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## HURRICANE SANDY RECOVERY

### Using Mitigation to Rebuild Safer and More Sustainable Communities

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*This paper outlines some of the actions that communities, individuals, businesses, and state and federal officials can take to reduce the suffering, damage, and risks from events like Hurricane Sandy in the future.*

The vast destruction on the Atlantic Coast and communities from Superstorm Sandy is unfortunately devastating, but may be a harbinger of what we can expect in the future. The history of our nation and the world provide ample evidence that large natural disasters can occur frequently, and with a vengeance. This region of the east coast experienced another event, Irene, just a year ago. These storms had similar paths and strength, but resulted in totally different impacts. Sandy wreaked havoc with coastal storm surge and inundation, whereas Irene moved ashore with far less coastal damage but stalled inland where it dumped huge volumes of rain, swelling rivers and outlets in many northeastern states, matching or exceeding record flood levels in many areas. **The point is, large events like Hurricanes Sandy and Irene WILL happen again.**

Whether it is tsunamis, hurricanes, floods, nor'easters, wildfires, or earthquakes, natural hazards remain a primary force that can bring catastrophic consequences to every region of the United States. Once the monumental job of attending to the pressing human needs through rescue and relief, immediate response, and short term recovery is well underway, the northeast region and the nation will turn attention to the rebuilding of the heavily damaged communities and properties. Citizens throughout the nation will contribute to this rebuilding, not only with personal contributions, but with our tax dollars. We must evaluate how we plan, mitigate, and respond to natural hazards, ensuring that the nation is not ignoring the almost weekly threat of natural hazards. We must rebuild in a way that will reduce vulnerability to flooding, hurricanes, and other large storms in the future in order to avoid the human suffering and economic disruption that always follows.

While the Hurricane Sandy damage throughout the Atlantic Region, New York, and New Jersey coasts and cities is one of the worst the region has suffered, similar large events – and the increasing likelihood of similar future events – should teach us valuable lessons that we must consider in the days, weeks, and months ahead. There is a need to take this disaster and use it as an opportunity to avoid the next one, not to rebuild in a way that will ensure another disaster or just have less damage and disruption next time. We should react to this disaster in a different way than in the past. The rules need to change or we will keep repeating our mistakes, proving, yet again, that we have not learned the lessons of the past.

**There will be pressure to roll back existing standards, to rebuild quickly and to not incorporate higher standards to create safer communities.** Hurricanes Andrew, Ivan, Katrina, Rita, Wilma, Ike, etc., demonstrated that 1) much of the nation has inadequate rebuilding policy to deal with situations when a large area is impacted by an extreme event and 2) significant pressure will be brought forth politically to relax reconstruction standards, leaving the rebuilt structures as much or more hazard-prone than prior to the disaster. The bigger the event, the more likely we are to see backsliding in those policies that would make our coasts, cities, and citizens safer in the next event. Some communities are considering or already changing to better standards, and may need to use building moratoriums to allow new standards to become effective to avoid buildings being rebuilt at high risk.

The nation and its communities have neglected protecting critical infrastructure, including water treatment plants, levees, and transportation for years (the subways are a prime example – while New York took some key steps, Sandy overwhelmed those measures). These critical facilities, including hospitals, fire and police stations, etc. must be protected so they are operable during and following events at least as severe as those expected on average every 500 years.

**Right now is the best window of opportunity to incorporate actions to make those communities impacted by Hurricane Sandy more resilient from future flood events.** In the devastating aftermath of a significant event like Sandy, there also exists a window of opportunity for communities to make wise redevelopment choices that will help support the economic and social vitality for generations to come. While such choices can be politically unpopular in the short term when the focus is to get back to normal, choosing a better path now can lead to reduced costs, misery, suffering, and hardship for families and businesses alike. It is much harder during a “sunny day”, or after the event has been forgotten, to make needed changes than it is right now when people are faced with the consequences of the storm and are more receptive to significant – although sometimes disruptive actions – that can result in effective mitigation. There are admirable examples of communities in the nation that chose a more resilient future in their darkest hours after a devastating event.

