



*Living shorelines installed at Rivercamps in St. Andrew Bay
© Darryl Boudreau*



A Framework for the Implementation of a Regional Approach to Nature-Based Solutions in the Florida Panhandle

**The Nature Conservancy Gulf of Mexico Program
April 2024**



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SUMMARY

Following the devastation of Category 5 Hurricane Michael to the Florida Panhandle in 2018, The Nature Conservancy's Gulf of Mexico Program, Northeastern University, and the U.S. Naval Academy conducted a study supported by the Walton Family Foundation which revealed that natural features, like tidal marshes, mitigated damage and enabled recovery as effectively, or in some cases more effectively, than hard infrastructure like sea walls.

Given this finding, TNC's Gulf Program then partnered with the Northwest Florida Water Management District and the St. Andrew and St. Joseph Bays Estuary Program with support from the NOAA/NFWF National Coastal Resilience Fund, to work with local governments and other organizations to identify opportunities for Nature-based Solutions (NBS) that would make Franklin, Gulf and Bay Counties more resilient to the impacts of storms and sea-level rise while providing benefits to fish and wildlife, outdoor recreation, and the local economy.

Most recently, with support from the Walmart Foundation, the SUNS partnership has provided technical assistance to multiple local governments and underserved communities to move projects identified in the SUNS portfolio to feasibility analysis, design and construction.

Nature-Based Solutions are projects that use natural features and processes to reduce storm damage and other negative impacts of a changing climate while also providing environmental, economic, and social benefits.

Over the course of the SUNS project, it became clear that, while implementation of the SUNS portfolio of individual projects will produce substantial benefits, linking/integrating multiple NBS within a community will provide the best protection and maximize community resilience. Creating a network of NBS projects within a community / region, will help maintain the natural character of the community and protect the natural cultural relationship between people and Gulf Coast landscapes. Identifying connections among projects can foster cooperation and synergy among Florida Panhandle communities, enhance individual project goals, including improving the quality of the natural environment, accelerate the pace and reduce the cost of project implementation, and facilitate the execution of projects at larger, more impactful scales.

This paper defines the various kinds of NBS project connections and their benefits, provides examples of how connected projects can create regional benefits, and explains the steps necessary to move them forward.

Over the long run, multiple connected NBS projects can produce a regional landscape where restored and linked marshes, freshwater wetlands, oyster reefs, vegetated dunes and coastal forests are interspersed with developed areas. These natural features can afford substantial protection to communities from Category 1 and 2 hurricanes as well as the more frequent and intense "non tropical" rainfall events Gulf Coastal communities are now facing. Critical infrastructure can be protected by a combination of NBS and traditional storm defenses. Damage from major hurricanes can be reduced by reinforced and elevated buildings in combination with NBS. Reforested areas can reduce periodic flooding. This interplay of built-up and "natural" areas can be sustainable in this era of a changing climate.



GulfCorps crews help with clean up from Hurricane Michael.
© Mike Dumas/ TNC

INTRODUCTION

The Aftermath of Hurricane Michael

In October 2018, Hurricane Michael made landfall in the Florida panhandle as a powerful Category 5 storm, causing loss of life, major damage to many communities, and widespread catastrophic impacts to the areas around Mexico Beach and Tyndall Air Force Base. The storm also significantly impacted the landscape by eroding beaches, knocking down forests and urban trees, and causing acute local flooding. In the aftermath of the storm, a study led by The Nature Conservancy (TNC), Northeastern University, and the US Naval Academy demonstrated the importance of considering green spaces and natural and nature-based features as part of a holistic portfolio of investments for increasing the resilience of coastal communities to future storms and sea level rise. The study was also a foundation for the Scaling Up Nature-based Solutions (SUNS) project by confirming that the area affected by Hurricane Michael would be a good place to work with local communities to ensure that Nature-Based Solutions are fully considered as part of the region's overall recovery planning.

Nature-based Solutions

Nature-based solutions, or NBS, are projects that are motivated and supported by nature and typically also provide environmental, economic, and social benefits, while increasing resilience. This is an umbrella concept that covers a range of approaches, including restoration, management, conservation, and nature-based infrastructure.

Many smaller and underserved urban and rural communities are the most vulnerable to natural disasters and typically do not have the staffing or resources to fully consider NBS approaches during recovery operations. As a result, without the support of external resources, these communities will not be able to consider/implement NBS projects as part of their recovery—missing the opportunity to improve their resilience and the other benefits NBS solutions provide.



County Rd 30A Protected

Hybrid Rock and Vegetation Revetment

Rock Sills or Oyster Reef Units

Horizontal Levee and Marsh
Grass/Tidal Creek Restoration

THE SUNS PROJECT

To address these challenges, TNC joined with the Northwest Florida Water Management District and the St. Andrew and St. Joseph Bays Estuary Program to develop and implement the SUNS project with the support of a grant from the National Fish and Wildlife Foundation's National Coastal Resilience Fund. The goals of SUNS were to:



- Provide local government staff, planners, and communities with **decision making knowledge and tools** to inform the use of nature-based solutions as part of their overall efforts to recover from storms by building more durable infrastructure.
- Develop and facilitate a regional, **stakeholder-based planning process** to create a **prioritized portfolio of nature-based solution investments** across the project area.
- Encourage adoption and implementation of the portfolio by **providing technical assistance and capacity building support to local governments**.

Creating the SUNS Portfolio

To achieve these goals, the SUNS Project team convened a Working Group composed of representatives of local governments, regional planning councils, state agencies, and local stakeholders to inform the SUNS planning process and develop the portfolio of potential nature-based solutions projects in Franklin, Gulf, and Bay counties. To craft the SUNS Portfolio, the SUNS project team hosted a four-part virtual workshop series that ran from January through April of 2022. The SUNS project team facilitated a process that relied on using maps showing NBS Opportunity Areas, existing projects, priority locations, and supporting data (such as sea level rise scenarios) to develop potential NBS project ideas across the region. The facilitated workshop series resulted in 143 potential NBS projects across the tri-county region.



