite. We lose jobs, jobs and jobs locally by forcing communities to not hire local contractors at local rate. With all that needs to be repaired this must be considered.

Thanks for your time in considering these issues.

LONG ISLAND INFRASTRUCTURE PRIORITIES TO RECOVER FROM HURRICANE SANDY

Submitted by:

Long Island Association
LEADING LONG ISLAND

NY • NJ • CT Regional Plan Association

LONG ISLAND CONTRACTORS' ASSOCIATION, INC.

NYLCV
NEW YORK LEAGUE OF CONSERVATION VOTERS

LIBI
LONG ISLAND BUILDERS INSTITUTE
Advocating Responsible Building & Remodeling

NASSAU COUNTY STATE OF NEW YORK

LONG ISLAND REGIONAL PLANNING COUNCIL

SUFFOLK COUNTY NEW YORK

ACEC New York
American Council of Engineering Companies of New York

Open for BUSINESS

Long Island Regional Economic Development Council; Infrastructure Working Group

December 2012

***With assistance from AECOM**

LONG ISLAND INFRASTRUCTURE PRIORITIES

In the aftermath of Hurricane Sandy, Long Island should rebuild its infrastructure stronger and smarter. We witnessed epic destruction and disruption to wastewater treatment facilities; water supply; solid waste; utilities (electric, gas and telecommunications); transportation and transit; and housing. We must harden our systems and enhance our capacity to respond and better withstand severe weather. This list represents the work of several leading organizations on Long Island that are committed to prioritizing our needs and sharing our experience and knowledge with those elected and appointed officials who can help address them. [1] It was unanimously agreed that because of the public health as well as economic development impacts of wastewater treatment facilities, water supply and solid waste, these listed infrastructure responses must have the highest priority. These priorities are also responsive to the charge given to the Infrastructure Working Group of Governor Cuomo's Long Island Economic Development Council.

1. **Public Health - Wastewater Treatment Facilities, Water Supply and Solid Waste (Wastewater treatment and clean water are critical to public health as well as economic development priorities)**
    a. Provide an ocean outfall for Bay Park Sewage Treatment Plant to prevent contamination of Reynolds Channel and Hempstead Bay and interior waterways with termination to be approximately three miles south of Long Beach in Atlantic Ocean.
    b. Convert Long Beach Sewage Treatment Plant to a pump station transporting flow to Bay Park, also reducing environmental stress on Reynolds Channel and surrounding bay area.
    c. Identify the level of inundation for each impacted sewer district and water supply building.
    d. Identify points of entry of the storm surge into above and below grade structures (doorways, stairwells, ventilation ducts, shafts, pull boxes, etc.).
    e. Determine if facility sites can accommodate berms, retaining walls, etc. for flood surge mitigation.
    f. Determine if buildings can be retrofitted to prevent flood surge entry into doors, stairwells, ducts, etc.
    g. Provide emergency power generator with a minimum seven day fuel supply (with a replenishment plan) not subject to flooding or located within a protected waterproof enclosure/structure.
    h. Where technically feasible, utilize submersible pump stations to eliminate the need for separate electrical systems and equipment (HVAC, lighting, sump pumps, etc.) associated with wet well/dry well stations.
    i. Relocate all electrical equipment, fixtures and controls a minimum of two feet above the highest known or anticipated flood surge elevation or in a protective waterproof enclosure.

[1] Long Island Association
Long Island Builders Institute
Regional Plan Association
American Council of Engineering Companies-NY
AECOM
Long Island Regional Planning Council
Long Island Contractors Association
NY League of Conservation Voters
Long Island Regional Economic Development Council
Infrastructure Work Group

j. Consider construction of bypass vaults to allow for ease of connecting portable pumping equipment and eliminate need to route discharge hoses into residential streets.
k. Install manhole inserts in low lying/flood prone areas to prevent flood water from entering sewer collection system.
l. Require check valves on home/commercial waste lines that are at an elevation lower than the sewer lateral to prevent backflow into business/residence.
m. Advance interconnectivity of sewer systems across both counties.
n. Prepare an asset inventory of water supply facilities and equipment.
o. Explore the viability of interconnectivity of sewer systems across both counties in case of emergency interruptions of services.
p. Extend water supply well casings to three feet above the highest known or anticipated flood surge elevation.
q. Ensure floors are three feet above the highest known or anticipated flood surge elevation and/or are constructed of resilient materials and in accordance with proper flood protection construction methods.
r. Provide for emergency access during a flood event.
s. Conform to flood protection requirements of the latest edition of the "Recommended Standards for Water Works" for water supply facilities.
t. Increase on-Island processing/disposal capacity for municipal and commercial solid waste.
u. Develop contingency plan for emergency removal of solid waste off Long Island via rail/barge/truck.

The following infrastructure priorities of "Utilities – Electric, Gas and Telecommunications," "Transportation, Transit and Shoreline," and "Housing" are considered of equal priority.

2. <u>Utilities – Electric, Gas and Telecommunications</u>

a. Aggressively pursue storm hardening improvements at all substations.
b. Begin implementing a smart grid to enhance communications and improve response time.
c. Require buried power lines for new construction sites and along key corridors.
d. Identify gas stations as priority locations for power restoration and ensure elevated or otherwise hardened generators for gas stations.
e. Standby generation capability (sited at appropriated elevations and protected from flooding and other elements) to be located at all cell tower, major communications centers and gas distribution stations and terminals (including solar power stand-by generators).
f. Increase strength of electrical distribution pole lines to withstand higher wind speeds and storm-related flooding including, but not limited to, using composite poles, and expedite replacement of deteriorated utility poles.
g. Require utility customers and municipalities to identify weak and diseased trees and treat or remove them.

h. Expedite upgrade of the outage management systems.
i. Expand mobile substation capabilities.
j. Expand mobile generator capabilities.

3. Transportation, Transit and Shoreline

a. Utilize a subgrade not subject to washout for major roadways essential to emergency access and critical facilities that are subject to flooding.
b. Consider the use of porous pavements for streets in flood prone areas.
c. Evaluate regional and sub-regional drainage systems in light of new storm surge elevations and the ability of such systems to effectively contain and safely transport runoff to designed termini.
d. Install steel sheeting along vulnerable sections of strategic roadways and road endings at bay fronts.
e. Seal and close transit and roadway tunnels during flood surges.
f. Develop alternative (pre-planned) bus routing.
g. Harden LIRR substations and yards from flooding.
h. Harden bulkheads, dunes and other infrastructure along the coastline.
i. Implement the U.S. Army Corps of Engineers' Fire Island to Montauk Point Reformulation Plan as well as the Long Beach Storm Damage Reduction Plan as Fire Island and Long Beach are critical to protecting the Long Island mainland and are also an important part of the Long Island economy.

4. HOUSING

a. Support the creation of additional equitable rental housing on Long Island to satisfy an overwhelming demand, principally in areas proximate to transit. This well-documented need was highlighted during and post-Sandy for the Island's many displaced residents; only 122 units were available for temporary housing.[2]
b. Support a state incentive to help municipalities pay for additional infrastructure costs caused by rental homes that the municipality allows under increased densities.
c. Rebuild dwelling units to higher codes with respect to flood damage.
d. Suspend or expedite the environmental and building regulatory review process for housing and all other Sandy-related projects.
e. Allow for self-certification approvals for architects and engineers on replacement structures.

[2] Source: Long Island Builders Institute.