


BUILDING RESILIENCE WITH NATURE

Policy Recommendations to Reduce Climate Threats
to Communities and Wildlife

Aerial view of the Donal C. O'Brien, Jr. Sanctuary and Audubon Center at Pine Island in Corolla, North Carolina.

A photograph of a bay with a city skyline in the background and a bird in flight in the foreground. The sky is blue with some clouds, and the water is calm. The city skyline is visible in the distance, and a single bird is flying in the foreground.

Mallard at Richardson Bay
Audubon Center and Sanctuary
near San Francisco, California.

2020 brought us new and familiar examples of the deadly consequences of our failure to address climate risks. Record-breaking hurricanes, wildfire, and drought—on top of the COVID-19 pandemic—battered communities across the nation.¹ As we begin to rebuild and recover from these compounding crises, Congress and the Administration have important decisions to make—not only to invest in our nation’s infrastructure, but also to restore and conserve our **natural infrastructure**.

Just like roads and bridges, our natural landscapes—wetlands, beaches, and barrier islands—provide critical services to our communities. They serve as safe recreational spaces, enhance our resilience to climate threats like increasing flooding and drought, and improve habitats for birds and other wildlife. Our elected leaders have a historic opportunity to harness America’s immense natural wealth in efforts to support the economy while also addressing both the causes and consequences of climate change.

*Hurricane Sandy damaged beach dunes
in Holgate, New Jersey in 2012.*



The Climate Challenge

Climate change is already affecting our communities and ecosystems. Rising seas, more intense and frequent storms, heavier rainfall events, and more extreme droughts are increasingly impacting people, property, and habitats. More than 41 million Americans face rising flood risks and \$1 trillion worth of properties are threatened by sea-level rise alone.



These threats along with more intense storms are increasing risks for the nearly 40 percent of people in the U.S. who live along our coasts. Coastal communities produce 40 percent of total jobs and contribute more than 46 percent to the US gross domestic product.

Climate change also threatens habitats that are vital to the survival of birds, fish, and other wildlife. With human development and changing environmental conditions shrinking bird habitats, the U.S. has lost 3 billion birds since the 1970s, with a 70-percent decline in sea- and shorebird populations over the last 50 years.^{3,4}

The burdens of climate change are also not affecting all communities equally. Communities on the frontlines of climate change—primarily lower-income communities, communities of color, and Tribal Nations and Indigenous communities—are being hit first and worst by its impacts.

