

An aerial photograph of a town and waterfront area. A river flows through the center, with a marina on the right side. The town is built on a hillside, with a church steeple visible. In the foreground, there are several large green and white storage tanks and a building with a red roof. The background shows a dense forest of trees with autumn foliage.

RESILIENT CATSKILL

*Report of the Catskill Waterfront
Resilience Task Force*

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RESILIENT CATSKILL: REPORT OF THE CATSKILL WATERFRONT RESILIENCE TASK FORCE

October 23, 2014

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A MESSAGE FROM THE PRESIDENT

“Welcome to the Ever Improving Village of Catskill”

That's a tagline we have been promoting for years. Most of our recent improvements are part of an overall strategy, but some improvements have been by accident or by necessity. Our waterfront is home to many of our residents, businesses, schools, parks, and infrastructure. Improving these accidentally is not an option; we needed a strategy for the future of our waterfront.

We are experiencing a shift in the way we view our waterfront and the assets tied to it.

We realize that our waterfront is a tremendous asset but it is also one that comes with a significant risk. We can't ignore the fact that we recently experienced two major weather incidents in a short timeframe. Regardless of the debate over the causes of sea level rise, and the ranging possibilities of its rate, we needed to go through this process of planning for what's become a new normal of larger storms and the flooding they bring.

The Task Force and our journey

As I write this, I'm going back in my mind to the journey this task force made since the first meeting. Each member brought their own experiences, skillsets, and passions to the table but all stayed true to the mission. I can't help but to think that the most important outcome of this is the new relationships, opportunities, and friendships that have been cultivated throughout this process. I can't thank everyone involved on the team enough. Special thanks to the New York State DEC Hudson River Estuary Program and the Consensus Building Institute who kept us on task and on track. And

finally, a huge thank you to our friends at Scenic Hudson for their leadership and overall support.

This is only the beginning.

Too often the research we conduct for the betterment of our community finds itself on a shelf collecting dust. We can't let that happen, this is just too important. The recommendations of this task force are straightforward, smart, and most importantly they are achievable. If you are reading this a year from now and no progress has been made on any of the recommendations, call us out on it.

What's next?

This is not a spectator sport. We need to get to work, it is that simple. Please read on through the recommendations and help where you can. The one true success of a project is seeing it in use. One local business has supported the recommendations and already applied them in a redesign of their facility, and we hope others will follow this example.

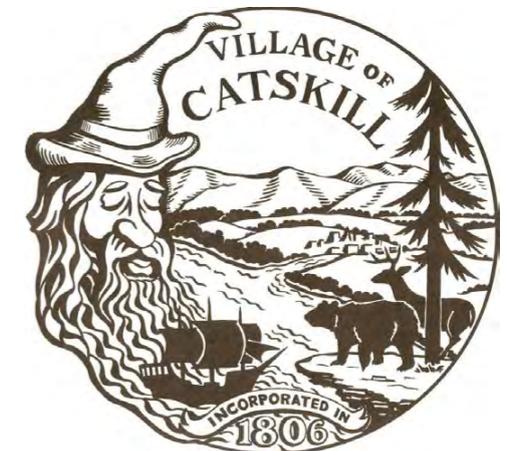
Thank you from the “Ever Improving Village of Catskill”.