Opportunity Areas Each NBS type has an Opportunity Map

Identifies where a given NBS type is:

- Likely suitable to implement
- In an area of coastal risk
- In an area of medium or high value for fish and wildlife habitat

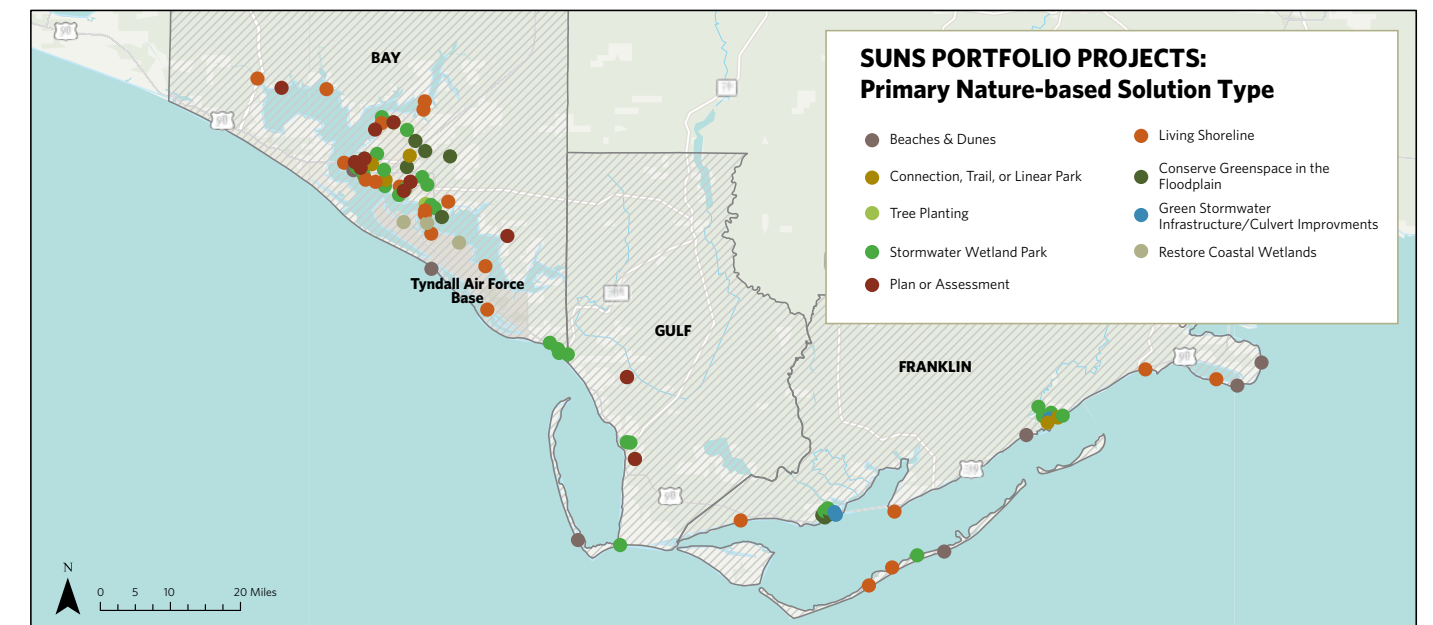
Opportunity areas help focus the conversation for developing project areas.

- Opportunity areas for Protecting Wetlands Migration Pathways
- Opportunity areas for Protecting Coastal Wetlands
- Opportunity areas for Conserving Land in the Floodplain



SUNS Working Group members met at Black's Island in St. Joseph Bay on May 15th, 2023 to mark the release of the SUNS Portfolio February 2023 Report. © Trysha Scott

To prioritize the project ideas for potential inclusion in the SUNS Portfolio, project concepts were scored using selection criteria that aligned with guiding principles defined by the SUNS Working Group. SUNS Working Group members were given the opportunity to adjust scores based on local knowledge and provide feedback to the SUNS teams on their project preferences. The SUNS project team worked closely with working group members to merge project ideas where feasible and confirm final projects selected for inclusion in the SUNS Portfolio. The final SUNS portfolio consists of **73 NBS projects, 11 plans or assessments, and 5 connector projects** such as linear parks and trails ([see the SUNS Report](#)).



The SUNS Portfolio consists of 72 nature-based solution projects, 11 plans or assessments, and 5 connector projects such as linear parks and trails. This map shows the location of the projects in the SUNS Portfolio displayed by project type. The project concepts are all at different phases of development and implementation. The SUNS team will be providing capacity and support to advance as many projects as possible towards completion through at least 2023.

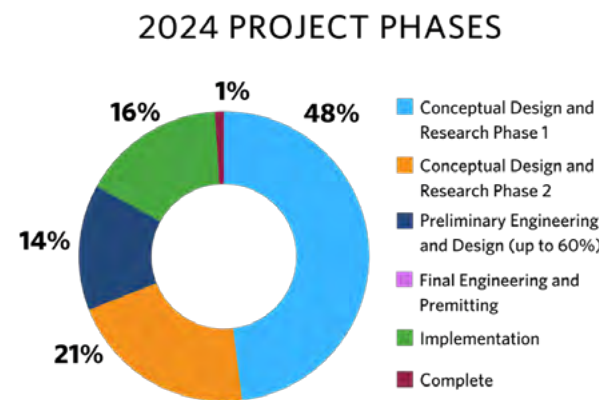
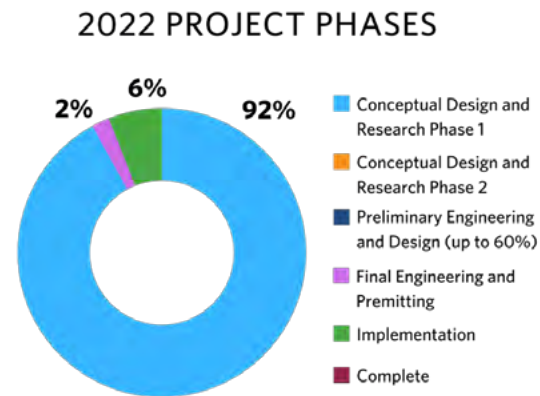
Implementing Individual Projects in the SUNS Portfolio