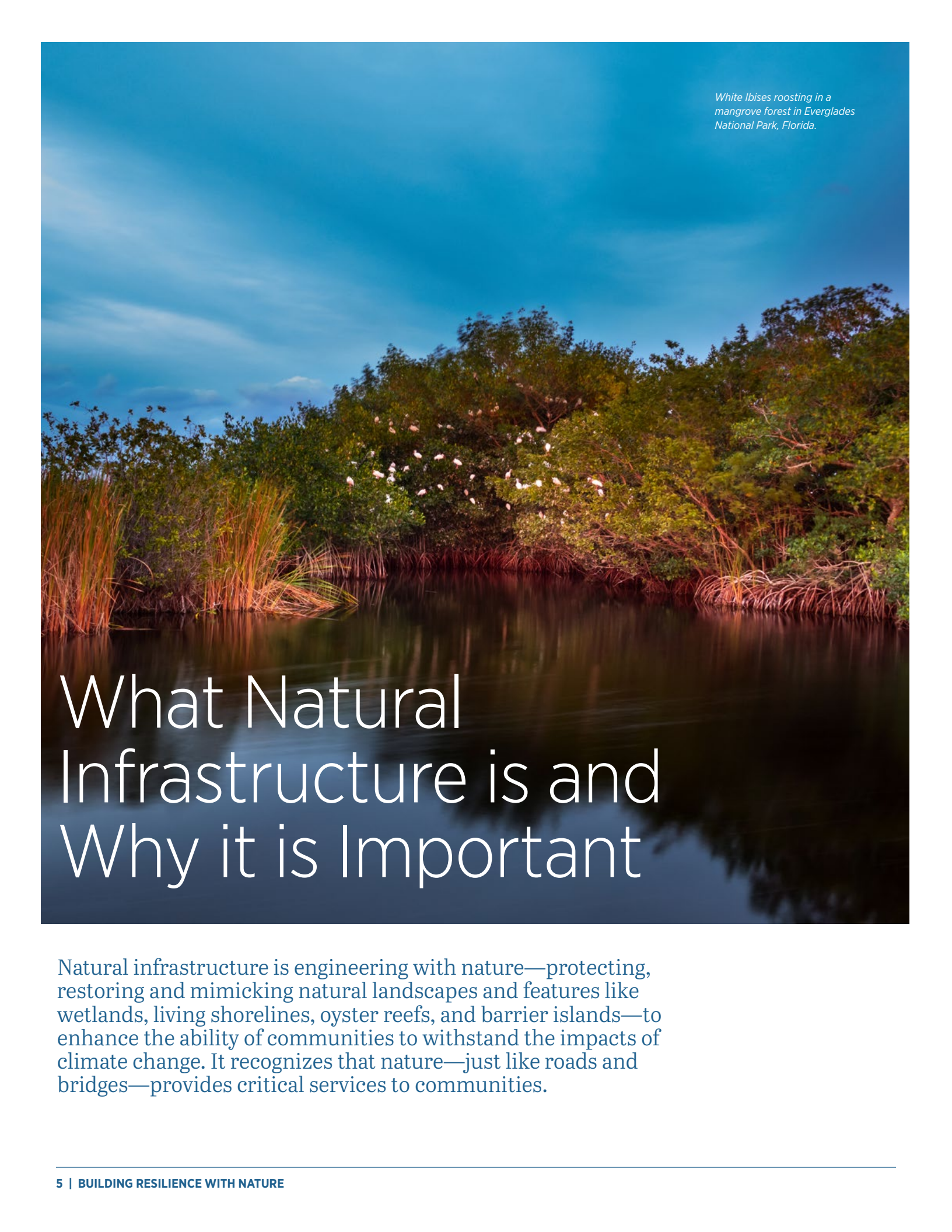
A legacy of racist policies like redlining and forced relocation have increased climate risks for these communities. These policies left communities of color in more flood-prone areas and near polluting facilities and starved communities of needed investments to reduce risks, which exacerbates harms when disasters strike. If these injustices are not intentionally addressed in federal programs and policies, climate change will increasingly act as a threat multiplier, exacerbating existing social, racial, and

economic disparities.

The way communities choose to adapt to these threats could further exacerbate these harms. If we choose to “wall in” our communities in an effort to keep flood waters at bay, this will erode and drown the coastal and riverine ecosystems that provide natural flood protections and other ecological services that are essential to the well-being of both people and wildlife.

Gray infrastructure—like sea walls and levees—while beneficial to some communities in the short term, will be necessary in some places to protect critical infrastructure and already built out communities, but these types of solutions will also become less protective over time as sea levels rise and rainfall patterns change. Gray infrastructure also pushes flood risk downstream, and may not be financially feasible options for all communities. Harnessing the power of nature provides an alternative for implementing resilience solutions that will grow and build over time, while delivering countless other benefits for both communities as well as birds and other wildlife.

Audubon staff walk along a flooded road during high tide at Blackwater National Wildlife Refuge in Cambridge, Maryland.



White Ibises roosting in a mangrove forest in Everglades National Park, Florida.

What Natural Infrastructure is and Why it is Important

Natural infrastructure is engineering with nature—protecting, restoring and mimicking natural landscapes and features like wetlands, living shorelines, oyster reefs, and barrier islands—to enhance the ability of communities to withstand the impacts of climate change. It recognizes that nature—just like roads and bridges—provides critical services to communities.

ENHANCES RESILIENCE

Restoring coastal wetlands and natural floodplains provides flood buffers against storms and reduces stormwater flooding from heavy rainfall events. During Hurricane Sandy, coastal wetlands prevented more than \$625 million in damages by providing natural storm surge buffers.⁵ Wetlands and floodplains also help to naturally store water and recharge groundwater aquifers, reducing drought risks in more arid states. And these types of solutions are more adaptable and durable than gray infrastructure, because they naturally adapt to changing environmental conditions.

