REPI

UNITED STATES DEPARTMENT OF DEFENSE
READINESS AND ENVIRONMENTAL PROTECTION INTEGRATION PROGRAM

2023 NATIONAL COASTAL RESILIENCE FUND DEPARTMENT OF DEFENSE RECIPIENTS

DOD REPI Program Contributions to the National Coastal Resilience Fund

The Department of Defense's (DOD) Readiness and Environmental Protection Integration (REPI) Program is a key tool for the Military Services and their partners to preserve compatible land uses outside installations and ranges. The REPI Program safeguards DOD testing and training missions by conserving natural landscapes that provide realistic training conditions, protecting species to alleviate endangered species restrictions, and increasing resilience to climate change through nature-based solutions. To accelerate the development of nature-based solutions outside installations and ranges, the REPI Program established a partnership with the National Fish and Wildlife Foundation (NFWF) in 2020. This partnership expands opportunities for DOD to conserve wildlife habitats, protect at-risk species, and reduce risks from extreme weather events across coastal installations.

Through the REPI-NFWF partnership, the REPI Program contributes funding annually to NFWF's National Coastal Resilience Fund (NCRF) to enable projects that preserve natural environments in support of military mission capabilities. NCRF projects that receive REPI funding restore, increase, and strengthen coastal habitats to benefit communities, species, and the military alike.

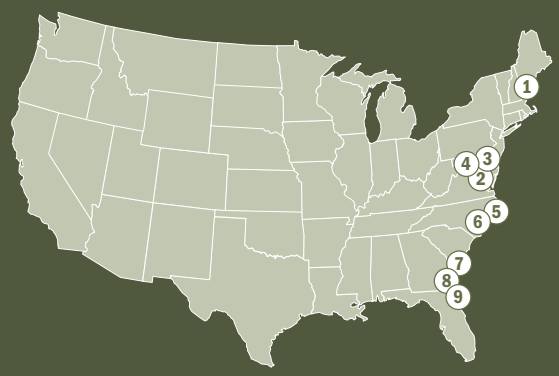
2023 National Coastal Resilience Fund Projects Benefit Missions for Every Service

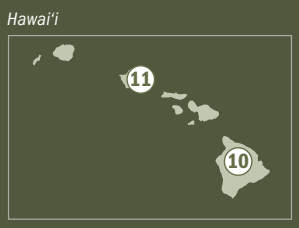
This year, NFWF will award over $144 million to 109 projects across 31 states and territories. Of this $144 million, the REPI Program is contributing $15 million in REPI Challenge funding to 11 NCRF projects that use nature-based solutions to protect key coastal installations. The 11 projects neighboring DOD installations received over $5.5 million in matching funds from non-federal partners and $336K from the National Oceanic and Atmospheric Administration (NOAA). By leveraging funding from multiple Federal and non-federal sources, DOD installations and their partners are advancing project planning, development, and implementation at a rate that would be unachievable by DOD alone.

A CH-53K test aircraft prepares for a night flight test at NAS Patuxent River, MD. (Photo by Victoria Falcon)

2023 National Coastal Resilience Fund Project Locations

1. **Portsmouth Naval Shipyard (Maine)** | REPI Funds: $520K
2. **Naval Air Station Patuxent River (Maryland)** | REPI Funds: $2.4M
3. **U.S. Naval Academy and Naval Support Activity Annapolis (Maryland)** REPI Funds: $843K
4. **Blossom Point Research Facility (Maryland)** | REPI Funds: $1.5M
5. **Marine Corps Auxiliary Landing Field Bogue (North Carolina)** REPI Funds: $297K
6. **Eastern North Carolina Sentinel Landscape** | REPI Funds: $1.5M
7. **South Atlantic Salt Marsh Initiative (Florida, Georgia, South Carolina, and North Carolina)** | REPI Funds: $1.4M
8. **Naval Submarine Base Kings Bay (Georgia)** | REPI Funds: $378K
9. **Naval Base Mayport (Florida)** | REPI Funds: $539K
10. **Pōhakuloa Training Area (Hawai'i)** | REPI Funds: $2M
11. **Marine Corps Base Hawai'i (Hawai'i)** | REPI Funds: $3.6M





For more information about the REPI Program, please visit repi.mil.

