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Before the U.S. House Committee on Transportation and Infrastructure,
Subcommittee on Water Resources and Environment
"Water Resources Development Acts: Status of Implementation and Assessing Future Needs."

Chair Napolitano, Ranking Member Westerman, and Members of the Subcommittee, thank you for the opportunity to be present here today, representing the National Audubon Society (Audubon), to discuss the status and future needs of Water Resources Development Acts. Audubon's mission is to protect birds and the places they need, today, and tomorrow. Audubon represents more than one million members and has 462 affiliated chapters, 22 state offices, and 41 nature centers across the country.

My name is Julie Hill-Gabriel, and I am Audubon's Vice President for Water Conservation, based in Washington, DC. I coordinate Audubon's water strategy across the United States. Before beginning this new role in 2018, I worked in Florida for 11 years as Audubon Florida's Deputy Director for policy, leading our Everglades restoration efforts and working closely with the U.S. Army Corps of Engineers (Army Corps), as the federal sponsor for these restoration efforts. We appreciate the consistency of the U.S. House of Representatives Committee on Transportation and Infrastructure in passing Water Resources Development Acts on a biennial basis since 2014 and the willingness to conduct important oversight hearings.

Protecting waterbird populations is a foundation of the establishment of the National Audubon Society. In 1896, Harriet Hemenway and Minna B. Hall formed the Massachusetts Audubon Society amid outrage over the slaughter of millions of waterbirds, particularly egrets and other wading birds who were killed for the harvest of their feathers. The first Audubon Societies were formed to tackle the dire threats that birds faced from prolific plume hunting, and to obtain strong legal protections for birds[1]. By 1898, Audubon Societies were established in 14 states, including New York, Pennsylvania, Ohio, Texas, and California. The present-day Audubon began as the National Association of Audubon Societies in 1905 as an umbrella organization for these state societies. Theodore Roosevelt was an early, strong supporter of Audubon and Audubon worked closely with the President to establish the first bird sanctuary in Florida, which became the basis for the National Wildlife Refuge System.

[1] Graham, Frank, Jr. (1990). The Audubon Ark. University of Texas Press, Austin, Texas.

In 2018, Audubon celebrated the "Year of the Bird," alongside National Geographic, Cornell Lab of Ornithology, and more than 180 other partners, including state agencies, zoos, businesses and conservation groups, to mark the 100-year anniversary of the Migratory Bird Treaty Act (MBTA). As Audubon recognized this centennial and marked the progress made since the passage of this landmark conservation law, we recommitted our organization to continue the work of our founders as we seek to protect birds over the next century.

With an eye toward this history, Audubon's water strategy focuses on protecting and restoring habitat that is crucial to birds' survival. Among other places, we focus our efforts in the Arid West through conservation around the Colorado River and the network of Saline Lakes, the Mississippi River and its Delta, the Great Lakes, the Everglades, the Delaware River, the Platte River and the Rio Grande. Audubon works to ensure that water conservation projects and programs that benefit birds are included in WRDAs. Audubon also works collaboratively with the Army Corps in many capacities, including through the Continuing Authorities Program, in the Upper Mississippi River Systemic Forest Stewardship Plan and through data collection and monitoring. This testimony highlights some of these issues that have received attention in recent WRDA bills.

1. **Ecosystem Restoration Mission of the U.S. Army Corps of Engineers**

The Army Corps has three primary mission areas: navigation, flood risk management, and aquatic ecosystem restoration. Army Corps ecosystem restoration activities seek to restore significant ecosystem function, structure, and dynamic processes. Ecosystem restoration efforts often involve an examination of the problems contributing to the system degradation, and the development of alternative means for their solution. Continued commitment of resources to this mission area will enable the Army Corps to make progress on critical ecosystem restoration efforts like those discussed in more detail below.

- *Restoring America's Everglades:*

The Everglades is a unique ecological treasure that provides the drinking water for one in three Floridians. As projected population growth and impacts from climate change put more pressure on South Florida's environment, Everglades restoration is increasingly urgent. Clean and sufficient freshwater forms a critical component of Florida's tourism economy. Recent toxic blue-green algal blooms, seagrass die-offs and outbreaks of red tide have occurred where the alteration of the ecosystem limits water management options. Significant economic losses have transpired as a result of these water quality and water management disasters.