For smaller, rural and underserved municipalities and agencies, the tasks involved in moving multiple coastal resilience projects to funding and construction can present significant obstacles for limited staff with multiple responsibilities. And so, with the development of the portfolio of SUNS projects, the SUNS project team shifted into a capacity building and support role through an additional grant from the Walmart Foundation to help translate the SUNS region-wide planning into tangible results. The SUNS project team is working closely with local governments and partners to further refine the SUNS portfolio of projects and provide technical and financial support to advance those that are most impactful and viable.

Identification of individual NBS sites through the SUNS process includes understanding the basic strategic value of each site and the practicality of implementation, but it is just a first step toward implementation on the ground.

Since creation of the SUNS portfolio of projects, the SUNS project core team, with staff support from The Nature Conservancy, Northwest Florida Water Management District, and St. Andrew and St. Joseph Bays Estuary Program, has moved fifty-five (55) projects further along the pipeline from project concept toward implementation. This pipeline has involved close coordination with project partners to undertake early project concept profiles and renderings, engineering surveys, preliminary design drawings, and permitting processes all to achieve the shovel-readiness needed to secure funding for eventual implementation.

However, these individual NBS projects are not sufficient to make the Florida panhandle region resilient to the impact of a changing climate, so the SUNS project and this report suggest how NBS projects can be connected to achieve more effective regional resilience results.



The above graphics depict the progression of projects from conceptual design and research, through engineering and design, permitting, and implementation. The public can continue to track progress of various projects at the [SUNS Florida Panhandle Projects Dashboard](#)



Early installation of saltmarsh plantings and breakwater materials at the Franklin 98 Living Shoreline project (Franklin County). © Darryl Boudreau, NWFWMMD

CONNECTING SUNS PROJECTS: A BROADER REGIONAL VISION

The three Florida Panhandle counties most impacted by Hurricane Michael in 2018 and the focus of the SUNS Florida project include very rural communities, Tyndall Air Force Base, the urban areas of Panama City, and adjacent smaller cities. The region encompasses exceptional ecological features including Apalachicola Bay and its barrier islands, large parts of which are permanently conserved, the lower Apalachicola River and its forested floodplains, longleaf and slash pine forests, St. Joseph Bay and its peninsula/Cape San Blas, and the many inlets, marshes and other wetlands of the St. Andrew Bay system. These areas provide habitat to a vast array of terrestrial, estuarine and marine species, and offer exceptional opportunities for outdoor recreation including fishing, hunting, kayaking and wildlife observation.

Interspersed with these natural features are varied human communities from the beach resorts on St. George's Island, the St. Joseph Peninsula, and Panama City Beach, to the fishing ports of East Point and Apalachicola, to dense working-class neighborhoods in Panama City. Apart from the resort and second home areas, the region has significant areas of poverty and underserved neighborhoods. Tyndall Air Force Base is a special case as a very large military installation with 45 miles of coastline.

While implementation of the SUNS portfolio of projects will produce substantial benefits, communities are best protected, the natural character of the region is best conserved, and the strong cultural relationship of people to the coast is best retained by connecting NBS projects across communities, and where possible, planning for NBS in ways that achieve regional resilience goals across the landscape. Identifying these kinds of connections among projects can foster cooperation and synergy among Florida Panhandle communities, enhance individual project goals, accelerate the pace of project implementation, and facilitate the execution of projects at larger, more impactful scales. This report summarizes the potential ways that NBS projects might be connected to address regional challenges and maximize benefits, provides examples of where and how this could be feasible within the Bay, Gulf and Franklin County region, explains the steps for implementation, and further notes the benefits of connected projects.



SUNS Portfolio Project location "Salinas Park," Gulf County © Darryl Boudreau



A baby Kemp's Ridley sea turtle © Carlton Ward Jr.

Identifying Opportunities for NBS Project Connections

There are several ways to connect and relate NBS projects and thereby increase the scale and/or efficiency of their implementation. These include connections made based on projects' similar geography, governance, desired function, project readiness, eligibility for funding, or broader themes such as habitat type or sense of urgency.

Geographic Connections

Connecting geographically related sites is the most obvious way to link NBS projects across a regional landscape and to leverage synergies that produce a greater effect when combined than their impacts as individual projects. Projects that are near each other and that require the same suite of NBS techniques can be implemented collectively to improve the resilience of the community. For example, living shorelines can be constructed across multiple properties and dune enhancements can be implemented along a whole barrier island for the benefit of a larger number of fish and wildlife species. Combinations of NBS techniques can also be used to leverage complementary project goals and/or to protect larger community sites. For example, oyster reef creation and marsh enhancements might be used together to increase wave attenuation and create a mosaic of habitat benefits along an eroding shoreline.

Governance/Jurisdictional Connections

NBS projects within a common government jurisdiction may be linked to streamline community approval processes, accelerate environmental review or permitting, and to leverage larger funding opportunities. Multiple project concepts within the same county, for example, can be reviewed simultaneously, designed in concert, and implemented concurrently and/or in sequence, as the situation permits, affording significant cost efficiencies.

Connections by Project Type

These are similar sites across a larger geographic area that are the same habitat type or structure such as multiple forest restoration sites across a county where the forest cover has been damaged by storms, multiple unconnected stormwater wetlands, and oyster reefs in several different bays.

