October 11, 2024

Emerald Coast Stakeholders,

As the CEO of the Emerald Coast Regional Council, I am honored to present the final report of our Emerald Coast Military Installation Resilience Review (MIRR). This document is a testament to a region-wide collaborative effort, partly supported by funding from the U.S. Department of Defense's Office of Local Defense Community Cooperation (OLDCC) and the Florida Defense Support Task Force.

Our dedicated team, including all members of our Policy and Technical Advisory Committees, council staff, and our primary contractor, Jacobs, worked tirelessly on this nearly two-year project. Our goal was to meticulously identify and assess the potential threats to our local infrastructure that supports military readiness. The focus of our review spanned six crucial installations for national security, where we explored not just the challenges but also the opportunities for enhancing resilience through strategic investments and policy innovations that serve our military and our community.

Our primary partners in this effort were our installations:

- Eglin Air Force Base
- Hurlburt Field
- Naval Support Activity Panama City
- Naval Air Station Pensacola
- Tyndall Air Force Base
- Naval Air Station Whiting Field

I sincerely thank Mr. William Van Houten, our project manager from OLDCC, for his invaluable advice and steadfast support throughout this process. Your contributions have been instrumental in shaping this report. My thanks also go to the commanders and staff of the involved military installations, Dr. Wesley Brooks, Florida's Chief Resilience Officer, and all our local elected officials and their teams whose active engagement was crucial. Moreover, I thank the members of the Emerald Coast Regional Council for their resolute support of this critical initiative. Your support, along with the contributions of all stakeholders, has been the backbone of our success.

As we transition from planning to action, our aim is clear: to implement these strategies swiftly and effectively. This is our unwavering commitment to you and to the enduring capability of Emerald Coast's military installations to perform their vital national security roles. I am honored to support our military community and am confident that the initiatives outlined in this report will foster long-term resilience and operational continuity.

Thank you to everyone involved for your commitment and participation. Your efforts have not gone unnoticed and have made a significant difference in supporting our nation's defense readiness. Together, we are shaping the future of our military installations and the resilience of our community.

With deepest appreciation,

Austin Mount, CEO
Emerald Coast Regional Council

October 2024

Emerald Coast
MILITARY INSTALLATION RESILIENCE REVIEW













EMERALD COAST 2.0 REGIONAL COUNCIL

EMERALD COAST MILITARY INSTALLATION RESILIENCY REVIEW

U.S. Department of Defense
Office of Local Defense Community Cooperation

Jacobs

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Abbreviations and Acronyms

°F	Degree(s) Fahrenheit
ACC	Air Combat Command
ACS	Air Control Squadron
ADU	Accessory Dwelling Unit
AFB	Air Force Base
AFNORTH	1st Air Force
AFSOC	Air Force Special Operations Command
AMI	Area Median Income
AOC	Air Operations Center
ATS	Automatic Transfer Switch
AWT	Advanced Water Treatment
BAH	Basic Allowance for Housing
BFE	Base Flood Elevation
C2IMERA	Command and Control Incident Management Emergency Response Application
CCR&R	Child Care Resource and Referral
CDC	Child Development Center
CERI	Coastal Engineering Resilience Index
CHELCO	Choctawhatchee Electric Cooperative
CIP	Capital Improvement Program
CR	County Road
CRIP	Coastal Resilience Implementation Plan
CRS	Community Rating System
CT	Census Tract
CWPP	Community Wildfire Protection Plan
DoD	U.S. Department of Defense
EC-ARC	Emerald Coast-Area Resilience Collaborative
ECRC	Emerald Coast Regional Council
ECUA	Emerald Coast Utilities Authority
EGTTR	Eglin Gulf Testing and Training Range
ELI	Extremely Low Income
EOD	Explosive Ordinance Disposal
ETTC	Eglin Test and Training Complex
EUL	Enhanced Use Lease
FBC	Florida Building Code
FDEP	Florida Department of Environmental Protection
FDOT	Florida Department of Transportation
FEMA	Federal Emergency Management Agency
FFS	Florida Forest Service

FPL	Florida Power & Light
FYE	Fiscal Year End
GCEC	Gulf Clean Energy Center
GCPEP	Gulf Coast Plain Ecosystem Partnership
HH	Household
HVAC	Heating, Ventilation, and Air Conditioning
JALBTCX	Joint Airborne Lidar Bathymetry Technical Center of Expertise
kV	Kilovolt(s)
LMS	Local Mitigation Strategy
LRTP	Long Range Transportation Plan
LTR	Long-Term Rental
MCCYN+	Military Childcare in Your Neighborhood
mgd	Million Gallon(s) Per Day
MIRR	Military Installation Resilience Review
MML	Military Mission Line
mph	Mile(s) Per Hour
NAS	Naval Air Station
NATRACOM	Naval Air Training Command
NCOA	Noncommissioned Officer Academy
NDA	Non-Disclosure Agreement
NGO	Non-Governmental Organization
NOAA	National Oceanic and Atmospheric Administration
NSA	Naval Support Activity
NWFSL	Northwest Florida Sentinel Landscape
NWFWMD	Northwest Florida Water Management District
OLDCC	Office of Local Defense Community Cooperation
OLF	Outlying Landing Field
P3	Public-Private Partnership
PBWS	Point Baker Water System
PD&E	Project Development and Environment
PNS	Pensacola International Airport
PPBEP	Pensacola & Perdido Bays Estuary Program
PSC	Pensacola State College
PWSC	Peoples Water Service Company
RCP	Representative Concentration Pathway
REPI	Readiness and Environmental Protection Integration
RHTS	RED HORSE Training Squadron
RIB	Rapid Infiltration Basin System
ROW	Right-of-Way
SAV	Submerged Aquatic Vegetation

SIS	Strategic Intermodal System
SLR	Sea Level Rise
SOW	Special Operations Wing
SR	State Road
SRF	State Revolving Fund
STR	Short-Term Rental
SVFRD	Skyline Volunteer Fire and Rescue Department
T&E	Threatened and Endangered
TAC	Technical Advisory Committee
TCPI	Tri-County Community Partnership Initiative
TPO	Transportation Planning Organization
UFC	United Facilities Criteria
USACE	U.S. Army Corps of Engineers
USAF	U.S. Air Force
USCG	U.S. Coast Guard
USGS	U.S. Geological Survey
VA	Vulnerability Assessment
VFD	Volunteer Fire Department
WEG	Weapons Evaluation Group
WMA	Wildlife Management Area
WRF	Water Reclamation Facility
WTP	Water Treatment Plant
WUI	Wildland-Urban Interface
WWTF	Wastewater Treatment Facility
WWTP	Wastewater Treatment Plant

Acknowledgments

While it is impossible to thank everyone individually that contributed, we take this opportunity to thank the following institutions and key individuals. In addition to our funding partners, we would like to thank the Installation Commanders and staff for their hospitality, generous assistance, and many contributions so critical to this study. We also extend our sincere thanks to the Emerald Coast MIRR Technical Advisory Committee and Policy Committee members for their generous assistance and contributions of time and expertise.

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- William Van Houten, Senior Project Manager
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U.S. Department of Defense

- U.S. Air Force
- U.S. Navy

U.S. Department of Homeland Security

- U.S. Coast Guard

Participating Installations

- Naval Air Station Pensacola
- Naval Air Station Whiting Field
- Eglin Air Force Base
- Hurlburt Field
- Naval Support Activities Panama City
- Tyndall Air Force Base

Federal Elected Officials & Staff - Florida

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- Senator Rick Scott
- Congressman Matt Gaetz, 1st District
- Congressman Neal Dunn, 2nd District

State of Florida

- Chief Resilience Officer Wesley R. Brooks, Ph.D.
- Department of Transportation District 3

Local and Regional Partners

- Northwest Florida Sentinel Landscape
- Northwest Florida Water Management District
- Escambia County
- Santa Rosa County
- Okaloosa County
- Walton County
- Bay County
- City of Pensacola
- City of Milton
- City of Mary Esther
- City of Crestview
- City of Niceville
- City of Fort Walton Beach
- City of Destin
- City of Panama City
- City of Panama City Beach
- Emerald Coast Regional Council
- Bay Defense Alliance
- Northwest Florida Defense Coalition
- Tri-County Community Partnership Initiative

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Executive Summary



Executive Summary

During the last several years, both the U.S. Congress and the U.S. Department of Defense (DoD) have acknowledged the important connections between climate resilience and national security. More recently, both institutions have recognized the vital importance of community resilience, enabling the expenditure of defense dollars outside the fence line through targeted legislation such as the Defense Access Roads Program and innovative programs such as Office of Local Defense Community Cooperation (OLDCC) Military Installation Resilience Review (MIRR) grants.

The Emerald Coast MIRR spans five counties and six key installations, including Naval Air Station (NAS) Pensacola, NAS Whiting Field, Eglin Air Force Base (AFB), Hurlburt Field, Naval Support Activities (NSA) Panama City, and Tyndall AFB. With funding from the DoD OLDCC, the MIRR identified the risks, hazards, and vulnerabilities outside the fence line of the installations related to the ability of the military to carry out its missions. It should be noted that in instances where community assets are located on base, such assets were included in the analysis. The process identified resilience strategies, projects, and investments to promote mission resilience. Consistent with state of Florida Standardized Vulnerability Assessment Scope of Work guidance, 2040 and 2070 projections were used to forecast the shocks and stresses the installations and their surrounding communities face.

A very well-attended project kickoff and visioning session took place in April 2023 at the Okaloosa County Administration Complex in the City of Shalimar, Florida. At that time stakeholder mapping, engagement, and data collection began. Over the summer, the Jacobs project team conducted four site visits and stakeholder engagement meetings with installation planners, municipal leaders, and utility providers for fact finding and data collection. During the last 18 months, the project team has successfully engaged many stakeholders including leadership from six installations, leadership (elected and appointed) from five counties (Escambia, Santa Rosa, Okaloosa, Walton, and Bay), numerous cities (City of Pensacola, City of Milton, City of Crestview, City of Fort Walton Beach, City of Niceville, City of Mary Esther, City of Destin, City of Panama City, City of Panama City Beach), and local utility providers (water, energy, and communications). Local government staff members, installation planners, municipal and private utilities, non-profit and military stakeholders participated in our technical advisory committee. Installation leadership, critical utility, and local government administrative representatives participated in our Policy Committee.



Emerald Coast Regional Council (ECRC) Executive Director, Austin Mount, presents at the Emerald Coast MIRR Kickoff Meeting in April 2023

The vulnerability assessment completed in the fall 2023 identified top shocks and stresses affecting the region and the installations' mission readiness. These include sea level rise and flooding, extreme heat, shoreline erosion, energy and fuel supply stress, and affordable housing. To address these vulnerabilities, recommendations range from formalized cooperative planning to investments for shoreline protection, stormwater management, roadway enhancements, resilient utilities, Complete Streets improvements, land management, resilience, and affordable housing. The resilience plan for each installation includes a funding strategy aligning grant opportunities with actionable projects that will ensure the military installations and surrounding communities survive, recover, adapt, and thrive. Building military mission assurance through community resilience is Northwest Florida's roadmap to a secure future.

The Good News

The military installations in Northwest Florida have excelled in fostering resilience through strategic partnerships at the local, state, and federal levels. Their proactive efforts have garnered funding to implement resilient strategies, ensuring preparedness and continuity in the face of challenges. These efforts have not gone unrecognized, with many of the region's military installations receiving accolades and securing strategic investments for their work.

NAS Whiting Field has demonstrated exemplary resilience in their proactive efforts to preserve more than 20,000 acres of land surrounding the installation, working together with the county officials and various community partners. Their steadfast commitment to preventing encroachment not only safeguards their operational capabilities, but also fosters environmental stewardship. This dedication not only underscores their role as a cornerstone of national defense, but also as a responsible neighbor and custodian of the local environment. In recognition in part for these and other efforts, NAS Whiting Field was selected as the best small base in the Navy by the Commander, Navy Installations Command and was honored as the DoD's 2024 Commander in Chief's Navy Installation of the Year.



NAS Whiting Field has conserved some 20,000 acres of land to protect the base from encroachment



Tyndall AFB's Coastal Resilience Infrastructure Plan

Tyndall AFB was recently a recipient of the Presidential Federal Sustainability Award that recognizes federal agencies and employees who have made transformational efforts to advance sustainability and climate resilience and lead by example, delivering on President Biden's goal to slash emissions from federal operations. Following the destruction sustained during Hurricane Michael in 2018, the DoD used Tyndall AFB's reconstruction as an opportunity to redevelop the base into a resilient, sustainable "Installation of the Future." This includes integrating the use of nature-based solutions into the rebuild plan, serving as a model for other coastal federal facilities that need to adapt to the changing climate.



NSA Panama City receiving the Partnership of Excellence Award

NSA Panama City stands as a beacon of resilience and excellence in supporting naval operations and community welfare. In 2023, NSA Panama City and its partners (Tyndall AFB, Bay District Schools, local charter schools, Gulf Coast State College, and Florida State University Panama City) were awarded the prestigious Partnership of Excellence Award for the second consecutive year. This accolade recognized the installation's partnership for its outstanding collaborative efforts and successful initiatives benefiting military-connected children, creating an environment that nurtures growth and success. Through these partnerships and initiative, NSA Panama City continues to uphold its reputation as a cornerstone of naval support and innovation in the City of Panama City and beyond.

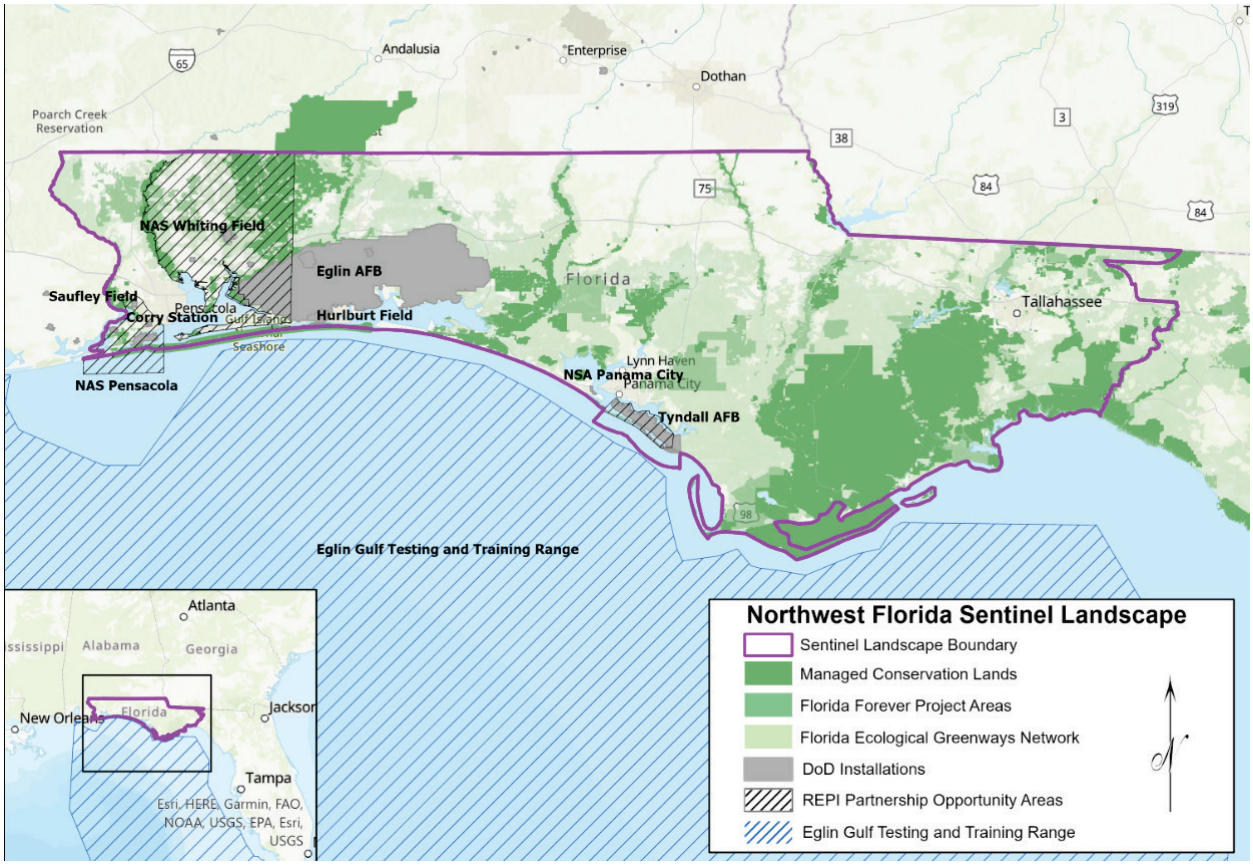
Eglin AFB has also received recognition for its environmental stewardship and sustainability efforts, preserving natural resources while supporting mission readiness. The installation's 96th Civil Engineer Group Cultural Resource Office claimed a 2023 Cultural Resources Management award from the DoD for its work regarding the management of historic properties on base and the implementation of nearly 14,000 linear feet of living shorelines to protect the base against coastal erosion. Eglin's commitment to innovation extends to collaborative partnerships with industry leaders and academic institutions, driving technological advancements and enhancing military capabilities.

Through a strong community partnership, Escambia County and NAS Pensacola won nearly $33 million in state and federal grant funding for their coastal protection projects. This underscores the base and community's commitment to environmental stewardship and resilience against coastal erosion. The project consists of nearly 20,000 linear feet of emergent and submergent reef breakwaters and 200 acres of emergent marsh and submergent aquatic vegetation habitat. By implementing innovative shoreline protection measures to mitigate damage sustained from Tropical Storm Cristobal and Hurricane Sally in 2020, NAS Pensacola not only enhances its natural surroundings, but also ensures sustainable practices that benefit the local ecosystem and community for years to come.



Pensacola Bay Living Shoreline Project Location Map

In 2021 Hurlburt Field, home to U.S. Air Force's Special Operations Command, completed an energy modernization project that upgraded infrastructure and supported the critical power supply and grid stability needs at the base. Through a $22.6 million Energy Savings Performance Contract, the project helps to reduce the installation's energy costs by nearly 18%, resulting in $1.5 million savings annually over the 22-year contract term. The project incorporates renewable energy alternatives that support the Air Force's Energy Vision to Enhance Mission Assurance Through Energy Assurance strategy and is part of the DoD's broader strategy to achieve mission-critical resilience.



Northwest Florida Sentinel Landscape's footprint

Northwest Florida's military installations work diligently with community partners to bolster military resilience by fostering shared resources and expertise. The region has a strong sense of appreciation for its military bases and those who serve them. Several key partnerships include the area's three defense alliances as well as the Northwest Florida Sentinel Landscape (NWFSL). In 2022, NWFSL was officially designated with the aim to preserve critical landscapes and enhance military readiness while fostering partnerships among various stakeholders in the region. These collaborations strengthen the support network for the region's installations, ensuring continuity of operations and readiness in the face of challenges.

Northwest Florida's military installations have not only forged strong relationships with its communities, but also with the local utility providers to bolster the resilience of their networks. Through coordinated efforts and shared resources, they have implemented robust infrastructure improvements and contingency plans aimed at mitigating disruptions from natural disasters and other challenges. For example, in Santa Rosa County, broadband projects endorsed by Santa Rosa's Local Technology Planning Team have been awarded $42 million to expand broadband to rural areas across the county. This funding will help enhance the community's resilience by providing reliable communication during emergencies, enabling swift coordination of response efforts and dissemination of critical information. It also supports economic resilience by facilitating remote work, access to online education, and digital healthcare services, ensuring continuity during disruptions.

In spring 2024, the DoD announced its participation in the Florida Power & Light Company (FPL) SolarTogether program enrolling Northwest Florida's six military installations. This initiative will advance the buildout of clean energy infrastructure and is estimated to achieve savings of around $2 million over the next 10 years. Partnerships and programs such as this not only enhance the reliability of essential services, but also help facilitate quicker recovery times during emergencies. By prioritizing resilience, utility providers have demonstrated a commitment to supporting the region's sustainability and ensuring continuous support to military installations and surrounding communities alike.



FPL's solar farm at NAS Whiting's OLF Holley

The projects and initiatives in this section help protect Northwest Florida installations and communities against increasing threats. In addition to bringing stakeholders together to work collectively, the project team identified many instances of current and ongoing resilience efforts and initiatives. The good news is these locations, communities, and efforts provide a solid foundation for continued mission assurance.

Vulnerability Assessment Key Findings

NAS Pensacola

NAS Pensacola consists of four distinct sites: NAS Pensacola, Corry Station, Bronson Field, and Saufley Field. The main base is located southwest of the City of Pensacola on a peninsula and is bordered on the north by Bayou Grande and east and south by Pensacola Bay. The installation is accessible from the west via South Blue Angel Parkway (State Road 173) and from the north by South Navy Boulevard. The host command is NAS Pensacola.

NAS PENSACOLA | MISSION
To efficiently deliver the very best Readiness From The Shore



Blue Angels flying over NAS Pensacola

Vulnerability Assessment Key Findings: Assets at Risk

- **Shoreline erosion** is a key concern at NAS Pensacola because it threatens mission-critical structures within the installation boundary. Much of NAS Pensacola will be protected by ongoing living shoreline projects. However, no protections are in place on the southwestern shorelines of the installation.
  - *Resilience Strategy Project*: NAS Pensacola Shoreline Protection
- A **primary mission-critical lift station**, NAS Main #1, is a high-risk mission-critical asset. Of the two lift stations that service the installation, this on-base, Emerald Coast Utilities Authority (ECUA)-owned lift station is in the 100-year floodplain.
  - *Resilience Strategy Project*: ECUA Resilience Improvements
- **Multiple primary mission-critical access roadways have high risk to mission**: U.S. Highway 98 (US 98), US 90, Gulf Beach Highway, Blue Angel Parkway, and South Navy Boulevard. Flood risks (stemming from the 100-year flood or coastal flood events) can impact transportation around the installation. These risks, coupled with noted capacity issues on Blue Angel Parkway and Gulf Beach Highway that affect ingress and egress, can prevent access to the installation.
  - *Resilience Strategy Projects*: Navy Boulevard Improvements, Gulf Beach Highway and Sorrento Road Improvements, and Blue Angel Parkway Improvements

NAS Whiting Field

NAS Whiting Field is in central Santa Rosa County. The installation consists of approximately 12,000 acres surrounded by rural residences and wooded areas.

NAS WHITING FIELD | MISSION
Produce the military's best trained "Aviation Warfighter"



TH73A Thrasher flying over NAS Whiting Field

Vulnerability Assessment Key Findings: Assets at Risk

- **Two of the six routes to the outlying landing fields (OLFs) are at high risk**. The first, on which installation personnel travel from the installation to OLFs Evergreen and Brewton, north of the main base, has areas of high vulnerability and risk at the crossing with Pond Creek. Meanwhile, the route to the OLFs located in Santa Rosa County has zones of high risk on Highway 90 near the Blackwater River, and the Highway 90 crossing at Pond Creek.
  - *Resilience Strategy Project*: City of Milton Flood Mitigation
- **Electrical production and supply infrastructure that supply the installation are at high risk.** Power transmission and reliability to NAS Whiting Field is currently aboveground with the main feed providing 100% of the need and secondary feed providing approximately 60% of required demand.
  - *Resilience Strategy Project*: NAS Whiting Field Resilient Energy Park
- **Additional noted vulnerabilities include a lack of highway capacity, cellular communications issues, lack of redundant power systems, and lack of redundant water systems**. During the workshops, stakeholders noted that highway systems lack the capacity to accommodate recent population growth. Cellular service (broadband) is insufficient in rural areas of the County, particularly around the OLFs. The installation, while it does have its own onsite backup power generation systems, does not have adequate redundant power connections. Similarly, it does not have any interconnections with neighboring community water systems. The relocation of the Milton Wastewater Treatment Plant (WWTP) also came up as a concern during the stakeholder workshops.
  - *Resilience Strategy Projects*: Highway 90 Resilient Roadway, Munson Highway Connector, Highway 87 Improvements, NAS Whiting Field Redundant Water Supply, Resilient Wastewater Treatment

Eglin AFB

Eglin AFB is the largest installation in the U.S. Air Force, spanning more than 464,000 acres in Santa Rosa County, Okaloosa County, and Walton County. The installation is bounded to its west by Highway 87 and on the east by US-331. The City of Niceville, City of Valparaiso, City of Shalimar, and City of Fort Walton Beach can be found south of the installation bordering Choctawhatchee Bay.

EGLIN AFB | MISSION

We test and evaluate state-of-the-art weapon systems and cyber capabilities, provide quality installation and mission support, and serve as responsible stewards of our resources to deliver war-winning capabilities.



96th Aircraft Maintenance Squadron Blue member guides a GBU-12 into place on his F-16 at Eglin AFB



An F-35 on the 33rd Fighter Wing flightline at Eglin AFB

Vulnerability Assessment Key Findings: Assets at Risk

- **Mission-critical electric power infrastructure that supplies the installation is at risk of wildfire impacts**. Much of the electric power infrastructure within the northern areas of the study region, owned by the Choctawhatchee Electric Cooperative and FPL, have significant wildfire risk that threatens the missions of Eglin AFB.
  - *Resilience Strategy Project*: Power Supply and Reliability Improvements
- **Flood risk for community wastewater infrastructure along coastlines**. Areas of the City of Fort Walton Beach and the City of Mary Esther experience varying levels of flood risk for wastewater infrastructure (lift stations and lines) and roadways in coastal neighborhoods.
  - Resilience Strategy Project: Lift Station Upgrades
- **Current and future traffic capacity issues on roadways around the installation** Population growth in the region will fuel traffic capacity, causing additional capacity issues on Highway 285 and Highway 20, which can hinder personnel from accessing the base.
  - *Resilience Strategy Projects*: Regional Intelligent Traffic Management System, Highway 85 Comprehensive Corridor Enhancement, Highway 98 Living Shoreline, Highway 20 Capacity Enhancement

Hurlburt Field

Hurlburt Field is in southern Okaloosa County, west of the City of Mary Esther. The installation is adjacent to Eglin AFB on its northern and western fence lines. Highway 98 runs through the southern portion of the installation.

HURLBURT FIELD | MISSION
Provide our Nation's specialized airpower, capable across the spectrum of conflict...Any Time, Any Place



Airmen with the 366th Fighter Wing and the 389th Fighter Squadron refuel an F-15E Strike Eagle at Hurlburt Field

Vulnerability Assessment Key Findings: Assets at Risk

- **Flood risk for community wastewater infrastructure along coastlines**. Areas of the City of Fort Walton Beach and the City of Mary Esther experience varying levels flood risk for wastewater infrastructure (lift stations and lines) and roadways in coastal neighborhoods.
  - *Resilience Strategy Projects*: Lift Station Upgrades, City of Mary Esther and Hurlburt Wastewater Conveyance
- **Miracle Strip Parkway (West Highway 98) is a high-risk asset because of coastal flooding and capacity issues**. Flooding and capacity on this mission-critical roadway poses a high risk to mission from personnel commuting from Santa Rosa County.
  - *Resilience Strategy Project*: Highway 98 Congestion Relief Package

NSA Panama City

NSA Panama City consists of 657 acres along the western shore of St. Andrew Bay in Bay County. The installation is bounded on the west by Thomas Drive and on the north by Highway 98 and the Hathaway Bridge. The installation also owns and uses three littoral (beach) sites along Panama City Beach.

NSA PANAMA CITY | MISSION
Enable warfighter readiness



Landing Craft Air Cushion at NSA Panama City



Aerial view of NSA Panama City

Vulnerability Assessment Key Findings: Assets at Risk

- **Highway 98 and Panama City Beach Parkway are both high-risk assets.** Flooding on these roadways can negatively impact the ability of students and staff to reach the installation. The 100-year flood inundates portions of Highway 98 and adjacent roadways Moody Drive and Collegiate Avenue prior to entering the Hathaway Bridge in the City of Panama City.
  - *Resilience Strategy Project*: Installation Access Improvements on Highway 98
- **Because of its coastal location, the secondary mission-critical U.S. Coast Guard station (co-located with the installation) has a high risk to mission.** Coastal flooding, including the 100-year flood and storm surge, threatens this mission-critical asset.
  - *Resilience Strategy Project*: NSA Panama City Shoreline Protection and Resilience

Tyndall AFB

Tyndall AFB is located on a peninsula south of the City of Panama City in Bay County. The installation occupies 14.5 square miles and is bounded on the east by the City of Mexico Beach and on the north by East Bay and the City of Parker, to which it is connected by Highway 98. The installation is surrounded mostly by water, with St. Andrew Sound to the southeast and St. Andrew Bay to the west. The host command for Tyndall AFB is the 325th Fighter Wing.

TYNDALL AFB | MISSION
Train and project unrivaled combat airpower



A F-22 Raptor from the 325th Fighter Wing flies alongside a F-35 Lightning II from the 33rd Fighter Wing over the Emerald Coast

Vulnerability Assessment Key Findings: Assets at Risk

- **The barrier islands that protect the installation suffered significant damage after Hurricane Michael.** According to modeling from the Coastal Engineering Resilience Index, portions of Crooked Island have low resilience. However, it must be noted that the Air Force has already developed a Coastal Resilience Implementation Plan to address these issues.
  - *Resilience Strategy Project*: Tyndall AFB Coastal Resilience
- **New growth in the City of Panama City and adjacent communities requires additional water and wastewater infrastructure capacity.** It was noted during the August 2023 stakeholder workshops that current water and wastewater infrastructure is reaching capacity because of population growth in Bay County. Additional treatment and conveyance infrastructure is required for developing neighborhoods and communities that can house installation personnel and their families.
  - *Resilience Strategy Projects*: Relocation of Panama City Millville Wastewater Treatment Facility, North Bay WWTP Upgrades, Military Point Advanced Water Treatment Facility Upgrades, Redundant Water Line to Tyndall AFB, Upgrade Transmitter Road Water Treatment Plant (WTP), New North WTP

- **Mission-supportive coastal infrastructure (roadways and wastewater lift stations) is at risk.** Coastal community roadways and wastewater lift stations are at high risk because of their exposure and sensitivity to flooding.
  - *Resilience Strategy Project*: Lift Station Improvements
- **Temperatures in Bay County are projected to increase to an annual maximum of 100°F in the 2040s and approximately 102°F in the 2070s.** While these temperatures are not anticipated to greatly impact infrastructure, they can harm service members and civilians throughout the region.
  - *Resilience Strategy Project*: Tree Canopy Restoration

Policy Recommendations for Further Consideration

During the MIRR project, issues surfaced beyond the scope of grant work, yet worthy of noting and highlighting. The following recommendations are logged for further discussion and development at the national, regional, and local level as appropriate.

National Recommendations

- Federal protections should be implemented for the EGTTR – federal legislation must prohibit all energy development (oil, gas, and wind) that presents an encroachment challenge for unencumbered military use of the Range.
- To aid in the increase of housing accessibility across military installations, an increase of the Basic Allowance for Housing program should be assessed and implemented.

Regional Recommendations

- It is highly recommended that communities leverage the relationships built or strengthened through the MIRR process to also include military installations in any ongoing planning processes for their community.
- Northwest Florida installations should continue to actively communicate and coordinate with their surrounding cities and counties for the express purpose of increasing resilience on both sides of the fence line. It is also recommended that installations pursue backup utility options inside the fence lines to increase resilience in times of disaster.
- To support forward-looking stormwater design criteria across the Emerald Coast, the Northwest Florida Water Management District should incorporate future rainfall changes for drainage design in its region. A tool similar to that of South Florida Water Management District can be created using preexisting data from the U.S. Geological Survey.
- To mitigate the increasing frequency of extreme heat days in the Emerald Coast, it is recommended that entities, whether utilities or local governments, consider enhancing operational practices regarding heat to protect critical, heat-sensitive infrastructure.
- To strengthen infrastructure against the threat of flooding, it is recommended that communities and utilities continue to adopt floodplain management ordinances and/or design standards that exceed the requirements in the Florida Building Code—particularly for mission-critical and mission-supportive infrastructure.

Local Recommendations

- To support the availability of attainable housing for installation personnel, local policy actions should focus on updating land management and construction cost incentives and broadening the acceptable housing product types beyond single-family homes.
- Traditional zoning and development patterns should be reviewed and updated to ensure they support the critical needs of installations and their personnel.
- Installations are encouraged to pursue redundant utility sources inside the fence lines for backup power, water, and communications systems. Redundancy is key for resilience during local outages and disruptions.

- Communities are encouraged to continue improving Community Rating System Scores by implementing floodplain ordinances and activities, identifying and piloting alternative or supplemental insurance programs, and enhancing local codes, ordinance, and zoning to reduce community and asset vulnerability to hazards.

Next Steps

During the 18-month-long Emerald Coast MIRR process, the collaboration and bond among regional and military staff and planners has grown and strengthened. As this initial assessment and planning phase of the Emerald Coast MIRR concludes, the continuation of an Emerald Coast Area Resilience Collaborative (EC-ARC) is needed to maintain momentum and enhanced synergy and communication among regional and military planners, elected leaders and military command leadership, and local, state, and federal stakeholders.

Started through a seed grant from the American Flood Coalition in 2021, the EC-ARC is a team of individuals from backgrounds such as education, research, economics, environment, planning, government, emergency management, and utilities/infrastructure. The collaborative represents a seven-county region including Escambia County, Santa Rosa County, Okaloosa County, Walton County, Holmes County, Washington County, and Bay County. Through the EC-ARC, Northwest Florida's leaders will work to secure funding to implement the resilience projects identified in the Emerald Coast MIRR, continue updating resilience strategies as new challenges arise, monitor progress of implementation, and provide periodic public updates.

The following prioritized list of actions are recommended for Emerald Coast MIRR implementation:

1. Work with the ECRC and regional stakeholders to grow EC-ARC as the focal point of regional collaboration for resilience.
2. The EC-ARC shall determine the staff structure and meeting cadence.
3. Prioritize the pursuit of funding for continued momentum.

The EC-ARC should have at a minimum the following representatives actively engaged:

- DoD OLDCC Leadership and community liaisons from each installation in the study area
- County representatives as necessary (transportation, parks, planning, etc.)
- City representatives (planning, parks, emergency management, as determined by the city)
- NWFSL
- Local Defense Alliances (TCPI, NWFL Defense Coalition, Bay Defense Alliance)
- Relevant state agencies (Florida Department of Transportation, Florida Forest Service)
- Utility providers
- Private and non-profit sector representatives, as needed.

For continued and effective collaboration, the following considerations are recommended:

- Municipal and installation planners should consider dedicating existing in-kind resources for the first year of coordination.
- The EC-ARC partners should include military presence in regional workshops and meetings.
- The partnership should communicate with the State of Florida Chief Resilience Officer and resilience team to continue momentum at a regional level in coordination with other regional planning councils engaged in MIRR work. Items for this discussion include funding, statewide information sharing, and formalizing relationships with state agencies given that other MIRR studies have been completed, are currently underway, or are being planned across the state by several of Florida's regional planning councils.
- Annual reports to the leadership of participant agencies, as well as future funders, highlighting accomplishments and performance milestones should be crafted and are highly recommended to celebrate success and continue funding momentum.

Introduction



1. Introduction

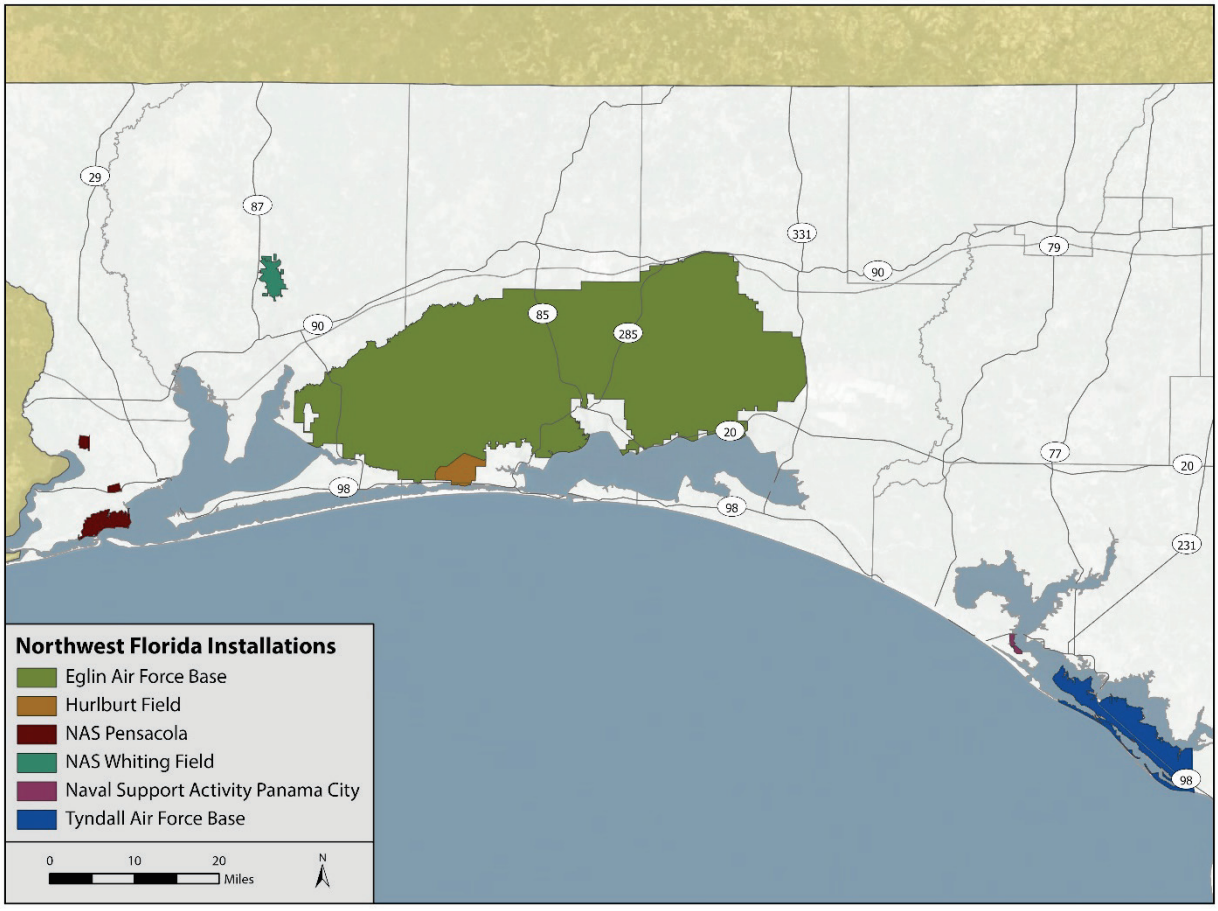
The Emerald Coast Regional Council (ECRC) is spearheading the Emerald Coast Military Installation Resilience Review (MIRR). Funded by the U.S. Department of Defense (DoD) Office of Local Defense Community Cooperation (OLDCC), in partnership with the Florida Defense Support Task Force, the goal of the project is to assess the military resilience of the following installations and their surrounding communities (Figure 1-1):

- **Naval Air Station (NAS) Pensacola** in Escambia County
- **NAS Whiting Field** in Santa Rosa County
- **Eglin Air Force Base (AFB**) in Santa Rosa County, Okaloosa County, and Walton County
- **Hurlburt Field** in Okaloosa County
- **Naval Support Activity (NSA) Panama City** in Bay County
- **Tyndall AFB** in Bay County

The need to increase the resilience of military installations is immediate in Northwest Florida. While major hurricanes and coastal flooding provide the most dramatic examples, many other climate-related risks threaten the long-term sustainability of local military installations. These risks include other natural hazards such as shoreline erosion, increases in the frequency and intensity of tropical storms, and the risks imposed by heat, droughts, and wildfires. These hazards are compounded by human-made vulnerabilities, such as incompatible urban development and infrastructure susceptible to overload or collapse in significant weather events.

This Emerald Coast MIRR provides a vulnerability assessment of mission-critical and mission-supportive infrastructure that has been agreed upon by the stakeholders and provides resilience strategies for risk reduction and mission assurance.

Figure 1-1. Military Installations in the Emerald Coast MIRR



1.1 MIRR Program Overview

The MIRR was developed by OLDCC as part of its Installation Resilience Program. This Program provides the opportunity for communities to collaborate with their local military installations with the goal of promoting both installation and community resilience. OLDCC takes a "One Community" approach: while military installations are their own entities, they do not function as islands. They rely on the communities in which they are based for utility and community services and housing. Service members and their families work and play in these same communities.

1.1.1 Florida Installations in MIRR Programs

Florida installations with completed MIRR programs are:

- Tampa Bay Regional Planning Council MIRR
  - MacDill AFB
- South Florida MIRR
  - South Florida Ocean Measurement Facility
  - U.S. Army Garrison/SOUTHCOM
  - Homestead Air Reserve Base
  - NAS Key West

Florida installations in concurrent MIRR programs are:

- East Central Florida Regional Planning Council MIRR
  - Patrick Space Force Base
  - Cape Canaveral Space Force Station
  - Naval Ordnance Test Unit
  - NSA Orlando
  - U.S. Coast Guard (USCG) Station Port Canaveral
- Central Florida Regional Planning Council MIRR
  - Avon Park Air Force Range

Programs on the horizon include:

- Central Florida Regional Planning Council MIRR
- Northeast Florida Regional Planning Council MIRR

1.1.2 Emerald Coast MIRR Program

Northwest Florida and its key installations are vulnerable to the compounding hazards and threats posed by sea level rise (SLR), increasing frequency and magnitude of tropical systems, flooding, storm surge, and recent increases in extreme rainfall and heat.

Bordered by the Gulf of Mexico to the south, concerns over SLR, flooding, storm surge, and other related effects are vulnerabilities that need to be addressed even when the facilities are not directly located on the coast. To the north, rural forested areas are the predominant landscape feature in many of the counties in the study area, making wildfire a key threat to communities in the region.

Because these installations are owned by different branches of the military but may also rely on each other for support, the development of shared resilience assessment standards, a unified framework, and consistent measures will provide the DoD with a valuable tool to better understand the level of resilience and risk across its regional facilities. DoD installations in Northwest Florida are concentrated primarily in five counties: Escambia, Santa Rosa, Okaloosa, Walton, and Bay, which collectively also comprise the ECRC planning area. Municipalities that are adjacent to the installations in this study include the City of Pensacola, City of Gulf Breeze, City of Milton, City of Crestview,

City of Niceville, City of Mary Esther, City of Fort Walton Beach, City of Destin, City of Freeport, City of Panama City, and City of Panama City Beach. DoD military installations depend heavily on these surrounding communities for critical resources and infrastructure including water, energy, communication, transportation, housing, emergency/medical services, and schools, among others.

The three objectives in the Emerald Coast MIRR are set to meet the vision of the grant to the highest degree possible:

- **Support Mission Assurance.** Protect and preserve military readiness and defense capabilities through funded interventions to supporting infrastructure.
- **Promote Resilient Communities.** Improve the public health, safety, and general welfare of those living and working at or near the installations through implementable, maintainable interventions.
- **Foster Regional Cooperation.** Increase public awareness of the military missions through closer communications and interventions that are integrated with ongoing community resilience planning.

The methodology developed to achieve these objectives and goals is described in detail in Sections 4 and 5.

ECRC received the MIRR grant in August 2022. The MIRR kickoff was held in April 2023 at the Okaloosa County Administrative Complex in the City of Shalimar Florida. The kickoff event was attended in-person and virtually by more than 150 regional stakeholders (Figure 1-2). Keynote speakers at the event included Captain Paul Flores, Commanding Officer at NAS Whiting Field; Jim Bagby, District Director for U.S. Representative Matt Gaetz; Dale Marks, Vice Director of the 96th Test Wing at Eglin AFB; and Susy Torriente, Former Miami Beach Community Resilience Officer. Following the presentation, stakeholders were invited to join the project visioning session (Figure 1-3).

Figure 1-2. Emerald Coast MIRR Kickoff Meeting



Figure 1-3. Emerald Coast MIRR Visioning Session

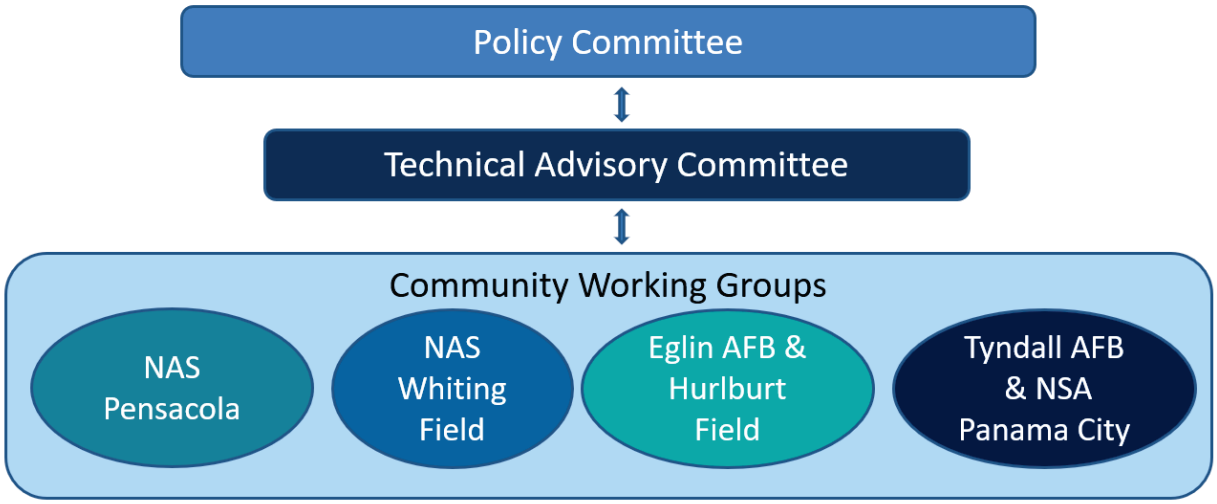


1.1.3 Planning Process and Stakeholder Engagement

As part of the "One Community" approach (Figure 1-4), the MIRR formed two stakeholder committees: the Policy Committee and the Technical Advisory Committee (TAC).

The purpose of the Policy Committee was to discuss ongoing project progress with high-level stakeholders to gain concurrence on project direction and results. The Policy Committee consisted of representatives of local government, utility providers and the installations. Four check-in milestone meetings were held in July and September 2023, and January and April 2024.

Figure 1-4. The "One Community" Approach for the Emerald Coast MIRR



The TAC met virtually each month to discuss ongoing project efforts and issues related to the shocks and stresses facing the regional installations and communities, while providing technical review and feedback. The TAC consisted of local government staff members, installation planners, municipal and private utilities, non-profit, and military stakeholders. Topics of discussion included topics such as encroachment, housing, childcare, and flood insurance.



Data collection and four stakeholder engagement workshops took place in the summer of 2023 for a deeper dive into the shocks and stresses that affect mission assurance at the bases. Community partners from across the five counties attended the workshops and provided invaluable input that helped lay the groundwork for both the vulnerability assessment and TAC. Robust dialogue informed the data collection process and brainstorming led to the foundation of strategies and intervention ideas to reduce risk. Summaries for the four individual stakeholder engagement workshops can be found in Appendix A.

The vulnerability assessment phase was undertaken throughout the fall of 2023 and complied with State of Florida guidance to ensure that identified MIRR resilience projects would be eligible for future Resilient Florida Program grants. Armed with the data, analysis, and stakeholder feedback, the project team moved to the strategy and project development phase. Continuous engagement with TAC and Policy Committee members and four additional workshops in March 2024 helped refine recommendations and gain support for funding and implementation.

All grant deliverables were met, and the project was completed on time and within budget. With the strategy completed, implementation through continued cooperation between the installations and the communities they call home began.



The project team facilitated cooperative and open communication among the stakeholders including representatives from the installations, cities, counties, and utilities, as appropriate, and engaged them in the site visits, workshops, and regularly scheduled meetings. Open dialogue encouraged stakeholders to talk to each other about the hazards they face, the relationships held between them, ongoing efforts, and coordination. This open dialogue confirmed that hazards prioritized by the installations are similar or identical to the priority hazards of their host cities and counties. Recognition of these shared threats was a key step in reaching agreement of the assessment process. Full reports of the stakeholder workshops can be found in Appendix A.

1.2 Military Significance and Mission Interdependency

The military presence in the Northwest Florida region has a storied past playing a critical role in national defense, training, research, and development. The region's strategic location along the Gulf Coast has made it a vital area for military operations dating back to colonial times. The six military installations within the Emerald Coast are closely tied to their communities and each other.

Northwest Florida's military history dates back nearly 200 years when the U.S. gained control of Fort San Carlos de Barrancas, currently known as Fort Barrancas, which is located on what is now NAS Pensacola. The oldest U.S. Naval Air Station, NAS Pensacola was established in 1914 to train pilots and provide support for naval operations during the World War I. Northwest Florida's modern military footprint dates back to World War II when the area had numerous locations dedicated for military training.

Today, Northwest Florida remains a hub for military activity, with multiple bases serving various branches of the armed forces. These bases continue to play critical roles in national defense, training, research, and development, shaping both the region's history and its ongoing relationship with the military.

The military's presence in Northwest Florida has numerous interconnected elements, offering vital support to our national security efforts and significantly bolstering the economic strength of the region. Military commands in Northwest Florida have numerous linkages with each other and the installations that support them. For example, NAS Pensacola and NAS Whiting Field host Training Air Wings under the Naval Air Training Command (NATRACOM). Aviators spend their first 6 weeks of training at NAS Pensacola and transition to their primary training phase at NAS Whiting Field. Aviation platform training is executed using NAS Whiting Field's main installation and its 12 Outlying Landing Fields (OLF) located throughout Florida and Alabama that support fixed and rotary-wing pilot training. OLFs and ranges across Northwest Florida and southern Alabama are used by aircraft based at NAS Pensacola, NAS Whiting Field, Eglin AFB, and Tyndall AFB, in addition to the training of foreign allies and the hosting of aircraft and crews from across the country. Resilience challenges at any of these three installations can have a direct impact on NATRACOM's mission execution.

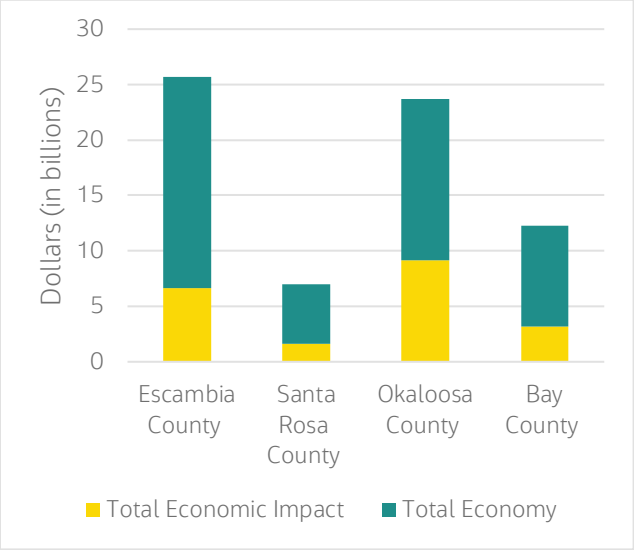
1.2.1 Economic and Community Impacts of the Military

Economic Impacts

The military is a critical piece of the Emerald Coast's communities. Florida's western panhandle is home to one of the highest concentrations of active-duty and civilian military personnel, veterans, and military retirees in the nation. Defense spending in Northwest Florida had a total combined economic impact of more than $21 billion in 2021—this makes up almost one-third of the region's 2020 gross regional product (Figure 1-5).

The military also provides a significant amount of direct and indirect employment in the region. According to the Defense Support Initiatives, the military bases across Northwest Florida create almost 187,000 jobs in the region. The Emerald Coast region has the largest military economic impact in the state (One Okaloosa n.d.).

Figure 1-5. 2020 Economic Impact of Defense Spending on Project Counties
Data were unavailable for Walton County. Source: Enterprise Florida (2022)



Community Impacts

The rich military history in the Emerald Coast is a source of pride for its communities. As mentioned in the previous section, the region's installations contribute to the local economy through job creation, contracts with local businesses, and the support of the auxiliary industries like housing and retail. Socially, military personnel and their families integrate into the community, enriching its culture and bringing unique perspectives. Moreover, these installations foster collaboration between military and local institutions, such as universities and hospitals, enhancing research capabilities and healthcare services. Overall, the military presence in Northwest Florida is a cornerstone of its identity, shaping its economy, culture, and relationships with broader national defense strategies.

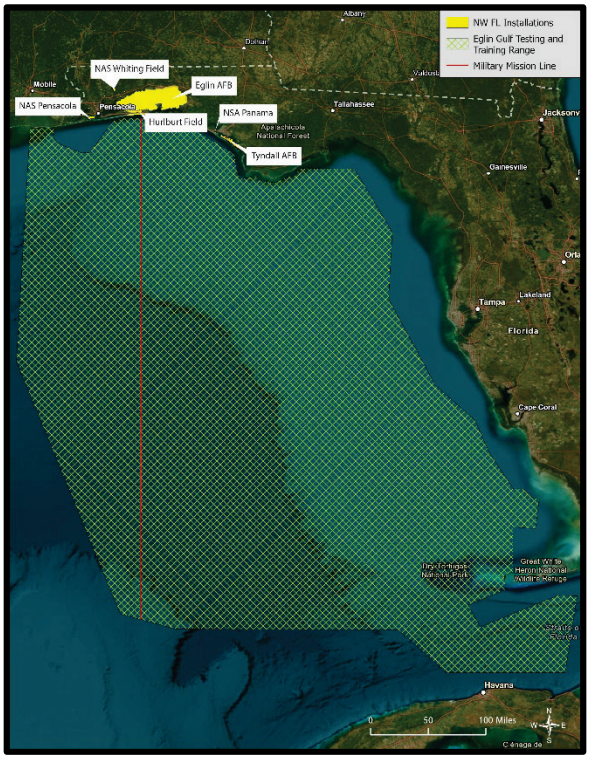
1.2.2 Geographic Significance of the Installations and Missions

The Emerald Coast is well-known for its cooperative military activity. While each installation has its own unique missions and tenant commands, they work with each other on training and testing activities. For example, personnel undergoing training at the Center for Explosive Ordinance Disposal (EOD) and Diving at NSA Panama City will also perform EOD training at Eglin AFB. Similarly, Navy fixed-wing pilots will start their initial ground training at NAS Pensacola and then continue their air training 1 hour away at NAS Whiting Field for another 6 to 12 months, depending on airframe and fleet platform selection. As shown on Figure 1-6, the geographic proximity of the installations to each other facilitates and improves the quality of the training and testing missions.

One reason the Emerald Coast is so unique is the Eglin Gulf Test and Training Range (EGTTR) and its proximity to the installations. The EGTTR is the largest training range in the continental U.S., with an area of 180,000 square miles of DoD-controlled airspace, along with 724 square miles of adjacent land ranges and 17 miles of shorelines. These ranges allow for a variety of activities, including air combat training, air-to-air missile testing, air-to ground targeting, drone targeting, and hypersonic weapons testing. The EGTTR and its size enables activities that cannot be done anywhere else, and it is defined by the DoD as a national asset.

Currently, energy sector development poses an encroachment hazard to the EGTTR, and by extension, the mission of Eglin AFB. To guard against encroachment, in 2006 Congress passed the Gulf of Mexico Energy Security Act, which created the Military Mission Line (MML) boundary that protects the EGTTR from encroachment by oil and gas drilling east of the MML in a moratorium that was active until June 20, 2022 (43 U.S.C. 1331). While a September 2020 Executive Order from President Trump extended the same moratorium until 2032, it does not protect the range from all energy sector activities occurring in the area. Additionally, there are no stipulations that prevent the development of offshore wind farms that pose a similar threat. It is critical to protect the missions of both Eglin and other Air Force and Navy installations (NAS Pensacola, NSA Panama City, and Tyndall AFB, all of which use the range) by protecting the EGTTR from encroachment.

Figure 1-6. Eglin Gulf Test and Training Range



1.3 Resilience in Northwest Florida

Northwest Florida exhibits a profound resilience ingrained in its communities, shaped by both natural challenges and a resilient spirit. The region has endured numerous hurricanes that have tested local infrastructure and resilience time and again. Despite these adversities, community bonds remain strong, bolstered by shared experience of rebuilding and mutual support. From grassroots efforts to government initiatives, Northwest Florida exemplifies resilience through proactive disaster preparedness plans, robust emergency response systems, and community-driven recovery effort. Communities in the panhandle are not only prepared but are also proactive in fostering resilience through collaborative planning and resource allocations, ensuring that each hurricane season brings renewed readiness rather than fear.

Northwest Florida's resilience extends beyond disaster recovery—it encompasses economic diversification, environmental stewardship, and social cohesion. Communities in the region not only survive, but thrive, embodying a resilience that serves as a model for other communities facing similar challenges.

1.3.1 Regional Military Resilience

Regional military resilience in Northwest Florida is bolstered by collaborative efforts among the counties and military installations. Programs such as the Tri-County Initiative Partnership between Okaloosa County, Walton County, and Santa Rosa County underscore the region's commitment to enhancing military readiness and support infrastructure. This collaborative approach ensures streamlined efforts in such areas as infrastructure development, education, healthcare, and housing, aiming to create a robust environment that attracts and retains military personnel and their families while sustaining economic growth across the region.

Moreover, organizations like the Bay Defense Alliance and the Northwest Florida Defense Coalition exemplify the community's stance in supporting military resilience. By advocating for base reconstruction post-Hurricane Michael (for Tyndall and NSA Panama City) and post-Hurricane Sally (for NAS Pensacola), the alliances strengthened the installations' mission capabilities while fortifying the region's overall resilience. This comprehensive approach not only safeguards military readiness but also enhances the quality of life for service members and their families, reinforcing Northwest Florida's status as a pivotal hub for national defense and community collaboration.

The six installations in the Emerald Coast MIRR each showcase dedicated efforts toward enhancing their specific resilience and readiness.



1.3.2 Local Government and Community Efforts

Emerald Coast Regional Council

The ECRC, the Emerald Coast MIRR project grantee, was originally formed in 1964 as the Pensacola-Escambia County Regional Planning Council, then became the West Florida Regional Planning Council (1980–2019). Its governing board consists of county and municipal elected officials, gubernatorial appointees, and ex officio members representing key state agencies and the Northwest Florida Water Management District. Growth of the regional council was driven by recognition that transportation planning was a regional concern. Later, environmental, economic, and criminal justice issues helped spur the addition of more counties, cities, and towns. By 1980, the ECRC district as it exists today was complete.

In 2021, ECRC founded the Emerald Coast-Area Resilience Collaborative (EC-ARC), which represents seven counties within the Emerald Coast including the five counties in this MIRR as well as Holmes County and Washington County. The purpose of EC-ARC is to generate creative solutions to regional natural and human-made hazards, with a focus on resilient infrastructure, housing, communities, and economies.

Counties

Northwest Florida has implemented various resilience efforts to address challenges such as natural disasters, economic fluctuations, and community wellbeing. These efforts involve collaboration between government agencies, non-profit organizations, businesses, and local communities (Figure 1-7).

All five counties in the Emerald Coast MIRR region have received funding through the Resilient Florida grant program and are actively pursuing their state compliant vulnerability assessments. This will identify vulnerabilities and make the communities eligible for future mitigation funding.

Additionally, given the region's susceptibility to hurricanes and other natural disasters, county resilience efforts focus on enhancing preparedness, evacuation procedures, and emergency response capabilities. This includes infrastructure improvements, such as strengthening buildings and roads, as well as community outreach programs to educate residents about disaster preparedness.

Figure 1-7. 2024 Northwest Florida Resiliency Seminar



Defense Alliances

Northwest Florida is home to four defense alliances associated with the installations in this MIRR:

- Northwest Florida Defense Coalition
- Tri-County Community Partnership Initiative
- Defense Support Initiatives
- Bay Defense Alliance

The **Northwest Florida Defense Coalition** was established as a nonprofit in the fall of 2023 with the mission to actively facilitate community support to sustain and enhance current military missions at both NAS Pensacola and NAS Whiting Field, while also pursuing future missions and promoting the region's contributions to the nation's defense. While the Coalition is new, the Greater Pensacola Area Chamber Armed Services office helped lay the foundation of fostering a long-time community partnership with NAS Pensacola.

The **Tri-County Community Partnership Initiative** (TCPI) was created by One Okaloosa Economic Development Council to foster regional development and cooperation between Okaloosa County and neighboring Santa Rosa County and Walton County to support military readiness and enhance the quality of life for service members and their families. By collaborating on infrastructure projects, housing initiatives, and community support programs, the partnership aims to ensure that the region remains a premier destination for military personnel stations at Eglin AFB, Hurlburt Field, and NAS Whiting Field. The Partnership's effort not only benefits the local economy through defense-related industries but also reinforces the area's commitment to supporting the military's mission and its integral roles in the community.

The **Defense Support Initiatives** was also created by One Okaloosa Economic Development Council to preserve the Eglin Test and Training Complex and its contributions to national security.

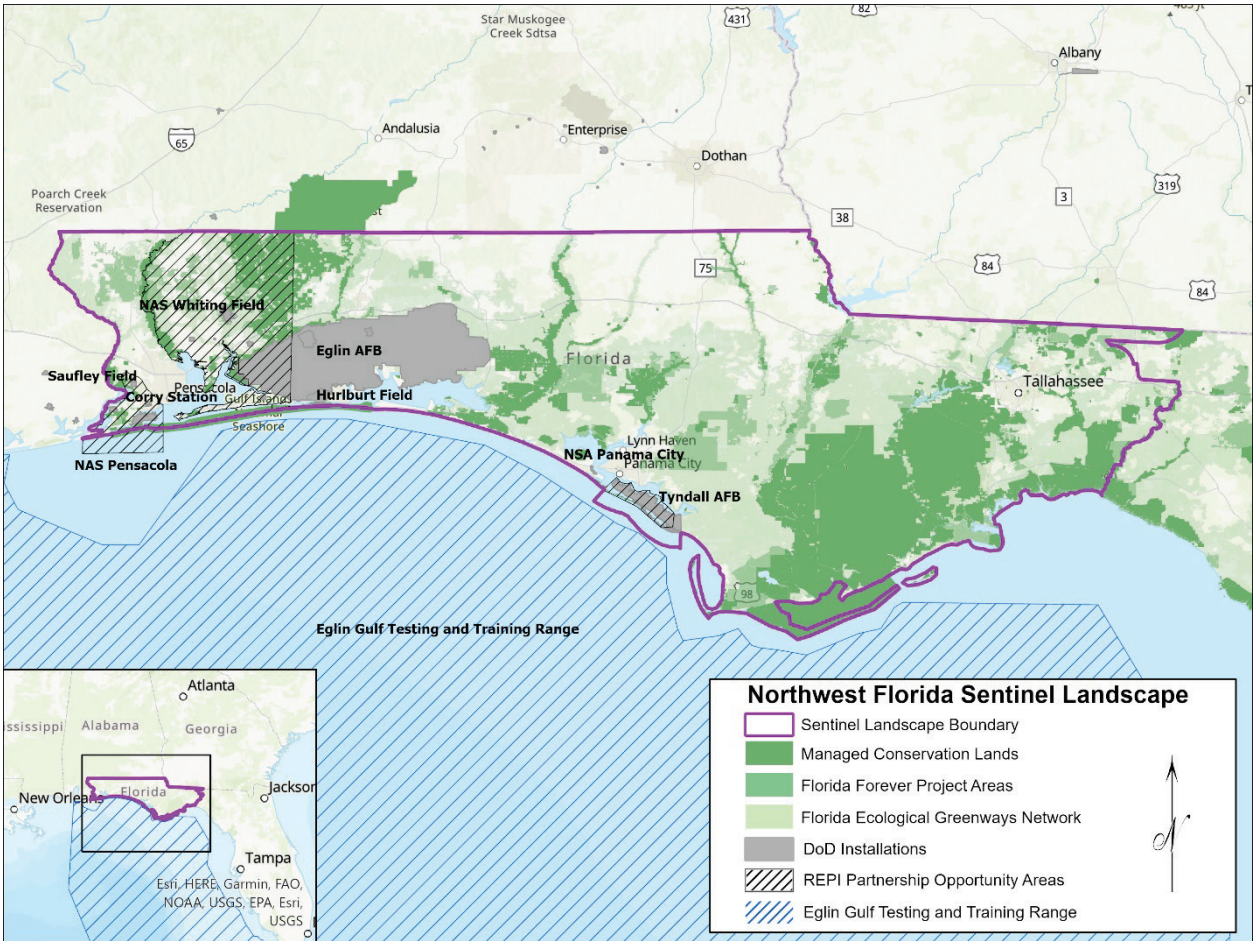
The **Bay Defense Alliance** is a strategic initiative that fosters collaboration and support within the communities surrounding Tyndall AFB and NSA Panama City. The Alliance brings together local businesses, government entities, and educational institutions to bolster the resilience and readiness of the area's military installations. By advocating for defense-related initiatives, infrastructure improvements, and workforce development programs, the Alliance aims to strengthen the bases' mission capabilities and economic impact on the region. Through proactive engagement with military leadership and ongoing community outreach, the Bay County Alliance ensures that Tyndall AFB and NSA Panama City remain a cornerstone of national defense while simultaneously contributing to the prosperity and vitality of Bay County and its residents.

Northwest Florida Sentinel Landscape

The Sentinel Landscape Partnership was created by the U.S. Department of Agriculture, Department of the Interior, and the DoD's Readiness and Environmental Protection Integration Program. Created in 2013, the Partnership works with state and local governments and non-governmental organizations (NGOs) to promote sentinel landscapes, which are defined as "areas where conservation, working lands, and national defense interests converge" (refer to Figure 1-8) (Sentinel Landscape n.d.).

Established in 2022, the Northwest Florida Sentinel Landscape (NWFSL) encompasses the military installations within the MIRR and works with the installations to protect both the installations and the many threatened and endangered (T&E) species in the region as well as natural systems, such as longleaf pine forests and coastal areas. NWFSL promotes collaboration between the local installations, communities, state and local governments, and NGOs (including the local estuary programs) to restore and protect natural resources in a manner that simultaneously protects and promotes installation resilience. NWFSL's goals include T&E species, expanding the use of prescribed fire, improving water quality and quantity, maintaining and improving the resilience of working agriculture and forestry lands, and working with its partners to identify, implement, and accelerate projects that mitigate climate risk and enhance installation resilience. NWFSL has worked with community partners to protect 11,107 acres since its designation in 2022 and has identified more than 30 Florida Forever Projects that target more than 500,000 acres for protection. These acquired lands protect NAS Whiting Field and Eglin AFB from encroachment.

Figure 1-8. Northwest Florida Sentinel Landscape
Source: NWFSL (n.d.)



Estuary Programs

The estuary programs in Northwest Florida play a crucial role in fostering resilience across the region by focusing on the health and sustainability of coastal ecosystems and communities. There are three estuary programs within the Emerald Coast MIRR study region: the Pensacola and Perdido Bays Estuary Program in Escambia County and Santa Rosa County, the Choctawhatchee Bay Estuary Program in Okaloosa County and Walton County, and the St. Andrew and St. Joseph Bays Estuary Program in Bay County. Each program continually works with local governments, environmental organizations, local stakeholders, and community members to protect and enhance the water quality and resilience of their Bays and watersheds. By promoting sustainable practices and conducting research on estuarine ecosystems, they help mitigate the effects of pollution, erosion, and habitat loss, which are critical factors in coastal resilience. Furthermore, estuary programs facilitate community engagement and education by raising awareness about environmental stewardship and resilience strategies among residents, businesses, and policymakers. Their efforts not only protect valuable natural resources but also enhance the region's ability to withstand and recover from environmental challenges, ultimately contributing to a more resilient Emerald Coast.

Emerald Coast Military Installations



2. Emerald Coast Military Installations

2.1 NAS Pensacola

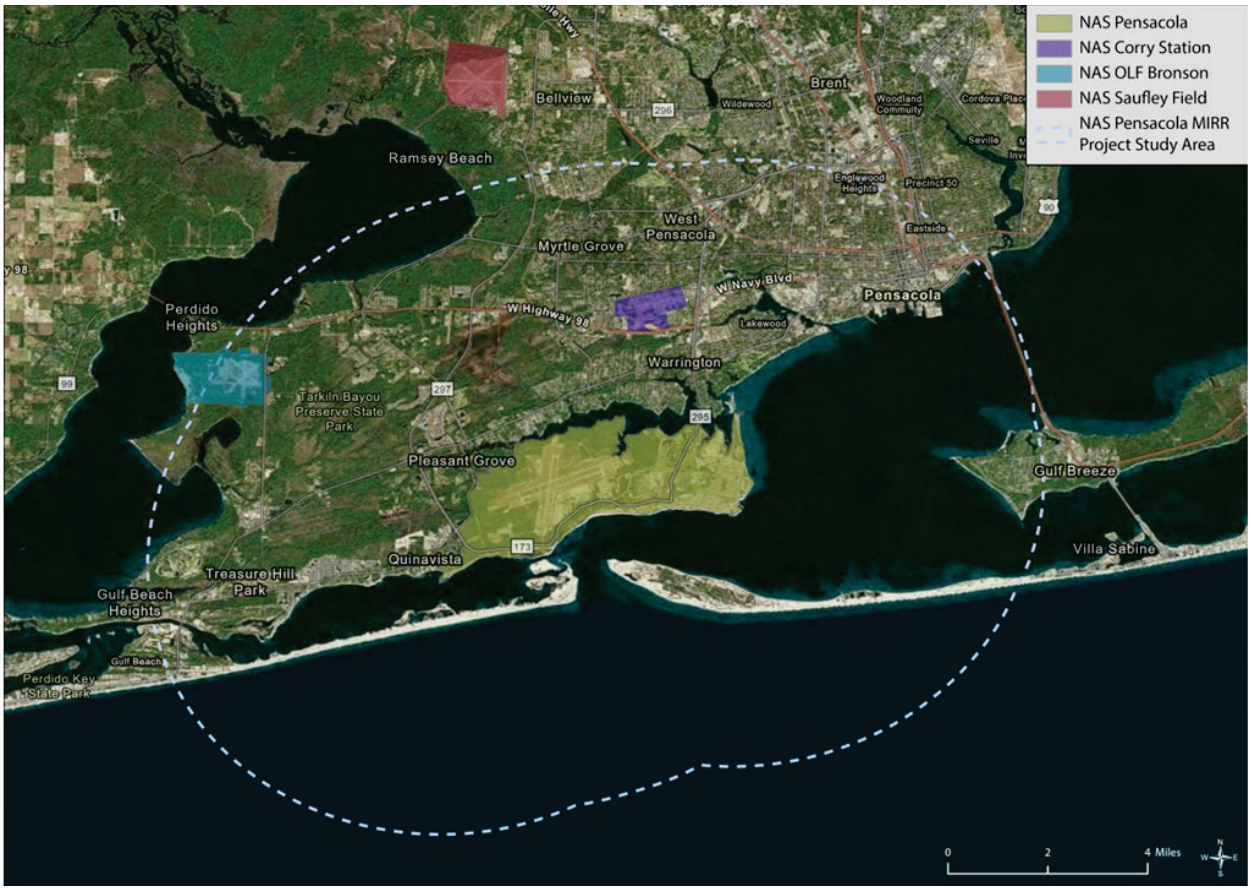
2.1.1 Location

NAS Pensacola consists of four distinct sites: NAS Pensacola, Corry Station, Bronson Field, and Saufley Field (Figure ES-1). The installation itself is located southwest of the City of Pensacola on a peninsula and is bordered on the north by Bayou Grande and east and south by Pensacola Bay. On the west, the installation is bordered by wetlands and the Pleasant Grove and Perdido Communities. On the east, the installation is bordered by Pensacola Bay and the Warrington Community. The installation is accessible from the west via South Blue Angel Parkway (State Road [SR] 173) and from the east by South Navy Boulevard (SR 295).

The host command is NAS Pensacola and co-located commands include:

- Naval Education and Training Command
- Center for Naval Aviation Technical Training
- Marine Aviation Training Support Group-21 and -23
- Naval Aviation Schools Command
- Center for Information Warfare Training
- Naval Hospital Pensacola
- Navy Medical Operational Training Center

Figure 2-1. Map of NAS Pensacola



2.1.2 Mission

NAS PENSACOLA | MISSION
To efficiently deliver the very best Readiness From The Shore

NAS Pensacola is known as "the Cradle of Naval Aviation." It trains naval aviators and provides a variety of additional training, with approximately 59,000 students graduating annually. Air operations at the installation support training and fleet requirements for the U.S. Navy. The installation trains students from every branch of the military along with the USCG. The installation provides support services to 126 tenant commands and the fleet itself. As the Navy's second largest training base, NAS Pensacola provides a premier initial training platform for aviation and cyber warfare specialties while supporting more than 23,000 military members, families, and civilian workforce. Corry Station, often thought of as the "Cradle of Cryptology," supports a unique primary mission to deliver trained information warfare professionals to the Navy and joint services, enabling optimal performance of information warfare across the full spectrum of military operations.

NAS Pensacola delivers warfighter readiness by ensuring the active-duty force is prepared to perform military operations across the globe while supporting family resiliency at home. Additionally, they support the 126 varied tenant commands through resource management to meet their mission goals while providing force protection to protect the assets on base including service members, their families, employees, and visitors.

Figure 2-2. NAS Pensacola Runways



2.1.3 History

In 1825, President John Quincy Adams and Secretary of the Navy Samuel Southard made arrangements to construct a Navy yard in the southern tip of Escambia County. In 1911, Congress passed the 1911-1912 Naval Appropriations Act, which allocated funds for the Navy to develop flight capabilities. This led to the establishment of an aviation training station in 1913. NAS Pensacola became the first U.S. Naval Air Station, training 1,000 naval aviators during World War I. During World War II, 12,000 pilots trained at the installation. Additional facilities were added, and primary pilot training continued to ebb and flow as demand for pilots increased during the Korean and Vietnam Wars. From its inception until the 1990s, NAS Pensacola was also home to significant aviation depot facilities providing maintenance, repair, and overhaul of aircraft. In 1971, a major education mission was added to the base when it was selected as the headquarters site for the Chief of Naval Education and Training, a new command that combined direction and control of all Navy education and training activities and organizations. The education and training focus of NAS Pensacola endures today as a critical mission.



NAS Pensacola Early Aviators

2.1.4 Unique Value

NAS Pensacola is one of only four installations in the continental U.S. with both an active airfield and a deep-water port, with the installation also being the Navy's only deep-water port in the Gulf of Mexico. The installation is co-located with and hosts USCG Station Pensacola and is home to multiple USCG cutters, which support marine safety and security in the Gulf of Mexico.



Training Jets Over NAS Pensacola

The installation has dual east–west runways 8,000 feet each and 7,100 feet of north–south runway. These runways support more than 100,000 flight operations annually.

NAS Pensacola's proximity to both NAS Whiting Field and the EGTTR provides a unique opportunity for training Navy pilots with robust airspace and OLF options. Additionally, the proximity of the installations to each other provides a unique area where pilots and their families can settle without needing to move as they transition between training aviation training programs at both locations.

NAS Pensacola is also a unique piece of pride in the Florida panhandle. The local community is proud and supportive of the Navy's Flight Demonstration Squadron – The Blue Angels, who are based at NAS Pensacola and attract tourists from around the world.

2.2 NAS Whiting Field

2.2.1 Location

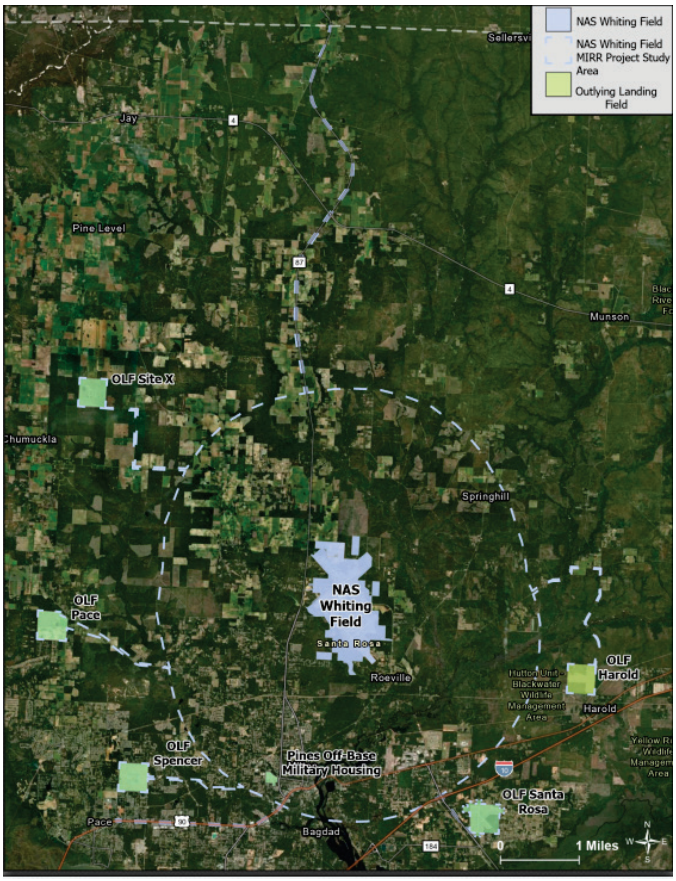
NAS Whiting Field is located in central Santa Rosa County. The installation consists of approximately 12,000 acres surrounded by rural residences and wooded areas (Figure 2-3).

NAS WHITING FIELD | MISSION
Produce the military's best trained "Aviation Warfighter"

Tenant commands at NAS Whiting Field include:

- Training Air Wing Five
- Center of Naval Aviation Technical Training, Detachment Whiting Field
- Commander, Naval Air Training Maintenance Detachment Whiting Field

Figure 2-3. Map of NAS Whiting Field and Outlying Fields



2.2.2 Mission

The mission of NAS Whiting Field is to produce the military's best-trained "aviation warfighter" and is one of two Navy pilot training sites for student pilots from the Navy, Marine Corps, and Coast Guard. Whiting Field has been described as part of the "backbone of the Navy's flight program" as well as "the busiest aviation complex in the world" with approximately 1 million flight operations annually. In fact, the yearly activity accounts for an average of 17% of Navy flight hours. Training is provided for both fixed wing and rotary wing pilots.