The Comprehensive Everglades Restoration Plan (CERP) was authorized in WRDA 2000 and represents the Army Corps' largest aquatic ecosystem restoration initiative to move the right amount of freshwater to the right places at the right time. After nearly 20 years of progress and bi-partisan support, five major Everglades infrastructure projects were recently completed or are expected to be complete by the end of 2020.

After a devastating flood in 1947, the Central and Southern Florida Flood Control Project (C&SF Project) was authorized as part of the Flood Control Act of 1948. After the implementation of the C&SF project resulted in both periods of drought and flooding and a decline of 90% of wading

birds in the Everglades[2], Congress authorized a Comprehensive Review Study of the C&SF project in 1992 (Restudy). The purpose of the Restudy was to modify the C&SF project to restore the Everglades and Florida Bay ecosystems while providing for other water-related needs of the region. The Restudy culminated in CERP, which was then authorized by Congress in 2000. Each component of CERP is identified by the Army Corps as part of the C&SF project and CERP projects are funded under a line item for "South Florida Ecosystem Restoration." CERP was broken up into more than 60 components, and eight of these were authorized in WRDA 2007, 2014, and 2016. Three additional components are in planning stages and expected to have a Chief of Engineers Report within the next two years. Because individual projects are all included within a single appropriations line item, and because CERP itself is an extension of the original C&SF Project, these components build upon ongoing construction work and should not be considered new construction or new planning starts.

A study conducted by Mather Economics, *Measuring the Economic Benefits of Everglades Restoration,*[3] demonstrates the potential economic benefits from Everglades restoration:

> "Our analysis strongly suggests that restoration of the Everglades as described and planned in [Comprehensive Everglades Restoration Plan] will have large economic benefits. **Our best estimate is that restoration will generate an increase in economic welfare of approximately $46.5 billion in net present value terms that could range up to $123.9 billion**. The return on investment, as measured by the benefit-cost ratio, assuming a cost of restoration of $11.5 billion, is also high and significant, 4.04, which means for every one dollar invested in Everglades restoration $4.04 dollars are generated. Everglades restoration will also have an incremental impact on employment of about 442,000 additional workers over 50 years. In addition, the Corps of Engineers estimates there will be 22,000 jobs created as a result of the actual restoration projects. Throughout our analysis, we have taken a very conservative approach to estimation. Accordingly our best estimates almost surely understate the return on investment of Everglades restoration."

The Central Everglades Planning Project (CEPP) that was authorized in WRDA 2016, was a culmination of important planning efficiencies. The project planned multiple components together to understand their interconnected impact, it included more robust technical input from stakeholders, and the plan was developed in 18 months, which became a model for the Army Corps' 3x3x3 process which requires projects to be developed in 3 years, with $3 million, with review by 3 levels Army Corps leadership.

Through one of the most successful examples of the use of authority created by Section 203 of WRDA 1986 (P.L. 99-662), the non-federal sponsor for CERP, the South Florida Water Management District, prepared a CEPP Post Authorization Change Report Feasibility Study and Draft Environmental Impact Statement and recommended the additional of the Everglades

[2] Davis, S., and J.C. Ogden. (1994). Everglades: The Ecosystem and its Restoration. St.Lucie Press, US

[3] Mather Economics. (2010). Measuring the Economic Benefits of Everglades Restoration:
An Economic Evaluation of Ecosystem Services Affiliated with the World's Largest Ecosystem Restoration Project. Mather Economics, 43 Woodstock Street, Roswell, Georgia 30075.

Agricultural Area Reservoir to the CEPP project. The study was determined to be feasible by the Assistant Secretary of the Army for Civil Works and was included in WRDA 2018.

WRDA 2018 Section 1308 directed that construction should commence "only after the Secretary prepares a report that addresses concerns, recommendations, and conditions identified by the Secretary," allowing 90 days for completion of that report. While more than six months has passed, the report has still not been delivered to Congress.

The EAA Reservoir will store and clean water from Lake Okeechobee and then reroute it south. This has the dual benefit of diminishing harmful discharges to the coastal estuaries east and west of Lake Okeechobee that fuel algal blooms, and instead deliver clean water to Everglades National Park and Florida Bay where it is desperately needed.