Vincent J. Seeley

President, Village of Catskill

Greene County Legislator, District 1

December, 2014



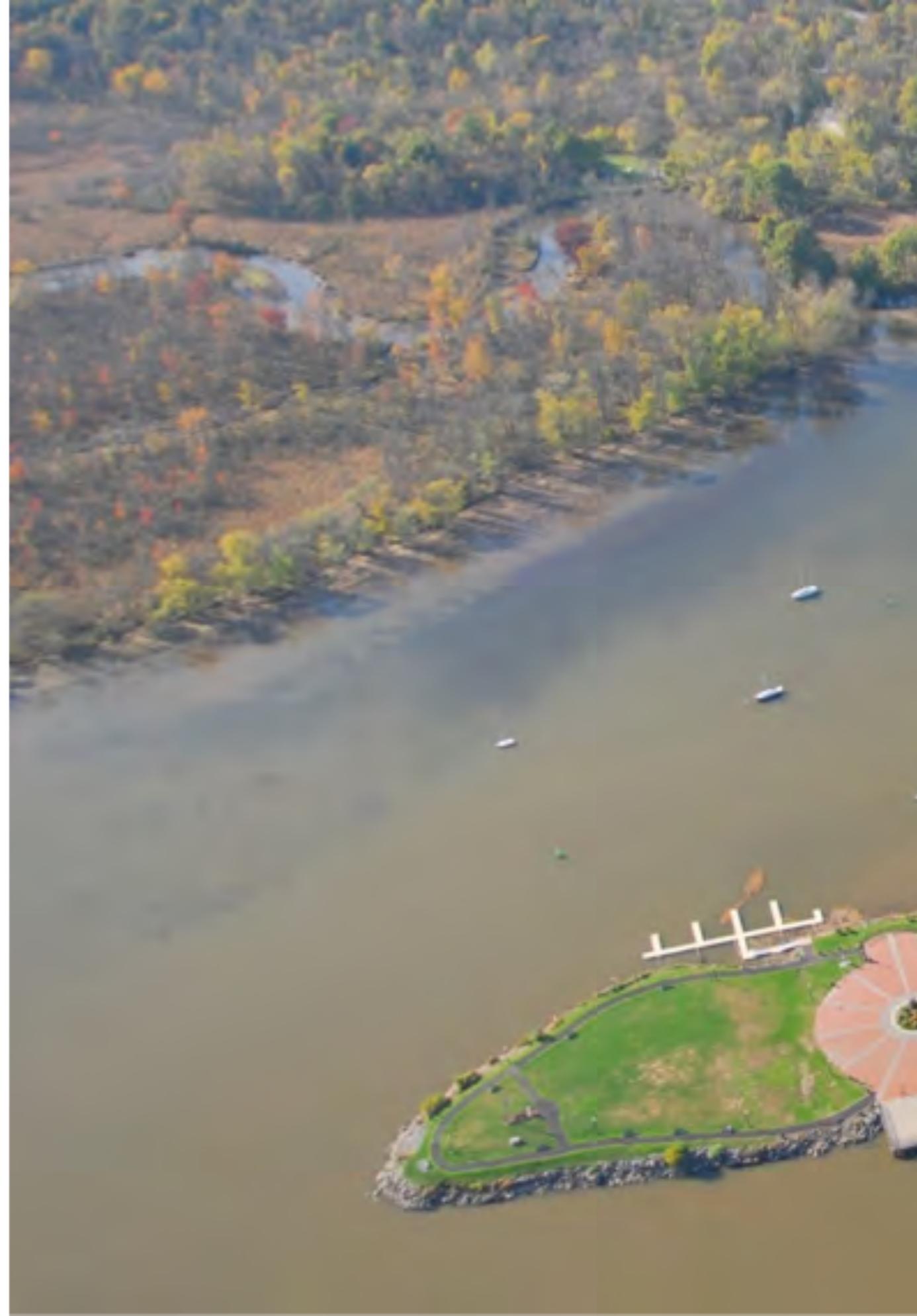
EXECUTIVE SUMMARY

When Tropical Storms Irene and Lee hit in the late summer of 2011, the Village of Catskill experienced unprecedented flooding and damages driven by stormwater flows in Catskill Creek and storm surge from the Hudson River. Just over a year later, Superstorm Sandy hit the northeast, bringing with it a historic coastal storm surge and additional flooding. The three storms led to significant damages to waterfront homes and businesses in the Villages, and prolonged disruptions of services and access in some neighborhoods.

At the same time, the village has been working actively to envision and implement a village-wide revitalization that builds on the central role of the waterfront in the community. In the past several years a range of public and private investments have been made in planning, redeveloping and redesigning the waterfront.

The intersection of the Village's revitalization goals and the community's new appreciation of the risks to the waterfront from flooding and sea level rise highlighted the need for better information about future flood risks as the community works to advance its objectives.

