Betsy Norton

I support the comments from WA Audubon and have some more specific suggestions for strengthening the climate adaptation rules especially with regard to sea level rise, so that local governments will take the needed action in a timely manner.
Please see 2 attachments - my comments and the National Audubon Society's guide to natural solutions for climate resilience.
thank you very much

TO: Department of Ecology
From: Betsy Norton, Olympia resident (birder)
RE: SMA rules - regarding Sea Level Rise in particular
Date: 11/13/26

Dear Ecology,

First of all, I support the comments from Washington Audubon and co-signers regarding these rules changes, and these comments are heavily informed by National Audubon's guide to building resilience to climate change intentionally with natural solutions[1].

Secondly, I urge you to be more forceful in your draft rules, so that they effectively protect marine and estuarine habitats and water quality.

I urge you to write SMA rules which compel local jurisdictions to adopt land-use codes and development regulations which effectively adapt to sea level rise. Asking local jurisdictions to 'consider' and 'evaluate' won't produce results that protect the environment and wildlife. Local government typically lacks scientific expertise and is vulnerable to political pressure and concerned about legal liability if they attempt to enforce climate adaptation on their own. Ecology must compel them to do so, by requiring the use of prescribed models for climate forecasts and requiring rules & actions to conserve shorelines and protect marine/estuarine water quality: Only by forcefully requiring local govts to do this will you give them the legal authority/position they need to implement changes to our shared state waters and shorelines which effectively adapt to sea level rise.

The main aim here is benefits which conserve and protect marine waters and estuaries from climate impacts stemming from the sea level rise interactions with the built environment. (There are plenty of other stakeholders who are focused on protecting the built environment from SLR impacts.)

"*OHWM+" = My shorthand for an Ordinary High Water Mark Plus - includes a buffer for that area's 'normal' shoreline/intertidal habitat added to the actual high water point. This buffer is intended to conserve the original space for shoreline/intertidal habitat that birds, invertebrates and wildlife inhabit and forage w/in, so we can avoid the 'shoreline squeeze' that results in habitat loss for them.*

SLR risk to habitat and water quality:

There are 2 main mechanisms associated with SLR creating risk of built environment impacts on aquatic ecosystems when the built environment is "too close" to the shoreline -
(1) Advancing high tide OHWM+s and periodic flooding (king tides + storms, especially) will sweep nearshore contaminants on the ground back into the aquatic ecosystems.
(2) New hydraulic pressures along the shoreline - from more marine water creeping ever inland (currents and tidal action) - will push groundwater into new directions (ref: septic tanks), acidify underground soils full of metal pipes, and otherwise deform underground infrastructure designed for a static environment underground by the shoreline.

Whether the resulting impact is bacterial (wastewater), chemical (unrefined petroleum spills) or material (asbestos insulation, metal pipes & wires), it is all significantly damaging to the local ecosystems and wildlife. To the extent this contamination and debris accumulates in these aquatic environments, it will impact overall water quality, displace underwater habitats, directly

[1] https://media.audubon.org/2025-12/Building.Resilience_12.9.2025%20(FINAL).pdf Also including a copy of this article as an attachment to these comments.

harm wildlife (e.g. entanglement) and cause short and long term species issues (endocrine disruption or immediate toxic impacts).

I suggest here 4 types of rules to strengthen your proposed changes, which all result in a form of managed retreat. I believe these would be implemented somewhere in section G on your rules overview (WAC 173-26-090(2)(b)(iii)(E), -171(1), -176(1) and (3)(k), -186(8)(f), -191(1)(b)(iii) & (2)(a)(i), -241(2)(a)(v) & (3)(j)(iii)(C)-246, -251(3)(f).

Rule 1: Communities MUST use the best available science FORECAST for sea level rise and precipitation as the baseline for measurements of all the setbacks, buffers and other relative siting associated with Ordinary High Water Mark OHWM+ (see map 1 e.g.). It is only by setting a new siting standard that the built environment will be situated far enough back from the shoreline to avoid inundation into the built environment and conserve the shoreline habitat from 'squeeze'.

a. Relying on building a 40-60 year structure based on a current OHWM is self-defeating. Ecology must require the OHWM+ for the built environment to be set based on accepted forecasts for climate change as of 2100[2]. The science is clear, accepted forecasts are being tuned, but largely so far, are correct. Failing to use accepted forecasts both undercuts public confidence in the science and undermines local government legal authority to use the projected OHWM+ as the most practical and logical basis on which to permit land use/new development along the shoreline.
b. Ecology MUST prescribe a specific climate change model to use for both SLR and Flooding. I would recommend for this model the UW CIG localizations for WA state[3], updated every time a major new climate model is accepted (IPCC)[4] or more often, if low-probability/high-impact events (e.g. Thwaites glacier sudden changes) take place. Local governments will only use a forecast if they are compelled to do so.