NAS Whiting Field made a successful transition from the T-34 training aircraft to the T-6B "Texan II" in 2012 and is transitioning from the TH-57 rotary aircraft to the TH-73 "Thrasher." The installation is host to the Navy's largest Air Wing, which supports more than 260 airframes, six flight training, and two instructor squadrons. In addition, Whiting Field is home to important missions and units such as Security, Branch Medical Clinic (Dental), Naval Branch Clinic (Medical), I.D. Card/CAC Office, Training Air Wing Five Reserve Component, Training Squadron Two, Training Squadron Three, Training Air Wing Five, Training Squadron Six, Helicopter Training Squadron Eight, Helicopter Training Squadron Eighteen, Helicopter Training Squadron Twenty-Eight, Marine Aviation Training Support Group, and Naval Air Maintenance Training Group Detachment.

2.2.3 History

NAS Whiting Field officially was commissioned in 1943, with the goal of training naval aviators during World War II. This mission has continued throughout the installation's history with 2023 celebrating 80 years of continuous operations. Whiting Field supported the Navy's transition from propeller to jet aircraft as well as rotary wing operations. Its location and proximity to multiple OLFs ensured its relevancy in training aviators in times of both peace and conflict.

2.2.4 Unique Value

NAS Whiting Field is an irreplaceable piece of naval aviation, producing more than 1,200 pilots every year, including 100% of all Navy, Marine Corps, and Coast Guard helicopter pilots. The installation has three separate and fully operational airfields (NAS Whiting Field North and South and Naval Outlying Land Field Choctaw) and is strategically located near 12 outlying landing fields that are used by the installation for training. These OLFs are spread throughout Florida and Alabama in four counties (Santa Rosa County, FL; Escambia County, FL; Baldwin County, AL; and Escambia County, AL) and the installation has a significant amount of airspace (4,500 square nautical miles) needed for pilot training. The entirety of this complex of nearby landing fields and airspace, along with year-round conducive flying weather, make NAS Whiting Field an irreplaceable asset in aviation training.



Training Helicopter Over NAS Whiting Field

2.3 Eglin AFB

2.3.1 Location

Eglin AFB is the largest installation in the U.S. Air Force (USAF), spanning more than 464,000 acres in Santa Rosa County, Okaloosa County, and Walton County (Figure 2-4). The installation is bounded to its east by Highway 331 and on the west by the Escribano Point Wildlife Management Area. The City of Niceville, City of Valparaiso, City of Shalimar, and City of Fort Walton Beach can be found south of the installation bordering Choctawhatchee Bay. The installation also owns a large portion of Santa Rosa Island, a barrier island south of the mainland and west of Navarre Beach. The installation is crossed north and south via SR 85 and SR 285.

The host command for Eglin AFB is the 96th Test Wing, and co-located commands include:

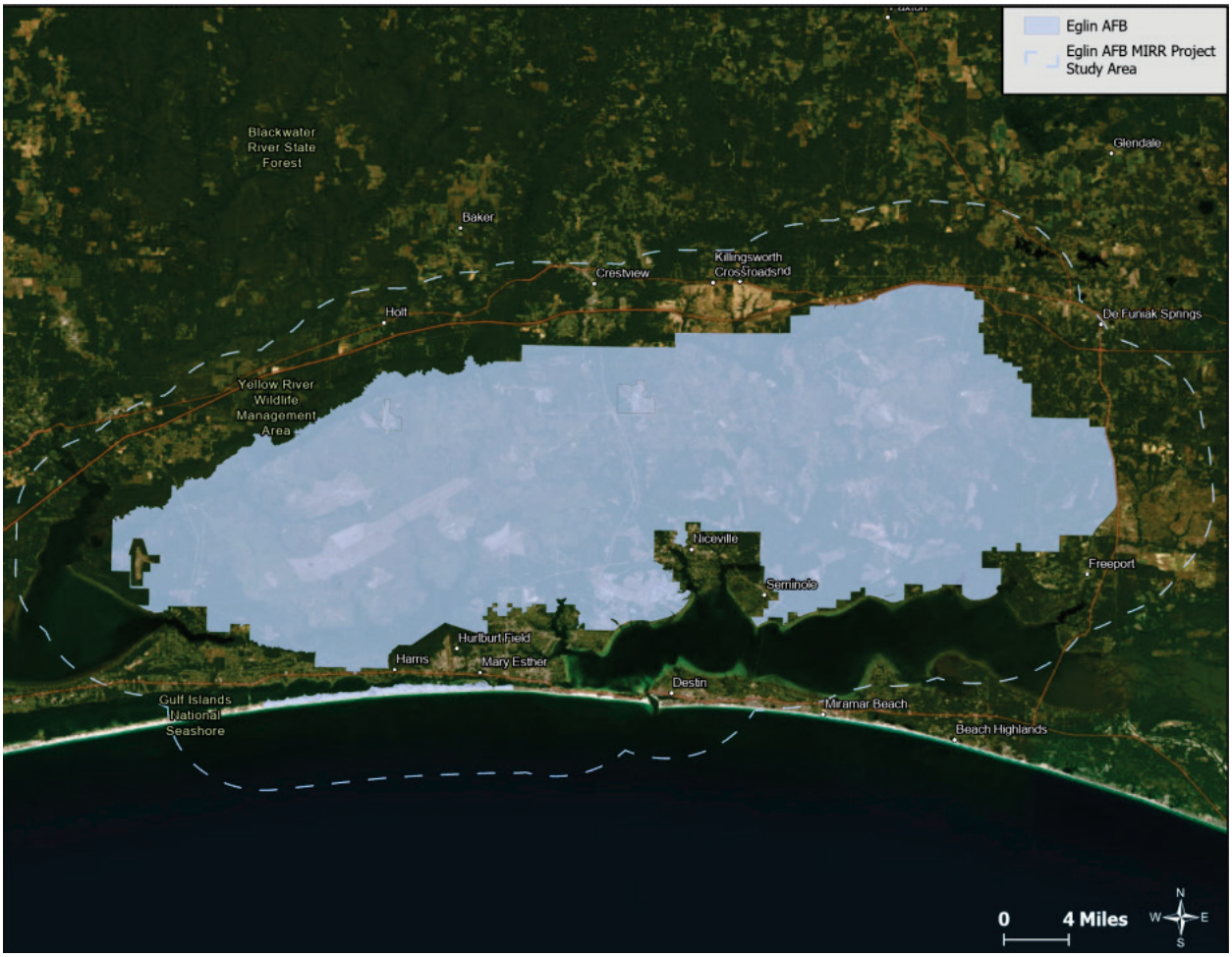
- 6th Ranger Training Battalion
- 7th Special Forces Group
- 33rd Fighter Wing
- 53rd Wing
- 350th Spectrum Warfare Wing
- 919th Special Operations Wing

EGLIN AFB | MISSION
We test and evaluate state-of-the-art weapon systems and cyber capabilities, provide quality installation and mission support, and serve as responsible stewards of our resources to deliver war-winning capabilities.

2.3.2 Mission

Eglin AFB's primary missions are testing and evaluating non-nuclear munitions, electronic combat systems and navigation/guidance systems for Air Force Materiel Command, providing operational testing and evaluation of new aircraft systems and equipment for Air Combat Command (ACC), conducting F-35A Formal Training Unit activities in the eastern U.S., providing commercial airline access via the Destin-Fort Walton Beach Airport, and concurrently providing host wing services to all Eglin AFB tenant commands, organizations, and other neighboring military installations and activities. The largest AFB by land area, beyond the main base, a number of auxiliary fields were constructed on the Eglin reservation during World War II, many of which are still in service in various roles, either in support of flight operations or special test activities. 'Team Eglin' consists of five wings, four wing equivalents, and 35 associate units across all branches of the military.

Figure 2-4. Map of Eglin Air Force Base



2.3.3 History

In 1931, the land on which Eglin sits today was identified as a potential site for the U.S. military because of the vast expanse of available land and proximity to the Gulf of Mexico. Established in 1935 as the Valparaiso Bombing and Gunnery Base, it was renamed Eglin Field in 1937. The installation was expanded in 1940 with the provision of 384,000 acres of land by the U.S. Forest Service to the War Department, and Eglin became the site for gunnery training for Army Air Forces fighter pilots and a major testing center for aircraft, equipment, and tactics during World War II. After the war, Eglin pioneered missile development and testing with the Air Force Armament Center, which centralized the development and testing of non-nuclear munitions, leading to innovations such as precision-guided weapons. In 2012, the Air Armament Center was deactivated, and the 46th Test Wing and 96th Air Base Wing merged to form the 96th Test Wing. The 96th Cyber Test Group was activated in 2017 to ensure the effectiveness and resilience of Air Force systems and networks. Eglin's long history resulted in it becoming the home of Air Force testing, evaluation, and training that it is today.



F-35s Flying Over Eglin Air Force Base

2.3.4 Unique Value

Eglin AFB's land impact areas and associated airspace, coupled with the EGTTR, provide a unique environment that supports the operational imperatives of the DoD, allowing for weapons testing to meet the U.S.'s global security challenges. The installation supports a unique aggregation of all phases of weapons development, from basic science and technological development to complex system evaluation and training. This includes hypersonic weapons testing, high-altitude supersonic air combat training, air-to-air missile testing, drone targeting, special operations training, and more.



Airfield at Eglin AFB

The Eglin Test and Training Complex (ETTC) is composed of 724 square miles of land ranges, 123,000 square miles of water ranges, and 134,000 square miles of airspace. The ETTC is the largest single component of the DoD's Major Range Test Facility Base structure. In fact, commenting on Eglin and the Eastern Gulf Range, a 2018 report from the Office of the Secretary of Defense (*Preserving Military Readiness in the Eastern Gulf of Mexico* [DoD 2018]) stated that "[t]he eastern Gulf of Mexico is an irreplaceable national asset… No other area offers the DoD a comparable combination of air space, water space, and existing infrastructure to support military activities."

2.4 Hurlburt Field

2.4.1 Location

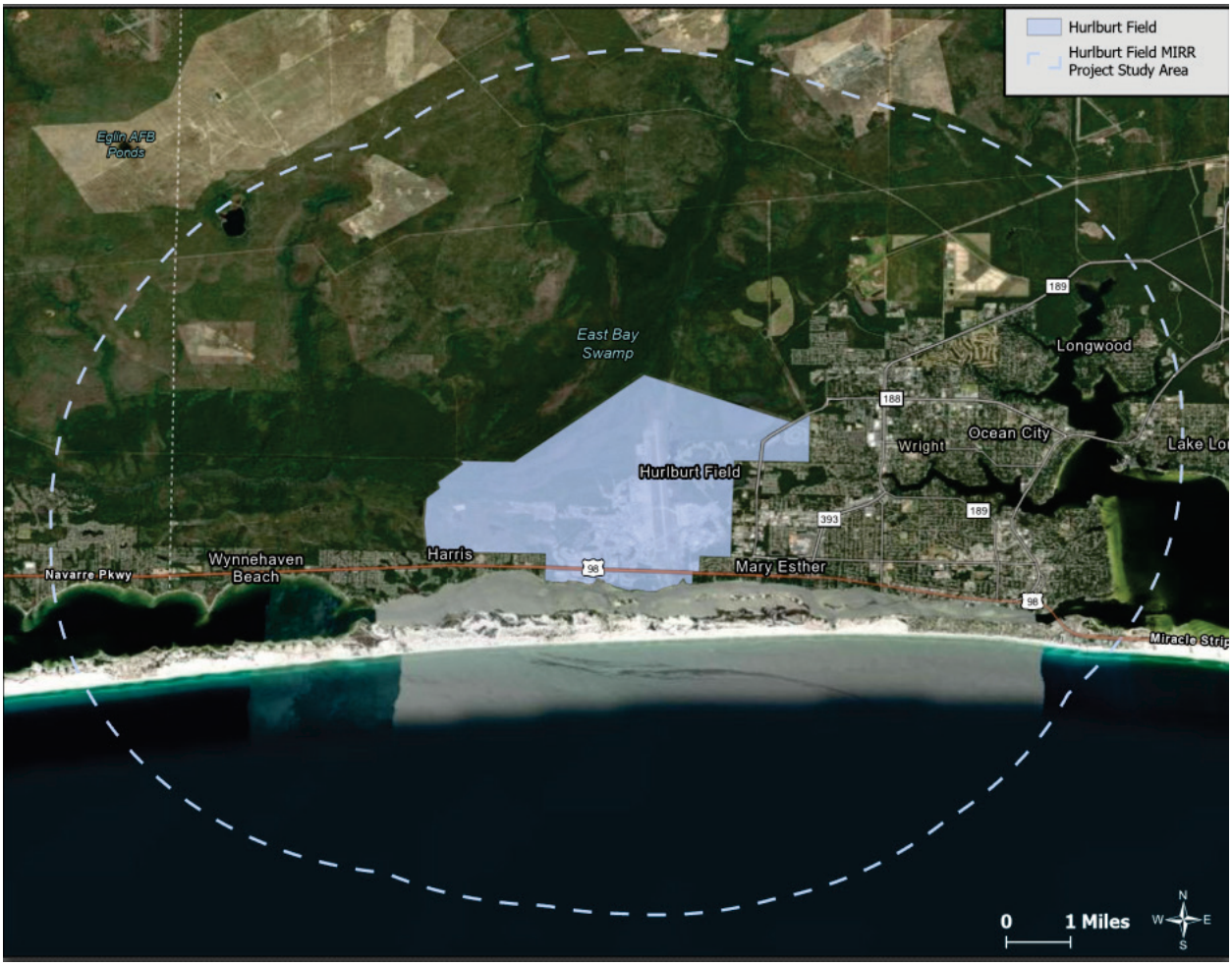
Hurlburt Field is located in southern Okaloosa County west of the City of Mary Esther. The installation is co-located with Eglin AFB on its northern and western fence lines. Highway 98 runs through the southern portion of the installation (Figure 2-5).

The host command for Hurlburt Field is 1st Special Operations Wing (1st SOW), and tenant commands include:

- Air Force Special Operations Command (AFSOC)
- 24th SOW
- 492nd SOW

HURLBURT FIELD | MISSION
Provide our Nation's specialized airpower, capable across the spectrum of conflict...Any Time, Any Place

Figure 2-5. Map of Hurlburt Field



2.4.2 Mission

Hurlburt Field is primarily a support base for the AFSOC, one of ten major Air Force commands and the Air Force component of U.S. Special Operations Command, which is a unified command located at MacDill AFB, Florida. In addition to hosting AFSOC Headquarters, Hurlburt is also home to several key AFSOC wings. The 1st SOW is the AFSOC host wing at Hurlburt that also operates specialized aircraft to support special operations worldwide. The 24th Special Operations Wing (24th SOW), provides special tactics forces for rapid global deployment to enable airpower success. The 24th SOW is the only special tactics wing in the Air Force. The 492nd SOW organizes, trains, educates and equips forces to conduct special operations missions; leads MAJCOM Irregular Warfare activities; executes special operations test and evaluation and lessons learned programs; and develops doctrine, tactics, techniques, and procedures for Air Force Special Operations Forces. The 1st SOW and Hurlburt Field also plays host to 40 partner units from six major commands.

2.4.3 History

Initially established as Auxiliary Field No. 9 on the Eglin AFB Complex during the early 1940s, Hurlburt Field gained notoriety during World War II with the formation of the 1st Air Commando Group, which supported "Wingate's Raiders" in Burma. Post-war, the installation hosted various bomber and air defense missile wings until the early 1960s and the Vietnam War, during which the air commandos were reactivated with the goal of training airborne warfare specialists. Hurlburt has continued to be a main host of these forces as they evolved into the 1970s and the establishment of dedicated USAF special operations forces. Hurlburt Field commandos played crucial roles in operations in Granada, Panama, and Operation Desert Storm. AFSOC was established in 1990, cementing the installation as the home of special operations for the Air Force.



Helicopter Training at Hurlburt Field

2.4.4 Unique Value

The 1st SOW is the second largest wing in the Air Force, with more than 5,900 personnel supporting the wing and its mission. Because of AFSOC and 1st SOW's multi-domain operating environment, positioning at Hurlburt Field provides unique capabilities difficult to replicate elsewhere. The adjacent land ranges at Eglin, coupled with immediate access to large volumes of airspace and also offshore range areas, enable the 1st SOW forces to easily train across multiple domains directly from their home base.

2.5 NSA Panama City

2.5.1 Location

NSA Panama City consists of 657 acres along Saint Andrew Bay on the eastern shore of Panama City Beach in Bay County. The installation is bounded on the west by Thomas Drive and in the North by Highway 98 and the Hathaway Bridge (Figure 2-6). The installation also owns and uses three littoral (beach) sites along Panama City Beach (Figure 2-7).

Tenant commands at NSA Panama City include:

- Naval Surface Warfare Center – Panama City Division
- Naval Diving and Salvage Training Center
- Center for Explosive Ordnance Disposal and Diving
- Navy Experimental Diving Unit
- USCG Station Panama City

NSA PANAMA CITY | MISSION
Enable warfighter readiness

Figure 2-6. Map of NSA Panama City

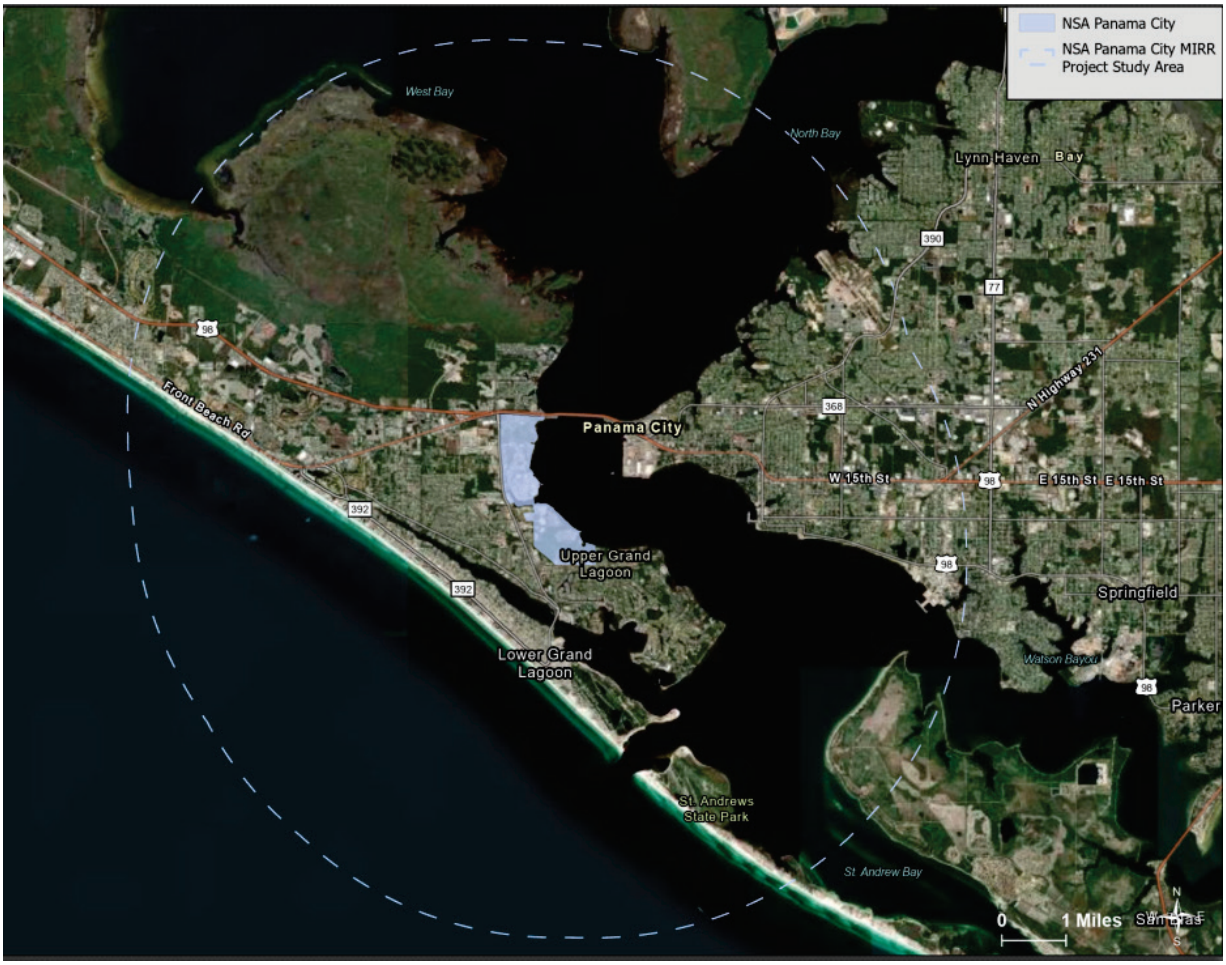


Figure 2-7. Beach Site Locations at NSA Panama City



2.5.2 Mission

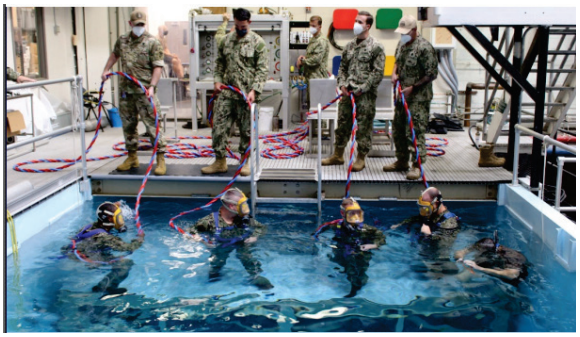
NSA Panama City hosts commands and missions focused on research and development, test and evaluation, and Navy/military diving related activities. The primary mission of NSA Panama City is to provide, operate, and maintain facilities; provide defense and physical security of critical infrastructure; and provide operational support to the Fleet, Fighter, and Family and supported commands focused on those mission priorities. The present-day NSA Panama City is home to more than 4,000 military and civilian personnel. The installation is a consolidated site for all Navy diving and salvage research, development, testing, and training. Naval Surface Warfare Center-Panama City Division is the largest tenant command conducting research on littoral warfare to include expeditionary warfare, special warfare, mine warfare, amphibious operations, diving operations, and autonomous underwater systems.

2.5.3 History

The installation was initially founded as the Navy Mine Countermeasures Station and relocated from Maryland to the City of Panama City in 1945. Other commands have joined the installation over time, including the Navy Experimental Diving Unit in 1975 and Coast Guard Station Panama City in 1971. The Center for Explosive Ordnance Disposal and Diving was established in 2001 and is one of eleven learning centers of the Naval Education and Training Command, performing interservice training for divers and EOD personnel across the DoD. Subordinate commands include the collocated Naval Diving and Salvage Training Center at NSA Panama City and the geographically separated Naval School of Explosive Ordnance Disposal at nearby Eglin AFB. The installation was realigned as NSA Panama City in 2003.

2.5.4 Unique Value

The installation's location within Bay County provides unparalleled access to numerous training sites within St. Andrew Bay, littoral sites, and operations areas within the EGTTR. The installation's location provides direct deep-water access to the Gulf of Mexico. This combined easy access to sheltered bay waters, littoral/coastal waters, and open ocean deep water all from a single site creates unique operating areas hard to replicate elsewhere. The relatively warm, year-round water temperatures also make it an ideal location for the various dive training and activities.



Dive Training at NSA Panama City

2.6 Tyndall AFB

2.6.1 Location

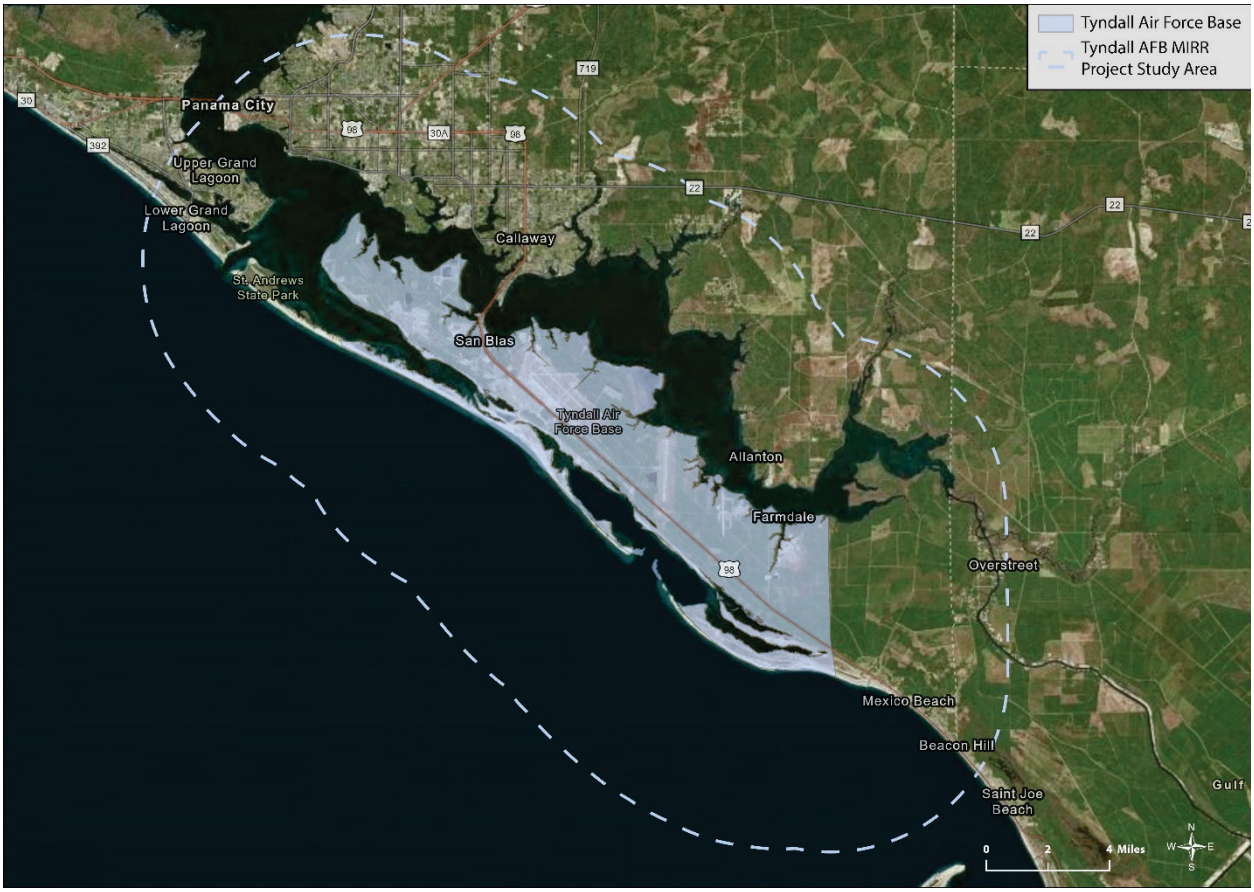
Tyndall AFB is located on a peninsula south of the City of Panama City in Bay County. The installation occupies 14.5 square miles and is bounded on the east by Mexico Beach and on the north by East Bay and the City of Panama City, to which it is connected by Highway 98. The installation is surrounded mostly by water, with Saint Andrew Sound to the southeast and Saint Andrew Bay to the west (Figure 2-8).

The host command for Tyndall AFB is the 325th Fighter Wing, and tenant commands include:

- AFNORTH
- Air Force Civil Engineering Center
- 337th ACS
- Airey NCOA
- 53rd WEG
- 601st AOC
- 801st RHTS

TYNDALL AFB | MISSION
Train and project unrivaled combat airpower

Figure 2-8. Map of Tyndall AFB



2.6.2 Mission

Tyndall AFB primarily supports the ACC and various operational and training units. The 325th Fighter Wing is the host wing with responsibility for the base. It is also home to the headquarters of the First Air Force (1 AF), one of eight numbered Air Forces assigned to ACC. The 1 AF is also the designated air component command for U.S. Northern Command with responsibility for ensuring the air sovereignty and air defense of the continental U.S., U.S. Virgin Islands, and Puerto Rico. Additional major commands supported by basing at Tyndall include the 53rd Weapons Evaluation Group, Air Force Rescue Coordination Center, 601st Air Operations Center, and the Air Forces Northern National Security Emergency Preparedness Directorate. The base also supports the 801st RED HORSE Training Squadron that develops and delivers integrated, realistic training and exercises for combat support teams. The squadron operates the Silver Flag Exercise Site, which is the Air Force's largest Agile Combat Support training location. As part of the installation's mission to train and project unrivaled combat airpower, Tyndall is in the process of shifting mission sets from an F-22 to an F-35 combat base.

2.6.3 History

The base was initially founded as Flexible Gunnery School No. 9 in 1940 and renamed to Tyndall Field in 1941, where gunnery students trained prior to deployment. After the war, the installation underwent several command changes before becoming an Air Training Command base in 1950 and then part of the Air Defense Command in 1957. The training and combat missions at Tyndall continued to grow, with the activation of the 325th Fighter Wing in 1981 and establishment of the Air Force Civil Engineering Agency in 1991. In 1993, the installation began a transition from an ACC installation to an Air Education and Training Command installation, emphasizing F-15 and later F-22 Raptor pilot training. In 2012, the 325th Fighter Wing transitioned to ACC once again, pushing the installation to a combat mission. Hurricane Michael devastated the installation in 2018, and the Air Force began rebuilding the base into the first 21st Century "Installation of the Future." The rebuilding was accompanied by the arrival of the new F-35 mission in 2023.



Historic Tyndall Air Force Base Sign

2.6.4 Unique Value

Tyndall AFB's unique location on the Florida panhandle places it at the nexus of several significant offshore Warning Areas with their associated airspace (W-155, W-151, and W-470). In most cases, these airspace areas enable operations from the surface to unlimited altitudes and supersonic operations when required. Long-standing arrangements with the Federal Aviation Administration have established routine military training routes, corridors, and tracks that Tyndall-based fighters can leverage for training away from populated areas and encroachment concerns. Additionally, Military Operating Areas overland near Tyndall overlay significant areas of undeveloped land that further diversifies the training areas. Furthermore, the local weather conditions enable an average of 250+ training days per year that supports the larger aircraft basing footprint for efficient use of training resources.


Airmen on the Runway at Tyndall Air Force Base

SECTION 3

Unified Resilience Assessment Methodology



3. Unified Resilience Assessment Methodology

3.1 Introduction and Background

DoD installations use the Unified Facilities Criteria (UFC) as design standards that provide criteria related to the well-being, construction, safety, and maintenance of capital projects. However, as a national standard, the UFC does not address localized hazards or unique conditions at the regional or installation level. Additionally, each military department within the DoD has a different set of guidance documents and approach to analyzing vulnerability and risk from climate and extreme weather hazards. At the regional and local community level, cities, counties, and DoD use varying climate projections and evaluation metrics for determining risk and differing design standards for building resilience.

Because hazards know no boundaries, resilience planning and action is more successful with cooperation and coordination across jurisdictions for assessment, analysis, and implementation. Regional cooperative planning and collaboration is a model that has been successful in the Northwest Florida region for many years and serves as the inspiration for the Emerald Coast MIRR.

3.1.1 Intent

To address these challenges, the intent of the Unified Resilience Assessment Methodology is to summarize how the project team facilitated discussion and agreement among installations to promote a standard methodology for the vulnerability analysis. In addition, the Unified Resilience Assessment Methodology seeks to provide an understanding of the development of resilience strategies that can be funded, implemented, and replicated throughout the region. The goal is to create a structure for the resilience planning for other communities and military installations of Florida and beyond.

Defining a Region



In the context of infrastructure resilience assessments, *region* is a flexible term that stretches beyond jurisdictional boundaries. For the hazards being analyzed in this assessment, the region was defined by the 5 -county area. Once regional hazards were collected, study areas with 5-mile radii centered on each installation were developed to analyze the exposure, vulnerability and risk to assets.

This section summarizes the approach used to identify hazards, evaluate asset vulnerabilities and risk, and develop resilience strategies to mitigate potential effects on military installation facilities, operations, and mission. The assessment process improves alignment between the multiple guidance documents of military departments within the DoD, Florida Department of Environmental Protection (FDEP) requirements, and local standards, where practicable, to best position military installations to receive much-needed regional support and funding.

The methodology discussed in this section may also serve as a template for DoD to support development of a standardized approach for consistency across military installations. This approach allows comparison across DoD to prioritize projects and capital investments for those installations with the highest vulnerabilities, operational implications, and threats to mission assurance.

3.2 Goals of the Unified Resilience Assessment Methodology

The goals of this Unified Resilience Methodology for the installations involved in the Emerald Coast MIRR include:

- Agreement among the installations and community on Resilience Assessment Methodology (including hazards, climate projections, local conditions, and planning horizons to assess risk)

- Consistency in the assessment approach for military installations across the region (note that there are two different military departments involved in the Emerald Coast MIRR project)
- Better alignment between communities' and military installations' resilience efforts

3.2.1 Agreement on Resilience Assessment Methodology

To facilitate agreement among stakeholders on the components, metrics, and methodology used to perform the vulnerability and risk assessment, the project team researched the requirements and practices at the state, regional, community, military department, and installation levels. The team communicated the scope of the assets to be analyzed and the corresponding resilience strategies were required to be "outside the installation fence line" (in other words, within the communities surrounding the installations). Study area boundaries were initially drawn at approximately 5-mile radii. These study areas were then modified to accommodate communities and supporting infrastructure for the installations. An understanding of the overlapping requirements, regional practices, and project scope boundaries was the first step toward agreement on the assessment methodology.

Resilience in the Department of Defense

With recent legislation and new DoD and department policies, plans, and strategies, United States Federal Executive Orders, and updates to the UFC, DoD resilience planning, design, and investment is beginning to address climate and future natural hazard threats. Military installations currently have vulnerability assessments conducted by the Center for Environmental Management of Military Lands at Colorado State University. These assessments utilize the DoD's Climate Assessment Tool.

A review of design standards relevant to this study is important in identifying opportunities for enhancement to these standards and guiding documents for supporting community infrastructure to reduce risk and build resilience for military installations and their missions. This will highlight discrepancies between DoD and regional resilience methodologies that can be better aligned for the Northwest Florida installations.

Resilience in the State of Florida

Climate resilience in Florida has gained momentum in the last few years with the creation of a new position (state Chief Resilience Officer) dedicated to resilience. Additionally, more than a billion dollars in state resilience grants are available to local governments. In 2022, the state issued the *Standardized Vulnerability Assessment: Scope of Work Guidance* (FDEP 2022) to ensure local government vulnerability assessments meet the requirements of the Florida statute for prioritizing state funding and to maximize the value of funding provided by FDEP's Resilient Florida Grant Program. This MIRR vulnerability assessment process aligns with that guidance. Emerald Coast communities have been successful in obtaining state grant funds for conducting their own vulnerability assessments as well as pursuing funding from a variety of sources to build infrastructure and community resilience. It is anticipated that projects identified in this MIRR will be eligible and well-positioned to secure state grant funding.

Defining the Value Proposition

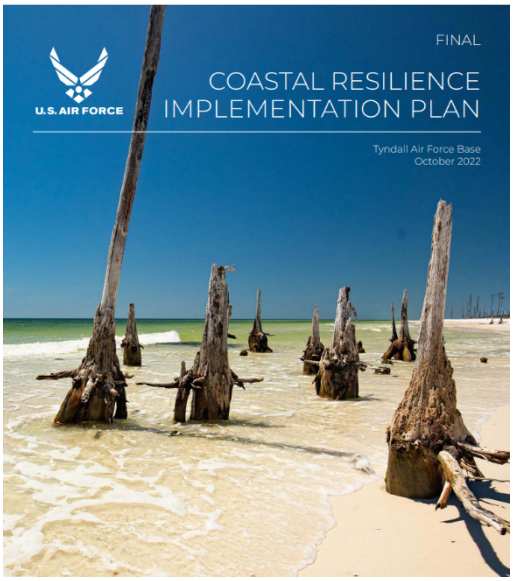


The value proposition for assessing infrastructure resilience at a regional level centers on the following:

- Incentivizing greater coordination among the civilian and military communities;
- Defining shared resilience objectives at the regional scale and leveraging collective resources effectively to achieve them;
- Informing design decisions, capital investments, and public policy for stronger, more resilient infrastructure; and
- Planning jointly to respond to and recover from various threats and hazards.

Resilience in the Emerald Coast Region

The Emerald Coast region engages in resilience planning and collaboration out of necessity because of its frequent exposure to various natural and climate-driven hazards.



Many hurricanes have impacted the region, but none more than Hurricane Michael in 2018. Tyndall AFB sustained significant damage to its assets and a loss of utilities because of Hurricane Michael. In response to the devastating effects of Hurricane Michael and SLR-related coastal flood inundation, the U.S. Air Force funded the Coastal Resilience Implementation Plan (CRIP) for Tyndall AFB. The purpose of the CRIP is to create a roadmap guiding coastal resilience project siting, planning, design, funding, and implementation to ensure long-term coastal resilience. With the CRIP as guidance, Tyndall AFB is building itself back stronger and aims to be an installation for the future.

NAS Pensacola is another resilience success story within the region. Through funding provided by the U.S. DoD Readiness and Environmental Protection Integration Program and the National Oceanic and Atmospheric Administration, NAS Pensacola enhanced the Magazine Point shoreline with emergent marsh, oyster reef break waters, and submerged aquatic vegetation (SAV).

This exposure to hazards has also resulted in a culture of robust collaboration. The Pensacola Bay Living Shoreline project is a second example of resilience collaboration within the Emerald Coast. Employing the same techniques as NAS Pensacola - emergent marsh, oyster reef breakwater, and SAV installation - living shorelines will be established at three project sites within Pensacola Bay. These nature-based solutions will aid in improving resilience to coastal climate hazards. Additionally, the Emerald Coast Area Resilience Collaborative (EC-ARC) was established in 2021. EC-ARC represents a seven-county region including Escambia, Santa Rosa, Okaloosa, Walton, Holmes, Washington, and Bay Counties. The vision of EC-ARC is to identify and create solutions to regional issues utilizing risk and vulnerability assessments with the goal of building resilience to both natural and manmade hazards.

Path to Concurrence

The project team facilitated cooperative and open communication between the stakeholders representing the installations, cities, counties, and utilities, as appropriate, by including them in the stakeholder engagement workshops. Open dialogue encouraged stakeholders to talk to each other about the hazards they face, the relationships held between them, ongoing efforts, and coordination. This open dialogue confirmed that hazards prioritized by installations were similar or identical to the priority hazards of the cities and counties. Recognition of these shared threats was the second step in agreement on the assessments.

The MIRR process builds upon the resilience guidance developed by the region and standards developed by counties and cities to plan and design for future climate conditions: elevation (roadway, seawall, and building freeboard above the Federal Emergency Management Agency [FEMA] base flood elevation), hardening, and protection standards in city and county codes for design, construction, renovation, and building material selection. The military installation representatives within the region have expressed agreement in following locally developed climate policy and design standards when more stringent than the UFC. DoD should develop department-wide guidance directing installations to adopt resilience and design standards on future efforts consistent with the most stringent approach in their local/regional context to better enable mission assurance in the ensuing years.

3.2.2 Consistency in the Assessment Approach

An outcome of the Emerald Coast MIRR will be the integration of resilience strategies into local government and regional strategies, plans, and investments. The intent is to foster hazard-resilient natural and built infrastructure that protects and enhances the resilience of Northwest Florida's military installation readiness and operations, including military range testing and training, for years and decades to come.

The following methodologies were used in the Emerald Coast MIRR climate and natural hazard vulnerability assessment, risk analysis, and adaptation plan development.

Asset Criticality

Asset criticality is a key element of vulnerability assessment and risk analysis. The determination for criticality is based on those assets, facilities, and systems required to support military installation operations and mission assurance. While many assets and systems may not be considered critical, if critical assets are dependent on them, they too may be considered critical. DoD uses an agency-wide definition of critical assets, delineated in the Defense Critical Infrastructure Program. As part of the broader defense strategy, military installations maintain lists of assets critical for their specific mission(s). These identified critical assets, systems, and services will be given priority in the evaluation and prioritization process.



Vulnerability Assessment

The vulnerability assessment process is focused on facility and asset vulnerabilities to applicable climate and natural hazards to identify possible points of failure that may cause mission impacts, service interruption, impacts to access, or damage to DoD facilities, assets, or supporting infrastructure. The vulnerability score is based on the following equation:

$$\text{Vulnerability} = \text{Exposure} + \text{Sensitivity}$$

These terms are further defined as follows:

Hazard Exposure. The proximity of the facilities and assets to the identified hazards and threats currently and over select future time horizons (for example, asset inside of 100-year flood zone).

Asset Sensitivity. The degree to which a facility or asset would be impaired by hazard and threat exposure. (for example, electrical equipment is sensitive to flood inundation).

Asset Adaptive Capacity/Redundancy. *Adaptive capacity* is the inherent ability of an asset to maintain its primary function when exposed to hazards/threats. (for example, the ease of which an electrical box can be elevated above the anticipated future flood elevation). Adaptive capacity is considered qualitatively in this assessment and is not included in the vulnerability equation to maintain consistency.

For the vulnerability assessment, the following evaluations were conducted for each of the quantitatively assessed hazards:

Exposure & Sensitivity analysis. Asset exposure and sensitivity were determined for each hazard – flooding, extreme heat, extreme wind, lightning, and wildfire – in both GIS and via a spreadsheet model. Based on these analyses, exposure and sensitivity scores were calculated for each asset – the higher the score, the more vulnerable the asset is to the hazard or the greater the degree of impairment to the hazard. After performing the aforementioned analyses, asset vulnerability scores are calculated, and assets are ranked, with those identified as critical and/or highly vulnerable included in the risk analysis.

Risk Analysis

The risk analysis is performed after the vulnerability assessment. The findings focused on the most vulnerable community assets and the community assets with implications for mission-critical infrastructure, as determined by

the vulnerability assessment. Risk is defined as the likelihood of the hazard occurring multiplied by the consequence of the hazard affecting the asset and is calculated as follows:

$$\text{Risk} = \text{Asset Impact to Mission} + \Sigma(\text{Hazard Likelihood} \times \text{Hazard Consequence})$$

Where:

Σ indicates that the sum of multiple risks.

Asset Impact to Mission. The impact of asset failure on the installation's ability to execute its mission (for example, inability to access a critical facility due to flooding making a roadway impassable).

Event Likelihood. The probability of an event occurring and impacting the asset service (for example, the likelihood of a specific SLR projection).

Impact Consequence. The impact the hazard has on an asset. Consequence is presented in terms of degree of impact on an asset itself.

The risk analysis provides a holistic understanding of the risk to the assets that support the military installations by assessing the likelihood of the hazard occurring and the consequence of the hazard impacting the asset.

Mission Criticality

The assets – transportation and evacuation routes, critical infrastructure, and critical community and emergency facilities – supporting the military installations were classified as either primary mission-critical, secondary mission-critical, or mission-supportive. This information was incorporated into the risk analysis which affects the risk score and reflects the risk to the missions.

Methodology Sources

Some of the regional and state information, data, and guidance used to inform the aforementioned methodology include:

- DoD, Department of the Army, and Department of the Navy
  - **Department of Defense Climate Risk Analysis (DoD 2021):** Understanding of climate hazards and associated security risk implications.
- State of Florida
  - **FDEP Adaptation Planning Guidebook (FDEP 2018):** Framework for vulnerability assessment upon which this methodology was built.
  - **FDEP Standard Vulnerability Assessment: Scope of Work Guidance (FDEP 2022)**: Inclusion of planning horizons for 2040 and 2070 and SLR projections.

3.2.3 Better Alignment between Community and Installation Resilience Efforts

Though the six installations within the scope of this MIRR and their neighboring communities have differing resilience and/or design standards, there are numerous ways in which these entities are connected to one another. These linkages include not only defense missions, including significant component command and contingency plan support, but physical infrastructure assets as well, such as electric power, water and wastewater service, and communications systems. This interconnectedness provides the critical underpinning of the MIRR's regional approach, along with efforts to identify potential and related regional resilience synergies.

Because climate threats do not follow geographic or political boundaries, a coordinated approach building interconnectedness will be most successful toward building regional resilience. The collaborative planning used by EC-ARC was inspired by the success of the Southeast Florida Regional Climate Change Compact model. The EC-ARC model shows promise to be just as successful for implementing the resulting MIRR projects as well as future endeavors. This regional perspective, along with an understanding of system interdependencies and failure chains, was critical to evaluate facility vulnerabilities and adaptation strategies.

This process provided a path for concurrence among the project stakeholders to identify potential vulnerabilities that affect mission assurance. The vulnerability assessment gives stakeholders an understanding of what and where the vulnerabilities are. The assessment process then subsequently prioritizes these vulnerabilities, with proposed improvements ranked according to mission criticality and performance criteria based on risk reduction and operational continuity for critical public services. Adaptation strategies are informed, where applicable, by the most stringent resilient building policies and design guidelines, informed by the best available science and data and within the local context.

Improvements and vulnerabilities identified during this project are "outside the fence line" of DoD facilities, pursuant to the grant guidelines. Those opportunities identified "inside the fence line" were highlighted and shared for future actions as appropriate. Robust stakeholder engagement with cities, counties, utilities, critical public services, and other entities was critical to success and to ensure that all stakeholders and external entities are aligned in their goals and expectations.

3.3 Outcomes

In addition to meeting the goals outlined for the Unified Resilience Assessment Methodology, this regional approach also ensured the following key components were incorporated for the development of the adaptation strategy, including planning guidelines and decision-making framework for capital investments:

- State of Florida (FDEP)-compliant vulnerability assessment
- Alignment with DoD Climate Action Plans
- Review of federal and DoD Building Requirements and individual installation guidelines

Creating this fully aligned baseline for the development of the adaptation strategy ensures that the proposed infrastructure and policy interventions are aligned and deconflicted between the multiple jurisdictions in which they will be implemented. Additionally, the feasibility of obtaining funding for design, permitting, and construction is greatly increased.

3.3.1 Coordinating Adaptation Among Regional Partners

Concurrence on the approach and methodology was attained throughout the assessment and adaptation phases of the project, particularly with regard to the alignment of the goals and the importance of consistency. This is particularly important when multiple entities (federal, DoD, state, local, non-governmental organizations, and so forth) are working together on a project. Climate change occurs without regard for geographic boundaries. As a result, adaptation work will continue to require collaboration and cooperation among different entities to enhance resilience across the region. The EC-ARC will help strengthen stakeholders' ability to implement adaptation strategies across multiple jurisdictions with similar local contexts.

To combat the evolving natural hazard threats facing our communities, military installations, and supporting infrastructure, collaboration across property and jurisdictional boundaries is imperative. By pooling resources and working toward common goals, infrastructure can be adapted and resilience operationalized through forward-looking policy, design standards, and capital investment prioritization. This can manifest through installations and their neighbors coordinating on the implementation of projects that use the same standards (e.g., seawall heights).

Such regional efforts leverage lessons learned and shared knowledge to work toward common goals and advance resilience for all participating entities, which in turn benefits the entire region.

3.3.2 Bringing in Lessons Learned and Avoiding Pitfalls

The regional approach will help provide multiple benefits to communities and installations in their adaptation efforts. Regional collaboration enables faster dissemination of good ideas and filtering of unsuccessful approaches. Entities (for example, counties and cities) can bring in their own lessons learned—what constitutes best practices, what projects succeeded, and what projects struggled. This allows for improved concepts and ideas to be developed and shared by all stakeholders more efficiently than if each group was working individually.

The unified regional approach will aid in better communication and greater understanding of the vulnerabilities and strategies among the various stakeholders. Using a regional approach to identify and address adaptation challenges allows for more frequent communication and greater opportunities to clarify misunderstandings and advance regional resilience.

SECTION 4

Vulnerability and Risk Assessment



4. Vulnerability Assessment and Risk Analysis

Critical assets within the study area have been evaluated both quantitatively and qualitatively to determine the risks to the assets and the accompanying impact on the mission. The methodology used to conduct the Vulnerability Assessment and Risk Analysis is provided in Appendix B. The results of the Vulnerability Assessment are provided in the subsections that follow.

4.1 NAS Pensacola

This MIRR Vulnerability Assessment and Risk Analysis evaluates asset vulnerability and risk in the communities surrounding NAS Pensacola and Corry Station. The two other sites (Saufley, which houses secondary missions, a solar field, prison, and Bronson Field, a DoD park) that are part of the NAS Pensacola complex were excluded from the study because of their lack of impact on the installation mission. The study area includes both the region surrounding NAS Pensacola and Corry Station as well as critical roadway and utility corridors, as shown on Figure 4-1.

4.1.1 Hazards

Hazard data and previously identified vulnerabilities were collected during the in-person workshops and the MIRR committee meetings, where data collection results were presented. Lists of stakeholder-identified hazards, vulnerabilities, and mission-critical assets were generated from these discussions. These lists were used to identify areas of concern for deeper risk analysis, to confirm findings from the Vulnerability Assessment, and to populate the list of priority assets at risk. The following subsections summarize the known hazards.

4.1.2 Natural Hazards

Natural hazards evaluated in this Vulnerability Assessment include a 100-year flood event, SLR, and storm surge; wildfire; heat; extreme wind; and lightning.

Flooding

The three flood hazards evaluated in this assessment include the 100-year flood zone (representing inland, riverine, and coastal flooding), SLR, and storm surge for hurricanes from Category 1 to 5. Flooding from rainfall affects multiple areas in and around the installation sites. At NAS Pensacola, flooding from Bayou Grande flows onto the installation and on Gulf Beach Highway and Blue Angel Parkway. The Pleasant Grove Ditch, located in the northern section of NAS Pensacola mainside, has been observed overflowing during storm events and causing flooding. Additionally, the same ditch dumps silt into Bayou Grande, impacting water quality in the bayou. Corry Station also has a history of drainage issues, with flows from offsite areas draining onto the facility property. Escambia County and the City of Pensacola have a history of flooding issues occurring on roadways that are major community corridors and critical access points to NAS Pensacola. Storm surge inundation has also been an issue in the City of Pensacola, which experienced inundation depths of 5.6 and 9.5 feet during Hurricanes Sally and Ivan, respectively (National Weather Service n.d.).

Wildfire

NAS Pensacola's study region is primarily urban and, as a result, wildfire is less of an immediate concern for the installation. The western portion of Escambia County, however, is more rural (though undergoing rapid development). These areas are in the wildland-urban interface (WUI), which is the transition area between developed land and unoccupied, undeveloped areas. The housing developments and critical assets in these areas will be more vulnerable to wildfire hazards because of their location adjacent to forests. Figure 4-2 shows past fire occurrence areas in the study region. Wildfire hotspots include Garcon Swamp and areas in and around Tarkiln Bayou Preserve State Park.

Figure 4-1. NAS Pensacola

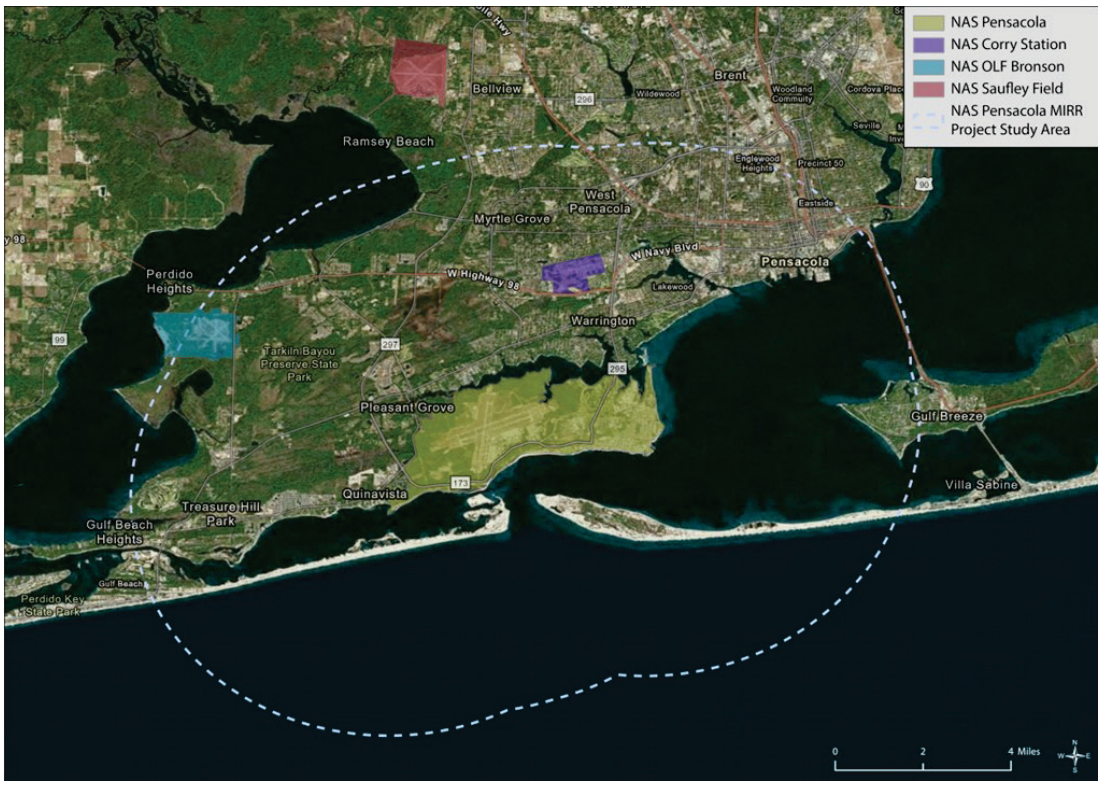
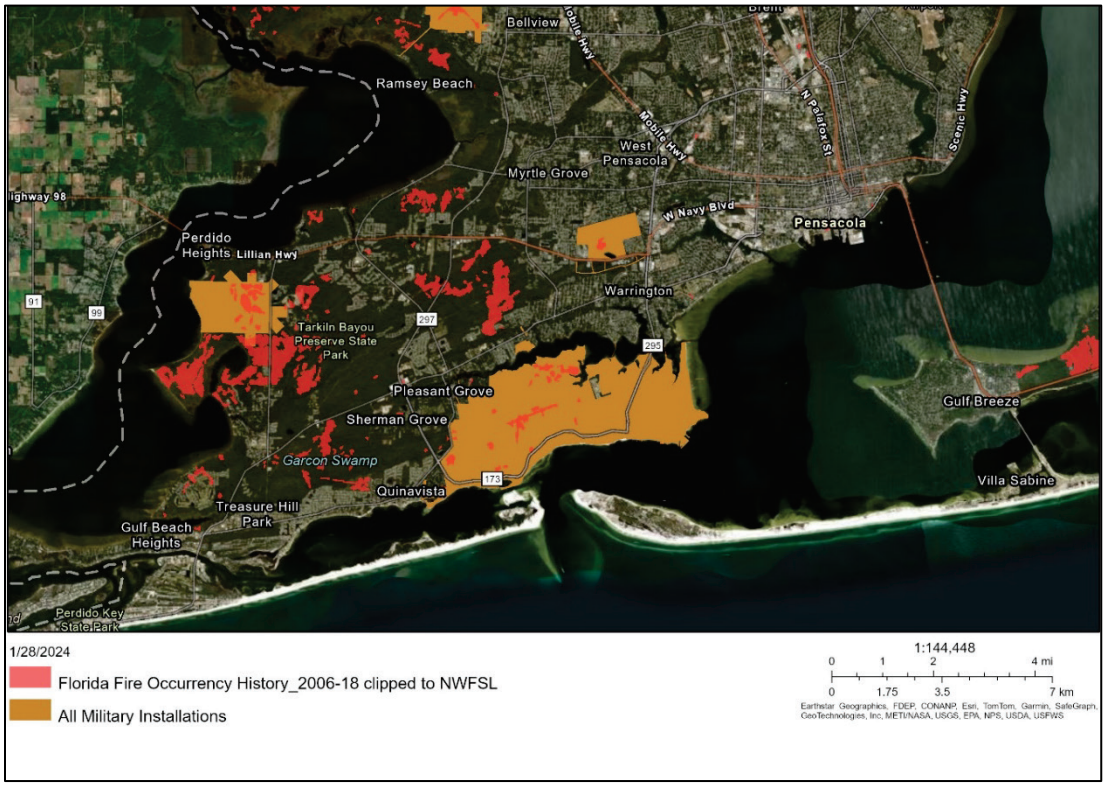


Figure 4-2. Wildfire Occurrence Areas, 2006-2018

Source: Northwest Florida Sentinel Landscapes (n.d.)

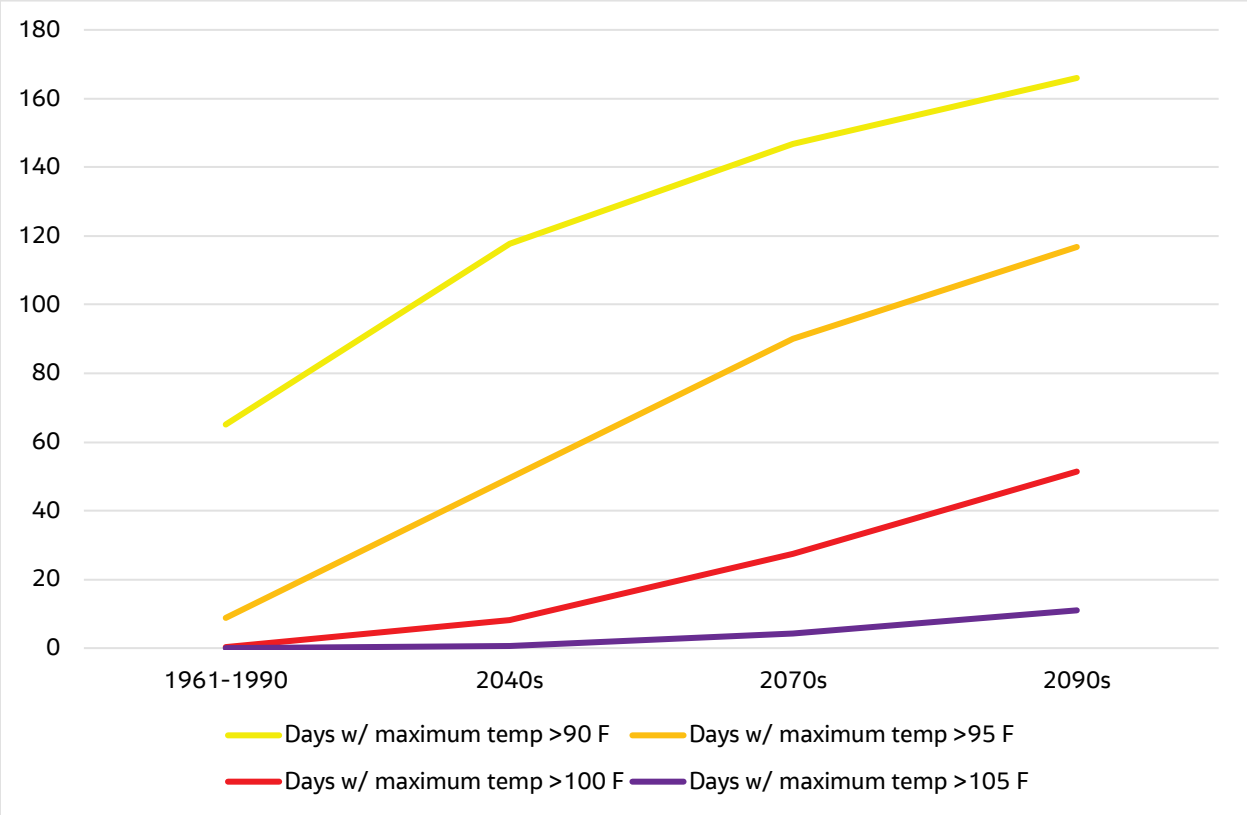


Extreme Heat

Heat projections are available under multiple representative concentration pathways (RCPs), which are climate change projections that depend on greenhouse gas emissions scenarios. According to data from the U.S. Climate Explorer, Escambia County is projected to experience an increase in temperatures from today through 2060–2070 of approximately 2.5 degrees Fahrenheit (°F). Figure 4-3 shows the projected number of days where the temperature is expected to be above 90-, 95,100-, and 105 degrees Fahrenheit (°F) in each county under the RCP 8.5, the high emissions scenario.

Figure 4-3. Projected Change in Mean Annual Highest Maximum Temperature in Escambia County

Source: U.S. Federal Government n.d.



The number of days with a maximum daily temperature greater than 100°F is projected to increase from 1.2 in the 2020s to 8 in the 2040s to a maximum of approximately 28 days in the 2070s under the high emissions scenario (U.S. Federal Government n.d.). These increased temperatures can cause electrical equipment to overheat and roadways to buckle, negatively impacting mission-critical power transmission lines and roadways that support the installation.

Extreme Wind

Extreme wind events can negatively impact critical power transmission lines and cell towers, disrupting power service and communications in the region. Florida Power & Light (FPL) is currently moving much of the electric power distribution infrastructure in the area underground and replacing wooden poles with concrete ones, reducing potential wind impacts.

Category 2 Hurricane Sally caused severe winds in Escambia County, including 92 miles per hour (mph) and 72 mph in NAS Pensacola and Gulf Breeze, respectively (National Weather Service n.d.). According to FDEP, 292 structures had major damage by the storm, most of them in Perdido Key and Pensacola Beach, while many others experienced minor damage or were affected by the storm per FEMA damage categorization standards.

Lightning

According to the Federal Emergency Management Agency National Risk Index, Escambia County experiences approximately 148 cloud-to-ground lightning strikes annually (FEMA n.d.). Lightning strikes can damage tall infrastructure, such as power transmission lines or cell towers (though many of those assets have lightning protection). In addition to lightning's potential to damage critical infrastructure, lightning strikes can also ignite dry fuels and cause wildfires.

4.1.3 Infrastructure Shocks and Stresses

The communities around NAS Pensacola are facing a number of infrastructure challenges, including aging infrastructure, transportation capacity issues, water and wastewater capacity concerns, natural gas supply, the channel depths at Pensacola Pass, and cell service.

Water and Wastewater Infrastructure Age and Capacity Concerns

Much of the water and wastewater infrastructure both within and surrounding NAS Pensacola is old and there is a general lack of redundant assets. NAS Pensacola produces its own water using facilities located on base at Corry Station while the Emerald Coast Utilities Authority (ECUA) provides wastewater service to the installation. It was noted during the mission brief with installation personnel that water lines supplying both Corry Station and NAS Pensacola require replacement.

Transportation Capacity and Installation Access

NAS Pensacola is a key piece of the City of Pensacola community, in part because of its rich history and the Blue Angels. The installation draws in civilians from around the country who visit the Naval Aviation Museum and historic lighthouse and watch the Blue Angels perform and train. While this tourism and engagement is great for the relationships between civilians, the military, NAS Pensacola, and the City of Pensacola, the large number of civilians accessing the installation places significant stress on the ingress and egress points, particularly along Blue Angel Parkway and Gulf Beach Highway. On the Parkway, civilians sometimes park along the road, blocking traffic.

Capacity concerns also exist for a multitude of regional transportation routes, including:

- North Davis Highway
- I-110 from Pensacola to I-10
- Navy Boulevard (Highway 98) from New Warrington to Bayou Chico

Insufficient capacity on the evacuation routes poses a threat during emergencies where personnel need to leave the installation quickly and safely.

In 2020, there were varying levels of traffic congestion around NAS Pensacola (Figure 4-4). Roadways that exceeded maximum capacity include Blue Angel Parkway (SR 173), Navy Boulevard (SR 295) leading to the installation, and Gulf Beach Highway (SR 292).

According to data from the Emerald Coast Regional Council, many of the roads around the installation will be at or above maximum capacity in 2045 (Figure 4-5). Gulf Beach Highway (SR 292) is anticipated to be above maximum capacity, with more than 110% of its maximum traffic volume occurring. More congestion will also occur in the City of Pensacola, with Highway 98 reaching or exceeding capacity. Increases in traffic congestion throughout the project study area create longer commutes for installation personnel.

Natural Gas Supply

NAS Pensacola mainside has only a single point of service for natural gas from Pensacola Energy. Natural gas line travels along the bottom of Bayou Grande and underneath the main entry gate along Duncan Road. This single point of failure can cut off the installation's natural gas supply during a hazard event. Corry Station has only a single point of service for natural gas from Pensacola Energy, which enters on the northeast perimeter of the installation.

Figure 4-4. 2020 Traffic Congestion

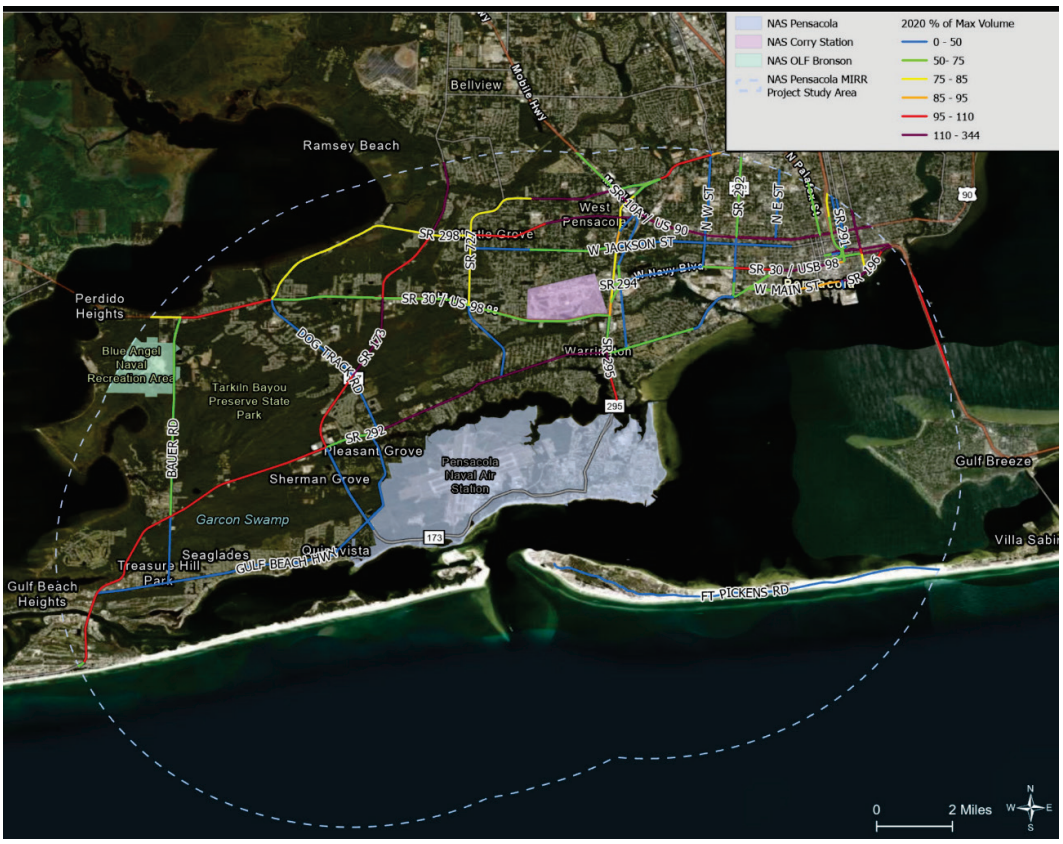
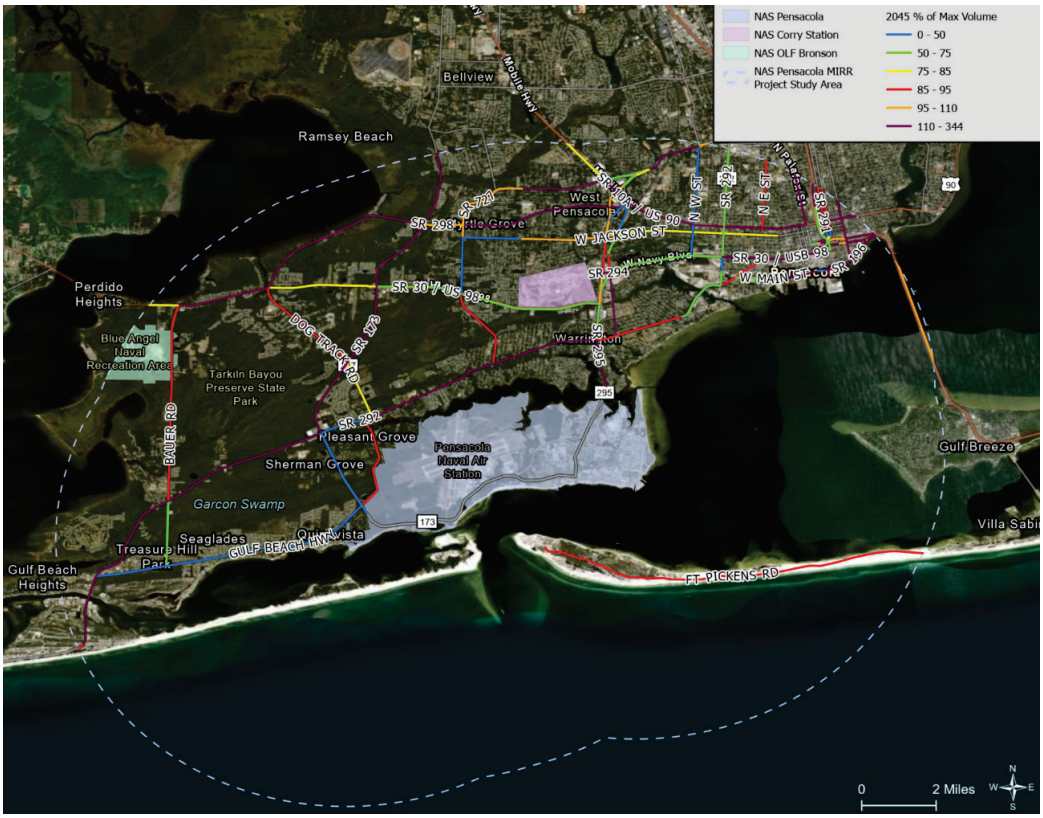


Figure 4-5. Projected 2045 Traffic Congestion



Pensacola Pass Depth

Pensacola Pass is a critical access point for large ships because NAS Pensacola is the only Navy deepwater port in the Gulf of Mexico (when dredged to 44 feet). In 2012, the U.S. Army Corps of Engineers dredged the channel to a depth of 35 feet to accommodate additional commerce. This capacity for large ships has enabled the homeporting of multiple USCG cutters and other military ships, as well as allowing private enterprises with large ships to use the Port of Pensacola. The Pass requires frequent dredging to maintain its status as a deepwater port, which can be particularly beneficial during an emergency event that needs large ships for emergency response.

Cell Service

Severe weather events have been known to cause a lack of cell connectivity, which affects installation operations by making essential personnel unreachable. Additionally, regular cell connectivity issues and dead zones are a problem on the western side of the installation and in the Perdido community.

Energy Disruption

The consequences of energy disruption are far-reaching, causing significant economic setbacks, jeopardizing public safety, and hindering essential services. This emphasizes the critical need to evaluate energy system vulnerabilities and establish protective measures to mitigate the adverse effects on local communities and military installations.

The major hazards affecting energy infrastructure stability and leading to disruptions in NAS Pensacola include:

- **Flooding**: extended exposure to water can cause malfunction and power transmission line poles to weaken and decay, reducing their load-bearing capacity. The flood events that can affect transmission poles include:
  - Current and future 100-year flood plain
  - Sea Level Rise
  - Storm Surge
- **Hurricanes**: strong sustained wind and fallen trees can take down power lines or even cause permanent damage to structures or equipment.

Proximity of nearby tree canopy to electric substations, transformers, and power transmission and distribution lines is also a critical consideration during fire occurrences for NAS Pensacola. Fire departments require 20 to 30 feet of fire line width with a 3 to 4 foot scrape to respond to fires. This standard is not met by two out of three substations that serve the installation.

4.1.4 Economic Threats

The communities surrounding NAS Pensacola are facing economic threats including economic stratification and housing attainability. Information on economic threats was gathered during the NAS Pensacola workshop.

Lack of Economic Diversity

Much like its neighbors along the Emerald Coast, Escambia County has a two-pronged local economy that depends on the defense and tourism sectors, leading to a lack of economic diversity. Rising costs of living have placed additional stresses on installation personnel and community residents surrounding NAS Pensacola. Installation personnel and community stakeholders at the workshops explained that retaining and attracting workers is difficult because of the high cost of living and has led to limited workforce availability. Additionally, the high costs and limited workforce availability forced many existing businesses to close down while preventing new businesses from opening.

Housing Attainability

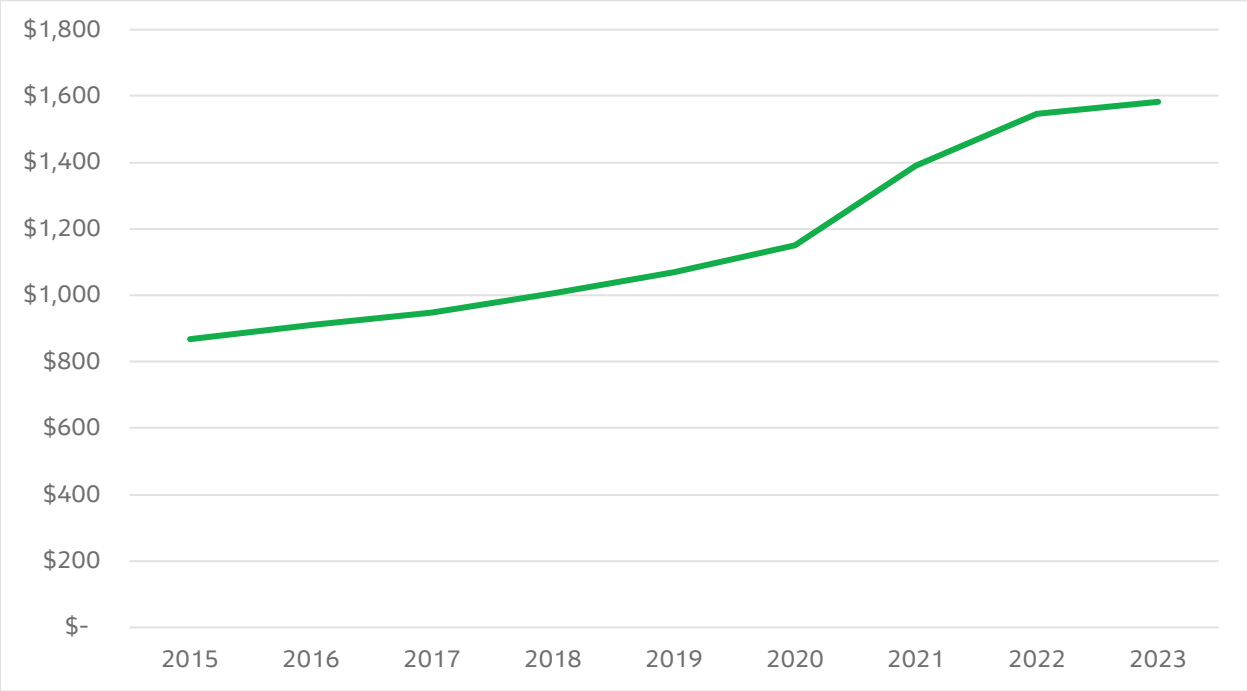
NAS Pensacola does not have the capacity to house all of its students and full-time personnel, resulting in many service members living in the wider community. These housing needs, coupled with rapid growth in Escambia

County, have resulted in a reduced supply of available housing for both NAS Pensacola students and staff, as well as the wider community.

In addition, home prices and rents have increased significantly in Escambia County. According to data provided by Zillow, home prices more than doubled from 2015 to 2023, increasing from a county-wide average of $114,500 to $266,000. Average rents experienced a similar increase, as shown on Figure 4-6, rising from $868 in 2015 to $1580 in 2023 (Zillow n.d.).

Figure 4-6. Escambia County Rents, 2015-2023

Source: Zillow Home Value Index 2023



4.1.5 Social Threats

Information on social threats was gathered during the NAS Pensacola workshop. Social threats for NAS Pensacola include lack of childcare services and poorly rated schools.

Lack of Childcare

In the community engagement workshops, installation personnel and community stakeholders explained that the area needs affordable childcare facilities. The lack of childcare options and availability poses challenges to installation personnel with young families.

Schools

The installation personnel and community stakeholders at the community engagement workshops revealed that many staff choose to live further away from the installation to locate themselves in their preferred school districts.

4.1.6 Environmental Threats

The communities surrounding NAS Pensacola are facing environmental threats including endangered species, shoreline erosion, and water quality. Information on environmental threats was collected and discussed during the NAS Pensacola workshop.

Endangered Species

Endangered species can be a threat to installation operations because of the protection and space required to protect endangered flora and fauna. While endangered species often reside within installation boundaries and would typically be outside the scope of this review, the MIRR presents opportunities to protect endangered species and promote mission assurance through activities outside the installation. NAS Pensacola is home to 31 protected species that live throughout its property. The installation is adept at managing endangered species while protecting its mission. In 2022 the NAS Pensacola Natural Resources Conservation Team won the Natural Resources Conservation award from the Department of Defense. As a result, it is not anticipated that endangered species will pose a threat to the installation mission.

Shoreline Erosion

NAS Pensacola has approximately 17 miles of shoreline, erosion of which removes vital coastal flood defenses that protect installation runways, buildings, and utilities. The protective barrier islands of Perdido Key and Fort Pickens are experiencing significant coastal erosion. According to FDEP (2020a), these areas experienced major erosion after Hurricane Sally, with dune recession greater than 10 feet or losing the dunes entirely (refer to Figure 4-7).

Both Escambia County and NAS Pensacola are proactively combating shoreline erosion. The Pensacola Bay Living Shoreline Project is developing three living shorelines (shorelines that are stabilized using natural materials) at NAS Pensacola itself, with living shoreline projects in development on White Island, NAS Pensacola East Shore, and the Sherman Inlet. However, there are no such projects for protecting the shorelines in the southeastern shorelines adjacent to the USCG station.