Project Summaries

1. Portsmouth Naval Shipyard, *Maine*

Strengthening Community and Military Resilience Through Tidal Wetland Enhancement and Infrastructure Adaptation in Kittery Maine

- Portsmouth Naval Shipyard is one of the four remaining naval shipyards in the nation. The shipyard's primary mission is the overhaul, repair, and modernization of Los Angeles-class submarines, including providing engineering services, production shops, and off-site support.
- The shipyard is situated on Seavey Island between the Piscataqua River, so base access is limited to only two roadways, including Route 103. This route and the neighboring Route 1 serve as emergency evacuation routes, are critical to the installation's shipments and deliveries, and face risks of coastal inundation from sea level rise.
- To respond to the sea level rise concerns and protect habitat in the adjacent tidal marsh, this project will develop conceptual designs for nature-based solutions along Routes 1 and 103 and include extensive community outreach to inform which solutions should move forward to implementation.

USS California (SSN 781) departs for sea trials after completing a scheduled maintenance period at the Portsmouth Naval Shipyard in Kittery, Maine. (U.S. Navy photo by Jim Cleveland)

REPI Funds: $520K
Partner Contributions: $26K

Total: $546K

PARTNER ORGANIZATION
Southern Maine Planning and Development Commission

2. Naval Air Station Patuxent River, *Maryland*

Living Shoreline and Terrapin Habitat Restoration Near Naval Air Station Patuxent River

- Located along the Patuxent River, Naval Air Station Patuxent River is the Navy's full spectrum acquisition, research, development, test, evaluation, and engineering and fleet support activity for manned and unmanned aircraft, engines, avionics, aircraft support systems, and ship, shore, and air operations. With more than 165,000 air operations annually, Service Members at Patuxent River fly 140 different aircraft over 780 restricted and 5,000 controlled square miles.
- Areas neighboring NAS Patuxent River, including Hog Point, are vulnerable to sea level rise and strong wave energy that has exposed the shoreline and accelerated erosion. Historically, more than 30 acres have been lost to erosion around Hog Point since 1848, and current projections suggest the sea level rise near Hog Point could rise an additional 18 inches within the next 30 years.
- To reduce these coastal risks, the installation is constructing 4,870 linear feet of living shoreline along the Patuxent River to safeguard two key Navy helicopter landing zones and the habitat for the at-risk Northern Diamondback Terrapin. This project will fund nature-based solutions along the final 1,200 feet of shoreline, including creating offshore breakwaters, restoring inland marsh habitat, and regrading steep cliff banks.

An MV-22B Osprey assigned to Air Test and Evaluation (HX) Squadron 21 of Naval Air Station (NAS) Patuxent River, MD, flies over the Military Sealift Command hospital ship USNS Mercy (T-AH 19). (U.S. Navy photo by Mass Communication Specialist 3rd Class Luke Cunningham)

REPI Funds: $2.4M
Partner Contributions: $2.7M

Total: $5.1M

Partner Organization
Southern Maryland Resource Conservation and Development Board, Inc.

3. U.S. Naval Academy and Naval Support Activity Annapolis, *Maryland*

Restoring Oyster Reefs and Improving Resilience in Severn River Through Community Engagement

- The U.S. Naval Academy has been educating Midshipmen in preparation for naval careers since 1845. Naval Support Activity Annapolis neighbors the Naval Academy and provides material, personnel, and service support by maintaining small craft, equipment, and facilities for Midshipmen training.
- Over the past 50 years, Annapolis has experienced a 925% increase in annual nuisance flooding events, the greatest increase recorded for any U.S. city. This nuisance flooding and threats from sea level rise impact the daily operations of the Naval Academy and Naval Support Activity Annapolis through road closures and damage to critical infrastructure.
- To address these challenges, this project will restore six acres of oyster reef, plant 30 million spat-on-shell oysters, and plant 1,000 bushels of recycled oyster shells in the Severn River. This project will also engage community members by recruiting 35 oyster gardeners per year and training six early-career environmental professionals through internships. Through this project, partners will improve installation resilience, increase biodiversity, and improve water quality.

The U.S. Naval Academy Drum and Bugle Corps performs in the second formal parade of the season. (U.S. Navy photo by Kenneth D. Aston Jr.).