IMPROVES THE ENVIRONMENT

Natural infrastructure provides habitats that birds, fish, and other wildlife depend on for feeding, nesting, and breeding. Wetlands and seagrasses naturally capture and store carbon pollution. Saltmarshes and reefs serve as nurseries for economically important fisheries. Natural landscapes also filter pollutants from the air and water and reduce risks of heat waves in urbanized areas.

BUILDS ECONOMIC OPPORTUNITIES

Restoring natural lands and waters increases recreational opportunities and access to green space, improves public health, supports fisheries, creates jobs, and increases property values—all delivering significant economic returns. Ocean-based tourism and recreation alone contribute approximately \$124 billion to the U.S. economy each year and employ almost 2.4 million Americans.⁶ Natural infrastructure can also be more cost-effective than gray infrastructure—for every dollar invested, \$7 or more in flood-reduction benefits are returned.⁷

A Great Blue Heron carrying nest material.





Sand is pumped onto Queen Bess Island to restore 37 acres of prime bird nesting habitat for Brown Pelicans and other coastal birds in Louisiana.

How Congress Can Advance Nature-based Approaches to Climate Change

The 116th Congress passed the landmark bipartisan Water Resource Development Act of 2020, which creates important incentives for using nature-based approaches to address flood and drought risks. In the 117th Congress, lawmakers should build upon this progress and drive much-needed funding to programs that will further support efforts to preserve and restore vital landscapes and watersheds, remove federal barriers that hinder the use of nature-based solutions, and create incentives that promote climate-smart land-use practices that preserve and protect our natural assets.



Sora in wetlands in the Colorado River Delta region.

INVEST IN NATURE-BASED SOLUTIONS

As Congress develops strategies to spur economic recovery from the COVID-19 pandemic, investments in infrastructure—including natural infrastructure—present a unique opportunity to make much-needed upgrades to our infrastructure systems while also creating high-paying jobs. The National Oceanic and Atmospheric Administration (NOAA) estimates that for every \$1 million spent on habitat restoration, 15 to 30 high-paying jobs are created.⁸

Restoration and Conservation Programs

By directing funding to NOAA and increasing funding for ecosystem restoration, through programs like the National Coastal Resilience Fund and Wetland Reserve Easement, Congress can support efforts to build natural flood buffers for communities

while enhancing recreational amenities and creating jobs in communities hardest hit by the pandemic.

Surface Transportation

Congress should also ensure that funding for surface transportation promotes nature-based approaches for enhancing resilience through creation of a new PROTECT program, which was included in the America's Transportation Infrastructure Act of 2019 and unanimously passed out of the Senate Environment and Public Works Committee last Congress.⁹

Water Infrastructure

Investments in water infrastructure through State Revolving Funds, with 15 percent set aside for a “green project reserve,” have encouraged use of nature-based approaches for enhancing the resilience of water infrastructure systems, reducing stormwater pollution, improving water quality, and addressing water scarcity.

Disaster Recovery and Hazard Mitigation

Congress should also promote and set aside funds specifically to support natural infrastructure through disaster recovery and hazard mitigation programs, including programs administered by the Federal Emergency Management Agency (FEMA) and the U.S. Department of Housing and Urban Development (HUD). Congress should direct FEMA to set aside a portion of hazard mitigation funding, administered through the Building Resilient Infrastructure and Communities program, for nature-based mitigation projects or call on FEMA to administer a natural infrastructure grant program in partnership with the National Fish and Wildlife Foundation. Additionally, Congress should permanently authorize the Community Development Block Grant Disaster Recovery program administered by HUD. This would not only streamline delivery of disaster aid to low-income com-

munities, but will also encourage climate-resilient rebuilding after disasters. Congress should encourage natural infrastructure approaches for addressing future risks and enable HUD to set aside a portion of its funds to support pre-disaster mitigation in lower-income communities, similar to what was done after Hurricane Florence in 2018.

Frontline Communities

In allocating any funding to support resilience, Congress should ensure that federal programs and agencies prioritize investments in and stakeholder input from frontline communities that have been hardest hit by the pandemic and that face the greatest threats from climate impacts.

