

# Coastal Flood Resilience Project

## WHITE PAPER

### Addressing Coastal Flood Resilience In Infrastructure Legislation

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The *Coastal Flood Resilience Project* is a coalition of organizations working for stronger programs to prepare for coastal storm flooding and rising sea level in the United States. This *White Paper* proposes measures to prepare for more severe coastal storms and rising sea level that should be included in legislation to rebuild the nation's infrastructure.

In summary, the measures recommended in this *White Paper* include:

- 1. Build on Higher Ground:** Federal infrastructure projects should be sited on high ground away from the risks of storm surge and rising sea levels and those investments that must be in coastal flood risk areas should be elevated to reduce future losses.
- 2. Support State, Community, and Federally Approved Plans for Storm and Sea Level Rise Preparedness:** The Federal government needs to help states and communities review options for coastal flood preparedness (i.e., building sea walls, elevating structures, and relocation).
- 3. Make Critical Infrastructure Safe from Coastal Floods:** Investments in critical infrastructure, including transportation, energy, water, and defense assets, need to recognize storm surge and sea level rise risks and be well coordinated with state and local flood preparedness plans.
- 4. Protect and Expand Coastal Natural Infrastructure:** Federal agencies should develop plans needed to assure that new investments in infrastructure projects do not degrade existing natural infrastructure, such as wetlands and beaches, that provide essential buffers from storm surge and rising seas and should encourage practices for expanding natural infrastructure, such as living shorelines.
- 5. Address Social Justice:** New infrastructure investments along the nation's coasts should be the result of a process that recognizes the interests of low income and minority communities and avoids simplistic cost-benefit analysis methods that undervalue these communities.

- 6. Focus on High-Risk Places:** Infrastructure in places such as the Northeast Corridor, Gulf of Mexico, and South Florida is at very high risk and special attention should be given to new investments in these areas to assure that storm surge and sea level rise risks are addressed.

The risks posed to the nation's coasts from more severe hurricanes and rising sea level are described below and recommendations for measures to address this risk in infrastructure legislation are described in greater detail.

### **Problem Statement**

Coastal storms are a major risk to life and property and a warming climate is causing an increase in the number of the strongest storms. These storms bring more extensive coastal flooding, higher storm surges, and increased rainfall. Research indicates that intense storms are [slowing down and thus](#) raining on a given place for longer. Even as storms move more slowly, they [intensifying more rapidly](#), making their landfall harder to predict and more likely to result in major damage and loss of life.

Sea level rise around the globe is likely to be [3 to 4 feet by 2100](#) but may be as high as 6 to 8 feet if efforts to control emissions of greenhouse gases falter. Sea level rise along parts of the American coast will be as much as [30 percent greater](#) than the global average due to factors such as ocean currents and land subsidence. In the short term, this will result in more [“sunny day flooding”](#) during high tides and larger surges and greater flooding during storms. In the long term, sea level rise will lead to permanent inundation of significant portions of the American coast.

More severe storms and rising seas will bring economic, environmental, and social disruption to coastal communities on an unprecedented scale. Prompt and thoughtful preparation for these impacts can save lives and dramatically reduce costs. Millions of people and [hundreds of coastal communities](#) face far more extensive flooding than they currently experience. The combination of more severe storms and rising seas is projected to result in potential losses of coastal property running into [trillions of dollars](#). These loss estimates, however, are based on the existing population along the coast which is increasing rapidly. Population living right along the coast (i.e., at elevations of 33 feet and lower) is expected to [double by 2060](#).

In addition, low income and minority communities are [in harm's way](#). These communities are [disproportionately affected](#) by climate change including sea level rise, flooding, and extreme coastal weather events, and often lack the resources to respond to these risks.

Storm and sea level rise risks to critical coastal infrastructure, such as transportation, water, and energy, [are well documented](#). [Thousands of miles of roads](#), railroads, ports, and airports are at risk. [Sewage treatment plants](#) and drinking water treatment facilities will be inundated.

[Energy facilities](#), especially along the [Gulf coast](#), are endangered. [Major defense installations](#), such as [Naval Station Norfolk](#), need to prepare for more severe storms and rising seas.

Coastal beaches and wetlands have already been harmed by coastal storms and rising seas and these losses will increase in the future. Some researchers estimate loss of [30 percent of Gulf of Mexico wetlands](#) by 2050 and over [60 percent of California beaches](#) by 2100. Some of these

ecosystems may be able to migrate to upland areas if geography is favorable and if the needs of communities and infrastructure do not take priority. The fortunes of [coastal tourism](#) and [fishing sectors](#) are tied to the health of these ecosystems.

## **OVERARCHING GOALS**

Congress should approach drafting of legislation to rebuild the nation's infrastructure with several overarching goals in mind with respect to coastal flood resilience.