REPI Funds: $843K
Partner Contributions: $244K

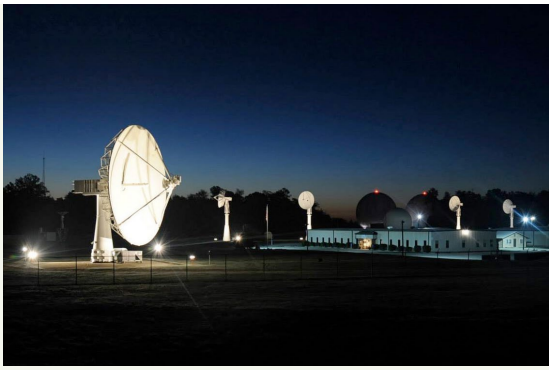
Total: $1.1M

PARTNER ORGANIZATION
Chesapeake Bay Foundation, Inc.

4. Blossom Point Research Facility, *Maryland*

Final Design and Permitting for the Blossom Point Shoreline Stabilization Project

- Blossom Point Research Facility (BPRF) is a 1,600-acre Army testing range located at the southern end of Charles County, Maryland. BPRF consists of multi-purpose test ranges with numerous applications, including small arms testing, storage facilities, and a state-of-the-art space command and control facility for the Naval Surface Warfare Center to execute energetic testing.
- Located along the Nanjemoy Creek, BPRF has experienced multiple erosion events in recent years, such as a historic windstorm in 2019 and a Nor'Easter in 2022, both of which caused 20 feet of landward erosion in one day. As part of the Lower Potomac River Mesohaline, this area also frequently experiences Total Maximum Daily Loads for sediment and nutrients, leading to poor water quality and habitat degradation.
- To improve BPRF's resilience, this project will prepare final design and permitting plans for stabilizing 2 miles of shoreline along the Najemoy Creek waterfront and re-establishing nearly 10 acres of aquatic habitat using living shorelines.



The U.S. Naval Research Laboratory's (NRL) Blossom Point Tracking Facility (BPTF) provides command and control (C2) for the Space Development Agency (SDA) Tranche 0 (T0) mission Launch 2. (U.S. Naval Research Laboratory photo by Jamie Hartman)

REPI Funds: $1.5M
Partner Contributions: $43K

Total: $1.6M

Partner Organization
GreenTrust Alliance

5. Marine Corps Auxiliary Landing Field Bogue, *North Carolina*

Ecological, Community, and Military Resilience Through Spoil Island Restoration in Bogue Sound

- Marine Corps Auxiliary Landing Field Bogue provides expeditionary airfield support and contingency runway training capabilities to Marine Corps Air Station Cherry Point for fixed-wing, rotary, and tiltrotor aircraft and ground support units. The installation training areas extend to the Bogue Sound shoreline to allow for ship-to-shore surface connectors in support of amphibious operations.
- The Bogue Sound has numerous spoil islands created from dredged materials to help with buffering wave energy from boats, supporting shallow-water aquatic species, and creating new nesting, stopover, and forging habitats. In recent decades, the spoil islands have experienced significant erosion, leading to certain islands being breached, and are expected to have 1.5 feet of sea level rise by 2050.
- To stabilize and restore the spoil islands, this project will support the final design and permitting for a suite of nature-based solutions in the Bogue Sound, including oyster sills and oyster reef enhancement, salt marsh plantings, and passive seagrass restoration. It is anticipated that a total of 2.5 acres of seagrass beds will be restored through natural regeneration, along with 850 linear feet of salt marsh.

Marines parachute to their landing point during parachute operations training at Marine Corps Auxiliary Landing Field Bogue, NC. (Photo by Marine Corps Lance Cpl. Deja Thomas)

REPI Funds: $297K
Partner Contributions: $150K

Total: $447K

PARTNER ORGANIZATION
North Carolina Coastal Federation, Inc.