Another issue that can impact the benefits that can be achieved from Everglades restoration is the need to secure the federal cost-share portion of Operation, Maintenance, repair, replacement and rehabilitation (OMRR&R) funds for completed Everglades restoration projects.

Per WRDA 2000 section 601(e)(4), the Army Corps and the non-federal sponsor are each responsible for 50% of the costs of OMRR&R. "(4) OPERATION AND MAINTENANCE- Notwithstanding section 528(e)(3) of the Water Resources Development Act of 1996 (110 Stat. 3770), the non-Federal sponsor shall be responsible for 50 percent of the cost of operation, maintenance, repair, replacement, and rehabilitation activities authorized under this section."

The federal contribution in this context is therefore not a reimbursement - it is an obligation under CERP. Funds not received from the Army Corps pose a direct impact to the local sponsor and taxpayers, since these funds do not come from state appropriations. While it was reassuring to see some OMRR&R funding in the FY20 budget, not receiving this funding consistently could erode the agreed-upon partnership between the Army Corps and the non-federal sponsor and cast unnecessary doubt on the ability to gain the needed benefits from future projects.

Audubon appreciates the consistent support from this committee for Everglades restoration and looks forward to working together to build upon the momentum of restoration success.

- *Addressing Asian Carp in the Great Lakes:*

The Great Lakes ecosystem is another globally important place for birds where Audubon focuses its water conservation efforts. The Great Lake includes about 20% of the freshwater on Earth and provide a source of freshwater for 30 million Americans. One of the greatest ecological threats to the health of the Great Lakes is the invasion of invasive exotic Asian carp. This species poses a serious threat to the ecological health of the Chicago Area Waterways System and the Great Lakes, and the people and economies these waters support. Right now, Asian carp have already wreaked havoc on the Mississippi and Illinois Rivers, outcompeting native fish for food and habitat, and creating a safety threat for people who recreate on these waterways. The environmental and economic consequences are significant. The Great Lakes support a $7 billion fishery; a $16 billion tourism industry; waterfowl production areas that support a hunting economy of $2.6 billion a year; and hunting, fishing, and wildlife observation that generates approximately $18 billion a year.

The Great Lakes Mississippi River Interbasin Study-Brandon Road Report (GLMRIS-BR) evaluated options to prevent the upstream transfer of Asian carp. A Chief of Engineers Report for this project was recently signed after encouragement in WRDA 2018, and authorizing this project should be a top priority in future WRDA legislation.

Asian carp are a real threat to the Great Lakes that demand quick action. There is no turning back if Asian carp invade the Great Lakes. It is much easier to control and prevent Asian carp at one relatively small choke point than in five massive lakes. The recommended plan will create additional levels of defense to stop Asian carp from migrating through the Chicago Area Waterway System.

- *Protecting the Delaware River Watershed:*

In the Water Infrastructure Improvements for the Nation Act, (PL 114-332) that included WRDA 16, the Delaware River Basin Conservation Act (DRBCA) created the Delaware River Basin Restoration Program (DRBRP) in the U.S. Fish and Wildlife Service, clearly affirming the national priority of restoring the Delaware River Watershed. The DRPRP provides a competitive grant and technical assistance program to support on-the-ground work by state and local governments, non-profit organizations, and universities.

The Delaware River Basin Commission is a federal-state compact agency tasked with overseeing a unified approach to managing the basins' water resources. The Army Corps is the federal representative for this commission. Despite the recognition of importance of the commission in the DRBCA, full funding for the Army Corps' participation has not been appropriated in recent years. In order to advance the goals of DRBCA, support for both the DRBRP alongside the DRBC is imperative.

Projects that benefit the Everglades, the Delaware River Watershed and the Great Lakes are just a small portion of the many projects and programs that advance ecological benefits through WRDA bills. As the future needs for WRDA legislation take shape, ecosystem restoration must remain on par with other Army Corps mission areas and be prioritized. Restoring America's great aquatic ecosystems are fundamental for wildlife, the environment and local economies.

2. **Facilitating the Use of Natural Infrastructure:**

In 2018, Audubon released a *Natural Infrastructure Report: How Natural Infrastructure Can Shape a Resilient Coast for Birds and People.*[4] This report demonstrated how federal investment in natural infrastructure will help increase preparedness of coastal communities and economies, while benefitting fish and wildlife, which also often provide a critical foundation for coastal economies. Natural infrastructure alternatives can also provide more resilient options for inland flood attenuation and water storage in places like the Colorado River basin.