Rule 2: Communities with municipal wastewater treatment plants located within the [high-confidence] inundation zone by 2100 MUST include in their long-range capital projects plan an intention and timeline for accomplishing relocation of this utility infrastructure on a timeline which accomplishes relocation, restart of operations and full cleanup of the old site before inundation begins. They must put in place funding, monitoring and progress checks such that this project is completed before sea level rises to inundate their operations. (See map 3 for these).

Rule 3: Similar to Rule 2, Communities MUST in their long-term shoreline management plans, create and complete processes to remove chemical/bacterial/mechanical waste hazards from the inundation zone described by the forecast for 2100, in order to avoid [possibly catastrophic] and predictable water quality degradation. This would cover existing structures in that inundation zone:

a) Industries creating these hazards next to the shoreline (oil refineries, fertilizer warehouses, timber processing plants)

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[2] I'm using 2100 for simplicity of explanation, Ecology should set the year projection for a static point or a rolling 50 years out, whatever timeframe is adoptable. The point is that it should be static enough to serve as a standard - easy to understand, replicate, follow and supersede when science changes.

[3] https://cig.uw.edu/resources/analysis-tools/climate-mapping-for-a-resilient-washington/

[4] This may require explicit funding: the Ecology budget should address that if the legislature fails to act. This same source/process should be used for freshwater/flood maps, exactly the same problems with local jurisdiction decisions regarding inland development in floodplains and CMZ's, encroachment on buffers for freshwater flood mitigation areas associated with shorelines.

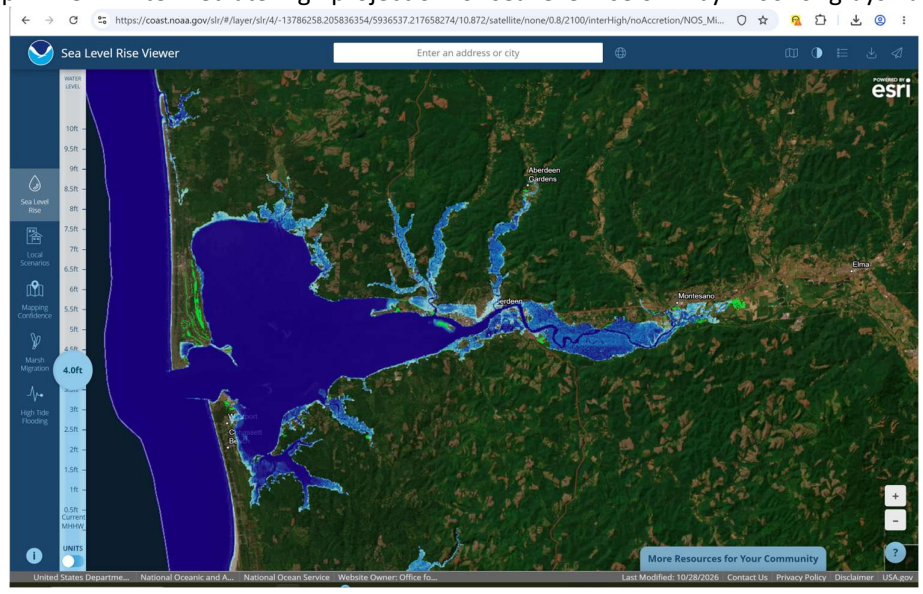
b) Existing toxic sites in and near the marine environment which have been "capped", like the dioxins in Shelton harbor[5] or Budd Inlet[6]. As sea level rises and hydraulic forces push in underlying fill, these enclosures and caps will fail to contain the toxics. These sites need to be excavated before this point, and more permanently managed.
c) Existing hazardous waste, landfills and abandoned industrial sites near the shoreline. Local community must take action to move those substances to locations where they don't threaten water quality as inundation moves up the shore (see map 2, e.g.).
d) Existing residential and other built environments and their underground infrastructure - must be moved inland to avoid inundation by 2100.

