



Rebuilding Stronger

12 Priority Policies to Better Protect our Nation from Extreme Storms

"America needs a national, bipartisan commitment to restoring natural defenses and rebuilding stronger. We simply must do a better job improving the resilience of communities to protect against the staggering destruction of extreme storms, like Hurricane Florence. An ounce of prevention will save thousands of lives."

—Collin O'Mara, President and CEO

Even as the damage from Hurricane Florence is still being measured and assessed – in lives lost, property destroyed and communities recovering – policymakers are already considering ways they can help prevent similar losses from future extreme storms and catastrophic floods.

Hurricane Florence hit the Carolina coast as a massive and slow-moving Category 1 hurricane, sparing the region from some of the worst possible wind damage, but dropping enormous amounts of rain—up to 36 inches in parts of North Carolina and nearly nine trillion gallons of water total on the Carolinas. The storm took more than 40 lives, cut off power for hundreds of thousands, flooded communities across the Carolinas and spawned deadly tornados in Virginia. The extreme rainfall also resulted in the release of toxic pollution into the environment from industrial facilities including coal ash ponds and hog farms. At one coal ash landfill in North Carolina, more than 2,000 cubic yards of toxic waste washed away, enough to fill more than 150 dump trucks.¹ More than 50 pig waste lagoons have overflowed, not only creating sanitation concerns for downstream communities, but also leading to possible algal blooms and mass fish die-offs, as happened in 1999 during Hurricane Floyd.²

Hurricane Florence came a year after Hurricanes Harvey, Irma and María wreaked havoc in one of the most costly hurricane seasons on record. And hurricane season is far from over.

Ill-planned and unmitigated development in risky areas has put communities in harm's way, at the same time often destroying the wetlands and other natural features that could have absorbed floodwaters and reduced flooding. The devastation observed during storms like Florence was heightened by inadequate stormwater management, an over-dependence on outdated flood control infrastructure, and an underinvestment in risk reduction measures that could make homes, businesses, and communities more resilient to natural hazards.

This document outlines 12 policy priorities that would ensure rebuilding after increasingly destructive storms is done right, leading to better protections for people, property and wildlife.

#1 - Prioritize Natural Infrastructure Solutions for Hazard Risk Reduction

In the face of increasing storm frequency and intensity, some of our greatest assets are healthy wetlands, upland forests, floodplains, grasslands, dunes, and other natural systems that buffer communities from storm surge and help retain water to prevent flooding. This natural infrastructure should be a key component of solutions to reduce flood and storm risk for coastal and riverine communities.

One of the most effective and simplest steps that communities can take to decrease their vulnerability to storms is to protect and restore these natural areas and open spaces where they still exist. Typically, a one-acre wetland can store about three-acre feet of water, or one million gallons. For example, wetlands prevented \$625 million in flood damages during Hurricane Sandy in the 12 affected coastal states, and reduced damages by 20 to 30 percent in the four states with the greatest wetland coverage.³ In addition, forested and other wetland vegetation slow the speed of flood waters and, combined with wetland flood storage, lower flood heights.⁴

Natural infrastructure has the added benefits of providing wildlife habitat, typically costing less than structural measures, *and* avoiding the risk of catastrophic failures of levees, floodwalls, or dams. Natural infrastructure solutions can also be used in combination with structural measures to increase levels of protection and improve environmental health.

To increase the use of natural infrastructure for risk reduction, an important opportunity is to enact, and then implement, Section 1149 of the 2018 Water Resources Development Act, which requires the Army Corps of Engineers to consider in its civil works engineering projects the use of natural infrastructure approaches for flood and storm damage risk reduction. By using natural infrastructure where practicable, the Army Corps can enhance fish and wildlife habitat, clean water, economic opportunities, and sustainable protections from storms and floods.

#2 - Reform the National Flood Insurance Program

One of the stated purposes of the National Flood Insurance Program (NFIP) is to discourage development in high flood risk areas. However, decades of highly-subsidized flood insurance rates have resulted in the opposite effect. In many floodplains and coastal areas, development subsidized by the NFIP has occurred in places that would otherwise have provided natural buffers for storms and floods. This has increased overall community vulnerability, leading to repetitive losses and a ballooning program deficit.

Outdated flood maps contribute to the problem by reflecting historic patterns of flooding rather than current and future conditions. Existing federal flood maps often fail to capture the risks to inland communities in particular, despite a well-documented increase in extreme precipitation events that is resulting in greater flood risks to these communities.⁵ An analysis before Florence hit found that only 35 percent of at-risk properties in North Carolina carried flood insurance.⁶

After seven short-term extensions of the program, Congress must urgently act to fully reauthorize and reform the NFIP. Any reauthorization should require the Federal Emergency Management Agency (FEMA) to use the most modern science and technology, and risk-assessment tools, to increase the accuracy of flood maps – a vital step toward promoting broader coverage and helping people and communities truly understand their risk. Congress should also encourage use of upfront hazard mitigation using natural infrastructure, and clarify that private insurance can satisfy the mandatory flood insurance purchase requirements to increase consumer coverage options.