Seeking solutions, the Village, together with its partners Scenic Hudson and the Consensus Building Institute, sought and was awarded support from the New York State Department of Environmental Conservation's Hudson River Estuary Program, for an initiative to address coastal flooding risks related to sea level





rise. The Catskill Waterfront Resilience Task Force initiative was formally launched in November 2013 to begin the work of creating a safer, more vibrant Catskill waterfront.

The Task Force, with its project partners and with input from the public, has synthesized a list of recommendations which, if implemented by the village, can be used as a flood and sea level rise resilience action plan. This report details these recommendations and the studies that support them, which span policy and planning updates, capital investments, municipal operations and infrastructure, and future studies that will better position Catskill to begin taking action and to attract future support for waterfront improvements.

Importantly, through this process task force members and others in the Catskill community have become well-versed in the issues surrounding sea level rise, flooding, adaptation, and resiliency planning. Together they represent an increased capacity in the village as it endeavors towards resilience. The information presented here and in the supplemental materials further enhance the village's ability to visualize and understand its coastal risks and create a foundation for further analysis specific to the village.

Planning for Catskill's resilience will be an ongoing civic conversation in the community for decades to come. With this report, the Task Force makes an opening contribution to that dialog.

Risks and Vulnerability of Catskill’s Waterfront Area

Public health and safety, damage to assets, business downtime, and accessibility are some of the top concerns motivating Catskill to take action to prepare for future flooding events. The Village seeks to become more resilient as those events become more frequent and their severity increase due to increasingly heavy downpours, storm surge events, and sea level rise that exacerbates the impact of both upland and coastal flooding.

The financial impact of recent Tropical Storms Irene and Lee and Hurricane Sandy on the Village of Catskill exceeded \$3 million in damages to structures alone. Losses to business and disruption of the lives of Catskill citizens were significant. Risk and vulnerability assessments conducted during this initiative suggest that, by the end of the century damages to structures from single events like Tropical Storm Irene could more than double as sea level rise exacerbates flood heights. In the absence of steps to adapt to changing conditions along the waterfront, cumulative damages from flood events could exceed \$15 million, with many homes permanently impacted and several key public assets like the sewage treatment facility, Catskill Point public spaces, the Public School, and many roads increasingly at risk.

Sea Level Rise and Planning for the Future

Along the tidal Hudson River, from the Battery in Manhattan to the Federal Dam at Troy, sea level has risen approximately one foot over the past century. There is evidence that annual rates of sea level rise along the Hudson River have accelerated over the past two decades and will continue to outpace the global average.

The Task Force considered sea level rise projections and planning timeframes that it felt were most appropriate for developing Catskill’s adaptation goals. The Task Force ultimately selected 2020s, 2050s, and 2100 as the time horizons for analyzing waterfront risks and elected to consider sea level rise values of 6.5”, 21.5”, and 60” respectively for those time periods. These sea level rise increments represent the middle values of the ranges projected in the three time frames under the Sea Level Rise with Rapid Ice Melt scenario conditions.

year	2020s	2050s	2100
sea level rise projection	6.5”	21.5”	60”

The Task Force chose these projections for planning and analysis because it opted to develop solutions for a relatively severe case and guard against under-preparation, not necessarily because it considered these to be the most likely sea level rise outcomes. Indeed, slower rates of sea level rise are possible, or even likely. In such a case the use of higher projections would mean that the projected levels would be reached at some later date than those used by the Task Force, as sea level continues to rise after 2100.



A Vision of a Resilient Catskill

With input from the public and a range of stakeholders, the Task Force identified several key principles that should guide Catskill's adaptation actions now and into the future. A resilient Catskill...

CONSERVES:

- Natural spaces, ecosystems, and biodiversity
- Historic and cultural assets
- Viewsheds and scenic values
- Existing waterfront investments

PROMOTES:

- Smart economic development and tourism
- Attraction of business investments
- Best uses of waterfront
- Attractive parks and other open spaces
- Community education about flooding resiliency
- Planning for safety, infrastructure, and efficient problem mitigation
- Preparedness for future environmental changes

ENHANCES:

- Community vibrancy
- Residential quality of life
- Waterfront access and public amenities
- Recreational opportunities
- The central role of the waterfront in the community
- Connections of neighborhoods and village centers to waterfront