Rule 4: As your rules may already cover, any new development must be placed inland of the 2100 OHWM+ inundation zone. Local municipalities SHALL prohibit new development - public or private - which is modeled for inundation by 2100 by the prescribed forecast model.

I recommend strengthening your rules in these ways to have a significant impact at the local level - implement a change which will effectively adapt land use for the expected sea level rise and precipitation changes from climate change. Only by taking bold and determined action can we protect our resources, our species and ourselves from the coming climate changes.

Thank you very much
Betsy Norton

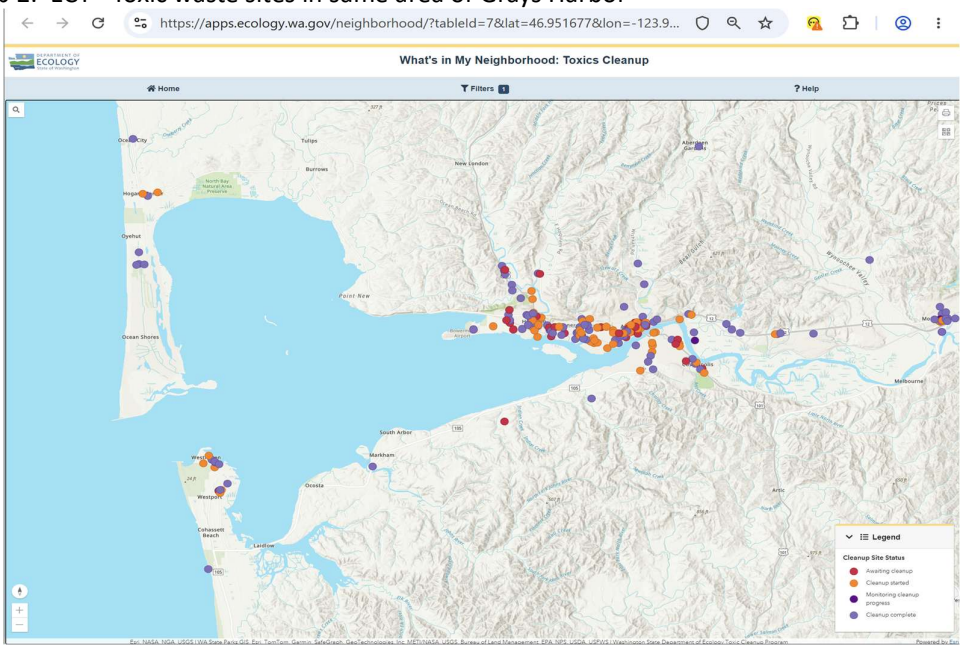
Map 1: NOAA intermediate-high projection for sea level rise of 4' by 2100 for grays harbor:



https://coast.noaa.gov/digitalcoast/tools/slr.html

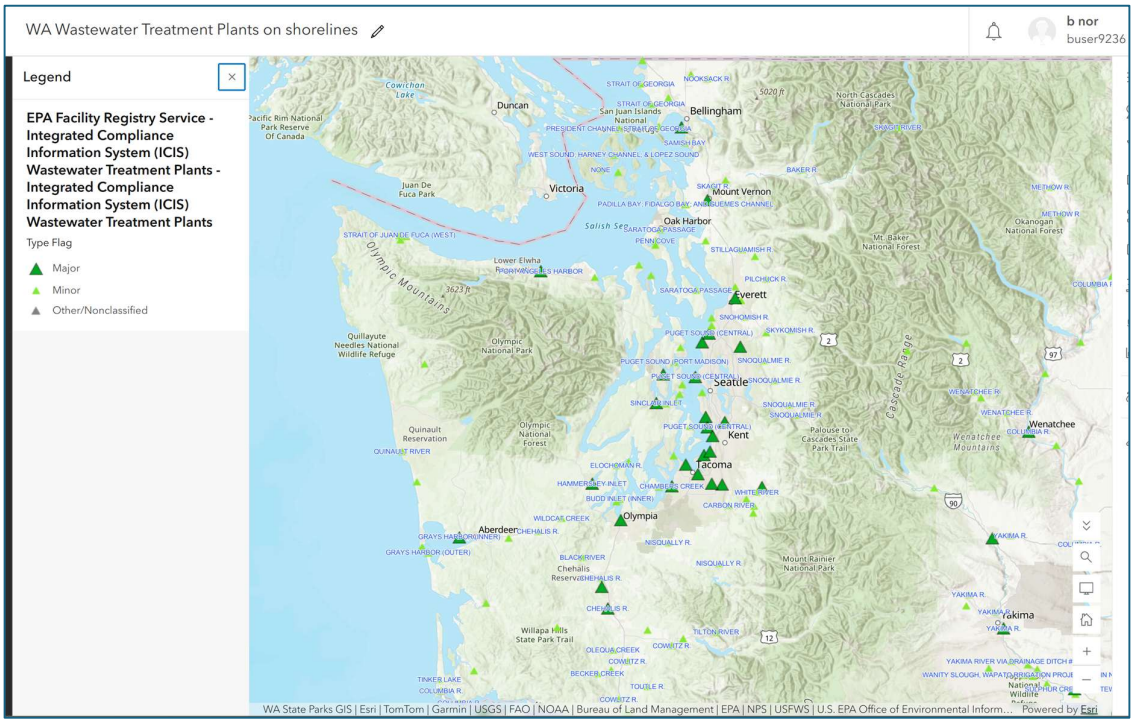
[5] https://apps.ecology.wa.gov/cleanupsearch/site/13007
[6] https://portolympia.com/about-us/environment/remediation/