#3 - Increase Investment in Resilience and “Pre-sponse”

FEMA’s hazard mitigation programs – under both the National Flood Insurance Program and the Stafford Disaster Relief and Emergency Assistance Act – are badly underfunded. These

programs support critical efforts by communities and property owners to enhance their resilience and “pre-pond” to disasters, for example by proactively elevating or relocating structures to reduce risks. According to the National Institute on Building Sciences, every \$1 spent on upfront risk mitigation saves \$4 to \$6 in disaster-recovery spending later.⁷ By significantly raising investment in these hazard mitigation programs, and including substantial mitigation dollars in any recovery package, Congress can help greatly reduce future disaster payouts in these areas.

Local governments also should create more resilient construction standards and building codes that will better enable homes and businesses to withstand hurricanes and floods, while incentivizing smart, sustainable land use planning.

A bill expected to pass Congress in the near-term takes important initial steps in this direction, by amending the Stafford Act to increase spending on pre-disaster mitigation and helping communities adopt and enforce the latest model building codes.⁸

#4 - Reinstate the Federal Flood Risk Management Standard

Congress and the Executive Branch should reinstate the Federal Flood Risk Management Standard, which creates common-sense rules to help protect communities from future floods. Under this standard, projects built by the federal government, or by states and municipalities using federal disaster funds, would have to be built to make them less vulnerable to flooding. One option for meeting this standard is as simple as building most new buildings two feet above the 100-year flood level, and building new critical facilities, such as hospitals, fire stations, evacuation centers, nursing homes and chemical storage facilities, three feet above the 100-year flood level. As last year’s hurricanes Harvey and Irma demonstrated, placing critical facilities and industrial facilities in areas that readily flood can have devastating, long-term impacts. Rebuilding in the same way, and in the same flood-prone areas, will leave too many suffering flood damages all over again.

The Federal Flood Risk Management Standard also requires federal agencies to use natural systems and nature-based approaches where possible when developing alternatives to construction in a floodplain. Limiting development in floodplains gives floodwaters more room to spread out, lowering flood levels both upstream and downstream. It also helps preserve natural processes of infiltration, improving water quality and wildlife habitat.

#5 - Ensure Clean Water Act Safeguards Protect Existing Wetlands, Waterways, and Natural Floodplains

As discussed above, natural infrastructure, such as wetlands, streams, and floodplains, ensures critical natural flood storage and water filtration functions, often providing the first line of defense to communities during extreme storm events. A key tool for ensuring the health of wetlands, waterways, and floodplains is the Clean Water Act, which requires permits for the pollution of waterways and the dredging and filling of wetlands that are under federal jurisdiction. These requirements provide a powerful incentive for developers to avoid, minimize, and mitigate these wetland and floodplain impacts in order to maintain their flood storage and water filtration capacity. To benefit from these protections, wetlands and streams must continue to be recognized as “Waters of the United States” subject to Clean Water Act permitting requirements. Presently, these Clean Water Act safeguards are under attack. Current efforts to drastically roll back Clean Water Act safeguards for many small streams and most wetlands – floodplain and non-floodplain wetlands alike – must be stopped. Otherwise, low-lying communities across the country will be at increased risk of flooding and flood damage as millions more wetland acres are subject to unregulated dredging and filling.

#6 - Ensure Meaningful Public Input and Environmental Review

Rebuilding should rely on meaningful public input and environmental review to improve rebuilding plans and protect natural systems like wetlands and riparian habitat that are vital for community safety and fish and wildlife. Where rebuilding involves federal projects, permits, or funding, reviews under the National Environmental Policy Act help ensure evaluation of the full suite of environmental impacts and public safety risks, leading to safer and healthier communities. This can be done using special procedures that allow federal agencies to quickly address emergency rebuilding needs.

#7 - Improve Stormwater Management

Stormwater management in urban and suburban areas is an increasingly daunting challenge as buildings and impervious surfaces lead to faster runoff and displace the floodwater storage capacity of natural systems. Additionally, increasing sea levels are undermining the ability of gravity-drained systems in coastal areas to carry and discharge municipal stormwater. As rebuilding begins, municipalities have an opportunity to better manage stormwater in ways that reduce future flood risk.