Functional Connections

NBS sites with a similar purpose can be linked to increase and/or expand their functionality across the landscape. These NBS may not have obvious physical connections, but when considered together, can be combined to address a

common problem within the community. For example, the integration of projects that involve stormwater wetlands, culvert installation, BaySaver technologies, or other actions can be combined into a larger project integrated across the watershed to improve stormwater management. Another example is the linkage of breakwater, living shoreline and other shoreline resilience projects for the purpose of enhancing oyster habitat. In this case, one project may enhance another through the provision of oyster spat and collectively contribute to the overall recovery of the oyster population in the system.

Project Readiness Connections

Projects may also be connected by their phase of development enabling them to move forward together with government support. Common phasing categories include preliminary engineering and design, final design and permitting, or implementation. For example, The Nature Conservancy applied a small amount of funding from the Walmart Foundation to move fourteen (14) individual projects forward in the three-county region from community-based ideas to written concepts that aligned with the community vision, and which were backed by early, science-based site assessments. The final product was project profile documents for each project. The profiles used a common format to describe the overarching project goals, landowner and community beneficiaries, essential habitats, permitting considerations, and potential funding opportunities. Development of the project profiles compiled key information necessary to solicit funding for the next phase of project development.

Connections Through Eligibility for Funding

In addition to readiness for implementation, many funding sources prioritize projects that fall within areas deemed as most eligible for funding. Eligibility may be determined by a sense of urgency such as an increased threat from sea level rise and other climate change induced impacts. For example, the Resilient Florida program prioritizes the funding of projects within areas identified within the Comprehensive Statewide Flood Vulnerability and Sea Level Rise Assessment. Eligibility may also be determined by the demographic character of a community. NOAA's Coastal Habitat Restoration and Resilience Grants are geared toward the advancement of coastal restoration and climate resilience priorities of tribes and/or underserved communities. Given such funding sources, municipalities or regional agencies may want to package multiple projects for submission to a common funding source.

Regional Benefits of Connected NBS Projects

The potential benefits of linked sites are:

- Protection of a whole community or infrastructure system from natural hazards.
- More effective and durable protection from more kinds and intensities of storm and flood events.
- Creation of and sustaining more viable long-term habitat for plants and animals.
- Creation of more functional and enjoyable recreational opportunities.
- Greater efficiency and a more comprehensive approach to permitting of projects.
- More cost-effective design and construction by reducing repetitive mobilization and demobilization costs.
- Decreasing repetitive grant preparation, monitoring and reporting costs for economically disadvantaged local communities.
- Increasing the field of potential government grants and increasing the scale and attractiveness of projects to granting agencies.
- Encouragement of communities to work together on NBS projects which can lead to greater cooperation in planning for the future coast.

Funding Linked Projects

There are now multiple funding sources for constructing NBS including connected projects and some of these funding sources give priority to region-wide/large scale resilience proposals such as consisting of connected projects. An important step in this process is will be to promote additional funding sources to adopt this approach.

There are now in the Florida panhandle multiple potential sources enabled in part by the Bi-partisan Infrastructure Law (BIL) passed by Congress in 2021, by the Inflation Reduction Act (IRA) passed by Congress in 2022 and from the State of Florida's Resilient Florida Grants program. For information on the most relevant funding for implementing SUNS projects, see the links below.

- The Southeast Regional Partnership for Planning and Sustainability (SERPPAS), Funding Opportunities: <https://serppas.org/resources/funding-opportunities/>
- The National Wildlife Federation, Nature-based Funding Database: <https://fundingnaturebasedsolutions.nwf.org/>
- Federal Mitigation and Infrastructure Task Force Resources: <https://tnc.box.com/s/x01slb8gdhkugrc0a2158fjxr09et54>
- REPI 2023 Resilience Project Funding Guide: <https://tnc.box.com/s/p7xeifb8fo1xujs1k6b1z07tzl5w3h9b>



At Buck Beach, along the Gulf of Mexico shoreline of Tyndall Air Force base, beach and dune habitats are experiencing severe erosion, including the loss of several acres of adjacent seagrass habitat. © David Bell (Jacobs)

EXAMPLES OF CONNECTED NBS IN THE SUNS FLORIDA REGION

Projects Underway

Nature-Based Solutions at Tyndall Air Force Base: An example of geographic, jurisdictional and functional connections