## NEEDED ACTIONS

### **Rebuilding in Damaged Areas—Do It Smarter and Safer!**

Huge amounts of funding will go into reconstruction of these devastated areas over the next weeks, months, and years. Reconstruction can and must result in safer, more disaster resistant communities, homes, businesses, and infrastructure. These actions are not only needed in the affected coastal areas, but in all coastal areas of the nation, where the population at risk is increasing daily as people move to the coast. The following actions will be necessary in this process:

1. **Utilize a building moratorium on issuing building permits** to provide time until an assessment has been conducted and a community reconstruction plan is in place. This will reduce future costs and risks for property owners and the community.
2. **Assess the damage to each structure** to determine if it should be rebuilt. If rebuilding is appropriate, the rules and standards for safe construction must be adhered to. There are over 20,000 severely damaged building in each state of New York and New Jersey alone. Each one must be inspected to determine if it was substantially damaged. If it was, the rebuilding must be done to new standards and elevations to comply with National Flood Insurance program and building code requirements. Substantial damage estimates must be done quickly before property owners become impatient and start repairs so they can get back into their homes.

While some existing tools are available, like the Emergency Management Assistance Compact (EMAC) and Hazard Mitigation Technical Assistance Program (HMTAP), these mechanisms have problems in implementation. EMAC can be used as a vehicle to request Certified Floodplain Managers to assist, but states have been reluctant to go down this path since substantial damage determinations have specifically been determined by FEMA to be non-reimbursable under Public Assistance (even though other health/safety inspections are eligible). Contract assistance like HMTAP or FEMA’s Technical Assistance and Research Contracts (TARC) program may also be utilized, but these need to be done in a fast and efficient manner – current contracting processes are cumbersome, especially for HMTAP. Even as of the date of this paper, communities are already issuing permits for rebuilding, without having the knowledge and/or assistance of completing substantial damage determinations. Another option might be to require property owners to submit a substantial damage determination with any flood insurance claim, with processes to assist.

3. **Use advisory Base Flood Elevations (ABFEs).** FEMA was already in the process of developing new flood hazard data, including elevations for much of the coast that was impacted by Sandy. Since the final maps will not become effective for perhaps a year, it is important that FEMA provide new advisory data to communities quickly so the information can be used in rebuilding. Communities should use the advisory data and elevations to guide new development because it will likely be a condition of any mitigation funding that is provided, and future premiums will rely heavily on complying with the advisory flood elevations. Using that data will help residents and businesses be more resilient to future storms while lowering their future flood insurance rates.
4. **Utilize planning and wise land use to reduce risk to people and property.** Planning is an effective way to analyze hazards and land use, and to develop strategies to improve resiliency. Existing comprehensive land use plans and hazard mitigation plans (if separate) should be updated to reflect new hazard information, assess areas at risk, identify possible mitigation actions, and update community goals. Post-disaster redevelopment plans are useful for systematically determining the best path forward for reconstruction, and capital improvement plans should be updated to ensure future infrastructure will be resilient to hazards. Finally, all levels of government and private industry have increasingly been undertaking climate adaptation planning, which should continue. Climate adaptation planning focuses not on what causes climate change but rather what adaptations are needed in response to a changing conditions. Data sets that can be downscaled have allowed this kind of analysis to occur at a local level.

Improved land use tools are important to address natural hazards and risk to people/property: development setbacks, density limits, conservation zoning, and transfer of development rights (TDRs – which can be used as a mechanism to facilitate acquisition/relocation when states and communities are cash strapped). Prohibiting new buildings, reducing development density, or only allowing open space compatible uses in the highest hazard areas should be considered – these areas are 100% guaranteed to flood again. While it may be necessary to enact temporary moratoria to allow for the full review of data and transparent adoption of updated land use, courts recognize the authority and responsibility of local governments to oversee land use and rebuilding for public safety purposes. It is important to note that communities are far more likely to be successfully sued for permitting redevelopment that results in future harm than they are for preventing it through adoption of new standards for public safety reasons and through a methodical and transparent process.