First, unlike in years past, today we understand that a changing climate will result in more severe storms and steadily rising sea levels. Infrastructure legislation should steer the full range of new investments away from sites that are at risk of flooding from storm surges and eventually permanent inundation from rising seas. A major national commitment to new infrastructure will be tragically undermined if new assets are soon damaged or lost to storm surges or made unusable by rising seas.

Second, the President has proposed that a significant part of a new infrastructure investment address the need for existing coastal communities, infrastructure assets, and ecosystems to build resilience to coastal storm surges and rising seas. This is a timely and valuable investment in adapting to the realities of a changing climate and has the potential to significantly reduce loss of life, costs of flood damages, and Federal disaster relief spending. Infrastructure legislation should deliver the resources needed to improve coastal resilience but should direct investments to implement plans that recognize long-term flood and sea level rise risks and have considered a range of response options, including relocation of assets, elevation of existing infrastructure, and nature-based infrastructure in addition to protection structures such as sea walls and related coastal armoring measures.

Finally, the President has proposed that new infrastructure investment recognize the interests of low income and minority communities. Investments in coastal flood resilience are especially vulnerable to perpetuating social inequities that already exist in coastal areas. For example, traditional cost-benefit analysis might justify protecting high value homes but not homes with lower values. Investments in buyouts of property at risk of storm surge and rising seas might favor wealthy owners. Infrastructure legislation should direct federal agencies be alert to social

justice consequences of their investments and report to Congress on this aspect of their investments.

## **SPECIFIC RECOMMENDATIONS**

With the overarching goals described above in mind, more specific recommendations for measures to prepare for more severe coastal storms and rising sea level that should be included in legislation to rebuild the nation's infrastructure are provided below.

- 1. Build on Higher Ground:** Federal infrastructure legislation should steer new investments in the full range of infrastructure types away for sites at risk of coastal storm surges and rising seas.

A critical foundation for implementing this recommendation is **new investment in mapping to identify coastal areas at risk of storm surge and rising seas**. In addition to providing for updating flood maps developed by the Federal Emergency Management Agency for the National Flood Insurance Program, infrastructure legislation should fund work by the National Oceanic and Atmospheric Administration to develop maps identifying areas subject to storm surge and future sea level rise.

The Federal Flood Risk Management Standard (FFRMS), created by the Federal Emergency Management Agency and recently [reinstated by President Biden](#), provides that Federal investments are to avoid sites that are at risk of flooding whenever possible. In cases where an asset must be in a flood risk area, it is to be elevated an additional three feet above the base flood elevation if it is critical infrastructure and two feet above base flood elevation if not critical infrastructure. **The core elements of the FFRMS should be enacted as part of new infrastructure legislation.**

The FFRMS is limited to direct federal investment. Since 1982, the Coastal Barrier Resources Act (CBRA) has prevented direct federal investment or other financial support, such as federal flood insurance, for new development on sensitive coastal lands. By discouraging investment in risky coastal places, CBRA is [estimated to have saved](#) taxpayers an astonishing \$1.3 billion in disaster relief and related costs from 1983 to 2010. In practice, CBRA encourages new development on higher ground. **New infrastructure legislation should amend CBRA to expand the geographic scope of sensitive coastal areas where federal funding and financial support is prohibited**, including adjusting the existing development density standard to allow adding to CBRA areas that exceed the current standard.

- 2. Support State, Community, and Federally Approved Plans for Storm and Sea Level Rise Preparedness:** A critical first step toward coastal flood resilience is significantly

expanded federal support for states to assist local governments in development of plans to adapt to more severe storms and rising sea level. These plans need to be based on the most recent science and include review of affordable options including relocation, elevation of structures, and building seawalls and related structures. Without these plans, there is a risk of significant waste of money on measures that are quickly overcome by more severe storm flooding and rising seas. Plans such as those developed collaboratively with states, communities, NGOs, and the private sector under the National Estuary Program can significantly benefit these efforts.

**Infrastructure legislation should provide the National Oceanic and Atmospheric Administration (NOAA) with significantly increased funds to support grants to states to support coastal flood planning.** NOAA should provide grant guidance on key topics including adaptation options, affordability and prudent use of tax dollars, plan approval, and social justice. Federal funding for implementing coastal flood resilience projects should only be available for projects in states with approved coastal flood resilience plans. Programs like FEMA's Building Resilient Infrastructure and Communities (BRIC) program can play an important role supporting this work.

The President has proposed significant funding to support implementation of coastal resilience measures. This funding should be linked to approved plans and be available to support the full range of adaptation options, rather than focused on a single strategy such as building protection structures. A key factor allowing for implementation of strategies to move assets to higher ground is funding for buyout of at-risk property. **Infrastructure legislation should increase funding for buyout programs and streamline the buyout process.**

In addition, the President's infrastructure proposal refers to relocation of coastal tribal communities at risk of flooding and this **community relocation assistance should be available for all coastal communities at risk on a priority basis.**

- 3. Make Critical Infrastructure Safe from Coastal Floods:** Investments in critical infrastructure, including transportation, energy, water, and defense assets, should be sited on high ground, or elevated, using the project specific FFRMS process. In addition, Federal agencies responsible for nationwide performance of key infrastructure systems should develop long-term plans to protect or relocate existing assets and to focus new investments on high ground away from storm surge and sea level rise risks. Federal agencies should also clarify policies to make disinvesting in infrastructure that is at high flood risk easier.