Water Quality

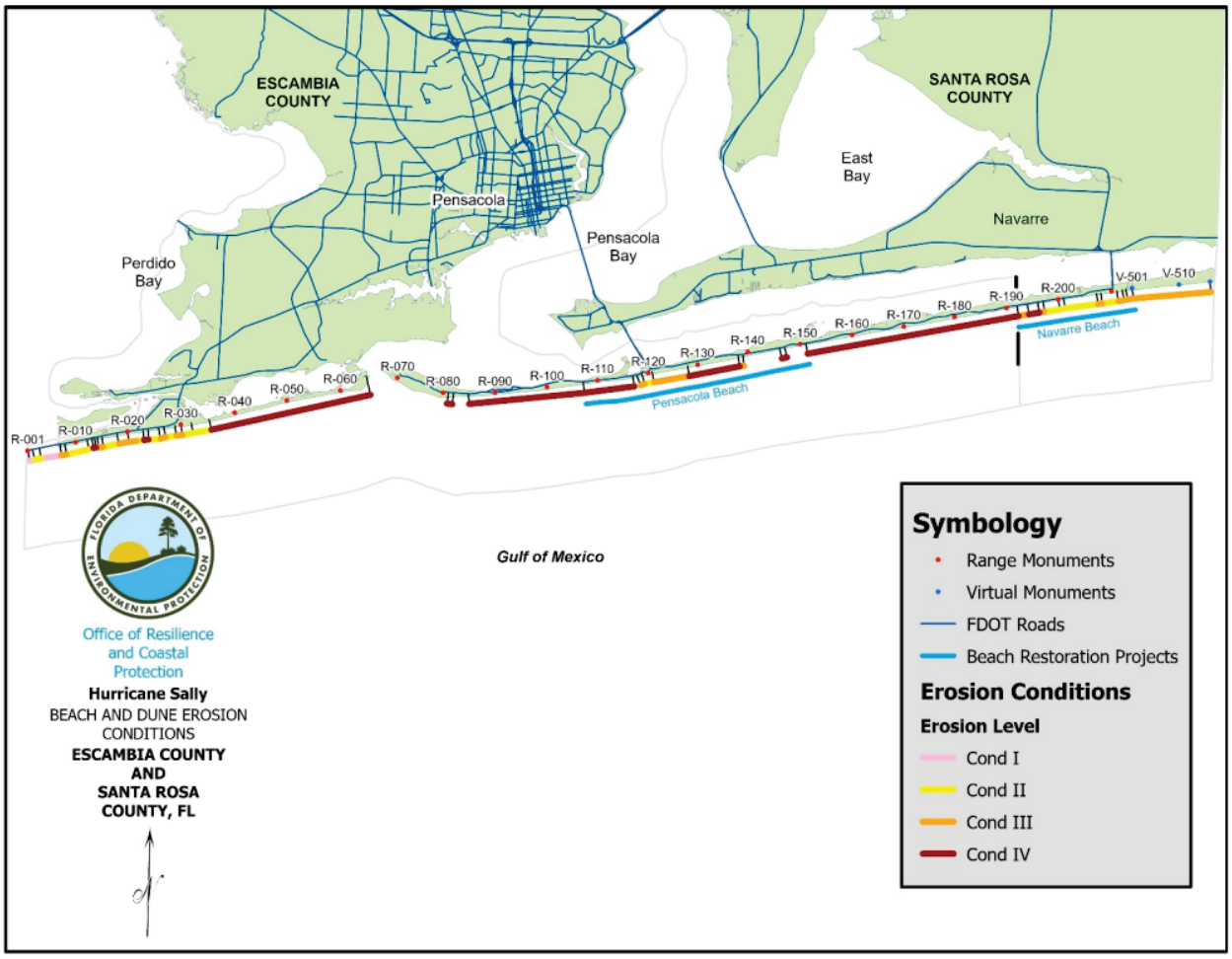
The Pensacola and Perdido Bays have struggled with water quality issues resulting from urbanization, polluted stormwater runoff, leaky septic tanks, and other nonpoint sources. Portions of the Pensacola Bay Watershed have been listed as impaired – including Bayou Chico, Texar Bayou, and portions of Pensacola Bay – in the Northwest Florida Water Management District (NWFWMD) Biennial Assessment 2022-2024 draft lists (NWFWMD 2023a).

The sand-and-gravel aquifer is one of the two primary water sources for Escambia County, the other being the Escambia River. Saltwater intrusion has been noted in certain coastal wells; however, these issues are localized and are not of concern (NWFWMD 2023b). During the stakeholder engagement workshop, per-and polyfluoroalkyl substances (PFAS), a group of chemicals that persist in the environment and do not break down, were noted as a contaminant of concern by project stakeholders.

There are no issues of concern with surface water quality in the Escambia River (NWFWMD 2023b).

Figure 4-7. Escambia County Shoreline Conditions after Hurricane Sally (2020)

Source: FDEP 2020a



4.1.7 Encroachment

Encroachment is an issue on the western side of the installation, where development is slowly moving closer to the installation's western boundary. The Trout Point area of the installation, located in the southwestern-most portion, experiences frequent trespassing by civilian beachgoers from the adjacent neighborhoods and causes security concerns for the installation.

4.1.8 Mission-Critical Infrastructure

Missions of the Installation

For the MIRR, the installation missions were categorized as primary or secondary missions. While not providing a complete overview of all ongoing installation activities, this process provides a sufficient understanding of the missions of the installation to identify what infrastructure is critical for supporting that mission. Assets were then categorized as primary, secondary, or mission-supportive mission-critical.

The primary mission of NAS Pensacola is designated as naval education and training, specifically, to provide the platform for the initial training of all U.S. Navy, Marine Corps, and Coast Guard aviators, Naval Flight Officers, and U.S. Air Force Combat System Officers. Additionally, NAS Pensacola provides the initial training platform for all enlisted aircraft maintenance, air traffic control, and aircrew specialties. Nearby Corry Station is the initial Joint Cyber

Warfare Training, which trains the cryptologic and information warfare specialties. The assets critical to supporting these missions are categorized in Table 4-1 and discussed further in the sections that follow.

Table 4-1. NAS Pensacola Missions and Associated Critical Infrastructure

	Mission	Mission-Critical Assets
Primary Mission	Naval education and training	▪ Water lines from Corry Station to NAS Pensacola ▪ Wastewater lines and lift stations connecting NAS Pensacola and Corry Station to Bayou Marcus Water Reclamation Facility (WRF) ▪ Major Roadways and Evacuation Routes ▪ Shorelines
Secondary Mission	Cyber training and operations at Corry Station	▪ Electric production and supply ▪ Community stormwater systems
Mission-Supportive	N/A	▪ Community roadways ▪ Community water systems ▪ Community wastewater systems ▪ Communications infrastructure

Overview of Mission-Critical Infrastructure

For the operations conducted at NAS Pensacola, primary mission-critical infrastructure includes the water lines that run from Corry Station to the installation, the roadways and evacuation routes that connect the installation to the community, and installation shorelines. Electric power systems constitute the secondary mission-critical infrastructure. Table 4-2 provides an overview of the owners and operators of these mission-critical assets.

Table 4-2. Critical Infrastructure Owners and Operators

Infrastructure Type	Asset Owner/Operator
Electric Power	FPL
Potable Water	ECUA, Peoples Water Service Company (PWSC)
Wastewater	ECUA, PWSC
Roadways	Florida Department of Transportation (FDOT), Escambia County, various municipalities
Communications	AT&T, Comcast, Cox, Verizon, Mediacom

Primary Mission-Critical Infrastructure

Water Lines from Corry Station to NAS Pensacola

Corry Station has its own water treatment plant (WTP), which has a capacity of 10 million gallons per day. Water from ten wells is treated at the plant before being delivered to NAS Pensacola through a line of transmission mains. These water lines have been designated primary mission-critical because of their importance in supplying NAS Pensacola with water.

Major Roadways and Evacuation Routes

Major roadways and evacuation routes are also mission-critical infrastructure. For this Vulnerability Assessment (VA), the routes noted in Table 4-3 were considered critical and are maintained by FDOT. These routes are significant as they serve as major thoroughfares from the communities to the installation. Additionally, these routes serve as vital evacuation routes for the communities surrounding NAS Pensacola.

Table 4-3. Primary Mission-Critical Roadways

Route	Limits of Route for VA
US-98	From Escambia County boundary to Santa Rosa County
Gulf Beach Highway (SR 292)	From Perdido Key Dr. to N. Navy Blvd.
Blue Angel Parkway (SR 193)	From NAS Pensacola western boundary to FL-10A
S. Navy Blvd. (SR 295)	From NAS Pensacola front gate bridge to US-98

Mission-critical roadways are shown on Figure 4-8.

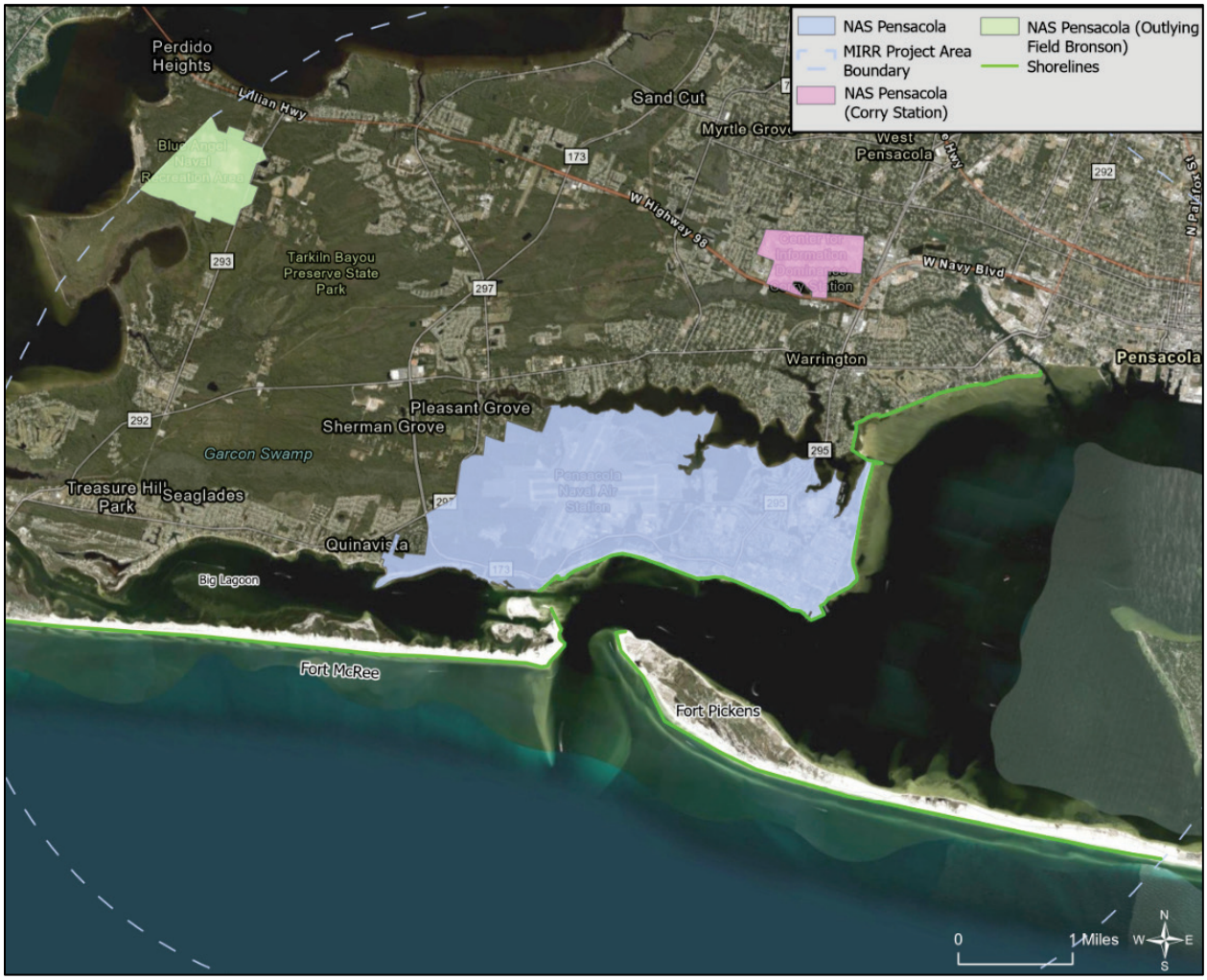
Figure 4-8. NAS Pensacola Mission-Critical Roadways



Shorelines

Mission-critical shorelines that protect the installation include those at NAS Pensacola as well as those on Perdido Key and Fort Pickens, as shown on Figure 4-9.

Figure 4-9. NAS Pensacola Mission-Critical Shorelines



Wastewater Infrastructure

ECUA provides wastewater collection and treatment for NAS Pensacola. Mission-critical wastewater lines include the pipes and lift stations that connect NAS Pensacola and Corry Station to the treatment facility at Bayou Marcus. Figure 4-10 displays the locations of these sewer lines, lift stations, and the Bayou Marcus Treatment Facility.

Figure 4-10. NAS Pensacola Mission-Critical Wastewater Infrastructure



4.1.9 Secondary Mission-Critical Infrastructure

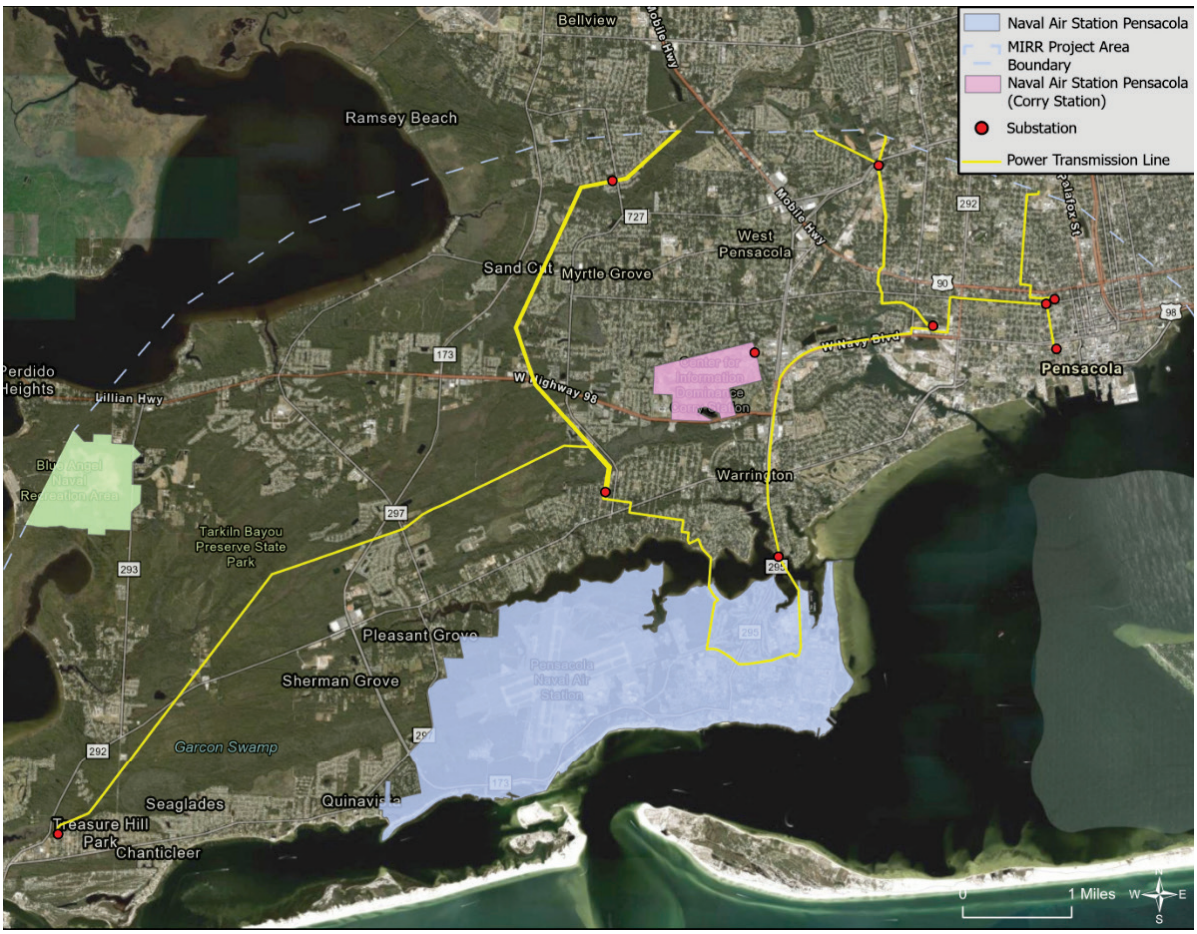
Electrical Production and Supply Facilities

FPL is the electric power utility provider for Escambia County, with electric power being generated in the Gulf Clean Energy Center (GCEC; formerly known as Plant Crist). For this VA, the GCEC and mission-critical transmission and distribution lines and electrical substations were analyzed, as shown on Figure 4-11.

Community Stormwater Systems

Community stormwater management systems protect vital installation infrastructure and roadways from flooding. A collection of FDOT, Escambia County, and City of Pensacola infrastructure make up the stormwater management systems providing drainage in the area.

Figure 4-11. NAS Pensacola Mission-Critical Electric Production and Supply Infrastructure



4.1.10 Mission-Supportive Assets

Community Roadways

Roadways maintained by Escambia County, the City of Pensacola, and FDOT connect installation personnel to their homes and communities. These roadways support the installation's mission by connecting personnel to the major roadways leading to the facility.

Community Water and Wastewater Systems

Escambia County is served primarily by ECUA and PWSC. ECUA provides water services to the City of Pensacola and Escambia County in addition to NAS Pensacola and Corry Station. PWSC provides water service to the communities directly adjacent to NAS Pensacola through a system of five wells and associated distribution infrastructure.

Communications Infrastructure

Communications infrastructure, such as towers and lines, provide communication capabilities and internet access throughout the area. Communications infrastructure in the area are primarily owned and operated by AT&T, Comcast, Cox, and Verizon.

4.1.11 Exposure Analysis

The exposure analysis consisted of overlaying the regional asset inventory (parcels, buildings, critical infrastructure) with hazard layers to determine whether an intersection or exposure occurred. The hazards analyzed include flood exposure (100-year flood, storm surge, and projected SLR), wildfire, heat, lightning, and wind exposure. In addition to the hazard analysis, the MIRR team reviewed transportation route exposure to flood and fire hazards.

Appendix C includes exposure maps for flood and wildfire.

Flood Exposure

The flood hazards considered in this analysis include the 100-year flood event, storm surge from hurricanes (Categories 1 through 5), and the four SLR scenarios recommended by Florida Statutes from the National Oceanic and Atmospheric Administration (NOAA): NOAA SLR 2040 Intermediate low, SLR 2040 Intermediate high, SLR 2070 intermediate low, and SLR 2070 intermediate high.

100-Year Flood

The 100-year flood, also known as the 1% annual chance event, represents pluvial (rainfall-induced), fluvial (river), and coastal flooding in this analysis. The vast majority (94%) of the assets in the study region are not exposed to the 100-year flood event, which occurs mostly along coastal boundaries including areas along Pensacola and Perdido Bay, Bayous Grande, Chico, Marcus, and Tarkiln, and connected rivers, streams, and wetland areas. Coastal roadways, lift stations, government facilities, and select substations throughout Navy Point, Bayou Chico, and downtown Pensacola are exposed to the 100-year flood event.

Storm Surge

As listed in Table 4-4, approximately 2% of assets are exposed to storm surge beginning with Category 1 storms. Intracoastal areas, and areas along waterways are most exposed to surge from a Category 1 or greater hurricane. Large portions of downtown Pensacola, including multiple government buildings, experience inundation beginning with a Category 1 hurricane. Highway 98, Blue Angel Parkway, Gulf Beach Highway, and Navy Boulevard all experience significant flooding starting with Category 1 surge events. NAS Pensacola itself experiences significant exposure starting with Category 1 hurricanes while Corry Station is exposed to Category 1 through 5 hurricane storm surge. Approximately 23% of assets throughout the region are exposed to Category 5 storm surge, including government buildings, water wells, wastewater lift stations, mission-critical and community roadways, and various electric power facilities (including the GCEC).

Table 4-4. Storm Surge Exposure

Hurricane	Percentage of Assets Exposed
Category 1	1.9%
Category 2	6.4%
Category 3	13.1%
Category 4	19.1%
Category 5	23.1%

Sea Level Rise

The SLR exposure analysis identifies future (NOAA 2040 and 2070) sea levels using SLR projections from NOAA (refer to Table 4-5).

In the 2040s, NAS Pensacola will have minor flooding in northern portions of the installation. Increases in sea level occur in coastal areas in Bayou Grande as well as along the coasts adjacent to Perdido Bay. No impacts to roadways are anticipated but coastal properties in Navy Point and Bayou Chico will experience higher tides. Approximately 50 assets—select power transmission lines, coastal roadways, and water conveyances (force mains and gravity mains)—will experience varying degrees of exposure. Exposure at gravity-powered water and wastewater systems is of significant concern because of the potential for seawater infiltration.

By 2070, NAS Pensacola will experience inland flooding at Point Bellinger and Magazine Point Roads, in addition to rising sea levels approaching Radford Boulevard. The barrier islands of Fort Pickens and Fort McCree are also projected to experience regular tidal flooding. Coastal properties in Navy Point and Warrington will be under varying degrees of permanent inundation and 0.7% (470) assets will experience flooding. Exposed assets include stormwater conveyances, water distribution infrastructure, power transmission lines, and wastewater lift stations.

Table 4-5. Sea Level Rise Exposure

SLR Scenario	Percentage of Assets Exposed
2040 Intermediate Low	0.01%
2040 Intermediate High	0.08%
2070 Intermediate Low	0.06%
2070 Intermediate High	0.72%

Wildfire Exposure

Almost half (48%) of the assets in the project study area are barely or not at all exposed to wildfire, as shown on Figure 4-12. Approximately 28% of assets are directly exposed to wildfire (primarily in the western, heavily wooded portions of the study area) while 24% are indirectly exposed. Directly exposed assets include roadways and railroads, power transmission lines, water wells and distribution lines, lift stations and wastewater lines, stormwater infrastructure, and community emergency facilities.

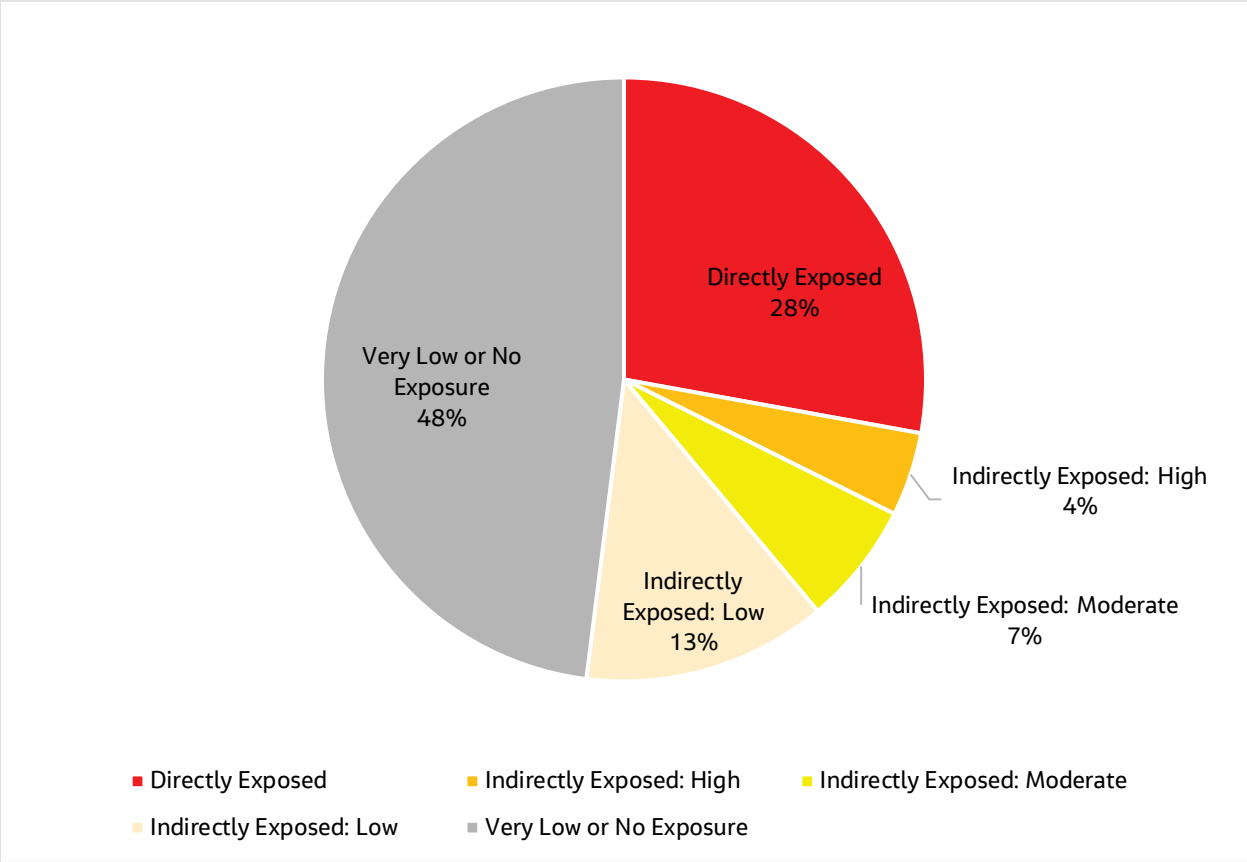
Heat, Lightning, and Wind Exposure

All aboveground assets (including structures and horizontal utilities) are exposed to heat, high winds, and lightning. Tall assets, such as cell towers or power transmission lines, are most exposed to lightning and wind hazards. Approximately 88% of assets in the project study area are aboveground or at grade (for example, roadways) while the other 12% are belowground and are not exposed to heat, lightning, or wind.

Transportation Exposure Analysis

Transportation exposure was reviewed for Blue Angel Parkway, Gulf Beach Highway, Highway 98, and Navy Boulevard. The extent of flooding exposure for the 100-year flood event, Category 1 through 5 storm surges, and SLR are described in the following text.

Figure 4-12. Distribution of Wildfire Exposure



Blue Angel Parkway

Blue Angel Parkway is exposed to the 100-year flood at the crossing over Garcon Swamp, the stream crossing just south of North Loop Road, the river crossing between North Loop Road and Sorrento Road, a wetlands area between Dog Track Road and Highway 98, and crossings at Bayou Marcus.

Blue Angel Parkway is exposed to the storm surge for Category 1 storms at the crossing over Bayou Marcus. Category 1, 2, 3, and 4 storms show exposure at the river crossing between North Loop Road and Sorrento Road and the crossing at Bayou Marcus with exposure increasing for each storm. The Category 1 storm shows increased exposure at each location and an additional exposed segment at the Garcon Swamp Crossing.

Table 4-6 lists the approximate lengths of exposure.

Table 4-6. Blue Angel Parkway Flood Exposure Analysis

Flood Event	Exposed Segments	Approx. Length of Exposed Segments	Total Length Inundated
100-Year Flood	Garcon Swamp crossing	200 feet	3,590 feet
	Stream crossing south of North Loop Road	50 feet	
	River crossing between North Loop Road and Sorrento Road	100 feet	
	Segment between Dog Track Road and Highway 98	0.5 miles	
	Highway 98 to project boundary over Bayou Marcus	400 feet	
	Crossing at Bayou Marcus	200 feet	

Table 4-6. Blue Angel Parkway Flood Exposure Analysis

Flood Event	Exposed Segments	Approx. Length of Exposed Segments	Total Length Inundated
Category 1 Storm Surge	Crossing at Bayou Marcus	200 feet	200 feet
Category 2 Storm Surge	River crossing between North Loop Road and Sorrento Road	100 feet	300 feet
	Crossing at Bayou Marcus	200 feet	
Category 3 Storm Surge	River crossing between North Loop Road and Sorrento Road	175 feet	925 feet
	Crossing at Bayou Marcus	750 feet	
Category 4 Storm Surge	River crossing between North Loop Road and Sorrento Road	1,670 feet	3170 feet
	Crossing at Bayou Marcus	1,500 feet	
Category 5 Storm Surge	Garcon Swamp crossing	100 feet	10,900 feet
	River crossing between North Loop Road and Sorrento Road	2,300 feet	
	Bayou Marcus and south toward Highway 98	8500 feet	

Blue Angel Parkway is not exposed to SLR except for at the Bayou Marcus crossing; current available modeling is unable to predict the depth of flooding on the roadway or bridge.

Gulf Beach Highway

Gulf Beach Highway is exposed to flooding at similar locations for the 100-year flood and the Category 1 through 5 hurricanes. The flooding locations for all events include the crossing over Bayou Grande at the intersection of Sorrento Road and Gulf Beach Highway and the Bayou Grande crossing at Americus Avenue. Additionally, Gulf Beach Highway is exposed north of the Bayou Grande branch between the intersections of Richmond Street and Brigadier Street for Category 1 through 5 hurricanes. Table 4-7 summarizes the approximate lengths of exposure. Gulf Beach Highway does not have exposure to SLR.

Table 4-7. Gulf Beach Highway Flood Exposure Analysis

Flood Event	Segments Inundated	Approx. Length of Segments Inundated	Total Length Inundated
100-Year Flood	Bayou Grande Crossing south of intersection with Sorrento Road	950 feet	1,750 feet
	Bayou Grande Crossing at Americus Avenue	800 feet	
Category 1 Storm Surge	Bayou Grande Crossing south of intersection with Sorrento Road	300 feet	800 feet
	Bayou Grande Crossing at Americus Avenue	500 feet	
Category 2 Storm Surge	Bayou Grande Crossing south of intersection with Sorrento Road	1,000 feet	1,800 feet
	Bayou Grande Crossing at Americus Avenue	800 feet	

Table 4-7. Gulf Beach Highway Flood Exposure Analysis

Flood Event	Segments Inundated	Approx. Length of Segments Inundated	Total Length Inundated
Category 3 Storm Surge	Between Shorewood Drive and Leeward Drive	800 feet	5,500 feet
	Between Freeboard Boulevard and Casa Maria Lane	1,400 feet	
	Bayou Grande Crossing south of intersection with Sorrento Road	1,500 feet	
	Bayou Grande Crossing at Americus Avenue	1,700 feet	
	Between Richmond and Brigadier Street	100 feet	
Category 4 Storm Surge	Between Perdido Key Drive to Kee Memorial Drive	3,800 feet	17,950 feet
	Between Bauer Road and Palm Lake Drive	1,300 feet	
	Between Alvin Drive and Bertha Street	5,700 feet	
	Between Seahawk Trail and Indigo Drive	250 feet	
	Bayou Grande Crossing south of intersection with Sorrento Road	3,500 feet	
	Bayou Grande Crossing at Americus Avenue	2,800 feet	
	Between Richmond and Brigadier Street	600 feet	
Category 5 Storm Surge	Between Perdido Key Drive to Plateau Road	5,900 feet	34,100 feet
	Between Bauer Road and Challenger Way	5,000 feet	
	Between Glades Lane and Bertha Street	5,900 feet	
	Between Landfall Drive and Indigo Drive	1,200 feet	
	Bayou Grande Crossing south of intersection with Sorrento Road	7,600 feet	
	Bayou Grande Crossing at Americus Avenue	7,300 feet	
	Between Richmond and Brigadier Street	1,200 feet	

Highway 98

Highway 98 experiences varying amounts of exposure to floodwaters. Table 4-8 summarizes the approximate lengths of exposure for the 100-year flood and storm surge from Category 1 through 5 hurricanes. Highway 98 is not exposed to SLR except for at Perdido Bay and the creek crossing at Lillian Highway; current available modeling is unable to predict the depth of flooding on the roadway or bridge.

Table 4-8. Highway 98 Flood Exposure Analysis

Flood Event	Segments Inundated	Approx. Length of Segments Inundated	Total Length Inundated
100-Year Flood	Perdido Bay	450 feet	4,200 feet
	Creek Crossing West of Lillian Highway and Dogtrack Road	200 feet	
	Wetland Crossing between Seapines Circle and Heritage Lakes Avenue	750 feet	
	Intersection with North Navy Boulevard	700 feet	
	Bayou Chico Crossing	150 feet	
	Along Garden Street Between North Reus Street and North Spring Street	450 feet	
	Wayside Park	1,500 feet	
Category 1 Storm Surge	Perdido Bay	300 feet	700 feet
	Creek Crossing West of Lillian Highway and Dogtrack Road	200 feet	
	Wayside Park	200 feet	
Category 2 Storm Surge	Perdido Bay	1,600 feet	2,700 feet
	Creek Crossing West of Lillian Highway and Dogtrack Road	300 feet	
	Bayou Chico Crossing	100 feet	
	Wayside Park	700 feet	
Category 3 Storm Surge	Perdido Bay	2,200 feet	10,300 feet
	East of Trout Road	100 feet	
	Around Creek Crossing at Lillian Highway and Dogtrack Road	1,000 feet	
	Bayou Chico Crossing	700 feet	
	At the start of Garden Street to North Donelson Street	4,700 feet	
	Wayside Park	1,600 feet	
Category 4 Storm Surge	Perdido Bay	2,800 feet	18,500 feet
	East of Trout Road	200 feet	
	Around Creek Crossing at Lillian Highway and Dogtrack Road	2,300 feet	
	Intersection with North Navy Boulevard	1,400 feet	
	Bayou Chico Crossing	3,500 feet	
	At the start of Garden Street to North E Street	6,500 feet	
	Wayside Park	1,800 feet	

Table 4-8. Highway 98 Flood Exposure Analysis

Flood Event	Segments Inundated	Approx. Length of Segments Inundated	Total Length Inundated
Category 5 Storm Surge	Perdido Bay	2,800 feet	24,600 feet
	East of Trout Road	300 feet	
	Around Creek Crossing at Lillian Highway and Dogtrack Road	6,400 feet	
	Between Erin Drive and Tallow Tree Drive	400 feet	
	Intersection with North Navy Boulevard	2,000 feet	
	Bayou Chico Crossing	4,000 feet	
	At the start of Garden Street to North F Street	6,700 feet	
	Wayside Park	2,000 feet	

Navy Boulevard

The flood events cause similar exposure along Navy Boulevard from the bridge over Bayou Grande to the intersection with Highway 98. The 100-year flood event and storm surge from Category 1 through 5 hurricanes cause exposure along Navy Boulevard north of the bridge over Bayou Grande. Additionally, the 100-year flood event and Category 1 through 5 hurricanes cause exposure along Navy Boulevard at the intersection with Highway 98. Table 4-9 summarizes the approximate lengths of exposure for the 100-year flood and storm surge from Category 1 through 5 hurricanes.

Table 4-9. Navy Blvd. Flood Exposure Analysis

Flood Event	Segments Inundated	Approx. Length of Segments Inundated	Total Length Inundated
100-Year Flood	Front Gate Bridge to E Palmetto Avenue	3,600 feet	4,600 feet
	Intersection with Highway 98	1,000 feet	
Category 1 Storm Surge	Front Gate Bridge to East Sunset Avenue	500 feet	500 feet
Category 2 Storm Surge	Front Gate Bridge to East Palmetto Avenue	3,600 feet	3,600 feet
Category 3 Storm Surge	Front Gate Bridge to East Palmetto Avenue	3,800 feet	4,300 feet
	Intersection with Highway 98	500 feet	
Category 4 Storm Surge	Front Gate Bridge to East Winthrop Avenue	4,400 feet	5,900 feet
	Intersection with Highway 98	1,500 feet	
Category 5 Storm Surge	Front Gate Bridge to Raymond Street	5,700 feet	7,400 feet
	Intersection with Highway 98	1,700 feet	

Navy Boulevard from the bridge over Bayou Grande to the intersection with Highway 98 does not have exposure to SLR.

4.1.12 Sensitivity Analysis

This section describes the anticipated impacts to community assets and infrastructure from exposure to each identified hazard and scenario. While the exposure analysis helped to identify the spatial extent of a hazard across relevant installations and study areas, the sensitivity analysis identifies the degree of negative impact across assets. The process for determining asset sensitivities can be found in the *Vulnerability and Risk Assessment Introduction and Methodology* document. This process was standardized across all MIRR VAs and is briefly discussed in the following text.

Flood Sensitivity

An asset's sensitivity to flooding depends on the asset's ability to operate during a flood event. Typically, low-lying assets can become inaccessible during flooding or go offline when electrical components are flooded. Facilities with finished interiors also have increased flood sensitivity.

Wildfire Sensitivity

Assets with electrical components or substations, such as power transmission lines or wastewater lift stations, will have some of the greatest sensitivities to this wildfire. Roadways, railroads and bridges also display sensitivity due to the effects of heat from wildfires. Bridge sensitivity is also dependent on the bridge material, as an example, a bridge with a wooden deck surface will be more sensitive to exposure from wildfire as opposed to one with a concrete or paved deck. Overall, transmission lines, potable water wells, and transportation assets are most sensitive to wildfire.

Heat Sensitivity

Asset sensitivity to heat depends on the threshold temperature of the asset. When the surrounding air temperatures exceed the asset threshold temperature, it is assumed that the asset begins to display sensitivity to the hazard. Railroads, roads, and bridges display the highest sensitivity to extreme heat events going into the future.

Lightning and Extreme Wind Sensitivity

While all aboveground assets are exposed to lightning and wind, the characteristics and installation of the asset can influence the sensitivity to these hazards. Cell towers and transmission lines are most sensitive to lightning.

Similarly, an asset's wind sensitivity depends on location and surface area of the asset. Tall structures with little surface area, such as a cell tower, are less sensitive to winds than those with a large surface area, such as a building. Assets without reinforcement are also more sensitive to wind. Transmission lines may be reinforced at poles; however, the lines themselves are vulnerable to wind and flying debris. The impacts of wind-borne debris were also considered when determining wind sensitivity.

4.1.13 Vulnerability Assessment

A vulnerability score for each asset was calculated using the follow equation:

Vulnerability = Exposure + Sensitivity

The highest hazard vulnerability score for each of the five hazards is 2, yielding a maximum total vulnerability score of 10. The following subsections detail asset vulnerability to flood, wildfire, and heat. Extreme wind and lightning are included in the overall vulnerability scores. This yields a score that reflects the risk to the mission of the installation. A detailed discussion of the methodology for evaluating risk can be found in *Vulnerability and Risk Assessment Introduction and Methodology* document.

Flood Vulnerability

The highest possible flood vulnerability score of an asset is 2, whereas the average score is 0.1 and the highest actual score is 1.6. In general, coastal assets have the greatest overall vulnerability to flood events. Assets with the greatest flood vulnerability include lift stations, roadways, and stormwater management facilities. Table 4-10 shows assets with the highest vulnerability score (greater than or equal to 1).

Table 4-10. Assets with Highest Flood Vulnerability (Score ≥1)

No.	Asset Unique ID	Asset Type	Asset Name	Mission-Criticality	Owner/ Operator	Total Flood Vulnerability Score
1	36282	Wastewater Treatment Facilities and Lift Stations	Lift Station	Supportive	ECUA	1.6
2	50642	Wastewater Treatment Facilities and Lift Stations	Lift Station	Supportive	ECUA	1.6
3	36095	Wastewater Treatment Facilities and Lift Stations	Lift Station-Navy Point 2	Supportive	ECUA	1.6
4	36292	Wastewater Treatment Facilities and Lift Stations	Lift Station	Supportive	ECUA	1.6
5	50515	Wastewater Treatment Facilities and Lift Stations	Lift Station-Holiday Harbor	Supportive	ECUA	1.6
6	50600	Wastewater Treatment Facilities and Lift Stations	Lift Station	Supportive	ECUA	1.2
7	36077	Wastewater Treatment Facilities and Lift Stations	Lift Station	Supportive	ECUA	1.2
8	50645	Wastewater Treatment Facilities and Lift Stations	Lift Station	Supportive	ECUA	1.2
9	36176	Wastewater Treatment Facilities and Lift Stations	Lift Station	Supportive	ECUA	1.2
10	50697	Wastewater Treatment Facilities and Lift Stations	Lift Station	Supportive	ECUA	1.2
11	36277	Wastewater Treatment Facilities and Lift Stations	Lift Station-Bayou Grande West	Supportive	ECUA	1.2
12	50657	Wastewater Treatment Facilities and Lift Stations	Lift Station-Harbor Lakes	Supportive	ECUA	1.2
13	36290	Wastewater Treatment Facilities and Lift Stations	Lift Station-Grand Lagoon	Supportive	ECUA	1.2
14	36282	Wastewater Treatment Facilities and Lift Stations	Lift Station-“B” and Gimble	Supportive	ECUA	1.2
15	50642	Wastewater Treatment Facilities and Lift Stations	Road	Supportive		1.2

Wildfire Vulnerability

The average wildfire vulnerability score was 0.6 (out of a maximum of 2), indicating low overall vulnerability among assets in the project study area. Approximately 38% of the assets are not vulnerable to wildfire. Only 7.4% of the assets displayed high vulnerability, including roads, rail roads, bridges, lift stations, power transmission lines, substations, water wells, cell towers, and emergency facilities.

Heat Vulnerability

A total of 78% of all assets have moderate to low vulnerability to heat, while only 0.5% are highly vulnerable to heat. Asset vulnerability to heat occurs when the asset is exposed to heat and the asset's threshold temperature is surpassed by projected air temperatures. The lower the threshold temperature, the higher the vulnerability to heat will be. The assets most vulnerable are railroads. Railroad tracks begin to show sensitivity to heat starting at 95°F, and the single annual maximum temperature and maximum temperature over the course of 5 days (heat waves) are projected to exceed that temperature (U.S. Federal Government n.d.).

Extreme Wind Vulnerability

The average extreme wind vulnerability score was 0.3, indicating low vulnerability among assets in the project study area. A total of 98% of assets have low vulnerability to extreme winds, and only 1% of assets are highly vulnerable to extreme winds. Elevated assets were most vulnerable to extreme winds. Assets most vulnerable to extreme winds include lift stations, wastewater treatment facilities, water storage tanks, cell towers, power generation facilities, and power lines.

Lightning Vulnerability

A total of 87% of assets have moderate to low vulnerability to lightning, while only 1% of assets are highly vulnerable to lightning. Elevated assets were most vulnerable to lightning whereas underground or at-grade assets were not as vulnerable. Assets most vulnerable to lightning are electric production and supply facilities (power transmission lines and substations), communications infrastructure (cell towers), lift stations, and wastewater treatment facilities.

Overall Vulnerability

The highest possible vulnerability score was a 10. Of the 64,908 assets analyzed in this VA, the average and median vulnerability scores were 2.9 and 2.8, respectively, which indicate low overall natural hazard vulnerability among assets in the project area. Table 4-11 shows assets with the highest total vulnerability scores (higher than 7.6).

Table 4-11. Assets with Highest Total Vulnerability (Score >8.6)

	Asset Unique ID	Asset Type	Asset Name	Owner/ Operator	Mission-Criticality	Total Vulnerability Score
1	50642	Wastewater Treatment Facilities and Lift Stations	Lift Station-Navy Point 2	ECUA	Supportive	8.6
2	36292	Wastewater Treatment Facilities and Lift Stations	Lift Station	ECUA	Supportive	8.6
3	36095	Wastewater Treatment Facilities and Lift Stations	Lift Station	ECUA	Supportive	8.3
4	36018	Wastewater Treatment Facilities and Lift Stations	Lift Station	ECUA	Supportive	8.2
5	36112	Wastewater Treatment Facilities and Lift Stations	Lift Station	ECUA	Supportive	8.2

Table 4-11. Assets with Highest Total Vulnerability (Score >8.6)

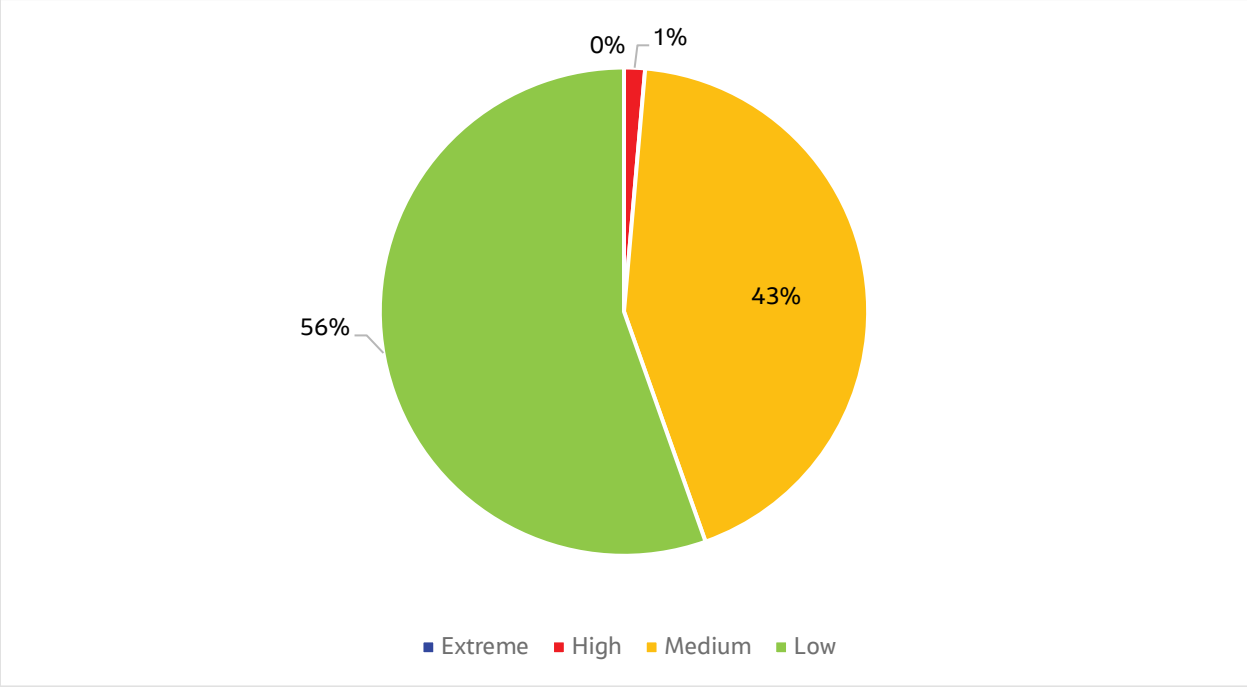
	Asset Unique ID	Asset Type	Asset Name	Owner/ Operator	Mission-Criticality	Total Vulnerability Score
6	50705	Wastewater Treatment Facilities and Lift Stations	Lift Station-Preserve at Crown Pt#2	ECUA	Supportive	8.1
7	36171	Wastewater Treatment Facilities and Lift Stations	Lift Station	ECUA	Supportive	8.0
8	50758	Wastewater Treatment Facilities and Lift Stations	Power Transmission Line	ECUA	Secondary	8.0
9	50605	Wastewater Treatment Facilities and Lift Stations	Lift Station-Keyser	ECUA	Supportive	8.0
10	50855	Wastewater Treatment Facilities and Lift Stations	Lift Station	ECUA	Secondary	8.0
11	50621	Wastewater Treatment Facilities and Lift Stations	Lift Station-San Sebastian	ECUA	Supportive	7.9
12	50515	Wastewater Treatment Facilities and Lift Stations	Lift Station-Holiday Harbor	ECUA	Supportive	7.8
13	50771	Electric Production and Supply Facilities	Power Transmission Line	FPL	Secondary	7.7
14	50770	Electric Production and Supply Facilities	Power Transmission Line	FPL	Secondary	7.7
15	50600	Wastewater Treatment Facilities and Lift Stations	Lift Station-Bayou Grande West	ECUA	Supportive	7.7

Assets with the highest vulnerability included coastal wastewater lift stations and communications towers. Assets were ranked from low to extreme vulnerability based on their vulnerability scores.

Figure 4-13 displays the distribution of the assets' overall vulnerability rankings. As shown in the figure, none of the assets have extreme vulnerability, 1% have high vulnerability, 43% have medium vulnerability, and 56% have low vulnerability.

High vulnerability assets (those with a vulnerability score greater than 6) will be carried forward into the risk analysis.

Figure 4-13. Distribution of Asset Vulnerability Rankings



Energy Sector Vulnerabilities

Methodology

To determine areas where the most prevalent energy infrastructure vulnerability exist within the Northwest Florida region, the following vulnerability indicators and metrics were considered: 1) exposure to major natural threats to energy infrastructure, 2) energy burden within the Census tract of the installation, 3) known vulnerabilities, 4) hardening efforts for the energy infrastructure, 5) presence of microgrids for redundancy, and 6) proximity of infrastructure to power recovery priority facilities, such as hospitals and emergency medical service stations. It is important to note that debris management and regular maintenance for the energy infrastructure are considered as important factors that can impact the stability and function of the energy systems.

These metrics were evaluated in asset and military installation scales, with each being awarded a final vulnerability score to rank their energy-related condition from "poor" to "good." The intention of this ranking system is to inform a resilience strategy that prioritizes installations and assets ranked as "poor" for improvement for each installation. Results of the energy sector VA are provided in this subsection.

Results

The energy infrastructure directly connected to the installation consists of three substations, two risers, and two main overhead power transmission lines spanning approximately 10 miles (Figure 4-14). The major hazards impacting the installation's energy infrastructure include hurricanes, SLR, 100-year flooding/rainfall, and storm surge.

Figure 4-14. NAS Pensacola Energy Infrastructure Vulnerabilities and Mitigating Factors



The installation operates within Escambia County's Census Tract #24 that has a 2% energy cost burden (the ratio of average annual housing energy costs to the average annual household income) (Ma et al. 2019), which is a relatively low percentage within the State of Florida where 6% is considered "high" (The Balmoral Group 2022).

There is a single point of failure: Pensacola Energy's natural gas line connecting to the base was noted as a known vulnerability during the stakeholder engagement workshops.

One fire station (Pensacola Fire Department Station 4) is within 0.5 miles from the installation's northeast substations. This metric is reviewed as a potential mitigation measure where a strategic proximity to fast power recovery priority assets (such as hospitals or fire stations) could enable the installation's power to be recovered faster along with the community's fast power recovery priority assets that are on the same power line. Storm hardening efforts that moved the power transmission and distribution lines underground within the facility also provide mitigating impacts to the installation's energy vulnerability score.

Nearby Pensacola Fire Station 4 and Escambia County Fire Station 16 appeared to be in the same power line as NAS Pensacola, while Escambia County Fire Station 14 that is on a separate power line may provide redundancy through the southwest gate during power outages, as emergency services can remain operational. Additionally, it appears that there is sufficient fire line width around the northwest substation that serve the installation, and tree canopy is not in direct contact with the overhead power lines. This reduces fire and hurricane debris risk in the substation fire protection system. However, around the northeast substation and the onsite substation, the tree canopy is close to overhead power transmission and distribution lines, and the fire line widths are potentially insufficient. Potential saltwater intrusion risk is also determined around the northeast substation because of the adjacent wetland.

Table 4-12 lists the results of installation-scale scoring.

Table 4-12. NAS Pensacola Energy Infrastructure Vulnerability Scoring

Installation	Exposure & Sensitivity to Natural Hazards (0-3 pts)	Are transmission lines in wildfire risk? (Yes=1.5,No=0)	Energy Burden	Other Known Vulnerabilities	Hardening Efforts (Yes=-1.5,No=0)	Strategic Proximity	Microgrid Presence (Yes=-1.5,No=0)	Final Energy Vulnerability Score
NAS Pensacola	3.0	0	1.0	1.0	-1.5	-1	0	2.5

NAS Pensacola has the second lowest energy vulnerability score within the Emerald Coast Region after Tyndall Air Force Base. A potential microgrid implementation could mitigate the energy reliability and vulnerability issues at NAS Pensacola.

Other Identified Vulnerabilities

In addition to the vulnerabilities identified in the quantitative analysis, the following additional vulnerabilities warrant inclusion:

- **Shoreline erosion at NAS Pensacola.** The shoreline on installation's southeastern coastline is eroding rapidly. This erosion removes coastal protections for shoreline-adjacent structures, including buildings where some of the schools are located.
- **Blue Angel Parkway and Gulf Beach Highway capacities.** Lack of capacity on both roadways stresses the ingress and egress capabilities of NAS Pensacola, particularly during emergencies.
- **Single point of failure – Pensacola Energy.** The installation has only a single point of service for natural gas from Pensacola Energy. This single point of failure can cut off the installation's natural gas supply during a hazard event.
- **Single point of failure –water line from Corry Station to NAS Pensacola.** While owned by the Navy, these water lines travel outside of the installation boundary from the WTP in Corry Station to NAS Pensacola.
- **Drainage systems at Corry Station.** The Pensacola State College Ditch and drainage system in the northern part of the Corry Station complex lacks the capacity to handle high flows. Increasing rainfall intensities will add additional failures, causing flooding of the Corry Station complex.

4.1.14 Risk Assessment

Assets with a vulnerability score greater than 6.0 were selected for the risk analysis. The risk associated with the selected high vulnerability was subsequently evaluated using the following equation:

$$Risk = Impact\ to\ Mission + \Sigma\ (Hazard\ Likelihood \times Hazard\ Consequence)$$

where likelihood is the annual probability of occurrence and consequence is the combination of the impact of asset failure on mission assurance and the degree of impact on the asset itself. This yields a score that reflects the risk to the mission that the potential asset failure poses. The highest possible risk score for an asset is 200, and the breakdown of risk scores and rankings is shown in Table 4-13.

Table 4-13. Total Risk Scores and Rankings

Risk Score	Ranking
180–200	Extreme
120–180	High
60–120	Medium
0–60	Low

A detailed discussion of the methodology for evaluating risk can be found in the *Emerald Coast Vulnerability and Risk Assessment Introduction and Methodology* document.

Maps showing the locations of high-risk assets can be found in Appendix C.

High Flood-Risk Assets

There are four assets ranked with high flood risk. Table 4-14 shows assets with the highest flood risk.

Table 4-14. Highest Flood-Risk Assets

No.	Asset Unique ID	Asset Name	Mission-Criticality	Owner/ Operator	Flood Risk Score	Flood Risk Rating
1	36282	Lift Station	Supportive	ECUA	43.8	High
2	36176	Lift Station	Supportive	ECUA	43.8	High
3	36077	Lift Station	Supportive	ECUA	41.8	High
4	36277	Lift Station	Supportive	ECUA	41.0	High
5	36095	Lift Station	Supportive	ECUA	38.8	Medium
6	50642	Navy Point 2 Lift Station	Supportive	ECUA	38.8	Medium
7	36292	Lift Station	Supportive	ECUA	38.8	Medium
8	50600	Bayou Grande West Lift Station	Supportive	ECUA	38.8	Medium
9	50638	Landfall Lift Station	Supportive	ECUA	38.8	Medium
10	50645	Harbor Lakes Lift Station	Supportive	ECUA	38.8	Medium

Three community coastal lift stations exhibit the greatest flood risk, followed by additional community coastal lift stations throughout the region.

Highest Total Risk

The average risk score for the 912 high-vulnerability assets was 31, indicating overall low risk. Of the assets, 12 (1%) have high risk, 155 (72%) have medium risk, and 744 (82%) have low risk scores. Table 4-15 provides details for the high-risk assets.

Table 4-15. Assets with Highest Total Risk

No.	Asset Unique ID	Asset Name	Mission-Criticality	Asset Owner/ Operator	Risk Score	Risk Rating
1	100060	STATE HWY 173 (Blue Angel Parkway)	Primary	FDOT	134	High
2	100055	US HWY 90	Primary	FDOT	134	High
3	100073	US HWY 98	Primary	FDOT	134	High
4	100051	STATE HWY 292/Gulf Beach Highway	Primary	FDOT	134	High
5	100053	US HWY 90	Primary	FDOT	134	High
6	100052	US HWY 90	Primary	FDOT	134	High
7	50851	ECUA Government Street Regional Lift Station	Secondary	ECUA	132	High
8	50733	Bayou Marcus WRF	Supportive	ECUA	130	High
9	60081	S NAVY BLVD	Primary	ESCAMBIA	128	High
10	50767	Power Transmission Line	Secondary	GULF POWER CO	124	High
11	50758	Power Transmission Line	Secondary	GULF POWER CO	123	High
12	50577	NAS#1(Main Side) Lift Station	Supportive	ECUA	122	High

As shown in Table 4-15, the majority of the high-risk assets are mission-critical roadways, lift stations, and the Bayou Marcus WRF, and power transmission lines. The power transmission lines owned by FPL and are listed as secondary to the installation's mission. ECUA owns several of the highest-risk assets including lift stations and the Bayou Marcus WRF at Bayou Marcus. Appendix C includes maps that provide the locations of these high-risk assets.

Risk for Mission-Critical Assets

Table 4-16 documents the risk to mission ratings for the mission-critical assets that support NAS Pensacola.

Table 4-16. Risks for Primary Mission-Critical Assets

No.	Asset Unique ID	Asset Name	Mission-Criticality	Asset Owner/ Operator	Risk Score	Risk to Mission
1	100060	STATE HWY 173 (Blue Angel Parkway)	Primary	FDOT	134	High
2	Multiple	US HWY 90	Primary	FDOT	134	High
3	100073	US HWY 98	Primary	FDOT	134	High
4	100051	STATE HWY 292/Gulf Beach Highway	Primary	FDOT	134	High
5	100052	Bayou Marcus WRF	Primary	FDOT	134	High
6	50851	Central WRF	Secondary	ECUA	27	Low

Table 4-16. Risks for Primary Mission-Critical Assets

No.	Asset Unique ID	Asset Name	Mission-Criticality	Asset Owner/ Operator	Risk Score	Risk to Mission
7	50733	Sanitary Sewer Lines Connecting Installation to WRFs	Supportive	ECUA	N/A	N/A
8	50577	Lift Station – NAS #1 (Main Gate)	Primary	ECUA	122	High
9	60081	Lift Station - NAS #2 (Back West Gate)	Primary	ECUA	109	Medium
10	50767	GCEC (formerly Plant Crist)	Primary	FPL	128	Medium
11	50758	Power Transmission Lines	Primary	FPL	Varies	High-medium

Risks for these assets are discussed in greater detail as follows:

- **Major roadways.** The risk for roadway assets (Blue Angel Parkway, Gulf Beach Highway, Highway 98, and Highway 90) stems from flood inundation. The Transportation Exposure Analysis subsection on p. 4-16 documents the locations on the roadways where flooding is anticipated to occur.
- **Wastewater treatment facilities and lift stations.** Bayou Marcus WRF has high risk to mission because it treats the wastewater from NAS Pensacola and is located within the 100-year floodplain. The Central WRF has low risk to mission - its risk level is significantly reduced to its resilient design (including structural design incorporating Category 5 Hurricane wind speeds [ECUA n.d.]) and its location—the facility is not located within the 100-year floodplain nor is it exposed to storm surge. The two lift stations at the installation, NAS #1 (Main Side) and NAS #2 (Back West Gate) have high and medium risk to mission scores, respectively.
- **Electrical production and supply facilities.** GCEC has medium risk to mission. It is a vital source of power for the installation, resulting in a high impact to mission score. The medium risk stems from the consequence scores from the 6 through 9 feet of storm surge stemming from Categories 4 and 5 storm surges, respectively. Power transmission lines that supply the installation are medium risk; while they are exposed to high winds and lightning, a desktop review showed that these assets are sufficiently protected. They have concrete poles, reducing the consequence of high winds, and lightning arresters, reducing the consequence of lightning strikes.

4.2 NAS Whiting Field

This MIRR vulnerability assessment and risk analysis evaluates asset vulnerability and risk in the communities surrounding NAS Whiting Field. The study area includes the region surrounding the installation and the critical roadways that connect the base to the OLFs, as shown on Figure 4-15. Critical assets within the study area have been evaluated both quantitatively and qualitatively to determine the risks to the assets and the accompanying impact on the mission.

4.2.1 Hazards

Hazard data and anecdotes of existing asset vulnerabilities were collected during the in-person workshops and the MIRR committee meetings, where data collection results were presented. Lists of stakeholder-identified hazards, vulnerabilities, and mission-critical assets were generated from these discussions. These lists were used to identify areas of concern for further analysis, to confirm findings from the vulnerability assessment, and to populate the list of priority assets at risk. The following subsections summarize the known hazards.

Natural Hazards

Natural hazards evaluated in this vulnerability assessment include flooding from a 100-year flood event, SLR, and storm surge; wildfire; heat; extreme wind; and lightning.

Flooding

The three flood hazards evaluated in this assessment include the 100-year flood zone, SLR, and storm surge for hurricanes from Category 1 to 5. Flooding poses a risk to critical installation operations: flooding can make its way onto runways and landing sites (both on the installation and at the OLFs), inhibiting training and impacting the installation mission. Aging drainage systems on and around the installation exacerbate pluvial flooding, which is caused when increased rainfall creates a flood independent of an existing body of water. These floods occur in any location, even without nearby water bodies in the case of extreme rainfall events. Flooding also impacts the roadways that are necessary to travel to the OLFs. Before training operations can begin, emergency teams travel from the installation to the OLFs daily via state and county roads; reducing flood risk on those roads is critical for preserving the installation's training mission.

Wildfire

Much of Santa Rosa County is in the WUI, the transition area between developed and unoccupied, undeveloped lands. Development in the WUI is typically more vulnerable to fire because of large amounts of vegetation. Santa Rosa County is heavily wooded – the region contains the Blackwater River State Forest, the Yellow River State Wildlife Management Area (WMA), and the Escambia River State WMA. This presents a large area for wildfires to occur, and damage assets that support the installation. In addition to the fire itself, smoke can inhibit training by impacting visibility and air quality. Figure 4-16 shows past wildfire occurrence areas from 2006 through 2018.

Figure 4-15. NAS Whiting Field – MIRR Study Area

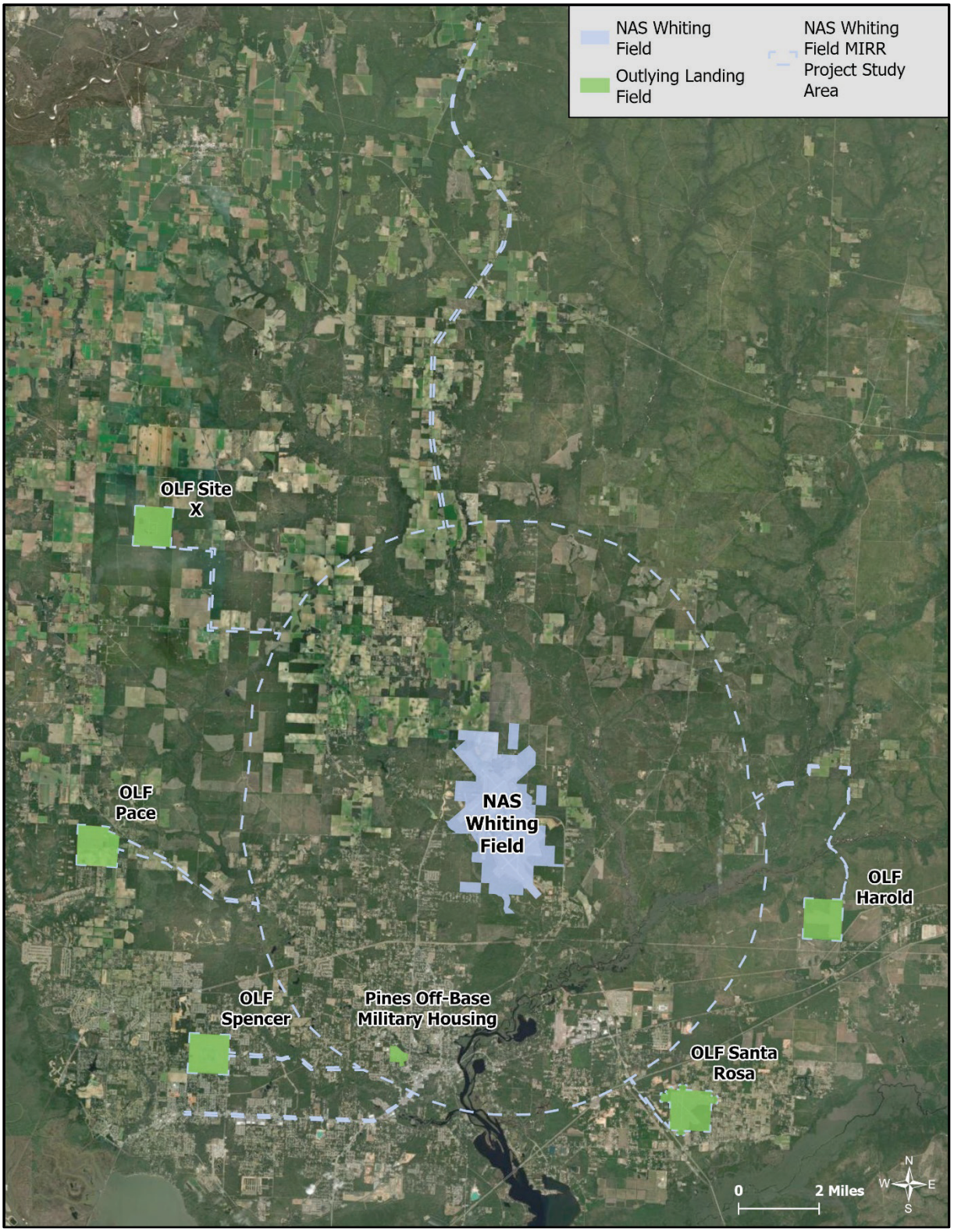
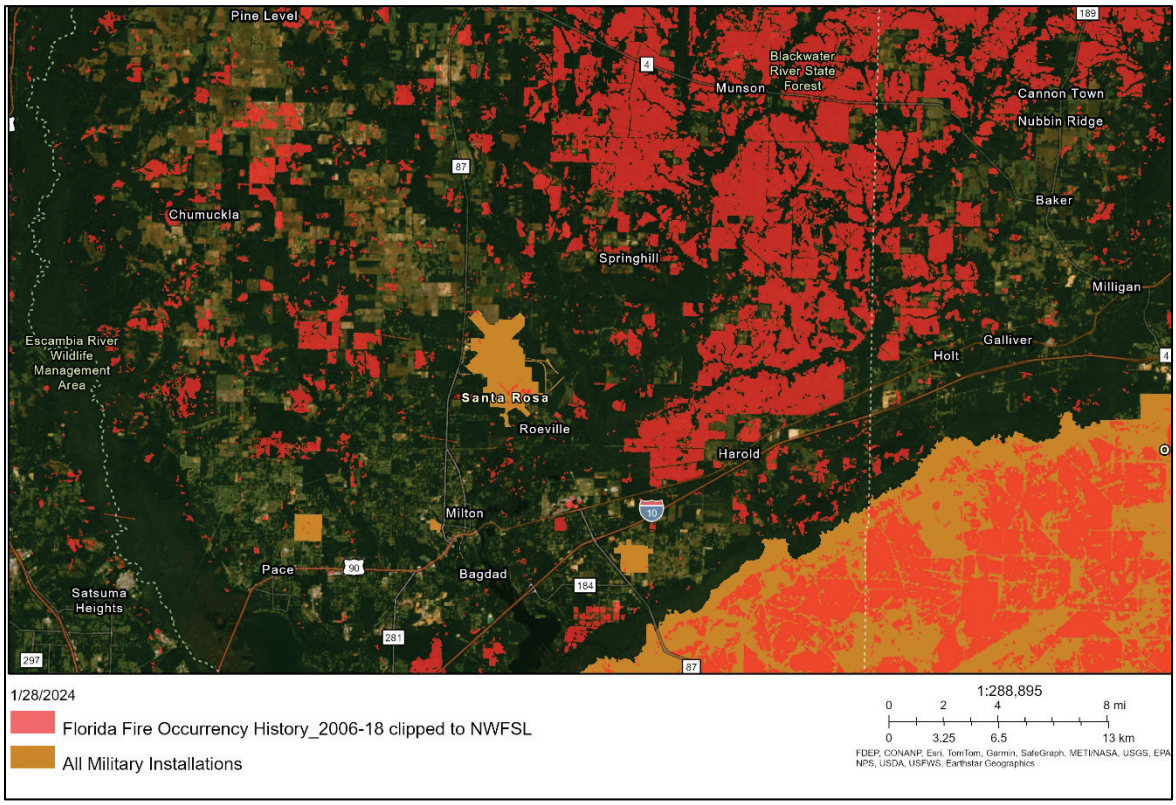


Figure 4-16. Wildfire Occurrence Areas, 2006-2018



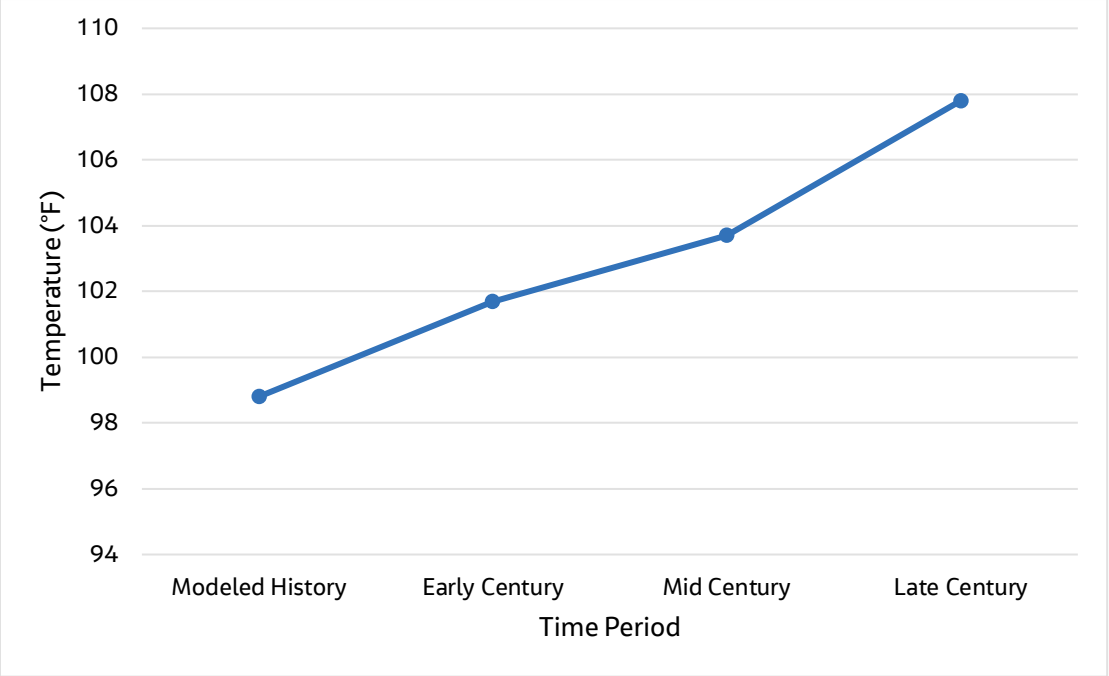
Prescribed burns are commonly executed on State Lands by the Florida Forest Service for fuels management. It was noted during the stakeholder workshops that smoke from these prescribed burns poses minimal risk to installation operations. Whiting Field staff maintain a strong relationship with the Florida Forest Service and Blackwater State Park to ensure that any planned fire activity is clearly communicated to minimize impacts on mission.

Extreme Heat

According to the U.S. Climate Toolkit, temperatures across the County are projected to increase through the year 2050, as shown on Figure 4-17 (U.S. Federal Government n.d.). The maximum temperature value recorded based on historical records is 99 degrees Fahrenheit (°F), however), the County is expected to increase in temperature through the year 2050 with projected maximum temperatures of 104°F. These increased temperatures can cause electrical equipment to overheat and roadways to buckle, negatively impacting mission-critical power transmission lines and roadways that support the installation.

Figure 4-17. Projected Change in Mean Annual Highest Maximum Temperature in Santa Rosa County

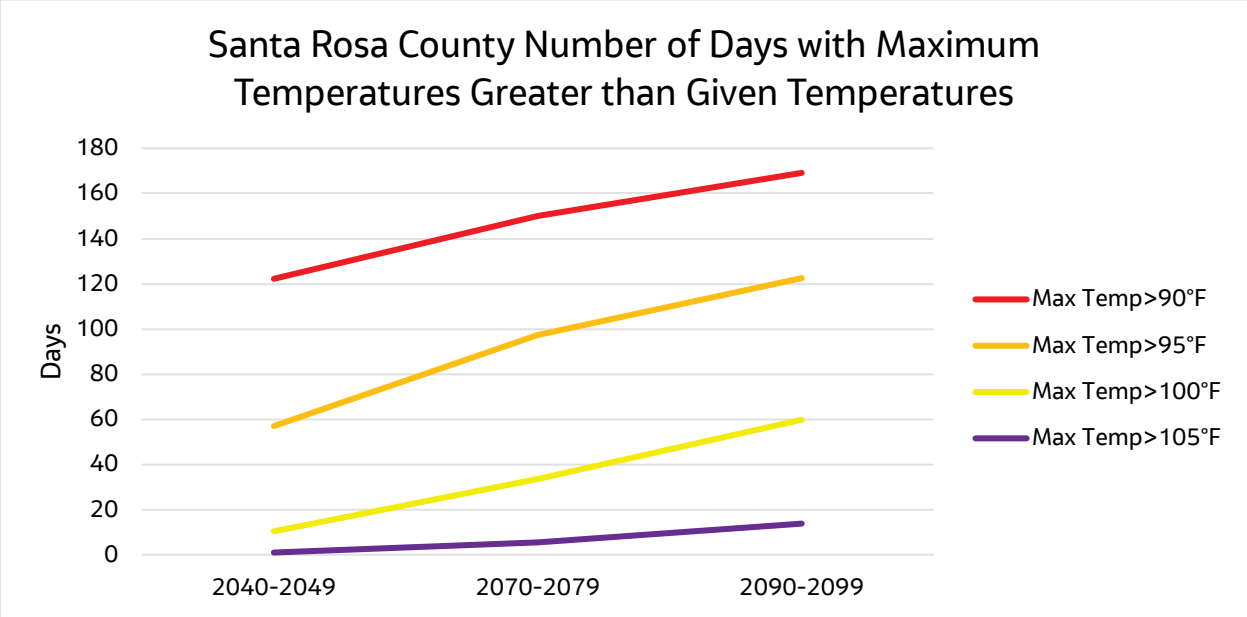
Source: U.S. Federal Government n.d.



The number of extreme heat days (defined as days with maximum temperatures exceeding 90°F) is also increasing throughout the County (Figure 4-18). Heat waves can negatively impact human health, and infrastructure, which adversely affects operations.

Figure 4-18. Projected Change in Number of Hot Days in Santa Rosa County

Source: U.S. Federal Government n.d.



Extreme Wind

Extreme wind events can negatively impact critical power transmission lines and cell towers, disrupting power service and communications in the region.

Lightning

According to the FEMA National Risk Index, the County experiences approximately 150 cloud-to-ground lightning strikes annually (FEMA 2023). In addition to lightning's potential to damage critical infrastructure, lightning strikes can also ignite dry fuels and cause wildfires.

Infrastructure Shocks and Stresses

The communities around NAS Whiting Field are facing infrastructure issues related to aging infrastructure, lack of functional and/or adaptive capacity, and broadband service coverage gaps.

Aging Infrastructure

The City of Milton and Santa Rosa County in general have aging drainage and wastewater infrastructure. This can cause the existing infrastructure to become unable to handle compounding flood hazards. Infiltration and inflow issues are also affecting wastewater pipes, placing additional stress on wastewater systems and treatment plants. The City of Milton Wastewater Treatment Plant, which currently serves NAS Whiting Field, is at full capacity and the Florida Department of Environmental Protection has ordered that the plant cease discharging treated effluent into the Blackwater River by 2025. Aging septic systems are at a higher risk of having leaking septic tanks, impacting the groundwater quality as well.

Lack of Capacity

Rapid population growth in Santa Rosa County has placed significant stress on water, wastewater, and regional transportation systems. The City of Milton's existing wastewater treatment plant is approaching capacity. Planned septic-to-sewer conversion and new housing development projects cannot be completed until the additional wastewater treatment capacity is added.

Roadway Capacity

Transportation infrastructure in the region is also experiencing additional stresses, as noted during the stakeholder workshops. Population increases in the Northwest Florida region have increased the annual daily traffic volumes on highways and roadways needed to access the installation. Traffic congestion on mission-critical roadways, including State Road 87 and Highway 90, can inhibit personnel from arriving at the installation on time, potentially impacting the mission. Traffic issues can be heightened during storms or flood events. Figures 4-19 and 4-20 show the percentage of max traffic volume occurring on critical roadways within the project study area for 2020 and 2045, respectively.

In 2020, State Road 87 experienced low levels of congestion. State Road 87 is critical to the project study area due to its connection to Langley St., one of the primary access roads for NAS Whiting Field. The 2020 congestion rate for State Road 87 is 34%. Other roads within the project study area, including Munson Highway, Highway 90, and US-89, are at 0% to 50% capacity apart from some segments of Highway 90 nearing or exceeding capacity. Overall, access to the installation is not hindered.

In 2045, traffic congestion is projected to increase on nearly all roads within the project study area. State Road 87 will increase from 34% to 52%. The most significant increase in traffic congestion will be seen on Munson Highway, with a projected capacity increase from 23% to 86%. This rise in congestion will potentially increase the commute time for installation personnel.