[4] National Audubon Society. (2018). Natural Infrastructure Report: How Natural Infrastructure Can Shape a Resilient Coast for Birds and People. Retrieved from https://www.audubon.org/sites/default/files/audubon_infrastructure_jan192018.pdf.

Provisions in WRDA 16 and WRDA 18 present important opportunities to incorporate the use of more resilient natural infrastructure options to address extreme weather events including flood risk management projects and hurricane and storm risk reduction projects.

WRDA 2016, Section 1184 states:

> In studying the feasibility of projects for flood risk management, hurricane and storm damage reduction, and ecosystem restoration, the Corps of Engineers (with the consent of the nonfederal sponsor) must consider: (1) natural features created through physical, geological, biological, and chemical processes over time; (2) human-designed, nature-based features engineered and constructed to provide risk reduction by acting in concert with natural processes; and (3) nonstructural and structural measures.

WRDA 2018, Section 1149 (c) states:

> NATURAL INFRASTRUCTURE.—In carrying out a feasibility report developed under section 905 of the Water Resources Development Act of 1986 (33 U.S.C. 2282) for a project for flood risk management or hurricane and storm damage risk reduction, the Secretary shall consider the use of both traditional and natural infrastructure alternatives, alone or in conjunction with each other, if those alternatives are practicable.

Despite these clear statutory directions, the Army Corps often screens out natural infrastructure alternatives early in the planning process, before their benefits can be fully analyzed. And it is extremely rare for the Army Corps to select a natural infrastructure alternative when compared with more traditional options to address flood and storm risks.

According to a March 2019 GAO report,[5] the agency faces considerable challenges in developing cost and benefit information for some types of natural infrastructure. While the Army Corps may consider direct incidental benefits such as improving ecosystems and water filtration, they often have difficulty monetizing such benefits. Additional information must be gathered in order to ensure that the Corps can better account for both indirect and direct natural infrastructure benefits and this should be incorporated into their benefit-cost analysis. The inability to properly monetize benefits is a consistent challenge preventing the Army Corps from selecting more natural infrastructure project alternatives.

Natural infrastructure alternatives can include nature-based systems such as restoring sand dunes, wetlands, oyster reefs and coastal forests in place of traditional human-built projects such as seawalls, jetties, levees, groins, bulkheads and riprap. This kind of "grey" infrastructure has traditionally been promoted as the best long-term, cost-effective approach to flood management. But natural infrastructure has been shown to provide significant, long-term and cost-competitive benefits for challenges such as flood reduction. For example, research published in the journal *Ocean & Coastal Management* reported that the average construction costs between natural and

[5] U.S. Government Accountability Office. (2019). U.S. Army Corps of Engineers. Consideration of Project Costs and Benefits in Using Natural Coastal Infrastructure and Associate Challenges. (Publication No. GAO-19-319). Retrieved from GAO Reports Main Page via GPO Access database: http://www.gpoaccess.gov/gaoreports/index.html.

grey infrastructure are similar, but there are lower replacement costs with living shorelines, a form of natural infrastructure.[6]

The National Oceanic and Atmospheric Administration (NOAA) and the National Fish and Wildlife Foundation have also identified several flood-reduction and resiliency benefits from a wide array of natural infrastructure systems. "Natural features such as coastal marshes and wetlands, dune and beach systems, oyster and coral reefs, mangroves, forests, coastal rivers, as well as barrier islands, help minimize the impacts of storms, rising sea levels and other extreme events on nearby communities and infrastructure."[7]

- *Wetlands and reefs:*

The significant benefits provided by natural infrastructure have been analyzed by the private sector, including the insurance specialist Lloyd's of London, which concluded in a 2016 report that, "[t]here is strong evidence that reefs and wetlands help protect coastlines under everyday circumstances by reducing wave energy and raising elevations."[8] State agencies in flood-prone areas along the Atlantic coast concur. The Mid-Atlantic Regional Council on the Ocean, a partnership of five Mid-Atlantic States, noted that, "[c]oastal wetlands can serve as an initial but important line of defense to protect coastal cities, towns and infrastructure from climate-related impacts by storage, conveyance, and wave attenuation."[9] Nationwide, NOAA has found that peak floods can be reduced by up to 60 percent in watersheds that contain 15 percent wetlands.[10] NOAA estimates that across the United States, coastal wetlands are estimated to provide $23.2 billion in storm protection services every year.[11]