6. Eastern North Carolina Sentinel Landscape

Advancing Community-Led Resilience Initiatives in a Sentinel Landscape

- Home to seven key military installations and ranges, the Eastern North Carolina Sentinel Landscape hosts a diverse set of mission capabilities and units for DOD, including U.S. Army Special Operations Forces, operational missions with F-15E Strike Eagles, and the Marine Corps School of Infantry.
- Across the state, recent extreme weather events, including Hurricanes Matthew and Florence have caused severe damage and disruptions to the communities and installations. The First Street Foundation reported in its 8th National Risk Assessment that North Carolina is expected to experience a 100-year flooding event every 5-20 years.
- This capacity-building project will support flood resilience planning efforts outside three key defense installations using advanced hydrologic and hydraulic modeling. Results from these models will be used across multiple stakeholder events to educate community members and align nature-based solutions to flood-prone areas near Seymour Johnson Air Force Base, Marine Corps Base Camp Lejeune, and Fort Liberty.

Air Force crew chiefs perform maintenance checks on an F-15E Strike Eagle at Seymour Johnson Air Force Base, N.C., April 25, 2019. (Photo by Air Force Senior Airman Alexander Cook)

REPI Funds: $1.5M

Total: $1.5M

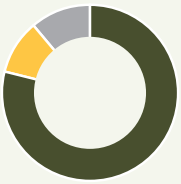
Partner Organization
NC Foundation for Soil and Water Conservation, Inc.

7. South Atlantic Salt Marsh Initiative, *Florida, Georgia, South Carolina, and North Carolina*

Building Capacity to Conserve Salt Marsh Habitat within Coastal Communities

- According to the National Oceanic and Atmospheric Administration, an estimated 14% to 34% of existing salt marshes along the South Atlantic could be lost by 2060 due to sea level rise. Salt marsh in the South Atlantic alone shields over a dozen military installations and training grounds from storm surge and coastal flooding.
- To enhance the long-term abundance and health of 1 million acres of salt marshes within the South Atlantic states, the Southeast Partnership for Planning and Sustainability created the South Atlantic Salt Marsh Initiative to bring together interested stakeholders and obtain funding necessary to accomplish landscape-scale restoration.
- This project will leverage a combination of community outreach and engagement techniques to identify nature-based solutions that are best suited to move forward for project design, permitting, and implementation. At the end of this capacity-building project, partners will select 20-25 project designs to reduce impacts from sea level rise, improve species habitat, and safeguard military infrastructure.

Air Force Maj. Paul Lopez, the commander of the F-22 Demonstration Team, flies above the Blue Angels' iconic diamond formation over Beaufort, SC. (Photo by Air Force 2nd Lt. Samuel Eckholm)



REPI Funds: $1.4M
NOAA Funds: $196K
Partner Contributions: $175K

Total: $1.8M

PARTNER ORGANIZATION
LegacyWorks Group

8. Naval Submarine Base Kings Bay, *Georgia*

Designing for Resilience Through Estuary Restoration in St. Marys Defense Community

- Naval Submarine Base Kings Bay is an integral part of the nation's strategic deterrence program, serving as the homeport for five Ohio-Class Trident submarines and two guided missile submarines. The installation also provides support to three major commands: the Trident Training Facility, the Strategic Weapons Facility, and the Trident Refit Facility.
- Situated in coastal Georgia, the installation faces continuous threats from flooding, sea level rise, and extreme weather events. The installation borders the town of St. Marys, which has experienced nine inches of sea level rise in the past century and has approximately 62% of the town in a Federal Emergency Management Agency designated Special Flood Hazard Area.
- This project will create designs for a new stormwater park in downtown St. Marys that will restore wetlands and create alternate areas for runoff and retention during extreme precipitation events. By returning the area to a natural state, this project will help reduce risks across the developed areas in the region, prevent road closures, and establish new estuary habitat.

The Ohio-class guided-missile submarine USS Georgia (SSGN 729) returns to homeport at Naval Submarine Base Kings Bay, GA, after a 790-day forward-deployment. (U.S. Navy photo by Chief Mass Communication Specialist Ashley Berumen)