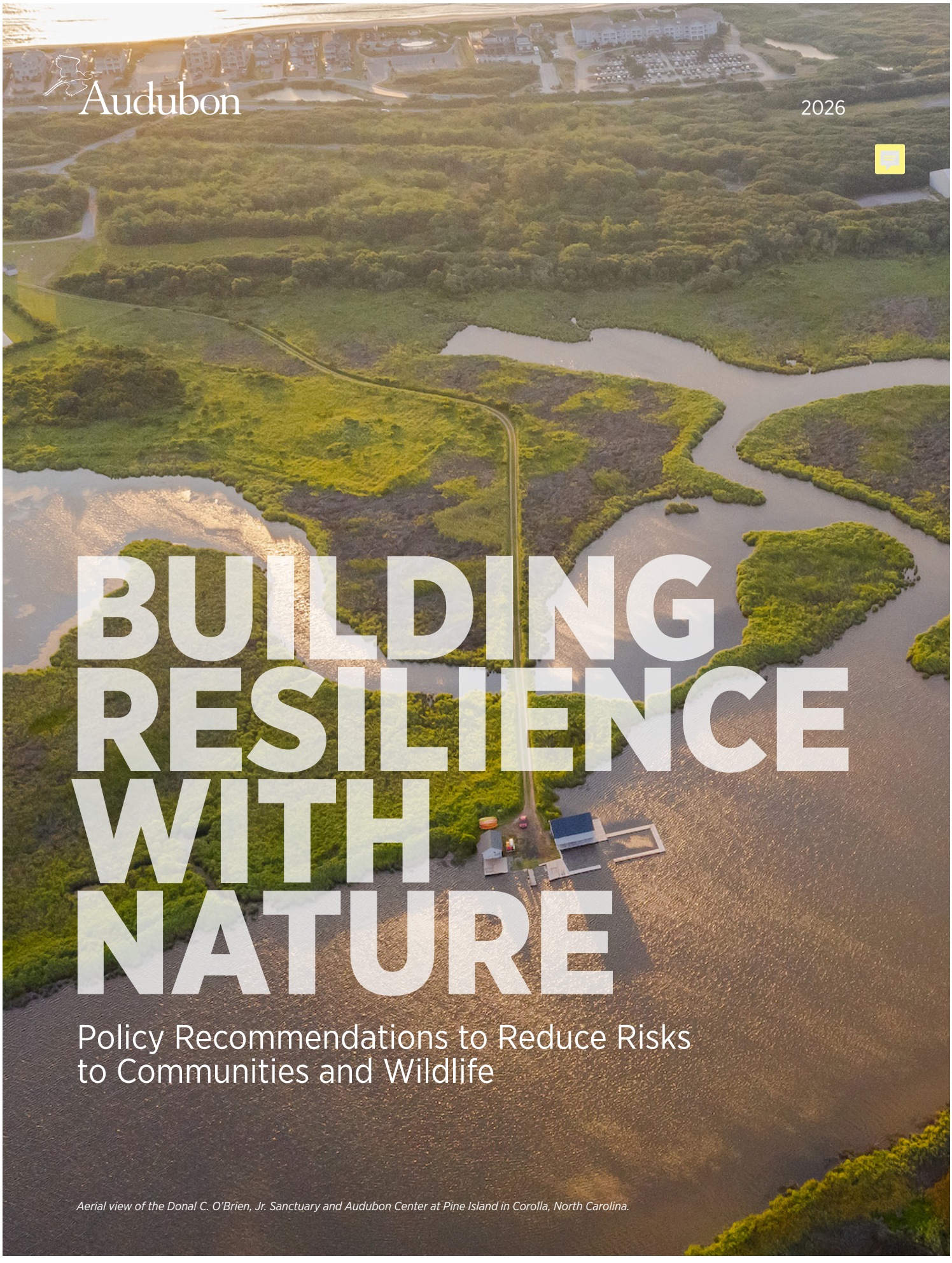
Map 2: ECY - Toxic waste sites in same area of Grays Harbor