Project Type

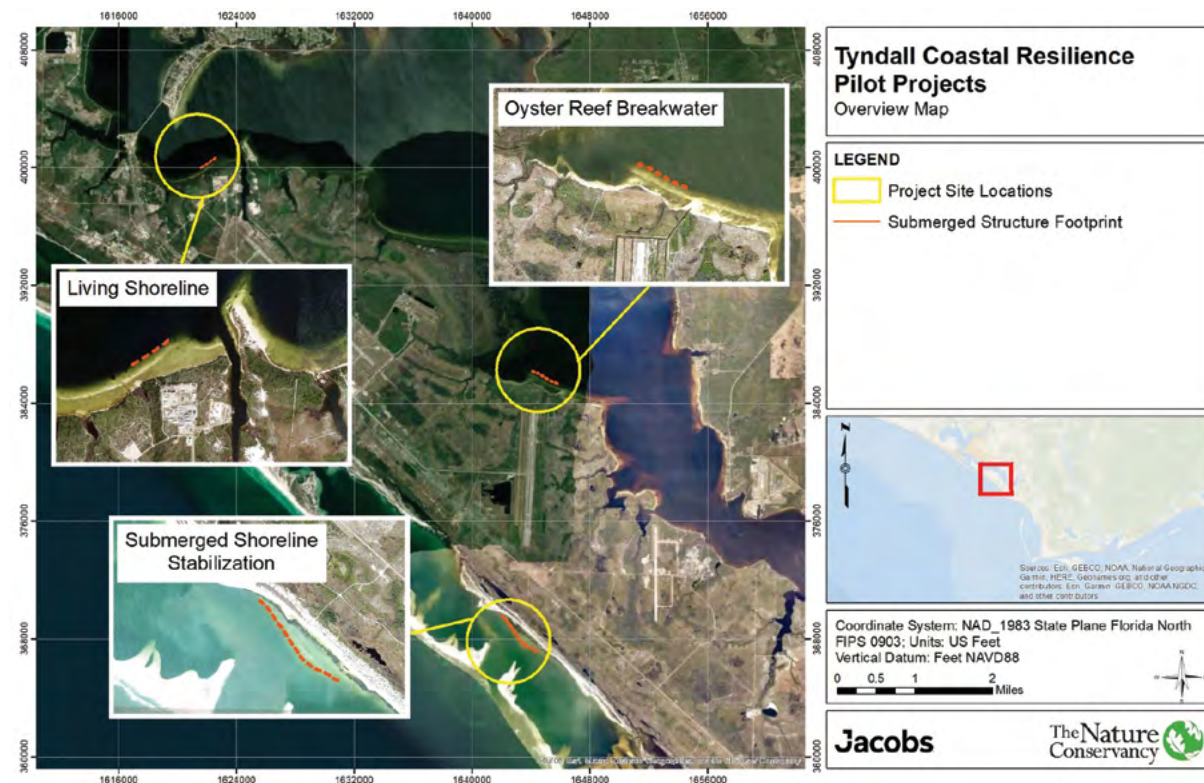
An example of a series of projects connected by jurisdictional boundaries, geography and overall function are a suite of nature-based solutions currently in the design and permitting phase at Tyndall Air Force Base (TAFB). TAFB, is an approx. 29,000-acre military installation located on a narrow, 18-mile long coastal peninsula in St. Andrew Bay, Bay County, Florida.

Background

On October 10, 2018, Hurricane Michael made landfall as a Category 5 hurricane, causing catastrophic wind and storm-surge damage at TAFB. Following this devastating event, the United States Air Force (USAF) made a commitment to build the base back stronger and more resilient through a combination of traditional engineering approaches and nature-based coastal resilience projects.

Project Description

The "Nature-Based Solutions at Tyndall Air Force Base" project includes the construction of four NBS projects to increase the resilience of TAFB shoreline while creating beneficial social, economic, and environmental outcomes. The four projects are shown on the map and in the following map and text.



Nature-based solutions currently in the planning and design phase for Tyndall Air Force Base include a Living Shoreline and Oyster Reef Breakwater in East Bay and a Submerged Shoreline Stabilization with seagrass habitat enhancements in St. Andrew Sound. © Jacobs Solutions.

- A **Living Shoreline** project site is in East Bay near the Highway 98 Dupont Bridge and directly adjacent to the Tyndall Fuel Depot on Fred Bayou. The project is located 600-1,000 feet offshore and adjacent to contiguous seagrass meadows and salt marshes in the higher tidal elevations. This approx. 1,000-foot Living Shoreline will be constructed in segments and is being designed to protect and enhance approximately 27 acres of intertidal and benthic habitat and 1,400 feet of shoreline from day-to-day coastal erosion.
- An **Oyster Reef Breakwater** project site is in East Bay to the north of the base's drone runway. The project site is located 300-800 feet offshore and is also adjacent to a contiguous seagrass meadow and to salt marshes in the higher tidal elevations. This 1,500-foot-long structure will be constructed in segments, will support oyster recruitment and is being designed to protect and enhance 32 acres of intertidal and benthic habitat and 2,100 feet of shoreline during day-to-day operational wave conditions.
- The **Submerged Shoreline Stabilization and Seagrass Restoration** combined project sites are in the St. Andrew Sound on the Gulf side of TAFB peninsula and south of the drone runway. As a result of its higher exposure to a more intense wave climate and more oceanic salinities, the site is characterized by different ecosystems compared to the Bay side projects. These include patchy subtidal seagrass meadows with beach areas and dunes onshore. Through an integrated approach to enhancing coastal resilience and estuarine habitats, a 3,500-foot-long network of submerged structures is being designed to protect and enhance 30 acres of intertidal and benthic habitat and 3,500 feet of shoreline during day-to-day operational wave conditions. Actions to restore lost seagrass habitat in this area are a key component of the mosaic habitat approach.

These projects are prototypes to evaluate pioneer NBS and inform additional NBS projects at TAFB.

Overall Project Objectives

Although site conditions for each project differ, the overall objectives of the four NBS projects at TAFB include:

- Protecting the shoreline from erosion during operational day-to-day conditions.
- Attenuating wave height and energy during operational day-to-day conditions.
- Enhancing natural coastal habitat by providing substrate for oyster attachment (in East Bay) and accreting sediments (all locations).
- Supporting marine species adaptation to sea level rise.

Project Benefits of Connections

These NBS projects will work in concert to enhance coastal resilience, leveraging the strengths of each component to protect base assets. Their collective implementation also provides significant economies of scale and cost reduction opportunities. For example:

- Hydrographic and hydrodynamic modeling can be applied across multiple NBS project concepts.
- National Environmental Policy Act (NEPA) compliance for NBS on or adjacent to federal lands can be completed through the development of a Programmatic Environmental Assessment that covers the environmental review necessary for multiple coastal resilience strategies and streamlines the permitting process for future NBS at Tyndall AFB.
- Enhancing natural coastal habitat by providing substrate for oyster attachment (in East Bay) and accreting sediments (all locations).
- Federal and state permit applications may be collectively prepared, routed and reviewed.
- The four initial NBS projects may be installed simultaneously or in immediate sequence by a single contractor.
- The prior completion of NEPA authorization for the initial suite of NBS at TAFB will also open additional opportunities for more rapid funding through State and Federal competitions.
- The four initial NBS projects described above are the keystone projects upon which additional shoreline protection and coastal resilience projects can be expanded. Lessons learned from their design and performance monitoring will inform long-term flood exposure modeling and provide baseline information necessary for the design and implementation of future NBS features at TAFB and similar installations.