ENCOURAGE AND REWARD CLIMATE-SMART LAND-USE PRACTICES

Congress should also create incentives to encourage state and local governments to update land-use practices to reduce threats from climate impacts.

Coastal Barrier Resources Act

Congress should bolster and expand protections offered by the Coastal Barrier Resources Act (CBRA) to include areas affected by Hurricane Sandy, the Pacific Coast, and to protect undeveloped upland areas that can serve as migration corridors to provide space for ecosystems to migrate upland to naturally adapt to rising seas. CBRA provides critical protections for vulnerable coastal areas by limiting federal investments in undeveloped parts of the coast. It has saved the U.S. taxpayer nearly \$10 billion, with hundreds of billions more in savings projected over the coming decades in disaster response costs alone.^{10, 11}

National Flood Insurance Program

As mounting flood losses continue to threaten the solvency of the National Flood Insurance Program (NFIP), Congress has an opportunity to enact important reforms to encourage climate-smart land-use practices in communities. Congress should adopt NFIP reform legislation calling

on FEMA to update floodplain maps to account for increasing flood risks due to climate change, update land-use standards to discourage building in flood-prone areas and to preserve natural flood buffers, prioritize nature-based flood mitigation measures, ensure insurance affordability for low-income homeowners, and streamline buyout funding for homeowners who want to relocate out of harm's way, while allowing for beneficial floodplain restoration on bought out lands.

RECOGNIZE THE ROLE OF BLUE CARBON IN ADDRESSING THE CLIMATE CRISIS

Congress can also support efforts to protect, restore, and enhance important coastal ecosystems—like marshes, mangroves, and sea-grasses—as a strategy for reducing the carbon pollution that is causing the planet to warm. One hundred acres of coastal marsh can store carbon pollution equivalent to taking 488 cars off the road for a year, and coastal ecosystems capture and store carbon pollution at up to four times the rate of forests.¹²

Protect and Restore Blue Carbon

Legislation like the **Blue Carbon for Our Planet Act** would support research to improve our understanding of the potential for coastal ecosystems to serve as carbon sinks and would fund efforts to protect and restore blue carbon resources as part of U.S. efforts to meet carbon reduction goals.



Building an oyster reef with bagged oyster shells and reef balls at Shellbed Island in the Lower Cape Fear River, North Carolina.

A southwest wind causes the Currituck Sound to flood the docks of the Donal C. O'Brien, Jr. Sanctuary and Audubon Center at Pine Island in Corolla, North Carolina.



How the Biden-Harris Administration Can Advance Nature-based Approaches to Climate Change

Federal agencies have tools they can use to advance natural infrastructure solutions by prioritizing nature-based approaches and resilience investments in frontline communities through grant programs, removing federal barriers that discourage use of nature-based solutions, and creating better incentives to discourage development in vulnerable areas.

DIRECT FEDERAL AGENCIES TO INVEST IN CLIMATE RESILIENCE

Stimulus Funding

As Congress debates stimulus funding to support economic recovery from the COVID-19 pandemic, the Administration should seek robust funding for programs that can help communities restore ecosystems and enhance the resilience of infrastructure systems—including through natural infrastructure approaches. This will not only deliver important environmental and climate resilience benefits in communities, it will also help to create high-paying jobs.

Black-bellied Plover, Lea-Hutaff Island, North Carolina

Water Resources Development Act

The 116th Congress passed the landmark bipartisan Water Resource Development Act of 2020, which includes important provisions encouraging the Army Corps of Engineers to use nature-based approaches for addressing climate risks and to beneficially use dredged materials to support environmental restoration projects. The Administration should ensure that the Corps uses this new authority to consider and advance natural infrastructure solutions when planning and constructing new projects, repairing damaged infrastructure, and operating and maintaining existing projects. The Beneficial Use Pilot Program should be fully implemented and the Corps should work to ensure that all clean dredged sediments are deployed to beneficial restoration projects.

Disaster Recovery and Hazard Mitigation

Disaster recovery and hazard mitigation programs administered by FEMA and HUD present opportunities for investing in innovative nature-based solutions that can reduce climate risks in communities. FEMA should set aside funding or partner with the National Fish and Wildlife Foundation to specifically support projects that can demonstrate the effectiveness of natural infrastructure approaches through the Building Resilient Infrastructure and Communities program. The Administration should also seek legislation to permanently authorize Community Development Block Grant Disaster Recovery program at HUD and to enable HUD to set aside funding for mitigation in lower-income communities and codify current practices of promoting nature-based approaches and climate resilient rebuilding.