https://apps.ecology.wa.gov/neighborhood/

Map 3: Wastewater Treatment Plants - Western WA / Puget Sound and pacific coast, label = name of the waterbody (AGOL public EPA GIS layer) just to give you an idea. Not comprehensive.





Audubon

2026

BUILDING RESILIENCE WITH NATURE

Policy Recommendations to Reduce Risks to Communities and Wildlife

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



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

The number of disasters costing a billion dollars or more has risen sharply. From 1980 to 2019, the U.S. averaged nine billion-dollar disasters per year (adjusted for inflation). From 2020 to 2024, that average jumped to 23.[1] More than statistics, these numbers represent a significant toll—loss of life, home, habitats, security, and economic stability. Congress and the administration have important decisions to make to reduce risk to communities and nature in the face of increasing hazards that threaten our economy and security.

Just like roads and bridges, our **natural infrastructure**—habitats like wetlands, beaches, and barrier islands—provide critical services to our communities. They serve as safe recreational spaces, enhance our resilience to threats like increasing flooding and drought, and improve habitats for birds and other wildlife. Our elected leaders have an opportunity to harness the U.S.'s immense natural wealth in efforts to support the economy while also addressing both the causes and consequences of changing environmental conditions.



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

The Challenge

Rising seas, more intense and frequent storms, heavier rainfall, and more extreme droughts are increasingly impacting people, property, and habitats. More than 41 million Americans face rising flood risks, and $1 trillion in properties are threatened by sea-level rise alone.



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

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 U.S. gross domestic product.[2]