Figure 4-19. 2020 Traffic Congestion

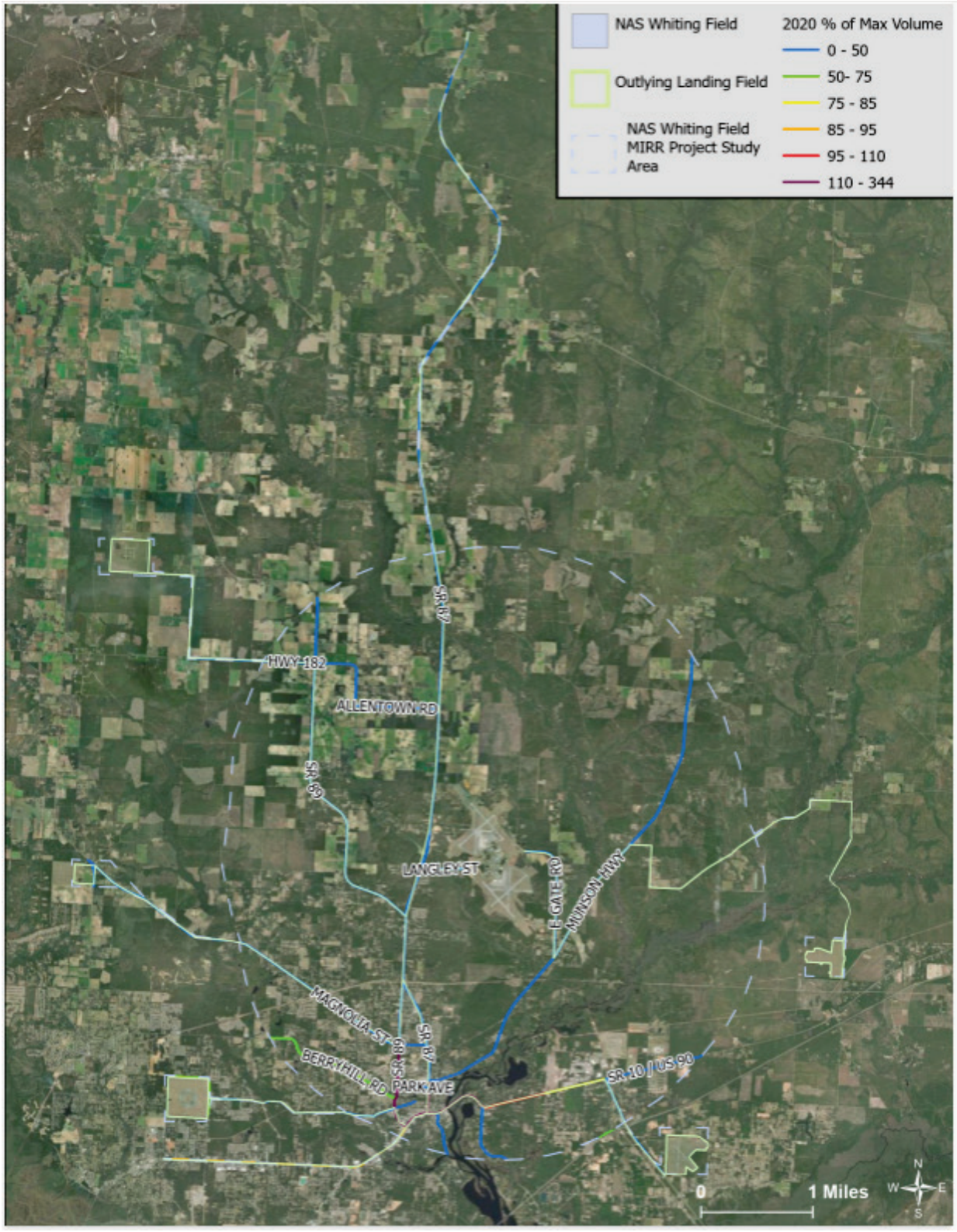
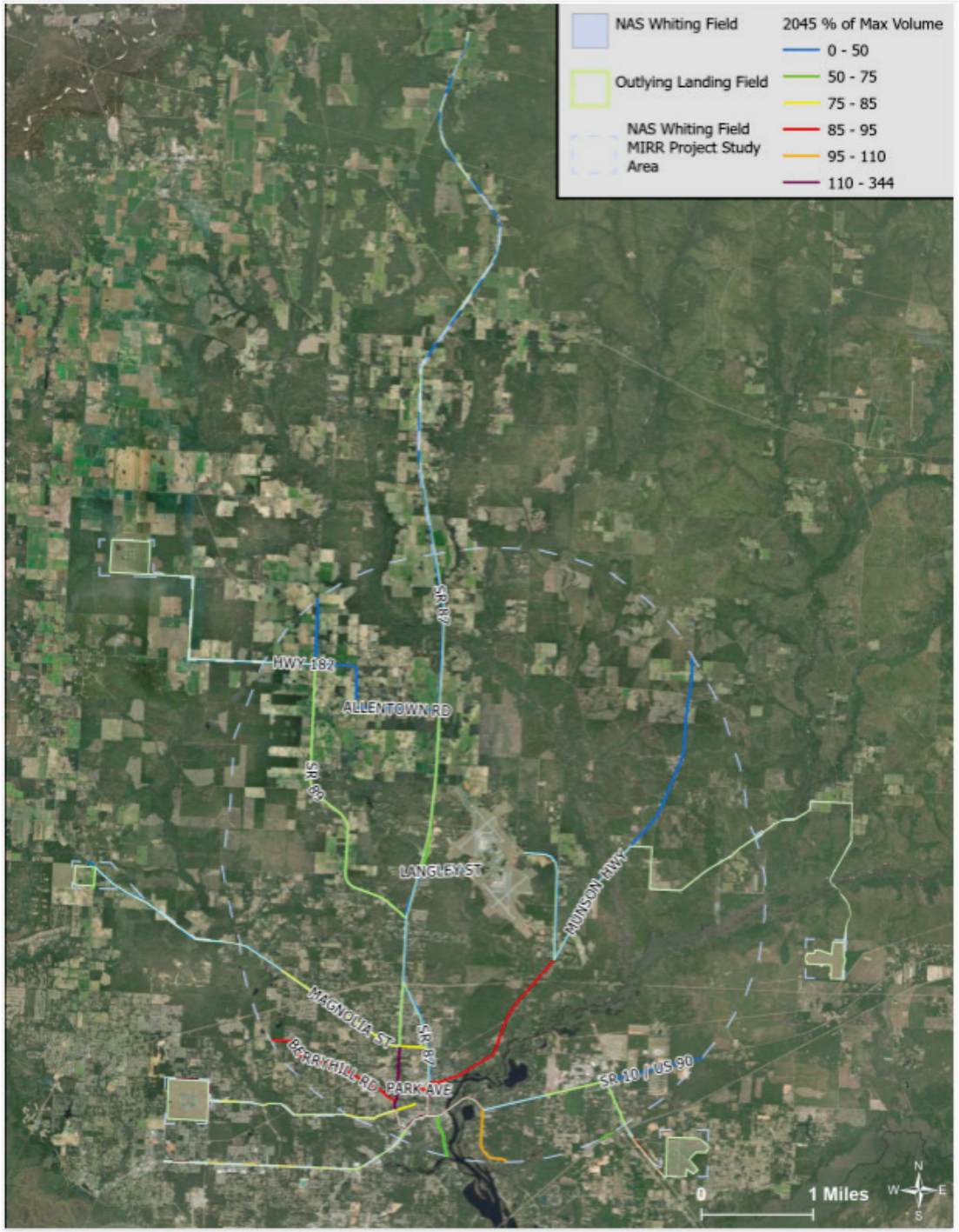


Figure 4-20. 2045 Traffic Congestion



Lack of Broadband Service

Broadband service within the installation and in the surrounding areas requires improvement. Broadband coverage at the OLFs is a concern and requires improvement as it limits the ability to conduct training and communicate with the installation. Both the County and NAS Whiting Field, in conjunction with AT&T and Cox Communications, are currently exploring options for improving rural broadband.

Energy Disruption

The adverse effects of energy disruption extend across various sectors, resulting in substantial economic setbacks, endangering public safety, and obstructing vital services. This highlights the pressing requirement to analyze energy infrastructure vulnerabilities and enforce protective measures to minimize the impact on both local communities and military installations.

While NAS Whiting Field assets are under low flooding risk, results of this assessment showed that wildfire and lightning are the major natural threat to base's energy system.

Proximity of nearby tree canopy to electric substations, transformers, and power transmission and distribution lines is also a critical consideration during fire occurrences. Fire departments require 20-30 ft of fire line width with a 3- to 4-foot scrape to respond to fires. This standard is not met around two of the substations that serve the base.

Economic Threats

Housing Attainability

The cost of housing is a significant issue in the County. From 2015 to 2023, home prices increased by 96% and rents increased by 77% (Zillow n.d.). Such increases put stress on the families of both the staff and trainees at NAS Whiting Field. In addition to high housing prices, the County is also facing a housing supply shortage.

New housing developments near or within the City of Milton are limited by wastewater treatment capacity – additional housing cannot be built out and connected to the City's existing wastewater system because it is currently at capacity. Simultaneously, the County is trying to discourage housing being built on septic systems because of the negative water quality impacts in the aquifers that supply the County's potable water. This housing crunch is resulting in many installation personnel commuting long distances from places such as Pensacola. The regional lack of housing availability increases commute times and places additional stresses on both training personnel and permanent residents within the County.

Social Threats

Information on social threats was gathered during the stakeholder workshops. The lack of childcare services was the primary social threat identified for NAS Whiting Field during the discussions.

Lack of Childcare

The lack of childcare staff and facilities poses a challenge to both installation personnel and service members undergoing flight training, many of whom have young families in the region. While the installation is currently expanding childcare capacity on base, additional work is needed at the regional level to provide an adequate amount of affordable childcare.

Environmental Stresses

The community surrounding NAS Whiting Field is facing environmental stresses related to water quality and endangered species.

Water Quality

Aging septic systems are at a higher risk of having leaking septic tanks, impacting the groundwater quality as well.

Endangered Species

Endangered species in the community surrounding NAS Whiting Field include the red-cockaded woodpecker and the reticulated flatwood salamander. While the installation, county, and community partners actively manage habitats

for these species, their presence can impose regulatory restrictions on new development and some training activities and poses a potential threat to the mission.

Encroachment

NAS Whiting Field is the model for protecting military installations from encroachment and incompatible neighboring land uses. The 2017 Air Installations Compatible Use Zones study included a compatible land use plan that identifies synergistic land uses between development around the installation and the base itself (NAVFAC 2017). NAS Whiting Field has protected itself from encroachment and preserved its mission by partnering with state and local government and nonprofits to purchase large swaths of land and easements around the installation.

It was noted in the stakeholder engagement workshop that the County-owned airport, Peter Prince Airfield, located approximately 3 miles southeast of NAS Whiting Field, poses an airspace encroachment issue. Civilian aircraft from Peter Prince occasionally enter NAS Whiting Field airspace interfering with training operations. The installation and community have actively worked to address this issue through the creation of the Whiting Field Aviation Park.

4.2.2 Mission-Critical Infrastructure

Mission of the Installation

For the MIRR, the installation missions were categorized as primary or secondary missions. While not providing a complete overview of all ongoing installation activities, this process provides a sufficient understanding of the missions of the installations to identify what infrastructure is critical for supporting that mission. Assets were then categorized as primary, secondary, or mission-supportive mission-critical.

The mission of NAS Whiting Field is to produce the military's best trained "Aviation Warfighter." For the MIRR, NAS Whiting Field's primary mission is defined as training fixed-wing and rotary-wing pilots. The installation does not have a secondary mission. Mission-critical and mission-supportive assets, which support the installation mission-critical infrastructure, are shown in Table 4-17 and are discussed further in the following sections.

Table 4-17. NAS Whiting Field Mission-Critical Assets

	Primary Mission-Critical Assets	Mission-Supportive Assets
Assets and Infrastructure	▪ Drainage systems to keep runways and roadways clear ▪ OLF and Installation Access Roads ▪ Power supply ▪ Community firefighting assets ▪ Community wastewater assets ▪ Community water systems	▪ Community roadways ▪ Community facilities (local government, schools, etc.)

Overview of Mission-Critical Infrastructure

NAS Whiting Field does not operate independently. It relies on a complex network of private and public partners to execute its mission. It was noted during stakeholder engagement workshops that staff at NAS Whiting Field maintain positive relationships with entities such as the County, the City of Milton, and utility providers. Table 4-18 provides an overview of the owners and operators of the primary mission-critical assets.

Table 4-18. Primary Mission-Critical Asset Owners and Operators

Primary Mission-Critical Asset	Asset Owner/Operator
OLF and Installation Access Roads	▪ FDOT ▪ Santa Rosa County ▪ City of Milton

Table 4-18. Primary Mission-Critical Asset Owners and Operators

Primary Mission-Critical Asset	Asset Owner/Operator
Power Supply	▪ FPL ▪ Escambia River Electric Cooperative (EREC)
Community Water Systems	▪ Point Baker Water District ▪ City of Milton ▪ East Milton Water System
Wastewater Assets	▪ City of Milton
Community Firefighting Assets	▪ Santa Rosa County ▪ City of Milton ▪ East Milton ▪ Skyline Fire and Rescue District, Inc.

Major Roadways and OLF Access Routes

Major roadways and evacuation routes are mission-critical infrastructure. They enable personnel to access the installation itself and enable support operations to access the OLFs daily to support training. These same roadways are also significant because they serve as major thoroughfares from the communities to the installation and as vital evacuation routes for the communities surrounding NAS Whiting Field. For this assessment, the following routes are considered primary mission-critical and are maintained by FDOT or the County:

- Highway 90
- US 98
- State Road 4
- State Road 87
- County Road 191
- NAS Whiting Field to OLF Pace
- NAS Whiting Field to Site X
- NAS Whiting Field to OLF Spencer
- NAS Whiting Field to OLF Harold
- NAS Whiting Field to OLF Santa Rosa
- NAS Whiting Field to Alabama OLFs

The portions of the routes to OLFs Silverhill, Summerdale, Barin, Wolf, Evergreen, and Brewton that are in Alabama are outside of the scope of this MIRR and the Emerald Coast Regional Council's area. A brief overview of 100-year flood exposure for the access roadways to the OLFs in Alabama is provided in Section 4.2.5.1. Resilience strategies for those routes should be coordinated with the Alabama Department of Transportation.

Power Supply

A consistent supply of electric power is critical for maintaining the training operations at NAS Whiting Field. FPL is the electric power provider for the installation. FPL's power is generated at the Gulf Clean Energy Center (formerly known as Plant Crist), a natural gas fired plant, in Escambia County and brought to the installation through a series of transmission and distribution lines and substations. Choctawhatchee Electric Cooperative (CHELCO) is a regional power supplier operating in the eastern portion of Santa Rosa County, purchasing its power from Power South but its service area lies outside the study area.

Community Water Systems

There are 14 water franchise areas in the County. Of those franchise areas, Point Baker Water District, the City of Milton, and East Milton Water System are in the project study region. NAS Whiting Field does not receive potable water from any of these providers but rather has its own onsite water wells and treatment system. Point Baker's service area is adjacent to the installation. The Whiting Pines Whiting Field base housing water supply comes from the City of Milton's water system. While community water systems may not directly support NAS Whiting Field itself, they are important for supplying water for firefighting efforts.

Community Wastewater Assets

NAS Whiting Field's wastewater is conveyed through a series of sewer lines and is treated at the City of Milton WRF.

Community Firefighting Assets

Firefighting is an important means of controlling fires and burns in the County. Nine fire stations were assessed in this analysis. The stations belong to the East Milton Volunteer Fire Department (VFD), Milton Fire Department, Skyline Fire Rescue, Pace VFD, and Allentown VFD. In addition to fire stations, hydrants within the buffer boundary and along the OLF routes were also analyzed.

4.2.3 Exposure Analysis

The exposure analysis consisted of overlaying the regional asset inventory (parcels, buildings, critical infrastructure) with hazard layers to determine whether an intersection or exposure occurred. The hazards analyzed include flood exposure (100-year flood, storm surge, and projected SLR), wildfire heat, lightning, and wind exposure. Appendix C includes exposure maps for flood and wildfire. In addition to the hazard analysis, the MIRR team reviewed the exposure of the transportation routes to the OLFs to flood and fire hazards, which includes portions of major roadways and evacuation routes outside of the study area.

Flood Exposure

The flood hazards considered in this analysis include the 100-year flood event, storm surge from hurricanes (Categories 1 through 5), and the four SLR scenarios recommended by Florida Statutes from NOAA: SLR 2040 Intermediate-low, SLR 2040 Intermediate-high, SLR 2070 intermediate-low, and SLR 2070 intermediate-high.

100-Year Flood

The 100-year flood, also known as the 1% annual chance event, represents pluvial (rainfall-induced), fluvial (river), and coastal flooding in this analysis. Almost all the assets (98%) in the study region are not exposed to the 100-year flood event, with exception of assets located near the Blackwater River and tributary stream crossings at SR 87, CR 191, and Spring Hill Road. A limited number of assets, such as, local roadways, bridges, and water and sewer lines in the City of Milton are exposed to the 100-year event.

Storm Surge

Overall, the study area has moderately low storm surge exposure, with approximately 15% of assets in the study area being exposed to Category 5 hurricane storm surge (Table 4-19). Approximately 2% of assets, consisting of coastal roads and water and wastewater lines in the City of Milton, are exposed to Category 1 storm surge.

Table 4-19. Storm Surge Exposure

Hurricane	Percent of Assets Exposed
Category 1	3.2%
Category 2	5.0%
Category 3	7.4%
Category 4	12%
Category 5	15%

Sea Level Rise

The SLR exposure analysis identifies future (NOAA 2040 and 2070) sea levels using SLR projections from NOAA. Overall, very few assets in the study area are exposed to SLR, as shown in Table 4-20.

In 2040, 25 (0.22% of the total) assets will be exposed to SLR; assets with the greatest exposure include railroads and sanitary sewer lines. Exposure will increase slightly in the 2070s, by which 470 (4.1% of the total) assets will be exposed to SLR under the intermediate-high scenario. Assets with the greatest exposure under this scenario include railroads, stormwater infrastructure (outfalls and pipes), and water and wastewater lines in the City of Milton. SLR can significantly impact stormwater systems when water levels are above the elevation of outfalls, preventing drainage during storm events and causing inland flooding.

Table 4-20. Sea Level Rise Exposure

SLR Scenario	Percent of Assets Exposed
2040 Intermediate Low	0.052%
2040 Intermediate High	0.22%
2070 Intermediate Low	0.23%
2070 Intermediate High	1.5%

Wildfire Exposure

Almost all assets in the project area are directly or indirectly exposed to wildfire, as shown on Figure 4-21. Approximately 32% of the assets are directly exposed while 65% are indirectly exposed to wildfire. Assets that are directly exposed to wildfire include water wells, mission-critical roadways (State Road 87 and Highway 90) power transmission lines, and railroads.

Heat, Lightning, and Wind Exposure

All aboveground assets (including structures and horizontal utilities) are exposed to heat, high winds, and lightning. Tall assets, such as cell towers or power transmission lines, are most exposed to lightning and wind hazards. Approximately 47% of assets are aboveground or at grade (for example, roadways) while the other 53% are belowground and are not exposed to heat, lightning, or wind.

Transportation Exposure Analysis

Table 4-21 provides details on the different OLF routes' exposure to flooding. The majority of the OLF routes are not exposed to flooding. The route to OLF Santa Rosa is the most exposed to storm surge along Highway 90 at the areas near Blackwater River Bridge while the routes to OLF Harold and the Alabama OLFs (heading west) also experience some storm surge inundation at the crossings at Pond Creek. All OLFs and routes to them are directly exposed to wildfire because they traverse through heavily vegetated areas. The routes to OLF Santa Rosa and the Alabama OLFs (west and north, respectively) have the greatest exposure to flood hazards.

Flood hazards at the OLFs in Alabama, along with the routes to those sites, were not assessed in depth in this MIRR because they are outside the Emerald Coast Regional Council's area. However, a brief review of 100-year flood exposure was conducted. The following Alabama roadways are exposed to the 100-year flood:

- Highway 98 to OLF Barin (OLF Barin itself is also exposed to 100-year and 500-year flood events)
- State Road 87 to OLF Brewton (OLF Brewton is exposed to both 100- and 500-year flood events)
- Baldwin Beach Expressway to OLF Summerdale over stream crossings

Figure 4-21. Distribution of Asset Exposure to Wildfire

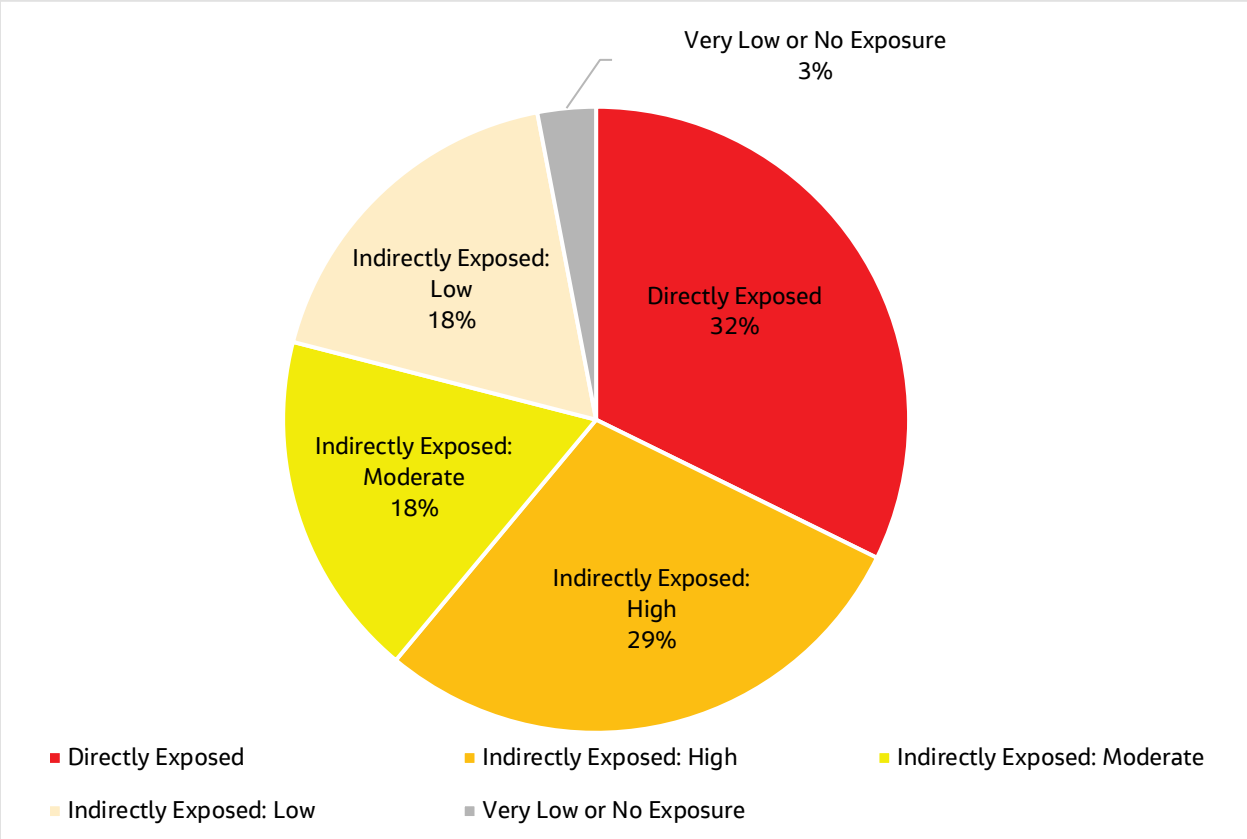


Table 4-21. OLF Route Flood Exposure

Route	Approx. Length of Route (miles)	Approx. Length of Route Exposed to Flooding (miles)	% Route Exposed
NAS Whiting Field to Site X	17	0	0
NAS Whiting Field to OLF Spencer	15	0	0
NAS Whiting Field to OLF Pace	16	0	0
NAS Whiting Field to OLF Santa Rosa	16	1.2	7.5%
NAS Whiting Field to OLF Harold	19	0.2	1.1%
NAS Whiting Field to Alabama OLFs[a] (north)	24	0	0
NAS Whiting Field to Alabama OLFs[b] (west)	13.5	0.6	4.5%

[a] The assessment for this route stops at the Florida-Alabama Boundary.

[b] The assessment for this route ends in I-10 in Pace.

4.2.4 Sensitivity Analysis

This section describes the anticipated impacts to community assets and infrastructure from exposure to each identified hazard and scenario. While the exposure analysis helped to identify the spatial extent of a hazard across relevant installations and study areas, the sensitivity analysis identifies the degree of negative impact across assets. The process for determining asset sensitivities can be found in the *Vulnerability and Risk Assessment Introduction and Methodology* document. This process was standardized across all MIRR VAs and is briefly discussed in the following text.

Flood Sensitivity

An asset's sensitivity to flooding depends on the asset's ability to operate during a flood event. Typically, low-lying assets can become inaccessible during flooding or go offline when electrical components are flooded. Facilities with finished interiors also have increased flood sensitivity.

Wildfire Sensitivity

Assets with electrical components or substations, such as power transmission lines or wastewater lift stations, will have some of the greatest sensitivities to wildfire. Roadways, railroads, and bridges also have sensitivity because of the effects of heat from wildfires. Bridge sensitivity also depends on the bridge material (for example, a bridge with a wooden deck surface will be more sensitive to wildfire as opposed to one with a concrete or paved deck). Overall, transmission lines, potable water wells, and transportation assets are most sensitive to wildfire.

Heat Sensitivity

Asset sensitivity to heat depends on the threshold temperature of the asset. When the surrounding air temperatures exceed the asset threshold temperature, it is assumed that the asset begins to display sensitivity to the hazard. Railroads display the highest sensitivity to projected extreme heat events followed by bridges.

Lightning and Extreme Wind Sensitivity

While all aboveground assets are exposed to lightning and wind, the characteristics and installation of the asset can influence the sensitivity to these hazards. Cell towers and transmission lines are most sensitive to lightning.

Similarly, an asset's wind sensitivity depends on location and the surface area of the asset. Tall structures with little surface area, such as a cell tower, are less sensitive to winds than those with a large surface area, such as a building. Assets without reinforcement are also more sensitive to wind. Transmission lines may be reinforced at poles; however, the lines themselves are vulnerable to wind and flying debris. The impacts of wind-borne debris were also considered when determining wind sensitivity.

4.2.5 Vulnerability Assessment

A vulnerability score was calculated for each asset using the follow equation:

Vulnerability = Exposure + Sensitivity

The highest hazard vulnerability score for each of the five hazards is two, yielding a maximum total vulnerability score of 10. This yields a score that reflects the risk to the mission of the installation. A detailed discussion of the methodology for evaluating risk can be found in *Vulnerability and Risk Assessment Introduction and Methodology* document (Appendix B). The following subsections detail asset vulnerability to flood, wildfire, heat, wind, and lightning as well as total vulnerability.

Maps showing the locations of high-risk assets can be found in Appendix C.

Flood Vulnerability

The highest possible flood vulnerability score of an asset is 2, whereas the average score is 0.1 and the highest actual score is 1.1. The vast majority of assets are not vulnerable to flooding and the most vulnerable assets are only moderately vulnerable to flooding. Table 4-22 shows the assets with the highest flood vulnerability score (score equal or greater than 1).

Table 4-22. Highest Flood-Vulnerability Assets (Score ≥1)

	Asset Unique ID	Asset Name	Owner/Operator	Mission Criticality	Vulnerability Score
1	3403	Milton Sewer Line	City of Milton	Supportive	1.2
2	6392	Railroad	CSX Transportation	Supportive	1.1
3	8522	Street	City of Milton	Supportive	1.1
4	8798	Street	City of Milton	Supportive	1.1
5	3866	Milton Sewer Line	City of Milton	Supportive	1.1
6	6393	Railroad	CSX Transportation	Supportive	1.1
7	6386	Railroad	CSX Transportation	Supportive	1.1
8	3619	Milton Sewer Line	City of Milton	Supportive	1
9	3315	Milton Sewer Line	City of Milton	Supportive	1
10	9671	Street	City of Milton	Supportive	1
11	3	Bridge	City of Milton	Supportive	1
12	6	Bridge	City of Milton	Supportive	1
13	6390	Railroad	CSX Transportation	Supportive	1
14	3399	Milton Sewer Line	City of Milton	Supportive	1
15	6388	Railroad	City of Milton	Supportive	1
16	6389	Railroad	City of Milton	Supportive	1
17	6235	OLF Route	FDOT	Primary	1

Flood vulnerability is experienced mostly by coastal mission-supportive assets in the City of Milton along the Blackwater River. Coastal sewer lines, roadways, and railroads, along with the route to OLF Santa Rosa at Highway 90 at and near the Blackwater River crossing, are the assets with the highest vulnerability to flooding. Flood vulnerabilities are exacerbated by aging wastewater infrastructure in the City of Milton, which is vulnerable to rising sea levels.

Wildfire Vulnerability

The assets most vulnerable to wildfire are roadways, railroads, bridges, power transmission lines, and water wells. Direct exposure to fire, combined with the inability to use the asset during wildfire along with damage to the assets stemming from the event, causes the highest vulnerability.

Heat Vulnerability

The railroads in Santa Rosa display the greatest vulnerability to extreme heat events in the future. Railroad tracks begin to show sensitivity to heat starting at 95°F. In Santa Rosa County the single annual maximum temperature and maximum temperature over the course of 5 days (heat waves) are projected to exceed that temperature (U.S. Federal Government n.d.).

Extreme Wind Vulnerability

Approximately 13% of critical assets exhibit high to moderate vulnerability to extreme winds, including power transmission lines and cell towers.

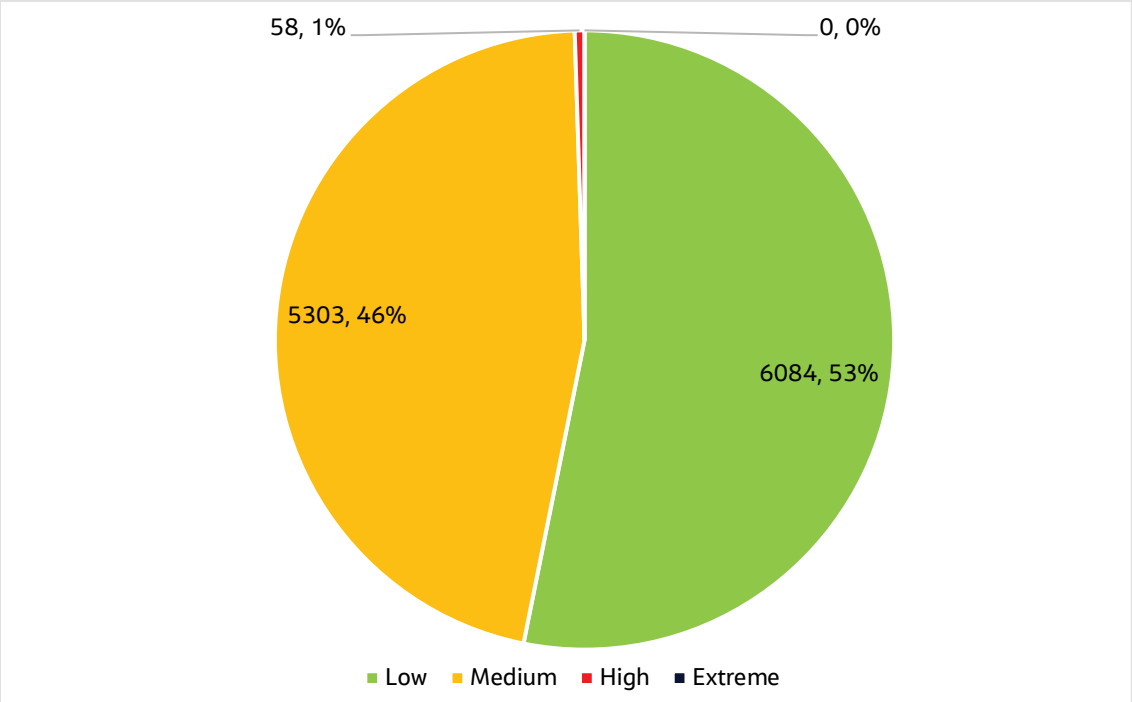
Lightning Vulnerability

Elevated assets are most vulnerable to lightning whereas underground or at-grade assets are not as vulnerable to lightning. Approximately 13% of assets are highly vulnerable to lightning while 87% of assets display moderate and low vulnerability. Assets most vulnerable to lightning are electric production and supply facilities (power transmission lines and substations) and communications infrastructure (cell towers).

Overall Vulnerability

The highest possible vulnerability score was a 10, where a score less than 3 indicates low vulnerability, a score between 3 and 6 indicates medium vulnerability, a score between 6 and 9 represents high vulnerability, and a score between 9 and 10 indicates extreme vulnerability. Figure 4-22 shows the distribution of vulnerability scores for assets in the study area.

Figure 4-22. Asset Vulnerability Distribution



The vast majority of assets have low or medium vulnerability. Of the 11,442 assets analyzed, the average vulnerability score was 2.7, which indicates low overall vulnerability among assets in the project study area. Table 4-23 shows all assets with a vulnerability score greater than 7.0. All 61 assets with total vulnerability scores greater than 6 (0.53% of total) were carried forward into the risk analysis.

Table 4-23. Highest Total Vulnerability Assets

	Asset Unique ID	Asset Type	Asset Name	Owner/ Operator	Mission-Criticality	Vulnerability Score
1	6376	Electrical Production and Supply Facilities	Power Transmission Line	FPL	Primary	7.8
2	56	Electrical Production and Supply Facilities	Power Transmission Line	FPL	Primary	7.5
3	6383	Electrical Production and Supply Facilities	Power Transmission Line	FPL	Primary	7.5
4	57	Electrical Production and Supply Facilities	Power Transmission Line	FPL	Primary	7.5
5	6374	Electrical Production and Supply Facilities	Power Transmission Line	FPL	Primary	7.5
6	6379	Electrical Production and Supply Facilities	Power Transmission Line	FPL	Primary	7.5
7	6378	Electrical Production and Supply Facilities	Power Transmission Line	FPL	Primary	7.4
8	58	Electrical Production and Supply Facilities	Power Transmission Line	FPL	Primary	7.4
9	6375	Electrical Production and Supply Facilities	Power Transmission Line	FPL	Primary	7.4
10	1	Communications Facilities	AM Tower	Spinnaker	Supportive	7.4
11	52	Electrical Production and Supply Facilities	Power Transmission Line	FPL	Primary	7.4
12	6377	Electrical Production and Supply Facilities	Power Transmission Line	FPL	Primary	7.4
13	11442	Wastewater Treatment Facilities and Lift Stations	Milton WRF	City of Milton	Primary	7.2
14	6392	Railroads	Railroad	CSX Transportation	Supportive	7.1
15	3	Bridges	Henry Street – Middle Bridge	City of Milton	Supportive	7.1
16	6393	Railroads	Railroad	CSX Transportation	Supportive	7.1

High vulnerability assets included bridges, select roadways, railroads, electric production and supply facilities (power transmission lines and substations), communications towers, and select wastewater treatment facilities and lifts stations.

Energy Sector Vulnerabilities

Methodology

To determine the energy infrastructure vulnerability for each installation within the Emerald Coast Region, the following vulnerability indicators and metrics were considered: 1) exposure to major natural threats to energy infrastructure, 2) energy burden within the Census tract of the installations, 3) known vulnerabilities, 4) hardening efforts for the energy infrastructure within and around the base, 5) presence of microgrids for redundancy, and 6) proximity of infrastructure to fast power recovery priority facilities, such as hospitals and emergency medical service stations. It is important to note that debris management and regular maintenance for the energy infrastructure are considered as important factors that can substantially impact the stability and function of the energy systems.

These metrics were evaluated in asset and military installation scales, with each being awarded a final vulnerability score to rank their energy-related condition. The intention with this ranking system is to inform a resilience strategy that prioritizes assets ranked poorly for improvement. Results of the energy sector vulnerability assessment are provided in the next subsection.

Results

The energy infrastructure directly connected to the base consists of two substations and one main overhead power transmission line spanning approximately 5.1 miles (Figure 4-23). This system faces significant vulnerabilities, particularly from natural threats like wildfires and lightning.

The base operates within Santa Rosa County's Census Tract #104 that has a 3% energy burden (i.e., the ratio of average annual housing energy costs to the average annual household income) (US DOE LEAD Tool 2019), which is a relatively low percentage within the State of Florida where 6% is considered "high" (The Balmoral Group 2022).

Lack of power redundancy and insufficient substation capacity are noted as a known vulnerability to NAS Whiting Field. It is also known that there is no automatic transfer switch (ATS) on the base's eastern electric substation, requiring a manual interference by base personnel to respond to an outage or physical threat.

Strategic proximity of base's energy infrastructure to fast power recovery priority assets, such as hospitals or fire stations is assessed. No such assets detected within a 0.5-mile distance from the NAS Whiting Field's substations (excluding the on-site fire station #24). This metric is reviewed as a potential mitigation measure where a strategic proximity to these assets could enable base's power to be recovered faster along with the community's fast power recovery priority assets that are on the same power line.

Skyline Volunteer Fire and Rescue Department (SVFRD) Substation 2 is on the same power line as the base. The two other fire stations within 3 -to 5-mile distance to the base (SVFRD Stations 1 and 4) are on a power different line, providing redundant response during power outages as emergency services may remain operational under wildfires or lightning occurrences.

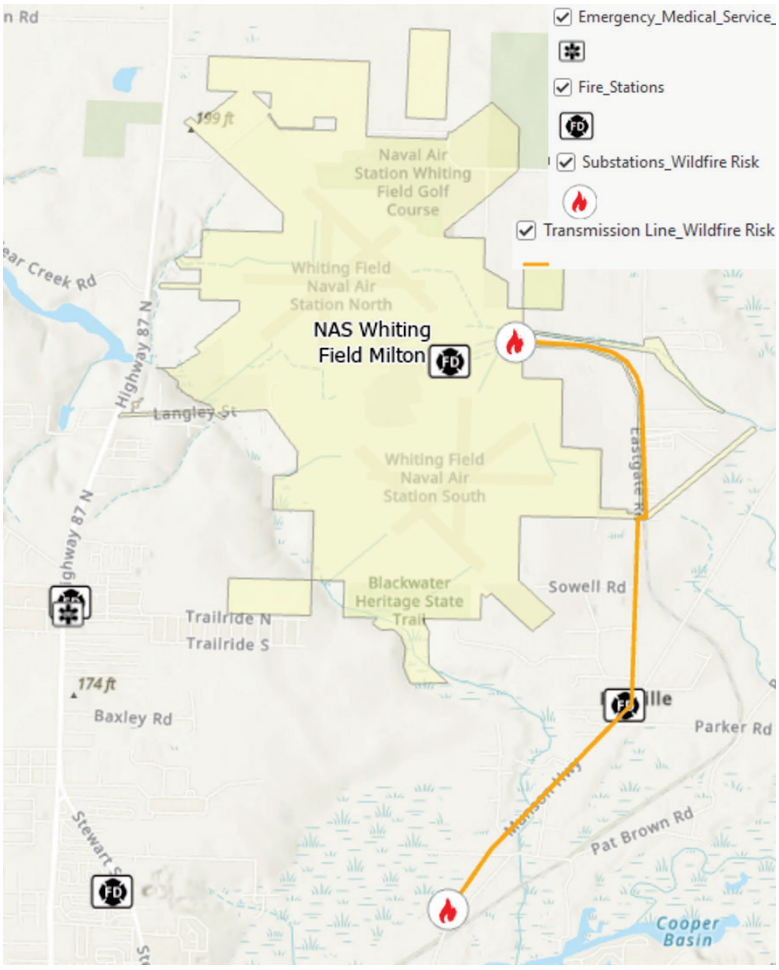
Additionally, there are concerns related to the environment surrounding the energy infrastructure. The proximity of the tree canopy to overhead power transmission and distribution lines poses a risk, potentially leading to disruptions during adverse weather conditions and wildfires. It appears that there is potentially insufficient fire line width and a lack of existing scrape or trench for added safeguarding and fire response.

The results of the installation-scale scoring for NAS Whiting Field are shown in Table 4-24.

Table 4-24. Installation Energy Vulnerability Score

Installation	Exposure and Sensitivity to Natural Hazards (0-3 pts)	Are transmission lines in wildfire risk? (Yes=1.5,No=0)	Normalized Energy Burden	Other Known Vulnerabilities	Hardening Efforts (Yes=-1.5,No=0)	Strategic Proximity	Microgrid Presence (Yes=-1.5,No=0)	Final Energy Vulnerability Score
NAS Whiting Field	3.0	1.5	1.5	1.0	0	0	0	7.0

Figure 4-23. NAS Whiting Field Energy Infrastructure Vulnerabilities



NAS Whiting Field is found to have the highest energy vulnerability score within the Emerald Coast Region, mostly due to lack of infrastructure hardening and power redundancy. A potential microgrid implementation and hardening efforts could greatly mitigate the energy reliability and vulnerability issues the base is facing.

Other Identified Vulnerabilities

In addition to the vulnerabilities identified in the quantitative analysis, other vulnerabilities were discussed during the stakeholder workshops and interviews. The following vulnerabilities, while lacking a vulnerability score, also pose a threat to NAS Whiting Field's mission:

- **Lack of highway capacity.** Population growth in Santa Rosa County has placed additional stress on the four critical transportation corridors that support NAS Whiting Field: Highway 90, Highway 98, I-10, and SR 4. Roadway capacity concerns increase both the time required for personnel to access the installation and evacuation times in the event of an emergency.
- **Drainage challenges on base and at OLFs.** While it is outside of the scope of the MIRR to review inside-the-fence-line vulnerabilities, it is important to mention that there are drainage issues both within the installation itself as well as at OLF Spencer because of aging drainage systems.
- **Communications challenges.** There are communications issues stemming from poor bandwidth and cell service within NAS Whiting Field itself and from the installation to the OLFs. These align with lack of access to broadband in rural areas of the County.
- **Lack of redundant water systems.** NAS Whiting Field has its own onsite potable water system. However, there are no connections to other water systems. In the event of an outage onsite, the installation does not have a backup water source and would be without a steady supply of potable water.

4.2.6 Risk Assessment

Assets with a vulnerability score greater than 6.0 were selected for the risk analysis. The risk associated with the selected high vulnerability was subsequently evaluated using the following equation:

$$Risk = Impact\ to\ Mission + \Sigma\ (Hazard\ Likelihood \times Hazard\ Consequence)$$

where likelihood is the annual probability of occurrence and consequence is the combination of the impact of asset failure on mission assurance and the degree of impact on the asset itself. This yields a score that reflects the risk to the mission that the potential asset failure poses. The highest possible risk score for an asset is 200, and the breakdown of risk scores and rankings is shown in Table 4-25.

Table 4-25. Total Risk Scores and Rankings

Risk Score	Ranking
180–200	Extreme
120–180	High
60–120	Medium
0–60	Low

A detailed discussion of the methodology for evaluating risk can be found in the *Emerald Coast Vulnerability and Risk Assessment Introduction and Methodology* document (Appendix B).

Maps showing the locations of high-risk assets can be found in Appendix C.

High Flood Risk Assets

Flood risk scores from 0 to 60. A score less than 20 indicates low flood risk, between 20 and 40 indicates medium flood risk, and from 40 to 60 indicates high flood risk. There were three assets with high flood risk, as shown in Table 4-26.

Table 4-26. Highest Flood-Risk Assets

	Asset Unique ID	Asset Type	Asset Name	Owner/Operator	Mission Criticality	Flood Risk Score	Risk Rank
1	10975	Roadways	Ward Basin Road (north of I-10)	Santa Rosa County	Supportive	43.8	High
2	3	Roadways	Henry Street	City of Milton	Supportive	41.2	High
3	8798	Bridges	Henry Street – Middle Bridge	City of Milton	Supportive	41.1	High

Within the Whiting Field study area, Ward Basin Road (a section north of I-10), Henry Street, and Henry Street – Middle Bridge all exhibit high risks of flooding. Of these three assets, Henry Street and Ward Basin Road are roadways that, if impacted, have minimal impact on the mission of the installation. Ward Basin Road may have greater significance because of its role as a connector to I-10.

Highest Total Risk Assets

The average risk score for the 165 high-vulnerability assets with a greater than 6 vulnerability score was 83, indicating overall medium-low risk. Of the assets, 2 had extreme risk, 15 were high risk, 103 were medium risk, and 45 were low risk. Table 4-27 lists the asset names, mission criticality, owner, location, and total risk values for the 17 facilities with extreme and high risk.

Table 4-27. Highest Risk Assets

	Asset Unique ID	Asset Type	Asset Name	Owner/ Operator	Mission Criticality	Risk Score	Risk Rank
1	17	Bridges	Highway 90 Bridge	FDOT	Primary	182	Extreme
2	56	Electrical Production and Supply Facilities	Power Transmission Line	FPL	Primary	169	High
3	27	Bridges	Highway 90 Bridge	FDOT	Primary	160	High
4	6236	Major Roadways	SR-87	FDOT	Primary	160	High
5	6375	Electrical Production and Supply Facilities	Power Transmission Line	FPL	Primary	159	High
6	6235	Major Roadways	SR-87	FDOT	Primary	158	High
8	9813	Major Roadways	Highway 90	Santa Rosa County	Primary	145	High
9	11442	Wastewater Treatment Facilities and Lift Stations	Milton WRF	City of Milton	Primary	142	High
10	21	Bridges	CR-191 Bridge	Santa Rosa County	Supportive	138	High
11	3	Bridges	Henry St. Bridge	Santa Rosa County	Supportive	120	High

Table 4-27. Highest Risk Assets

	Asset Unique ID	Asset Type	Asset Name	Owner/ Operator	Mission Criticality	Risk Score	Risk Rank
12	15	Bridges	SR-87 Bridge	FDOT	Primary	120	Medium
13	29	Bridges	Highway 90 Bridge	FDOT	Primary	120	Medium
14	30	Bridges	SR-87 Bridge	FDOT	Primary	120	Medium
15	51	Electrical Production and Supply Facilities	Power Transmission Line	FPL	Primary	120	Medium
16	54	Electrical Production and Supply Facilities	Power Transmission Line	FPL	Primary	120	Medium
17	6373	Electrical Production and Supply Facilities	Power Transmission Line	FPL	Primary	120	Medium

The risk for the assets listed in Table 4-27 is discussed as follows:

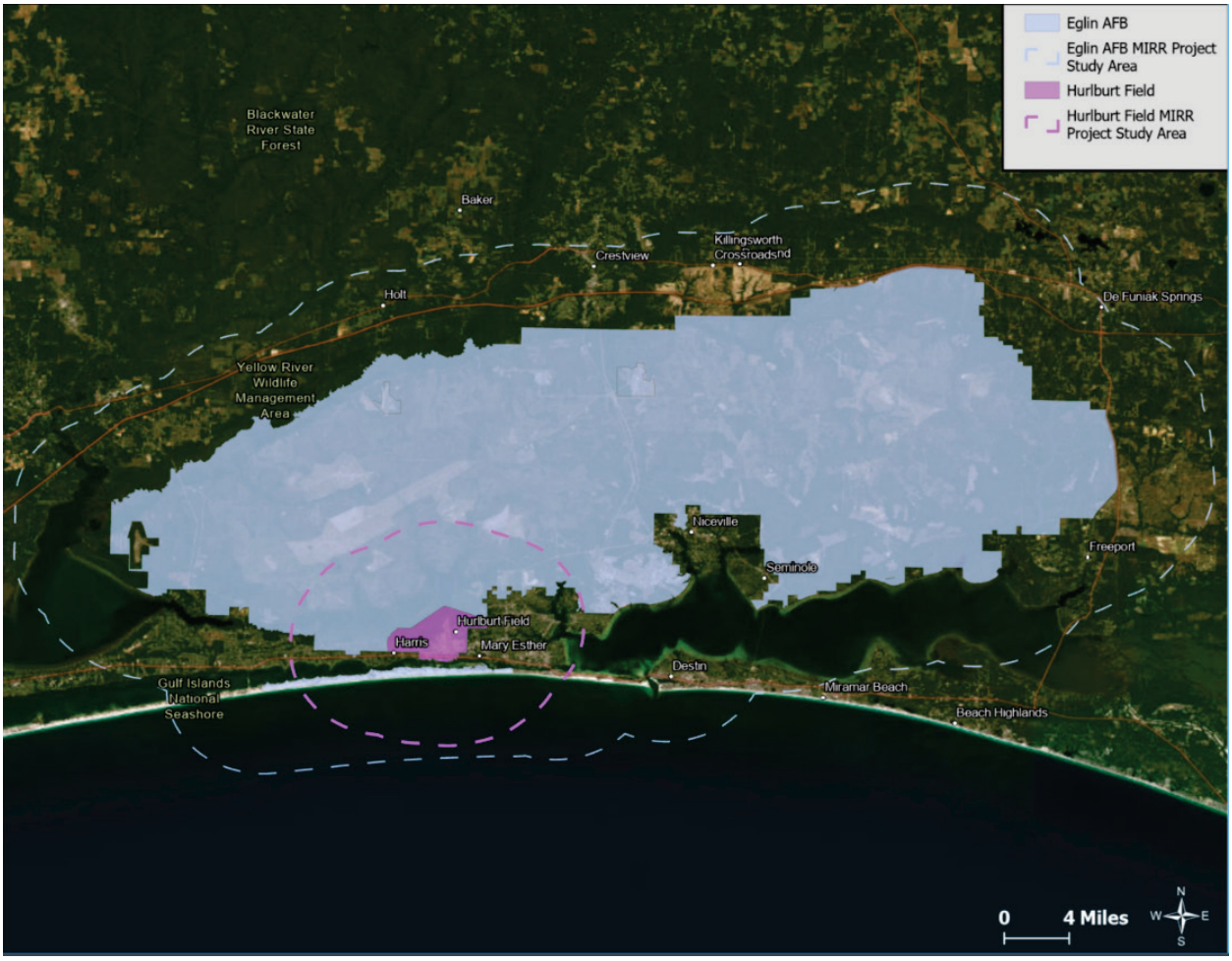
- **Highway 90 over the Blackwater River.** Highway 90 over Blackwater Bridge is vulnerable to flooding. The bridge has previously experienced flooding issues from rain events, where the rainfall exceeds the design capacity of the bridge's drainage systems.
- **Route to east Alabama OLFs.** This route, Highway 87, has a high risk to mission because of the importance of installation personnel being able to travel along it without delay. Highway 87 provides access to the OLFs to the north in Alabama. Flood impacts stemming from either the 100-year flood event or storm surge can inhibit travel, resulting in a significant risk to mission.
- **Route to OLF Santa Rosa.** As mentioned above, Highway 87 has a high risk to the mission because of the crossing of the Blackwater River and provides access to OLF Santa Rosa.
- **Power transmission lines.** Power transmission lines pose some of the greatest risk to the installation's mission due to the criticality, totaling 80% of the highest-risk mission assets. Vulnerability to multiple hazards including heat, high winds, and wildfire compound the risk to these assets.
- **Mission-supportive roads, highways, and bridges.** Two mission-supportive streets and bridges are high risk due to associated flood impacts. Additional risk stems from high vulnerability to wildfires.

Collectively FPL, FDOT, the City of Milton and Santa Rosa County own all the extreme and high-risk assets. Appendix C provides the locations of these high-risk assets.

4.3 Eglin AFB and Hurlburt Field

This MIRR Vulnerability Assessment and Risk Analysis identifies vulnerabilities and risks to assets and facilities that support Eglin AFB and Hurlburt Field. The study area includes both the region surrounding the installations as well as the critical roadways used to access the base as shown on Figure 4-24. Critical assets within the study area have been evaluated both quantitatively and qualitatively to determine the risks to the assets and the accompanying impact on the mission. The results of the VA and risk analysis will be used to inform the development of resilience strategies and projects, with the goal of improving the resilience of the infrastructure outside the fence line that supports the installation.

Figure 4-24. Eglin AFB and Hurlburt Field



4.3.1 Hazards

Hazard data and anecdotes of existing asset vulnerabilities were collected during the in-person workshops and the MIRR committee meetings, where data collection results were presented. Lists of stakeholder-identified hazards, vulnerabilities, and mission-critical assets were generated from these discussions. These lists were used to identify areas of concern for further analysis, to confirm findings from the VA, and to populate the list of priority assets at risk. The following subsections summarize the known hazards.

Natural Hazards

Natural hazards evaluated in this VA include flooding from a 100-year flood event, SLR, and storm surge; wildfire; heat; extreme wind; and lightning.

Flooding

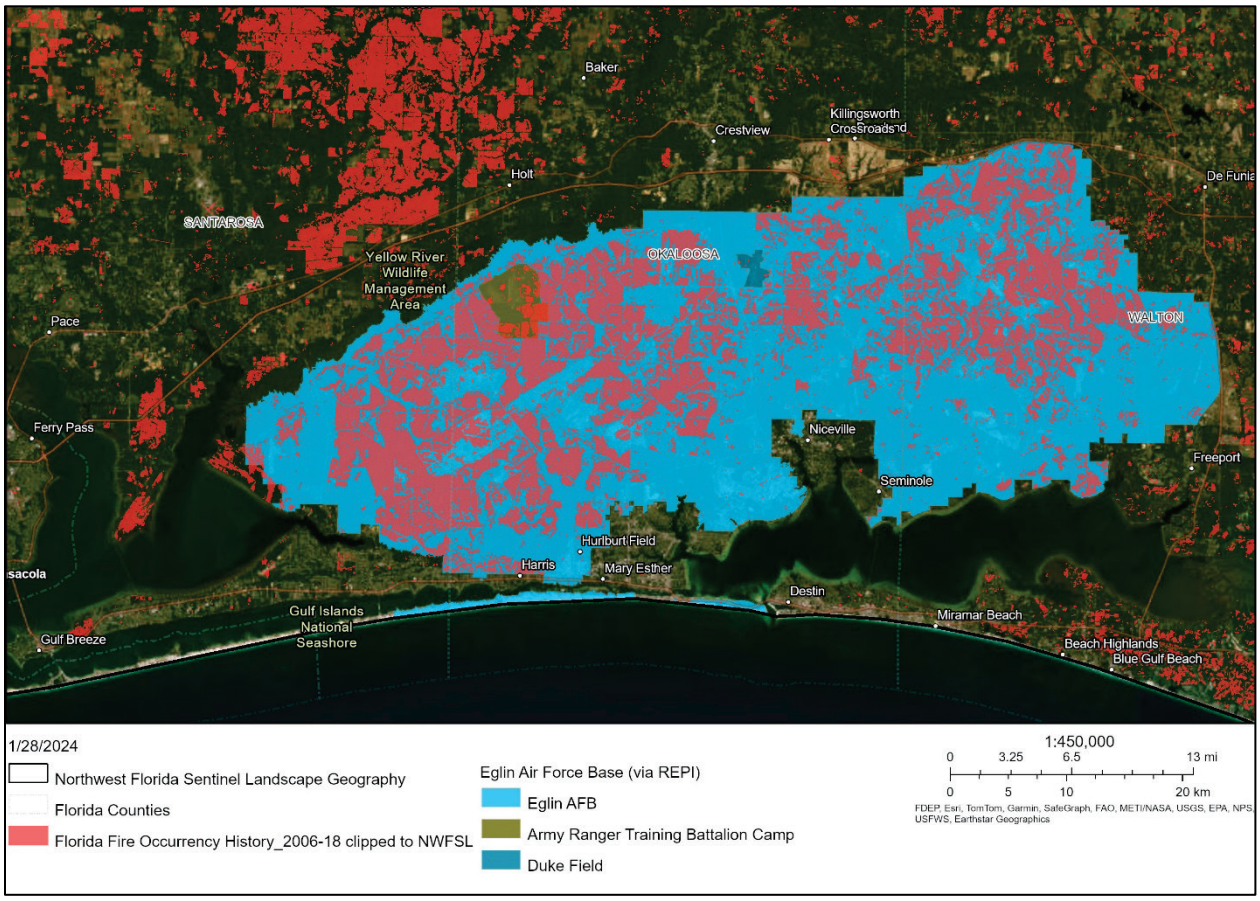
The three flood hazards evaluated in this assessment include the 100-year flood zone, SLR, and storm surge for hurricanes from Category 1 to 5. Flooding poses a risk to critical installation operations: flooding can make its way onto runways, inhibiting training and impacting the installation mission. Aging drainage systems on and around the installation exacerbate pluvial flooding, which is caused when increased rainfall creates a flood independent of an existing body of water. These floods occur in any location, even without nearby water bodies in the case of extreme rainfall events.

Wildfire

Much of Santa Rosa County, Okaloosa County, and Walton County are located in the WUI, which is the transition area between developed land and unoccupied, undeveloped lands. Development in the WUI is typically more vulnerable to fire because of large amounts of vegetation. The area around Eglin AFB and Hurlburt Field is heavily wooded – the region contains the Blackwater River State Forest, the Yellow River State WMA, and the Lafayette Creek WMA. This presents a large swath of area where there is an opportunity for wildfire to occur and damage assets that support the installation. Figure 4-25 shows past fire occurrence areas in the study region. In addition to the fire itself, smoke can inhibit visibility and pilot sight lines.

Figure 4-25. Wildfire Occurrence Areas, 2006-2018

Source: Northwest Florida Sentinel Landscapes n.d.



Forest management on Eglin AFB is led by the Natural Resources Branch (also known as the Jackson Guard), which manages approximately 250,000 acres of installation property. Prescribed burns are commonly executed on State lands by the Florida Forest Service as a means of fuels management. It was noted during the stakeholder workshops that smoke from prescribed burns poses minimal risk to installation operations due to decreased smoke volume compared to that of a wildfire.

Extreme Heat

According to the U.S. Climate Explorer, Santa Rosa, Okaloosa, and Walton Counties are expected to increase in maximum daily temperatures through 2090 (U.S. Federal Government n.d.). Heat projections are available under multiple RCPs, which are climate change projections that depend on greenhouse gas emissions scenarios. Figure 4-26 shows the projected number of days where the temperature is expected to be above 100 degrees Fahrenheit (°F) in each county under the RCP 8.5. Increased temperatures can cause electrical equipment to overheat and roadways to buckle, negatively impacting the critical power transmission lines and mission-critical roadways that support the installation.

Extreme Wind

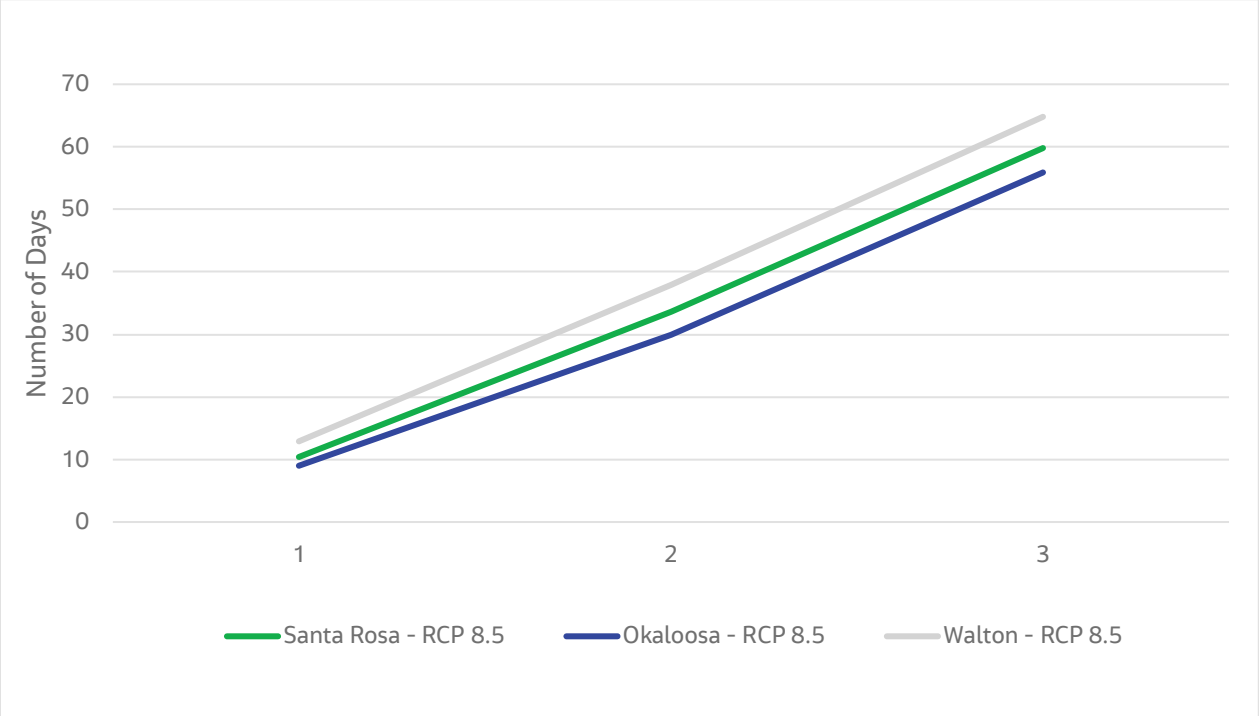
Extreme wind events can negatively impact critical power transmission lines and cell towers, disrupting power service and communications in the region.

Lightning

According to the FEMA National Risk Index, the County experiences approximately 150 cloud-to-ground lightning strikes annually (FEMA 2023). In addition to lighting's potential to damage critical infrastructure, lightning strikes can also ignite dry fuels and cause wildfires.

Figure 4-26. Days with Temperatures Greater than 100°F Under RCPs 4.5 and 8.5

Source: U.S. Federal Government n.d.



Infrastructure Shocks and Stresses

The communities surrounding Eglin AFB and Hurlburt Field are facing infrastructure issues related to aging infrastructure, single points of failure, water/wastewater capacity concerns, transportation capacity issues, and energy disruption.

Aging Infrastructure

There are two bridges located in the surrounding communities that are aging and have the potential to cause issues. The following bridges are considered structurally deficient or in poor condition, according to structural assessments in the National Bridge Inventory (FHWA n.d.):

- US-98 from Fort Walton Beach to Santa Rosa Island, also known as the Brooks Bridge. However, the Brooks Bridge Replacement project is actively in construction and will be completed in fall 2027 (FDOT).
- SR-85 at Shoal River Bridge.

Many county roads require replacements and widening to meet population growth demands. Aging, municipal-based utility infrastructure also require upgrades or replacement, specifically water and wastewater infrastructure.

Single Points of Failure

Sudden failures or disruptions to certain infrastructure may cause major impacts to the community. For example, Navarre Beach has multiple single points of failure. There is a single power service to Navarre Beach; if this power source goes offline, there will be no service feeding this area. The Navarre Beach Causeway is a single access point to Navarre Beach and any negative impacts to this bridge could potentially disconnect this area from the rest of the community. Evacuation from Navarre Beach would not be possible if the causeway bridge were inaccessible. Similarly, if flooding made the SR-85 Shoal River Bridge inaccessible, south Okaloosa County would be disconnected from the I-10 evacuation route.

Water and Wastewater Capacity Issues

The rapid population growth in Santa Rosa County, Okaloosa County, and Walton County has stressed local water, wastewater, and transportation systems. These counties have seen a 24.2%, 17.1%, and 36.8% increase in population, respectively, between the 2010 and 2020 Census (USCB 2022). Capacity limits at many wastewater systems in the communities surrounding Eglin AFB and Hurlburt Field was a common concern during stakeholder engagement workshops. In particular, the City of Milton Wastewater Treatment Plant (WWTP) is known to be at capacity and funding for construction of a new WWTP is currently underway.

Transportation Capacity Issues

Transportation infrastructure is experiencing stress because of population increase in the region resulting in increased congestion on highways used to access the installations. There has been more recent interest in widening Highways 85 and 285 from 2 to 4 lanes and from 4 to 6 lanes, respectively. There are no current nor future plans for constructing new bypass roadways to improve traffic flow because of Eglin AFB's need to retain land necessary for missions and testing.

Traffic congestion around the north end of Eglin AFB on I-10 is relatively low, as shown on Figure 4-27. Through the installation, SR-85 is already exceeding capacity at more than 110% of its max volume while SR-285 is approaching 75% of its maximum capacity. SR-20, which connects the City of Freeport to the City of Niceville, is also approaching 75% capacity, except within the City of Niceville where it is at capacity. Much of the congestion in the region occurs south of the installation in the City of Niceville, the City of Shalimar, and the City of Fort Walton Beach.

Many of the roadways around Hurlburt Field are approaching traffic capacity. US-98 is exceeding or approaching capacity, depending on the location (Figure 4-28). SR-189 is above its maximum traffic volume.

Figure 2-27. 2020 Traffic Congestion around Eglin AFB

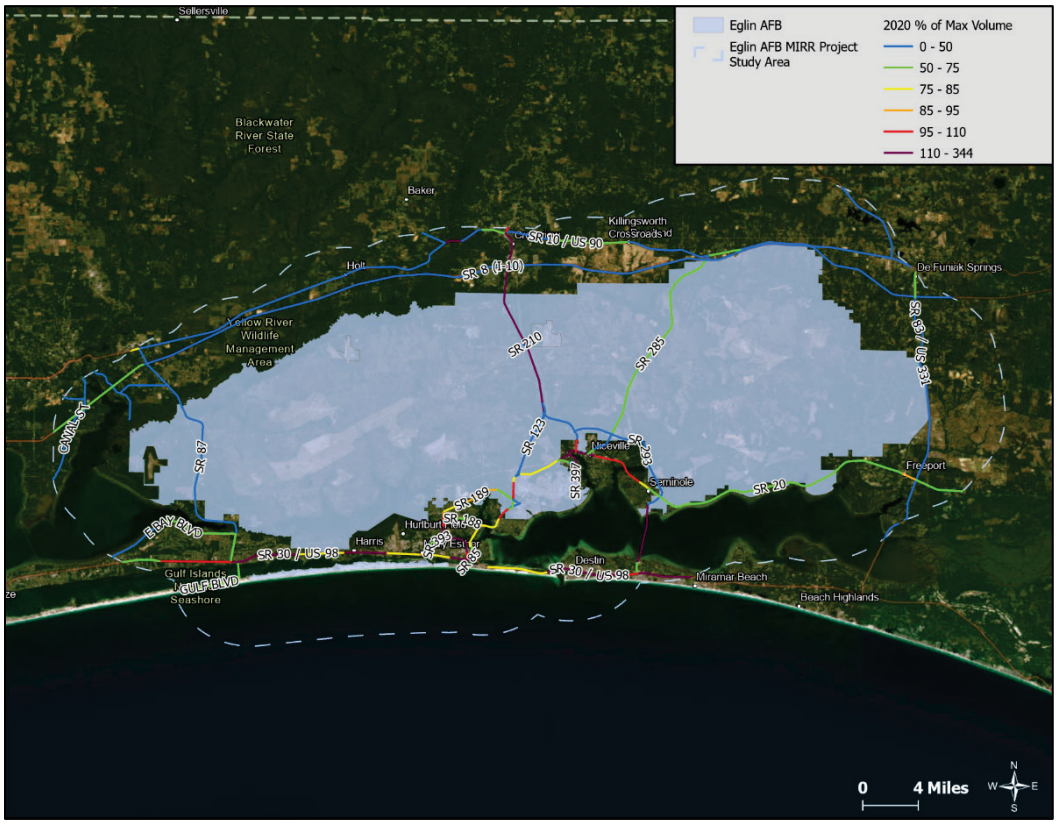


Figure 4-28. 2020 Traffic Congestion around Hurlburt Field

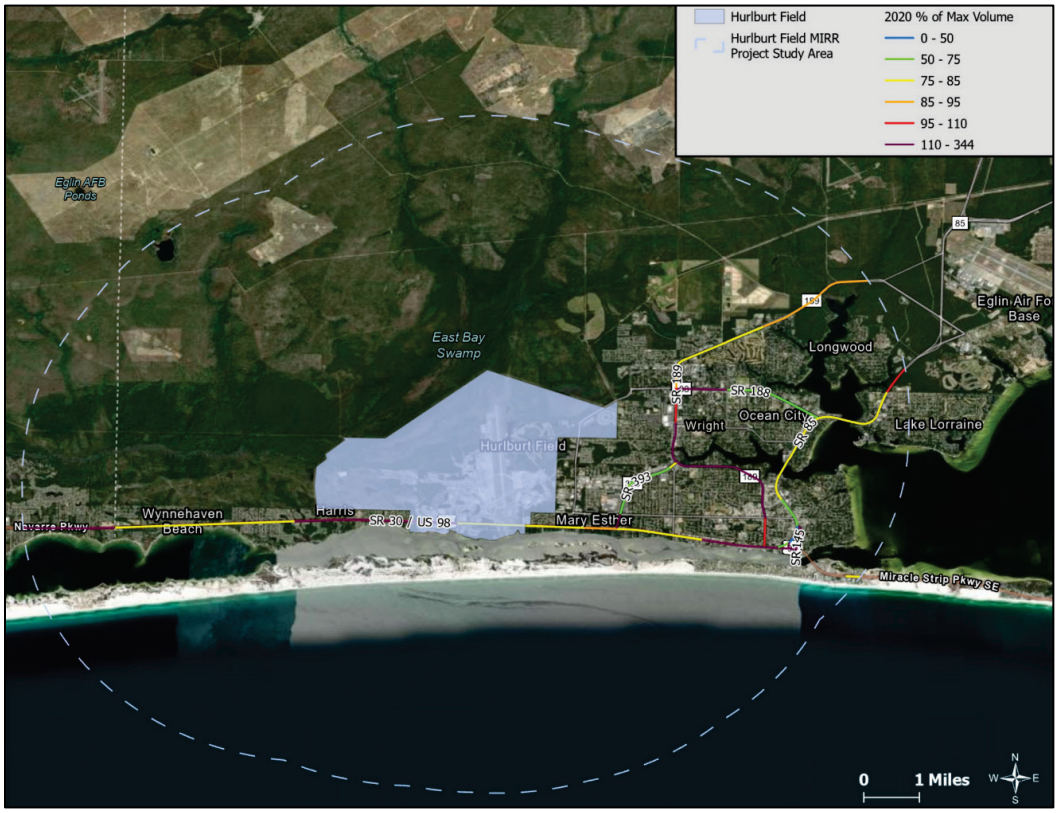


Figure 4-29 shows projected traffic volumes around Eglin AFB in 2045. The roadways north of the installation that travel east–west are projected to have increases in traffic volumes up to 75% of maximum capacity. SR-85 and SR-285 will both be at or above capacity. SR-20 and US-98 are also both projected to be at more than 110% of their maximum traffic volume.

Figure 4-29. 2045 Traffic Congestion around Eglin AFB

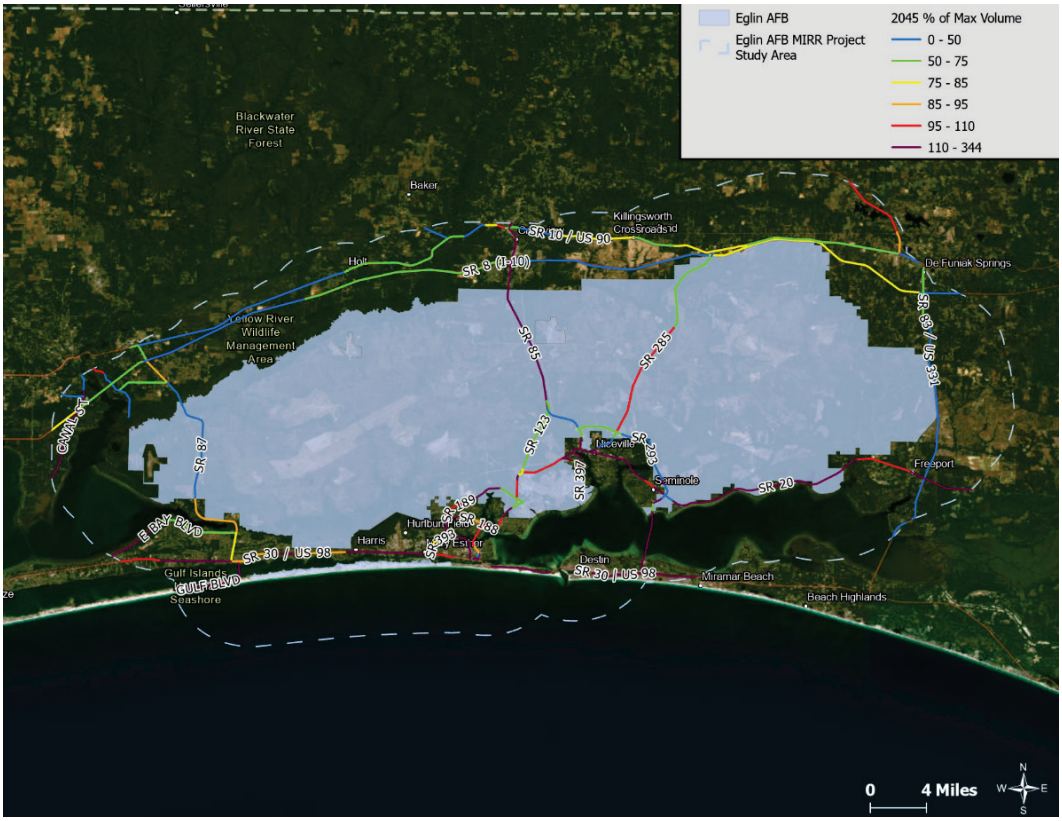


Figure 4-30 shows projected traffic volumes around Hurlburt Field in 2045. In 2045, almost all of the major roadways around Hurlburt Field will be at more than 95% of their maximum traffic volume. These projected volumes will impact the ability of personnel to access the installation. US-98, in particular, will experience significant congestion problems.

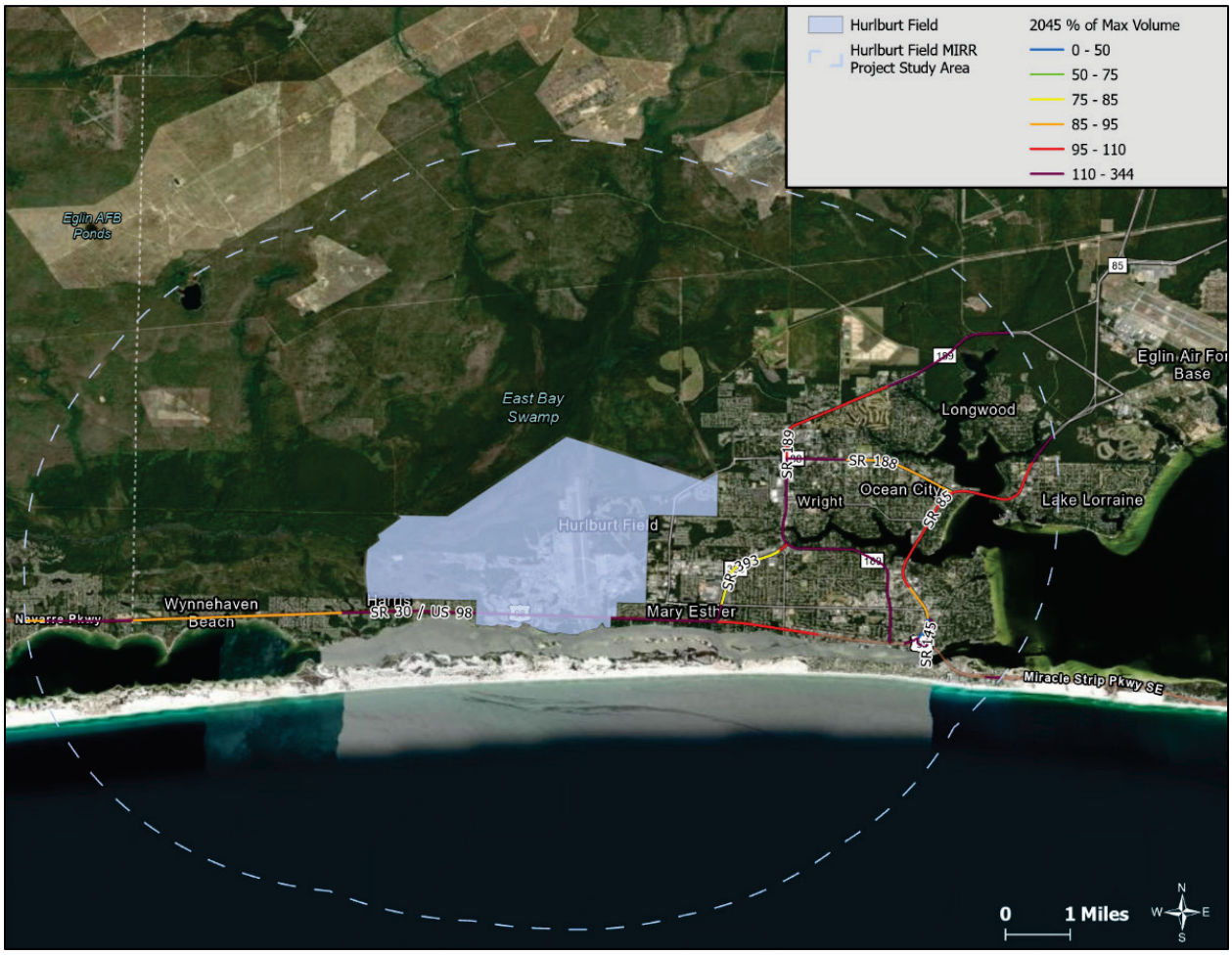
Energy Disruption

Energy disruption is inherently detrimental as it can lead to widespread economic setbacks, compromise public safety, and impede critical services, underscoring the urgency to assess vulnerabilities and implement safeguards to minimize the adverse impact on both local communities and military installations. Hazards that impact the stability and function of energy infrastructure and cause energy disruption to Eglin AFB and Hurlburt Field include:

- **Hurricanes**: strong sustained wind and fallen trees can cause permanent damage to structures or equipment.
- **Wildfires**: uncontained wildfires can damage or destroy transmission lines, substations, and other critical components, leading to widespread power outages and disruptions.

Proximity of nearby tree canopy to electric substations, transformers, and power transmission and distribution lines is also a critical consideration for fire occurrences. Fire departments require 20 to 30 feet of fire line width with a 3- to 4-foot scrape to respond to fires. Some of the substations that serve the base does not meet this standard.