Wetlands provided significant flood-buffering benefits to the states impacted by Hurricane Sandy. According to an analysis in *Scientific Reports*, coastal wetlands reduced flood heights and thus avoided more than $625 million in flood damages across the 12 coastal states affected by Hurricane Sandy, from Maine to North Carolina.[12] Among the four states with the greatest wetlands cover – Maryland, Delaware, New Jersey, and Virginia – wetlands are estimated to have reduced flood damages between 20 to 30 percent. Coastal wetlands in Virginia, Maryland, and Delaware also helped save the largest number of roadways from Sandy's damaging impacts

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[6] Bilkovic, D. M., Mitchell M., Mason P., and Duhring K. (2016). The Role of Living Shorelines as Estuarine Habitat Conservation Strategies. *Coastal Management. Vol. 44* (3): 161-174.
[7] National Oceanic and Atmospheric Administration and National Fish and Wildlife Foundation. (2018). National Fish and Wildlife Foundation and NOAA announce new coastal resilience funding. Retrieved from https://www.noaa.gov/media-release/national-fish-and-wildlife-foundation-and-noaa-announce-new-coastal-resilience-funding.
[8] Lloyd's Tercentenary Research Foundation. (2016). Coastal Wetlands and Flood Damage Reduction: Using Risk Industry-Based Models to Assess Natural Defenses in the Northeastern USA.
[9] Environmental Law Institute for the Mid-Atlantic Regional Council on the Ocean. (2017). Developing Wetland Restoration Priorities for Climate Risk Reduction and Resilience in the MARCO Region. Retrieved from https://www.eli.org/sites/default/files/eli-pubs/developing-wetland-restoration-priorities-climate-risk-reduction-and-resilience-marco-region.pdf.
[10] National Oceanic and Atmospheric Administration. Apply It: Understand – Conserving Coastal Wetlands for Sea Level Rise Adaptation. https://coast.noaa.gov/applyit/wetlands/understand.html. Accessed July 1, 2019.
[11] National Oceanic and Atmospheric Administration, Office for Coastal Management. Fast Facts: Natural Infrastructure. https://coast.noaa.gov/states/fast-facts/natural-infrastructure Accessed July 1, 2019.
[12] Narayan, S, et al,. (2017). The Value of Coastal Wetlands for Flood Damage Reduction in the Northeastern USA. *Scientific Reports.* No. 9463.

– about 833 miles. Overall, more than 1,400 miles of roads and highways were protected by wetlands during Hurricane Sandy.[13]

- *Eelgrass and seagrass beds:*

A variety of experts have evaluated the coastal resiliency benefits provided by eelgrass and seagrass beds. The National Institutes of Health reported that eelgrass can slow erosion and stabilize sediment loss by "attenuating hydrodynamic energy from currents and waves, and thereby trap suspended sediment and cause sediment accretion."[14] The roots of seagrass beds have been shown to mitigate erosion by decreasing or slowing wave impacts on nearshore areas.[15]

- *Oyster reefs:*

The American Planning Association (APA) and American Society of Civil Engineers (ASCE) examined elements of naturally resilient communities and concluded that oyster reefs can have a significant impact in moderating storm damages on nearby communities. "Oyster reefs serve as natural breakwaters – their physical structure absorbs the force of waves, creating calmer waters on the shoreline side of the reef and reducing the impacts of erosion. Studies from the Gulf of Mexico have found that oyster reefs are capable of reducing the energy of high power waves by as much as 76 to 93 percent."[16]

In fact, living shorelines constructed of oyster reefs have proven to be more effective than bulkheads in protecting shoreline areas. Researchers reported in the journal *Ocean & Coastal Management* that in North Carolina's Outer Banks, living shorelines protected nearby shoreline areas from the impact of Hurricane Irene, whereas 75 percent of regional bulkheads were damaged.[17]

- *Barrier islands, spits and dunes:*

In their evaluation of naturally resilient communities, the APA and ASCE examined the role that barrier islands and beaches can play in protecting upland communities from storm impacts, finding that "[b]eaches are capable of reducing impacts from coastal storms by acting like a buffer along the coastal edge and absorbing and dissipating the energy of breaking waves, either