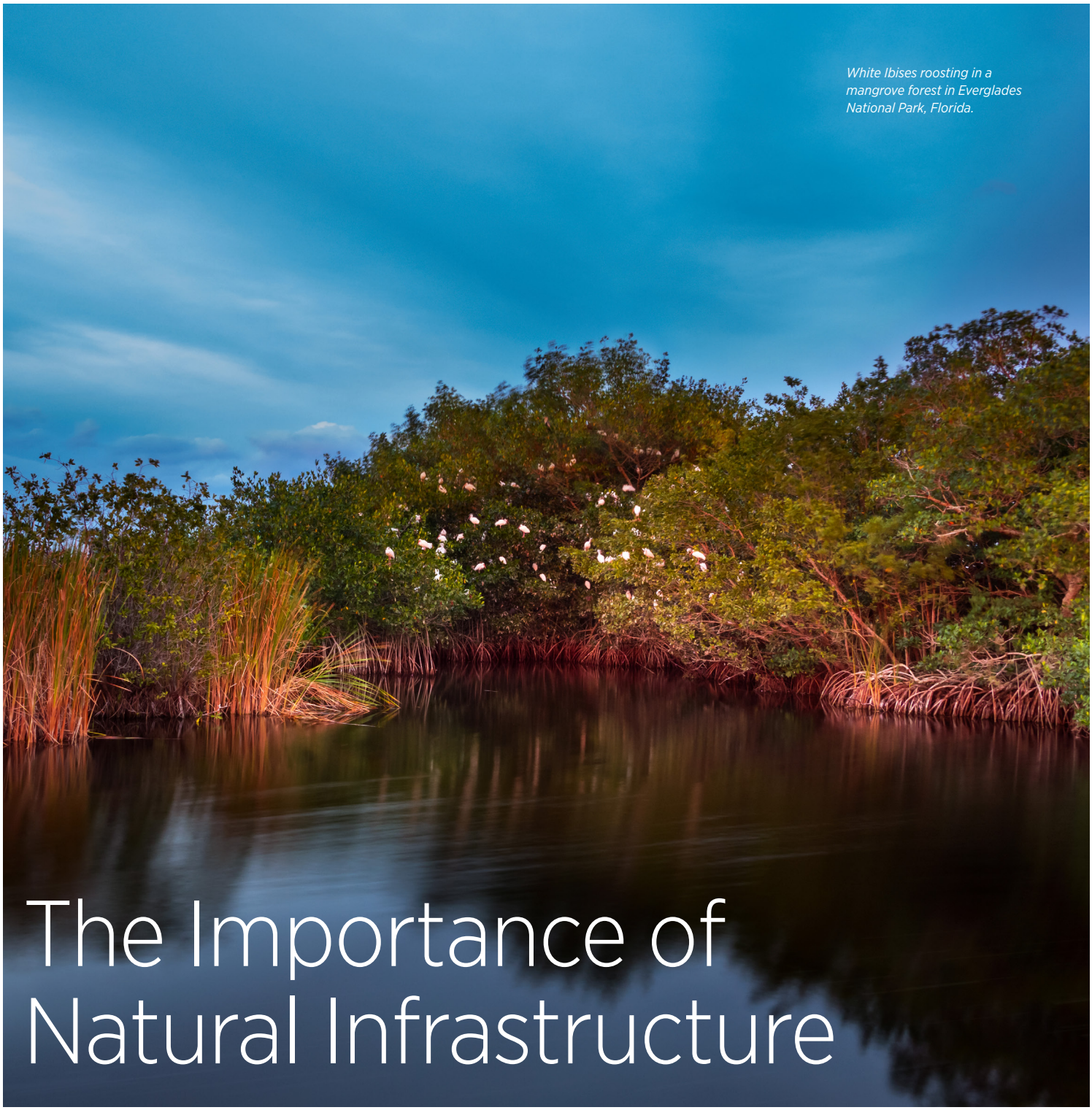
Increased hazards associated with flooding, drought, and wildfires also threaten habitats that are vital to the survival of birds, fish, and other wildlife. With human development and changing environmental conditions shrinking bird habitats, the U.S. has lost 3 billion birds since the 1970s, with a 70-percent decline in sea- and shorebird populations over the last 50 years.[3, 4]

Disasters don't affect everyone equally. They can hit hardest in communities that are already under stress like low-income neighborhoods, coastal and rural populations, and those living without access to safe housing or basic services. In communities all across the U.S., people can't afford to evacuate, don't have the means to rebuild, and take decades to fully recover from disasters.

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 can 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.

Hard structures like sea walls and levees can be beneficial to some communities in the short term and will continue to be necessary in some places to protect critical infrastructure and already built-out communities. However, these "gray infrastructure" 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.



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

The Importance of Natural Infrastructure

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 changing environmental conditions. It recognizes that nature—just like roads and bridges—provides critical services to communities.

ENHANCE RESILIENCE

Restoring coastal wetlands and natural floodplains buffers communities 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 naturally store water and recharge groundwater aquifers, reducing drought risks in more arid states. These types of solutions are more adaptable and durable than gray infrastructure, because they naturally adapt to changing environmental conditions.

IMPROVE THE ENVIRONMENT

Natural infrastructure provides habitats that birds, fish, and other wildlife depend on for feeding, nesting, and breeding. Habitats like wetlands and seagrasses naturally capture and store carbon pollution. Salt marshes 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.

BUILD 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 $143 billion to the U.S. economy each year and employ almost 2.5 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 Solutions to Reduce Risk

Lawmakers have the opportunity to drive much-needed funding to programs that 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 sound 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 address inefficiencies in disaster response and drive economic growth while reducing risk to communities, built infrastructure, and habitat, 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 conservation funding to federal agencies 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.