Figure 4-30. 2045 Traffic Congestion around Hurlburt Field



Economic Threats

Lack of Economic Diversity

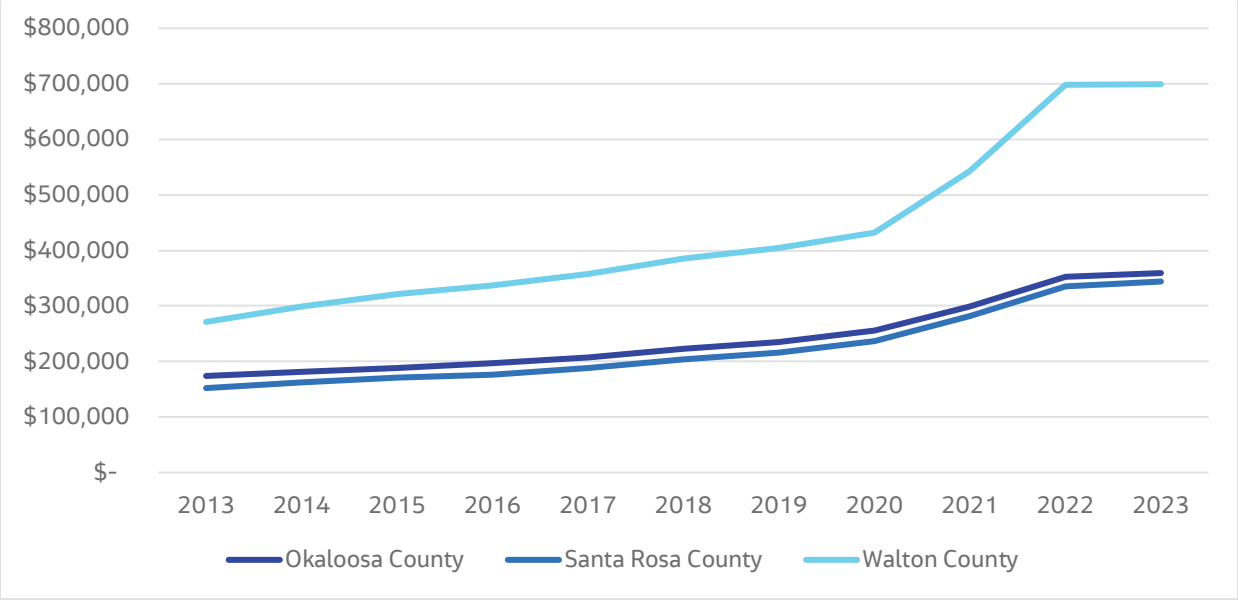
There is a lack of economic diversity in the region because the economy is dependent mainly on the military and tourism sectors. The tourist economy varies year-to-year and can be destabilized by disasters, such as oil spills and hurricanes, and national economic downturns. As discussed at the stakeholder workshops, as population grows with economic expansion there will be additional stress on existing community infrastructure specifically the insufficient housing availability and strains on transportation capacity.

Housing Affordability

At the stakeholder workshops, stakeholders expressed a need to prioritize affordable housing in the region. According to Zillow, housing prices and rents have increased significantly in all three counties: home prices have doubled since 2013, increasing by 135% from a tri-county average of $199,000 to $467,000 (Zillow n.d.). Figure 4-31 shows the home prices in the three counties (Santa Rosa, Okaloosa, and Walton). A sharp increase in housing prices occurred starting in 2020, presumably resulting from influx of new residents to Florida after the COVID-19 post-pandemic economic boom. Similarly, the tri-county area average rental unit rent has increased from $1,087 per month in 2015 to $1,996 per month in 2023 (an 84% increase). Another factor that contributed to the rental unit rent increase is when the DoD increased housing allowances to military personnel. It was noted during the workshops that the base housing allowing increase is accompanied by a corresponding rent increase.

Figure 4-31. Housing Prices in Santa Rosa, Okaloosa, and Walton Counties

Source: Zillow n.d.



Low inventory of affordable housing and rental units in the tri-county area puts additional financial pressure on military personnel and residents, adding to the challenge of military personnel retainment and recruitment efforts.

Social Threats

Lack of Childcare

The lack of childcare staff and facilities poses a challenge to installation personnel, many of whom have young families in the region. Although Hurlburt Field and Eglin AFB both have their own on-base childcare facilities additional childcare efforts are needed at the regional level.

Environmental Threats

The communities surrounding Eglin AFB and Hurlburt Field are facing environmental threats related to water quality and water supply, shoreline erosion, and presence of endangered species.

Water Quality

Surface water quality degradation continues to be a regional problem due to the sedimentation, nutrient runoff, and introduction of microorganisms to local waterways. The source of increased sedimentation to waterways is attributed to the increase in urbanization and more impervious surfaces. Aging septic systems across the region leach excess nutrients and harmful microorganisms to surface waters and groundwater aquifers.

While there are long-term concerns about potential saltwater intrusion into groundwater aquifers in Santa Rosa, Okaloosa, and Walton Counties, current simulations by the NWFWMD indicate that intrusion rates are low. Most wells are not projected to exceed water quality standards within the 2025–2045 planning period (NWFWMD 2023). That said, it is important to take proactive measures to prevent salt water intrusion, as once groundwater is contaminated, salt removal through methods such as desalinization is energy-intensive and expensive.

Shoreline Erosion

Santa Rosa Island and Okaloosa Island are barrier islands south of Eglin AFB and Hurlburt Field and provide installation shoreline protection by serving as a buffer from the Gulf of Mexico's wave impacts. Shoreline erosion to these critical buffer islands has occurred previously during storm events and continues to occur. Shoreline erosion

reduces the available usable land because of land loss through erosion or being submerged. Other areas where erosion risks exist throughout the study region are on bay-adjacent shorelines such as the Choctawhatchee Bay. Due to the importance of shorelines, erosion was assessed herein using the Joint Airborne Lidar Bathymetry Technical Center of Expertise (JALBTCX) Coastal Engineering Resilience Index (CERI). The Shoreline Erosion subsection on p. 4-82 provides results of the erosion assessment.

Endangered Species

There are a number of endangered species that inhabit areas within the installations, surrounding communities, and coastal bodies of water. The most prominent endangered species on land include the reticulated flatwood salamander, gopher tortoise, and red cockaded woodpecker. The Rice's Whales are critically endangered with approximately 51 whales remaining and their habitat is only within the EGTTR (NOAA Fisheries n.d.).

The Sikes Act of 1960 (Sikes Act) directs the Secretary of Defense to work with the U.S. Fish and Wildlife Service and state fish and wildlife agencies to develop and implement conservation and rehabilitation of natural resources on military installations (16 U.S. Code Sections 670a-670o). Eglin AFB and Hurlburt Field have gone above and beyond the requirements of the Sikes Act with recognition in 2019 and 2021 for the Secretary of Defense Environmental Award for Natural Resources Conservation. These ongoing commitments by the installations for environmental conservation have contributed to the Okaloosa Darter being removed from the U.S. Fish and Wildlife Services endangered and threatened species list (Cole 2023).

Encroachment

Land development and urbanization encroachments surrounding Eglin AFB continues to escalate the threats to the installation's abilities to effectively carryout testing and training missions. These encroachments, specifically along the I-10 corridor, produce light pollution that reduces the available dark skies necessary for testing and training missions. Additionally, increase in urbanization requires additional communication towers to provide stronger cell phone service within the region. Certain testing and training missions at Eglin AFB require controlled electromagnetic environments. The proliferation of additional cell phone towers may introduce electromagnetic interference, potentially impacting these missions.

Hurlburt Field, however, has not experienced the impacts of encroachment that Eglin AFB has. Because of Hurlburt Field's location, development is extremely limited since available land inventory is low. The City of Mary Esther to the east is fully developed and the available land along the US-98 corridor between the Santa Rosa Sound and Eglin AFB reservation is less than a mile in width (north to south) which is also fully developed.

4.3.2 Eglin AFB Mission-Critical Infrastructure

Missions of the Installation

For the MIRR, the installation missions were categorized as primary or secondary missions. While not providing a complete overview of all ongoing activities occurring on base, this process provides a sufficient understanding of the missions of the installation to identify what infrastructure is critical for supporting that mission. Assets were then categorized as primary, secondary, or mission-supportive mission critical. The primary and secondary missions of Eglin AFB are discussed in the following subsections.

Primary Mission

The primary mission of Eglin AFB is weapons testing and training. Much of this testing is conducted by the 96th Test Wing, which functions as the test and evaluation center for weapons, navigation and guidance systems, and command and control systems. Eight operations groups within the wing execute its testing mission. Training on the installation is conducted by the 6th Ranger Training Battalion, which leads the final phase of the U.S. Army Ranger Course, and the 33rd Fighter Wing, which trains pilots of the F-35 Lightning II.

Secondary Mission

The secondary mission of Eglin AFB was defined as special operations conducted by the 7th Special Forces Group. It has an area of responsibility that includes 32 countries, including Latin America south of Mexico and multiple island nations in the Caribbean. The region they cover is approximately 15.6 million square miles and represents one-sixth of the landmass of the world (Eglin Air Force Base n.d.).

Overview of Mission-Critical Infrastructure

Eglin AFB does not operate independently. It relies on a complex network of private and public partners to execute its missions. It was evident during the stakeholder engagement workshops that the installation maintains positive relationships with entities such as Santa Rosa County, Okaloosa County, and Walton County as well as its utility providers. Table 4-28 summarizes the primary mission-critical, secondary mission-critical, and mission-supportive infrastructure.

Table 4-28. Eglin AFB Mission-Critical Assets

	Mission	Mission-Critical Infrastructure
Primary Mission	Testing and Training	▪ Shorelines ▪ Land around installation (dark skies/flyover areas) ▪ Electrical production and supply facilities ▪ Regional drainage systems ▪ Firefighting capability (fire station staff and community water systems) ▪ Major roadways and evacuation routes ▪ Wastewater systems
Secondary Mission	7th Special Forces	▪ Electrical production and supply facilities
Mission-Supportive	N/A	▪ Community water systems ▪ Community wastewater systems ▪ Community roadways ▪ Community facilities

The testing and training operations at Eglin AFB require power, wastewater service, community water service (for firefighting), major roadways for installation access, shorelines, and land buffers to mitigate encroachment hazards. The 7th Special Forces Group requires a steady supply of electric power. Infrastructure asset owners/operators are noted in Table 4-29.

Table 4-29. Eglin AFB Mission-Critical Infrastructure Owners and Operators

Infrastructure Type	Asset Owner/Operator
Electric Power	FPL, CHELCO
Potable Water	Eglin AFB
Wastewater	Okaloosa County Water and Sewer
Shorelines	Eglin AFB, Okaloosa County, Santa Rosa County, Walton County, private landowners
Communications	AT&T, Comcast, Cox, Verizon

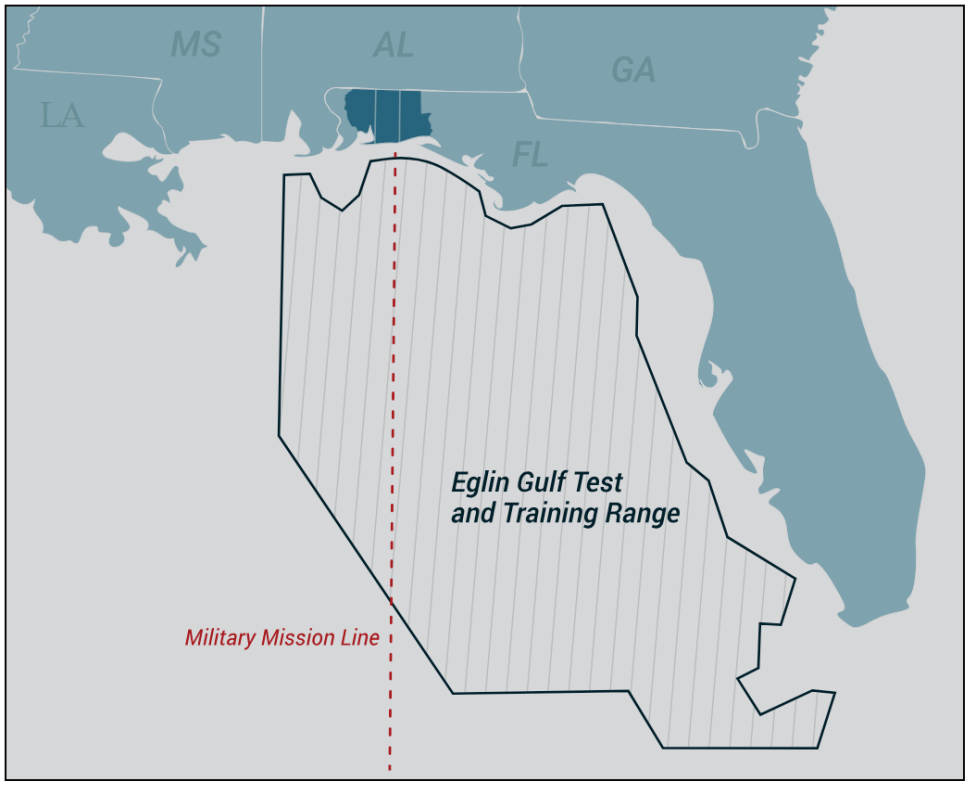
Eglin AFB has its own onsite water systems and, as a result, water supply for the installation is not assessed in this MIRR. The following subsections describe the individual infrastructure sectors that support the missions.

Primary Mission-Critical Infrastructure

Eglin Gulf Test and Training Range

In addition to Eglin's land-based testing and training operations, there are many activities that take place within the Gulf of Mexico's EGTTR, shown on Figure 4-32. The EGTTR is crucial to the mission of Eglin AFB, as well as the other installations in the Northwest Florida region, including Naval Air Station Pensacola and Tyndall AFB.

Figure 4-32. Eglin Gulf Test and Training Range
Source: Economic Development Council of Okaloosa County (n.d.)



The EGTTR is the largest training range in the continental United States, with an area of 180,000 square miles of DoD-controlled airspace, along with 724 square miles of adjacent land ranges and 17 miles of shorelines. These ranges allow for a variety of activities, including air combat training, air-to-air missile testing, air-to ground targeting, drone targeting, and hypersonic weapons testing. The EGTTR and its size enables activities that cannot be done anywhere else and it is defined by the DoD as a national asset. Currently, energy sector development poses an encroachment hazard to the EGTTR, and by extension, the mission of Eglin AFB.

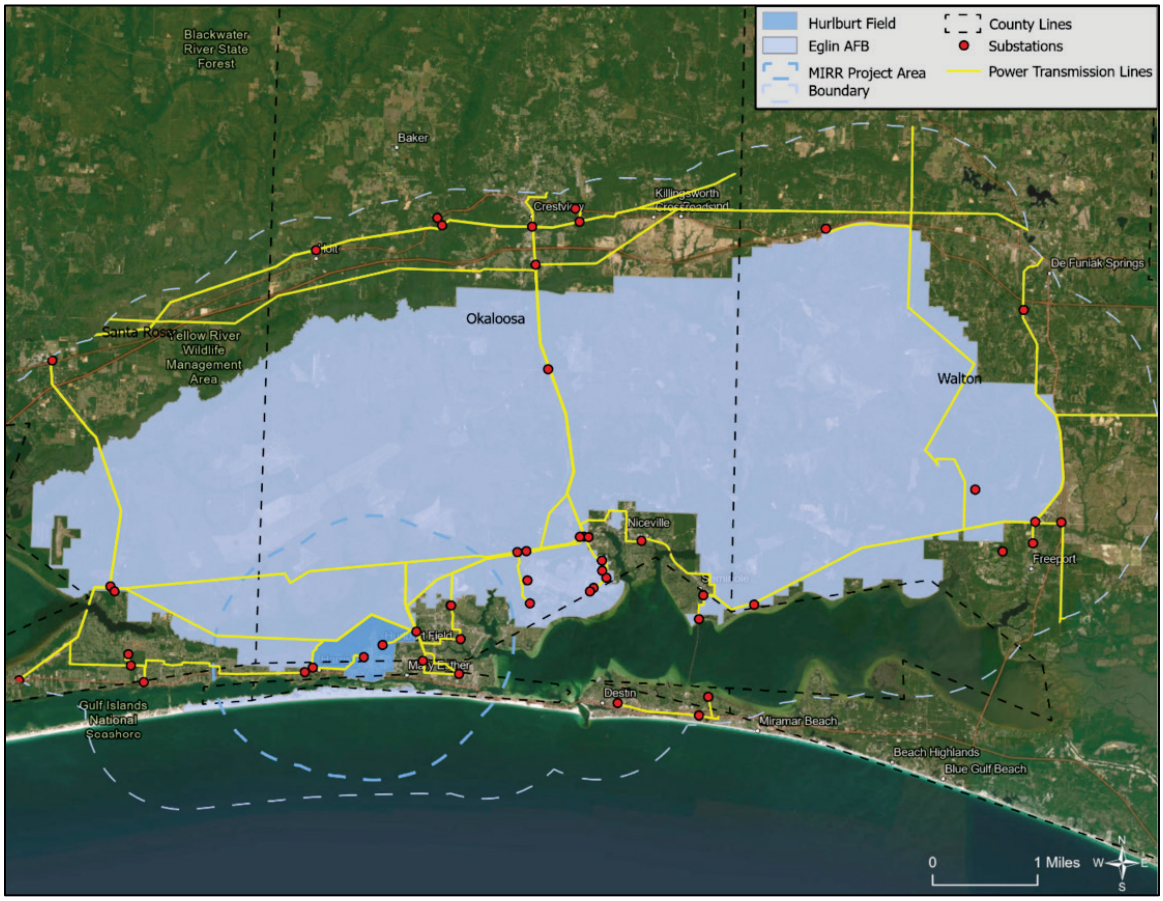
In 2006, Congress passed Gulf of Mexico Energy Security Act which created the MML boundary that protects the EGTTR from encroachment by oil and gas drilling east of the MML in a moratorium that was active until June 20, 2022 (43 U.S.C. 1331). While a September 2020 Executive Order from President Trump extended the same moratorium until 2032, it does not protect the range from all energy sector activities occurring in the area. Additionally, there are no stipulations that prevent the development of offshore wind farms that pose a similar threat. It is critical to protect the missions of both Eglin and other Air Force and Navy installations by protecting the EGTTR from encroachment.

Electrical Production and Supply Facilities

As shown on Figure 4-33, the electric supply and distribution facilities owners and operators to the surrounding communities are FPL, PowerSouth Energy Cooperative (PowerSouth), and CHELCO. FPL provides service to Santa Rosa County, Okaloosa County, and some portions of Walton County. CHELCO provides power supply lines and services to rural surrounding communities. CHELCO's franchise area includes Walton, Okaloosa, Holmes, and Santa Rosa counties. However, CHELCO does not have power-generating facilities, instead purchases power from its wholesale power provider, PowerSouth. PowerSouth is a not-for-profit generation and transmission cooperative headquartered in Andalusia, Alabama, that provides wholesale power to 16 electric cooperatives and four municipal electric systems in Alabama and Northwest Florida.

Figure 4-33. Eglin AFB Mission-Critical Electrical Production and Supply Facilities

Note: This figure shows only publicly available data. Utility-sensitive data were included in the analysis.



FPL generates all of the power for the three counties in the study area. There are two production facilities in Northwest Florida: the Gulf Clean Energy Center (formerly known as Plant Crist) in Escambia County and the Lansing Smith Generating Plant in Bay County. Within FPL's electrical distribution network, FPL also operates and maintains substations and transmission mains in the surrounding communities. There are also smaller power-generating stations that are rarely used except for emergency situations: the Santa Rosa Energy Center near Pace, Florida, and the Ascend Performance facility in Escambia County.

Stormwater Drainage

Regional stormwater management systems prevent roadway stormwater ponding and allows for installation access. The regional stormwater management systems also keeps runways active and free of ponding water. The most common regional stormwater management systems are in the vicinity of major roadways owned and maintained by FDOT. FDOT major roadways are constructed with drainage systems to mitigate roadway flooding and stormwater ponding. Okaloosa County has stormwater management infrastructure that is not part of FDOT drainage systems. Municipalities such as the City of Fort Walton Beach, City of Crestview, and City of Mary Esther have their own

stormwater infrastructure as well as some stormwater infrastructure maintained by Okaloosa County. However, rural areas that do not have stormwater management, such as rural sections of Walton County and Santa Rosa County, rely on FDOT stormwater management or natural conveyances such as streams and rivers.

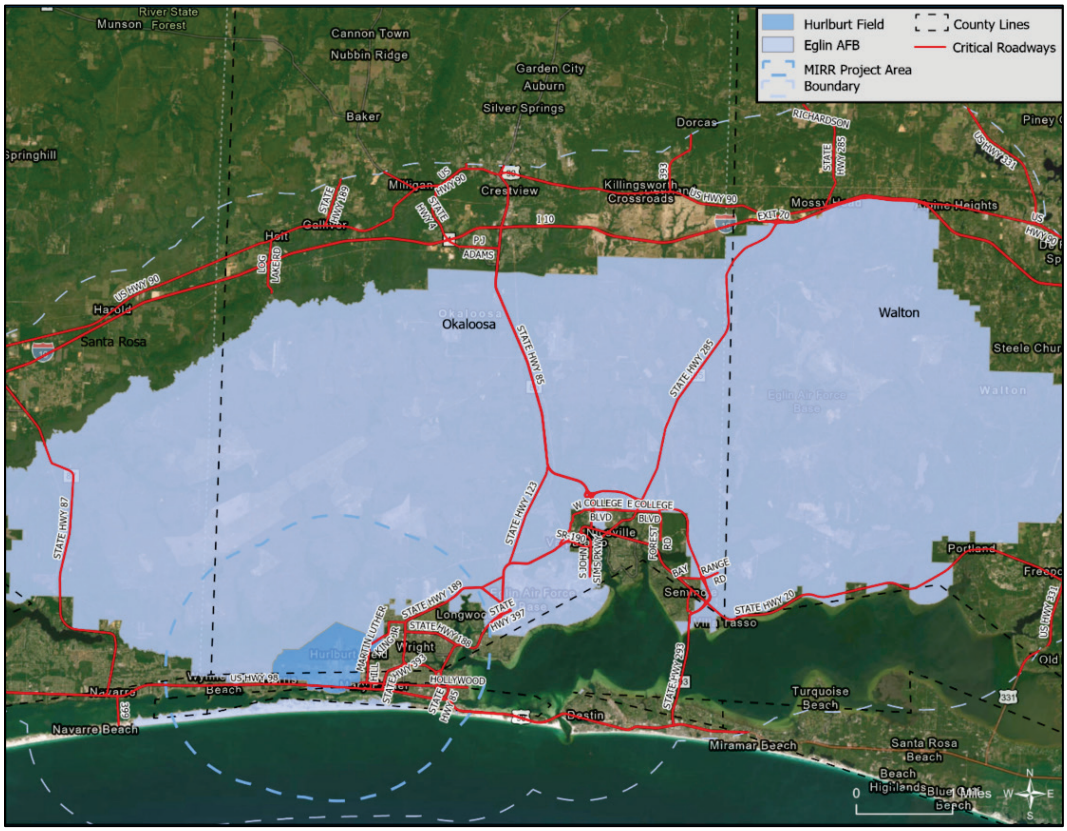
Critical Evacuation Routes through the Installation

Major roadways and evacuation routes are mission-critical infrastructure for Eglin AFB. For this VA and risk analysis, the routes noted in Table 4-30 were considered mission critical. These routes are significant and serve as major thoroughfares connecting communities to the installations. Additionally, they are vital evacuation routes for the communities surrounding the installation. Figure 4-34 shows the critical east/west bound roadways.

Table 4-30. Critical Roadways and Evacuation Routes

Route	Limits of Route for Eglin AFB and Hurlburt Field	Notes
US-98	From Escambia County to Bay County	Critical regional evacuation route; connects both installations with personnel who live in Navarre and Gulf Breeze
Interstate 10	From Escambia County to Holmes County	
SR-87	From US-98 to Highway 90	Utilized by Hurlburt Field personnel who live in Santa Rosa County
SR-85	From US-98 to north of Highway 90 (to buffer)	Critical evacuation route; connects both installations with the City of Crestview
SR-285	From SR-20 to Highway 90	
US-331	From US-98 to Highway 90	

Figure 4-34. Eglin AFB Critical Roadways and Evacuation Routes



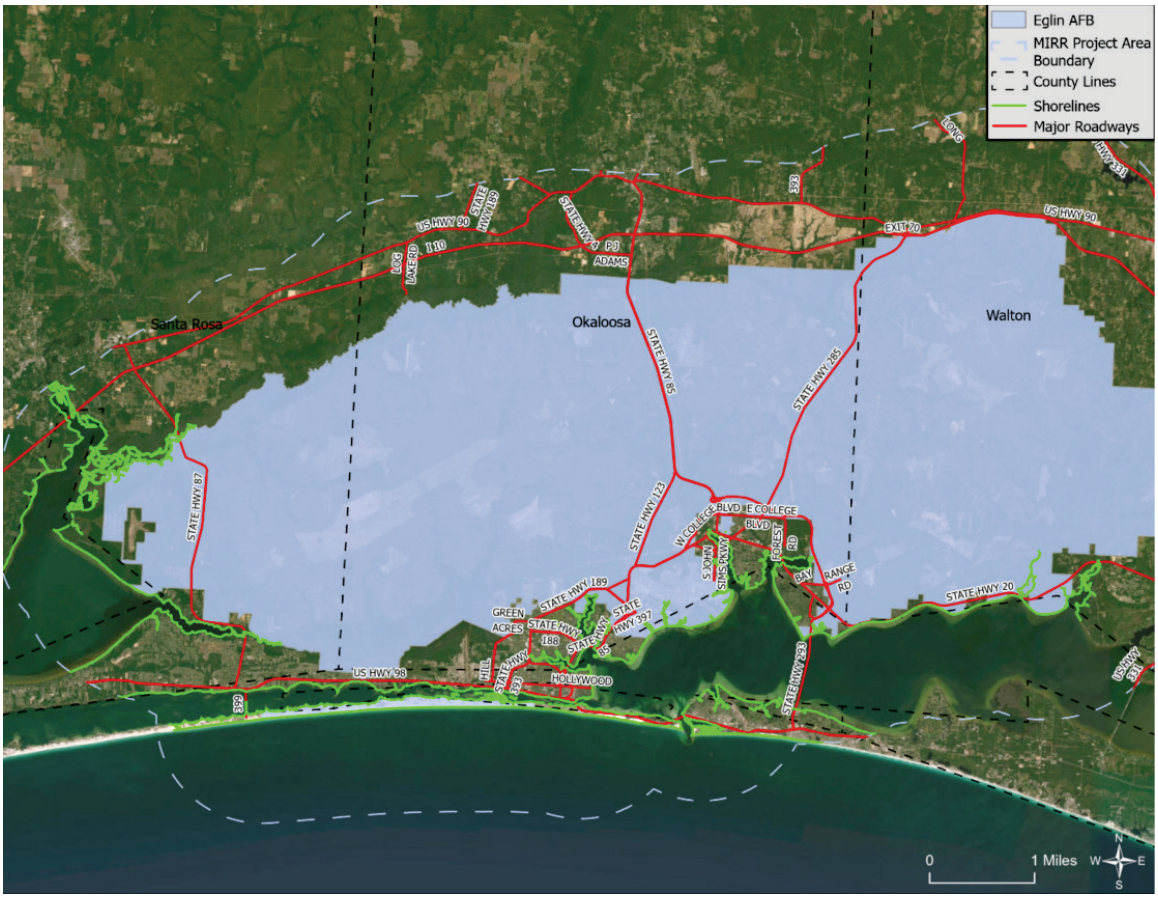
Shorelines

Santa Rosa Island and Okaloosa Island are crucial for protecting the installation (refer to Figure 4-35). A large portion of the installation occupies Santa Rosa Island, which acts as a buffer that protects both Hurlburt Field and the eastern portion of Eglin (as well as mission-critical Highway 98) from wave impacts during storm events. Maintaining shoreline and natural resource stability of the island, as well as installation shorelines in East Bay and Choctawhatchee Bay, can protect both Eglin AFB and Hurlburt Field from wave and erosion impacts. This assessment evaluates the resilience of the Gulf-facing shorelines on Santa Rosa and Okaloosa Islands.

Firefighting Capability

Fire control within Eglin AFB is provided by Jackson Guard and Eglin AFB Fire and Emergency Services. The surrounding communities have fire stations that are maintained by local governments or volunteers. There are approximately 30 fire stations surrounding the AFB in Santa Rosa County, Okaloosa County, and Walton County. These surrounding community fire stations assist with managing and protecting the installation from fire hazards.

Figure 4-35. Eglin AFB and Critical Community Shorelines



Secondary Mission-Critical Infrastructure

The 7th Special Forces requires constant electric power supply. The discussion on electric power at the installation can be found in Electrical Production and Supply Facilities subsection on p. 4-65.

Community Water Systems

Eglin AFB has onsite water treatment and distribution systems. The installation obtains its potable water from onsite water wells and also has emergency interconnects with community water systems.

The communities surrounding the base are served by numerous government and private water utility providers. Within the project study area, more than 100 water wells serve these communities. Unless a water utility purchases water wholesale from a different utility, the utility provider maintains water supply wells in addition to the distribution mains and services within their respective water franchise area. Table 4-31 lists the water utility providers in Santa Rosa County, Okaloosa County, and Walton County within project study area.

Table 4-31. Community Water Utilities

County	Water Utility Providers
Santa Rosa	City of Milton, East Milton, Holley-Navarre Water System, Inc., Midway Water System, Inc., Fairpoint Regional Utility Services
Okaloosa	City of Crestview, City of Fort Walton Beach, City of Mary Esther, City of Niceville, City of Valparaiso, Holt Water Works, Inc., Destin Water Users, Inc., Okaloosa County Water and Sewer
Walton	City of DeFuniak Springs, City of Freeport, Mossy Head Water Works, North Bay Water System, South Walton Utility Company, Inc., Regional Utilities

Community Wastewater Systems

There are several wastewater utility providers in the region which are listed in Table 4-32.

Table 4-32. Community Wastewater Utilities

County	Wastewater Utility Providers
Santa Rosa	Holley-Navarre Water System, Inc., East Milton, City of Milton, City of Gulf Breeze
Okaloosa	City of Crestview, City of Fort Walton, City of Mary Esther, Okaloosa County Water and Sewer, Destin Water Users, Inc.
Walton	City of DeFuniak Springs, South Walton Utilities Inc., Regional Utilities Water System

Eglin AFB wastewater is treated offsite at the Okaloosa County Water and Sewer's Arbennie Pritchett WRF. To convey wastewater to this facility, an Eglin AFB maintained lift station pumps to a large gravity sewer main maintained by Okaloosa County Water and Sewer, which connects directly to the WRF.

4.3.3 Hurlburt Field Mission-Critical Infrastructure

Installation Mission

For the MIRR, the installation missions were categorized as primary or secondary missions. While not providing a complete overview of all ongoing activities occurring on base, this process provides a sufficient understanding of the missions of the installation to identify what infrastructure is critical for supporting that mission. Assets were then categorized as primary, secondary, or mission-supportive mission critical. The primary and secondary missions of Eglin AFB are discussed in the following subsections.

Primary Mission

For the purposes of the MIRR, Hurlburt Field's primary mission is defined as special operations. These operations are conducted in part by the 1st SOW, which plans and executes missions in support of national priorities (Hurlburt Field n.d.). The 1st SOW's missions include air support, aerospace firepower and mobility, intelligence, surveillance and reconnaissance, and combat support (Hurlburt Field n.d.). The 1st SOW consists of four separate groups comprising approximately 12,900 military and civilian personnel (Hurlburt Field n.d.).

Secondary Mission

The installation's secondary mission is the Air Force Special Operations Command Headquarters. AFSOC provides Air Force special operations forces that deploy throughout the world conducting a variety of operations and activities.

Overview of Mission-Critical Infrastructure

Hurlburt Field does not operate independently. It relies on a complex network of private and public partners to execute its missions. It was evident during the stakeholder engagement workshops that the installation maintains positive relationships with entities such as Okaloosa County, the City of Mary Esther, and local utility providers. Table 4-33 summarizes the primary mission-critical, secondary mission-critical, and mission-supportive infrastructure.

Table 4-33. Hurlburt Field Mission-Critical Assets

	Mission	Mission-Critical Assets
Primary Mission	Special operations and support	▪ Electrical production and supply facilities ▪ Shorelines ▪ Housing
Secondary Mission	AFSOC	▪ Electrical production and supply facilities
Mission-Supportive		▪ Community water systems ▪ Community wastewater systems ▪ Community roadways ▪ Community facilities

AFSOC Headquarters operations and support require electric power for operating aircraft runways and hangers. The Santa Rosa Sound shorelines to the south of the installation, as well as Santa Rosa Island, protect Hurlburt Field from flooding and shoreline erosion. Housing is also crucial to the mission of the installation – personnel need to be able to live close enough to the base to be onsite in a moment's notice. Infrastructure and asset owners/operators are noted in Table 4-34.

Table 4-34. Hurlburt Field Mission-Critical Infrastructure Owners and Operators

Infrastructure Type	Asset Owner/Operator
Electric Power	FPL
Potable Water	Hurlburt Field
Wastewater	Hurlburt Field
Shorelines	Okaloosa County, Air Force, private landowners
Communications	AT&T, Comcast, Cox, Verizon

Hurlburt Field owns and operates its own potable water and wastewater treatment infrastructure onsite.

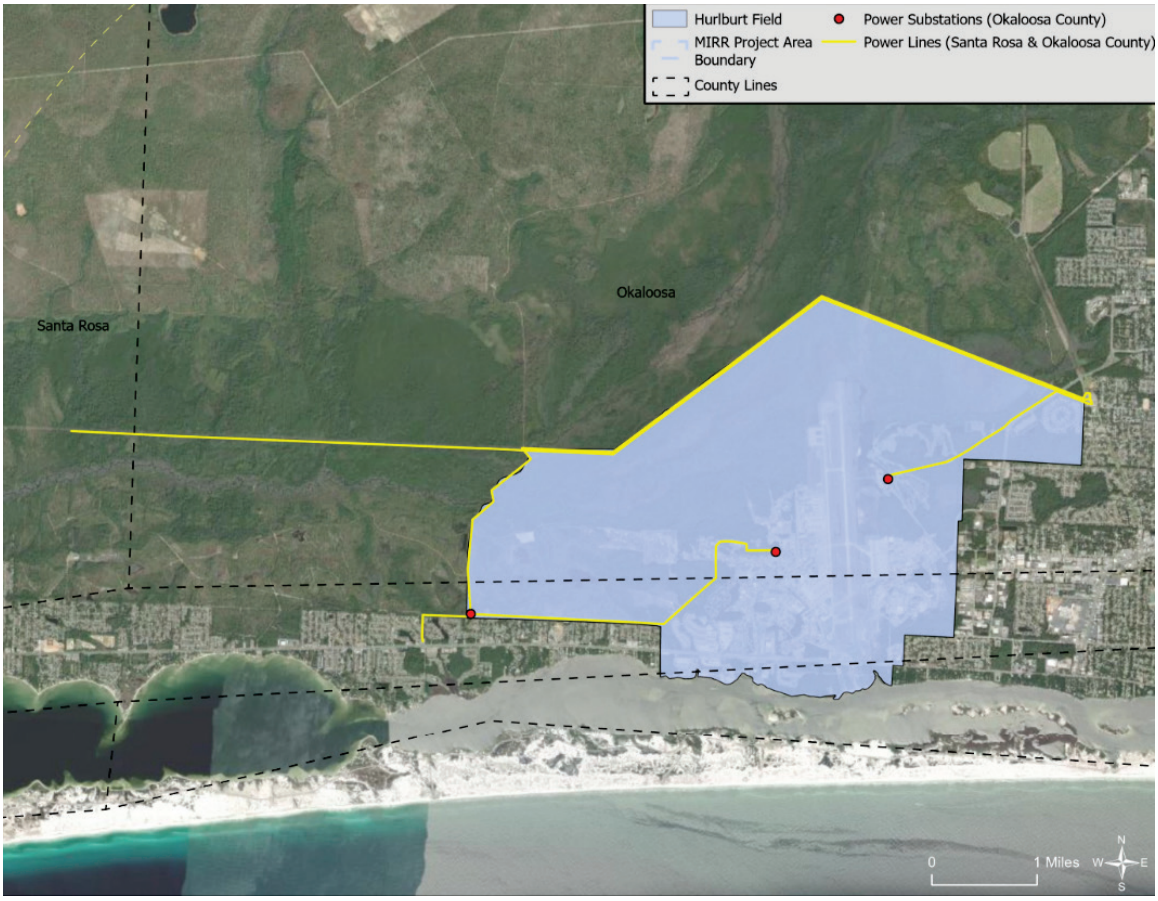
Misson-Critical Infrastructure

Primary Mission-Critical Infrastructure

Electrical Production and Supply Facilities

Hurlburt Field receives its electric power solely from FPL. As shown on Figure 4-36, FPL has redundancy connections within the electrical transmission system. Although redundancy in the electrical transmission system allows for an alternate power supply route, there is a single point of failure for transmission infrastructure in the City of Mary Esther. Additionally, stakeholders explained that Hurlburt could be better prepared for the immediate loss of power. While the installation does have onsite generators with 30 days of stored fuel, there is no immediate alternative source of power. There are additional power concerns stemming from the federal electric vehicle mandate, which requires transitioning to electric vehicles. The requirement will place additional stress on the electric grid.

Figure 4-36. Hurlburt Field Mission-Critical Electrical Production and Supply Facilities



Shorelines

Hurlburt Field has approximately two miles of shorelines on the Santa Rosa Sound, as shown on Figure 4-37. Adjacent to these shorelines are housing units and wetlands. These shorelines protect the primary mission-critical housing for service members, and erosion at these shorelines threatens these coastal homes.

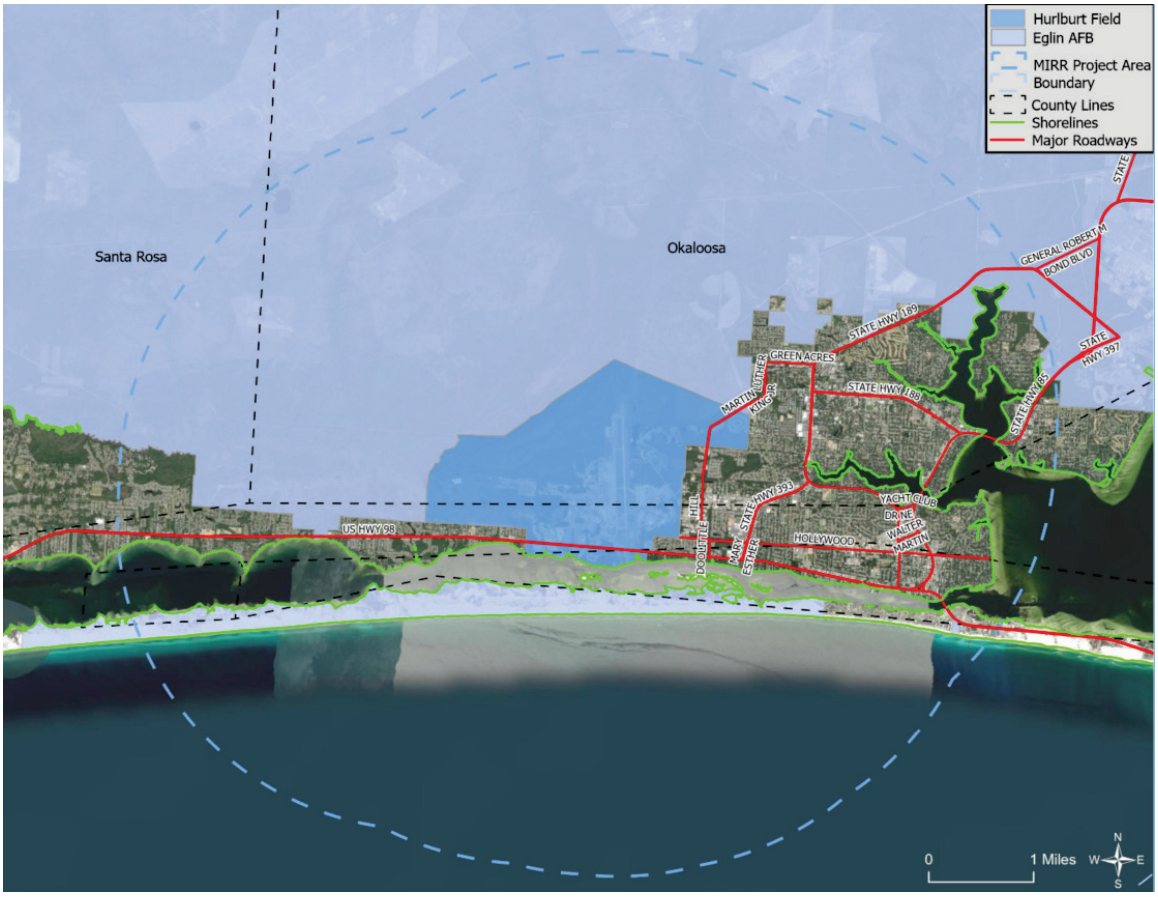
Housing

Housing of military staff and their families is a critical community asset to Hurlburt Field. As mentioned previously in Housing Affordability subsection, housing affordability and low housing inventory impacts personnel who need to live near the installation. Affordable housing inventory is often located in distant communities such as Crestview and Navarre. Traveling from these communities creates long commutes for installation personnel.

Secondary Mission-Critical Infrastructure

AFSOC requires 24/7 electric power. The discussion on electric power at the installation can be found in Electrical Production and Supply Facilities subsection on p. 4-65.

Figure 4-37. Hurlburt Field Mission-Critical Shorelines



Mission-Supportive Infrastructure

Community Water Systems

Hurlburt Field has onsite water wells, treatment, and distribution systems. The installation also has an emergency interconnect for potable water.

The communities surrounding the base are served by numerous government and private water utility providers. The utility provider typically maintains water supply wells in addition to the distribution mains and services within their respective water franchise area. Table 4-35 lists the water utility providers in Santa Rosa County and Okaloosa County within the project study area.

Table 4-35. Community Water Utilities

County	Water Utility Providers
Santa Rosa	Holley-Navarre Water System, Inc., Fairpoint Regional Utility Services
Okaloosa	City of Fort Walton Beach, City of Mary Esther, City of Valparaiso

Community Wastewater Systems

Hurlburt Field has its own onsite wastewater treatment facility. Treated wastewater is either discharged to wetlands or stored as reclaimed water, which is used for vehicle wash racks and irrigation.

There are several wastewater utility providers in the region that serve the communities adjacent to the installation, as listed in Table 4-36.

Table 4-36. Community Wastewater Utilities

County	Wastewater Utility Providers
Santa Rosa	Holley-Navarre Water System, Inc.
Okaloosa	City of Fort Walton Beach, City of Mary Esther, Okaloosa County Water and Sewer

4.3.4 Exposure Analysis

The exposure analysis was completed to evaluate each mission-critical asset's respective exposure to each of the natural hazards noted herein. This analysis was completed by mapping the extent of each hazard and comparing these to the asset locations to determine the proximity of the assets to each hazard. A total of 172,925 assets within the project study region were evaluated in the exposure analysis.

Appendix C includes exposure maps for flood and wildfire.

Flood Exposure

The flood hazards considered in this analysis include the 100-year flood event, storm surge from hurricanes (categories 1 through 5), and four SLR scenarios from the National Oceanic and Atmospheric Administration (NOAA): SLR 2040 low, SLR 2040 high, SLR 2070 low, and SLR 2070 high.

100-Year Flood

The 100-year flood, also known as the 1% annual chance event, represents a combination of pluvial (rainfall-induced) flooding and coastal inundation in this analysis. Approximately 7.8% of all assets (13,415 of 172,925 total assets) within the study area fall within the 100-year floodplain. The assets exposed to the 100-year flood hazard are located in low-lying areas near bodies of water such as rivers, creeks, bays, and the intercoastal sound. The remaining 92% of assets (159,228 of 172,925 assets) are not exposed to the 100-year flood event.

Storm Surge

As shown in Table 4-37, the number and percentage of total assets exposed to storm surge increases with increasing storm strength.

Table 4-37. Assets Exposed to Storm Surge in Hurricane Categories 1–5

Hurricane Category	No. of Assets Exposed	% of Total Assets Exposed
1	3,798	2.2
2	11,462	6.6
3	19,774	11
4	46,246	27
5	60,265	35

Sea Level Rise

The SLR exposure analysis identifies future sea levels using SLR projections from NOAA. SLR exposure occurs primarily in low-lying coastal areas (many in residential neighborhoods), which can exacerbate impacts from high tide and storm surge events. For this analysis, the 2040 and 2070 planning horizons and intermediate-low and intermediate-high projections were used, accounting for a total of four SLR scenarios. Results are shown in Table 4-38.

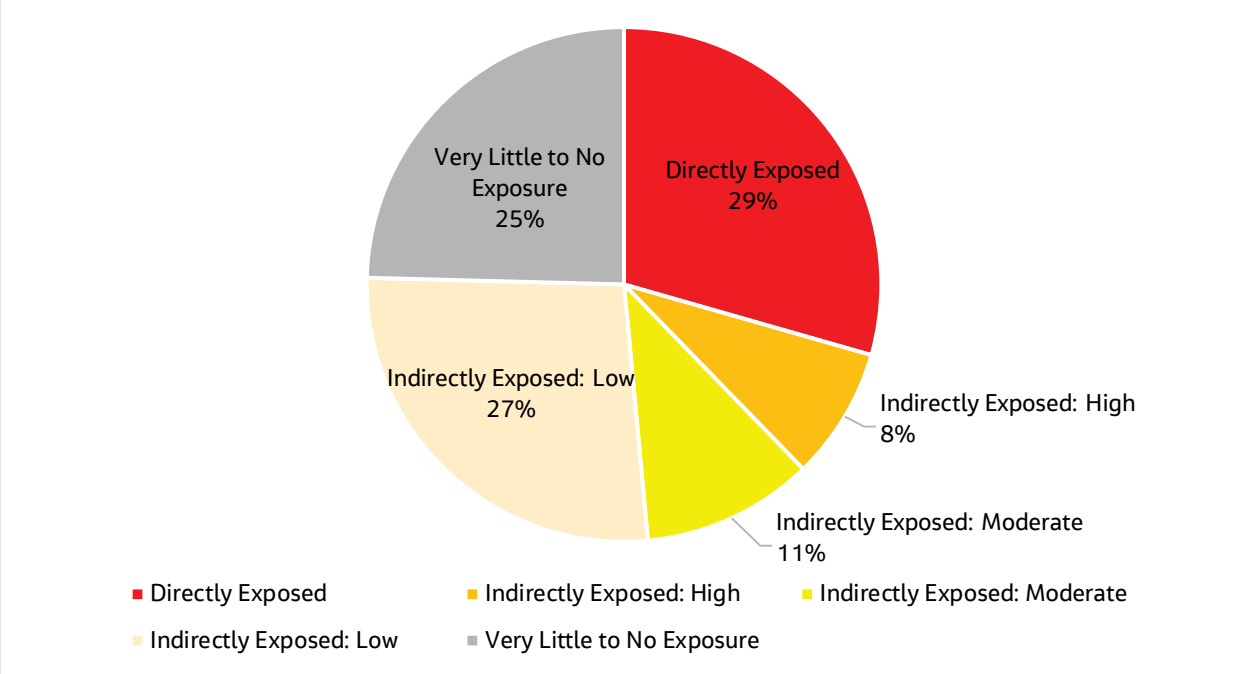
Table 4-38. Assets Exposed to Different SLR Scenarios

SLR Scenario	No. of Assets Exposed	% of Total Assets Exposed
2040 Int. Low Scenario	40	0.023
2040 Int. High Scenario	157	0.091
2070 Int. Low Scenario	119	0.069
2070 Int. High Scenario	1,593	0.92

Wildfire Exposure

As previously mentioned, the region is prone to wildfires in rural and low developed areas because of higher densities of vegetation. As shown on Figure 4-38, approximately 25% of assets (42,517 of 172,925 assets) had very little to no wildfire exposure, 46% (79,521 of 172,925 assets) had some level of indirect wildfire exposure, and 30% of assets (50,887 of 172,925 assets) had direct exposure to wildfires. These directly exposed assets are located inland and in rural areas with high vegetation density. Appendix C includes wildfire exposure maps.

Figure 4-38. Asset Exposure to Wildfire



Heat, Lightning, and Wind Exposure

All aboveground assets (including structures and horizontal utilities) are exposed to heat, high winds, and lightning. Tall assets, such as cell towers or power transmission lines, are most exposed to lightning and wind hazards. Approximately 43% of assets (74,967 of 172,925) are aboveground or at grade (for example, roadways) while the other 57% of assets (97,959 of 172,925) are belowground and are not exposed to heat, lightning, or wind.

Transportation Exposure Analysis

Major routes for base access and evacuation routes cross the Eglin AFB in a north/south direction or circumvent the base in east/west directions. US-98 and SR-20 border the southern portion of Eglin AFB and I-10 borders the northern portion. SR-87, SR-85, and SR-285 cross Eglin AFB from south to north and US-331 is east of Eglin AFB.

The evacuation routes and major roadways away from coastal areas for the most part fare well against the various flood events. While roadways at higher elevations inland are less exposed to coastal flooding, they may still be exposed to riverine flooding. Table 4-39 lists the areas of major roadways vulnerable to flood exposure.

The wildfire exposure was higher for non-coastal areas along the I-10 corridor and north/south route corridors (SR-87, SR-85, SR-285, and US-331). The increase in wildfire exposure in these areas can be attributed to them being more rural, less developed, and having an abundance of vegetation. Assets along the US-98 corridor have much lower wildfire exposure because the area is more developed and has less vegetation than undeveloped land.

The combined wildfire and flood exposure can have major impacts on certain portions of these major routes. SR-20 from SR-293 to US-331 is vulnerable to both flooding and wildfire. SR-87 from East Bay River to I-10 has flooding and wildfire exposure near the Yellow River and East Bay River.

Table 4-39. Summary of Roadway Exposure to Flood and Wildfire

Major Roadway	Flood Exposure Limits	Wildfire Exposure Limits
US-331	From SR-20 to US-98	From SR-20 to I-10
US-98	Okaloosa Island to Destin; Wynnehaven Beach; Navarre near SR-87	From Walton Co. Line to US-331; From US-98 to SR-281
SR-20	From US-331 to Niceville	From SR-293 to US-331
SR-293	From US-98 to SR-285	From SR-20 to SR-85
SR-285	SR-20 to SR-293	From SR-20 to Highway 90
SR-85	Fort Walton Beach to Shalimar; Valparaiso to Niceville; Shoal River	From SR-291 to Highway 90
SR-87	From East Bay River to Holley; Yellow River Crossing	From East Bay River to Highway 90

4.3.5 Sensitivity Analysis

This section describes the anticipated impacts to community assets and sector elements infrastructure from exposure to each identified hazard and scenario. While the exposure analysis helped to identify the spatial extent of a hazard across relevant installations and study areas, the sensitivity analysis identifies the degree of negative impact across assets. The process for determining asset sensitivities can be found in the *Vulnerability and Risk Assessment Introduction and Methodology* document (Appendix B). This process was standardized across all MIRR VAs and is briefly discussed in the following text.

Flood Sensitivity

An asset's sensitivity to flooding depends on the asset's ability to operate during inundation flood event. Typically, low-lying assets can become inaccessible during flooding or go offline when electrical components are flooded. Facilities with finished interiors also have increased flood sensitivity.

Wildfire Sensitivity

Assets with electrical components or substations, such as power transmission lines or wastewater lift stations, will have some of the greatest sensitivities to wildfire. Roadways, railroads, and bridges also have sensitivity because of the effects of heat from wildfires. Bridge sensitivity also depends on the bridge material (for example, a bridge with a wooden deck surface will be more sensitive to wildfire as opposed to one with a concrete or paved deck). Overall, transmission lines, potable water wells, and transportation assets are most sensitive to wildfire.

Heat Sensitivity

Asset sensitivity to heat depends on the threshold temperature of the asset. When the surrounding air temperatures exceed the asset threshold temperature, it is assumed that the asset begins to display sensitivity to the hazard. Railroads display the highest sensitivity to projected extreme heat events followed by bridges.

Lightning and Extreme Wind Sensitivity

While all aboveground assets are exposed to lightning and wind, the characteristics and installation of the asset can influence the sensitivity to these hazards. Cell towers and transmission lines are most sensitive to lightning.

Similarly, an asset's wind sensitivity depends on location of the asset (that is, above ground) and the surface area of the asset. Tall structures with little surface area, such as a cell tower, are less sensitive to winds than those with a large surface area, such as a building. Assets that are above ground without reinforcement are also more sensitive to wind. Transmission lines may be reinforced at poles; however, the lines themselves are vulnerable to wind and flying debris. The impacts of wind-borne debris were also considered when determining wind sensitivity.

4.3.6 Vulnerability Assessment

A vulnerability score was calculated for each asset using the follow equation:

Vulnerability = Exposure + Sensitivity

The highest hazard vulnerability score for each of the five hazards is two, yielding a maximum total vulnerability score of 10. The following subsections detail asset vulnerability to flood, wildfire, and heat. Extreme wind and lightning are included in the overall vulnerability scores. This yields a score that reflects the risk to the mission of the installation. A detailed discussion of the methodology for evaluating risk can be found in the *Vulnerability and Risk Assessment Introduction and Methodology* document (Appendix B).

Flood Vulnerability

The highest possible flood vulnerability score of an asset is 2, whereas the average score is 0.1 and the maximum highest actual score is 1.1. Overall, the vast majority of assets are not vulnerable to flooding and the most vulnerable assets are only moderately vulnerable to flooding. Table 4-40 shows the highest-vulnerability assets with the highest flood vulnerability score (score equal or greater than 1).

Table 4-40. Assets with Highest Flood Vulnerability (Score ≥ 1.0)

	Asset Unique ID	Asset Type	Asset Name	Owner/ Operator	Mission Criticality	Applicable Installation Study Area	Vulnerability Score
1	20238	Wastewater Treatment Facilities and Lift Stations	Lift Station	Okaloosa County Water and Sewer	Primary	Both Eglin AFB and Hurlburt Field	1.7
2	20214	Wastewater Treatment Facilities and Lift Stations	Lift Station	Okaloosa County Water and Sewer	Primary	Both Eglin AFB and Hurlburt Field	1.6
3	19839	Wastewater Treatment Facilities and Lift Stations	Sewer Network Structure	City of Fort Walton Beach	Primary	Both Eglin AFB and Hurlburt Field	1.6

Table 4-40. Assets with Highest Flood Vulnerability (Score ≥ 1.0)

	Asset Unique ID	Asset Type	Asset Name	Owner/ Operator	Mission Criticality	Applicable Installation Study Area	Vulnerability Score
4	154797	Wastewater Treatment Facilities and Lift Stations	Regional Utilities Lift Station	Regional Utilities	Primary	Eglin AFB	1.6
5	20147	Wastewater Treatment Facilities and Lift Stations	Lift Station	Okaloosa County Water and Sewer	Primary	Both Eglin AFB and Hurlburt Field	1.6
6	20187	Wastewater Treatment Facilities and Lift Stations	Lift Station	Okaloosa County Water and Sewer	Primary	Both Eglin AFB and Hurlburt Field	1.6
7	134246	Wastewater Treatment Facilities and Lift Stations	Skipper Aly	Walton County	Supportive	Both Eglin AFB and Hurlburt Field	1.4
8	133347	Major Roadways	State Hwy. 20	FDOT	Primary	Both Eglin AFB and Hurlburt Field	1.3
9	23969	Wastewater Treatment Facilities and Lift Stations	Sunny Dr.	City of Mary Esther	Supportive	Hurlburt Field	1.3
10	35455	Roadways	Blvd of The Champions	Okaloosa County	Supportive	Both Eglin AFB and Hurlburt Field	1.3
11	20121	Wastewater Treatment Facilities and Lift Stations	Lift Station	Okaloosa County Water and Sewer	Primary	Both Eglin AFB and Hurlburt Field	1.3
12	20271	Wastewater Treatment Facilities and Lift Stations	Lift Station	Okaloosa County Water and Sewer	Primary	Both Eglin AFB and Hurlburt Field	1.3
13	19863	Wastewater Treatment Facilities and Lift Stations	Sewer Network Structure	City of Fort Walton Beach	Primary	Both Eglin AFB and Hurlburt Field	1.3
14	19884	Wastewater Treatment Facilities and Lift Stations	Sewer Network Structure	City of Fort Walton Beach	Primary	Both Eglin AFB and Hurlburt Field	1.3
15	135011	Roadways	N Main Deck Dr.	Walton County	Supportive	Eglin AFB	1.3

Wildfire Vulnerability

The assets most vulnerable to wildfire are roadways, railroads, bridges, power transmission lines, and water wells. Direct exposure to fire (aboveground assets), combined with the inability to use the asset during wildfire along with damage to the assets stemming from the event, causes the highest vulnerability.

Heat Vulnerability

The railroads in Santa Rosa display the greatest vulnerability to extreme heat events in the future. Railroad tracks begin to show sensitivity to heat starting at 95°F. In Santa Rosa County; the single annual maximum temperature and maximum temperature over the course of 5 days (heat waves) are projected to exceed that temperature (U.S. Federal Government n.d.).

Extreme Wind Vulnerability

Aboveground assets are most vulnerable to extreme winds. Approximately 21% of assets (36,805 of 172,925 total assets) exhibit high to moderate vulnerability vulnerable to extreme winds, including power transmission lines and cell towers. Buried critical assets, such as water and wastewater lines, are not as vulnerable.

Lightning Vulnerability

Aboveground assets are most vulnerable to lightning whereas underground or at-grade assets are not as vulnerable to lightning. Approximately 21% of assets are highly vulnerable to lightning while 79% of assets display moderate and low vulnerability. Assets most vulnerable to lightning are electric production and supply facilities (power transmission lines and substations) and communications infrastructure (cell towers).

Overall Vulnerability

Of the 172,925 assets analyzed, the average vulnerability score was 2.8, which indicates low overall vulnerability among assets in the project study area. There were 37,217 assets with high total vulnerability (a score greater than 6). Table 4-41 shows the highest-vulnerability assets greater than 8.0.

Table 4-41. Assets with Highest Total Vulnerability

	Asset Unique ID	Asset Type	Asset Name	Owner/Operator	Mission-Criticality	Applicable Installation Study Area	Vulnerability Score
1	154797	Wastewater Treatment Facilities and Lift Stations	Regional Utilities Lift Station	Regional Utilities	Primary	Eglin AFB	8.6
2	20121	Wastewater Treatment Facilities and Lift Stations	Lift Station	Okaloosa County Water and Sewer	Primary	Both Eglin AFB and Hurlburt Field	8.3
3	20271	Wastewater Treatment Facilities and Lift Stations	Lift Station	Okaloosa County Water and Sewer	Primary	Both Eglin AFB and Hurlburt Field	8.3
4	20258	Wastewater Treatment Facilities and Lift Stations	Lift Station	Okaloosa County Water and Sewer	Primary	Both Eglin AFB and Hurlburt Field	8.2

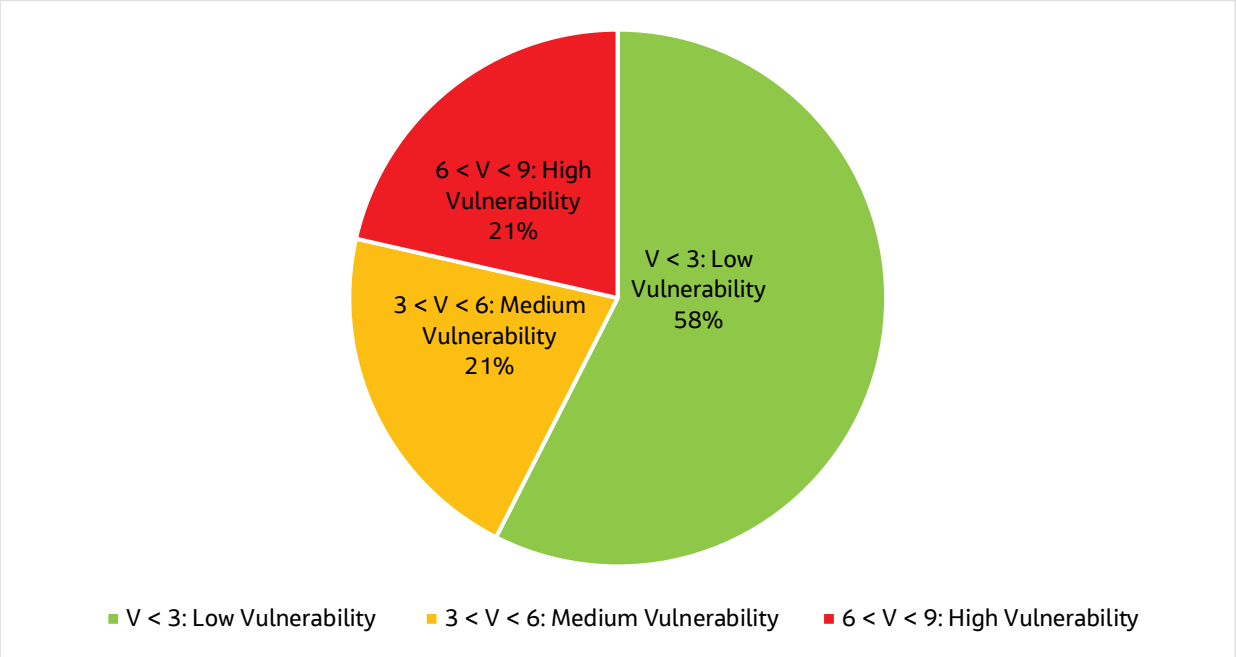
Table 4-41. Assets with Highest Total Vulnerability

	Asset Unique ID	Asset Type	Asset Name	Owner/Operator	Mission-Criticality	Applicable Installation Study Area	Vulnerability Score
5	20190	Wastewater Treatment Facilities and Lift Stations	Lift Station	Okaloosa County Water and Sewer	Primary	Both Eglin AFB and Hurlburt Field	8.2
6	20221	Wastewater Treatment Facilities and Lift Stations	Lift Station	Okaloosa County Water and Sewer	Primary	Both Eglin AFB and Hurlburt Field	8.2
7	20230	Wastewater Treatment Facilities and Lift Stations	Lift Station	Okaloosa County Water and Sewer	Primary	Both Eglin AFB and Hurlburt Field	8.2
8	19854	Wastewater Treatment Facilities and Lift Stations	Lift Station	City of Fort Walton Beach	Primary	Both Eglin AFB and Hurlburt Field	8.2
9	154775	Wastewater Treatment Facilities and Lift Stations	Freeport Lift Station	Regional Utilities	Primary	Eglin AFB	8.2
10	20231	Wastewater Treatment Facilities and Lift Stations	Lift Station	Okaloosa County Water and Sewer	Primary	Both Eglin AFB and Hurlburt Field	8.2
11	20223	Wastewater Treatment Facilities and Lift Stations	Lift Station	Okaloosa County Water and Sewer	Primary	Both Eglin AFB and Hurlburt Field	8.2
12	20199	Wastewater Treatment Facilities and Lift Stations	Lift Station	Okaloosa County Water and Sewer	Primary	Both Eglin AFB and Hurlburt Field	8.1
13	154702	Wastewater Treatment Facilities and Lift Stations	Lift Station	South Walton Utility Co., Inc.	Primary	Eglin AFB	8.1
14	154761	Wastewater Treatment Facilities and Lift Stations	Lift Station	South Walton Utility Co., Inc.	Primary	Eglin AFB	8.1
15	154762	Wastewater Treatment Facilities and Lift Stations	Regional Utilities Lift Station	South Walton Utility Co., Inc.	Primary	Eglin AFB	8.1

While the assets with the highest vulnerability scores are all lift stations, almost all of the high vulnerability assets (99%) in the study area are owned by CHELCO and PowerSouth whose overhead power transmission (PowerSouth) and distribution (CHELCO) lines are exposed and sensitive to wildfire, high winds, and lightning.

Figure 4-39 shows the distribution of the asset vulnerability rankings.

Figure 4-39. Distribution of Vulnerability Scores



Around 21% of assets demonstrated high vulnerability to hazards, including coastal roadways and lift stations, electric power and distribution infrastructure, and roadways. These assets, along with additional primary mission-critical assets, that, while having medium vulnerability, may pose a high risk to the mission of the installation. These medium-vulnerability assets include Highway 98 and other mission-critical roadways.

Energy Sector Vulnerabilities

Methodology

To determine the energy infrastructure vulnerability for each installation within the Emerald Coast region, the following vulnerability indicators and metrics were considered: 1) exposure to major natural threats to energy infrastructure, 2) energy burden within the census tract of the installations, 3) known vulnerabilities, 4) hardening efforts for the energy infrastructure within and around the base, 5) presence of microgrids for redundancy, and 6) proximity of infrastructure to fast power recovery priority facilities, such as hospitals and emergency medical service stations. It is important to note that debris management and regular maintenance for the energy infrastructure are considered as important factors that can substantially impact the stability and function of the energy systems.

These metrics were evaluated in asset and military installation scales, with each being awarded a final vulnerability score to rank their energy-related condition. The intention with this ranking system is to inform a resilience strategy that prioritizes assets ranked poorly for improvement. Results of the energy sector VA are provided in the next subsection.

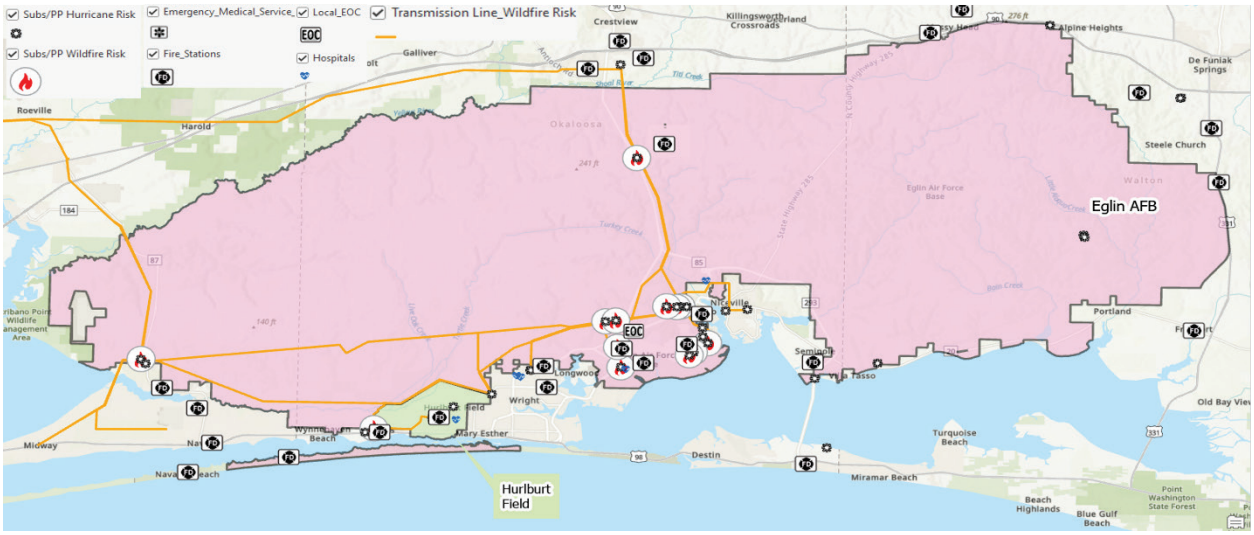
Results

The energy infrastructure directly connected to the base consists of 36 substations, 3 power plants (Gulf Coast Solar Center I & II and an onsite fossil fuel power plant that uses petroleum), 1 nearby petroleum product terminal (CITGO), and overhead power transmission lines spanning approximately 418 miles, 240 miles of it being vulnerable to

wildfires (Figure 4-40). 110.5 miles of the power transmission lines that are vulnerable to wildfires are found to be "High Voltage" at 230kV capacity, exacerbating the risk and implications of potential damage to those lines. This system faces significant vulnerabilities, particularly from natural threats. The major risks include the impact of hurricanes and wildfires. While 33 out of 36 substations, Gulf Coast Solar Center I, and CITGO Petroleum Corp. are vulnerable to hurricanes, wildfires are threats to 13 substations and Gulf Coast Solar Center I.

Figure 4-40. Eglin AFB & Hurlburt Field Energy Infrastructure Vulnerabilities

Note that because of non-disclosure agreements, CHELCO's and PowerSouth's assets are not shown on the figure.



The base operates across three counties and Census Tracts (CTs); Okaloosa CT#208, Santa Rosa CT 108.02, and Walton CT 9503.02. These CTs have energy burdens of 2%, 2%, and 4%, respectively. Energy burden is the ratio of average annual housing energy costs to the average annual household income. (US DOE LEAD Tool, 2019). For the purposes of this study, average of the three CTs was taken, and reported as 2.7%. 2.7% is a relatively low percentage within the State of Florida where 6% is considered "high" (The Balmoral Group 2022).

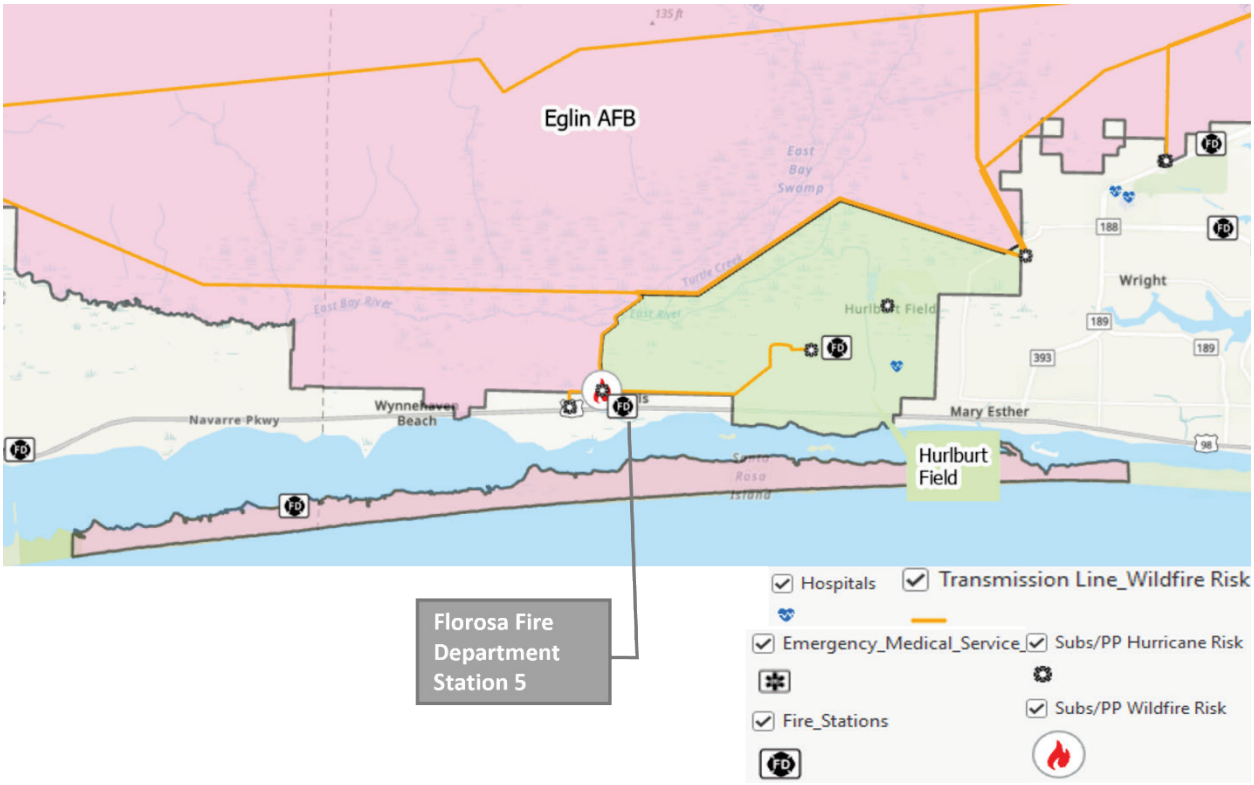
High wildfire risk for power transmission lines is noted as a known vulnerability to Eglin AFB & Hurlburt Field by stakeholders, as it was confirmed by this VA.

A total of 23 fast power recovery priority assets, such as hospitals or fire stations, are detected to be within a 0.5-mile distance from the base's substations. This metric is reviewed as a potential mitigation measure where a strategic proximity to these assets could enable base's power to be recovered faster along with the community's fast power recovery priority assets that are on the same power line. Along with having the secondary fast power recovery benefits, Eglin AFB's storm hardening efforts (such as undergrounded power distribution lines) provide mitigating impacts to the base's energy vulnerability score.

While some fire stations around the base operate on the same power lines as the base (e.g., Florosa Fire Department Station 5), several other fire stations are on a different power line (e.g., Holley-Navarre Fire District Station 45 that is in a 5-mile distance to the base boundary) providing redundancy during power outages, as emergency services can remain operational (Figure 4-41).

Figure 4-41. Nearby Fire Stations in Relation to Emergency Operations and Redundancy

Note that because of non-disclosure agreements, CHELCO's and PowerSouth's assets are not shown on the figure.



Additionally, it appears that there is potentially insufficient fire line width and no existing scrape/trench for some substations that serve the base. There are several occurrences of tree canopy being close to overhead power transmission & distribution lines around and within the base. This causes heightened fire and hurricane debris (fallen trees and branches) risk to the substation fire protection system

Results of installation-scale scoring are listed in Table 4-42. It should be noted that Eglin-Hurlburt's "other known vulnerability score" is zero because the power line vulnerability to wildfire has already been scored under the second metric.

Table 4-42. Installation-Scale Scoring for Eglin-Hurlburt

Installation	Exposure & Sensitivity to Natural Hazards (0-3 pts)	Are transmission lines in wildfire risk? (Yes=1.5, No=0)	Normalized Energy Burden	Other Known Vulnerabilities	Hardening Efforts (Yes=-1.5, No=0)	Strategic Proximity	Microgrid Presence (Yes=-1.5,No=0)	Final Energy Vulnerability Score
Eglin-Hurlburt	2.7	1.5	1.35	0	-1.5	-1	0	3.1

Eglin AFB and Hurlburt Field ranked 3rd for energy vulnerability among the five installations evaluated within the Emerald Coast region. A potential microgrid implementation and additional hardening efforts could greatly mitigate the energy reliability and vulnerability issues the base is facing.

Other Identified Vulnerabilities

Other identified vulnerabilities, though not included in the quantitative analysis, include shoreline erosion and encroachment. The encroachment vulnerability was previously discussed in the Encroachment subsection on p. 4-62 and is not repeated here.

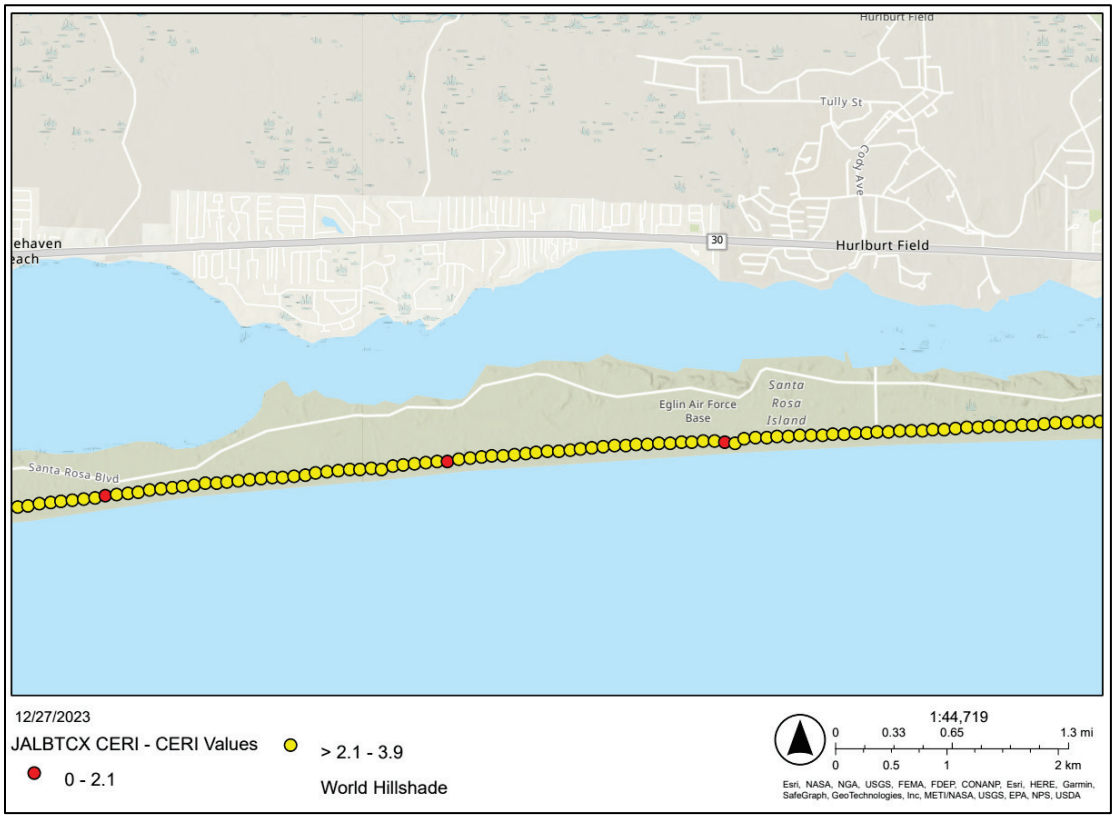
The discussion on electric power at the installation can be found in Electrical Production and Supply Facilities subsection on p. 4-65.

Shoreline Erosion

Shoreline erosion is a hazard of significance, particularly on Santa Rosa Island. The Joint Airborne Lidar Bathymetry Technical Center of Expertise (JALBTCX) CERI tool was used to assess shoreline resilience along the Gulf of Mexico on Santa Rosa Island and in the City of Destin. CERI scores range from 0 to 5, with scores between 0 and 2.1 indicating low resilience, scores between 2.1 and 3.9 indicating moderate resilience, and scores between 3.9 and 5 indicating high resilience to coastal hazards. CERI maps show circles along the shoreline – each circle indicates a 100-meter zone with its own coastal resilience score.