Franklin 98 Living Shoreline

Project Type

The Franklin 98 Project is a geographically and thematically connected suite of living shoreline components spanning approximately six miles of U.S. Route 98 between Eastpoint and Yent Bayou, in Franklin County, Florida.

Background

Much of Highway 98 lies immediately adjacent to the water's edge. Due to chronic erosion along this shoreline, and the importance of this roadway as a designated Hurricane Evacuation Route, millions of dollars have been spent trying to protect the roadway from erosion. In many cases, erosion during coastal storm events has damaged the roadway requiring costly repairs and reducing access during storm events. The Apalachee Bay Regional Planning Council is working in tandem with professional services firms, WSP and Harter Restoration & Consulting, and local contractors, Franklin's Promise Coalition and North Florida Construction, Inc., to enhance estuarine habitats and increase resilience along this section of the roadway.

Project Description

The Franklin 98 project is envisioned as a multi-phased initiative to enhance resilience along a vital transportation route. The eligible project area is over six miles long and is made up of multiple groups of properties, or phases. This is an example of bundling projects geographically and thematically, even though they are not necessarily contiguous or being constructed at the same time. This has allowed an opportunity to phase the project into smaller pieces and build public support (as discussed below).

Nearshore Reef Habitat

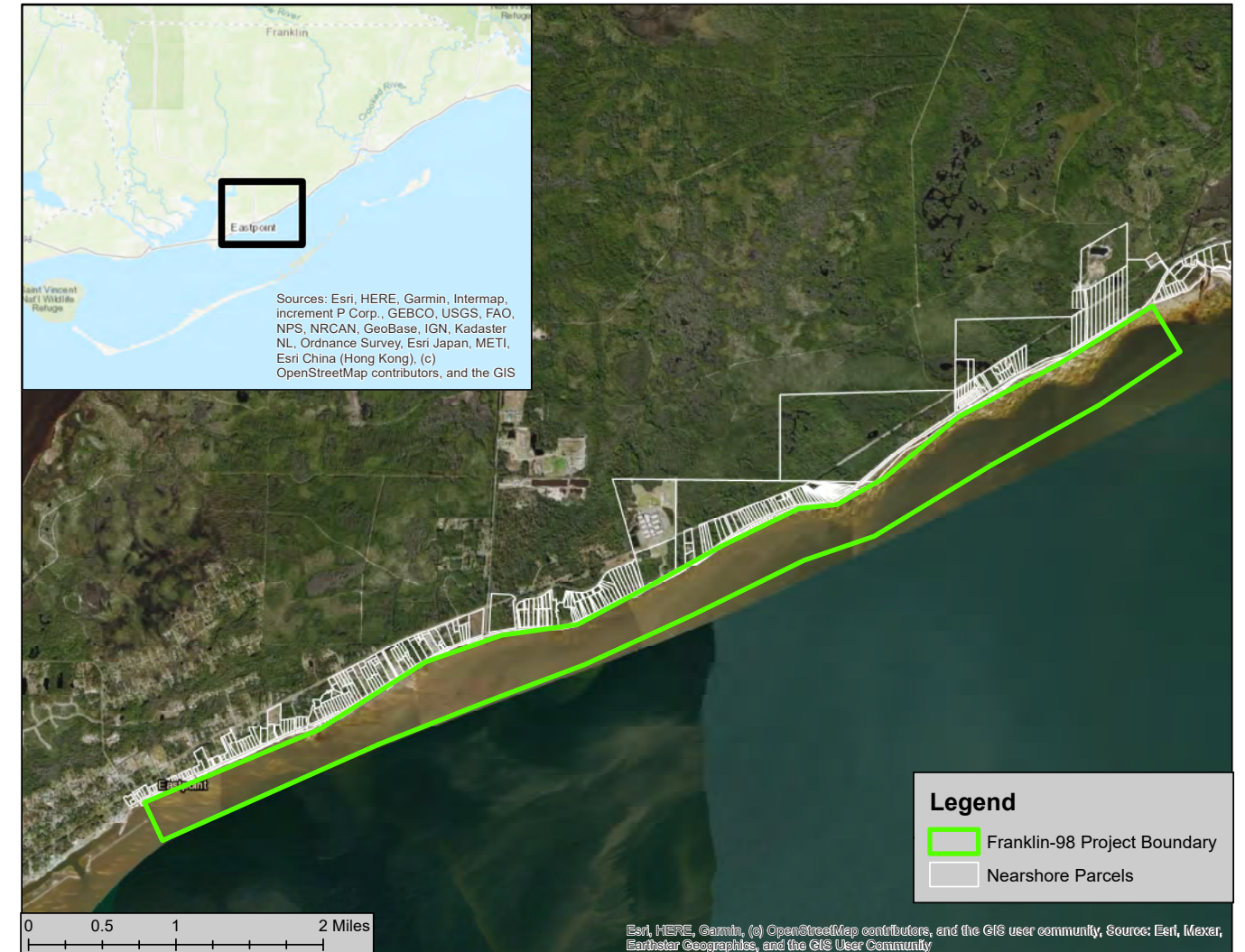
The project includes the installation of nearshore reefs to help attenuate wave energy through their increased elevation and rough surface, which will create a calmer wave environment landward of the reefs. As these reefs become colonized with various marine species, including oysters, they will help serve as a source of larval oysters for other parts of the bay. The high density of marine life currently found on existing substrate along the shoreline provides confidence that these reefs will be productive.