5. **Adopt higher standards for reconstruction to improve resiliency to hazards.** The standards of the National Flood Insurance Program (NFIP) are minimum nation-wide standards. Each community and state should understand that current standards are the absolute minimum. They should review their hazards and risk in light of recent events, the uncertainty in mapping methodology, and the variation in the storm intensities and impacts. Only then can they determine if higher standards and best practices that require elevation, relocation, or floodproofing that exceed the minimums are necessary to protect their citizens, properties and infrastructure. Many states (New Jersey, New York and others) and communities throughout the nation have adopted higher standards including:
  - a. Require “freeboard” above the 100 year flood level for structures. Freeboard is a safety factor requiring buildings to be constructed higher than the calculated flood level to provide better protection and reduce damages. About half the 21,000 flood prone communities in the NFIP require 1 to 3 feet of freeboard for buildings. Based on the current premium rates for NFIP flood insurance, premiums can generally be reduced 50% or more if buildings use 2 feet of freeboard. Given the impact of sea level rise, subsidence on some areas of the coast, and changing flood conditions, a 3-4 foot freeboard in coastal areas is not unreasonable. The State of New York wisely requires a minimum 2 foot freeboard statewide for one and two family homes.
  - b. Adopt Zone V development and construction standards in coastal A-Zones, where areas are subject to moderate wave action that can still cause significant damage. This was a recommendation of the 2006 comprehensive evaluation of the NFIP.

- c. Adopt the standard of a 500-year flood risk reduction level or the flood of record, whichever is greater, for all critical facilities. What is a critical facility? ASCE 24 indicates critical facilities are buildings and structures that contain essential facilities and services necessary for emergency response and recovery, or that pose a substantial risk to the community at large in the event of failure, disruption of function, or damage by flooding. Among others, this would include health care facilities, fire, rescue and police facilities, power generating and substation facilities, key communication facilities, and facilities containing hazardous materials. If federal funding is used for rebuilding critical facilities, this will be required because this standard is the same in Federal Executive Order 11988.
  - d. Carefully designed and planned floodproofing can prevent or reduce losses in large buildings from urban flooding. Careful planning and design is necessary so that vulnerability of existing buildings to structural damage is investigated and the impacts on building use are considered. It is important to know what will happen if nothing is done and flood water is allowed to infiltrate into building lower levels and into critical operational equipment such as electrical panels, heating and emergency power generating systems.
6. **Complete a post-disaster analysis of the Sandy event and track how the federal money is spent for this disaster.** There is currently no post-rebuilding analysis of major disasters to determine the cause of the disaster or what could have been done to prevent it or reduce the deaths, suffering, and costs. Only by tracking what is done and what is effective or not effective can we improve the disaster relief and mitigation process. We, the federal taxpayers will pay probably \$80 billion or more for this disaster, just as we paid over \$150 billion for the 2005 hurricane disasters. We deserve no less than a full accounting. This analysis would be similar to what the National Transportation and Safety Board (NTSB) does after each plane crash and would gather information such as:
- What were the actual damages by category of homes, businesses, and infrastructure? (that data is not now updated from initial estimates)
  - How many lives were lost and how could that have been prevented?
  - What was the total cost (damages, loss of business, indirect costs, etc.) and who paid them?
  - How did previous land use decisions add to or reduce the damages and costs?
  - How did infrastructure decisions at local, state, and federal levels add or reduce costs?
  - Was mitigation incorporated into every rebuilding decision, and if not, why not?
  - What steps can the communities, citizens, and states take to not experience this disaster again?
7. **Perform an evaluation of the current flood and coastal standards and inundation maps for needed adjustments to protect lives and property.** FEMA is rightly performing an analysis of the flood maps and damages along the coast to determine if the current maps and standards for mapping and managing those areas are adequate or need to be changed. This analysis could inform:
- Did the maps correctly reflect the calculated storm surge and flood hazard?
  - Did the existing flood maps show properties not at risk that were destroyed or badly damaged?
  - Did those maps accurately reflect the 1% chance (100-year) flood and storm surge?
  - Did those structures on the coast which were built to existing standards survive?
  - If not, do the standards need to be strengthened?
  - Did the development along the coast expose public infrastructure to costly damages requiring a huge influx of tax dollars?

This analysis can inform needed adjustments for better maps and standards for stronger reconstruction.