Two species of saltmarsh grasses (*Spartina patens* and *Spartina alterniflora*) are compared at Blackwater National Wildlife Refuge in Cambridge, Maryland.



Surface Transportation

The Administration should encourage Congress to adopt legislation reauthorizing surface transportation programs and including provisions promoting the use of nature-based solutions for enhancing the resilience of transportation systems, including by authorizing funding for natural infrastructure in the Surface Transportation Block Grant program and by creating a new discretionary grant program to support climate resilience investments in the transportation sector, like the PROTECT program that was included in the America's Transportation Infrastructure Act of 2019 and unanimously passed out of the Senate Environment and Public Works Committee last Congress.¹³

Frontline Communities

Across all federal grant programs, federal agencies should be encouraged to support community-led efforts to develop and design resilience projects and to prioritize funding for projects that benefit frontline communities that face the greatest threats from climate impacts. The Administration should

seek waivers of non-federal match requirements for economically distressed communities to ensure that under-resourced communities have access to the funding they need to reduce risk from climate threats.

Coordinated Funding

The Administration should encourage agencies administering programs that support environmental conservation and restoration to coordinate, align, and reduce administrative barriers to deploying funding to innovative, large-scale natural infrastructure projects, including by funding design, feasibility and environmental analyses, and permitting to develop a pipeline of “shovel-ready” natural infrastructure projects that can be implemented as funding becomes available.

Monitoring

Consistent protocols should be developed and funding should be provided to support post-implementation monitoring of resilience projects across funding programs, and agencies should be required to report on the

effectiveness of projects in terms of risk reduction, environmental improvements, and social benefits, such as job creation, so that we are learning from our work and improving our practices.

Technical Assistance

Federal agencies should also be encouraged to coordinate and provide technical assistance and guidance to help communities assess climate risks and develop and fund resilience projects, including innovative, multi-benefit solutions like the use of natural infrastructure, prioritizing under-resourced communities.

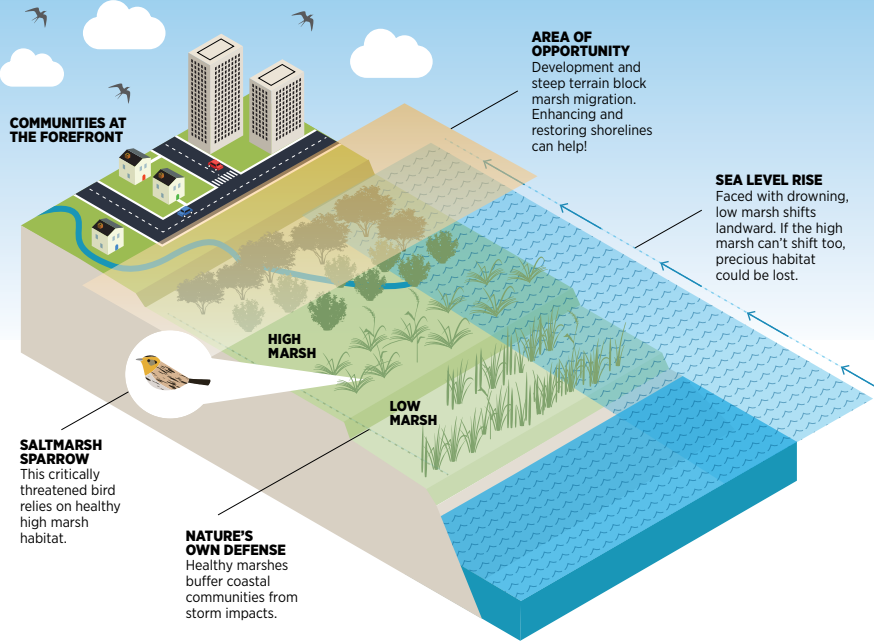
REMOVE FEDERAL LAW BARRIERS TO NATURAL INFRASTRUCTURE

Benefit-Cost Analysis

The Administration should update and align methodologies for evaluating the cost effectiveness of federal investments, including discount rates, to better account for future climate risks and the social and environmental benefits and costs of projects. These updates should guide reforms to FEMA's methodologies for conducting benefit-cost analyses and updates to the Corps' Principles, Requirements, and Guidelines and Federal Standards governing beneficial use of dredged materials. The Office of Management and Budget should revise discount rates to account for the benefits of nature-based approaches that grow and build over time, which is not reflected in current agency practice requiring application of a 7-percent discount rate.