Figures 4-42 through 4-44 show CERI shoreline resilience maps for Santa Rosa Island (Eglin AFB, west), Santa Rosa Island and Okaloosa Island (City of Fort Walton Beach), and Okaloosa Island (Eglin AFB, east), respectively.

Figure 4-42. Shoreline Resilience on Santa Rosa Island (Eglin AFB property, west)
Source: JALBTCX CERI



The portion of Santa Rosa Island directly south of Hurlburt Field has mostly moderate coastal resilience (Figure 4-42), with some small pockets of low resilience areas.

Figure 4-43. Shoreline Resilience on Santa Rosa Island and Okaloosa Island (City of Fort Walton Beach)
Source: USACE CERI



Santa Rosa Island transitions to Okaloosa Island. The City of Fort Walton Beach owns some of Santa Rosa Island. This area has moderate resilience scores (Figure 4-43). Shorelines north of Highway 98 experienced significant erosion because of Hurricane Sally.

Eglin also owns the eastern portion of the island (Figure 4-44). This area primarily has moderately resilient shorelines, with some small sections of highly resilient shorelines and one 100-meter-long stretch of low resilience.

Overall, Santa Rosa Island shows moderate resilience to coastal hazards. There are areas for improvement, particularly in the low-scoring shorelines north of Hurlburt Field.

The shorelines along Hurlburt Field were not assessed using CERI because there was no available data. A review of historical satellite imagery revealed that there has not been significant shoreline recession for the installation shorelines at Hurlburt Field since 1994. It must be noted that this may not continue into the future because of SLR, which can increase the rate of shoreline erosion.

Figure 4-44. Shoreline Resilience on Okaloosa Island (Eglin AFB, east)
Source: USACE CERI



4.3.7 Risk Assessment

Assets with a vulnerability score greater than 6 were pulled into the risk analysis. The risk associated with the selected high vulnerability was subsequently evaluated using the following equation:

$$Risk = Impact\ to\ Mission + \Sigma\ (Hazard\ Likelihood \times Hazard\ Consequence)$$

where likelihood is the annual probability of occurrence and consequence is the combination of the impact of asset failure on mission assurance and the degree of impact on the asset itself. This yields a score that reflects the risk to the mission that the potential asset failure poses. The highest possible risk score for an asset is 200, and the breakdown of risk scores and rankings is shown in Table 4-43.

Table 4-43. Total Risk Scores and Rankings

Risk Score	Ranking
180–200	Extreme
120–180	High
60–120	Medium
0–60	Low

A detailed discussion of the methodology for evaluating risk can be found in the *Emerald Coast Vulnerability and Risk Assessment Introduction and Methodology* document (Appendix B).

Maps showing the locations of the high-risk assets can be found in Appendix C.

High Flood Risk Assets

The highest possible flood risk score of an asset was 60. There were no assets with high flood risks (risk score greater than 40). The medium-risk assets consist mostly of coastal wastewater lift stations along with some cell towers; these assets are exposed and sensitive to the 100-year flood and multiple categories of storm surge. In alignment with the corresponding flood vulnerability scores, coastal lift stations, particularly those in the City of Fort Walton Beach, experience the greatest risk of flooding, as shown in Table 4-44.

Table 4-44. Assets with Highest Flood Risk

	Asset Unique ID	Asset Type	Asset Name	Owner/Operator	Mission-Criticality	Applicable Installation Study Area	Risk Score	Risk Rank
1	20121	Wastewater Treatment Facilities and Lift Stations	Lift Station	Okaloosa County Water and Sewer	Supportive	Both Eglin AFB and Hurlburt Field	38.3	Medium
2	20271	Wastewater Treatment Facilities and Lift Stations	Lift Station	Okaloosa County Water and Sewer	Supportive	Both Eglin AFB and Hurlburt Field	38.3	Medium
3	20258	Wastewater Treatment Facilities and Lift Stations	Lift Station	Okaloosa County Water and Sewer	Supportive	Both Eglin AFB and Hurlburt Field	38.3	Medium
4	20190	Wastewater Treatment Facilities and Lift Stations	Lift Station	Okaloosa County Water and Sewer	Supportive	Both Eglin AFB and Hurlburt Field	38.3	Medium
5	20221	Wastewater Treatment Facilities and Lift Stations	Lift Station	Okaloosa County Water and Sewer	Supportive	Both Eglin AFB and Hurlburt Field	38.1	Medium
6	20230	Wastewater Treatment Facilities and Lift Stations	Lift Station	Okaloosa County Water and Sewer	Supportive	Both Eglin AFB and Hurlburt Field	38.1	Medium
7	19854	Wastewater Treatment Facilities and Lift Stations	Sewer Network Structure	City of Fort Walton Beach	Supportive	Both Eglin AFB and Hurlburt Field	38.1	Medium
8	20231	Wastewater Treatment Facilities and Lift Stations	Lift Station	Okaloosa County Water and Sewer	Supportive	Both Eglin AFB and Hurlburt Field	36.0	Medium
9	20223	Wastewater Treatment Facilities and Lift Stations	Lift Station	Okaloosa County Water and Sewer	Supportive	Both Eglin AFB and Hurlburt Field	35.9	Medium

Table 4-44. Assets with Highest Flood Risk

	Asset Unique ID	Asset Type	Asset Name	Owner/Operator	Mission-Criticality	Applicable Installation Study Area	Risk Score	Risk Rank
10	20199	Wastewater Treatment Facilities and Lift Stations	Lift Station	Okaloosa County Water and Sewer	Supportive	Both Eglin AFB and Hurlburt Field	35.9	Medium
11	154797	Wastewater Treatment Facilities and Lift Stations	Regional Utilities Lift Station	Regional Utilities	Supportive	Only Eglin AFB	35.4	Medium
12	154702	Wastewater Treatment Facilities and Lift Stations	Lift Station	South Walton Utility Co., Inc..	Supportive	Only Eglin AFB	35.4	Medium
13	154761	Wastewater Treatment Facilities and Lift Stations	Lift Station	South Walton Utility Co., Inc..	Supportive	Only Eglin AFB	35.2	Medium
14	154775	Wastewater Treatment Facilities and Lift Stations	Freeport Lift Station	City of Freeport	Supportive	Only Eglin AFB	33.6	Medium
15	154762	Wastewater Treatment Facilities and Lift Stations	Regional Utilities Lift Station	Regional Utilities	Supportive	Only Eglin AFB	32.7	Medium

Highest Total Risk Assets

The average risk score for the 84 high-vulnerability assets was 69, indicating overall medium-low risk. Of the assets, no assets had extreme risk nor high risk, 84 were medium risk, and 0 were low risk. Table 4-45 lists the asset names, mission criticality, owner, location, and total risk values for the 15 facilities with the highest risk.

Table 4-45. Assets with Highest Total Risk

	Asset Unique ID	Asset Type	Asset Name	Owner/ Operator	Mission Criticality	Applicable Installation Study Area	Risk Score	Risk Rank
1	27289	Roads	US-98 (Miracle Strip Parkway)	FPL	Supportive	Eglin AFB and Hurlburt Field	147	High
2	3043	Electrical Production and Supply Facilities	Power Transmission Line	FPL	Supportive	Eglin AFB	111	Medium
3	31908	Roads	Highway 98	FPL	Supportive	Eglin AFB and Hurlburt Field	105	Medium

Table 4-45. Assets with Highest Total Risk

	Asset Unique ID	Asset Type	Asset Name	Owner/ Operator	Mission Criticality	Applicable Installation Study Area	Risk Score	Risk Rank
4	137062	Electric Production and Supply Facilities	Power Transmission Main	FPL	Primary/ Secondary	Eglin AFB and Hurlburt Field	102	Medium
5	137054	Electric Production and Supply Facilities	Power Transmission Main	FPL	Primary/ Secondary	Eglin AFB and Hurlburt Field	102	Medium
6	3042	Electrical Production and Supply Facilities	Power Transmission Line	FPL	Primary/ Secondary	Eglin AFB and Hurlburt Field	102	Medium
8	3044	Electrical Production and Supply Facilities	Power Transmission Line	FPL	Primary/ Secondary	Eglin AFB and Hurlburt Field	102	Medium
9	3038	Electrical Production and Supply Facilities	Power Transmission Line	FPL	Primary/ Secondary	Eglin AFB and Hurlburt Field	102	Medium
10	3031	Major Roadways	Highway 98	FDOT	Supportive	Eglin AFB and Hurlburt Field	102	Medium

There were no high-risk assets due to the geography of the region. The coastal assets with the greatest flood risk had minimal risk from other hazards (i.e., wildfire) and vice-versa. Risk for some of the selected above assets is discussed as follows:

Risks for Mission-Critical Assets for Eglin AFB

As discussed in Section 4.3.2, Eglin's mission-critical assets include electrical production and supply facilities and community roadways. Table 4-46 shows the risk scores and rankings for the primary mission-critical assets for Eglin AFB.

Table 4-46. Eglin AFB Risks for Primary Mission-Critical Assets

	Asset Type	Asset Name	Owner/ Operator	Risk Score	Risk Rank	Notes
1	Major Roadways	Miracle Strip Parkway (US- 98)	FDOT	147	High	High flood risk throughout roadway
2		SR-293	FDOT	N/A	N/A	Asset had medium vulnerability score (4.3), not carried forward to risk analysis
3		SR-85	FDOT	N/A	N/A	Asset has medium vulnerability score (4.3), not carried forward in risk analysis

Table 4-46. Eglin AFB Risks for Primary Mission-Critical Assets

	Asset Type	Asset Name	Owner/ Operator	Risk Score	Risk Rank	Notes
4		SR-87	FDOT	127	High	Flood risk on connection from East Bay River to Holley in Santa Rosa County
5	Electrical Production and Supply Facilities	Power poles and distribution lines	CHELCO	Varies	Medium-low	Risk for wooden power poles and lines from fire and wind
6		Substations	CHELCO	Varies	Medium-low	
8		Power transmission lines	FPL	Varies	High-medium	
9		Substations	FPL	Varies	Medium	

The risks for additional mission-supportive assets are discussed below:

- **Arbennie Pritchett WRF.** This asset had a medium vulnerability score and was not carried forward into the risk analysis, though it is estimated that the risk to mission would be low. It is not exposed to flooding and has very low to no exposure for wildfire.
- **Gravity main connecting Eglin AFB to Arbennie Pritchett**. This main has low vulnerability. It is not exposed to SLR or other hazards that could impact operation. Overall, there is low risk for the wastewater assets that support the installation.

Risks for Mission-Critical Assets for Hurlburt Field

Table 4-47 documents the risk scores for primary mission-critical assets for Hurlburt Field, where applicable.

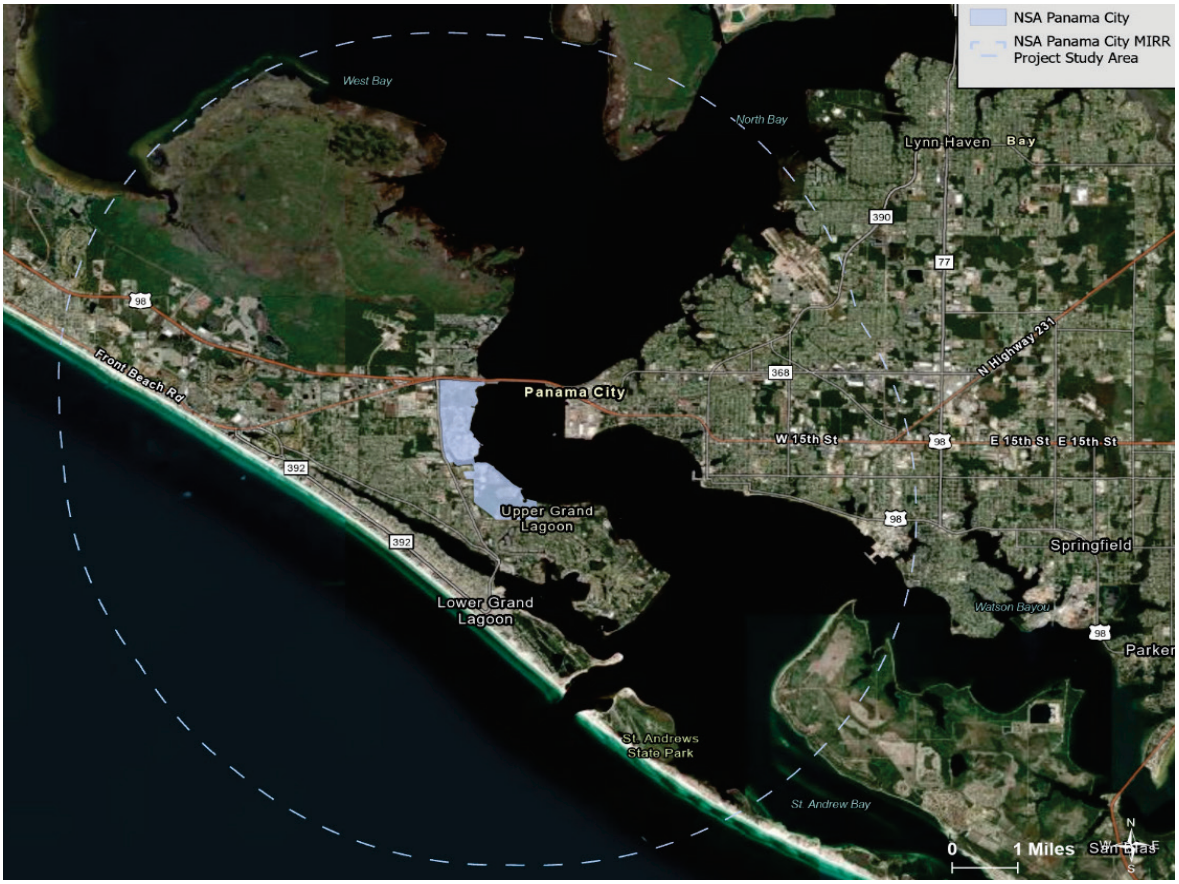
Table 4-47. Hurlburt Field Risks for Primary Mission-Critical Assets

Asset Type	Asset Name	Owner/ Operator	Risk Score	Risk Rank	Notes
Electrical Production and Supply Facilities	Power transmission lines	FPL	Varies	High-medium	
	Substations	FPL	Varies	Medium	
N/A	Housing	Varies	N/A	N/A	Not assessed via quantitative risk assessment
Shorelines	Santa Rosa Island Shorelines	Eglin AFB	N/A	N/A	Not assessed via quantitative risk assessment; Santa Rosa Island shorelines had moderate resilient scores per CERI
	Hurlburt Field Shorelines	Hurlburt Field	N/A	N/A	Not assessed via quantitative risk assessment

4.4 NSA Panama City

This MIRR Vulnerability Assessment and Risk Analysis evaluates asset vulnerability and risk in the communities surrounding NSA Panama City. The study area includes the region surrounding the installation, as shown in Figure 4-45. Critical assets within the study area were evaluated both quantitatively and qualitatively to determine the risks to the assets and the accompanying impact on the mission.

Figure 4-45. NSA Panama City



4.4.1 Hazards

Hazard data and anecdotes of existing asset vulnerabilities were collected during the in-person workshops and the MIRR technical advisory committee meetings. Lists of stakeholder-identified hazards, vulnerabilities, and mission-critical assets were generated from these discussions. These lists were used to identify areas of concern for deeper risk analysis, to confirm findings from the vulnerability assessment, and to understand the priority assets at risk. The following subsections summarize the known hazards.

Natural Hazards

Natural hazards evaluated in this vulnerability assessment include flooding from a 100-year flood event, SLR, and storm surge; wildfire; heat; extreme wind; and lightning.

Flooding

The three flood hazards evaluated in this assessment include the 100-year flood zone (representing inland, riverine, and coastal flooding), SLR, and storm surge for hurricanes from Category 1 to 5. Flooding poses a risk to installation operations.

It was noted during the stakeholder workshops that Thomas Drive is an area with flood hazard: during heavy rainstorms, water sheet-flows across the roadway and enters the north end of the installation. Roadway flooding throughout Bay County can also impact the installation's workforce, who commute from areas such as the City of Callaway, the City of Panama City Beach, and the City of Lynn Haven.

Additional flood concerns noted during the workshops include SLR affecting Deer Point Dam. The dam contains the Deer Point Lake Reservoir, which is the primary water source for Bay County (NWFWMD 2023).

Wildfire

In 2022, more than 40,000 acres of Bay County were burned by wildfire. As shown in Figure 4-46, historic wildfire areas near NSA Panama City include the heavily wooded area north of the installation as well as miscellaneous small properties throughout the City of Panama City Beach. Wildfire smoke is not anticipated to impact the missions of the installation.

Extreme Heat

According to data from the U.S. Climate Explorer, Bay County is projected to experience an increase in temperatures from today through 2060–2070, with a temperature increase of approximately 2.5 degrees Fahrenheit (°F). Heat projections are available under multiple RCPs, which are climate change projections that depend on greenhouse gas emissions scenarios. Figure 4-47 shows the projected number of days where the temperature is expected to be above 90, 95, 100, and 105°F in the county under the RCP 8.5, the high emissions scenario. The number of days with a maximum daily temperature greater than 100°F will increase over time, with projections from 1.2 days in the 2020s to 5 days in the 2040s to a maximum of approximately 22 days in the 2070s under the high emissions scenario (U.S. Federal Government n.d.).

Figure 4-46. Wildfire Occurrence Areas 2006–2018
Source: NWFSL (n.d.)

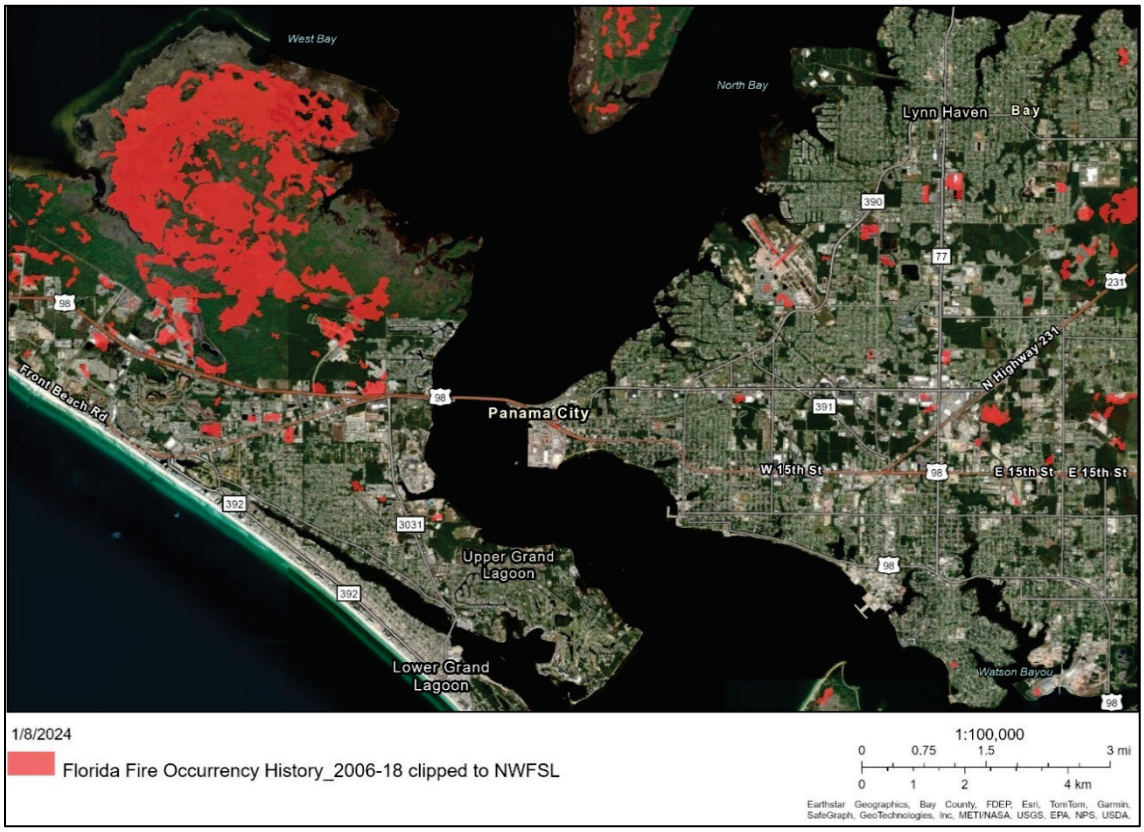
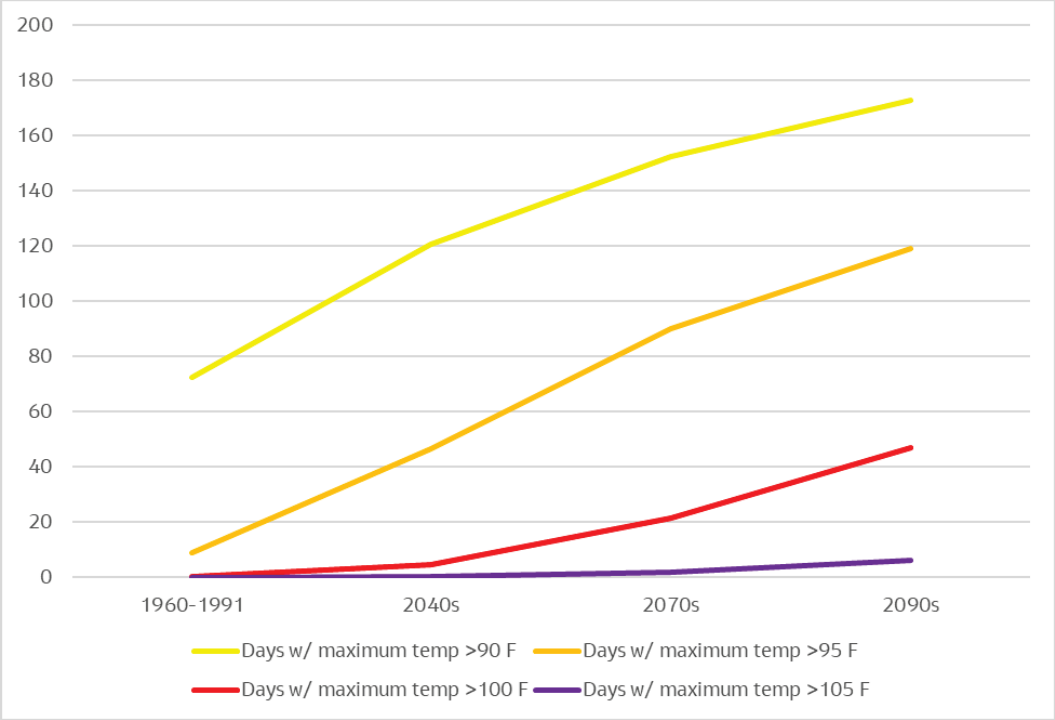


Figure 4-47. Projected Change in Mean Annual Highest Maximum Temperature in Bay County
Source: U.S. Federal Government n.d.



Many assets begin to display sensitivity to heat starting around 100°F. Higher temperatures can cause electrical equipment to overheat and roadways to buckle, negatively impacting the mission-critical power transmission lines and roadways that support the installation.

Heat is a particularly significant concern in the region after Hurricane Michael in 2018, which destroyed much of Bay County's tree cover. Shade trees can reduce heat impacts and provide cooling; the lack of tree canopy increases both infrastructure and human vulnerability to heat.

The region around the installation also lost much of its tree cover because of Hurricane Michael, as shown in Figure 4-48. The City of Panama City Beach suffered moderate timber damage, in which as many as 32% of tree stems were broken, while the City of Panama City suffered severe timber damage, losing up to 50% of its tree cover (NWFSL n.d.).

Extreme Wind

Winds from Hurricane Michael caused significant devastation throughout Bay County. The storm made landfall with estimated sustained winds of 161 miles per hour. According to the FEMA Mitigation Assessment Team, significant structural damage occurred throughout Bay County, affecting residences and critical community assets such as hospitals and schools (Federal Emergency Management Agency 2020). Figure 4-49 shows estimated wind speeds from the storm.

Hurricane Michael's wind speeds exceeded the design wind speeds for risk category II buildings by 10% in Bay County. Newer structures, specifically those built after the implementation of the Florida Building Code, fared better than those built before (FEMA 2020).

The region around the installation also lost much of its tree cover because of Hurricane Michael's winds, as shown in Figure 4-48. the City of Panama City Beach suffered moderate timber damage, in which as many as 32% of tree stems were broken, while the City of Panama City suffered severe timber damage, losing up to 50% of its tree cover (NWFSL n.d.).

Figure 4-48. Hurricane Michael Timber Damage
Source: NWFSL (n.d.)

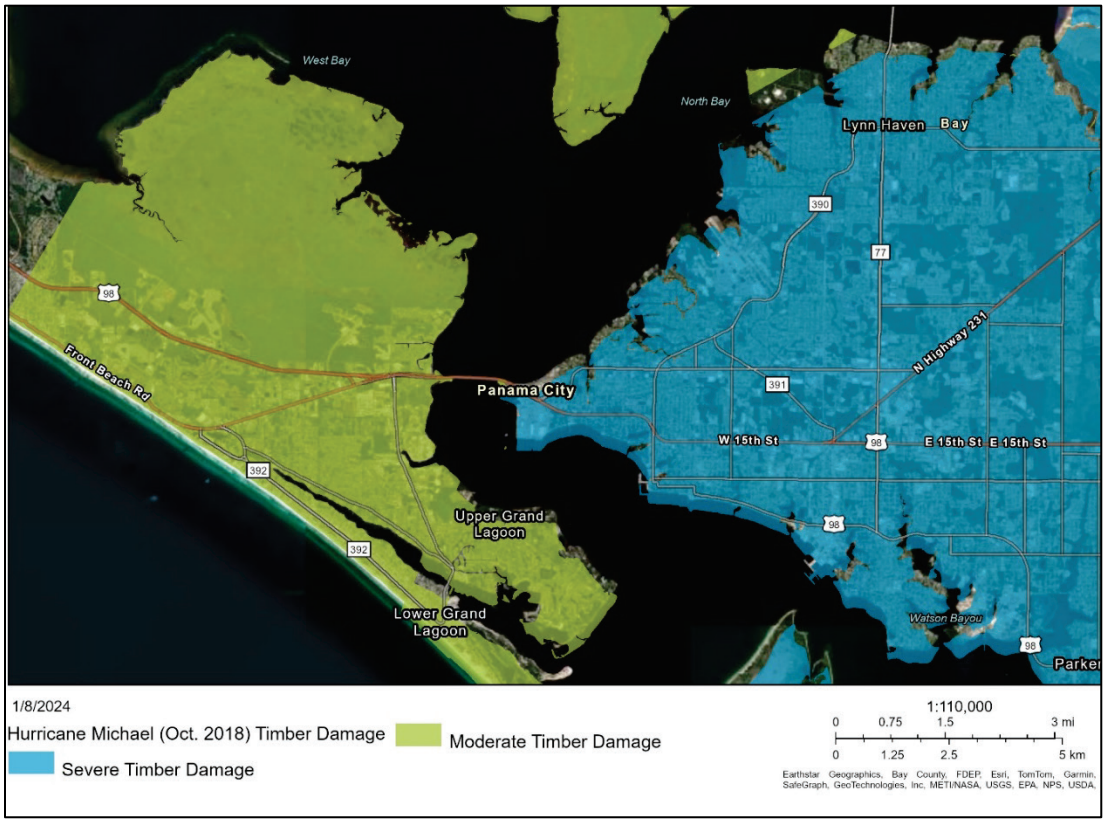
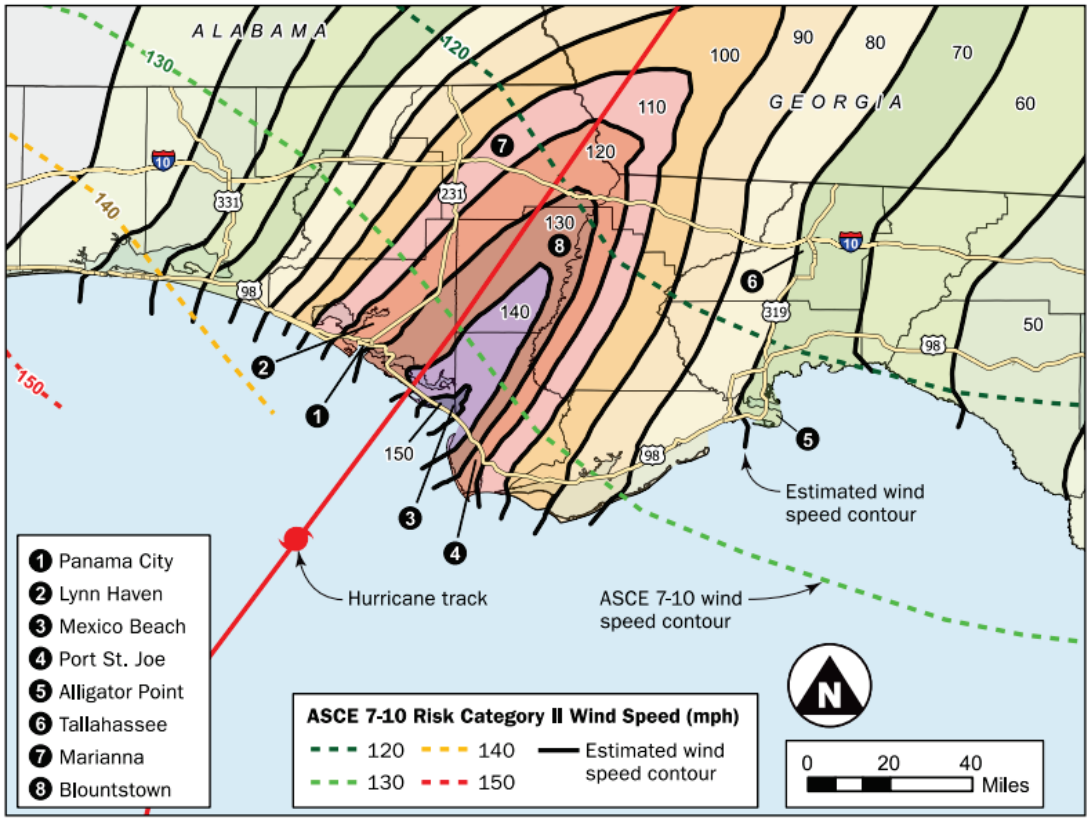


Figure 4-49. Hurricane Michael Wind Speeds
Source: FEMA (2020)



Lightning

According to the FEMA National Risk Index, Bay County experiences approximately 125 cloud-to-ground lightning strikes annually (FEMA n.d.). In addition to lightning's potential to damage critical infrastructure, lightning strikes can also ignite dry fuels and cause wildfires, which can be an issue in the wooded regions of the County.

Infrastructure Shocks and Stresses

The communities around NSA Panama City are facing infrastructure issues stemming from roadway capacity and energy infrastructure.

Roadway Capacity

Traffic congestion on mission-critical roadways, including US-98, can inhibit personnel from arriving at the installation on time, potentially impacting the mission. Traffic issues can be further compounded during storms or flood events. Figures 4-50 and 4-51 show the percentage of max traffic volume occurring on critical roadways within the project study area for 2020 and 2045, respectively.

In 2020, US-98 and SR-30 exceeded their capacity. Both of these roadways are critical because of their connections to Thomas Drive. The primary access road for NSA Panama City are US-98 and US-30. The 2020 congestion rate for US-98 on Hathaway Bridge is 111%. Elevated congestion on US-98 and SR-30 impedes access to the installation. Other roads within the project study area, including State Road 368, W 15th Street and Front Beach Rd, are at 50% to 85% capacity and nearing full capacity in some areas.

In 2045, traffic congestion is projected to increase on nearly all roads within the project study area. US-98 and SR-30 will continue to exceed capacity. Roads such as State Road 368, W 15th Street and Front Beach Rd will experience an increase in congestion. It is projected that State Road 368 capacity will increase from 67% to 75%, W 15th Street capacity will increase from 88% to 111%, and Front Beach Rd capacity will increase from 67% to 96%. Increases in traffic congestion throughout the project study area create longer commutes for installation personnel.

Energy Disruption

Energy disruption's inherent risks have broad implications, causing notable economic setbacks, compromising public safety, and obstructing crucial services. This underscores the immediate necessity to assess vulnerabilities and institute safeguards to reduce the adverse impact on local communities and military installations. Hazards affecting energy infrastructure stability and triggering disruptions for NSA Panama City include:

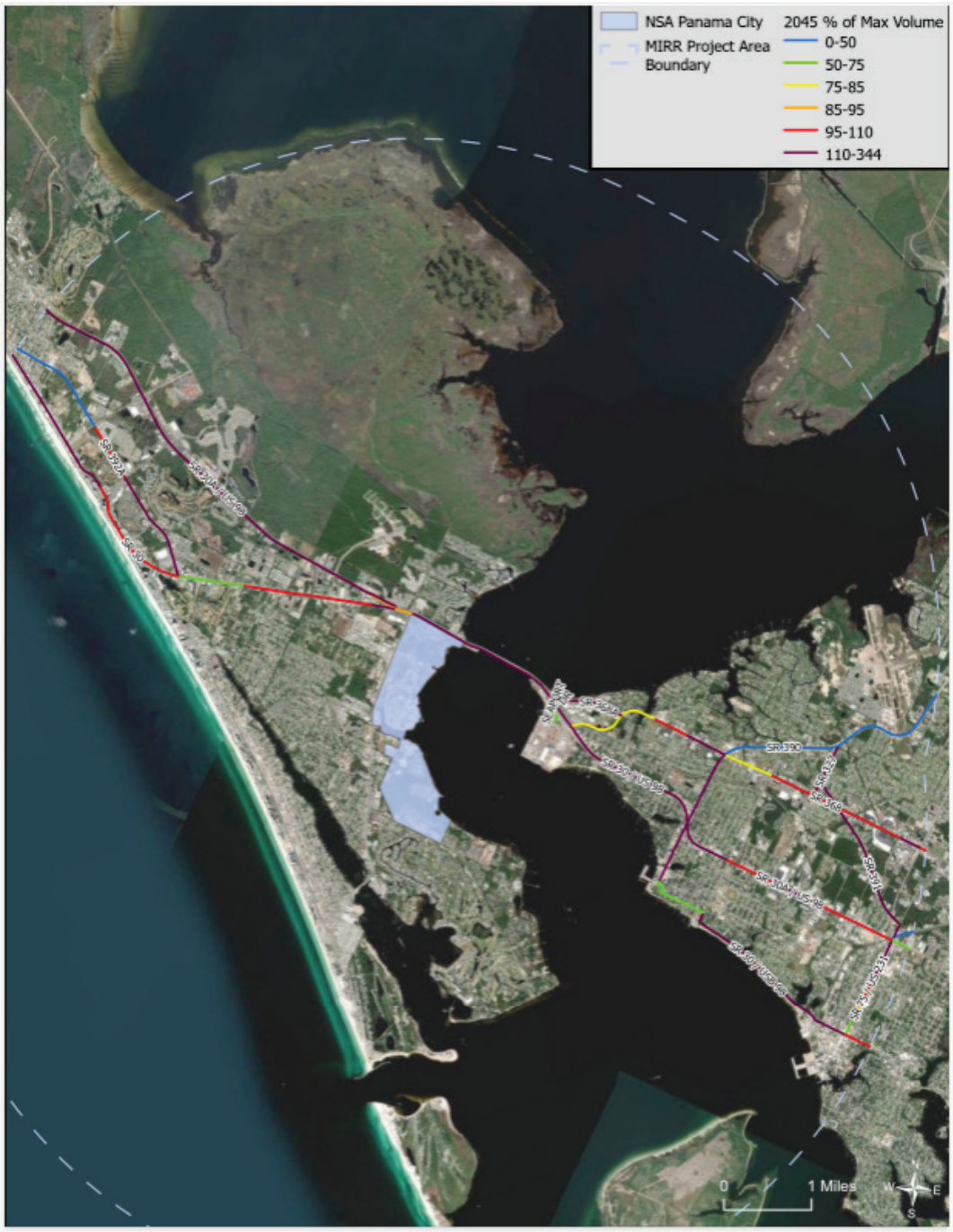
- **Storm Surge and 100-year Flood:** extended exposure to water can cause malfunction and power transmission line poles to weaken and decay, reducing their load-bearing capacity. One substation northwest of the installation is found to be within FEMA's 100-year floodplain, increasing its vulnerability to flooding.
- **Hurricanes**: strong sustained wind and fallen trees can take down power lines or even cause permanent damage to structures or equipment.

Proximity of nearby tree canopy and wetlands to electric substations, transformers, and power transmission and distribution lines is also a critical consideration for fire occurrences and potential saltwater intrusion cases. Fire departments require 20 to 30 feet of fire line width with a 3- to 4-foot scrape (cleared area via vegetation removal) to respond to fires. The substations that serve the installation meet this standard.

Figure 4-50. 2020 Traffic Congestion



Figure 4-51. 2045 Traffic Congestion



Economic Threats

Economic threats that affect the mission of the installation, as discussed during the stakeholder engagement workshops, include the stratified economy in Bay County and housing attainability.

Lack of Economic Diversity

As with the other counties in this study, Bay County has a stratified economy in which the military and tourism are key economic drivers. It was discussed in the workshops that business growth is occurring; in 2023, more than 300 businesses were started including incoming research and development facilities for major companies. However,

many of these new employment opportunities are in the retail, hospitality, and service industries and thus provide low-paying wages. Still, these efforts are working to bolster the County's economic health and resilience.

Housing Attainability

Consistent with the rest of the Emerald Coast, attainable housing is a significant challenge that is affecting the installations and their personnel. Housing prices have increased significantly in Bay County, rising from an average of $170,500 in 2015 to $350,000 in 2023 (Zillow n.d.).

The majority of the staff at NSA Panama City are civilians who reside in communities such as the City of Panama City Beach, the City of Callaway, and the City of Lynn Haven. It was noted in the stakeholder engagement workshops that high housing prices in the neighborhoods around the installation are pushing staff and students into communities that are farther away from the installation.

Environmental Threats

Environmental threats facing NSA Panama City include water quality, rising groundwater levels, endangered species, and shoreline erosion.

Water Quality

Water quality in St. Andrew Bay can pose a threat to the health and safety of Navy personnel, community members, and the environment. Stormwater management systems and septic systems threaten water quality in the Bay. The septic systems can impact water quality in both St. Andrew Bay and at Deer Point Lake Reservoir, which is the primary water source for Bay County. To mitigate these issues, Bay County is pushing septic-to-sewer conversions throughout the County and has allocated $7.5 million to convert 150 homes to wastewater service."

Rising Groundwater Levels

It was noted during the stakeholder workshops that, as a result of Hurricane Michael uprooting thousands of trees, Bay County has been experiencing higher than normal groundwater levels. This alteration to the regional groundwater hydrology, coupled with heavy precipitation events, can cause inland flooding. The NWFWMD is conducting an assessment of groundwater levels in the Floridan aquifer in the region, which is expected to be completed in 2026.

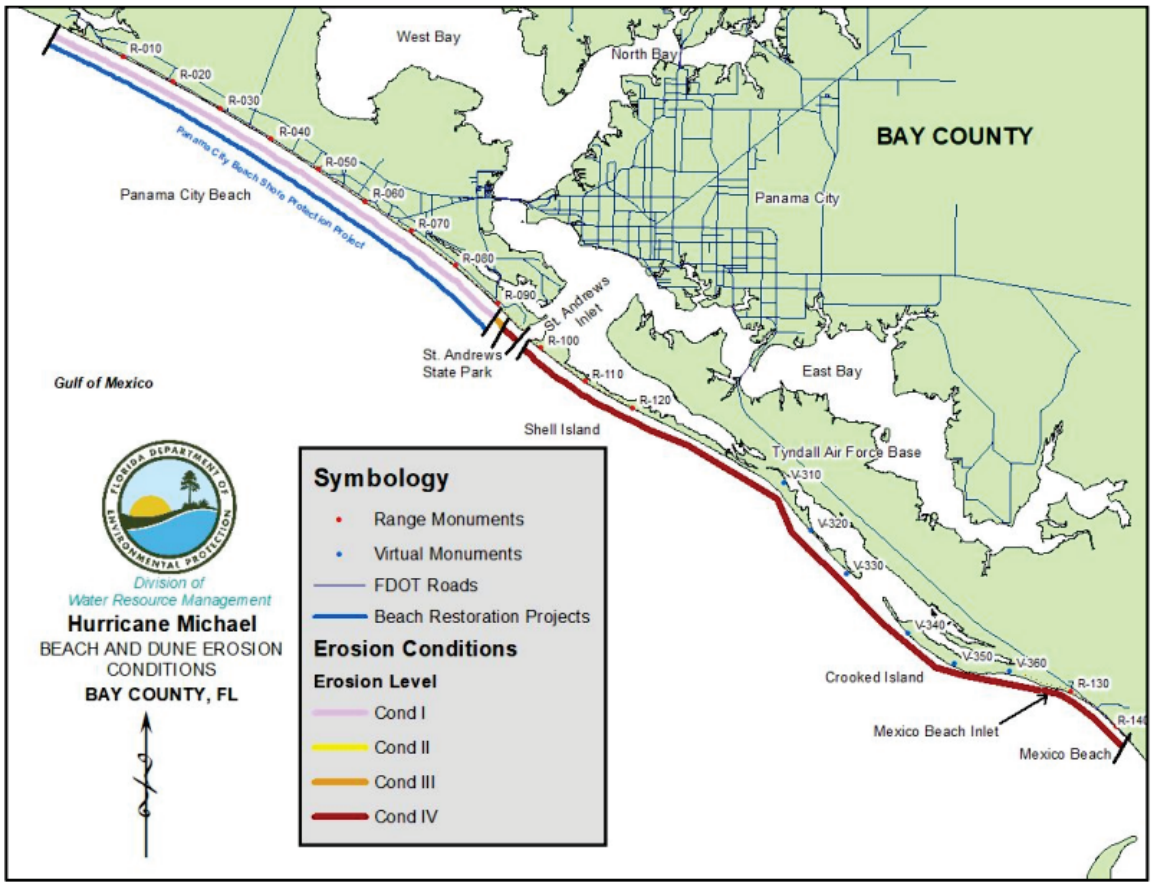
Shoreline Erosion

Erosion is occurring on shorelines along the Gulf of Mexico as well as in St. Andrew Bay and is exacerbated by storm events such as Hurricane Michael (refer to Figure 4-52).

In 2018, Hurricane Michael caused minor erosion along the City of Panama City Beach (FDEP 2019). Multiple beach renourishment projects have occurred in 1999, 2007, 2011, and 2017 as part of the federal Panama City Beaches Shore Protection Project (FDEP 2020b). The most recent funding was secured for St. Andrews State Park in September 2023.

Shoreline erosion at installation shorelines was noted to be a concern during the stakeholder engagement workshops, where it was discussed that NSA Panama City is evaluating potential nature-based (Engineering With Nature) solutions.

Figure 4-52. Hurricane Michael Erosion Conditions in Bay County
Source: FDEP (2019)



Encroachment

Operations Areas

The on-water operations areas of NSA Panama City—St. Andrew Bay and the beach sites—also face encroachment threats. In St. Andrew Bay, encroachment challenges range from residents extending their docks into the operations areas to tourists accidentally paddling or driving boat rentals into the area. NSA Panama City proactively addresses these issues: installation personnel notify offenders about the encroachment and also educate watercraft rental companies.

The beach sites face regular encroachment from beachgoers and service companies (beach chair providers). The sites are used by the Naval Surface Warfare Center for research and testing and must be kept clear of civilian impacts.

Barefoot Palms

Barefoot Palms is a legacy encroachment issue for NSA Panama City. The parcel was initially purchased by a dive museum but was sold to a developer in 2004. The developer added 8 feet of fill to the property, raising the elevation above the installation fence line. The site was identified as an encroachment issue in 2007 and as a major encroachment issue in the 2009 Joint Land Use Study (Matrix Design Group 2009). In 2017, the property was purchased by the state military protection fund and in 2023 the Florida Governor and Cabinet voted to gift the property to the Navy. The Navy expects to accept the property in 2025. The Navy is currently evaluating options for use of the property, which is currently in disrepair (where a retaining wall has collapsed).

4.4.2 Mission-Critical Infrastructure

Mission of the Installation

For the MIRR, the installation missions were categorized as primary or secondary missions. While not providing a complete overview of all ongoing installation activities, this process provides a sufficient understanding of the missions of the installation to identify what infrastructure is critical for supporting that mission. Assets were then categorized as primary, secondary, or mission-supportive mission-critical. The primary and secondary missions of NSA Panama City are discussed in the following text.

Primary Mission

The Naval Diving and Salvage Training Center trains divers from all DoD commands and is the world's largest diving center. The Center annually trains approximately 1,500 students in 4,200 square miles of in-water training area, including ten restrictive waterways in St. Andrew Bay and a large portion of the EGTTR. On land, the Naval Experimental Diving Unit contains a 55,000-gallon facility that simulates ocean depths to 1,000 feet. For the purposes of the MIRR, dive training is the primary mission of NSA Panama City.

Secondary Missions

The secondary missions are the research, development, testing, and evaluation occurring through the Naval Surface Warfare Center and the USCG operations that operate out of the installation. While the USCG is not part of the DoD, it was discussed during the stakeholder engagement workshops that the USCG station works closely with the installation for both security and training. As a result, the station provides a critical support function for NSA Panama City.

Overview of Mission-Critical Infrastructure

NSA Panama City does not operate independently. It relies on a complex network of private and public partners to execute its missions. It was evident during the stakeholder engagement workshops that the installation maintains positive relationships with entities such as Bay County, the City of Panama City Beach, the City of Panama City, and utility providers. Table 4-48 summarizes the primary, secondary, and mission-supportive mission-critical infrastructure.

Table 4-48. NSA Panama City Missions and Associated Critical Infrastructure

	Mission	Mission-Critical Infrastructure
Primary Mission	Dive Training (Naval Diving and Salvage Training Center)	▪ St. Andrew Bay ▪ Eastern Gulf Test and Training Range ▪ Electric production and supply facilities ▪ Communication infrastructure ▪ Major roadways and evacuation routes ▪ Installation shorelines ▪ Water treatment and conveyance infrastructure connected to installation ▪ Wastewater infrastructure from NSA Panama City to Panama City Beach WWTP
Secondary Mission	▪ U.S. Coast Guard Operations ▪ Research, Development, Testing, and Evaluation	▪ Coast Guard Station Panama City

Table 4-48. NSA Panama City Missions and Associated Critical Infrastructure

	Mission	Mission-Critical Infrastructure
Mission-Supportive	▪ N/A	▪ Community water systems ▪ Community wastewater systems ▪ Community assets (schools, law enforcement, etc.)

N/A = not applicable

Mission-critical infrastructure required to support normal operations at NSA Panama City include St. Andrew Bay, electric power, and major roadways and evacuation routes for personnel to travel to the military installation. Table 4-49 lists infrastructure and asset owners/operators.

Table 4-49. NSA Panama City Mission-Critical Infrastructure Owners and Operators

Infrastructure Type	Asset Owner/Operator
Electric Power	FPL
Potable Water	Bay County
Wastewater	City of Panama City Beach
Roadways	FDOT, Bay County, various municipalities
Shorelines	Bay County
Communications	AT&T, Comcast, Cox, Verizon

The following subsections discuss the individual infrastructure pieces that support the missions.

Primary Mission-Critical Infrastructure

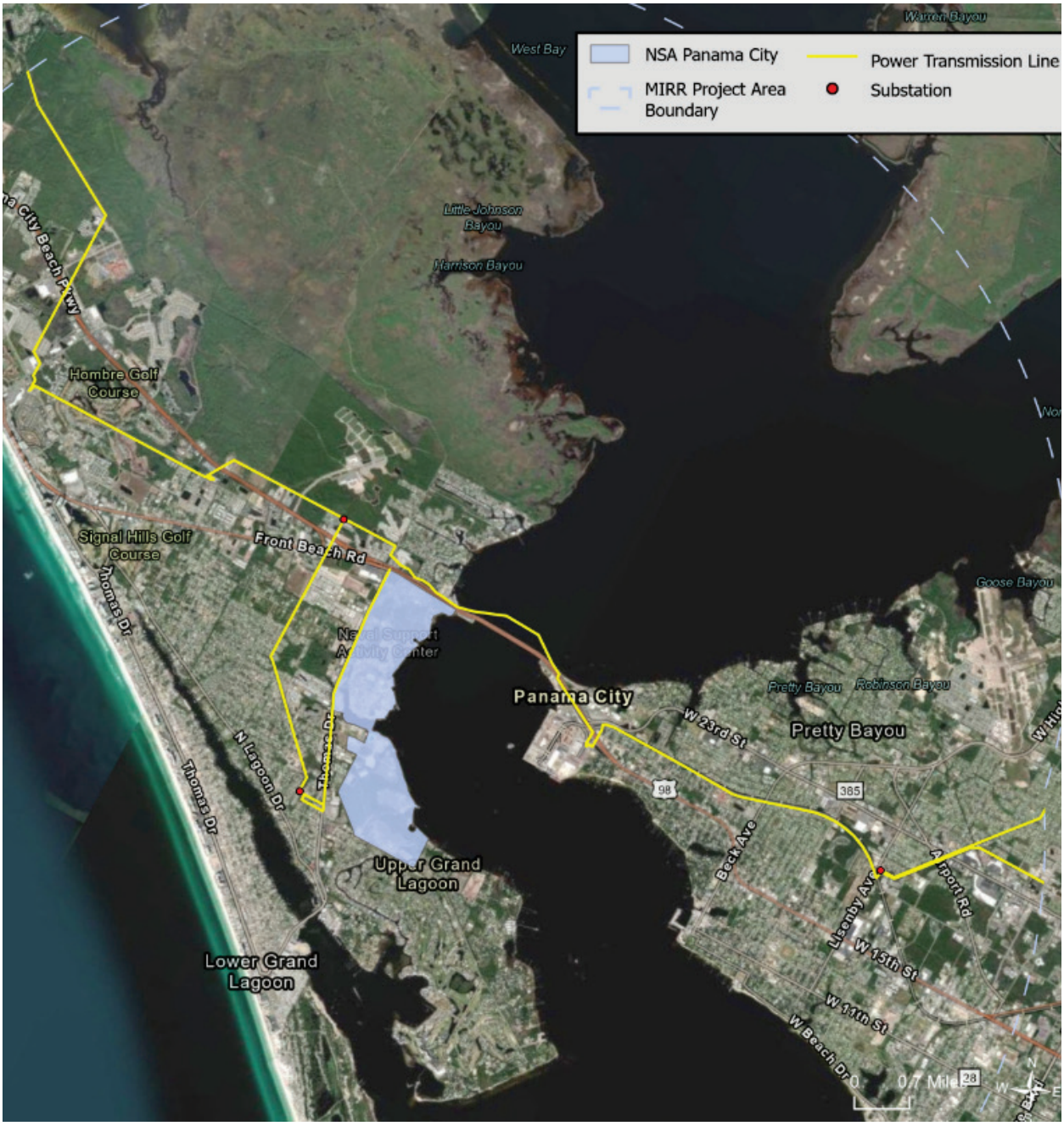
St. Andrew Bay

While not necessarily traditional infrastructure, St. Andrew Bay is a critical community asset that supports the dive training mission at NSA Panama City. Encroachment and water quality hazards within the Bay can impact the ability of the installation to conduct training.

Electric Production and Supply Facilities

FPL and Power South are two of the electrical suppliers in Bay County, with FPL providing most of the power in the study area as well as supplying power to NSA Panama City. The installation receives its electric power from the Lansing Smith Generation Plant, which delivers power to the installation through a series of overhead power transmission and distribution lines (refer to Figure 4-53). It should be noted that PowerSouth is not a direct provider of power but rather the wholesale energy provider of the rural cooperative in Bay County.

Figure 4-53. NSA Panama City Mission-Critical Electric Production and Supply Facilities



Hardening of the electrical distribution system is underway in many areas. Overhead distribution lines are being moved underground, though these efforts typically require funding from the community. Distribution infrastructure in the City of Springfield, the City of Callaway, the City of Parker, the City of Lynn Haven, and historic areas of the City of Panama City require additional hardening.

Major Roadways and Evacuation Routes

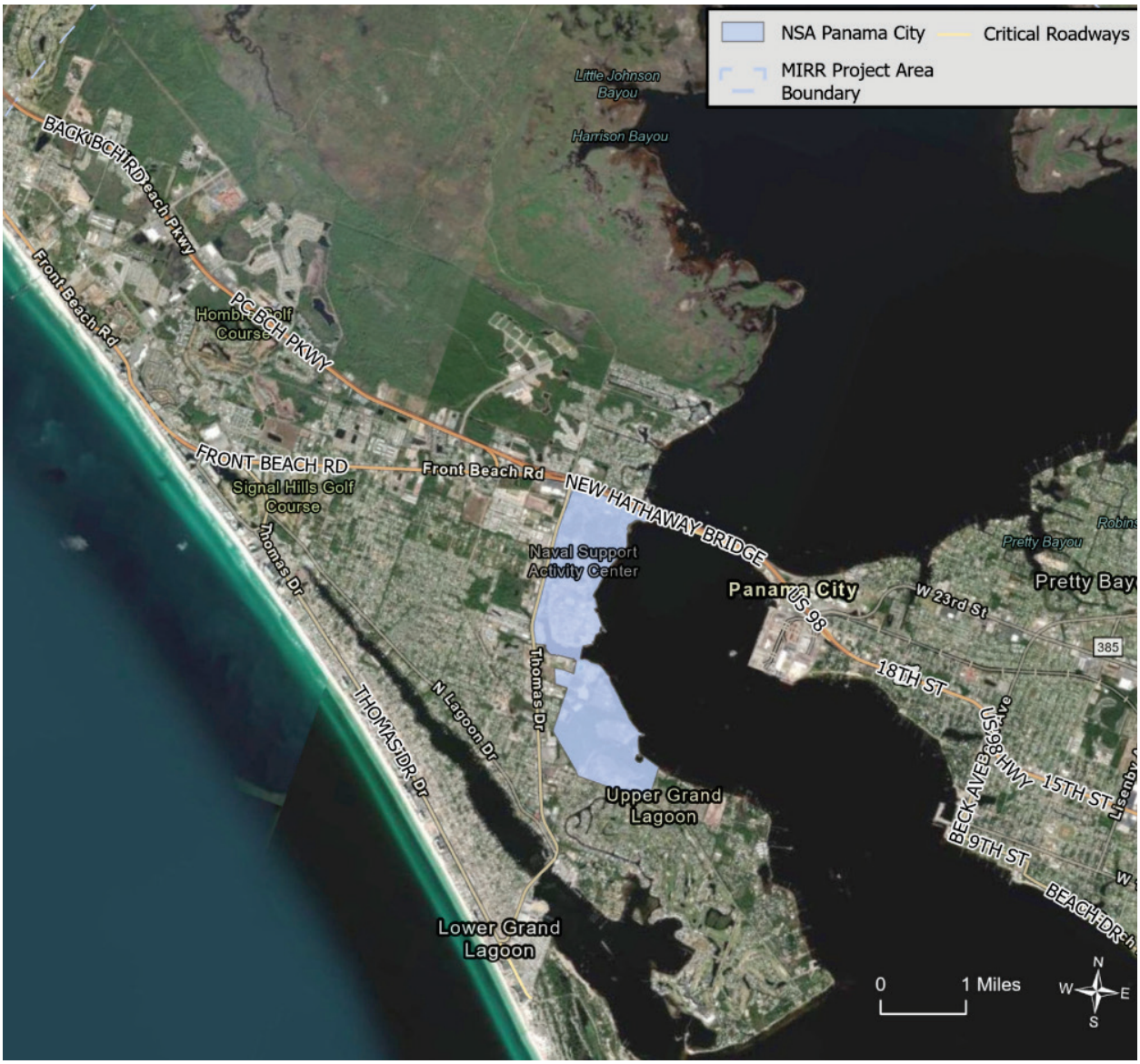
Major roadways and evacuation routes are mission-critical infrastructure needed for service members to access the installation. For this VA, the routes noted in Table 4-50 were considered primary mission-critical.

Table 4-50. NSA Panama City Major Roadways

Route	Limits for VA
Thomas Drive	Contained within study area
US 98	From extent of study area to Walton County
US 30	From intersection with US 98 to eastern extent of study area
US 231	From intersection with US 98 to extent of study area boundary

These routes serve as major thoroughfares connecting communities to NSA Panama City and are shown in Figure 4-54.

Figure 4-54. Primary Mission-Critical Roadways



Communications

Communications systems are critical for training operations, including communication between training watercraft and the installation. Relevant communications assets include cell towers and fiber lines, though only cell tower data were able to be acquired for this assessment. Regional communications providers are AT&T, Cox, Verizon, and Comcast Xfinity.

Shorelines

There are two areas where shorelines are critical for NSA Panama City. The first are the shorelines along the installation itself in St. Andrew Bay. In addition to the installation, the three beach sites along the Gulf of Mexico are exposed to erosion as well (refer to Figure 4-55). It is beyond the scope of this project to evaluate shoreline health within the installation itself; however, it should be noted that NSA Panama City is evaluating options for improving shoreline resilience, including the Engineering With Nature program.

Figure 4-55. Primary Mission-Critical Shorelines



Secondary Mission-Critical Infrastructure

U.S. Coast Guard Station Panama City

The USCG station, co-located with the installation, relies upon the same infrastructure that NSA Panama City does.

Mission-Supportive Infrastructure

Community Water Systems

The Bay County Water Treatment Plant at Deer Point is currently the primary source of potable water for the City of Panama City as well as NSA Panama City.

Community Wastewater Systems

The Panama City Beach WWTP receives wastewater from NSA Panama City and the communities on the eastern side of the Hathaway Bridge. Wastewater from the City of Panama City, including the communities of Callaway and Lynn Haven, is sent to the Advanced Water Treatment Facility, which is located on base at Tyndall Air Force Base but operated by Bay County.

Community Roadways

Community and neighborhood roadways are considered mission-supportive. These roads are used by installation personnel to commute to the installation from their neighborhoods.

4.4.3 Exposure Analysis

The exposure analysis consisted of overlaying the regional asset inventory (parcels, buildings, shorelines, seawalls, critical infrastructure) with hazard layers to determine whether intersection or exposure occurred. The hazards analyzed include flood exposure (100-year flood, storm surge, and projected SLR); wildfire; heat, lightning, and wind exposure; and transportation exposure. In addition to the hazard analysis, a review of transportation route exposure to flood and fire hazards was conducted. Appendix C includes exposure maps for flood and wildfire.

Flood Exposure

The flood hazards considered in the flood exposure analysis include the 100-year flood event, storm surge from hurricanes (Categories 1 through 5), and the four SLR scenarios recommended by Florida Statutes from NOAA: SLR 2040 Intermediate-low, SLR 2040 Intermediate-high, SLR 2070 intermediate-low, and SLR 2070 intermediate-high.

100-Year Flood

The 100-year flood, also known as the 1% annual chance event, consists of pluvial (rainfall-induced), fluvial (riverine), and coastal flooding. Flooding from the 100-year event occurs along the coastlines of the City of Panama City and the City of Panama City Beach, as well as along various streams and low-lying areas. Approximately 18% of assets are exposed to the 100-year flood event; the other 82% are not in the special flood hazard area.

Storm Surge

The study area has high storm surge exposure, as shown in Table 4-51. Under a Category 5 hurricane, almost all of the City of Panama City Beach and the City of Panama City west of Franklin Avenue is inundated by more than 1 foot of water. Of the 20,663 assets analyzed, 72.8% are exposed to storm surge under the most extreme conditions.

Table 4-51. Storm Surge Exposure

Hurricane	Percentage of Assets Exposed
Category 1	9.7%
Category 2	20.7%
Category 3	36.4%
Category 4	62.8%
Category 5	72.8%

Sea Level Rise

The SLR exposure analysis identifies future (2040 and 2070) sea levels using SLR projections from NOAA. Overall, few assets in the study area are exposed to SLR, as shown in Table 4-52.

Table 4-52. Sea Level Rise Exposure

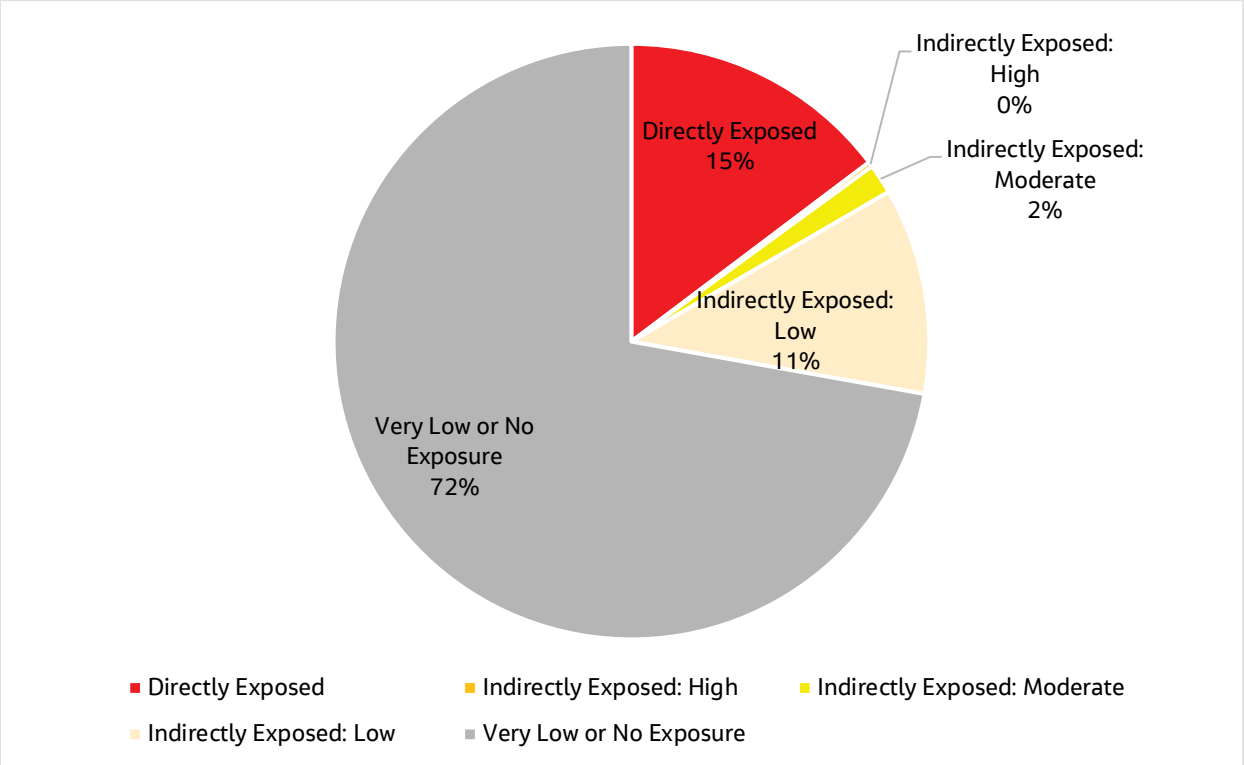
SLR Scenario	Percentage of Assets Exposed
2040 Intermediate Low	0%
2040 Intermediate High	0.13%
2070 Intermediate Low	0.12%
2070 Intermediate High	1.95%

None of the assets in the study region are exposed to SLR in the 2040 intermediate-low scenario. Less than 1% of assets are exposed to the 2040 intermediate-high and 2070 intermediate-low SLR scenarios. Approximately 2% of assets (403) will be exposed to SLR in the 2070 intermediate-high scenarios, mainly select community pipes and roadways in northern coasts near Goose Bayou. No primary mission-critical infrastructure is anticipated to be impacted by SLR.

Wildfire Exposure

The majority of the study area is urban and, as a result, is not exposed to wildfire, with 70% (14,400) of assets exhibiting very low or no exposure and only 15% being directly exposed (refer to Figure 4-56). Assets with direct exposure to wildfire are located adjacent to forested areas (such as the large, wooded area north of the City of Panama City Beach) or conservation areas.

Figure 4-56. Asset Exposure to Wildfire



Heat, Lightning, and Wind Exposure

All aboveground assets (including structures and horizontal utilities) are exposed to heat, high winds, and lightning. Tall assets, such as cell towers or power transmission lines, are most exposed to lightning and wind hazards. Approximately 47% of assets are aboveground or at grade (for example, roadways) while the other 53% are belowground and are not exposed to heat, lightning, or wind.

Transportation Exposure Analysis

Thomas Drive

Thomas Drive has minimal flood exposure during the 100-year flood event, experiencing flooding near the bridges crossing Grand Lagoon and Alligator Bayou. The roadway experiences worsening inundation as storm surge becomes more severe, becoming entirely inundated under a Category 5 storm. Table 4-53 quantifies the length of exposed segments.

Table 4-53. Thomas Drive Flood Exposure Analysis

Flood Event	Exposed Segments	Approx. Length of Exposed Segments	Total Length Inundated
100-Year Flood	Grand Lagoon crossing (on ramps)	690 feet	790 feet
	Alligator Bayou crossing	100 feet	
Category 1 Storm Surge	N/A	100 feet	
Category 2 Storm Surge	Grand Lagoon crossing	2,900 feet	3,000 feet
Category 3 Storm Surge	Alligator Bayou crossing	100 feet	
	Grand Lagoon crossing	5,000 feet	1.1 miles
	Alligator Bayou crossing to Albatross Drive	1,000 feet	
Category 4 Storm Surge	Majority of roadway	31,000 feet	5.9 miles
Category 5 Storm Surge	Entire roadway	N/A	N/A

N/A = not applicable

4.4.4 Sensitivity Analysis

This section describes the anticipated impacts to community assets and infrastructure from exposure to each identified hazard and scenario. While the exposure analysis helped to identify the spatial extent of a hazard across relevant installations and study areas, the sensitivity analysis identifies the degree of impact across assets. The process for determining asset sensitivities can be found in the *Vulnerability and Risk Assessment Introduction and Methodology* document (Appendix B). This process was standardized across all MIRR VAs and is briefly discussed in the following text.

Flood Sensitivity

An asset's sensitivity to flooding depends on the asset's ability to operate during a flood event. Typically, low-lying assets can become inaccessible during flooding or go offline when electrical components are flooded. Facilities with finished interiors, such as schools or government buildings, also display increased flood sensitivity.

Wildfire Sensitivity

Assets with electrical components or substations, such as power transmission lines or wastewater lift stations, will have some of the greatest sensitivities to wildfire. Roadways, railroads, and bridges also have sensitivity because of

the effects of heat from wildfires. Bridge sensitivity also depends on the bridge material (for example, a bridge with a wooden deck surface will be more sensitive to wildfire as opposed to one with a concrete or paved deck). Overall, transmission lines, potable water wells, and transportation assets are most sensitive to wildfire.

Heat Sensitivity

Asset sensitivity to heat depends on the threshold temperature of the asset. When the surrounding air temperatures exceed the asset threshold temperature, it is assumed that the asset begins to display sensitivity to the hazard. Railroads display the highest sensitivity to projected extreme heat events followed by bridges.

Lightning and Extreme Wind Sensitivity

While all aboveground assets are exposed to lightning and wind, the characteristics and installation of the asset can influence the sensitivity to these hazards. Cell towers and transmission lines are most sensitive to lightning.

Similarly, an asset's wind sensitivity depends on location and the surface area of the asset. Tall structures with little surface area, such as a cell tower, are less sensitive to winds than those with a large surface area, such as a building. Assets without reinforcement are also more sensitive to wind. Transmission lines may be reinforced at poles; however, the lines themselves are vulnerable to wind and flying debris. The impacts of wind-borne debris were also considered when determining wind sensitivity.

4.4.5 Vulnerability Assessment

A vulnerability score was calculated for each asset using the follow equation:

Vulnerability = Exposure + Sensitivity

The highest hazard vulnerability score for each of the five hazards is 2, yielding a maximum total vulnerability score of 10. The following subsections detail asset vulnerability to flood, wildfire, and heat. Extreme wind and lightning are included in the overall vulnerability scores. This yields a score that reflects the risk to the mission of the installation. A detailed discussion of the methodology for evaluating risk can be found in *Vulnerability and Risk Assessment Introduction and Methodology* document (Appendix B).

Appendix C provides maps showing the locations of high-risk assets.

Flood Vulnerability

The highest possible flood vulnerability score of an asset is 2, whereas the average score is 0.3 and the highest achieved score is 1.3, indicating low flood vulnerability among all assets. The majority of assets are not vulnerable to flooding. The highest score attained was 1.3, indicating medium vulnerability of assets to flooding. Table 4-54 shows the assets with the highest flood vulnerability score. The assets most vulnerable to flooding include various lift stations, J.R. Arnold High School, the Florida Highway Patrol Station, and Northshore Islands Road.

Table 4-54. Assets with Highest Flood Vulnerability

No.	Asset Unique ID	Asset Name	Mission Criticality	Owner/Operator	Flood Vulnerability Score
1	21	J.R. Arnold High School	Supportive	Bay County	1.3
2	13	PC 11 Lift Station	Supportive	City of Panama City	1.3
3	37	PC 12 Lift Station	Supportive	City of Panama City	1.3
4	179	Bay County Lift Station 11	Supportive	Bay County	1.3
5	209	Bay County Lift Station 39	Supportive	Bay County	1.3
6	288	Bay County Lift Station 84	Supportive	Bay County	1.3

Table 4-54. Assets with Highest Flood Vulnerability

No.	Asset Unique ID	Asset Name	Mission Criticality	Owner/Operator	Flood Vulnerability Score
7	1	Florida Highway Patrol Station	Supportive	FDOT	1.3
8	36103	Northshore Islands Road	Supportive	Municipal	1.3

Wildfire Vulnerability

The assets most vulnerable to wildfire are fire-sensitive infrastructure, such as roadways and lift stations, which are located near the forests north of the City of Panama City Beach. The majority of assets within the study region do not demonstrate vulnerability to wildfire.

Overall Vulnerability

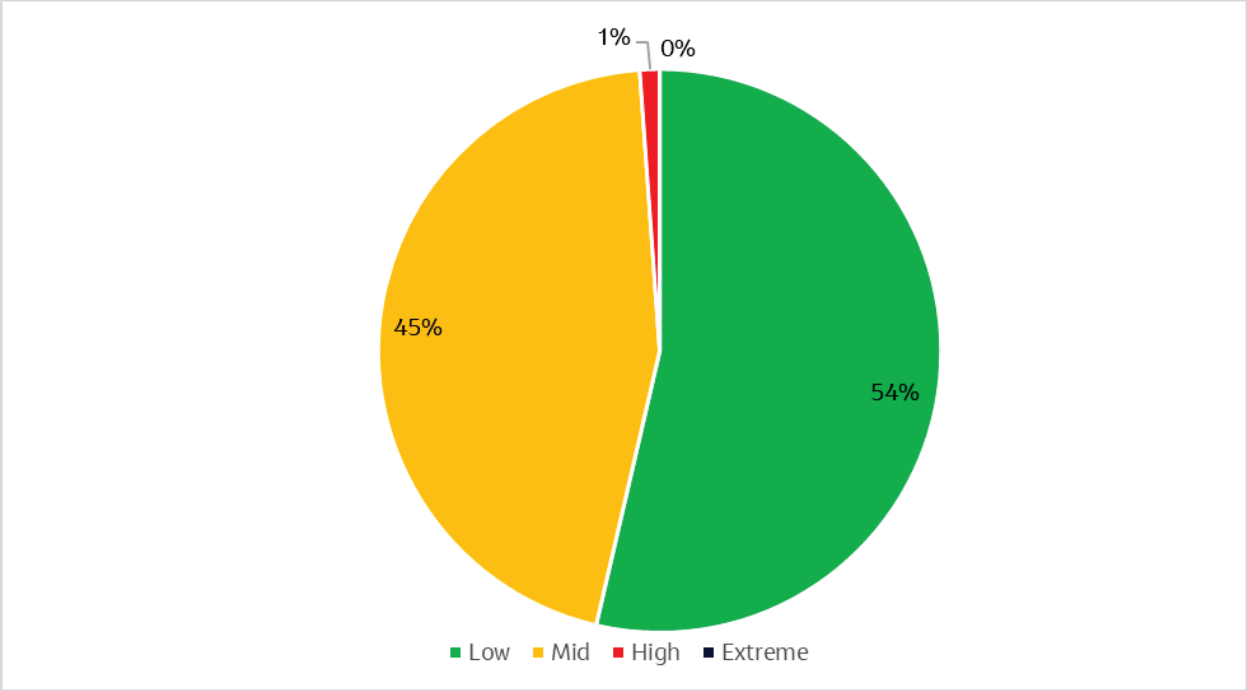
The highest vulnerability score that could be attained was a 10. Of the 20,663 assets analyzed, the average vulnerability score was 2.2, which indicates low vulnerability among assets in the project study area. The highest score was 8.2. Table 4-55 shows assets with a vulnerability score greater than or equal to 8.0.

Table 4-55. Assets with Highest Total Vulnerability

Rank	Asset Unique ID	Asset Name	Mission Criticality	Asset Owner	Vulnerability Score
1	58	PC 16 Lift Station	Supportive	City of Panama City	8.2
2	77	PC 20 Lift Station	Supportive	City of Panama City	8.2
3	232	Lift Station 204	Supportive	Bay County	8.2
4	251	Lift Station 96	Supportive	Bay County	8.2
5	360	Cell Tower	Secondary	Unknown	8.2
6	82	PC 48 Lift Station	Supportive	City of Panama City	8.1
7	256	Lift Station 54	Supportive	Bay County	8.1
8	349	Cell Tower	Secondary	Unknown	8.1
9	365	Cell Tower	Secondary	Unknown	8.1
10	417	Cell Tower	Secondary	Unknown	8.1
11	415	Cell Tower	Secondary	Unknown	8.0

The most vulnerable assets included lift stations, cell towers, and power transmission lines. Figure 4-57 shows the distribution of vulnerability scores. Approximately 1% of assets (235) have high vulnerability, including, but not limited to, primary mission-critical Thomas Drive, secondary mission-critical USCG Station Panama City, and electrical production and supply infrastructure. These assets, along with medium vulnerability mission-critical roadway segments, will be carried forward into the risk analysis. Mission-critical assets with low vulnerability include the Bay County Water Treatment Plant, which has low exposure to wildfire and flood hazards (due in part to its inland location).

Figure 4-57. Distribution of Vulnerability Scores



Shoreline Erosion

The JALBTCX CERI tool was used to assess shoreline resilience of the coastlines that protect the installation (JALBTCX 2022). CERI scores range from 0 to 5, with scores between 0 and 2.1 indicating low resilience, scores between 2.1 and 3.9 indicating moderate resilience, and scores between 3.9 and 5 indicating high resilience to coastal hazards. CERI maps show circles along the shoreline: each circle indicates a 100-meter zone with its own coastal resilience score.

Figures 4-58 and 4-59 show CERI shoreline resilience maps for the Lower Grand Lagoon and City of Panama City Beach, respectively. The shorelines in lower Grand Lagoon have mostly moderate coastal resilience scores (Figure 4-58), with a 100-meter zone of low resilience in St. Andrew State Park. The shorelines of the City of Panama City have moderate resilience scores, though there are some areas that are healthy and resilient.

Figure 4-58. Shoreline Resilience – Lower Grand Lagoon
Source: JALBTCX (2022)



Figure 4-59. Shoreline Resilience – City of Panama City Beach
Source: JALBTCX (2022)



Energy Sector Vulnerabilities

Methodology

To determine areas where the most prevalent energy infrastructure vulnerability exists within the Northwest Florida region, the following vulnerability indicators and metrics were considered: 1) exposure to major natural threats to energy infrastructure, 2) energy burden within the Census tract of the installation, 3) known vulnerabilities, 4) hardening efforts for the energy infrastructure, 5) presence of microgrids for redundancy, and 6) proximity of infrastructure to power recovery priority facilities, such as hospitals and emergency medical service stations. It is important to note that debris management and regular maintenance for the energy infrastructure are considered as important factors that can impact the stability and function of the energy systems.

These metrics were evaluated in asset and military installation scales, with each being awarded a final vulnerability score to rank its energy-related condition from "poor" to "good". The intention of this ranking system is to inform a resilience strategy that prioritizes installations and assets ranked as "poor" for improvement for each installation. Results of the energy sector VA are provided in this subsection.

Results

The energy infrastructure directly connected to the installation consists of three substations and two main overhead power transmission lines spanning approximately 2.5 miles. The major risks impacting the installation's energy infrastructure include hurricanes and storm surge affecting the three substations. Additionally, one substation just northwest of the installation is found to be in FEMA's 100-year flood zone, increasing the risk of flooding during intense storms.

NSA Panama City operates within Bay County's Census Tract #26.08 that has a 2% energy burden (that is, the ratio of average annual housing energy costs to the average annual household income) (Ma et al. 2019), which is a relatively low percentage within the state of Florida where 6% is considered "high" (The Balmoral Group 2022).

Energy reliability issues are noted as a known vulnerability to NSA Panama City. It is also noted that there are no fast power recovery priority assets, such as hospitals or fire stations, within a 0.5-mile distance from the base's substations. This metric considers that strategic proximity to fast power recovery priority assets could enable the installation's power to be restored more quickly, especially if these assets share the same power line. Despite not having the secondary fast power recovery benefits, NSA Panama City's storm hardening efforts (such as underground power distribution lines) provide mitigating impacts to the installation's energy vulnerability score. The fact that all six fire stations around NSA Panama City operate on a different power line than the installation provides redundancy during power outages, as emergency services can remain operational (Figure 4-60).

Additionally, it appears that there is sufficient fire line width around the substations that serve the installation, and tree canopy is not in direct contact with the overhead power lines. This reduces fire and hurricane debris risk in the substation fire protection system.

Table 4-56 presents the results of installation-scale scoring for NSA Panama City.