Transportation Planning

Congress should ensure that funding for transportation programs and projects promote nature-based approaches for enhancing resilience. Competitive grants such as the U.S. Department of Transportation's Promoting Resilient Operations for Transformative, Efficient, and Cost-saving Transportation (PROTECT) Program and Better Utilizing Investments to Leverage Development (BUILD) Grant Program (previously known as the Rebuilding American Infrastructure with Sustainability and Equity [RAISE] grants) have demonstrated successful outcomes.[9] Supporting those and funding new discretionary grant programs to support resilience investments in the transportation sector will continue to yield benefits into the future. Congress should pass legislation reauthorizing surface transportation programs and authorize funding for and prioritization of natural infrastructure in the Surface Transportation Block Grant program. Discretionary grant programs are critical to incentivizing innovative practices and projects, including more sustainable and resilient nature-based solutions, for rural and lower-population areas that are often overlooked and underfunded through basic formula programs. In addition to the aforementioned inclusions, any surface transportation reauthorization legislation should consider disasters like increased frequency of flooding and wildfires, as well as sea-level rise and storm surge, that impact transportation systems and their long-term resilience. Congress should also reauthorize the National Culvert Program. Modernized culverts

create local jobs and keep our transportation corridors safe, our rivers clean and flowing, and our communities protected from flooding.

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). The FEMA Building Resilient Infrastructure and Communities (BRIC) pre-disaster mitigation program presents a prime opportunity to prioritize natural infrastructure. Not only should a competitive grant program be retained for BRIC, but project selection criteria that favor natural infrastructure projects should be added. Private nonprofit organizations should be more broadly eligible to participate as subapplicants in BRIC and other disaster recovery and mitigation programs, such as the Hazard Mitigation Grant Program. Further, the benefit-cost analysis templates for natural infrastructure projects should account for the wide array of ecosystem service values provided. 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 communities but will also encourage 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 natural disasters and that face increasing risk from natural hazards. Waivers of non-federal match requirements for economically distressed communities are another avenue to ensure that resourced communities have access to the funding they need to reduce risk from natural hazards.

ENCOURAGE AND REWARD SMART LAND-USE PRACTICES

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

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 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 changing environmental conditions, 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.



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

DIRECT FEDERAL AGENCIES TO INVEST IN CLIMATE RESILIENCE

Water Resources Development Act (WRDA)

For the past 10 years, Congress has maintained a successful, biennial, and bipartisan reauthorization of the Water Resources Development Act (WRDA). WRDA authorizes projects and programs for the U.S. Army Corps of Engineers, including important provisions that direct the Corps to use nature-based approaches or to beneficially use dredged materials to support environmental restoration projects. The administration should ensure that the Corps uses existing authorities to consider and advance natural infrastructure solutions when planning and constructing new projects, repairing damaged infrastructure, and operating and maintaining existing projects. Congress should direct the Corps to ensure that all clean dredged sediments are deployed to beneficial restoration projects.