Specifically, **infrastructure legislation should direct the following agencies to develop coastal flood resilience plans for the following infrastructure sectors:**

- Department of Defense: military and shipbuilding facilities;
- Environmental Protection Agency: drinking water and wastewater facilities, including sewer lines, septic systems, and outfalls;
- Department of Transportation: road, rail, maritime, and aviation assets; and
- Department of Energy: energy production, storage, and transport facilities.

Federal infrastructure investments in new facilities in these sectors should be consistent with these plans and the plans should be coordinated with coastal flood resilience plans for states and communities and coastal ecosystem protection.

- 4. Protect and Expand Coastal Natural Infrastructure:** Almost one third of the U.S. population lives in coastal areas and a multi-trillion-dollar national investment in diverse infrastructure types has the potential to build over and reduce the existing “natural infrastructure,” such as coastal wetlands, marshes, mangroves, and beaches, that provide significant coastal flood and storm surge resilience benefits. **Infrastructure legislation should direct federal agencies supporting new infrastructure projects to recognize the benefits of natural infrastructure for coastal flood resilience and protect and preserve these ecosystems.**

New conventional infrastructure projects also may be located in places that would otherwise provide space for the inland migration of these ecosystems as sea level rises. Unfortunately, although the location of existing coastal ecosystems is known, the feasibility of inland migration of these ecosystems has not been evaluated for much of the coast. **Infrastructure legislation should direct federal natural resource agencies, such as the Department of Interior and NOAA, to identify coastal ecosystem migration corridors and direct all agencies to avoid committing the spaces these ecosystems need to move to as sea level rises to uses that would prevent that migration.**

**Finally, infrastructure legislation should take advantage of the important opportunity to strengthen the defenses to coastal flooding that natural infrastructure now provides by making a significant new investment to expand that natural infrastructure.** For example, infrastructure investments can be used to remove tidal restrictions that degrade existing coastal wetlands. The Environmental Protection Agency [found](#) over 1,700 tidal restrictions degrading over 70,000 acres of coastal

wetlands. Federal agencies could also give priority in investment and regulatory decisions to practices such as “living shorelines” that provide both flood resilience and ecosystem benefits over conventional coastal armoring such as bulkheads and seawalls. Accounting for these co benefits, including carbon sequestration, should be incorporated into assessment of alternatives. Expanded funding for the existing programs like the National Coastal Resilience Fund managed by the National Fish and Wildlife Foundation and the National Estuary Program managed by the Environmental Protection Agency should be part of this major new investment.

- 5. Address Social Justice:** Plans for reducing flood risks for coastal communities, infrastructure, and ecosystems should all recognize the interests of low income and minority communities. In addition, decision tools, such as cost-benefit analysis, can lead to investment decisions that favor high value property and wealthy individuals while undervaluing low income and minority communities. The implementation of buyout programs poses difficult equity choices with respect to who is eligible for a buyout and the amount of a buyout. Past decisions on siting of polluting facilities or waste management facilities have caused low income and minority communities to suffer disproportionate environmental impacts. The development of tools, such as FEMA’s [RAPT](#) and EPA’s SoVI, provide useful input to inform decision-making on social justice.

**Infrastructure legislation should address social justice throughout but also include specific new direction to:**

- direct appropriate the Office of Management and Budget to work with other federal agencies to revise federal standards for cost-benefit analysis to eliminate methods that undervalue low income and minority communities;
  - assure that expanded buyout programs are implemented fairly; and
  - assure that decisions to protect or relocate pollution facilities or water disposal facilities avoid past impacts on low income and minority communities and avoid these impacts in siting of new facilities.
- 6. Focus on High-Risk Places:** There are places around the country where geography makes storm surges and rising seas a special risk. Some of these places also are home to infrastructure assets of national importance. For example:
- Norfolk Naval Station in Norfolk, Virginia is widely considered the single most essential facility for national defense;

- The Gulf Coast is home to a significant percentage of domestic energy production and refining infrastructure;
- The Northeast transportation corridor through northern New Jersey is essential to the movement of goods along the east coast; and
- Southeast Florida is region of the country most vulnerable to coastal flooding and is also home to some ten million people.

**Infrastructure legislation should recognize the existential threat that coastal storm surge and rising seas pose for high-risk places and focus funding as needed to plan and implement coastal flood resilience strategies**, including protection of relocation of existing assets and shifting of new investments to sites on higher ground.

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The *Coastal Flood Resilience Project* is a coalition of organizations working for stronger programs to prepare for coastal storm flooding and rising sea level in the United States. The views expressed in this *White Paper* are those of the contributors and do not represent the views or endorsements of their organizations.

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