Table 4-56. NSA Panama City Installation-Scale Scoring Results

Installation	Exposure and Sensitivity to Natural Hazards (0-3 pts)	Are transmission lines in wildfire risk? (Yes=1.5,No=0)	Normalized Energy Burden	Other Known Vulnerabilities	Hardening Efforts (Yes=-1.5,No=0)	Strategic Proximity	Microgrid Presence (Yes=-1.5,No=0)	Final Energy Vulnerability Score
NSA Panama City	3.0	0	1.0	1.0	-1.5	0	0	3.5

Figure 4-60. NSA Panama City Energy Infrastructure Vulnerabilities and Mitigating Factors



NSA Panama City is found to have the second highest energy vulnerability score within the Emerald Coast Region after Naval Air Station Whiting Field. A potential microgrid implementation could greatly mitigate the energy reliability and vulnerability issues the installation is facing.

Other Identified Vulnerabilities

In addition to the items identified in the quantitative analysis above, a number of other vulnerabilities were discussed during the stakeholder workshops and interviews. These vulnerabilities, while lacking a vulnerability score, also pose a threat to NSA Panama City's mission and are listed below:

- **Encroachment.** Encroachment on the in-water training areas in St. Andrew Bay threatens the training mission at NSA Panama City.
- **Dredging needs in St. Andrew Bay.** Deep waters are required for the needs of sub-surface vessels and other in-water activities being conducted by installation personnel.

4.4.6 Risk Assessment

Assets with a vulnerability score greater than 5.0 were selected for the risk analysis. The risk associated with the selected high vulnerability was subsequently evaluated using the following equation:

$$Risk = Impact\ to\ Mission + \Sigma\ (Hazard\ Likelihood \times Hazard\ Consequence)$$

where likelihood is the annual probability of occurrence and consequence is the combination of the impact of asset failure on mission assurance and the degree of impact on the asset itself. This yields a score that reflects the risk to the mission that the potential asset failure poses. The highest possible risk score for an asset is 200, and the breakdown of risk scores and rankings is shown in Table 4-57.

Table 4-57. Total Risk Scores and Rankings

Risk Score	Ranking
180–200	Extreme
120–180	High
60–120	Medium
0–60	Low

A detailed discussion of the methodology for evaluating risk can be found in the *Emerald Coast Vulnerability and Risk Assessment Introduction and Methodology* document (Appendix B).

Appendix C includes maps showing the locations of the high-risk assets.

High Flood Risk Assets

There were 86 assets with high flood risk. These assets are mostly roads, along with coastal lift stations, law enforcement facilities (Florida Highway Patrol Station), schools (Panama City Marine Institute and St. Andrew Elementary School). All of these assets are exposed and sensitive to the 100-year flood, the 2070 intermediate-high SLR scenario, and multiple categories of storm surge. Table 4-58 contains the ten assets with the highest flood risk.

Table 4-58. Assets with Highest Flood Risk

No.	Asset Unique ID	Asset Type	Asset Name	Mission Criticality	Asset Owner/ Operator	Flood Risk Score	Flood Risk Rank
1	39008	Roads	Power Line Road	Supportive	City of Panama City Beach	46.8	High
2	38090	Roads	Big Daddy Drive	Supportive	Bay County	46.8	High
3	36319	Roads	Drake Avenue	Supportive	City of Panama City	46.8	High
4	42098	Roads	Campers Drive	Supportive	State of Florida	46.8	High
5	35810	Roads	Drummond Avenue	Supportive	Bay County	46.8	High
6	35379	Schools	Panama City Marine Institute	Supportive	Private	46.8	High
7	38	Law Enforcement Facilities	Florida Highway Patrol Station	Supportive	State of Florida	46.8	High
8	1	Wastewater Treatment Facilities and Lift stations	PC 11	Supportive	City of Panama City	46.8	High
9	13	Roads	Wildwood Road	Supportive	Private	46.8	High
10	38558	Roads	Northshore Islands Road	Supportive	City of Panama City	46.6	High

Within the study area, various mission-supportive community roadways, lift stations (PC 11, PC 46, and PC 17), St. Andrew Elementary School, and the Florida Highway Patrol Station all exhibit the greatest flood risk because of exposure to the 100-year flood events and high storm surge depths at their locations.

Assets with Highest Total Risk to Mission

The average risk score for the 703 high and medium-high vulnerability assets was 75, indicating medium overall risk within the study area. None of the assets had extreme risk, 16 assets had high risk to mission, and 451 had medium risk to mission. The rest of the assets (236) had low risk scores. Table 4-59 shows the assets with the greatest total risk. Note that some roadways may have multiple asset IDs and risk scores representing varying levels of exposure and sensitivity along different segments of the roadway.

Table 4-59. Assets with Highest Total Risk

No.	Asset Unique ID	Asset Type	Asset Name	Mission Criticality	Asset Owner/ Operator	Risk Score	Risk Rank
1	Multiple	Roadways	Thomas Drive	Primary	Bay County	173-133	High
2	337	Federal Government Facilities	US Coast Guard Station	Secondary	Department of Homeland Security	149.6	High
3	639	Electrical Production and Supply Facilities	Power transmission line	Primary	FPL	114.1	Medium
4	664	Electrical Production and Supply Facilities	Power transmission line	Primary	FPL	113.9	Medium
5	38536	Roads	Wildwood Road	Supportive	Bay County	109	Medium
6	41943	Roads	Harbour Way	Supportive	Private	109	Medium
7	35795	Roads	Kristanna Drive	Supportive	City of Panama City	109	Medium
8	35591	Roads	Big Daddy Drive	Supportive	Bay County	109	Medium
9	38431	Roads	Savannah Drive	Supportive	City of Panama City	109	Medium
10	34396	Roads	Calabria Road	Supportive	City of Panama City	109	Medium

Other assets with medium risk include the Panama City Beach Wastewater Treatment Plant, various community roadways and lift stations.

Risks for Mission-Critical Assets

Table 4-60 shows the risk to mission scores for primary mission-critical assets.

Table 4-60. Risks for Primary Mission-Critical Assets

	Asset Type	Asset Name	Owner/ Operator	Risk Score	Risk Rank	Notes
1	Major Roadways	Thomas Drive	Bay County/ Panama City Beach	173-133	High	High flood risk throughout roadway
5	Electrical Production and Supply Facilities	Power transmission lines	FPL	Varies	Medium	
6		Substations	FPL	Varies	Medium	
7	Water Supply Facilities	Bay County WTP	Bay County	N/A	N/A	Asset had low vulnerability, not carried into risk analysis
8	Wastewater Treatment Facilities and Lift Stations	Panama City Beach WWTP	Panama City Beach	95	Medium	
	Federal Government Facilities	US Coast Guard Station	Department of Homeland Security	150	High	

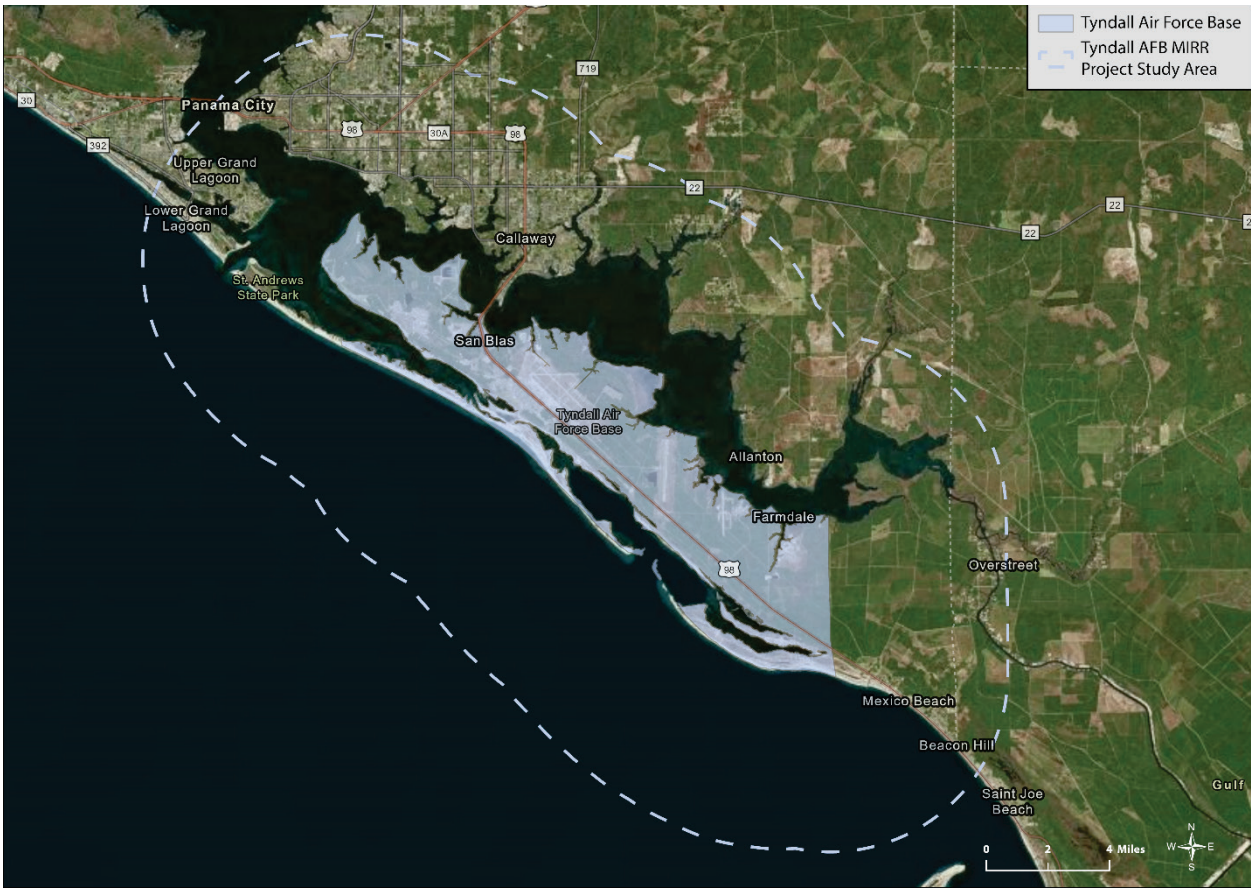
Additional discussion on some of the mission-critical assets is provided as follows:

- **Thomas Drive.** Thomas Drive is the asset with the highest risk to mission because of the impacts of the 100-year flood event and storm surge starting with the Category 3 hurricane. Significant flood impacts, combined with the criticality of the road to the installation, result in high risk to the mission of the installation.
- **Highway 98/Panama City Beach Parkway.** These critical access roads have substantial flood risk from both storm surge and the 100-year flood event, as well as exposure to other hazards.
- **U.S. Coast Guard Station Panama City.** Hazards at the USCG station pose high risk to the secondary mission of the installation. Flood hazards from a 100-year event, storm surge (Category 3 and higher hurricanes), and extreme winds, coupled with the mission criticality of the facility, result in a high risk to the mission of the installation for this secondary mission-critical asset.

4.5 Tyndall AFB

This MIRR Vulnerability Assessment and Risk Analysis evaluates asset vulnerability and risk in the communities surrounding Tyndall AFB. The study area includes the region surrounding the installation as shown in Figure 4-61. Critical assets within the study area were evaluated both quantitatively and qualitatively to determine the risks to the assets and the accompanying impacts on the mission.

Figure 4-61. Tyndall AFB – Emerald Coast MIRR Project Study Area



4.5.1 Hazards

Tyndall AFB faces threats from a variety of hazards, including natural hazards, infrastructure shocks and stresses, encroachment, and economic, social, and environmental shocks and stresses.

Natural Hazards

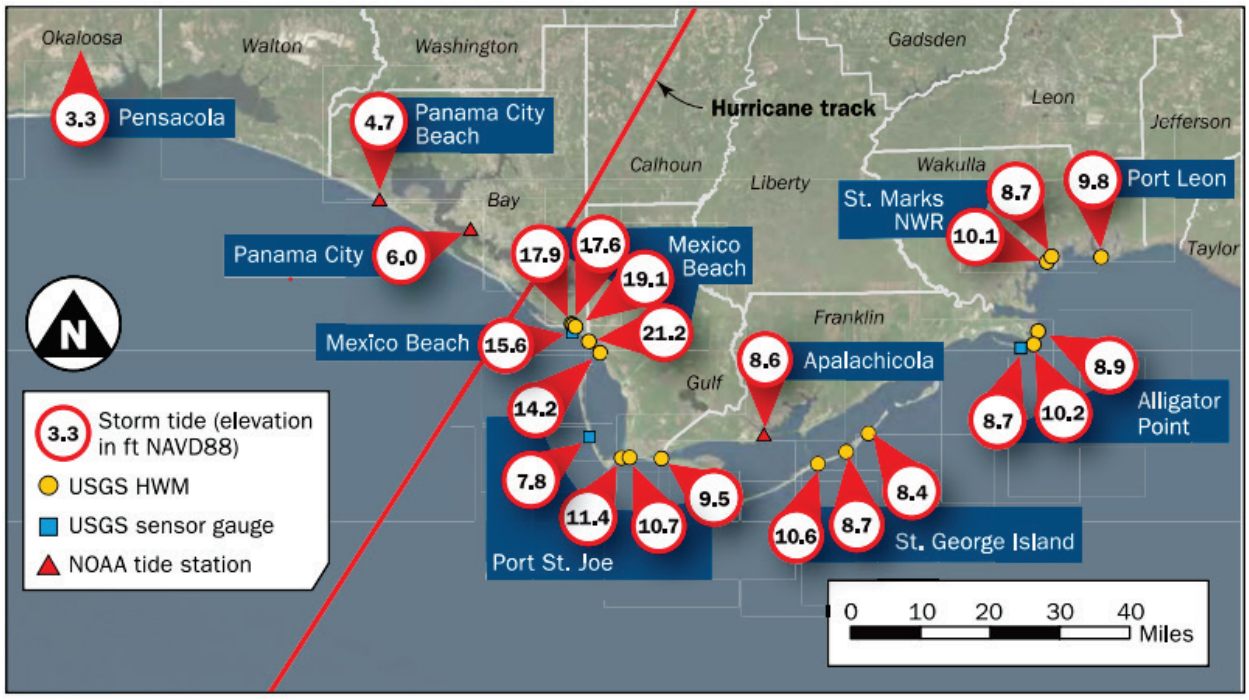
Natural hazards evaluated in this vulnerability assessment include flooding from a 100-year flood event, SLR, and storm surge; wildfire; heat; extreme wind; and lightning.

Flooding

The three flood hazards evaluated in this assessment include the 100-year flood zone (representing inland, riverine, and coastal flooding), SLR, and storm surge for hurricanes from Category 1 to 5. Flooding poses a risk to critical installation operations: floodwaters can cover runways and landing sites as well as disrupt travel to and from the installation.

Hurricane Michael inundated portions of the installation as well as the surrounding communities. In the City of Mexico Beach, storm surge depths were as high as 19 feet, damaging 94% of the city's buildings and destroying more than 800 (FEMA 2023). Figure 4-62 shows the storm surge depths associated with the storm.

Figure 4-62. Hurricane Michael Storm Surge Depths
Source: FEMA 2023



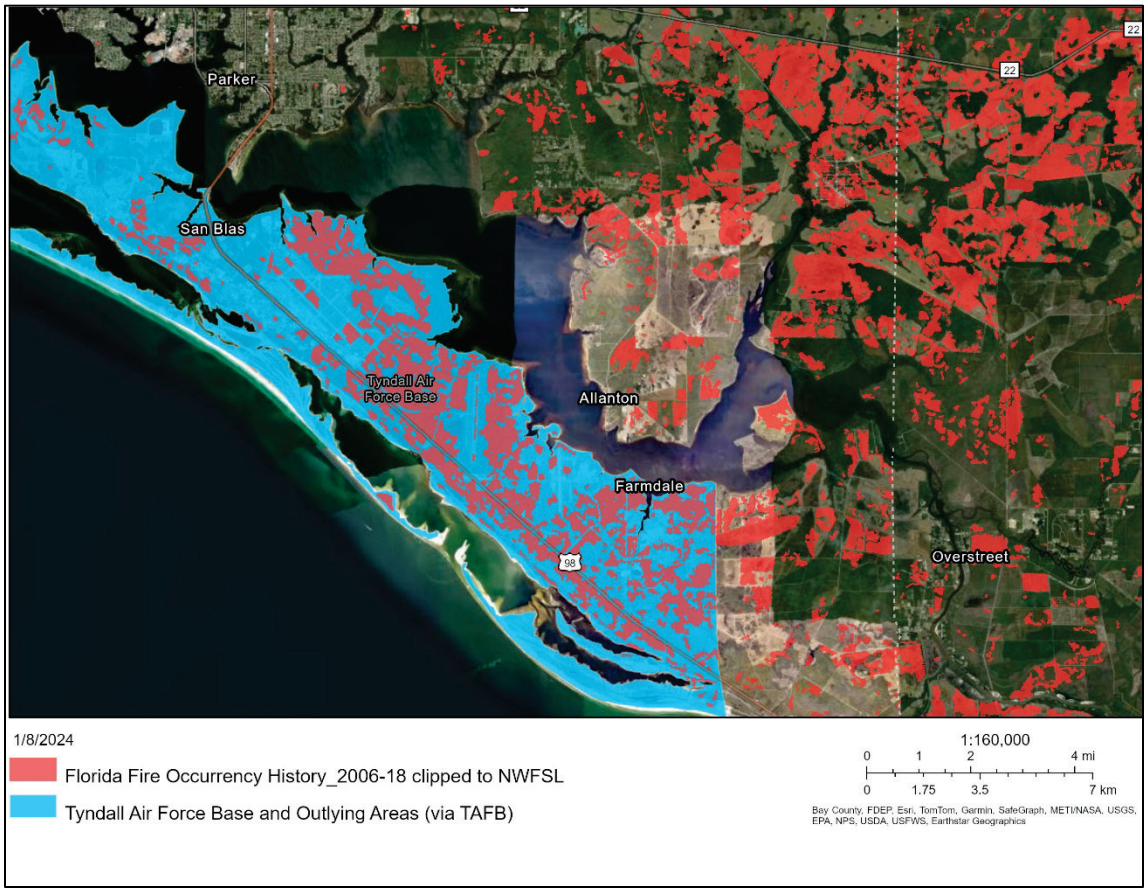
While the City of Mexico Beach experienced the highest storm surge depths, the City of Panama City and the City of Panama City Beach also experienced moderate surge depths of 6 and 4.7 feet, respectively.

Flooding throughout Bay County can also impact the installation's workforce, who commute from areas such as the City of Callaway, City of Panama City Beach, and City of Lynn Haven. Additional flood concerns noted during stakeholder workshops in August 2023 include SLR affecting Deer Point Dam. The dam contains the Deer Point Lake Reservoir, which is the primary water source for Bay County (NWFWMD 2023).

Wildfire

Along with direct and indirect infrastructure impacts from wildfires, wildfire smoke can impact flight operations and training at the installation. As shown in Figure 4-63, prior burn areas include the rural areas north of the installation and east of the City of Panama City, as well as within the installation itself.

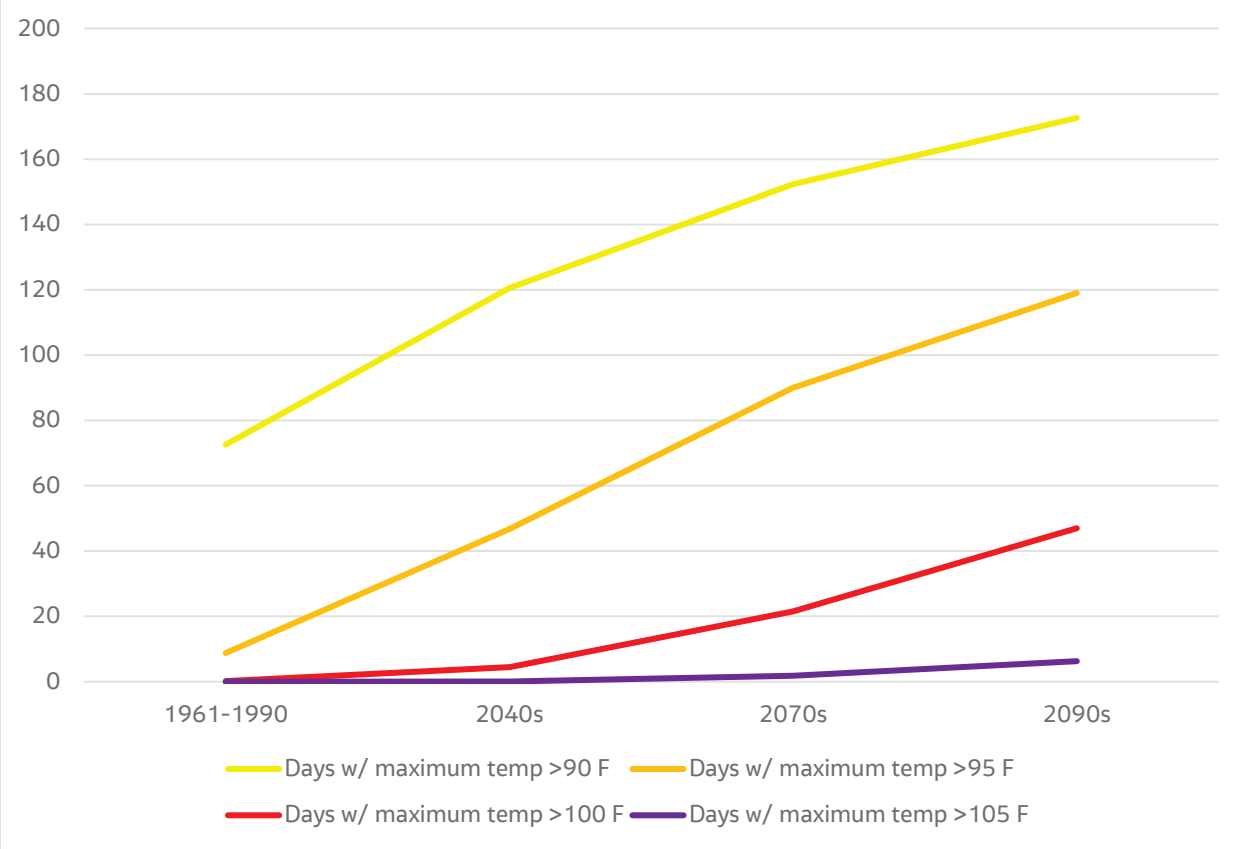
Figure 4-63. Wildfire Occurrence Areas 2006–2018
Source: NWFSL n.d.



Extreme Heat

According to data from the U.S. Climate Explorer, Bay County is projected to experience an increase in temperatures from today through 2060–2070, with a temperature increase of approximately 2.5 degrees Fahrenheit (°F). Heat projections are available under multiple RCPs, which are climate change projections that depend on greenhouse gas emissions scenarios. Figure 4-64 shows the projected number of days where the temperature is expected to be above 90, 95, 100, and 105°F in each county under the RCP 8.5, the high emissions scenario. The number of days with a maximum daily temperature greater than 100°F will increase over time, with projections from 1.2 days in the 2020s to 5 days in the 2040s to a maximum of approximately 22 days in the 2070s under the high emissions scenario (U.S. Federal Government n.d.).

Figure 4-64. Projected Change in Mean Annual Highest Maximum Temperature in Bay County

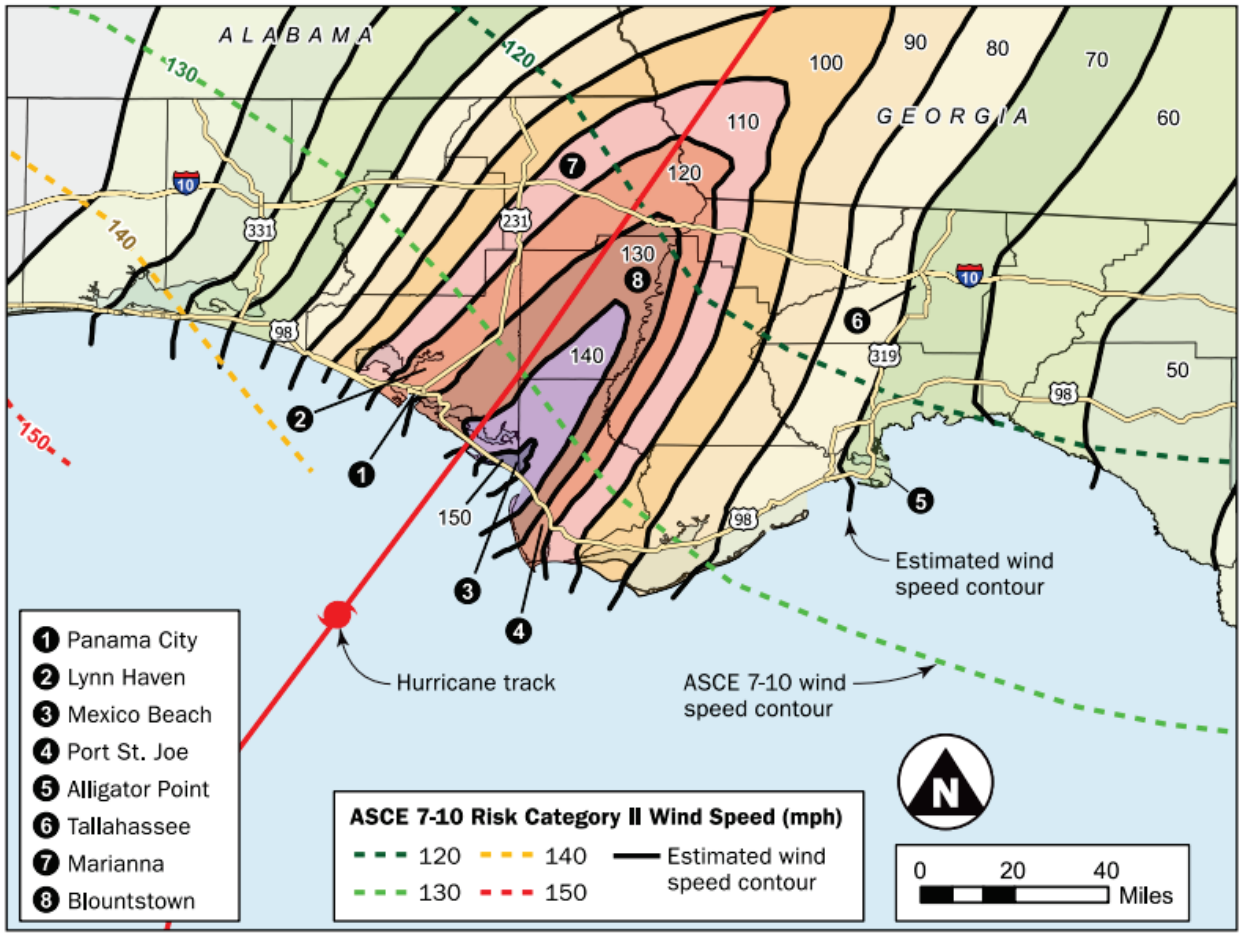


Heat is a particularly significant concern in the region after Hurricane Michael, which destroyed much of Bay County's tree cover. Shade trees can reduce heat impacts and provide cooling; the lack of tree canopy increases both infrastructure and human vulnerability to heat. These increased temperatures can cause electrical equipment to overheat and runways, taxiways, and roadways to buckle, negatively impacting mission-critical power transmission lines and roadways that support the installation.

Extreme Wind

The left eyewall of Hurricane Michael passed over Tyndall AFB, causing significant devastation within the installation and throughout Bay County. The storm made landfall with estimated sustained winds of 161 miles per hour (mph), damaging all of the structures on the installation and destroying 484 buildings (U.S. Air Force 2019). According to the FEMA Mitigation Assessment Team, significant structural damage occurred throughout Bay County, affecting residences and critical community assets such as hospitals and schools (FEMA 2020). Figure 4-65 shows estimated wind speeds from the storm.

Figure 4-65. Hurricane Michael Wind Speeds
Source: FEMA 2020



Hurricane Michael's wind speeds exceeded the design wind speeds for risk Category 2 buildings by 10% in Bay County. Newer structures, specifically those built after the implementation of the Florida Building Code (FBC), fared better than those built before (FEMA 2020).

The region around the installation also lost much of its tree cover, as shown in Figure 4-66.

The City of Panama City and the northwestern portion of Tyndall AFB suffered severe timber damage, losing up to half of tree canopy, while the City of Mexico Beach, the rural areas north of the installation, and the southwestern portion of Tyndall AFB suffered catastrophic timber damage, losing more than 50% of tree cover (NWFSL n.d.).

As part of the Tyndall Rebuild effort, the installation redefined its design wind speeds. Table 4-61 compares the new design criteria to the ultimate design wind speeds as laid out in Section 1609 of the 2020 and 2023 FBC.

Figure 4-66. Hurricane Michael Timber Damage
Source: NWFSL n.d.

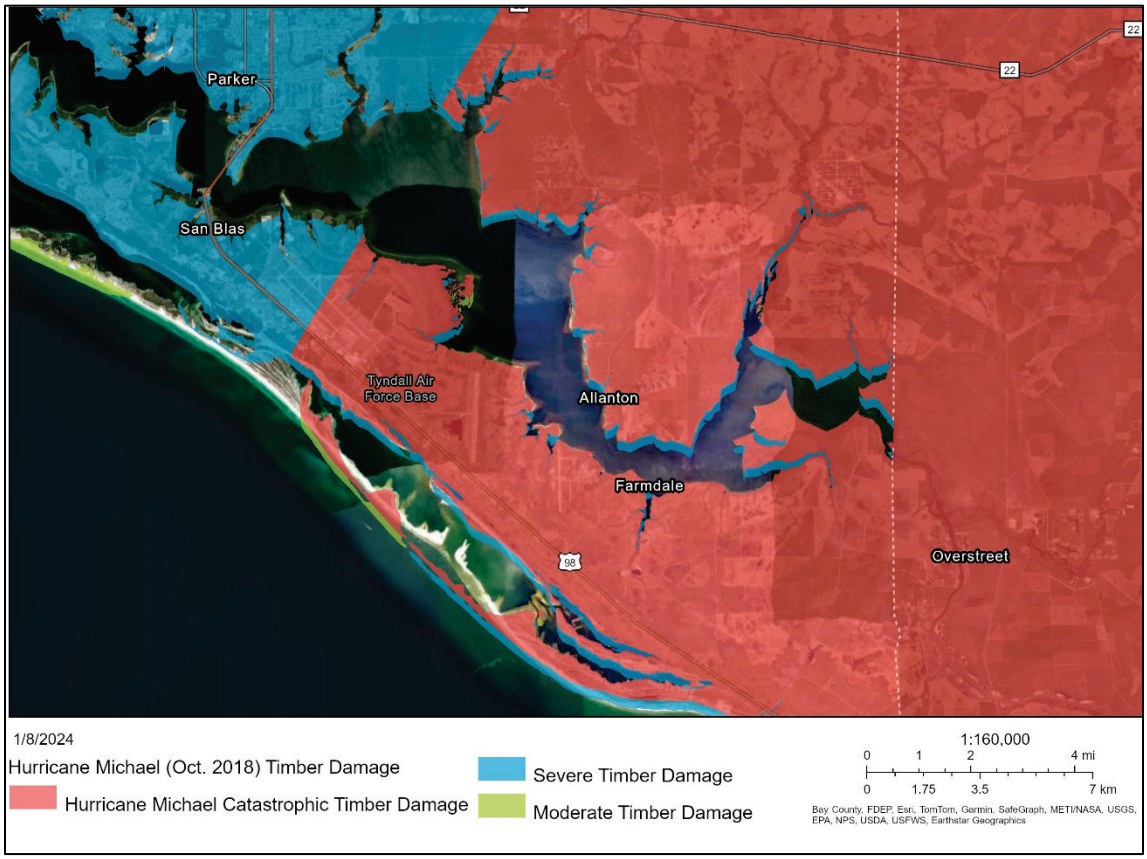


Table 4-61. Design Winds Speeds – Tyndall AFB and Florida Building Code

Structure Risk Category (RC)	Tyndall AFB Design Wind Speed (mph)	2020 Florida Building Code Design Wind Speed (mph)	2023 Florida Building Code Design Wind Speed (mph)
Risk Category II	Not permitted	135	140
Risk Category III	165	145	150
Risk Category IV	170	155	160
Risk Category V[a]	203	Not included in FBC	Not included in FBC

[a] Risk Category V is used for facilities that are national strategic military assets, per Unified Facilities Criteria 3-301-02.

Source: United States Department of the Air Force (n.d.), Florida Building Code (2020), Florida Building Code (2023)

This new design criteria will increase the resilience of the base as it recovers and rebuilds.

Lightning

According to the FEMA National Risk Index, Bay County experiences approximately 125 cloud-to-ground lightning strikes annually (FEMA 2023). In addition to lightning's potential to damage critical infrastructure, lightning strikes can also ignite dry fuels and cause wildfires.

Infrastructure Shocks and Stresses

Relevant infrastructure threats to the installation include community infrastructure capacity and the differences between housing development and utility development timelines.

Water and Wastewater Infrastructure Capacity

During the stakeholder engagement workshops, it was noted that additional water and wastewater capacity is needed to accommodate future growth in Bay County. The Military Point Advanced Water Treatment (AWT) Facility, which treats wastewater for Tyndall AFB, City of Mexico Beach, City of Callaway, City of Parker, City of Springfield, and the unincorporated areas of Bay County, has a feasibility study underway to identify solutions for addressing capacity issues.

Existing potable water treatment infrastructure requires more capacity. Development in the South Port area is unable to be serviced by the Deer Point WTP, showing the necessity for additional sources of potable water supply.

Transportation Capacity

Traffic congestion on mission-critical roadways, including US-98, can inhibit personnel from arriving at the installation on time, potentially impacting the mission. Traffic issues can be further compounded during storms or flood events. Figures 4-67 and 4-68 show the critical roadways within the project study area.

In 2020, Highway 98 was at capacity through most of its southern segments extending from its conjunction with Tyndall Parkway. Much of the roadway was at or above capacity in its southern segments, including East 5th Street, East 6th Street, West Beach Drive, and Beck Avenue, as well as from Beck Avenue to the Hathaway Bridge. Other at capacity roadways include State Road 389 (North East Avenue) and Tyndall Parkway from State Road 22 to East 11th Street. Tyndall Parkway is approaching capacity on the segment between East 11th Street and Transmitter Road.

In 2045, most of the major roadways in the area will be at capacity, causing issues with installation access for personnel who live in the City of Panama City. Much of US-98 will be above capacity, experiencing daily traffic volumes greater than 95% of its capacity. Other roadways projected to be at or near capacity include State Road 22 and State Road 368 (West 23rd Street).

Lead Times and Developments

During the stakeholder engagement workshops, the group discussed the challenges associated with the rapid construction of housing developments. Housing developments can be built more quickly compared to community-based critical infrastructure. The current lead time for a new electrical substation is approximately 2.5 years. Many housing developers are asking for electric power service quickly without planning for this lead time, causing delays and rendering the utility provider unsure of what to build and when.

Energy Disruption

Energy disruption is inherently detrimental as it can lead to widespread economic setbacks, compromise public safety, and impede critical services, underscoring the urgency to assess vulnerabilities and implement safeguards to minimize the adverse impact on both local communities and military installations. Hazards that impact the stability and function of energy infrastructure and cause energy disruption to Tyndall AFB include:

- **Flooding**: extended exposure to water can cause malfunction and power transmission line poles to weaken and decay, reducing their load-bearing capacity. The flood events that can affect transmission poles include:
  - Current and future 100-year flood zone
  - SLR
  - Storm Surge
- **Hurricanes**: strong sustained wind and fallen trees can cause permanent damage to structures or equipment.

Proximity of nearby tree canopy to electric substations, transformers, and power transmission and distribution lines is also a critical consideration when fire threatens Tyndall AFB. Fire departments require 20 to 30 feet of fire line width with a 3- to 4-foot scrape (area that has been cleared via vegetation removal) to respond to fires. This standard is not met around two of the substations that serve the Tyndall.

Figure 4-67. 2020 Traffic Congestion

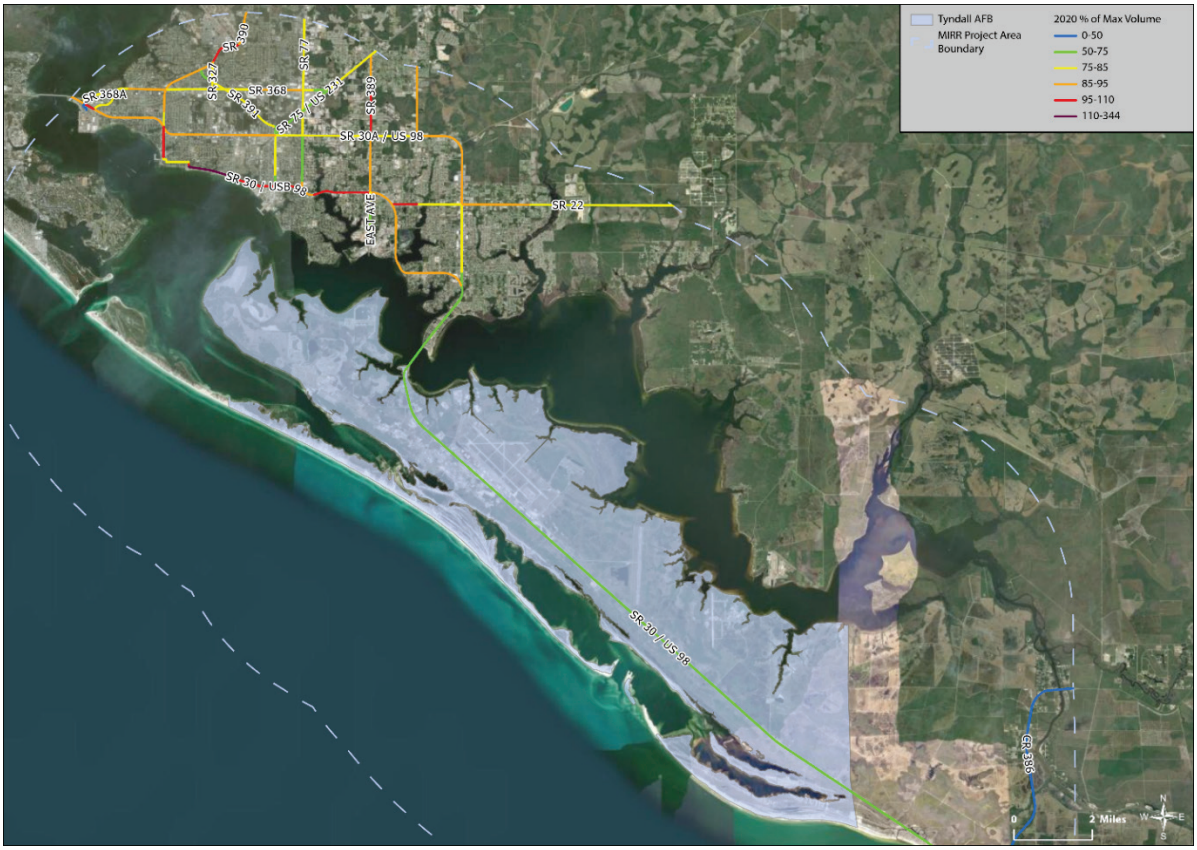
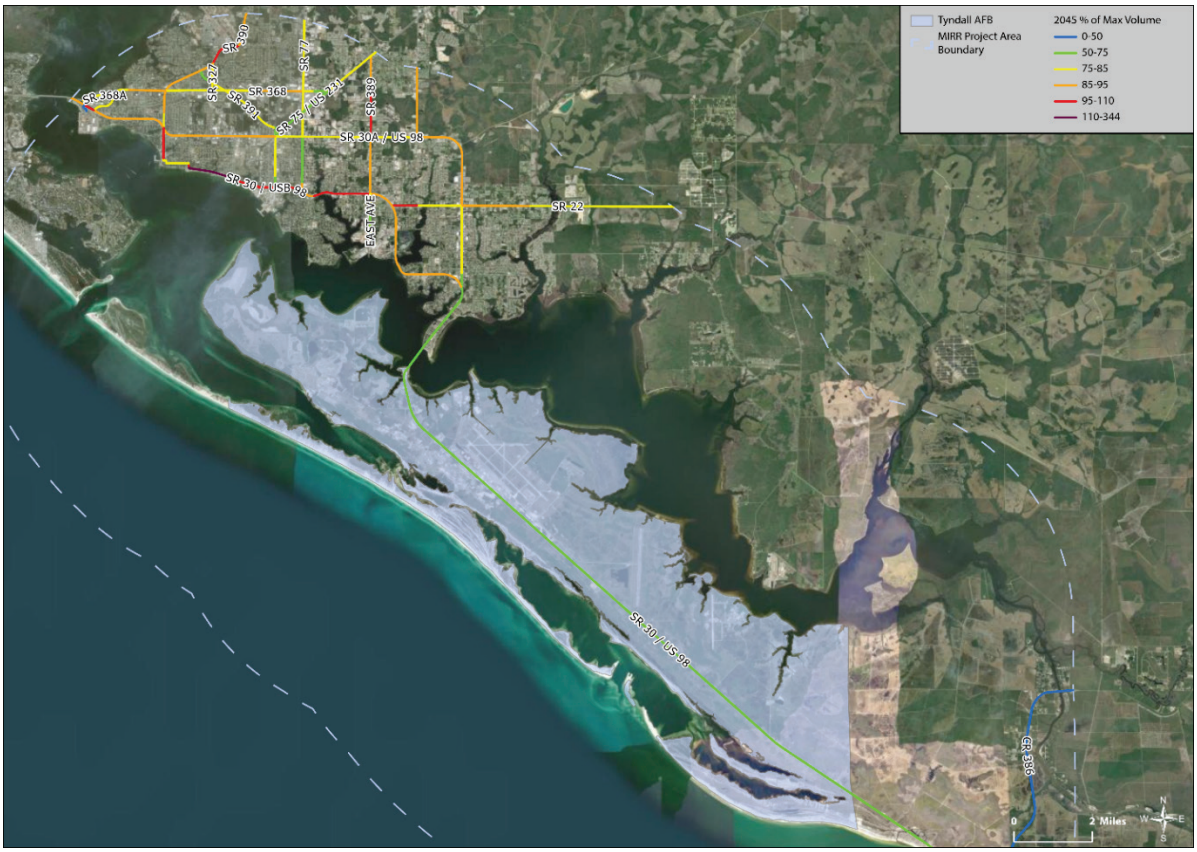


Figure 4-68. 2045 Traffic Congestion



Economic Threats

Economic threats that affect the mission of the installation, as discussed during the stakeholder engagement workshops, include the stratified economy in Bay County and housing attainability.

Stratified Economy

As with other counties in this study, Bay County has a stratified economy in which the military and tourism are key economic drivers. It was noted during the stakeholder engagement workshops that business growth is occurring: in 2023 more than 300 businesses were started including incoming research and development facilities for major companies. However, many of these new employment opportunities are in the retail, hospitality, and service industries and provide low-paying wages. Still, these efforts are working to bolster the County's economic health and resilience.

Housing Attainability

Tyndall AFB is experiencing a housing shortage because of the lasting impacts from Hurricane Michael, which destroyed much of the on-base housing. As mentioned in the stakeholder workshops, approximately 3,000 off-base housing units are anticipated to be needed to support on-base operational activities. This estimate does not consider the influx of contractors that will support the new F-35 mission. The lack of available housing on base, coupled with the high costs of new home purchases or rentals, has exacerbated the housing attainability for personnel at Tyndall AFB.

Housing prices have increased significantly in Bay County, rising from an average of $170,500 in 2015 to $350,000 in 2023 (Zillow n.d.), exacerbating the pressure put on new staff at Tyndall AFB. Bay County is working to address this issue with a multi-pronged approach that includes a new program to help reduce barriers for first-time home buyers.

Environmental Threats

Environmental threats facing Tyndall AFB include water quality, endangered species, rising groundwater levels, and shoreline erosion.

Water Quality

Septic systems in Bay County negatively impact water quality in St. Andrew Bay and the bayous; poor water quality can be harmful for the health of divers training in the Bay. These systems leach pollutants into groundwater systems, which make their way to surface waters in St. Andrew Bay and Deer Point Reservoir. Bay County is encouraging septic-to-sewer conversions throughout the County and has allocated $7.5 million to convert 150 homes to wastewater service. Areas requiring conversions include King's Point, Grand Lagoon, Deer Point Lake, and Bayou George.

Rising Groundwater Levels

It was noted during the stakeholder workshops that, as a result of Hurricane Michael uprooting thousands of trees, Bay County has been experiencing higher than normal groundwater levels. This alteration to the regional groundwater hydrology, coupled with heavy precipitation events, can cause inland flooding. Bay County has been experiencing higher than normal surface groundwater levels because of increased rainfall and reduced evapotranspiration after Hurricane Michael uprooted thousands of trees. However, the deeper Floridan aquifer, which is the County's secondary water supply source, has seen water levels decline approximately 20 feet below sea level on the coast, raising concerns about saltwater intrusion (NWFWMD 2023).

Shoreline Erosion

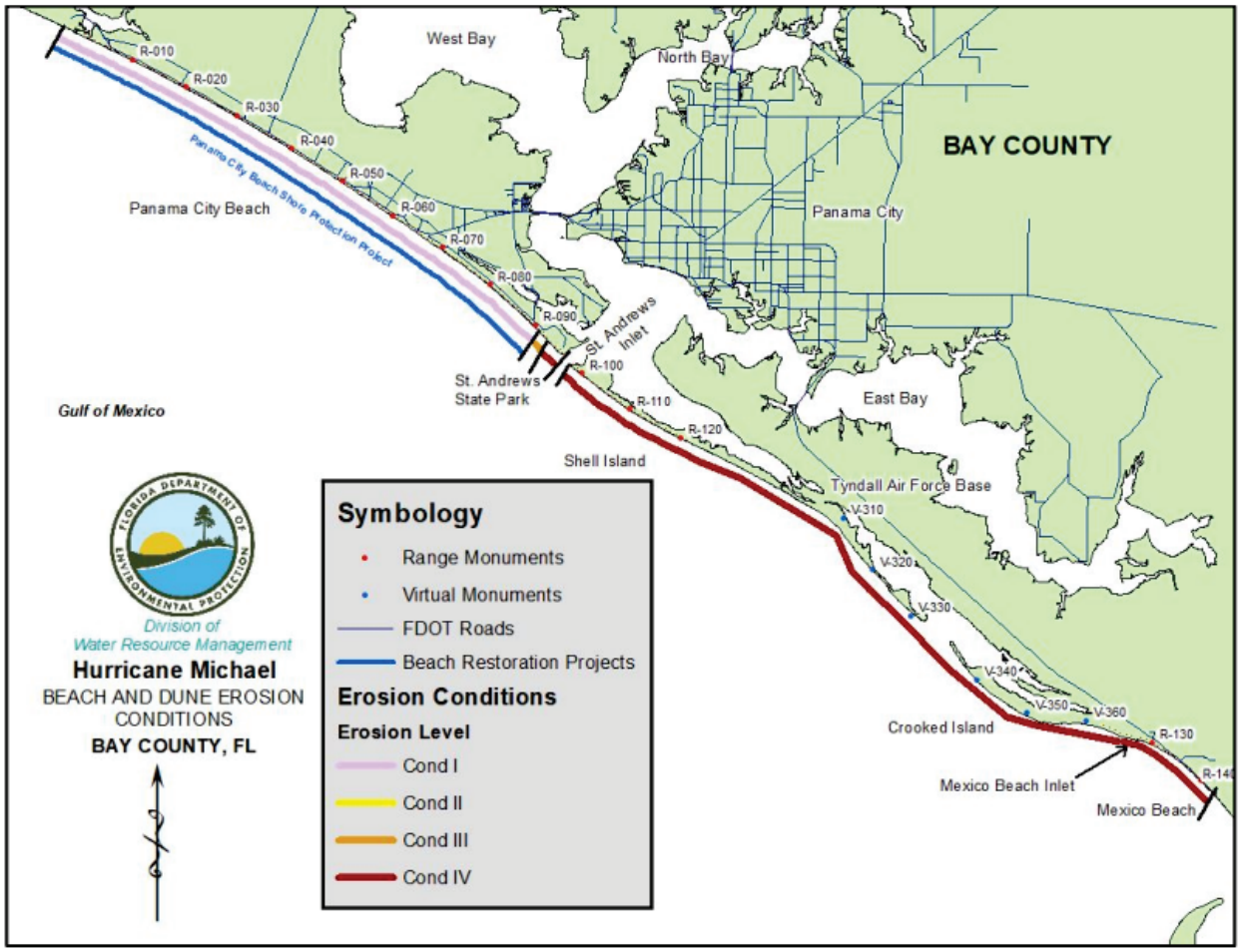
Erosion is occurring both in shorelines along St. Andrew Bay and on Tyndall AFB. Tyndall suffered significant erosion after Hurricane Michael, particularly on the barrier islands that protect the installation, as shown in Figure 4-69.

Tyndall AFB developed a Coastal Resilience Implementation Plan to repair and improve its shorelines. The CRIP identified two coastal lines of defense for the installation: the barrier islands and relic dune line on the installation proper. These defenses can be enhanced via multiple pilot projects, including physical reinforcement of dunes, promoting dune growth via sand trapping (fences), strategic sediment placement, and the implementation of nature-based solutions in the Back Bay Area (Jacobs 2022).

Encroachment

The air operations areas of Tyndall AFB located in the EGTTR face encroachment threats. The presence of in-water activities, such as oil drilling or wind farms, can disrupt training that supports the new F-35 mission occurring within the range. It was discussed during the stakeholder engagement workshops that as part of training for the F-35 mission, in-water targets will be used for training. Energy sector activities in the Gulf of Mexico, including oil drilling and wind farming, can disrupt this training.

Figure 4-69. Hurricane Michael Erosion Conditions in Bay County
Source: FDEP 2019



4.5.2 Mission-Critical Infrastructure

Missions of the Installation

For the MIRR, the installation missions were categorized as primary or secondary missions. While not providing a complete overview of all ongoing activities occurring on base, this process provides a sufficient understanding of the missions of the installation to identify what infrastructure is critical for supporting that mission. Assets were then

categorized as primary, secondary, or mission-supportive mission critical. The primary and secondary missions of Tyndall AFB are discussed in the following subsections.

Primary Mission

Tyndall AFB's mission is to project unrivaled combat airpower, which is executed by the 325th Fighter Wing. The installation's mission has recently changed from an F-22 training mission to the F-35 combat mission. The first F-35s arrived in August 2023, with the end goal of three F-35A squadrons residing on base.

Secondary Mission

The 1st Air Force (AFNORTH) is a critical piece of national defense. AFNORTH is responsible for ensuring the air defense of the continental United States, Puerto Rico, and the U.S. Virgin Islands. It is also the air component of U.S. Northern Command, presiding over the continental U.S., Canada, and Mexico. In addition to its military duties, AFNORTH also supports civilian agencies before and during emergencies.

Overview of Mission-Critical Infrastructure

Tyndall AFB does not operate independently. It relies on a complex network of private and public partners to execute its missions. It was evident during the stakeholder engagement workshops that the installation maintains positive relationships with entities such as Bay County, the City of Panama City, and utility providers. Table 4-62 summarizes the primary mission-critical, secondary mission-critical, and mission-supportive infrastructure.

Table 4-62. Tyndall AFB Primary and Secondary Mission-Critical Infrastructure

	Mission	Mission-Critical Infrastructure
Primary Mission	Flight Operations (325th Fighter Wing)	▪ Electrical production and supply facilities ▪ Housing ▪ Installation shorelines ▪ Major roadways and evacuation routes ▪ EGTTR
Secondary Mission	First Air Force Command Center	▪ Electrical production and supply facilities ▪ Communications
Mission-Supportive	N/A	▪ Community water systems ▪ Community wastewater systems ▪ Community roadways ▪ Critical community and emergency facilities (schools, law enforcement, etc.)

Mission-critical infrastructure required to support flight operations and AFNORTH include electric power, housing, shorelines, and communications. Infrastructure and asset owners/operators are noted in Table 4-63.

Table 4-63. Tyndall AFB Mission-Critical Infrastructure Owners and Operators

Infrastructure Type	Asset Owner/Operator
Electric Power	FPL
Potable Water	Bay County
Wastewater	Bay County
Shorelines	Bay County, Air Force
Communications	AT&T, Comcast, Cox, Verizon

The following subsections discuss the individual infrastructure sectors that support the missions.

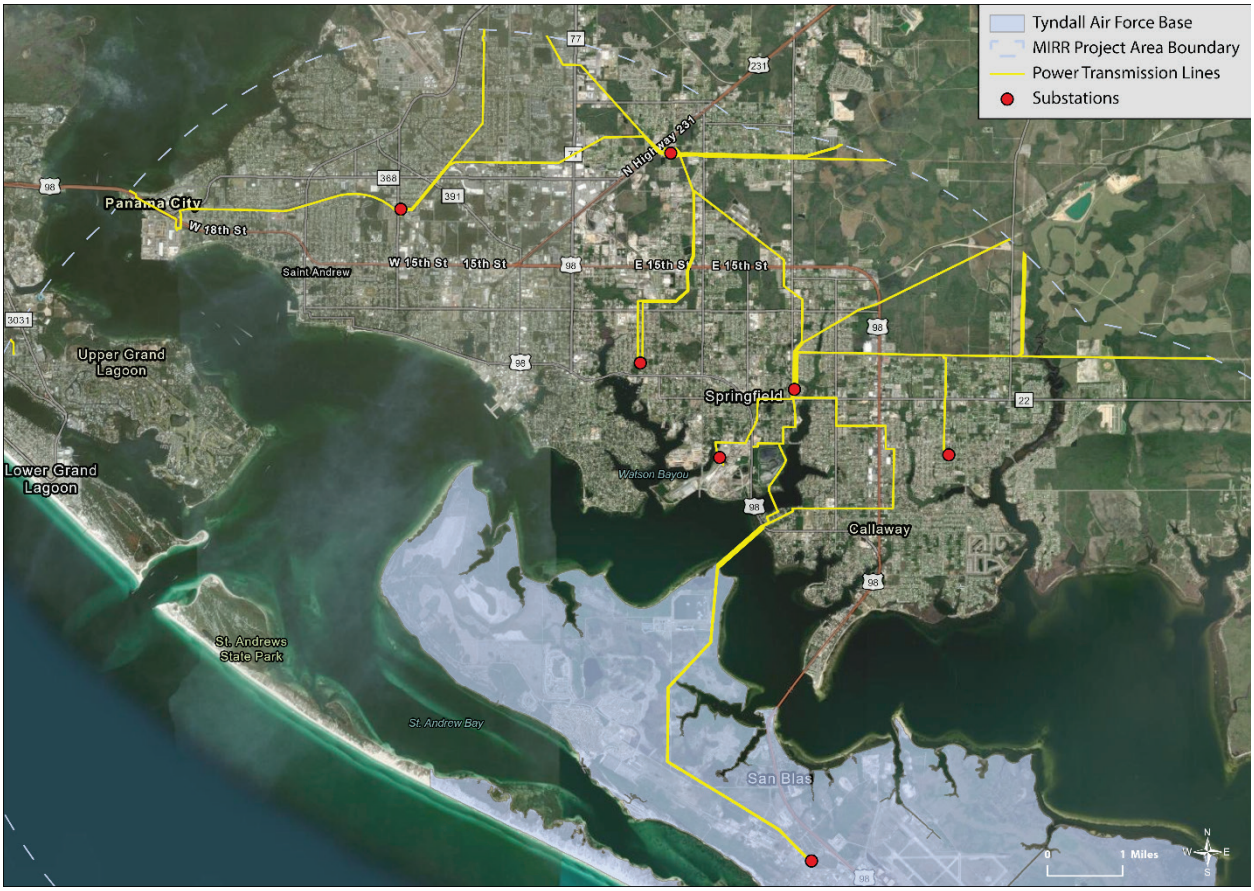
Primary Mission-Critical Infrastructure

Electrical Production and Supply Facilities

FPL and PowerSouth are two of the electrical suppliers in Bay County, with FPL being the sole power supplier for Tyndall. For this VA, power transmission lines and substations owned and operated by FPL were analyzed. FPL provides power to Tyndall AFB through two lines that are located on the same easement. The lines traverse St. Andrew Bay and supplies power to an on-base substation, as shown in Figure 4-70. Power in the City of Panama City and City of Mexico Beach is supplied by FPL and Duke Energy, respectively. It should be noted that PowerSouth is not a direct provider of power but rather the wholesale energy provider of the rural cooperative in Bay County.

Hardening of the electrical distribution system is underway in many areas. FPL is working to upgrade the two 46-kilovolt (kV) lines servicing Tyndall substation to 115-kV lines starting in 2024. The recently installed concrete poles housing one of the 46-kV lines will be used for one of the new 115-kV lines. The wooden structures that hold the other 46-kV line will be replaced with concrete poles and the other new 115-kV line will be housed on the new concrete poles. Overhead distribution lines are being undergrounded around Bay County, though these efforts typically require funding from the community. Distribution infrastructure in the City of Springfield, City of Callaway, City of Parker, City of Lynn Haven, and historic areas of the City of Panama City require additional hardening.

Figure 4-70. Primary Mission-Critical Electrical Production and Supply Facilities



Shorelines

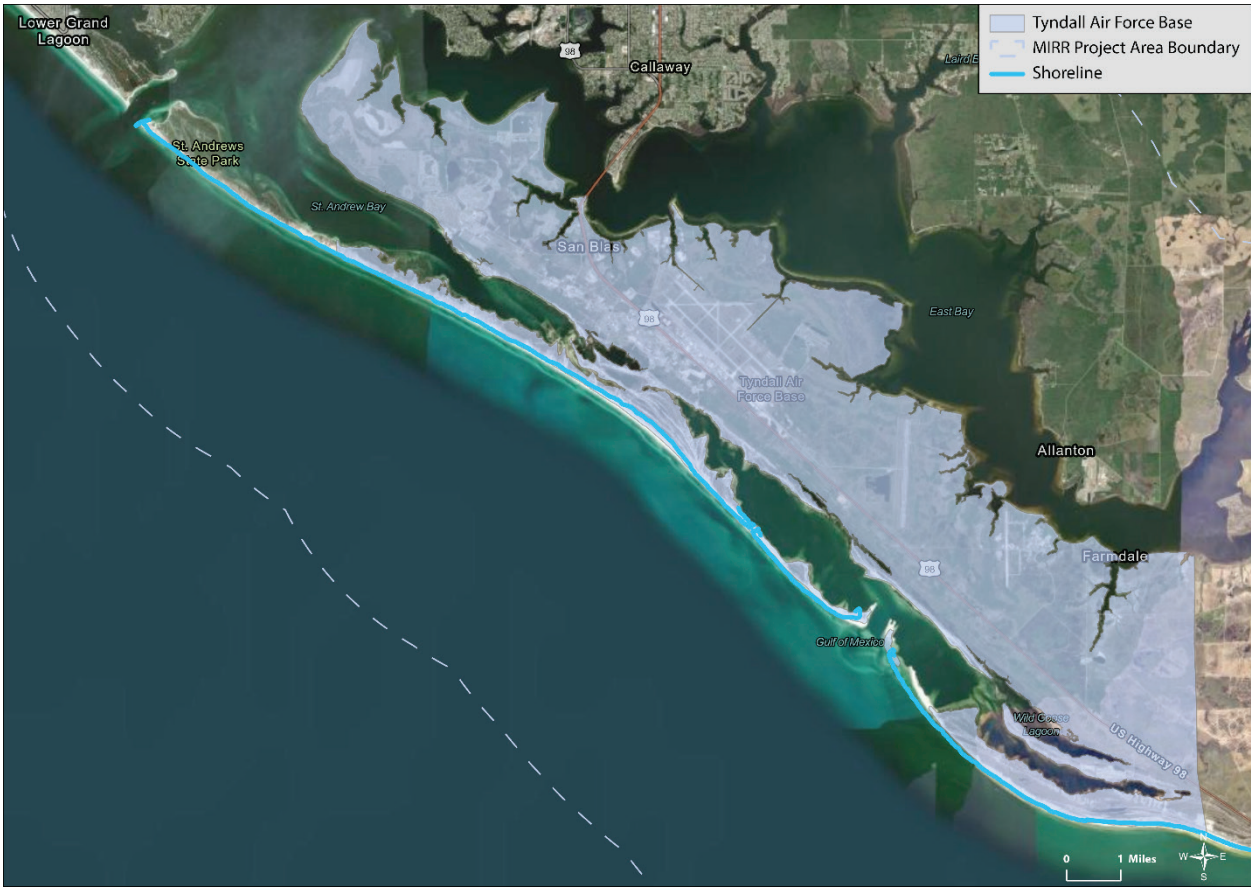
As discussed in the Shoreline Erosion subsection on p. 4-123, the shorelines at and around the installation are critical for protecting the installation from wave action during storm events. The barrier islands that protect the installation include St. Andrew State Park, Shell Island, and Crooked Island, as shown in Figure 4-71.

Housing

Tyndall AFB is facing a housing shortage because of the destruction of much of the onsite housing during Hurricane Michael. The installation had 867 homes available to service members prior to the storm: almost all those structures were substantially damaged or completely destroyed. As of the stakeholder engagement workshops in August 2023, 300 units have been renovated and 300 more are planned for renovation.

During the workshops, it was discussed that the new F-35 mission is projected to bring 1,500 new personnel to the installation, and approximately 3,000 offsite housing units will be needed to support on-base operational activities. Not enough supply exists on base to accommodate this growth and thus the installation is looking to the community to meet this need.

Figure 4-71. Primary Mission-Critical Shorelines



Major Roadways and Evacuation Routes

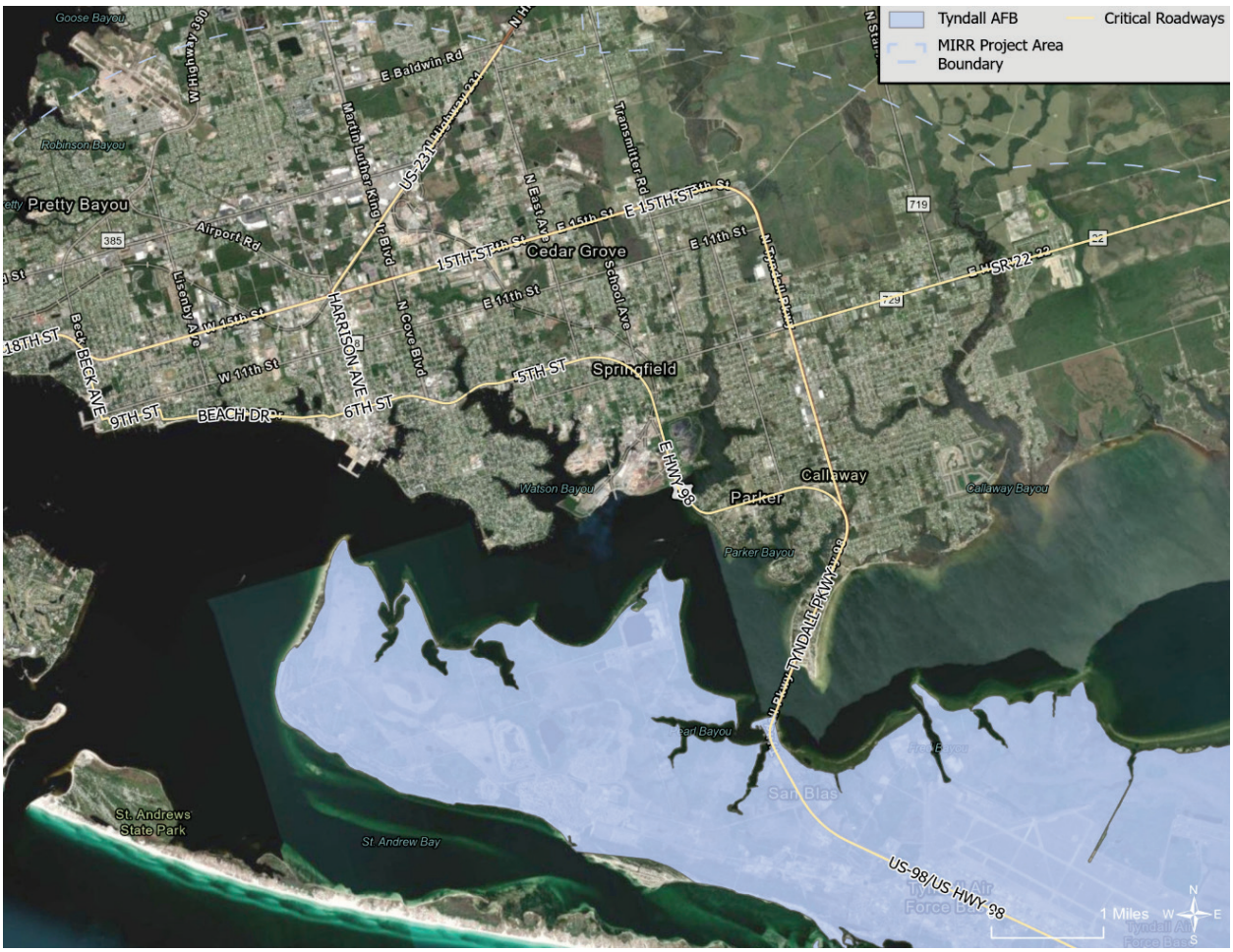
As more service members move to Bay County as part of the new mission, major roadways and evacuation routes are critical for personnel to access the base in a safe and timely manner. For this VA, the routes noted in Table 4-64 were considered primary mission-critical.

Table 4-64. Primary Mission-Critical Roadways

Route	Limits for VA
US 98	From extent of study area to Walton County

These routes are significant as they serve as major thoroughfares connecting communities to Tyndall. Additionally, they are vital evacuation routes. Figure 4-72 shows the mission-critical roadways for the installation.

Figure 4-72. Primary Mission-Critical Roadways



Secondary Mission-Critical Infrastructure

Communications

Regional communications providers are AT&T, Cox, Verizon, and Comcast Xfinity. Both installation operations and electric production and supply assets rely on the same communication systems, increasing criticality. Tyndall AFB has separate communications inside the installation. However, additional use of systems outside installation boundaries has increased because of the rise of teleworking that accompanied the COVID-19 pandemic. As a result, outside-the-fenceline communications towers and lines are important for base operations. Fiberoptic lines that connect to the base are currently being installed underground, reducing potential wind impacts.

Mission-Supportive Infrastructure

Water Infrastructure

The Bay County WTP is currently the primary source of potable water for the City of Panama City as well as Tyndall AFB. There is a single line that feeds the installation via a water line that crosses the Dupont Bridge. Bay County is currently planning to relocate this main underneath the bay via directional drilling.

Wastewater Infrastructure

Wastewater throughout the City of Panama City is collected through a network of wastewater pipes and conveyed to the Military Point AWT Facility, which is operated by Bay County. Reclaimed water from the AWT can be used as irrigation on the installation's former golf course; however, this practice has been discontinued in recent years. The

AWT is a single point of failure for County wastewater treatment. While it is inside the installation, the AWT is included in this analysis because it is a critical asset that supports both the installation and the community.

4.5.3 Exposure Analysis

The exposure analysis consisted of overlaying the regional asset inventory (for example, critical infrastructure or community assets) with hazard layers to determine proximity to the given hazard (exposure) to determine whether an intersection or exposure occurred. The hazards analyzed include flood exposure (100-year flood, storm surge, SLR); wildfire; and heat, lightning, and wind exposure. In addition to the hazard analysis, a review of transportation route exposure to flood and fire hazards was conducted.

Appendix C includes exposure maps.

Flood Exposure

The flood hazards considered in the flood exposure analysis include the 100-year flood event, storm surge from hurricanes (Categories 1 through 5), and the four SLR scenarios recommended by Florida Statutes from NOAA: SLR 2040 Intermediate-low, SLR 2040 Intermediate-high, SLR 2070 intermediate-low, and SLR 2070 intermediate-high.

100-Year Flood

The 100-year flood, also known as the 1% annual chance event, consists of pluvial (rainfall-induced), fluvial (river), and coastal flooding. The majority of the assets (88%) in the study region are not exposed to the 100-year flood event, which occurs mostly along the shorelines and bayous, including Watson Bayou, Martin Lake, Callaway Bayou, Parker Bayou, Posten Bayou, Pretty Bayou, and other bayous in East Bay. Additionally, significant inland flooding occurs in the City of Mexico Beach and in the areas east of the installation. Assets exposed to the 100-year flood event include community wastewater lift stations and various roadways.

Storm Surge

During a Category 1 hurricane, approximately 6% of assets—mainly coastal lift stations, pipes, and roadways—are exposed to surge. Storm surge inundates coastal areas in western and northwestern Panama City, starting with Category 3 hurricanes. Coastal roadways, including Highway 98 and West Beach Drive, also get flooded in this event, in which 21% of assets in the study area are exposed. Surge exposure becomes more extreme during a Category 5 storm, with approximately 44% of assets experiencing exposure. Table 4-65 shows asset exposure to storm surge during hurricanes.

Table 4-65. Storm Surge Exposure

Hurricane	%/Number of Assets Exposed
Category 1	5.5% (2124)
Category 2	12.0% (4598)
Category 3	20.9% (7984)
Category 4	35.5% (13496)
Category 5	43.5% (16,637)

Sea Level Rise

The SLR exposure analysis identifies future (NOAA 2040 and 2070) sea levels using SLR projections from NOAA. Overall, SLR is projected to affect few assets that support Tyndall AFB, as shown in Table 4-66 In the 2040s, coastal roadways and water lines in Pretty Bayou and Callaway Bayou will be permanently inundated. By 2070, coastal properties in the bayous will experience varying degrees of flooding, impacting impact mission-supportive roadways, water and sewer pipes, and lift stations.

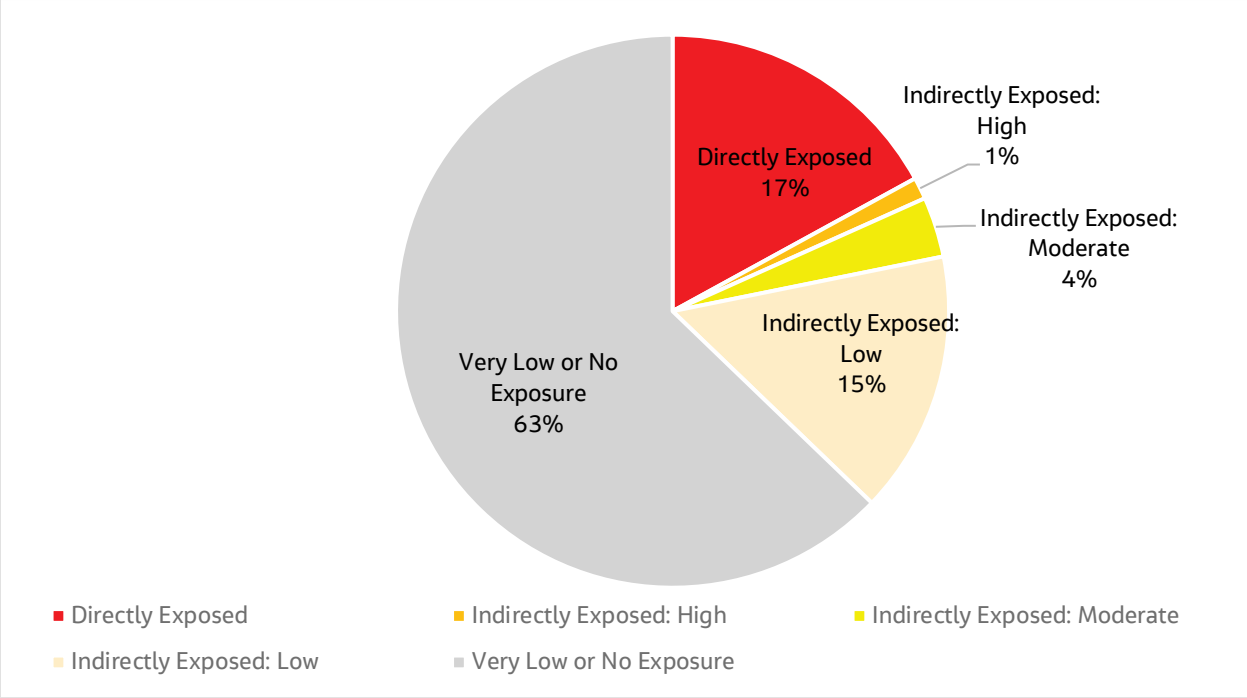
Table 4-66. SLR Exposure

SLR Scenario	% / Number of Assets Exposed	Areas Exposed
2040 Intermediate Low	0.05% / 20	Pretty Bayou, Emmons Bayou, Callaway Bayou
2040 Intermediate High	0.13% / 50	Pretty Bayou, Emmons Bayou, Callaway Bayou
2070 Intermediate Low	0.11% / 42	Pretty Bayou, Emmons Bayou, Callaway Bayou
2070 Intermediate High	1.3% / 498	Bayous, East and West Crooked Island

Wildfire Exposure

Approximately 63% of assets in the project study area are barely or not at all exposed to wildfire. These assets are located mostly in the City of Panama City. Only 17% of assts are directly exposed to wildfire, consisting of roadways and aboveground infrastructure in the City of Callaway, while the other 20% are indirectly exposed because of their proximity to vegetated areas. Figure 4-73 shows the distribution of wildfire exposure.

Figure 4-73. Wildfire Exposure Distribution



Heat, Lightning, and Extreme Wind Exposure

All aboveground assets (including structures and horizontal utilities) are exposed to heat, high winds, and lightning. Tall assets, such as cell towers or power transmission lines, are most exposed to lightning and wind hazards. Approximately 53% of assets are aboveground or at grade (for example, roadways) while the other 43% are belowground and are not exposed to heat, lightning, or wind.

Transportation Exposure Analysis

Significant flood exposure on US-98 begins with the 100-year flood and increases with storm surge Categories 3, 4, or 5 hurricanes. Table 4-67 summarizes the approximate lengths of exposure.

Table 4-67. US-98 Flood Exposure Analysis

Flood Event	Exposed Segments	Approx. Length of Exposed Segments	Total Length Inundated
100-Year Flood	Mexico Beach	2,000 feet	11,500 feet (2.2 miles)
	Watson Bayou crossing	500 feet	
	W. Beach Drive	9,000 feet	
Category 1 Storm Surge	Minimal inundation	N/A	N/A
Category 2 Storm Surge	In the City of Panama City, from Hathaway Bridge to study area boundary	1 mile	1 mile
Category 3 Storm Surge	Mexico Beach	6.1 miles	6.6 miles
	City of Panama City (W. Beach Drove and W. 9th Street)	0.5 miles	
Category 4 Storm Surge	Mexico Beach	8.5 miles	14 miles
	Tyndall AFB	2.8 miles	
	City of Panama City (W. Beach Drive, W. 9th Street, Beck Avenue)	2.7 miles	
Category 5 Storm Surge	Mexico Beach	7 miles	17.9 miles
	Tyndall AFB	5.9 miles	
	Tyndall Parkway near Long Point Park	0.6 miles	
	City of Panama City (W. Beach Drive, W. 9th Street, Beck Avenue)	4.4 miles	

4.5.4 Sensitivity Analysis

This section describes the anticipated impacts to community assets and infrastructure from exposure to each identified hazard and scenario. While the exposure analysis helped to identify the spatial extent of a hazard across relevant installations and study areas, the sensitivity analysis helps to identify the degree of negative impact across assets and infrastructure of interest. The process for determining asset sensitivities can be found in the *Emerald Coast Vulnerability and Risk Assessment Introduction and Methodology* document (Appendix B). This process was standardized across all MIRR VAs and is briefly discussed in the following text.

Flood Sensitivity

An asset's sensitivity to flooding depends on the asset's elevation and the ability to operate during a flood event. Flood sensitivity depends on the depth of the floodwaters and characteristics of the asset. Typically, low-lying and buried assets can become inaccessible during flooding or go offline when electrical components are flooded. Assets that are located on higher ground would likely not experience floodwater inundation. Assets with electrical components also display greater sensitivity to floodwaters.

Wildfire Sensitivity

Assets with electrical components or substations, such as power transmission lines or wastewater lift stations, will have some of the greatest sensitivities to wildfire. Roadways, railroads, and bridges also have sensitivity because of the effects of heat from wildfires. Bridge sensitivity also depends on the bridge material (for example, a bridge with a wooden deck surface will be more sensitive to wildfire as opposed to one with a concrete or paved deck). Overall, transmission lines, potable water wells, and transportation assets are most sensitive to wildfire.

Heat Sensitivity

Asset sensitivity to heat depends on the threshold temperature of the asset. When the surrounding air temperatures exceed the asset threshold temperature, it is assumed that the asset begins to display sensitivity to the hazard.

Lightning and Extreme Wind Sensitivity

While all aboveground assets are exposed to lightning and wind, the characteristics and installation of the asset can influence the sensitivity to these hazards. Towers, poles, and structures made from metal have an elevated risk of lightning strike. If these aboveground assets also have electrical components, there will be an accompanying increase in sensitivity to lightning strike.

Similarly, an asset's wind sensitivity depends on whether the asset is above ground and the surface area of the asset. Tall structures with little surface area, such as a cell tower, are less sensitive to winds than those with a large surface area, such as a building. Assets that are above ground without reinforcement are also more sensitive to wind. Transmission lines may be reinforced at poles; however, the lines themselves are vulnerable to wind and flying debris. The impacts of wind-borne debris were also considered when determining wind sensitivity.

4.5.5 Vulnerability Assessment

A vulnerability score was calculated for each asset using the follow equation:

Vulnerability = Exposure + Sensitivity

The highest hazard vulnerability score for each of the five hazards is two, yielding a maximum total vulnerability score of 10. The following subsections detail asset vulnerability to flood, wildfire, and heat. Extreme wind and lightning are included in the overall vulnerability scores. This yields a score that reflects the risk to the mission of the installation. A detailed discussion of the methodology for evaluating risk can be found in *Vulnerability and Risk Assessment Introduction and Methodology* document (Appendix B).

Flood Vulnerability

The highest possible flood vulnerability score of an asset is 2, whereas the average score is 0.18 and the highest actual score is 1.4. The vast majority of assets are not vulnerable to flooding and the most vulnerable assets are only moderately vulnerable to flooding. Table 4-68 shows the assets with the highest flood vulnerability scores (score greater than or equal to 1.2).