MARSH MIGRATION

Our vital coastal ecosystems benefit birds and serve as the first line of defense for communities facing stronger, more frequent storms. Unfortunately, our coastlines and their associated marshes are being squeezed by rising sea levels and human development. They must be protected, enhanced, and/or given more space to shift onto formerly dry land—a concept called “marsh migration”—to stay healthy. Where marshes can’t migrate, habitat will be lost, water quality will decline, and communities will face more frequent flooding.



BIRDS
80% decline

Over the last 15 years, Saltmarsh Sparrow populations have declined by an estimated 80%. If we don't act, they face extinction.



HABITAT
up to 48% lost

Across the Long Island Sound area, nearly half of tidal wetlands have been lost to human activity. Sea level rise poses a new threat.



MONEY
\$23.2B in storm protection

The National Oceanic and Atmospheric Administration estimates that marshes provide \$23.2B in storm protection annually. Healthy ecosystems are the first and best line of defense.



PROMOTE CLIMATE SMART LAND-USE PRACTICES

Coastal Barrier Resources Act

The Administration should seek to bolster and expand protections offered by the CBRA, which protects sensitive coastal ecosystems and saves taxpayer dollars by limiting federal investments that would encourage development of vulnerable

coastal areas. The Administration should reverse Trump-era rules, which enabled harmful sand mining in the CBRA system to nourish beaches outside the System. Maps of areas affected by Hurricane Sandy should be completed and quickly brought to Congress for adoption to expand the CBRA system by a quarter million acres. The Administration should also seek legislation to modernize CBRA by expanding the System to the Pacific Coast and to

undeveloped uplands that can serve as migration corridors to enable coastal ecosystems to adapt to rising seas.

Flood Standards

Federal agencies should be encouraged to quickly and fully implement President Biden's Executive Order reinstating the Federal Flood Risk Management Standards. In doing so, agencies should bolster¹⁴ and reinforce the Standards to require federal agencies to look beyond simply elevating structures to account for increased flood risks, but also avoid investments that would promote development and redevelopment in areas that will become increasingly flood-prone based upon climate projections. This will ensure that federal investments are not promoting unwise development in risky areas, while also helping to preserve ecologically valuable floodplains.

National Flood Insurance Program

To address mounting flood losses and the rising debt of NFIP, FEMA should update land-use standards to discourage building in areas with increasing flood risk, encourage natural infrastructure approaches across all of its flood mitigation programs, and increase incentives offered by the Community Rating System and other programs that encourage communities to promote voluntary floodplain buyouts, restore natural floodplains, and adopt proactive programs to support flood resilience investments, like the Resilience Revolving Fund recently created by the South Carolina legislature.

Least Tern.



Examples of Audubon's Natural Infrastructure Projects

Audubon is working with communities around the country to deploy natural infrastructure projects and to demonstrate the effectiveness of nature-based approaches for building climate resilience. Federal policy should encourage and fund work to scale up these types of innovative nature-based solutions for building climate resilience. These [and other Audubon projects](#) demonstrate the multiple benefits that natural infrastructure can provide to both communities and birds and other wildlife.



Aerial view of Lea-Hutaff Island, an undeveloped barrier island between Topsail Island and Figure 8 Island in North Carolina.

In **Marin City**, Audubon California is working with a community-based, multiracial coalition—Shore Up Marin City—to design and restore an urban wetland in an underserved community in the otherwise affluent Marin County. The project will restore 1.6 acres of urban wetland habitat to reduce flooding that frequently prevents residents from traveling to work and school, and will also incorporate recreational amenities that will provide equitable access to green space and help residents connect with nature. It is estimated that the project would deliver \$138,000 annually in resilience, environmental, and community benefits and would deliver \$4.40 in community benefits for every dollar invested.