8. **Review existing disaster policy to remove incentives for communities and citizens to build and live in high risk areas.** The larger a disaster, the larger the cost share picked up by the federal taxpayers. Furthermore, there is no limit on the number of times the federal taxpayer bails out a community hit by a flood or other natural hazard, even one of the same or less magnitude. Do such policies create perverse incentives that encourage at-risk development because the local community gains the property tax from development, but can externalize the costs and consequences of the disaster to the federal taxpayer? Should the cost share be less or declining for disasters in known high risk areas or where communities do little or nothing to reduce their risk? Should federal taxpayer assistance for predictable disasters be considered a “one-time-only” taxpayer bailout? This would shift the primary responsibility for building and living at-risk to those who benefit from occupying those high risk areas. Would that result in communities and property owners more carefully considering whether to rebuild (or build) in high risk areas, thus reducing the ever increasing long term taxpayer costs? In this vast nation of millions of acres of land, only 7 % of our land is floodplain. Is it necessary to occupy the majority of that high risk land to have a viable economy? If it is occupied, who should pay for the risk of that occupancy? The Federal Interagency Floodplain Management Task Force seems an appropriate group to perform this review and suggest recommendations to the President and Congress.
9. **Communities should participate aggressively in FEMA’s Community Rating System (CRS) program.** The CRS rewards communities who have holistic and active floodplain management programs (actions communities take to earn their CRS credit, such as open space, buyouts, dealing with repetitive loss, community awareness, freeboard, etc.) with lower flood insurance costs, which can be up to a 45% discount in a community. Recent research findings conclude that communities participating in the CRS accrue significant benefits, including insurance savings and losses avoided.

### **Mitigate Wherever Possible**

Reconstruction in coastal and riverine areas must incorporate the tenets of natural hazards mitigation. All options for mitigation must be considered, including elevating or floodproofing the structure, or acquiring and relocating those in areas too hazardous for habitation. In some cases it may be more economical to remove the structure and restore the naturally functioning coast. The first priority is to decide where to and where not to rebuild, seeking support for those decisions. A natural coast does provide “flood risk reduction”. Those that can be repaired must be carefully cleaned and dried to eliminate moisture and mold. While mitigating the structures against flooding, also modify them to protect against wind and storm surge. The bottom line is that for any complex flooding problem, multiple mitigation solutions must be used. Here are suggested actions:

1. **Focus on repetitively damaged structures.** A number of the nation’s repetitively damaged structures (those with repeated losses or flood insurance claims) are in the areas hit by Sandy. Now is the time to mitigate those structures. Many property owners will have problems finding the resources to rebuild, let alone mitigate their structures. The 2004 and 2012 NFIP Reform Act provides authority for added funding in the flood insurance policy to help property owners mitigate repetitive loss structures through a variety of generally non-structural means, including voluntary buyouts and relocations, elevation of buildings, and floodproofing. Appropriately implementing these provisions will help reduce this drain on the Flood Insurance Fund over time. While repetitive loss properties constitute only 1.3% of the policies in the NFIP, they represent about 25% of the claims. This matter should be of concern to everyone in or near a flood zone. Repetitive claims and large numbers of claims will drive up the cost of flood insurance for everyone.
2. **Speed the 404 mitigation grant process and better coordinate these mitigation programs and repair assistance.** When people are out of their home or business for extended periods of time, they will start to do repairs to their building just so they can get back to feeling normal. If they had flood insurance, that claim payment comes quickly, and they may use it to make some repairs to their building. However, a little later, the community may offer to assist them with a mitigation project – primarily under the Hazard Mitigation Grant Program or HMGP, such as elevation or relocation using

post disaster mitigation funding. The money spent up front may have been for naught, and could be used by the owners to match federal monies or complete or enhance the mitigation. After Hurricane Irene, the State of New Jersey implemented an expedited mitigation program leveraging their Blue Acres experience and resources (a State-funded mitigation program to acquire or demolish damaged buildings). It is important to identify potential projects in County and Community Hazard Mitigation Plans that can be funded by HMGP funds, before homeowners with Flood Insurance start to rebuild their structures. A building moratorium supports time for project identification. The current Stafford Act (disaster relief act) allows the HMGP mitigation grant program to be delegated to qualified states (Sec 404 (c)). FEMA has not implemented that provision, which could shorten the time for mitigation grants being implemented by 6-12 months, and still allow oversight by FEMA.

- 3. Use Public Assistance (PA) funding to mitigate damaged infrastructure to the maximum extent possible.** After a Federal disaster declaration, mitigation assistance is available for infrastructure. This program, called 406 Mitigation, is available under FEMA's Public Assistance program. Every piece of infrastructure that has been damaged should be evaluated for mitigation opportunities, and it should be a goal of a community, the state's mitigation strategy, and the Federal Coordinating Officers to incorporate 406 Mitigation into every Public Assistance Project Worksheet. This should include support for not reconstructing infrastructure in inappropriate places, allowing the community to use the money in a safer location to allow development there. Any funding for PA in coastal areas, and the mitigation required, should take into account changing conditions like sea level rise and coastal erosion that will impact the infrastructure. FEMA should consider reducing the cost share for PA projects that do not include adequate mitigation.