Natural drainage features, such as wetlands and grasslands, often prove to be the most efficient means of managing both the volume and velocity of water during extreme weather events. Where possible, these natural systems should be protected or restored, including by acquiring adjacent areas that can help contain flood flows and double as open-space. Both new and rebuilt structures should incorporate pervious surfaces for walkways and parking areas where possible, and either include natural on-site runoff-containment measures or pay into regional containment approaches. Buildings, whether new or substantially rebuilt, should be constructed with floors higher off the ground, providing increased freeboard above curb-level to minimize damage when floods do occur.

Several EPA and Housing and Urban Development Grant programs – including the Clean Water State Revolving Fund and Community Development Block Grants– provide resources to communities to improve stormwater management, including through green or natural infrastructure solutions, and can be funded at greater levels and targeted as part of a recovery package as well as through annual appropriations.

#8 - Address Dangerous and Outdated Infrastructure

Dams and levees often degrade wildlife habitat and, when poorly maintained, put the public at risk during extreme weather events. Dam and levee failures cause untold suffering to communities and many billions of dollars in property damage. Flooding from Hurricane Florence has already caused 10 dams to breach in the Carolinas, including a dam holding back a large reservoir at a Wilmington, North Carolina power plant that has likely sent coal ash from an adjacent dump into the nearby Cape Fear River. Twenty five dams failed in South Carolina and at least 17 dams failed in North Carolina when Hurricane Matthew made landfall. Another 51 dams in South Carolina failed during a major storm in 2015.⁹

Outdated dam and reservoir operating plans also harm wildlife habitat and put communities at risk particularly during major storms. The Corps of Engineers is responsible for operations at 707 dams that it owns across the country, and for flood control operations at 134 dams constructed or operated by other federal, non-federal or private agencies. Many of these dams are being operated under decades old plans that do not account for current conditions and do not use modern scientific tools, information, or state-of-the-art management approaches that can both ensure effective operation of federal projects *and* protect the environment. Many reservoirs are filling up with sediment and many dams and spillways are in need of major repairs.

Dams and levees that are no longer needed should be removed when possible, and Congress and the Administration should ensure that federal dams and reservoirs are managed to protect communities and the environment.

#9 - Ensure Climate-Resilient Siting and Design of Toxic Pollutant Storage Facilities

It is not uncommon for energy companies to site their coal ash waste storage facilities near waterways. Coal ash contains toxic substances like arsenic, mercury, lead, and selenium, and a coal ash spill not only pollutes waterways with sludge but also with these toxins. The risk of toxic water pollution is compounded by the increasing frequency and intensity of storm events and the inadequacy of existing mapping to forecast this heightened risk.

The risks of coal ash toxic pollution are compounded where energy companies are permitted to leave most of the ash in primitive unlined pits filled with water. Florence flooding caused at least one spill at coal ash landfills in North Carolina, causing more than 2,000 cubic yards of toxic waste to be washed away, enough to fill more than 150 dump trucks.¹⁰ Federal and state water and toxic pollution laws must be more stringently enforced to require energy companies to take the necessary steps to properly site, design, and manage their coal ash waste facilities to ensure that spills to waterways do not occur during storms, floods or hurricanes.

#10 - Ensure Climate-Resilient Siting, Design, and Management of Concentrated Animal Feeding Operations.

Hurricanes like Florence push the limits of safety and sanitation for many agricultural operations. Within the 100-year floodplain of North Carolina's rivers are 62 industrial swine operations housing nearly a quarter million hogs, as well as 166 open pits storing swine feces and urine. Within the floodplain there are also 30 industrial poultry operations which house more than 1.8 million chickens.¹¹ With the heavy rains and flooding from Florence, more than 50 hog lagoon failures have already been reported, with each releasing millions of gallons of untreated manure into surrounding waterways with significant human health and environmental impacts.¹²

These large concentrated animal feeding operations (CAFOs) require Clean Water Act permits where they discharge to "Waters of the United States." Most states have assumed this Clean Water Act permitting responsibility for CAFOs. The Environmental Protection Agency and

state clean water permitting agencies must strengthen and strictly enforce CAFO permitting standards to properly site, design and manage CAFOs to ensure that spills to waterways do not occur during storms, floods or hurricanes. In addition, states must do more to help relocate CAFOs currently located in particularly flood-prone areas.

#11 - Ensure Full Funding for Farm Bill Conservation Programs

Farm bill conservation dollars are being used to help farmers deal with cleanup and to help adopt practices to reduce flood and wind risk for future storms. USDA is currently holding special signups in the affected counties through the Environmental Quality Incentives Program to help farmers and ranchers deal with livestock mortality and carcass disposal as they work to recover their agricultural property from the storm. It is critical that farm bill conservation programs are fully funded in the next farm bill and not cut through the appropriations process.