Intertidal Saltmarsh Habitat

With increased wave protection provided by the reefs, this section of coastline can support healthy intertidal marshes. Although the reefs are not expected to completely stop all wave energy, they are expected to reduce the energy enough to allow marsh vegetation to thrive. These marsh plants will assist in stabilizing the shoreline by capturing and holding suspended sediments. The marshes will also provide important habitat and improve water quality.

Demonstration Phase

To get permits from the State of Florida, shoreline property owners must sign on with their approval. This creates a challenge for this project area, since it is comprised of over 100 separate parcels, most of which are privately owned. To facilitate project support, the first phase of the project was completed on three large publicly owned parcels (Franklin County School, and two parcels that are part of Tate's Hell State Forest). Once this demonstration phase was constructed, it gave everyone an opportunity to see what the end result would look like. This helped alleviate concerns about change, since property owners could then know what to expect. Multiple other phases are now in the permitting phase and are expected to be constructed in 2024.



The Franklin 98 Living Shoreline spans six linear miles of Apalachicola Bay shoreline between East Point and Yent Bayou immediately adjacent to U.S. Highway 98. © Will Mather, WSP

Overall Objectives

- Establish 20 acres of reef habitat.
- Establish 30 acres of intertidal marsh.
- Reduce potential impacts from natural hazards to 6 miles of critical highway.

Project Benefits

- Improve fishery production (through the provision of substrate for oysters),
- Expand nursery habitats (for other commercially and recreationally important seafood species.
- Expand areas suitable for intertidal marsh habitat.
- Reduce maintenance and repair to public roadways and other infrastructure.
- Maintain access to evacuation route during lesser storm events.

EXAMPLES OF POTENTIAL OPPORTUNITIES FOR ADDITIONAL CONNECTED SITES

These project descriptions exemplify the kinds of opportunities available for connecting individual NBS projects in the SUNS region.

Multiple Living Shorelines in St Andrew Bay

Project Type

An example of connection by project type.

Background

The St Andrew Bay System (SAB) in Bay County, Florida consists of four interconnected bays that host one of the highest estuarine biological diversities in the Gulf of Mexico. SAB system is also a primary economic driver for the local community; ensuring the sustainability of the SAB system is a priority for local communities and their elected officials. The shoreline of SAB varies from undeveloped to intensively developed, from pristine to degraded. As demonstrated by the impacts of Hurricane Michael in 2018, all the SAB shoreline is vulnerable to the impacts of storms and sea level rise. The St Andrew and St Joseph Bays Estuary Program (SASJBEP) was established to address the complex problems of those bays.

The SASJBEP, along with stakeholders, has been working with the Northwest Florida Water Management District and The Nature Conservancy through the SUNS project to identify and rank NBS projects that will have the greatest impact on marine resources and on local communities, with greater priority given to those projects that benefit underserved communities through increasing resiliency..

Project Description

The proposed project would construct living shorelines at 12 different locations across the SAB. Living shorelines use stone, various shapes of concrete, bagged shell and similar components to shelter the shoreline from waves and erosion to enable and encourage the growth of marsh vegetation along the shore and the growth of oysters and other shellfish on the structures. The desired result is a durable shoreline that performs natural biological functions.

This proposed SAB project is an example of thematic and governance linked projects that are similar to sites across a larger geographic area that are the same habitat type or structure.



Hibiscus by the Bay Condos Living Shoreline installed along St. Andrew Bay (Bay County) by St. Andrew Bay Watch. © St. Andrew & St. Joseph Bay Estuary Program

Examples of the 12 living shoreline projects include:

Lynn Haven Bayou Park and Preserve Living Shorelines

This 8-acre park provides recreational opportunities in a community where 85% of the homes were damaged or destroyed by Hurricane Michael. The park shoreline was eroded by the hurricane. There was sedimentation of adjacent habitat. The project would construct 1472 feet of living shoreline and correct hydrologic problems at the entrance to the adjacent bayou.

Emmon's Bayou Restoration and Protection

Emmon's Bayou is in Callaway adjacent to neighborhoods where 80% of the population is categorized as low income. The bayou has been degraded by development, erosion and inadequate drainage structures. The project would combine living shorelines with drainage improvements and removal of sediment to create a healthy and sustainable aquatic environment.

Overall Objectives

- Afford protection from erosion of important and vulnerable coastal sites in SAB.
- Restore and enhance the habitat of SAB for native species.
- Test and demonstrate the effectiveness of living shoreline strategies and tools in various circumstances so that living shorelines and related NBS will be used more widely in SAB.

Project Benefits

- Small projects that could not be cost-effectively proposed for government funding individually can be packaged into a single proposal.
- Similarly, small projects can be packaged together for design and permitting thus saving time and money to make them feasible for implementation.
- The implementation of multiple living shorelines at different kinds of sites across the SAB system can serve as examples to encourage more private and public investment in NBS.
- Multiple site and techniques of living shoreline construction being done at the same time can facilitate monitoring of those techniques to determine which are most effective for SAB.

Tree Planting Across the SUNS Project Area

Project Type

This is an example of connections by project type and function.

Background

In the three-county SUNS region, trees of different species and in both urban and rural settings play an important role in sustaining the natural environment and in mitigating the impacts of natural hazards to built-up areas. Trees take up water from the ground lowering water tables and reducing flooding by reducing the quantity of stormwater entering nearby water bodies. Trees along the coast and along waterways hold the soil in place to reduce erosion. Trees shade waterways and the ground overall reducing the temperature of water flowing into bays and bayous. In urban settings, trees reduce daytime temperatures making life more comfortable for people in a warming world. And, of course, trees and forested areas provide habitat for a wide range of resident and migratory species.