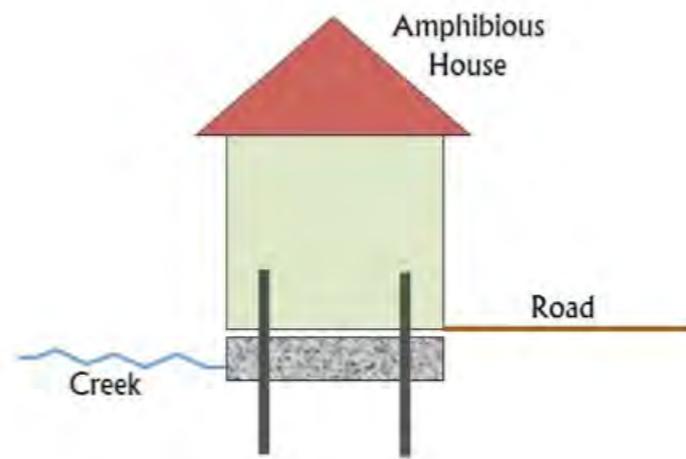
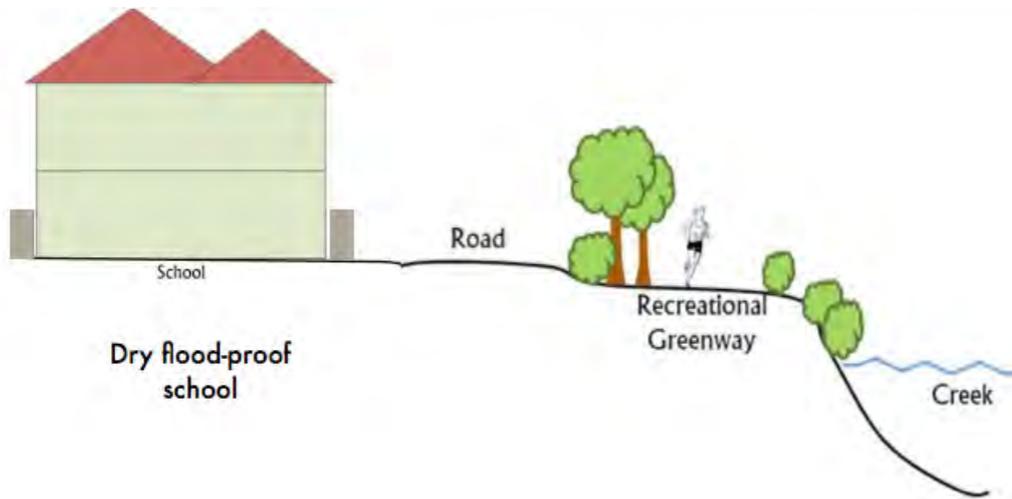
Adaptation Strategies

Examining a wide-range of adaptation types and tools, and evaluating their strengths and weaknesses, was an important part of the Task Force’s process for considering both short-and long-term adaptation alternatives for the Village of Piermont. Many tools exist to implement community-wide adaptation, from land-use planning and regulation, urban design, and coastal engineering to market- and tax-based incentives, grants from state and federal agencies, spending, and public outreach actions.

The Task Force worked to launch the process of planning and designing a more resilient waterfront, not to complete it. Task Force members learned about the range of conceptual, architectural, and regulatory approaches to adaptation currently in practice or development in other coastal areas in the United States and abroad. With this perspective, the Task Force developed and evaluated a portfolio of “Adaptation Alternatives” - alternate scenarios for how specific neighborhoods or the entire Village might reduce risks and achieve the resilience vision principles.

Sketches of some of the Adaptation Alternative strategies explored by the Task Force for specific areas of Catskill’s Waterfront.

A wider range of Adaptation Alternatives and Benefit-Cost Case Studies were considered by the Task Force and are available in this report and in its Supplemental Materials.



TASK FORCE RECOMMENDATIONS

The Task Force recommends the following proactive steps toward a safer, vibrant waterfront and a more resilient Catskill, both for the next storm event and for a future of rising seas.

The recommendations target a broad spectrum of Catskill's physical, natural and social fabric and are focused on actions that tie immediate recovery needs to long-term adaptation goals.