Another mitigation assistance program available is through the Small Business Administration (SBA) as part of their Disaster Loan Program. SBA guidelines allow for individuals who are granted loans to have an extra amount approved to include mitigation activities. This is a private loan, so the taxpayer is not primarily responsible for the loan.

- 4. Mitigate critical facilities.** Federally declared disasters are special opportunities to mitigate those facilities. Many critical facilities are publically owned, such as water or wastewater treatment plants, fire and police stations, major roads and bridges, etc. See detail in the [Critical Facilities paper](#).

Under the Disaster Relief Act, mitigation monies are provided by FEMA to incorporate mitigation into the reconstruction of those facilities. Communities should evaluate each critical facility that was damaged to see how mitigation can be incorporated. Some critical facilities, such as hospitals, nursing homes etc, may not be public, but it is essential they are operable and accessible during extreme events such as Sandy. This means they should be protected to and operable/accessible during the 500 year event or flood of record, whichever is greater.

**Mitigation is cost effective!** FEMA/DHS has completed an independent analysis on the benefits of mitigation, requested by Congress. **That report demonstrates that every dollar invested in flood mitigation saves \$5 for the taxpayers**, which reinforces the cost-effectiveness of federal, state, local, and private investment in mitigation. See the report from the [Multihazard Mitigation Council here](#).

Additionally, state technical assistance is available to provide expert assistance on mapping, safer rebuilding standards and mitigation funding assistance. Every state has a Coordinator for the National Flood Insurance Program (SFM) and a State Hazard Mitigation Officer (SHMO). See the [SFM List](#) and the [SHMO List](#).

### **Provide Resources and New Authority/Flexibility for Mitigation Programs**

- 1. Fully fund HMGP cost share mitigation grants.** There should be full HMGP funding of 15% for the declared disasters in each state, and 20% for those states that are "enhanced mitigation plan" states. The opportunity to elevate or floodproof or relocate damaged buildings will be huge, but that also represents a huge opportunity to help those homeowners and businesses mitigate their building so they

do not suffer these same damages in the next event. Mitigation cost sharing with federal funds under all FEMA programs is only done after a rigorous test to ensure that benefits to the taxpayers over the life of a project exceed the cost of the mitigation. This opportunity for incorporating mitigation as we rebuild must not be missed. Rebuilding after Sandy will be expensive enough once, let's not set ourselves up to do it again when the next major hurricane or nor'easter takes aim at this coast.