In the **Cape Fear Region** near Wilmington, Audubon North Carolina is working to acquire the 415-acre Lea-Hutaff Island, an undeveloped barrier island protected by the Coastal Barrier Resources Act. The island is currently in a mix of public and private ownership, and acquisition of the island will ensure that the island can be preserved as an important natural flood buffer and first line of defense for communities on the mainland. It will also ensure that the island can be managed and maintained as a vital bird habitat for sea- and shorebirds like Wilson's Plovers and Least Terns. Preserving this valuable natural barrier will deliver an estimated \$12.3 million in annual economic benefits to the region and over \$278 million in total economic benefits over a 35-year period.



American Oystercatchers.

At **Crab Bank**, Audubon South Carolina is working with the Army Corps of Engineers and many local partners to restore this critical bird nesting island by using sediment that will be dredged from Charleston Harbor in fall 2021. Construction, community engagement, and monitoring is funded in large part by the National Fish and Wildlife Foundation's National Coastal Resilience Fund and generous donations from private donors in the state. Restoring Crab Bank will provide important natural protections from waves and storm surge for communities on the mainland and will improve a recreational asset for kayakers, boaters, and bird-watchers. It will also resurrect this Globally Important Bird Area that supports as many as 5,000 nesting birds per season, including Brown Pelicans, Black Skimmers, and American Oystercatchers. Finally, this project also kick-started South Carolina's first-ever dedicated state fund for coastal birds that is now funding much-needed stewardship throughout the state.

Calumet wetlands in southeast Chicago.



In **Mastic Beach on Long Island** on Long Island, Audubon New York is working to enhance flood resilience in a community devastated by Hurricane Sandy. In the town of Brookhaven, New York, the low-lying community of Mastic Beach bore the brunt of Hurricane Sandy's storm surge, damaging more than 1,000 homes and stranding 100 residents. After Sandy, the town sought to rebuild in a way that will enhance its resilience to future climate-related events by harnessing and restoring the region's tidal marshes. Audubon is working with the town to remove a flood-prone road and restore 1.75 acres, which will improve the health of over 40 acres of salt marsh, enhancing habitat for the imperiled Saltmarsh Sparrow and other species and building a natural flood buffer and recreational asset for the community. The project will deliver \$379,000 in resilience and environmental benefits annually and will return \$15 for every dollar invested in the project.

In the towns of Madison and Guildford, Audubon Connecticut is working to ensure the long-term health of the **East River Marsh** by enabling the marsh to move upland, or "migrate," to naturally adapt to rising sea levels. The 900-acre marsh could see as much as 80 inches of sea-level rise over the next 60 years. Audubon seeks to protect the marsh, as well as the significant economic value it provides, including flood protection, habitat, water quality improvements, and recreational opportunities. Over a 35-year period, it is estimated that the marsh would contribute \$610 million to the region. To ensure the long-term survival of this valuable resource, Audubon is working with landowners to protect important marsh migration corridors to ensure that the marsh complex can continue to provide for the communities and wildlife that rely on it as sea levels rise.

Saltmarsh Sparrows are dangerously close to extinction, as sea-level rise is increasingly flooding their nests.

In **Southeast Chicago**, Audubon Great Lakes and partners at the Forest Preserves of Cook County, National Oceanic and Atmospheric Administration and the Great Lakes Commission are working to restore more than 100 acres of wetlands at Powderhorn Lake and Wolf Lake—a critical region for marsh birds, such as the Least Bittern. This region was once a thriving series of wetlands and lakes and a vital migratory stopover spot, but due to a booming steel industry and fragmentation from railroads and intersections, the lakes became isolated and separated. Audubon is working with partners to reconnect the two lakes, for the first time in nearly a century and install a water control structure and a series of habitat connections that will improve fish passage, and restore rare marsh, dune, and swale habitat across this important refuge and ultimately the Lake Michigan ecosystem. To ensure long term survival of these habitats, Audubon is leading efforts to monitor marshbird presence, wetland vegetation, and water level and use the data to help manage water levels in this important habitat. This work will improve the quality of habitat for birds, fish, and other wildlife while also providing recreational opportunities for residents and helping to alleviate flooding issues in the nearby community that have long suffered from environmental injustices.