[13] PBS News Hour. (2017). Wetlands stopped $625 million in Hurricane Sandy. Can they help Houston? Retrieved from https://www.pbs.org/newshour/science/wetlands-stopped-650-million-property-damage-hurricane-sandy-can-help-houston.
[14] Nordlund LM, Koch EW, Barbier EB, Creed JC (2016). Seagrass Ecosystem Services and Their Variability across Genera and Geographical Regions. *PLoS ONE Vol.11* (10).
[15] Norlund, L.M., et.al. (2018). Seagrass Ecosystem Services – What Next? *Marine Pollution Bulletin. Vol. 134* (145-151).
[16] Naturally Resilient Communities. Oyster Reefs. A http://nrcsolutions.org/oyster-reefs/. Accessed July 5, 2019.
[17] Gittman, R. K., A. M. Popowich, J. F. Bruno, and C. H. Peterson. (2014). Marshes with and without sills protect estuarine shorelines from erosion better than bulkheads during a Category 1 hurricane. *Ocean & Coastal Management Vol. 102* (94–102).

seaward or on the beach itself. Dunes serve as more of a barrier between the water's edge and inland areas, taking the brunt of larger storm surges."[18]

- *Additional benefits from natural infrastructure*:

In addition to providing storm-buffering benefits that can be as or more effective than grey infrastructure, there are benefits provided by natural infrastructure that are often absent in grey infrastructure, making natural infrastructure an even more appealing approach to floodplain management.

Natural Infrastructure can provide habitat that supports the economically vital recreational and commercial seafood industries. Wetlands not only absorb impacts from storms, thereby protecting upland communities from damaging impacts, they also provide vitally important habitat that is the lynchpin for the commercial and recreational fishing industries. According to Florida State University researchers, marshes in Florida provide up to $7,000 per acre in value for recreational fishing.[19] Barrier islands also play a vital role in protecting areas that are critical to commercial fishing. According to NOAA, barrier islands in Texas protect sheltered bays and estuaries from storm impacts, and these bays and estuaries are the foundation of a seafood industry that generates $846 million and supports more than 14,000 jobs.[20] Elsewhere in the Gulf of Mexico, 3.5 miles of oyster reefs significantly reduce the height and energy of waves while contributing to more than 6,900 pounds of additional commercial and recreational catch.[21]

Water quality benefits can also be achieved by using natural infrastructure alternatives that reduce excess nutrients. Along with stabilizing shorelines and preventing erosion, coastal wetlands can also "improve water quality by filtering, storing, and breaking down residential, agricultural and urban runoff."[22]

Grey infrastructure like seawalls, groins and jetties, cannot adapt to changes in the nearby environment. In contrast, wetlands and islands can be responsive to changing conditions and adapt to them, thereby continuing to provide storm protection benefits as well as habitat. As NOAA has observed, "Evidence suggests that coastal dunes dominated by native plants are better able to move inland in response to sea level rise while maintaining their integrity and protecting inland habitats and land uses."[23] NOAA has documented the responsive, adaptive

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[18] Naturally Resilient Communities. Beaches and Dunes. http://nrcsolutions.org/beaches-and-dunes/. Accessed July 5, 2019.

[19] Hughes, R. (2017). How Can We Prevent Salt Marsh Die-Off? *The WFSU Ecology Blog. Vol. 27.*

[20] NOAA Office for Coastal Management. Barrier Island Restoration. https://coast.noaa.gov/states/stories/barrier-island-restoration.html. Accessed July 5, 2019.

[21] Sutton-Grier, A. E., et al. (2015). Future of Our Coasts: The Potential for Natural and Hybrid Infrastructure to Enhance the Resilience of Our Coastal Communities, Economies and Ecosystems. *Environmental Science & Policy Vol. 51* (137–148).