2. **Restore Pre-disaster mitigation funding.** The FEMA Pre-Disaster Mitigation program (PDM) provides cost sharing for communities to use to develop hazard mitigation plans and to implement mitigation projects before a storm like Sandy hits, thus preventing human suffering and tragedy. The PDM program is especially helpful for proactive communities who embrace the need to make their community safer before the disastrous event occurs, and in about half of the states that do not have disasters consistently enough to trigger HMGP with any regularity. While the Hazard Mitigation Grant Program (HMGP) provides mitigation cost sharing after a disaster as part of the Disaster Relief Act, citizens and communities must experience the suffering and damage before that funding is available.
3. **Expand use of Increased Cost of Compliance.** Increased Cost of Compliance (ICC) is an additional coverage as part of a flood insurance policy paid for by policy holders. ASFPM has long advocated for its increased use as it had been underutilized for years. In fact, if not for Hurricane Katrina, there would have been a significant "surplus" of ICC funds collected but unused; however, ICC claims from Katrina have resulted in added mitigation activity. In the 2004 NFIP Reform Act, the authority to use ICC as match to FEMA mitigation programs was enhanced but implementation has been much slower to follow. One way ICC can be better utilized is by allowing the full amount of ICC to be applied to the acquisition project instead of limiting it to demolition costs only. FEMA should be implementing this on a broad scale post-Sandy, and states and locals must do their part by quickly determining which structures were substantially damaged before in-kind repairs are underway.
4. **Ensure the Sandy disaster supplemental supports mitigation efforts that will reduce long term costs for Communities, citizens and the taxpayers.** The President has submitted a \$60.4 billion supplemental disaster bill to Congress for consideration. Congress needs to carefully consider the request for each agency and only support truly long term effective measures. ASFPM is especially keen on measures that both support flood mitigation and restoration of natural systems. NRCS funding for floodplain easements is an example, and there are others. Spending for measures that will require repeated taxpayer funding for similar events in the future needs careful scrutiny. One aspect of Sandy assistance that ASFPM does not support is increasing the casualty loss deduction. Such an action rewards the wrong behavior and provides incentive to not take measures to increase resiliency. If any tax incentives are provided, they should be provided to incent mitigation activities during reconstruction.
5. **States need to contribute too.** Hazard mitigation resources can be more effectively utilized and stretched when states have complimentary hazard mitigation programs. For example, the State of New Jersey has the Blue Acres program that has been able to provide matching funds and/or independently pursue flood mitigation projects like buyouts. A 2010 assessment of state and local floodplain management programs completed by ASFPM indicates that 24% of states have programs or make resources available to fund or match mitigation projects. This is down from 29% in 2003.
6. **Address flood insurance affordability for low income property at risk owners at risk while moving flood insurance premiums to actuarial rates.** The National Flood Insurance Program is nearly \$18 billion in debt and will likely need to borrow from the federal treasury to pay the estimated \$5-10 billion in claims from Sandy. To address that debt, the recently passed NFIP Reform bill focused on increasing premiums, especially for second homes and repetitively flooded properties. This was a positive move by Congress, which will begin to pay off in a few years as premium increases take effect. It will be important for Congress to quickly consider how to address the issue of affordability for lower income property owners since the taxpayer will still help cover those damages through disaster relief if the property is not covered by flood insurance.

## **Protect and Restore Natural Floodplain and Coastal Systems**

Restoration and enhancement of natural and beneficial functions should be part of an effective mitigation strategy. Natural systems such as wetlands, marshes, and barrier beaches provide a level of protection against coastal storm events. The entire nation's coast is rapidly losing barrier islands and the coastal wetlands that buffer the impact of hurricanes, storms, and flooding on the coast. In order to have a sustainable working northeast coastal area, we must invest now in sound redevelopment and restoration practices. Future public financial investment in redevelopment along the coast must be completed in a manner that respects the natural processes occurring along the coast. Reconstruction must balance the critical nature of coastal wetlands and other shoreline processes with the economic uses unique to the Northeast. If we do not account for the delicate balance, we will simply be reconstructing a coast that will be even more vulnerable to the destruction caused by natural disasters.

The frequency and severity of coastal storms and rainfall events are changing in the northeast part of the US, as in many other areas. Moreover, over 100 years of tide gage data in the region confirm that relative sea level has risen one foot over the past century. It makes no difference why these changes are happening, the undeniable future of this coast is one of rising tides, shifting sands, increasing storm vulnerability and increasing taxpayer liability. It will impact us all if the rebuilding does not adapt to these changes to make our citizens safer and our communities more resilient. With Climate Change, as more heat is being retained in our atmosphere, there is more energy available to generate more extreme weather events. The benefits of building better will be realized quickly. The following actions are important steps to becoming more resilient:

1. **Modernize the national guidance for water projects that can impact floodplains and reduce flood damages.** Procedures for planning and implementing water resources developments, including flood damage reduction projects, beach nourishment, etc., should be modernized with much greater attention to setting priorities for investments. The current rules for planning and evaluating federal water resource projects have not been updated for 30 years. Despite an onslaught of high-level reports from federal agencies, the National Academy of Sciences, and professional organizations calling for an updating effort, past Administrations have not taken action to ensure that these guiding documents incorporate key lessons that have been learned since the rules were established, and to ensure wiser investment of taxpayer dollars. This should now be completed.
2. **Develop new flood and coastal surge level calculations accounting for future conditions.** When calculating flood levels that guide the building requirements, it is essential these calculations not be based solely on past flood and storm events. If storm intensity will increase runoff in major events far and above historical events, and the data is available to so demonstrate, flood levels shown on maps and used for guiding development must utilize this future condition data. Future conditions in riverine areas must also incorporate planned watershed development, which may have an even larger impact on flood levels. Larger floods will continue to occur, so if there was not time to incorporate future conditions into the maps, communities could counteract this by extending the flood zone to the 500 year zone, or to the intersection of ground elevation with the BFE plus the selected freeboard.
3. **Improve our approaches to beach and dune management.** The Association of State Floodplain Managers (ASFPM) does not advocate creating new dunes or beaches to provide new areas for development, and finds that using these measures to protect existing development can result in situations where the expense of ongoing operation and maintenance costs may, over time, exceed the costs of other mitigation alternatives such as acquisition and relocation or elevation.