Hurricane Michael knocked down millions of trees in the forested areas north of the coast and in cities and towns. The Florida Department of Agricultural Services estimated the loss of a million trees in Panama City alone encompassing 95% of its tree cover. Tree loss in the three-county region has resulted in a documented rise in the water table causing a noticeable increase in flooding and a decline in water quality and healthy aquatic vegetation from increases in nutrients and sediment in stormwater runoff.

Project Description

Potential linked NBS projects could be planting of appropriate tree species at multiple sites including in urban areas and on the urban fringe undertaken as a free-standing initiative and/or the funding of a tree-planting component of multiple NBS projects that also have other nature-based elements. Such projects would be examples of linkage by project type—that is projects of a similar type and objectives conducted at multiple locations. Depending on the mix and location of tree-planting sites, this could also be an example of geographic linkage. Examples of potential projects are Salinas Park in Gulf County and Strategically Reforesting Bay County.

Overall Objectives

- Restore the cover of appropriate native trees across multiple sites in the SUNS area or in an individual county or city.
- Increase the efficiency of tree planning projects by planting multiple sites.
- Increase the scale and reduce the unit cost of tree purchase and planting.
- Provide employment for conservation corps and similar workforce development entities.
- Engaging citizens in tree planning and planting.

Project Benefits

- Reduce stormwater runoff and flooding.
- Improve the quality of adjacent water bodies.
- Enhance the effectiveness of companion NBS projects such as living shorelines.
- Reduce the summer temperatures in urban neighborhoods.
- Store carbon.

KEY STEPS FOR IMPLEMENTING CONNECTED PROJECTS

To accomplish these and other connected projects in the SUNS area these steps are needed:

First, it is necessary to identify an entity to form a project partnership and coordinate project activities, to orchestrate multi-site grant proposals, and, potentially, to administer grant funds, execute multi-site engineering and construction contracts. Without a convening/coordinating entity, linked projects are not possible.

To accomplish the connected project examples above as well as others in the SUNS area and beyond, several key steps are needed. The first step is to identify a lead for the effort. The lead entity will facilitate the creation of a project team, development of the set of projects to be included in the proposal(s), and a funding strategy. Within the SUNS project area, the St. Andrew and St. Joseph Bays Estuary Program (SASJBEP) and TNC have both taken on the leadership role for connected project proposals. A key aspect of the leadership component is how to fund the lead entity. Generally speaking, the work conducted by the lead entity is “pre-proposal” and the costs associated with this step is not reimbursable. Therefore, there must be a mechanism to fund the leadership role. In the case of SUNS, TNC’s work was grant funded supplemented by in-kind staff support by the Northwest Florida Water Management District and the SASJBEP.

Once a lead has been identified, the following steps are conducted:

- 1. Complete an inventory of potential linked sites with sufficient information on each to apply these feasibility criteria:**
 - There are portfolio sites near each other that if developed together, would further enhance resilience of an adjacent community or infrastructure.
 - There are portfolio sites near each other that if developed together, would provide habitat for more or a larger number of fish and wildlife species.
 - There are multi-site projects in the same county or other governmental jurisdiction that if designed, permitted and constructed together would save time and money.
 - There are multi-site adjacent or similar projects in a government jurisdiction that if pursued together would increase the eligibility for or competitiveness of the project for government grants.
 - There are multi-site projects across a regional scale led by a regional effort (e.g. living shorelines across the watershed led by SASJBEP).
- 2. Form a working group of public officials whose jurisdictions would be involved in the connected site and seek a lead official to chair the working group.**
- 3. Complete a feasibility study for the project using inventory data and the criteria noted above**
- 4. If generally feasible, use the feasibility as the basis for seeking funding for a planning and design study and environmental review that would make the project shovel ready.**
- 5. Include cost estimates and methods for maintenance and management of the improvements in the planning work.**
- 6. Involve appropriate local community groups in formulating and reviewing the designs.**
- 7. With the planning and design study in place, complete permitting and seek construction funding.**



Eastward view of St. Andrew Bay. © Devin Ford/TNC

A VISION OF THE FUTURE COAST

One of the outcomes of the SUNS effort was the generation of several themes based on the types and locations of proposed projects. These themes help generate a vision of the future coast and include:

- **Exceptional fish and wildlife habitat in the three-county area with connected publicly owned tracts of land integrated with preserved private properties to enhance greenways.**
- **Healthy waterbodies supported by sustainable acreage of restored and created wetlands, along with healthy stream corridors, bayous, and forested lands.**
- **Resilient communities that have maintained their cultural connection to the Gulf by implementing effective managed retreat policies and strong investments in NBS that are proactively maintaining coastal habitat and created communities that are accommodating sea-level rise and changes in weather events.**

CONCLUSION

The concept of using natural features and processes to make both human and natural communities more resilient to the impacts of climate change is receiving increasing attention across the U.S. In Federal laws and regulations and in the practices of the U.S. Army Corps of Engineers and the Federal Highway Administration such Nature-Based Solutions are being put on an equal footing with traditional hard infrastructure for dealing with natural hazards and environmental problems.

The Scaling Up Nature Based Solutions (SUNS) project in Franklin, Gulf and Bay Counties of the Florida Panhandle has demonstrated the effectiveness and value of providing technical assistance and facilitating discussions with communities to identify NBS projects that can help reduce the impact from storms and sea level rise while providing multiple other community benefits such as facilitating economic growth. This assistance is particularly beneficial to rural and underserved communities. While such individual NBS projects are useful, given the anticipated impacts of climate change and sea-level rise on coastal regions, it is necessary to link individual NBS projects to adapt whole coastal communities to be sufficiently resilient in a changing world.

This paper suggests a framework for doing this in the Florida panhandle that will build on the progress of SUNS to magnify the benefits of nature-based solutions and serve as an example to other regions of the Gulf of Mexico Coast.

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