*Black Skimmers in
Panacea, Florida.*



Conclusion

As we work to rebuild our country's economy and recover from the COVID-19 pandemic, we need new solutions that harness nature to build healthy, sustainable, and resilient communities. The federal government must use this opportunity to support investments in natural infrastructure and encourage climate-smart land-use policies that will protect and restore vital landscapes and watersheds.

These nature-based solutions will reduce climate risks to people and property, save taxpayer dollars, improve habitats for birds and other wildlife, and support economically important industries like fishing and recreational tourism. With these investments, Congress and the Administration will not only help the country recover economically from the pandemic and 2020's recording-breaking disasters, it will also pay countless social and environmental dividends.



225 Varick Street 7th Floor
New York, NY 10014

audubon.org

¹ NOAA National Centers for Environmental Information (2021) U.S. Billion-Dollar Weather and Climate Disasters. <https://www.ncdc.noaa.gov/billions/>

² National Oceanic and Atmospheric Administration. (undated). "Socioeconomic Data Summary." <https://coast.noaa.gov/data/digitalcoast/pdf/socioeconomic-data-summary.pdf>

³ Rosenberg, K., Dokter, A., Blancher, P. et al. (2019). "Decline of the North American Avifauna." *Science*. <https://www.birds.cornell.edu/home/wp-content/uploads/2019/09/DECLINE-OF-NORTH-AMERICAN-AVIFAUNA-SCIENCE-2019.pdf>

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⁶ National Oceanic and Atmospheric Administration, Office for Coastal Management. (undated) "Fast Facts: Tourism and Recreation." <https://coast.noaa.gov/states/fast-facts/tourism-and-recreation.html#:~:text=Workers%20in%20the%20ocean%2Dbased,the%20national%20economy%20each%20year>

⁷ National Oceanic and Atmospheric Administration, Office for Coastal Management. (undated) "Fast Facts: Natural Infrastructure." <https://coast.noaa.gov/states/fast-facts/natural-infrastructure.html>

⁸ U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Marine Fisheries Service. (2017). "Socioeconomic Benefits of Habitat Restoration." <https://repository.library.noaa.gov/view/noaa/15030>

⁹ S. 2302, 116th Cong. Included the Promoting Resilience Operations for Transformative, Efficient, and Cost-Saving Transportation (or PROTECT) grant program at Sec. 1407 to support investments to enhance the resilience of transportation systems and assets.

¹⁰ Coburn, A., & Whitehead, J. (2019). "An Analysis of Federal Expenditures Related to the Coastal Barrier Resources Act (CBRA) of 1982." *Journal of Coastal Research*. <https://meridian.allenpress.com/jcr/article-abstract/35/6/1358/10018/An-Analysis-of-Federal-Expenditures-Related-to-the?redirectedFrom=fulltext>

¹¹ National Audubon Society. (Mar. 18, 2019). "Nearly 10 Billion Taxpayer Dollars Saved by Bipartisan Coastal Law: New Economic Study." <https://www.audubon.org/news/nearly-10-billion-taxpayer-dollars-saved-bipartisan-coastal-law-new-economic-0>

¹² Brian C. Murray, Linwood Pendelton, W. Aaron Jenkins, & Samantha Sifleet. (April 2011). "Green Payments for Blue Carbon Economic Incentives for Protecting Threatened Coastal Habitats." Nicholas Institute for Environmental Policy Solutions at Duke University. <https://nicholasinstitute.duke.edu/sites/default/files/publications/blue-carbon-report-paper.pdf>

¹³ S. 2302, 116th Congress included the "Promoting Resilience Operations for Transformative, Efficient, and Cost-Saving Transportation" (or PROTECT) grant program at Sec. 1407 to support investments to enhance the resilience of transportation systems and assets.

¹⁴ President Biden's Executive Orders (EO) on Protecting Public Health and the Environment and Restoring Science to Tackle the Climate Crisis revoked Trump's EO 13807 and reinstated EO 13690, which called for development of a Federal Flood Risk Management Standard.

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