Artificial dunes and beach replenishment historically were done for recreation and habitat enhancement. More recently, communities justify these actions as providing storm protection. There is considerable debate on the pros and cons of those actions. The residents of these areas now ask for federal funding to help them add sand to their beaches and build up artificial dunes. In some cases this may be a viable alternative, if good sand is available and the action does not adversely impact other



properties or the environment. The big issue is who pays for that protection. Unlike most mitigation projects, beach nourishment and protection is a repetitive loss activity which does not permanently reduce risk, and may actually induce new risk if unwise development decisions are made under the assumption that large projects reduce long-term vulnerability. The nourishment must be done frequently, especially after every significant storm event, and often many more times. The taxpayers have grown weary of bailing out those who get repeatedly flooded or damaged without taking remedial measures; is it unreasonable to expect the repetitious replenishment of sand beaches should be a “beneficiary pays” activity? If a community wants help building a beach or dune for protection, we suggest it be done with local or state money, or at a minimum, use federal money on a “one-time” basis, with the community in question signing an agreement up front that O&M will be their responsibility from then on, and that they demonstrate the financial capability to do that into the future.

- 4. Restore barrier island functions whenever possible.** Nature has a process for protecting the coastal mainland – they are called barrier islands. These islands are offshore land forms that migrate landward and erode in response to storm energy and rising ocean levels during heavy storms and rebuild in between storms. They migrate back and forth as they perform their protective function. Unfortunately, most of the barrier islands in the northeast have been totally developed, and often hardened, preventing them from migrating landward in response to rising sea levels or otherwise performing their natural function. The hardening and stabilizing of barrier islands is causing them to gradually flood in place both on the ocean side and bay side. Whenever possible, barrier islands should be evacuated of development so they can perform their natural protective functions.

Residual risk insurance and minimum construction standards should be required for buildings behind dunes or structural works. Under current standards, structures behind a dune providing 100 year “protection” are not required to purchase flood insurance and are not required to be elevated. When the bigger storm occurs (and it will), and the dune is breached or is overtopped or fails, that development may be flooded – not just with a foot or so of water, but to great depths, as we’ve seen in many areas. This “all or nothing” approach in current national policy encourages communities to seek federal funding for just the forms of protection that cannot be guaranteed, leaving not only the property owners and community, but also federal taxpayers exposed to the catastrophic event. At a minimum, buildings “protected” by dunes or beaches must pay a small amount (residual risk insurance) into a fund for when that catastrophic event occurs that results in flooding. Those structures should also be required to be elevated a minimum of two feet above natural ground to protect against low level incidents and internal drainage.

## SUMMARY

We cannot afford, as a nation, to rebuild the same way. This event could push the total debt of the NFIP alone to 30 billion dollars. Recovery from Sandy must include mitigation in every single decision. The frequency and severity of coastal storms and rainfall events are changing in the US. We must evaluate how we plan, mitigate, and respond to natural hazards. We must ensure that the nation is not ignoring the ever increasing threat of natural hazards. We must rebuild in a way that will reduce vulnerability to flooding, hurricanes, and other large storms in the future in order to avoid the human suffering and economic disruption that always follows. Reconstruction must balance the critical nature of coastal wetlands, barrier islands, and other natural shoreline processes with the economic uses unique to the Northeast, for if we do not account for the delicate balance, we will simply be reconstructing a coast that will be even more vulnerable to the destruction caused by natural disasters. We must learn from the past to avoid repeating these problems so we have safer, more disaster resistant communities, homes, businesses, and infrastructure. And we must start now.

*Further information about flooding and flood mitigation issues can be found on the ASFPM website [www.floods.org](http://www.floods.org) or from Executive Director Chad Berginnis at [cberginnis@floods.org](mailto:cberginnis@floods.org), 608-828-3000. The Association of State Floodplain Managers is a national non-profit organization of 15,000 professionals involved in floodplain and flood risk management, flood hazard mitigation, the National Flood Insurance Program, and flood preparedness, warning, and recovery.*