Each recommendation is phased to a specific timeline and implementers have been identified to establish clear lines of responsibility. Also, for most of the recommendation, there are more specific sub-tasks or implementation details described on pages 40-56.

These recommendations comprise an integrated set of actions that will make substantive contributions to the well-being of the community and its residents.

- 1. Review the village comprehensive emergency management plan (CEMP) for any necessary updates.*
- 2. Improve emergency communications.*
- 3. Design and install high-watermark signs in the waterfront area to educate the community about flood risk and sources of flood preparedness informational resources.*
- 4. Establish an Interim Flooding and Storm Resilience committee and create a Permanent Joint Village and Town Conservation Commission.*
- 5. Invite agencies or experts to give public outreach presentations on storm preparedness and flood-mitigation options for families, businesses, institutions, structures and facilities, including funding opportunities when applicable.*
- 6. Create a flooding best practices manual for distribution to village residents and businesses.*
- 7. Post key information on flood risks and emergency plans on the village website.*
- 8. On an annual basis, direct property owners and residents of current and projected future floodplains to the Village's informational resources about flooding and emergency preparedness.*
- 9. Support regular training for the village floodplain manager (Code Enforcement Officer).*
- 10. Work with other communities in the Catskill Creek watershed to better manage stormwater and runoff.*
- 11. Work through the Greene County Multi-Hazard Mitigation Plan to position Catskill for resiliency actions and funding opportunities.*
- 12. Conduct a risk and engineering review of key municipal infrastructure to identify adaptation needs/options/plans.*
- 13. Maintain an inventory and stock all necessary replacement parts for sewage treatment plant and pump stations.*
- 14. Convene a working group including representation from Village boards, committees, officials and municipal planners to review the Task Force Report and identify which/how local codes can be modified to better weather and adapt to future storms and account for sea level rise.*
- 15. Consider applying to participate in the National Flood Insurance Program (NFIP) Community Rating System (CRS), to reduce flood insurance rates and improve flood resilience.*
- 16. Ensure that all proposals and plans address projected sea level rise and are responsive to flood resilience issues.*

17. *Promote the use of Green Infrastructure techniques throughout the village to reduce flooding from runoff and minimize stormwater treatment burdens.*
18. *Consider participating in NYS DEC's Climate Smart Communities and its new certification program, in order to receive free technical assistance and eligibility for future grant applications.*
19. *Promote the long-term persistence of natural storm buffer areas, particularly Ramshorn-Livingston Marsh, Catskill Point, and undeveloped riparian areas along Catskill Creek (e.g. Goat Island, Pelican Island).*
20. *Consult Task Force report for neighborhood/asset specific recommendations and begin developing strategies to address them (e.g. developing an alternate access to the school complex via Bridge Street).*
21. *Take advantage of training opportunities from federal, state and local partners to improve staff and volunteer understanding of tools available to help plan for and respond to flood emergencies.*
22. *Integrate departmental funding requests into a village-wide Capital Improvement Plan that incorporates and prioritizes the needs of all departments, along with phased adaptation of infrastructure to flooding and sea level rise.*
23. *Incorporate cost-benefit analyses and long-term flood risk due to sea level rise and stronger storms into asset design and the prioritization of strategies to manage key municipal assets.*
24. *Create an orientation packet or a presentation on flood hazards and municipal plans for all newly elected/appointed municipal representatives, to ensure that new personnel are well-informed on the issues and procedures in the village.*

Implementation: Top Priorities

The Task Force recognizes that the Village of Catskill, with its small staff and reliance on volunteer leadership, may be unable to simultaneously implement all of the recommended actions in any given time frame. To address this, six recommendations were prioritized as the most urgent or important. Note that while the Task Force recommends these be initiated or implemented in the next five years, some of them also set the Village on a path to addressing its longer-term goals.

Establish a Flooding and Storm Resilience Committee and Joint Village and Town Conservation Commission

Review/update the Village Comprehensive Emergency Management Plan (CEMP)

Improve emergency communications

Create a flooding and best practices manual for residents and businesses

Review the Task Force report and identify how local codes can be modified

Promote the long-term persistence of natural storm buffer areas