REPI Funds: $378K
NOAA Funds: $139K
Partner Contributions: $43K

Total: $560K

Partner Organization
St. Marys, Georgia

9. Naval Base Mayport, *Florida*

Designing Shoreline Restoration to Protect Waterfront and Navy Base at Mayport

- Naval Base Mayport is the third-largest Navy fleet concentration area in the country. The installation can accommodate 34 ships and has an 8,000-foot runway capable of handling any aircraft in the Department of Defense inventory.
- Located in Jacksonville, Florida, the installation and surrounding community face continued risks from flooding, hurricanes, and shoreline erosion. One roadway neighboring the installation, State Highway A1A, serves as the installation's primary evacuation route and is in a Federal Emergency Management Agency Flood Zone A, meaning it is in a high-risk area for flooding.
- To restore the land along Highway A1A and reduce further shoreline erosion, this project will establish designs for nature-based solutions along 1,000 to 2,000 linear feet of shoreline. To ensure solutions are adequate for the region, project partners will use a suite of models to evaluate different climate scenarios and predict future shoreline changes, including tidal hydrodynamics, coastal morphology, and hurricane storm surge and waves.

The Royal Canadian Navy Halifax-class frigate HMCS Charlottetown (339) pulls into Naval Station Mayport for a scheduled port visit. (U.S. Navy photo by Mass Communication Specialist 1st Class Brandon J. Vinson)

REPI Funds: $539K
Partner Contributions: $29K

Total: $568K

PARTNER ORGANIZATION
University of Georgia Research Foundation, Inc.

10. Pōhakuloa Training Area, *Hawai'i Island*

Creating a Community-Based Resilience and Watershed Management Plan in Hilo Bay

- The Hilo Bay Watershed area is home to a diverse marine ecosystem, the primary commercial port for the County of Hawai'i, and recreation opportunities for the community, such as surfing, fishing, and outrigger canoe paddling. Since 1964, researchers have been aware of the degraded water quality in the watershed and have completed several studies and reports to monitor and propose solutions for improving the water quality in Hilo Bay.
- One of the most recent studies completed by the U.S. Army Corps of Engineers' Civil and Public Works Branch, "Hilo Bay Watershed Planning Assistance to States," recommended developing a watershed plan that provides all relevant stakeholders with a roadmap of priorities, strategies, policies, programs, and projects.
- This project will create a multi-disciplinary plan that includes a Watershed Management Plan, a suite of nature-based solutions for the watershed, and community stories, reflections, cultural practices, and images to highlight the community's work. To develop the plan, the County will work with nearly 40 agencies and organizations, including the Department of Army at Pōhakuloa Training Area, Hui Hoʻoleimaluō, the Pacific Islands Fisheries Group, and many others.

Marines maneuver to secure a notional enemy position at Pōhakuloa Training Area, Hawai'i Island, as part of Rim of the Pacific exercise. (Marine Corps photo by Lance Cpl. Adam Montera)

REPI Funds: $2M
Partner Contributions: $464K

Total: $2.5M

Partner Organization
County of Hawai'i

11. Marine Corps Base Hawai‘i, *O‘ahu*

Restoring He‘eia Coastal Community Through Wetlands Restoration

- In 2017, the He‘eia Reserve received an official designation from the National Oceanic and Atmospheric Administration as one of the 30 areas in the National Estuarine Research Reserve System. This critical estuary provides habitat for important endemic species, including the federally endangered Hawaiian stilt, Hawaiian moorhen, Hawaiian coot, Hawaiian duck, and Hawaiian hoary bat.
- Over time, land use changes and invasive species have displaced native plants and animals and disrupted the natural flow of water through the estuary. To retain and recharge freshwater, slow and diffuse storm pulses, remove sediment, promote fish habitat, and provide a nursery habitat for resource fish, this project will develop a constructed wetlands system to restore the ecological function of the estuarine system.
- Kāko‘o ‘Ōiwi will work in partnership with The Nature Conservancy, He‘eia National Estuarine Research Reserve, and the State of Hawai‘i Division of Aquatic Resources to restore 24 acres of wetlands, implement 20 acres of traditional agriculture integrated systems, protect 88 acres of a traditional fishpond floodplain detainment basin, and enhance 6 miles of coral reef shoreline in southern Kāne‘ohe Bay outside Marine Corps Base Hawai‘i.

Marines perform routine maintenance on an MV-22B Osprey at at Marine Corps Air Station Kāne‘ohe Bay, O‘ahu. (Marine Corps photo by Cpl. Logan Beeney)

REPI Funds: $3.6M
Partner Contributions: $1.7M

Total: $5.3M

PARTNER ORGANIZATION
Kāko‘o ‘Ōiwi