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

RECOGNIZE THE BENEFITS OF CARBON STORAGE

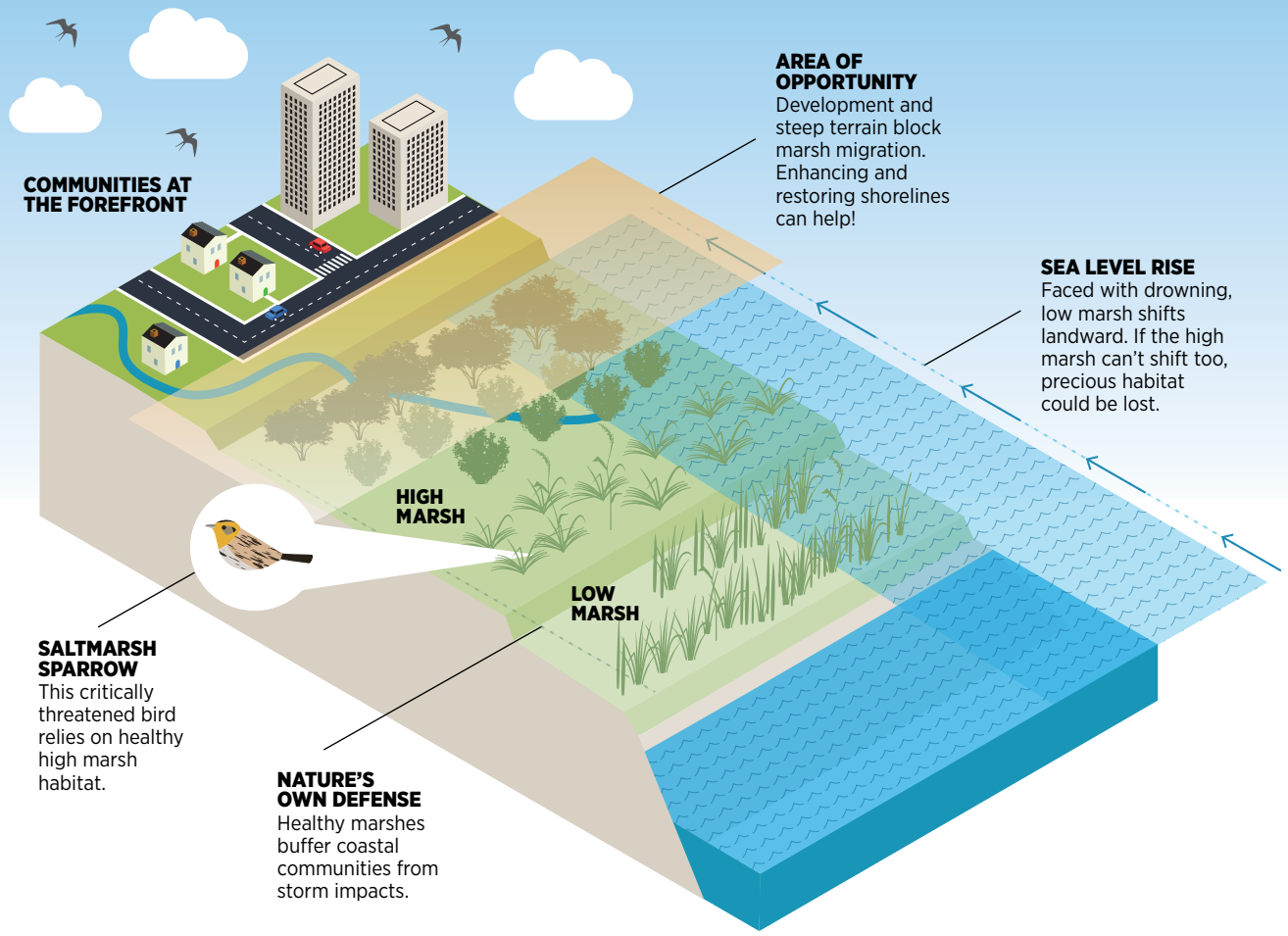
Congress can also support efforts to protect, restore, and enhance important coastal ecosystems—like marshes, mangroves, and seagrasses—as a strategy for reducing the carbon pollution that is causing the planet to warm. One hundred acres of coastal marsh can store carbon pollution equivalent to taking 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.[10] Incentivizing projects with natural resource, community, and carbon storage benefits delivers results with benefits now and into the future.



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

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.

Audubon



Black Skimmers in Panacea, Florida.

Conclusion

We need new solutions that harness nature to build healthy, sustainable, and resilient communities. The federal government must support investments in natural infrastructure and encourage smart land-use policies that will protect and restore vital landscapes and watersheds.

Nature-based solutions will reduce 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 recording-breaking disasters, it will also pay countless social and environmental dividends.

Audubon

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[1] National Oceanic and Atmospheric Administration, National Centers for Environmental Information. (2025). "U.S. Billion-Dollar Weather and Climate Disasters." https://www.ncei.noaa.gov/access/billions/

[2] National Oceanic and Atmospheric Administration, Office for Coastal Management. (accessed December 1, 2025). "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

[4] Mock, Jillian. (2019). North America Has Lost More Than 1 in 4 Birds in Last 50 Years, New Study Says. *Audubon*. https://www.audubon.org/news/north-america-has-lost-more-1-4-birds-last-50-years-new-study-says

[5] Narayan, S., Beck, M.W., Wilson, P. et al. (2017). The Value of Coastal Wetlands for Flood Damage Reduction in the Northeastern USA. *Scientific Reports*, 7: 9463. https://doi.org/10.1038/s41598-017-09269-z

[6] National Oceanic and Atmospheric Administration, Office for Coastal Management. (accessed December 1, 2025). "Fast Facts: Tourism and Recreation." https://coast.noaa.gov/states/fast-facts/tourism-and-recreation.html

[7] National Oceanic and Atmospheric Administration, Office for Coastal Management. (accessed December 1, 2025) "Fast Facts: Natural Infrastructure." https://coast.noaa.gov/states/fast-facts/natural-infrastructure.html

[8] 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] Murray, Brian C., Pendelton, L., Jenkins, W. A., & Sifleet, S. (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

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