#12 - Advance Climate and Clean Energy Solutions

While hurricanes have always been a reality in the Atlantic and Gulf of Mexico, climate change is increasing the severity and intensity of those that occur and making them much more destructive and dangerous. This is because of several interacting factors: sea-level rise means storm surge reaches farther inland; warmer ocean and air temperatures translate to more moisture in the air, resulting in more rain during hurricanes; and warmer waters provide more of the energy that powers hurricanes and allows them to strengthen in intensity.

According to a 2018 survey of mayors by the Center for Climate and Energy Solutions, “Ninety-five percent of responding cities report they have experienced climate impacts in the last five years—from flooding, heavier snow and ice storms, wildfires, heat waves and drought, and 57 percent of cities responding are planning for new climate actions in the coming year.”¹³ Aware of the local dangers of unabated climate change, cities and states are leading the way to cut climate-altering pollution, including through carbon pricing, emissions caps, energy efficiency requirements and promotion of low-carbon transportation.

However, more action is still required at the state, national, and international levels to sufficiently and quickly drive down greenhouse gas emissions to safeguard people and wildlife from the most extreme impacts. Key actions should include:

- Enact policies that aggressively reduce greenhouse gas emissions, including (but not limited to) carbon pricing and other market mechanisms that spur energy market signals toward cleaner energy and economic choices;

- Adopt land management practices for forests, wetlands, and grasslands that allow these systems to naturally sequester carbon from greenhouse gas emissions, and provide community protections from extreme storms;
- Invest robustly in climate science and monitoring, renewable energy research and development, energy storage, and clean transportation programs;
- In the absence of a price on carbon, continue to support renewable energy tax credits that help level the playing field with subsidized fossil fuels, and improve transmission policies to ready the nation’s power grid to accommodate more renewable sources; and
- Ensure the country continues to develop its vast offshore wind resource by supporting federal permitting processes that are efficient, environmentally responsible, and wildlife conscious.

Additional Resources

For more information from the National Wildlife Federation on the above policy priorities, please visit:

- [Natural Defenses in Action: Harnessing Nature to Protect Our Communities](#)
- [Natural Defenses from Hurricanes and Floods: Protecting America’s Communities and Ecosystems in an Era of Extreme Weather](#)
- [Green Works for Climate Resilience: A Guide to Community Planning for Climate Change](#)

Other National Wildlife Federation reports and resources can be found at:

- <https://www.nwf.org/Our-Work/Environmental-Threats/Climate-Change/Climate-Smart-Conservation/Adaptation-Reports>

¹https://www.washingtonpost.com/energy-environment/2018/09/21/dam-breach-reported-former-nc-coal-plant-raising-fears-that-toxic-coal-ash-may-pollute-cape-fear-river/?utm_term=.4dc4c498191f

² <https://www.nytimes.com/interactive/2018/09/13/climate/hurricane-florence-environmental-hazards.html>

³ Narayan, S., Beck, M.B., Wilson, P., et al., The Value of Coastal Wetlands for Flood Damage Reduction in the Northeastern USA. *Scientific Reports* 7, Article number 9463 (2017), doi:10.1038/s41598-017-09269-z (available at <https://www.nature.com/articles/s41598-017-09269-z>).

⁴ EPA, Wetlands: Protecting Life and Property from Flooding, May 2006 at <https://www.epa.gov/sites/production/files/2016-02/documents/flooding.pdf>

⁵ <http://iopscience.iop.org/article/10.1088/1748-9326/aaac65/pdf>

⁶<https://www.apnews.com/ec380b921573424fa3fda92514c416e1/Florence-likely-to-expose-gaps-in-flood-insurance>

⁷ <https://www.nibs.org/news/381874/National-Institute-of-Building-Sciences-Issues-New-Report-on-the-Value-of-Mitigation.htm>

⁸ The noted provisions are contained within the bill reauthorizing the Federal Aviation Administration, and were originally introduced as the Disaster Recovery Reform Act (HR 4460). See: https://transportation.house.gov/uploadedfiles/drra_packet_2018.pdf

⁹ <https://www.eenews.net/greenwire/2018/09/19/stories/1060098359>

<https://www.nbcchicago.com/news/national-international/Hurricane-Florence-Flooding-Dam-Evacuees-Carolinas-493922571.html>

¹⁰ https://www.washingtonpost.com/energy-environment/2018/09/21/dam-breach-reported-former-nc-coal-plant-raising-fears-that-toxic-coal-ash-may-pollute-cape-fear-river/?utm_term=.4dc4c498191f

¹¹ <https://www.ewg.org/research/exposing-fields-filth#.W6felOhKhPY>

¹² <https://www.npr.org/2018/09/22/650698240/hurricane-s-aftermath-floods-hog-lagoons-in-north-carolina>

¹³ Center for Climate and Energy Solutions. Mayors Leading the Way on Climate--2018. <https://www.c2es.org/document/mayors-leading-the-way-on-climate-2018/>