[22] Environmental Law Institute for the Mid-Atlantic Regional Council on the Ocean. (2017). Developing Wetland Restoration Priorities for Climate Risk Reduction and Resilience in the MARCO Region. Retrieved from https://www.eli.org/sites/default/files/eli-pubs/developing-wetland-restoration-priorities-climate-risk-reduction-and-resilience-marco-region.pdf

[23] Environmental Law Institute for the Mid-Atlantic Regional Council on the Ocean. (2017). Developing Wetland Restoration Priorities for Climate Risk Reduction and Resilience in the MARCO Region. Retrieved from https://www.eli.org/sites/default/files/eli-pubs/developing-wetland-restoration-priorities-climate-risk-reduction-and-resilience-marco-region.pdf

behavior displayed by oyster reefs and eelgrass beds. These coastal resiliency benefits "are increasingly important to buffer shorelines against sea level rise and increased storm surge and frequency."[24]

Grey infrastructure, such as seawalls, jetties, groins, and bulkheads, can exacerbate erosion in nearby areas, intensifying flood risks for properties and communities located in the erosion-impacted areas. Researchers with the University of Pennsylvania and the Pennsylvania State University documented these impacts, noting that, "when seawalls are constructed on eroding beaches, the erosion continues so that the beach in front of the seawall can become very narrow or disappear completely. And while groins and jetties trap sediment on the updrift side resulting in shoreline accretion, there is corresponding shoreline erosion on the downdrift side due to the interruption in longshore transport."[25] Natural infrastructure, such as oyster reefs, restored wetlands, living shoreline installations, and green spaces provide flood protection benefits without negative impacts in nearby areas.

The Army Corps implementation guidance around WRDA 2018 Section 1149 (c) states that the Corps is already implementing this provision. However, the Congressional intent of producing more robust analysis and greater use of natural infrastructure alternatives has in fact not come to fruition. Looking ahead to WRDA 2020, additional efforts to overcome hurdles related to the benefit-cost analysis and other issues that can enable the Army Corps to make greater use of natural infrastructure should be pursued.

3. **Beneficial Use of Dredged Material:**

WRDA 2018 Section 1130 authorized a two-fold increase in the number of beneficial use of dredged materials (BUDM) pilot projects. Audubon has worked with the Army Corps and state partners to use dredged material to restore habitat that is important to birds and outdoor recreation economies. This work has created and restored islands that provide excellent nesting habitat for seabirds and shorebirds, including state-listed species of conservation concern such as Black Skimmers, American Oystercatchers, and Least Terns, and is leading innovations in thin-layer dispersal of dredged sediment to protect tidal marsh habitat in the face of sea-level rise. Audubon looks forward to building upon our collaborative efforts in Connecticut, North Carolina, Maine, Maryland, Florida and Texas. In South Carolina, Audubon is working to implement the Crab Bank project that was selected as a BUDM pilot project in 2019.

To further facilitate the continued use and expansion of this important win-win program, funding must be dedicated to its implementation. A number of projects selected as pilot efforts under WRDA 2018 Section 1130 and WRDA 2016 Section 1122 have only been able to proceed using funding from the Army Corps Continuing Authorities Program because appropriations for the program has not followed the new authorizations.

[24] NOAA, California Coastal Conservancy, et al. (2017). Case Studies of Natural Shoreline Infrastructure in Coastal California. Retrieved from http://scc.ca.gov/files/2017/11/tnc_Natural-Shoreline-Case-Study_hi.pdf

[25] University of Pennsylvania, The Pennsylvania State University, et al, "Coastal Processes, Hazards, and Society." https://www.e-education.psu.edu/earth107/node/1066

In addition, Audubon supports on-going efforts within the Army Corps to develop and implement best management practices for coastal engineering projects that benefit shoreline-dependent species that can be incorporated into beneficial use of dredged material projects. More information can be found in a recent U.S. Army Engineer Research and Development Center Technical Note.[26]

4. **Ensuring new projects avoid adverse environmental impacts**

As projects authorized or approved in WRDA 16 and WRDA 18 advance, significant effort must be made to avoid adverse environmental impacts. For example, Audubon has expressed opposition to any projects or activities on the Pearl River in Mississippi, that involve destroying wetlands and wildlife habitat that will imperil birds, fish and wildlife, alter local and downstream river hydrology, impair water quality and threaten public and environmental health.

In WRDA 2018, Section 1176 sought to establish a demonstration program to advance a 2018 Integrated Draft Feasibility and Environmental Impact Statement for the Pearl River Basin, Mississippi, Federal Flood Risk Management Project, Hinds and Rankin Counties, Mississippi. The plan was prepared by the Rankin-Hinds Pearl River Flood and Drainage Control District, whose preferred alternative is known locally as the "One Lake" project.

WRDA 2018 Section 1176(b) directs "the Secretary to determine that the project is technically feasible, economically justified, and environmentally acceptable," while Section 1176(d) acknowledges that "the non-Federal sponsor shall design the project in a manner that addresses any potential adverse [downstream] impacts [to the Pearl River Basin] or that provides mitigation." These requirements must be specifically adhered to if the projects proceeds. Before the Secretary performs any project review, all Environmental Impact Statement and Feasibility Study documents must fully comply with all required federal laws. This must include, but not be limited to the National Environmental Policy Act, provisions of Water Resources Development Act of 1996, Clean Water Act, Endangered Species Act, Fish and Wildlife Coordination Act, Marine Mammal Protection Act, Coastal Zone Management Act, and the Rivers and Harbors Act. This information also must be officially noticed in the Federal Register with proper and timely review provided to the public, natural resource agencies, and other interested stakeholders.

The study cannot be limited to the proposal's immediate footprint but must be expanded to fully encompass rigorous upstream and downstream modeling and associated scientific analyses for all river miles above and below the proposed activity, including the coastal zones of Mississippi and Louisiana.

The Pearl River is a 490 mile-long waterway, shared by Mississippi and Louisiana, which is recognized as one of the most intact river systems in the southeast U.S. while serving as a major

[26] Guilfoyle, M.P., Jung J.F., Fischer R.A. and Dickerson, D.D. (2019). Developing Best Management Practices for Coastal Engineering Projects that Benefit Atlantic Coast Shoreline-dependent Species. Technical Note developed by the U.S. Army Engineer Research and Development Center - Environmental Laboratory.

input of freshwater into the Gulf of Mexico. Thus, a Programmatic EIS should be required to thoroughly quantify any demonstration project's primary, secondary, and cumulative impacts on the basin's flora and fauna. This should include at a minimum, impacts on downstream natural resources and existing industrial users and commercial sectors (i.e., seafood, tourism), Important Bird Areas, 125,000+ acres of existing conservation lands, alterations to wetland habitats that help to protect communities from flooding and storm events, and impacts to multi-million dollar restoration projects planned or underway across the Central Gulf Coast.
Over the past forty years, there has been an effort to address flooding in the Pearl River Basin. Several flood control plans have been developed. Many of these plans have inappropriately incorporated economic development as a goal. Any demonstration program should place priority on natural infrastructure solutions, as discussed above and should be required to evaluate less ecologically damaging and more comprehensive flood control measures. Some examples include flood-proofing existing homes and buildings; better management of existing infrastructure (i.e., Ross Barnett Reservoir); selectively elevating structures, buy-outs or relocations; setbacks from existing levees; floodplain restoration within the river basin; and development and implementation of a comprehensive flood and stormwater Master Plan for metropolitan areas (i.e., City of Jackson) to coordinate water management. A detailed, publically vetted mitigation plan should be submitted to and approved by the Secretary and the appropriate funding for mitigation set aside in a secure fund allocated for this express purpose.

Any and all mitigation required for activities in the Pearl River Basin should be in-kind, occur within the established watershed boundary, and be identified and tentatively procured prior to the Secretary's approval.

5. **Preliminary Views looking ahead to the next Water Resources Development Act**

As development of the next WRDA begins, ecosystem restoration and the use of natural infrastructure should be prioritized. As climate change creates more challenges associated with stronger storms, increased flooding in some areas and drought in others, projects directed toward providing ecological benefits can increase climate resiliency. It is more efficient to invest in projects that increase resiliency than to react after an extreme weather event occurs.

Audubon also supports robust funding for the Clean Water State Revolving Fund and other programs that provide financing to help communities address water quality and water management infrastructure needs.

Attempts to exempt Army Corps projects from environmental laws should also be rejected. As innovative efforts continue to advance projects more quickly, compliance with environmental laws can ensure that projects benefit both birds and people.

Thank you again for the opportunity to testify on these important issues. Audubon is ready to work with the Subcommittee and others to advance important water conservation issues looking ahead to the next Water Resources Development Act in ways that will help protect birds and the places they need. We know that where birds thrive, people prosper.