Wildfire Vulnerability

Most of the assets are located in urban areas. Thus, there is a corresponding lower overall vulnerability to wildfire, with approximately 50% (19,149 of 38,274 assets analyzed) of assets having a wildfire vulnerability score of 0. Approximately 5% (1,951) of assets are highly vulnerable to wildfire.

Table 4-68. Assets with Highest Flood Vulnerability (Score ≥1.2)

	Asset Name	Owner/Operator	Mission-Criticality	Flood Vulnerability Score
1	Laird Point Drive	Private Road	Supportive	1.4
2	Christen Drive	City of Callaway	Supportive	1.3
3	Island Road	Private Road	Supportive	1.3
4	Lift Station - PC 11	City of Panama City	Supportive	1.3
5	Lift Station - PC 12	City of Panama City	Supportive	1.3
6	Lift Station - P-9	City of Panama City	Supportive	1.3
7	Lift Station at W 30th Ct	City of Panama City	Supportive	1.3
8	Florida Highway Patrol Station	State of Florida	Supportive	1.3
9	Panama City Marine Institute	Bay County School District	Supportive	1.3
10	Horseshoe Bayou Road	Private Road	Supportive	1.3
11	Winona Street	City of Callaway	Supportive	1.2
12	Lift Station - PC 16	City of Panama City	Supportive	1.2
13	Lift Station - PC 20	City of Panama City	Supportive	1.2
14	Lift Station - PC 71	City of Panama City	Supportive	1.2
15	Lift Station - C-11	City of Callaway	Supportive	1.2
16	Cell Tower	-	Supportive	1.2
17	Lift Station - PC 95	City of Panama City	Supportive	1.2
18	Lift Station - P-17	City of Panama City	Supportive	1.2
19	Lift Station - PC 14	City of Panama City	Supportive	1.2
20	Lift Station - PC 17	City of Panama City	Supportive	1.2

Heat Vulnerability

Approximately 70% of assets have low heat vulnerability scores, whereas the other 30% of assets display high vulnerability to heat. The assets most vulnerable to future heat waves are electric production and supply facilities (power transmission lines) and railroads.

Extreme Wind Vulnerability

Approximately 1% of critical assets exhibit high vulnerability to extreme winds, including lift stations, cell towers, wastewater treatment facilities, and power lines.

Lightning Vulnerability

Elevated assets were most vulnerable to lightning whereas underground or at-grade assets were not as vulnerable to lightning. Only approximately 1% of assets are highly vulnerable to lightning while the rest of the assets display moderate and low vulnerability. Assets most vulnerable to lightning are electric production and supply facilities (power transmission lines and substations) and communications infrastructure (cell towers).

Overall Vulnerability

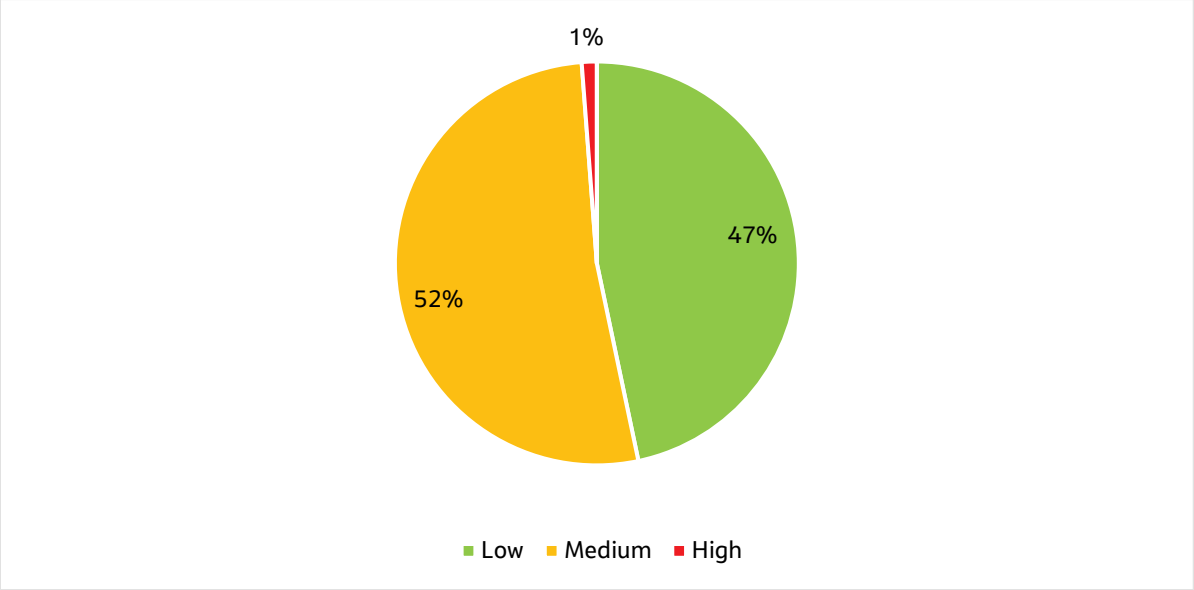
The highest possible vulnerability score is a 10. Of the 38,274 assets analyzed, the average vulnerability score was 0.54, which indicates low overall vulnerability among assets in the project study area. Table 4-69 shows the 20 assets and facilities with a vulnerability score greater than 7.6.

Table 4-69. Assets with Highest Total Vulnerability

Rank	Asset Name	Mission-Criticality	Asset Owner	Vulnerability Score
1	Lift Station - PC 16	Supportive	City of Panama City	8.2
2	Lift Station - PC 20	Supportive	City of Panama City	8.2
3	Lift Station - PC 71	Supportive	City of Panama City	8.2
4	Lift Station - C-11	Supportive	City of Callaway	8.2
5	Cell Tower	Supportive	Unknown	8.2
6	Lift Station - PC 48	Supportive	City of Panama City	8.1
7	Lift Station - PC 87	Supportive	City of Panama City	8.1
8	Lift Station - C-2	Supportive	City of Callaway	8.1
9	Cell Tower	Supportive	Unknown	8.1
10	Lift Station - PC 91	Supportive	City of Panama City	8.0
11	Lift Station - P-11	Supportive	City of Parker	8.0
12	Cell Tower	Supportive	Unknown	7.97
13	Cell Tower	Supportive	Unknown	7.97
14	Lift Station - PC 34	Supportive	City of Panama City	7.8
15	Lift Station - PC 47	Supportive	City of Panama City	7.8
16	Lift Station - BC-6	Supportive	Bay County	7.7
17	Lift Station - BC-4	Supportive	City of Springfield	7.7
18	Lift Station - C-14	Supportive	City of Callaway	7.6
19	Lift Station - C-10	Supportive	City of Callaway	7.6
20	Lift Station - P-6	Supportive	City of Parker	7.6

Assets with the highest total vulnerability are mission-supportive community lift stations and community cell towers. Figure 4-74 shows the distribution of vulnerability scores for various mission-critical assets.

Figure 4-74. Distribution of Vulnerability Scores



Approximately 1% (462) of assets have high vulnerability – these will be carried forward into the risk analysis, along with additional primary mission-critical assets that, while having medium vulnerability, may still pose a high risk to the mission of the installation.

Shoreline Erosion

The JALBTCX CERI tool was used to assess shoreline resilience of the coastlines that protect the installation (JALBTCX 2022). CERI scores range from 0 to 5, with scores between 0 and 2.1 indicating low resilience, scores between 2.1 and 3.9 indicating moderate resilience, and scores between 3.9 and 5 indicating high resilience to coastal hazards. CERI maps show circles along the shoreline: each circle indicates a 100-meter zone with its own coastal resilience score.

Figures 4-75 through 4-78 show CERI shoreline resilience maps for St. Andrew Park and Shell Island; Shell Island and Crooked Island West; Crooked Island West, St. Andrew Inlet, Crooked Island East; and Crooked Island East, respectively.

The shorelines in St. Andrew State Park and east of the park are a mix of moderately resilient and not resilient.

The shorelines on Panama City have mostly moderate resilience scores, though there are approximately 800 meters that have low resilience scores.

The shorelines at St. Andrew inlet suffered significant impacts during Hurricane Michael and thus have low resilience scores, requiring significant restoration.

The shorelines on Crooked Island East are not resilient but become more so leading to Mexico Beach.

Figure 4-75. Shoreline Resilience – St. Andrew Park and Shell Island

Source: JALBTCX 2022



Figure 4-76. Shoreline Resilience – Shell Island and Crooked Island West

Source: JALBTCX 2022



Figure 4-77. Shoreline Resilience – Crooked Island West, St. Andrew Inlet, Crooked Island East

Source: JALBTCX 2022

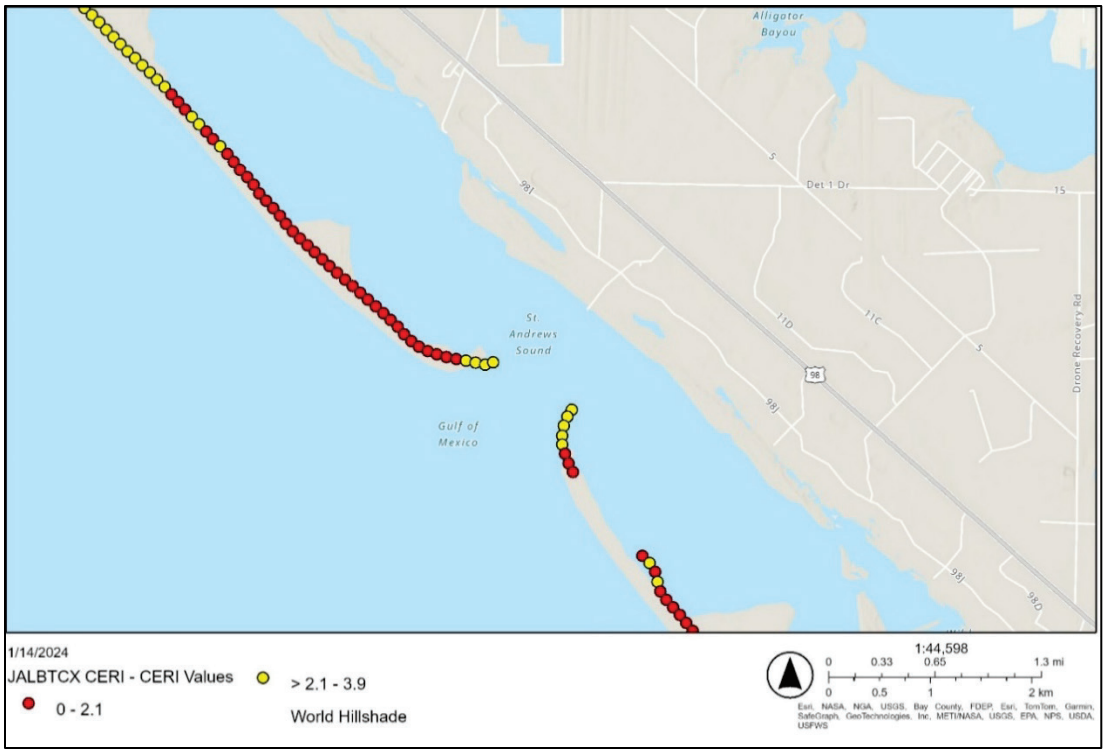


Figure 4-78. Shoreline Resilience – Crooked Island East

Source: JALBTCX 2022



Energy Sector Vulnerability

Methodology

To determine areas where the most prevalent energy infrastructure vulnerability exist within the Northwest Florida region, the following vulnerability indicators and metrics were considered: 1) exposure to major natural threats to energy infrastructure, 2) energy burden within the Census tract of the installation, 3) known vulnerabilities, 4) hardening efforts for the energy infrastructure, 5) presence of microgrids for redundancy, and 6) proximity of infrastructure to power recovery priority facilities, such as hospitals and emergency medical service stations. It is important to note that debris management and regular maintenance for the energy infrastructure are considered as important factors that can impact the stability and function of the energy systems.

These metrics were evaluated in asset and military installation scales, with each being awarded a final vulnerability score to rank their energy-related condition from "poor" to "good". The intention of this ranking system is to inform a resilience strategy that prioritizes installations and assets ranked as "poor" for improvement for each installation. Results of the energy sector VA are provided in this subsection.

Results

The energy infrastructure directly connected to the base consists of two substations, eight taps, and four risers (hereinafter referred to as "points"), spanning a total of 13.3 miles of overhead and underground power transmission lines (Figure 4-79). However, this system faces significant vulnerabilities, particularly from natural threats. The major risks include the impact of hurricanes on 12 out of the 14 points and flooding affecting 8 out of the 14 points. The presence of a single point of failure in the energy infrastructure is noted as a known vulnerability for Tyndall AFB. The BASE operates within Bay County's Census Tract #7 that has a 3% energy burden (that is, the ratio of average annual housing energy costs to the average annual household income) (Ma et al. 2019), which is a relatively low percentage within the State of Florida where 6% is considered "high" (The Balmoral Group 2022).

It is noted that there are no fast power recovery priority assets (such as hospitals or fire stations) within a 0.5-mile distance from the base's substations. This is reviewed as a potential mitigation measure where this strategic proximity could enable Tyndall's power to be recovered faster along with the fast power recovery priority assets that are on the same power line. However, the base has implemented an on-site/connected microgrid, serving as a critical source of redundancy for some of the installation's buildings. Additionally, there are two low-risk substations just north of the base that are not exposed to any hazards assessed in the study, providing a degree of resilience to the overall energy infrastructure. Storm hardening efforts that moved the power transmission and distribution lines underground within the base also provide mitigating impacts to the installation's energy vulnerability score.

The fact that all four fire stations operate on a different power line than the base provides redundancy during power outages, as emergency services can remain operational. However, concerns still exist related to the environment surrounding the energy infrastructure.

The proximity of the tree canopy to overhead power transmission and distribution lines poses a risk, potentially leading to disruptions during adverse weather conditions. Moreover, there are identified vulnerabilities in the substation fire protection system, with potentially insufficient fire line width and the absence of existing scrape (clear area created via vegetation removal) or trench for added safeguarding.

Table 4-70 lists results of installation-scale scoring for Tyndall AFB. Tyndall AFB has the lowest energy vulnerability score of all the installation assessed in this MIRR.

Figure 4-79. Tyndall AFB Energy Infrastructure Vulnerabilities and Mitigating Factors

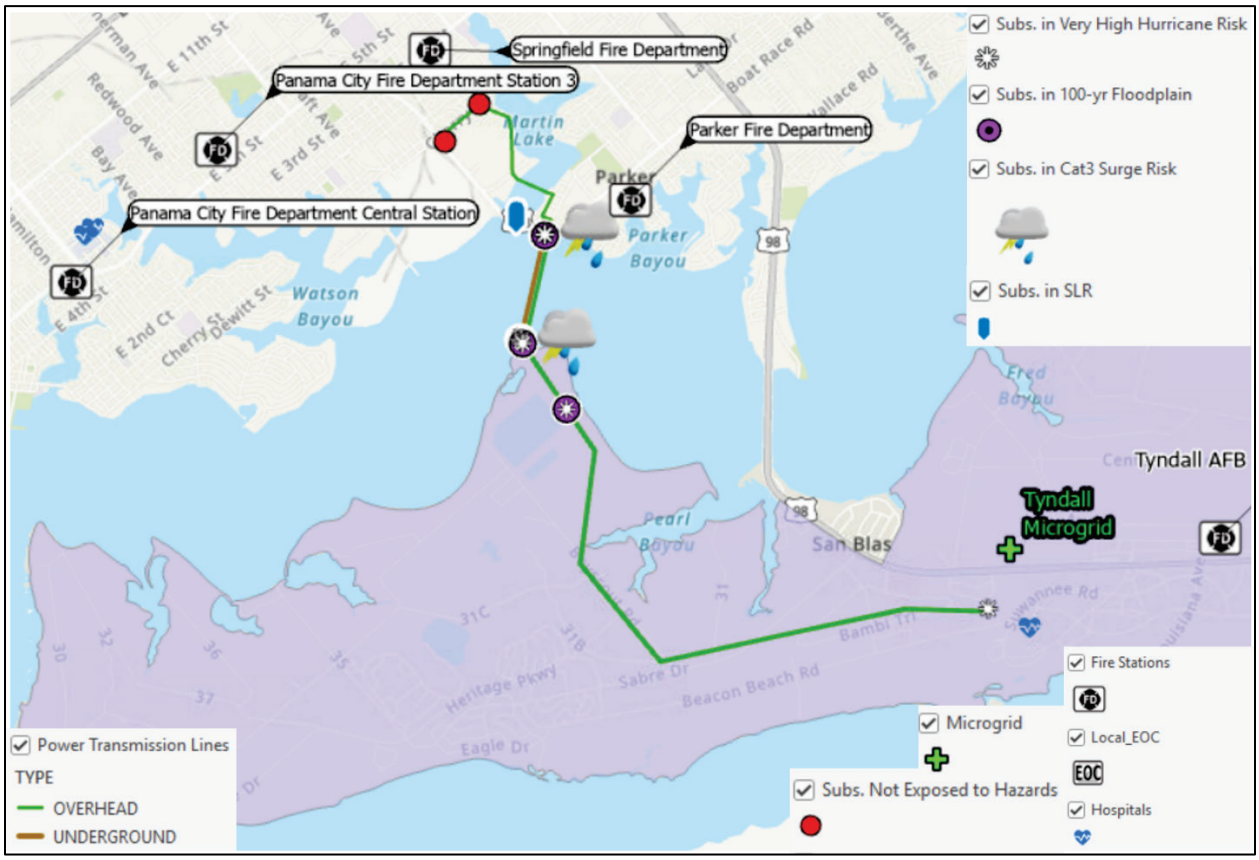


Table 4-70. Installation-Scale Scoring Results

Exposure and Sensitivity to Natural Hazards (0–3 pts)	Are transmission lines in wildfire risk? (Yes=1.5, No=0)	Energy Burden	Other Known Vulnerabilities	Hardening Efforts (Yes=-1.5, No=0)	Strategic Proximity	Microgrid Presence (Yes=-1.5, No=0)	Final Energy Vulnerability Score
2.6	0	1.5	1.0	-1.5	0	-1.5	2.1

Other Identified Vulnerabilities

In addition to the vulnerabilities identified in the quantitative analysis, other vulnerabilities were discussed during the stakeholder workshops and interviews. The following vulnerabilities, while lacking a vulnerability score, also pose a threat to Tyndall AFB's mission.

- **Lack of housing.** The destruction of on-base housing after Hurricane Michael, coupled with the growing population of Bay County and the influx of new personnel arriving at Tyndall AFB with the F-35 mission, has resulted in a severe housing shortage. This threatens the ability of the installation to execute its primary mission because installation personnel and their families lack sufficient housing.
- **Encroachment on EGTTR.** Encroachment by the energy sector on the EGTTR can impact the training and operations occurring at Tyndall AFB.

- **Lack of infrastructure capacity for new growth.** As discussed in the stakeholder workshops, additional growth in Bay County is outpacing infrastructure capacity. New development in the South Port community will require a new WTP to accommodate the growing population, including the new personnel moving to Bay County to support the F-35 mission.

4.5.6 Risk Assessment

Assets with a vulnerability score greater than 6.0 were pulled into the risk analysis. The risk associated with the selected high vulnerability was subsequently evaluated using the following equation:

$$Risk = Impact\ to\ Mission + \Sigma\ (Hazard\ Likelihood \times Hazard\ Consequence)$$

where likelihood is the annual probability of occurrence and consequence is the combination of the impact of asset failure on mission assurance and the degree of impact on the asset itself. This yields a score that reflects the risk to the mission that the potential asset failure poses. The highest possible risk score for an asset is 200, and the breakdown of risk scores and rankings is shown in Table 4-71.

Table 4-71. Total Risk Scores and Rankings

Risk Score	Ranking
180–200	Extreme
120–180	High
60–120	Medium
0–60	Low

A detailed discussion of the methodology for evaluating risk can be found in the *Emerald Coast Vulnerability and Risk Assessment Introduction and Methodology* document (Appendix B).

Maps showing the locations of the high-risk assets can be found in Appendix C.

High Flood Risk Assets

The highest possible flood risk score of an asset was 60. There were no assets with high flood risks (risk score greater than 40). The medium-risk assets consist mostly of coastal wastewater lift stations along with some cell towers; these assets are exposed and sensitive to the 100-year flood and multiple categories of storm surge. Table 4-72 shows the assets with the highest flood risk scores.

Table 4-72. Assets with Highest Flood Risk

No.	Asset Type	Asset Name	Mission-Criticality	Asset Owner/ Operator	Flood Risk Score	Flood Risk Ranking
1	Wastewater treatment facilities and lift stations	Lift Station 11	Supportive	Bay County	37.2	Medium
2	Wastewater treatment facilities and lift stations	Lift Station - PC 11	Supportive	City of Panama City	37.2	Medium

Table 4-72. Assets with Highest Flood Risk

No.	Asset Type	Asset Name	Mission-Criticality	Asset Owner/ Operator	Flood Risk Score	Flood Risk Ranking
3	Wastewater treatment facilities and lift stations	Lift Station - PC 12	Supportive	City of Panama City	37.2	Medium
4	Major Roadways	Highway 98	Primary	FDOT	31.7	Medium
5	Communications Facilities	Cell Tower	Secondary	Unknown	31.7	Medium
6	Wastewater treatment facilities and lift stations	Lift Station 39	Supportive	Bay County	31.7	Medium

Maps for highest-flood risk assets are located in Appendix C.

Assets with Highest Total Risk to Mission

The average risk score for the 1,032 high vulnerability assets is 70, indicating overall medium risk for the assets within the study area. The only assets with high risk to mission were:

- **US-98.** This FDOT-operated mission-critical asset has high risk to mission because of flood hazards that can inhibit installation personnel from reaching the base.
- **Power transmission lines.** These assets are critical for the installation missions. While the impacts from most hazards are mitigated by existing protections, the lines' criticality, coupled with lack of redundant power feeds to the installation, results in high risk to the mission.

Community assets with medium risk included:

- **Community wastewater lift stations.** Coastal wastewater lift stations throughout the study area have high risks because of severe impacts from flood hazards, as well as compounded risks from wildfire, heat, and wind impacts.
- **St. Andrew Wastewater Treatment Facility.** The wastewater treatment plant, which treats wastewater for the City of Panama City, had medium risk.

The highest-risk assets are owned by the City of Panama City, City of Parker, and Bay County. Maps showing the locations of the high-risk assets are located in Appendix C.

Risks for Mission-Critical Assets

Table 4-73 documents the risk scores for primary mission-critical assets for Tyndall AFB.

Table 4-73. Risks for Primary Mission-Critical Assets

	Asset Type	Asset Name	Owner/ Operator	Risk Score	Risk Rank	Notes
1	Major Roadways	US-98	FDOT	147	High	High flood risk throughout roadway.
2		Tyndall Parkway	FDOT	N/A	N/A	Asset had medium vulnerability score (4.3), not carried forward to risk analysis.
5	Electrical Production and Supply Facilities	Power transmission lines	FPL	Varies	High-medium	
6		Substations	FPL	Varies	Medium	
7	N/A	Housing	N/A	N/A	N/A	Not assessed via quantitative risk assessment.
8	Shorelines	Shorelines		N/A	N/A	Not assessed via quantitative risk assessment. Shorelines had low to moderate CERI scores, particularly around St. Andrews Inlet.

The risks for additional mission-supportive assets are discussed below:

- **AWT Facility.** This facility provides wastewater treatment services for both the installation and Bay County and is thus a mission-critical asset. The facility's risk stems from storm surge from Category 4 or 5 hurricanes.
- **Bay County WTP.** The Bay County WTP had a vulnerability score of "low" and was not carried forward into the risk analysis. It is anticipated that this asset would have a low risk to mission score.

SECTION 5

Installation Resilience Strategies and Projects



5. Installation Resilience Strategies and Projects

With an established list of vulnerable assets in Section 4 and an understanding of the hazards that threaten them, the next step was to identify resilience interventions that can mitigate the risks. Risks can be mitigated by reducing the consequence of their impact.

5.1 Approach to Resilience Strategies

There are two categories of resilience interventions: regional strategies that can be implemented across the installation or community-specific interventions that address one or more vulnerabilities. The Emerald Coast MIRR identifies 52 resilience strategies.

Each installation-specific intervention aligns with a noted risk, vulnerability, or topic area. Interventions are categorized as follows:

- **Physical infrastructure** improvements in the built environment include projects that reduce risk and enhance system reliability and resilience in the transportation, wastewater, power, stormwater, or communications sectors.
- **Social infrastructure** consists of the organizations, places, and spaces that enable communities to create social connections and thrive. It includes services and assets that benefit a community, such as housing, childcare, education, and emergency services. Interventions (policy or physical) for social infrastructure improve these assets or services.
- **Natural infrastructure** consists of natural elements or features that benefit both human wellbeing and the environment. Natural infrastructure can be implemented in a variety of environments, including coastal, riverine, temperate, or arid regions, and can mitigate flood or fire risk, attenuate wave energy, cool an area, or minimize coastal erosion.
- **Economic infrastructure** promotes the financial wellbeing and security of a community. Economic interventions seek to improve these factors and can include changes that promote commercial corridors, reduce costs of living or insurance costs, support healthy businesses, improve the job market and wages, or enhance supply chain reliability.

5.2 Evaluation of Metrics for Project Prioritization

To prioritize projects for implementation, a series of resilience metrics were developed. Metrics were developed to describe the availability of projects: mission criticality, funding opportunities, feasibility, long-term costs, and community resilience benefits.

Mission criticality addresses the relevance of the resilience intervention to the mission of the installation. A higher mission criticality score indicates greater impact on the installation mission.

A variety of **funding sources** are available from federal, state, and non-governmental sources for the implementation of resilience projects. The higher the likelihood and greater the availability of funding sources, the higher the score.

The **feasibility** metric describes the ability of an entity to get a resilience project completed. Feasibility is comprised of three sub-metrics: owner willingness and capacity, shovel-readiness, and previous identification.

- *Willingness and capacity* assesses the project owner's commitment to the project and the availability of necessary staff and resources to support implementation of the project. A higher score indicates the project owner is in a better position to execute the project.

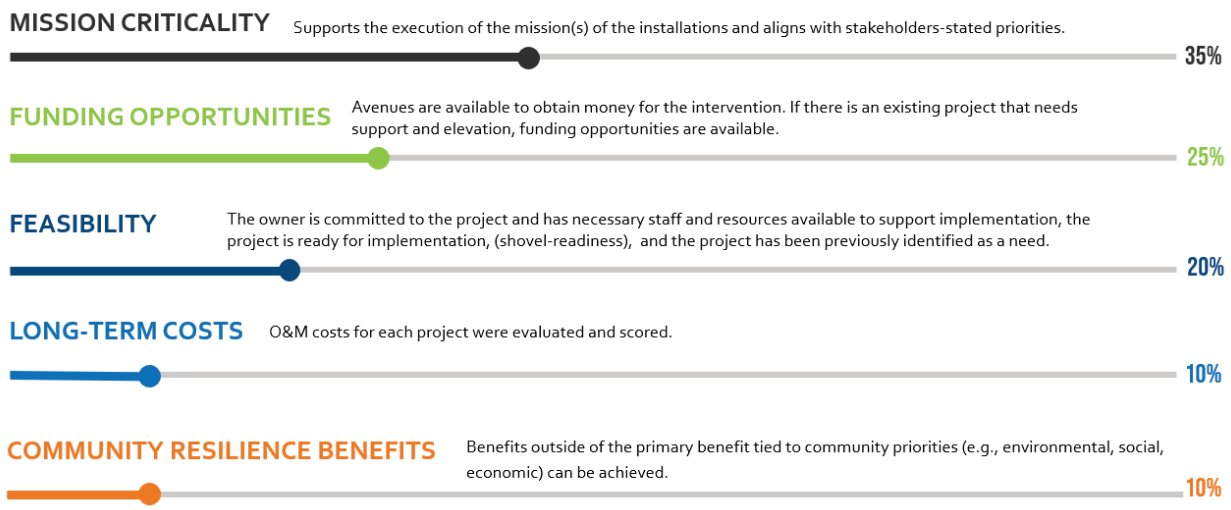
- *Shovel-readiness* evaluates the project's readiness, including completion of planning, design, and pre-construction activities. For non-construction projects, similar measures were used.
- Projects that have been *previously identified* in pre-existing strategic planning documents, such as capital improvement plans, long-range transportation plans (LRTPs), or other similar documents, are recognized as a prior need.

As with all projects, the **life cycle cost** of the proposed improvement should be evaluated when determining project priority. Because of the nature of some proposed projects, a traditional cost-benefit analysis was not feasible. Proposed project life cycle costs are Association for the Advancement of Cost Engineering Class 5 cost estimates (also known as rough order-of-magnitude estimates).

Off-installation improvements can also be evaluated by **community resilience benefits** or provide other infrastructure, environmental, social, and economic co-benefits. Infrastructure improvements can include improved utility service and reliability and congestion reduction. Environmental benefits can include, but are not limited to, water quality improvements, air quality improvements, stormwater management, or habitat or biodiversity enhancement. Social benefits consist of actions such as greater community connectivity through mobility improvements. Economic benefits stem from projects that promote economic growth or activity.

The project team assigned weights to the evaluation metrics (Figure 5-1) to reflect their importance. Mission criticality is the most important, followed by funding opportunities and feasibility. Long-term costs and community resilience benefits, while important and beneficial, were included but not ranked as highly.

Figure 5-1. Weighted Resilience Project Metrics



While the metrics evaluate the feasibility of implementing the project, the MIRR team sought inputs from each installation to understand where the resilience strategies rank relative to the installations' priorities. Each installation-specific resilience project was ranked by the installations using a system of three tiers, as shown in Table 5-1.

Table 5-1. Installation Priorities

Prioritization Tier	Description
High	Project will have an immediate and measurable impact on the installation and its mission.
Medium	Project will enhance the resilience of the installation and is reasonably executable in the next 5–10 years.
Low	Project is a long-term effort (10+ years) that will require significant funding and/or continual participation by external stakeholders.

5.3 Identifying Priority Resilience Improvements and Local Projects for Alignment Opportunities

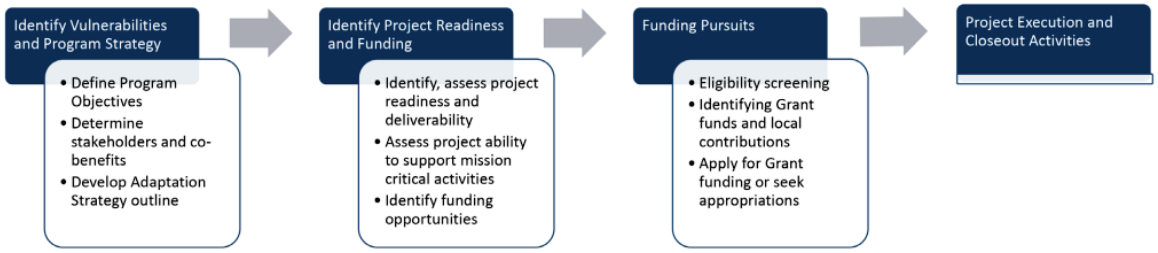
Priority improvements are identified by their scoring in the resilience strategy matrix. The higher the score, the more useful and easily implementable the improvement is in the context of the installation and surrounding community.

While not formally identified as resilience projects, many existing local projects offer opportunities into which priority improvement projects can be integrated. Leveraging existing projects reduces the effort required to build stakeholder support for the projects. Priority improvement projects can be integrated into capital improvement programs (CIPs) and local mitigation strategies (LMS). CIPs have infrastructure-related projects in sectors such as transportation, utilities, or stormwater. LMSs identify projects and actions related to disaster preparedness. Integrating local projects into existing plans can be a task addressed in the next steps of collaboration and implementation.

5.4 Funding Strategy

The MIRR aims to facilitate collaboration between communities and local installations to help build mission assurance through community resilience. Given the crucial role of defense communities in supporting military installations, it is essential to equip them with resources for implementing effective resilience measures. In addition to conventional funding avenues, specific opportunities are available for defense communities to engage in resilience planning and projects, detailed on Figure 5-2.

Figure 5-2. MIRR Funding Outline Strategy



Tailored for defense communities, the MIRR emphasizes one key stakeholder—the installation—especially regarding resources extending beyond installation boundaries. This framework identifies shared opportunities for installations and communities to enhance resilience collaboratively. Key federal and state funding programs that might be applicable to the resilience projects identified in the MIRR were reviewed for how they may be applied to support climate resilience programs. In addition to identifying defense-related funding for implementation, the MIRR is aligned with the national security imperative, potentially precipitating reprioritization of existing funded and/or unfunded municipal resilience projects.

Given these opportunities, capital resilience projects often necessitate funding from diverse sources, highlighting the importance of understanding cost-sharing and leveraging partnerships. In addition to the funding options outlined in the resilience strategy project sheets starting in Section 5.5, Appendix D provides a comprehensive list of federal and state grant programs relevant to each installation, enabling communities devise implementation strategies, set timelines, build on successful models, forge partnerships, and identify funding mechanisms.

5.4.1 Funding Options

The passage of the Bipartisan Infrastructure Law marked a significant increase in funding for federal grant programs. Alongside augmenting resources for established programs such as the U.S. Department of Transportation's Rebuilding American Infrastructure with Sustainability and Equity Program and the Infrastructure for Rebuilding America Program, the law introduced a suite of new grant initiatives. These new programs present additional opportunities for installation communities aiming to finance various resilience investments. Furthermore,

enhancements in federal formula funding have bolstered state-administered transportation funding streams managed by agencies such as FDOT and metropolitan planning organizations. There are several relevant grant programs funded through state agencies and other local entities, as well as state-distributed programs that are funded through federal formula funds.

Across all federal funding and financing programs, the specified funding priorities guide the allocation of new federal infrastructure funds aligned with the Administration's objectives. These priorities can be summarized as follows:

- **Equity**: Planning and executing projects that promote equity throughout the U.S.
- **Recovery and Resilience**: Planning and executing projects that enhance resilience to and facilitate long-term recovery from disruptions.
- **Workforce Development**: Planning and executing projects that bolster workforce education and skills training tailored to the hiring and skills demands of the business sector.
- **Technology-Based Development**: Planning and executing projects that cultivate regional knowledge ecosystems supporting entrepreneurs and startups.
- **Environmentally Sustainable Development**: Planning and executing projects that contribute to addressing the climate crisis.

5.4.2 Other Considerations

There are several federal and state credit instruments that could potentially be a source of financing to support infrastructure needs. Specifically, low-cost financing tools enable borrowing against future revenues, converting this financing into immediate funding when required, with repayment and interest obligations in the future.

In addition to federal and state funding and financing options, public agencies employ a diverse array of approaches to deliver improvements for both new and existing facilities. These methods span from the traditional design-bid-build model to more innovative alternative delivery models. Alternative delivery models such as Public-Private Partnership (P3) not only transfer key risks from public agencies to private entities but also address funding gaps by introducing new funding sources. This allows projects to be completed sooner, potentially with shorter construction timelines, reduced costs, and improved operational efficiency.

For competitive funding programs and other financing instruments, additional project-specific considerations come into play when evaluating funding options:

- **Project Readiness:** Ensuring the project is well-prepared for development and implementation as planned.
- **Cost-Benefit Analysis**: Evaluating the project's benefits against its costs.
- **Value for Money Analysis**: Assessing the optimal balance of benefits and costs in delivering desired services, typically comparing P3 and conventional delivery models using qualitative and quantitative approaches.

These funding programs listed cater to various resilience planning and infrastructure development phases, applicable to both installations and community partners based on identified interventions and projects.

The following sections outline each of the six installation’s resilience strategy projects complete with the project title, overall strategy score, breakdown of metrics, cost estimation, leadership priority, estimated timeline, project description, project lead and partners, and potential funding sources.

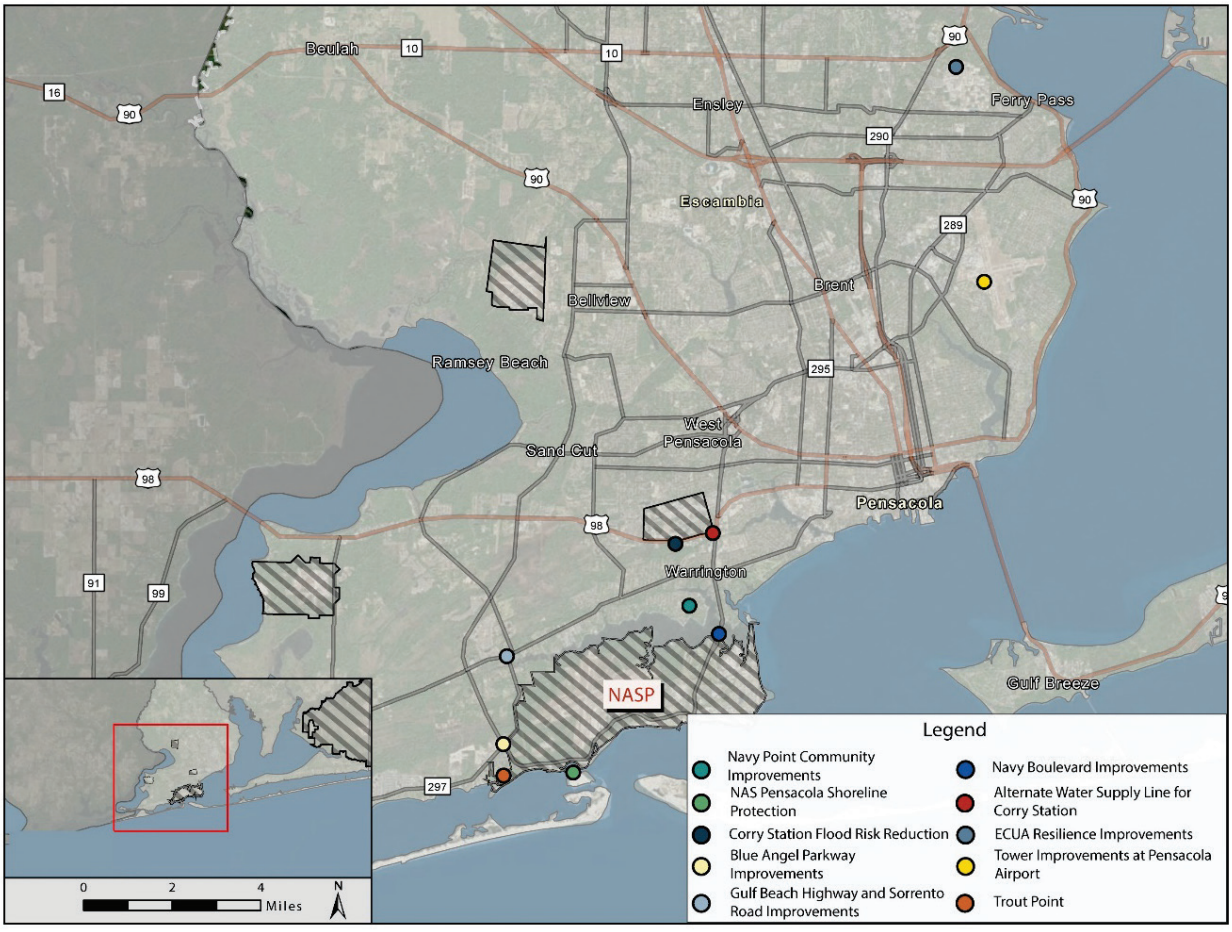
5.5 NAS Pensacola

Ten resilience projects were identified for NAS Pensacola. Table 5-2 outlines the projects and their respective strategy scores. Figure 5-3 shows the approximate project locations.

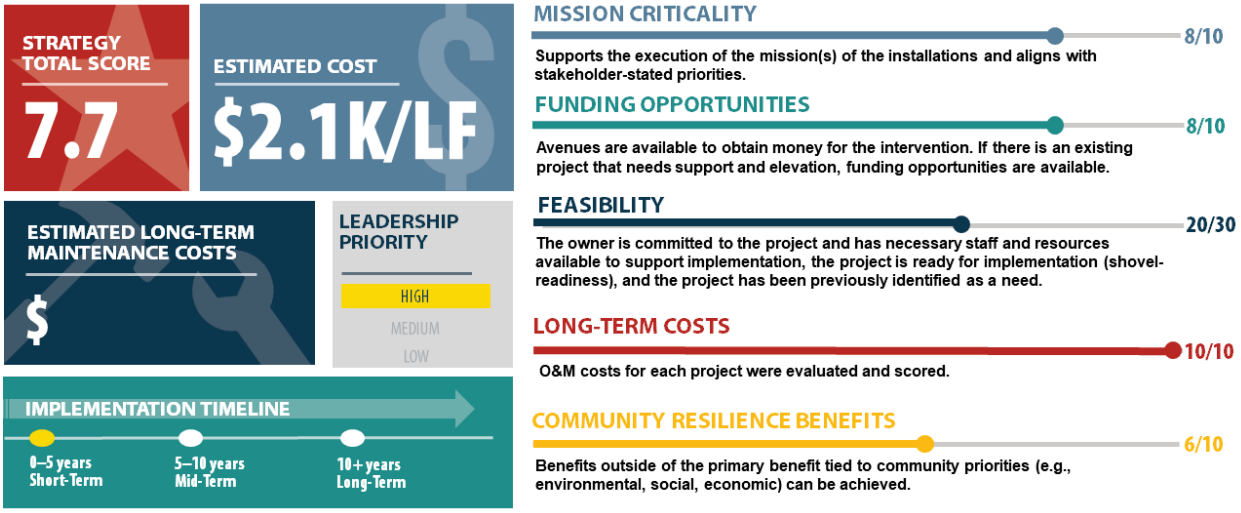
Table 5-2. NAS Pensacola Resilience Projects

Project Name	Strategy Score
NAS Pensacola Shoreline Protection	7.7
Tower Improvements	7.0
ECUA Resilience	6.5
Blue Angel Parkway Improvements	5.7
Corry Station Flood Risk	5.5
Navy Boulevard Improvements	5.1
Gulf Beach Highway	4.9
Navy Point Community	3.9
Trout Point Preserve	3.4
Alternative Water Supply Line	2.5

Figure 5-3. Approximate Locations of NAS Pensacola Resilience Projects



5.5.1 NAS Pensacola Shoreline Protection



Project Description

NAS Pensacola is surrounded by 17 miles of shorelines. These shorelines are a mixture of hardened shoreline structures (seawalls) of various ages, living shorelines, white sand beaches, and vegetated areas. These shorelines serve as a buffer between the installation's facilities and the waters of Pensacola Bay.

NAS Pensacola and its mission-critical shorelines are exposed to coastal flooding and wave action, which erode the shorelines. Washout can impact coastal transportation and utility infrastructure within the installation, potentially causing service outages.

This project consists of multiple components that work together to minimize shoreline erosion throughout the installation. It begins with the development of a resilience plan and then identifies specific areas where shoreline adaptation projects are required.

Actions

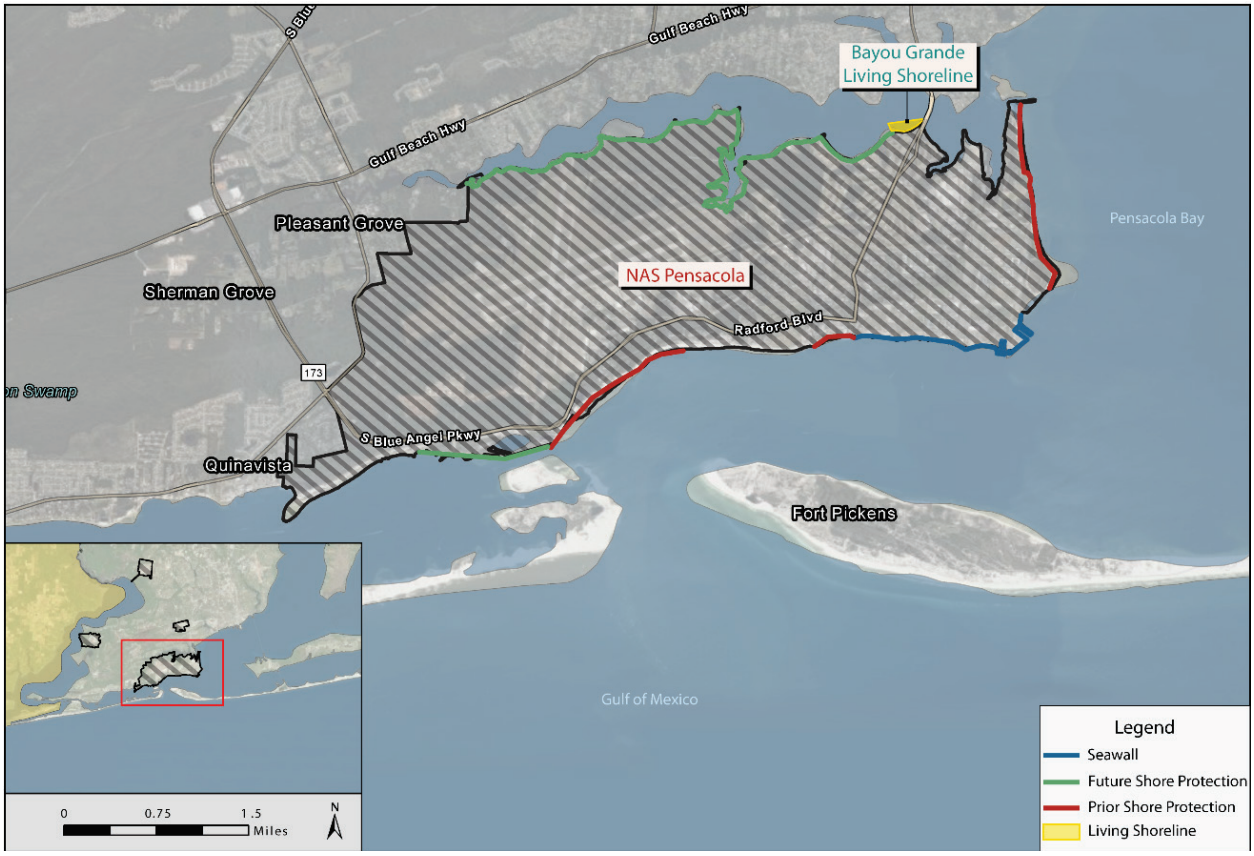
1. **Develop an installation coastal resilience plan.** While this is an "inside the fence line" activity, it is important that NAS Pensacola develop a plan for mitigating its coastal risks. This plan should evaluate the feasibility of resilience interventions, evaluating grey infrastructure, green infrastructure, and hybrid solutions, with a focus on flood risk mitigation and erosion control. It should also incorporate design standards that use future flood scenarios.

2. **Continue cooperation with Escambia County and Pensacola and Perdido Bays Estuary Program (PPBEP).** These three entities have a history of cooperating to complete shoreline resilience projects. This is exhibited by three prior living shoreline initiatives and ongoing work to develop a new living shoreline in Bayou Grande.

3. **Design and build a new living shoreline in Bayou Grande.** This pre-existing project is in the conceptual stage and would create a living shoreline west of the Navy Boulevard entrance, stabilizing an area that is currently experiencing erosion (Figure 5-4).

4. **Protect South Blue Angel Parkway around Sherman Cove.** The area around Sherman Cove is experiencing erosion, threatening subsurface utility infrastructure. A shoreline protection solution should be designed that minimizes erosion and protects the area.

Figure 5-4. NAS Pensacola Shoreline Protection



Community Resilience Benefits

This project provides significant environmental co-benefits, including habitat creation and erosion reduction through the living shoreline. It is possible to incorporate carbon sequestration using seagrasses.

Project Team

The project lead is NAS Pensacola and Escambia County, and project partners include PPBEP.

Funding Opportunities

Opportunities for funding include the following:

- Transformational Habitat Restoration and Coastal Resilience
- Section 103 CAP - Hurricane and Storm Damage Reduction Projects
- DoD Readiness and Environmental Protection Integration (REPI) Challenge

5.5.2 Tower Improvements at Pensacola Airport



Project Description

Student naval aviators require air traffic control services to safely conduct training missions. NAS Pensacola and NAS Whiting Field airfield towers close each weekend to allow for airfield maintenance and downtime for air operations staff. The two installations pre-position 30 to 40 aircraft to the Pensacola International Airport (PNS) each Friday prior to weekend closure of their towers. This allows pilot training missions to continue through weekend and holiday closures by providing required air traffic control services through the PNS Tower. The weekend is when commercial air traffic is heaviest and PNS sees the most traffic conflict during this time, which has caused the need to separate military and commercial air traffic activity. Additionally, there is an instrument landing system to the north that provides all-weather capability, so if there is crowding to NAS fields, the military can use PNS for landing practice.

The air traffic control tower was last expanded more than 20 years ago and has numerous issues, including faulty expansion joints, HVAC issues, and mold problems. The City's current CIP plan includes $3 to $4 million for renovation plans of the tower at PNS.

This project would consist of making the following improvements to the PNS air traffic control tower:

- Mechanical system improvements
- Structural improvements
- Install downspouts on the tower
- Restroom improvements
- Breakroom improvements
- Landscaping improvements

Actions

1. **Obtain funding for tower improvements.** Obtain funding for design and construction of the tower improvements.

Community Resilience Benefits

Conducting tower improvements at Pensacola Airport will benefit the military installations and surrounding communities. In addition to the military, PNS also provides air traffic control for private aircraft, thus improved tower communication will benefit private aircraft owners who fly out of PNS as well.

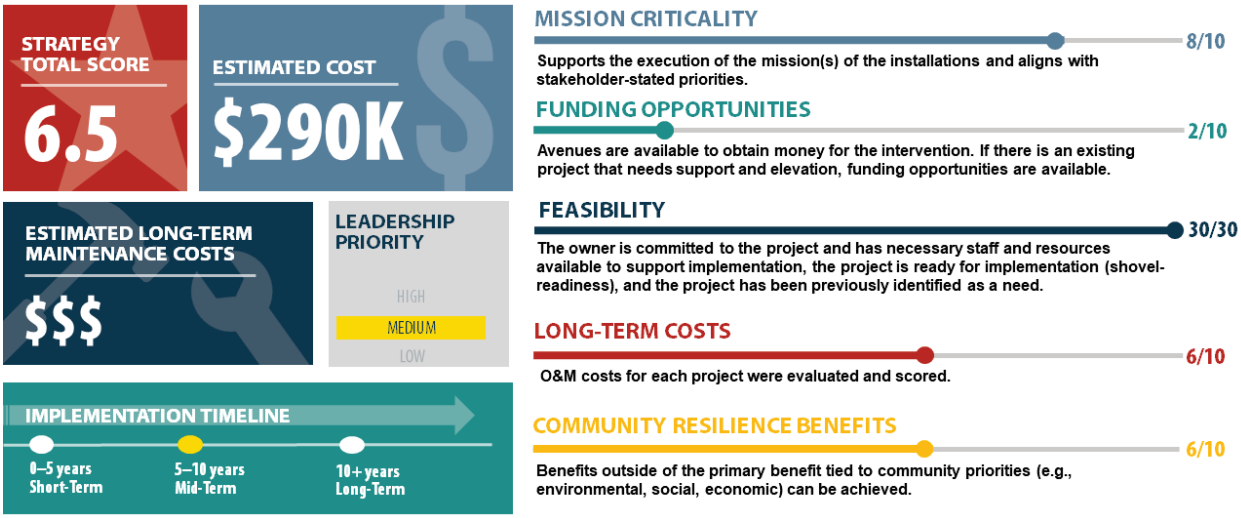
Project Team

The project lead is the City of Pensacola, and project partners include NAS Pensacola and NAS Whiting Field.

Funding Opportunities

Opportunities for funding include FAA - Facilities and Equipment Funding and Airport Terminals Program.

5.5.3 ECUA Resilience Improvements



Project Description

ECUA is the sewer provider to the Warrington and West Pensacola areas. Although the installation owns and maintains their own sewer system infrastructure within the fence line, the installation's wastewater is discharged into ECUA lift stations within the sewer transmission system. Lift stations are critical infrastructure within the sewer transmission system that conveys sewer to the Bayou Marcus WRF and Central WRF.

ECUA continues efforts to improve existing lift stations to minimize storm surge and flooding impacts. ECUA's ability to continue lift station upgrades is budget-dependent, with a limited number of lift stations being upgraded in a fiscal year. ECUA has engineering standards for lift station hardening; typical lift station upgrades include elevating the electrical control panels 3 feet above the current 100-year floodplain elevation. Wet wells can sometimes be modified, if possible, so that the wet well is extended above the 100-year floodplain elevation. New lift stations are constructed with consideration to floodplain elevations. Funding is regularly sought to upgrade lift stations that are in need of hardening. However, annual budgets are usually the funding source for lift station upgrades, which are expensive and limit the amount of lift station upgrades possible.

Actions

1. **Identify lift stations that are exposed to flooding and require hardening.** Some ECUA lift stations already meet engineering stations for hardening. Therefore, this recommendation applies only to those lift stations in need of upgrading. Figure 5-5 shows all lift stations that are currently exposed to flooding.

2. **Create a funding plan** that identifies grant opportunities for necessary lift station upgrades.

Figure 5-5. ECUA Resilience Improvements



Community Resilience Benefits

Conducting lift station upgrades will benefit the community and environment surrounding the installation. Infrastructure will be improved by reducing stormwater entry into the sewer system via the wet well and preventing damage to equipment from inland or coastal flooding. Additional benefits include minimizing sewer service disruptions and reducing sanitary sewer overflows.

Project Team

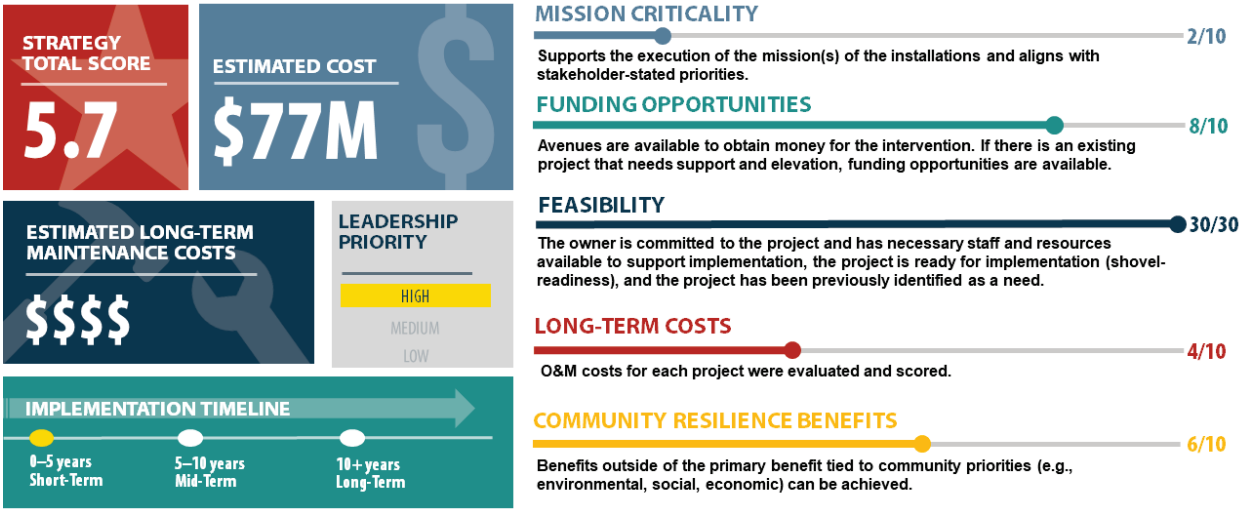
The project lead is ECUA. There are no partners anticipated for this project.

Funding Opportunities

Opportunities for funding include the following:

- Clean Water and Drinking Water State Revolving Fund (SRF)
- Defense Community Infrastructure Program
- Building Resilient Infrastructure and Communities

5.5.4 Blue Angel Parkway Improvements



Project Description

Blue Angel Parkway (SR 173) is a Strategic Intermodal System (SIS) roadway that connects SR 292 (Sorrento Road/Gulf Beach Highway) to US 98. The parkway is a significant route for military, local traffic, and freight, facilitating access and connectivity across the region. The parkway currently faces challenges with capacity and safety, especially during peak traffic hours, which can lead to significant delays and increased accident risks.

Several improvement projects for Blue Angel Parkway are already funded including a capacity project and improved bike-ped infrastructure. This comprehensive development will include the reconstruction of the existing roadway, addition of new lanes, upgrading of drainage systems to better manage stormwater, and installation of modern traffic management systems to improve safety and reduce congestion.

Actions

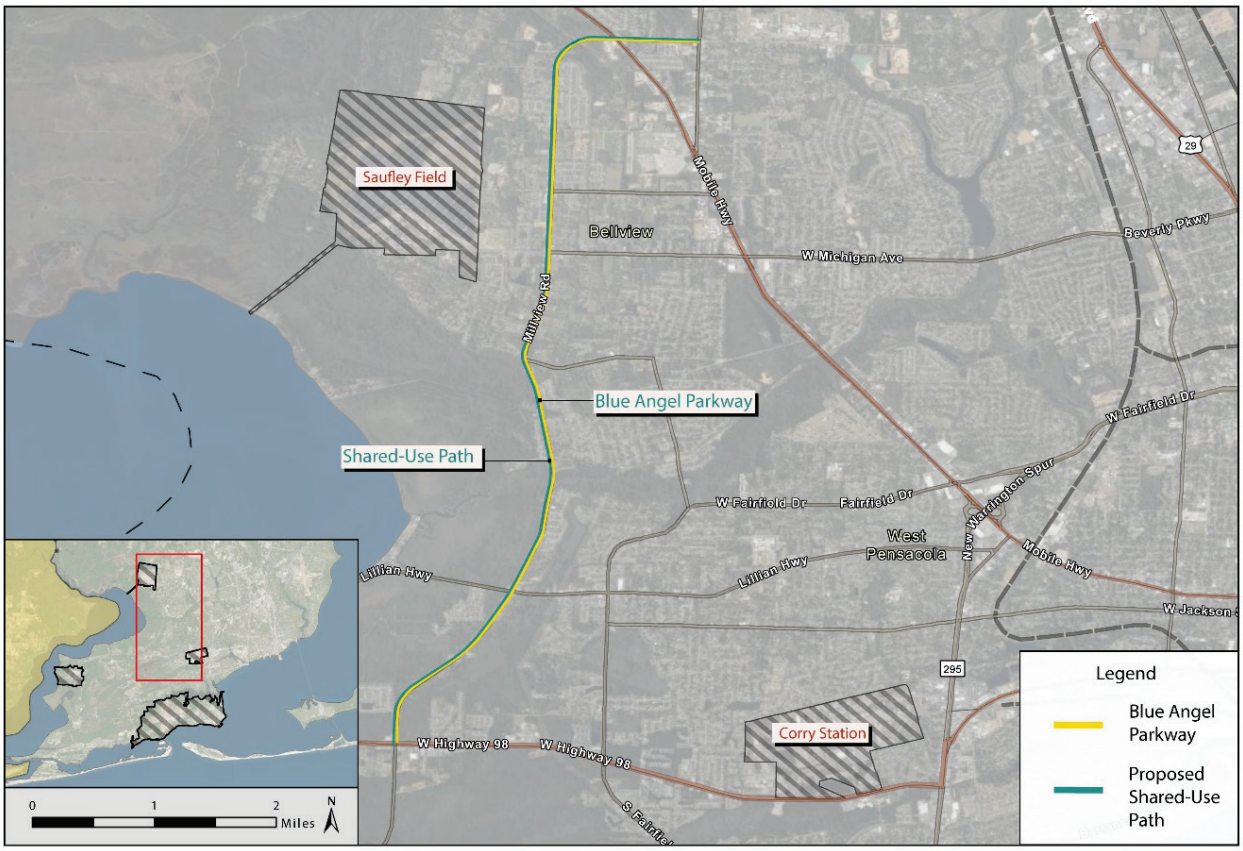
The plan to widen Blue Angel Parkway from two lanes to four lanes is currently in a preliminary stage. Project action items include:

1. **Conduct a study** of the area to assess the social, economic, and environmental impacts on the installation and surrounding communities.

2. **Design and construction of the upgrades.** This project spans from US-98 to SR-297, which is approximately 7 miles. Design should consider future flood mapping, in alignment with the findings of the Escambia County vulnerability assessment, and future rainfall conditions in accordance with incoming rainfall adjustment values from the Florida Flood Hub. Design should also include ongoing bike and pedestrian pathways (already funded for design in 2025 and construction in 2027).

Figure 5-6 shows the location of Blue Angel Parkway improvements.

Figure 5-6. Blue Angel Parkway Improvements



Community Resilience Benefits

The project will significantly enhance traffic flow and safety, reducing congestion and shortening travel times for both military and civilian users. Improved infrastructure will also support economic development by providing better access to local businesses and fostering growth in the surrounding areas. Additionally, the upgraded road will enhance emergency response and evacuation capabilities.

Project Team

The project lead is FDOT, and project partners include the following:

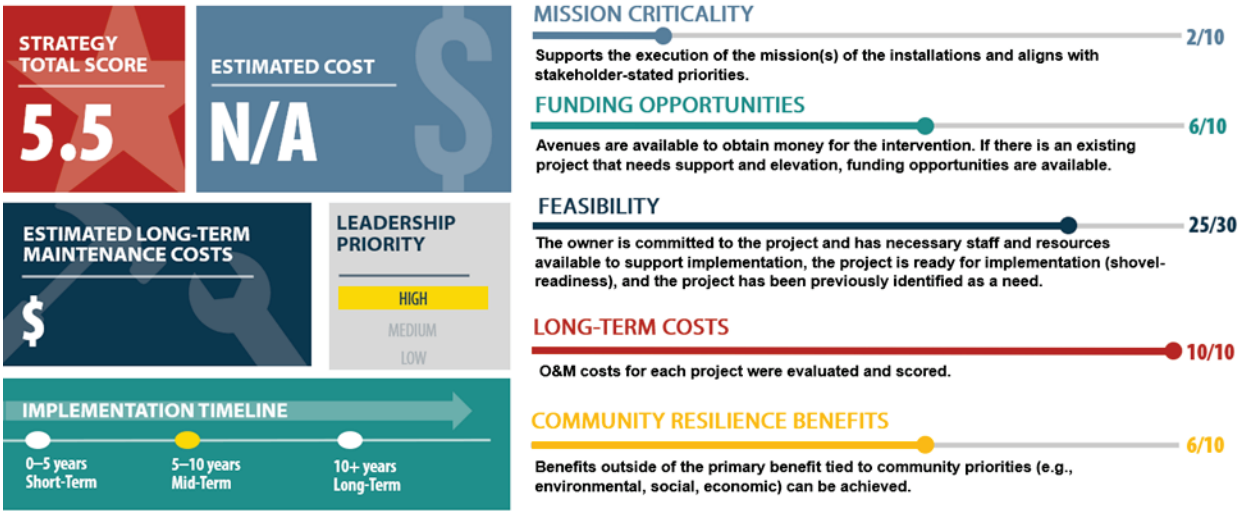
- NAS Pensacola
- Florida-Alabama Transportation Planning Organization (TPO)
- Escambia County

Funding Opportunities

The project is fully funded under the Florida-Alabama TPO 2045 LRTP and is included in the SIS 2029-2045 Long Range Cost Feasible Plan and the FDOT D3 Current Work Program for 2025. This funding ensures the project's completion within the planned timeframe, reflecting its high priority within regional and state transportation planning frameworks. Funding opportunities for additional improvements include:

- PROTECT (Formula and Competitive Discretionary programs)
- Defense Community Infrastructure Program
- Defense Access Roads
- FDOT Five Year Work Program

5.5.5 Corry Station Flood Risk Reduction



Project Description

NAS Pensacola's Corry Station is partially located in Jones Creek's historic floodplain, much of which was filled in during the 1940s to accommodate the facility. As a result, areas of the Bayou Chico Basin, including Corry Station, Pensacola State College (PSC), and nearby residences, have experienced repetitive nuisance flooding and stormwater management issues. While this issue is not necessarily mission critical, it is a high priority for the installation as it seeks to be a good neighbor.

Flooding issues occur within Jones Creek, located south of Corry Station, and on the northeast corner of the installation. Flooding in Jones Creek is anticipated to increase in frequency with increasing intensity of rainfall events. While flooding does not impact the installation directly, the leadership of NAS Pensacola is aware of the effects this has on the neighboring property and on the wider community.

Actions

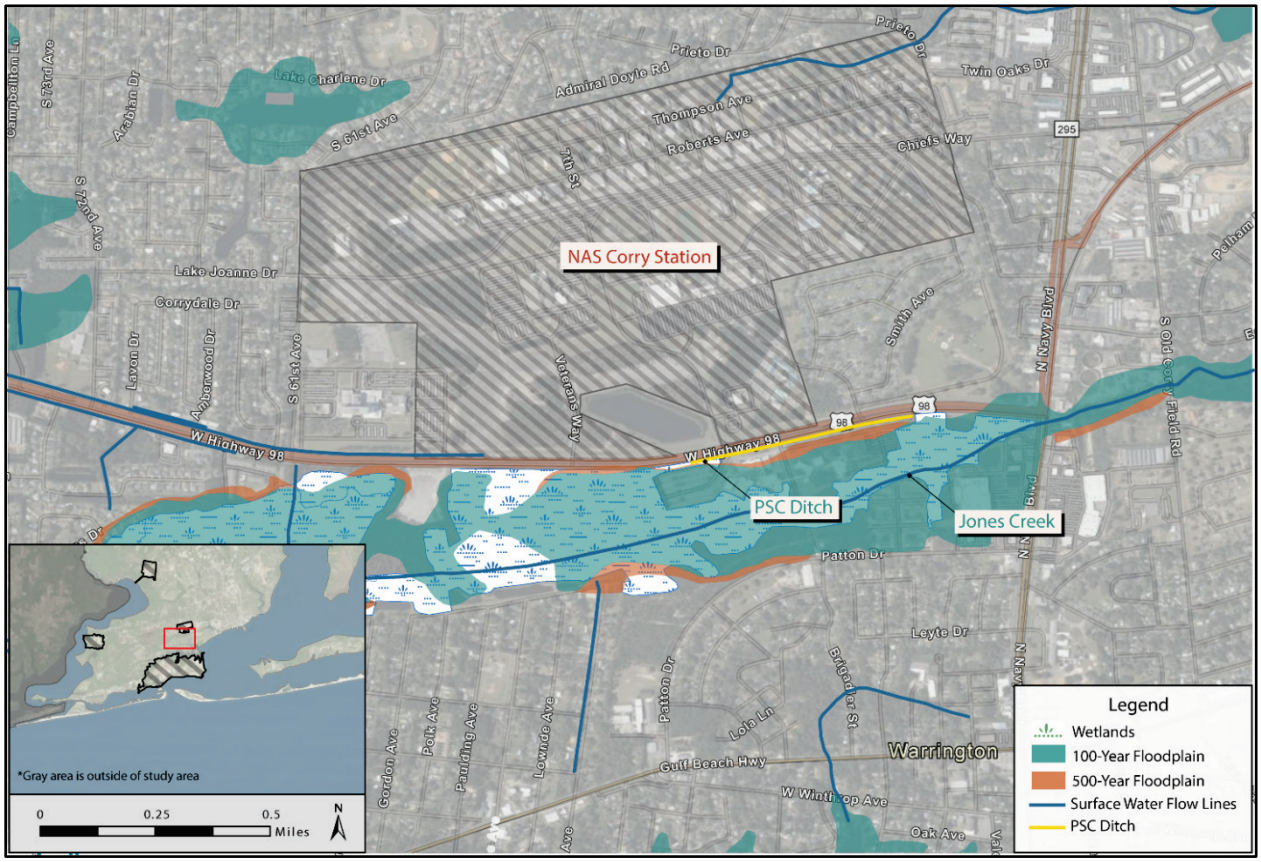
1. **Develop a floodplain management plan and restoration project for Jones Creek.** The PPBEP recently applied for a NOAA grant to develop a floodplain restoration initiative. This project will restore approximately 1 mile of Jones Creek east of the installation, extending the riparian wetlands to 20 acres. The wetland restoration will increase the area available for storage of floodwaters, attenuating peak flows during high-magnitude flooding and reducing flooding downstream near Corry Station.

2. **Reduce flooding entering the northeast corner of Corry Station.** Stormwater from the surrounding neighborhoods drain into the northeast corner of Corry Station. PPBEP is looking to acquire two parcels in the community north of Corry to slow the flows on the north side of West Jackson Street. These parcels will use green infrastructure to assist with reducing flood risk.

3. **Upgrade the PSC Ditch.** The PSC Ditch is an open concrete channel that is located south of Highway 98 and north of Pensacola State College. The channel is overgrown, damaged, and overflows during extreme events. The Navy has 100% design plans to convert 1,200 linear feet of open ditch into a box culvert; funding is needed for construction.

Figure 5-7 shows flood risk reduction measures for Corry Station.

Figure 5-7. Corry Station Flood Risk Reduction



Community Resilience Benefits

This project improves stormwater management and mitigates flooding in a historically flood-prone area. It also improves water quality discharges through the incorporation of green infrastructure.

Project Team

The project leads are FDOT and Escambia County, and project partners include the following:

- NAS Pensacola
- PPBEP
- NWFWMD
- Warrington Community Redevelopment Agency

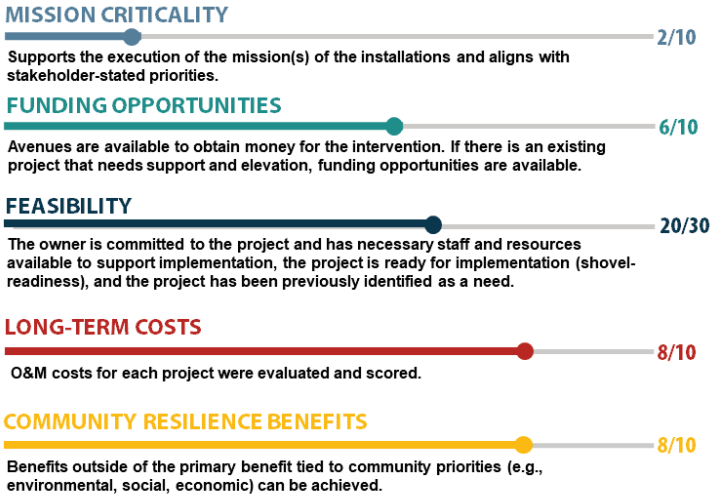
Funding Opportunities

Opportunities for funding include the following:

- Section 205 CAP - Flood Damage Reduction
- Transformational Habitat Restoration and Coastal Resilience
- REPI Challenge
- Clean Water and Drinking Water SRF

5.5.6 Navy Boulevard Improvements





Project Description

Stretching from New Warrington Road to the Sam Lovelace Bridge and the NAS Entrance, Navy Boulevard (SR 295) is a critical route linking NAS Pensacola with the surrounding community in Escambia County. This corridor is pivotal for both military and civilian traffic, facilitating seamless access to and from the naval base and supporting the local economy.

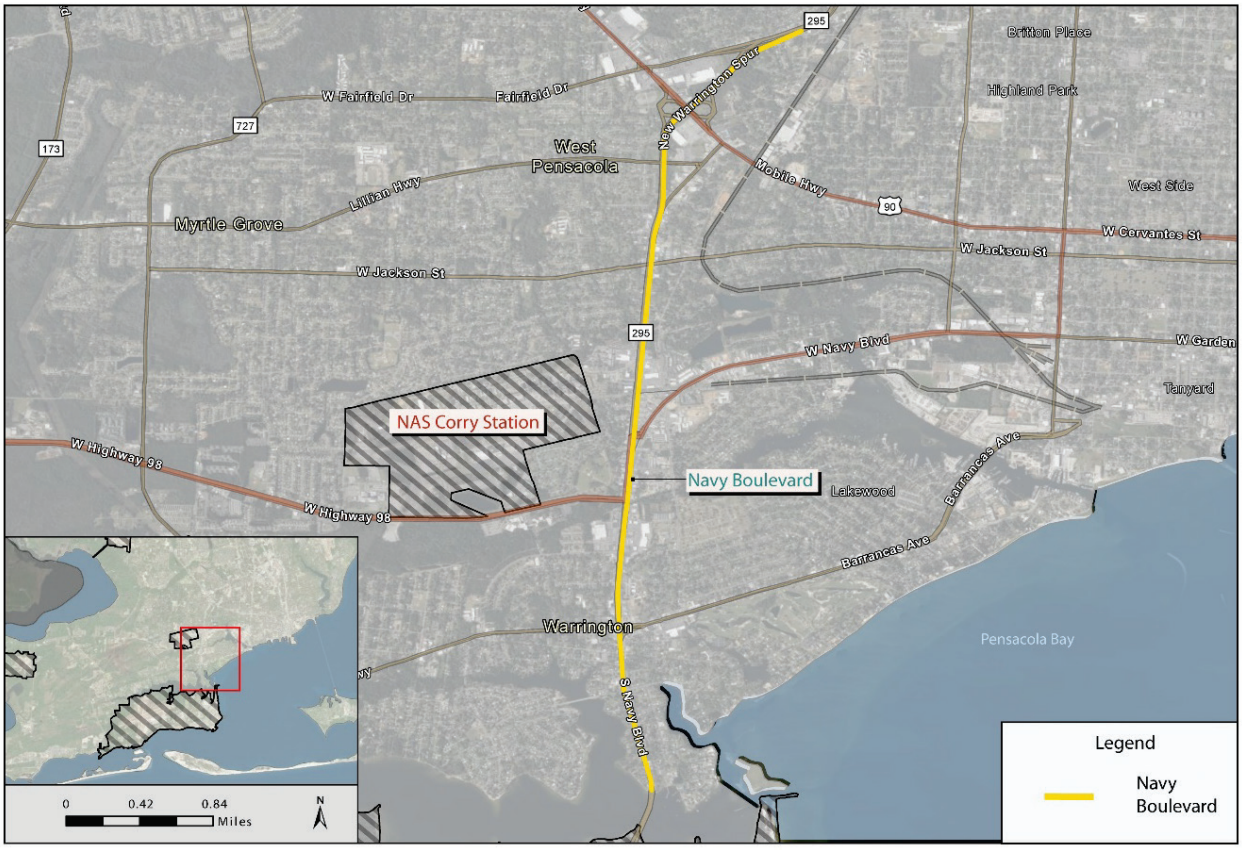
The improvement efforts for Navy Boulevard will focus on resurfacing the existing roadway to enhance its condition, appearance, and usability. This project will also explore opportunities to integrate Complete Streets elements, such as improved pedestrian pathways, bicycle lanes, overhead electronic signage, and traffic-calming measures to ensure a safer and more accommodating road environment for all users.

Actions

1. **Resurface the existing roadway.** This will enhance the roadways' condition, appearance, and usability. These resurfacing efforts are not identified in the LRTP.
2. **Explore opportunities to integrate Complete Streets elements**. These elements can include pedestrian pathways, bicycle lanes, dedicated transit lane, and/or traffic-calming measures to ensure a safer and more accommodating road environment for all users.

Figure 5-8 shows the location of Navy Boulevard.

Figure 5-8. Navy Boulevard Improvements



Community Resilience Benefits

The enhancements planned for Navy Boulevard will significantly improve road conditions, reduce maintenance issues, and enhance the overall driving experience. By incorporating Complete Streets principles, the project will also promote greater connectivity and safety for pedestrians and cyclists, fostering a more livable and accessible community. These improvements will support the operational needs of NAS Pensacola and contribute to the safety and wellbeing of the surrounding residential areas.

Project Team

The project leads are Escambia County and FDOT. Project partners are NAS Pensacola and Florida-Alabama TPO and the Warrington Community Redevelopment Agency.

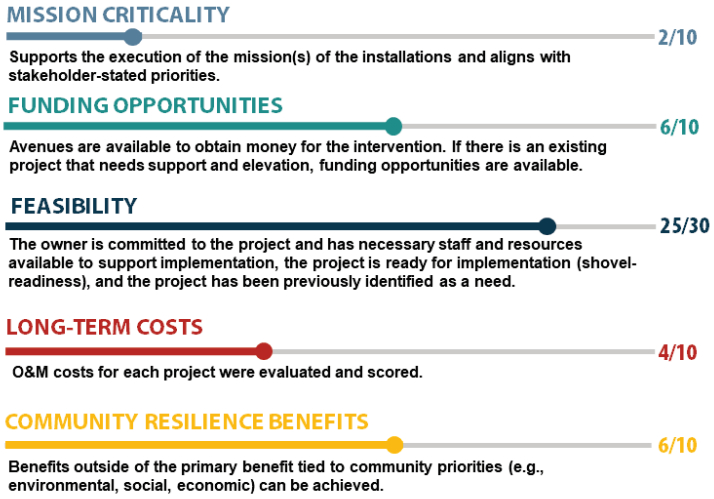
Funding Opportunities

Currently, the project is unfunded in the Florida-Alabama TPO 2045 LRTP, and efforts are underway to secure funding. The project aims to obtain support through state and federal transportation programs that focus on roadway improvements and safety enhancements. Potential funding opportunities may include:

- PROTECT (Formula and Competitive Discretionary programs)
- Defense Community Infrastructure Program
- Defense Access Roads
- FDOT Five Year Work Program
- Safe Streets and Roads for All Program

5.5.7 Gulf Beach Highway and Sorrento Road Improvements





Project Description

Gulf Beach Highway (SR 292), extending from Sorrento Road to Navy Boulevard, forms a critical corridor in western Escambia County. This route is vital for facilitating access to NAS Pensacola and supporting regional connectivity. Current challenges include congestion, flooding, inadequate road capacity, and safety concerns for both vehicular and non-vehicular users. The lack of sufficient lanes to handle the increasing volume of traffic leads to bottlenecks and increases the risk of accidents.

The comprehensive improvement plan for Gulf Beach Highway and Sorrento Road includes an eventual widening of the road to four lanes to improve traffic flow and safety. The project will also include resurfacing efforts, enhanced pedestrian and cycling infrastructure, and upgraded drainage systems to effectively manage stormwater.

The project segments include:

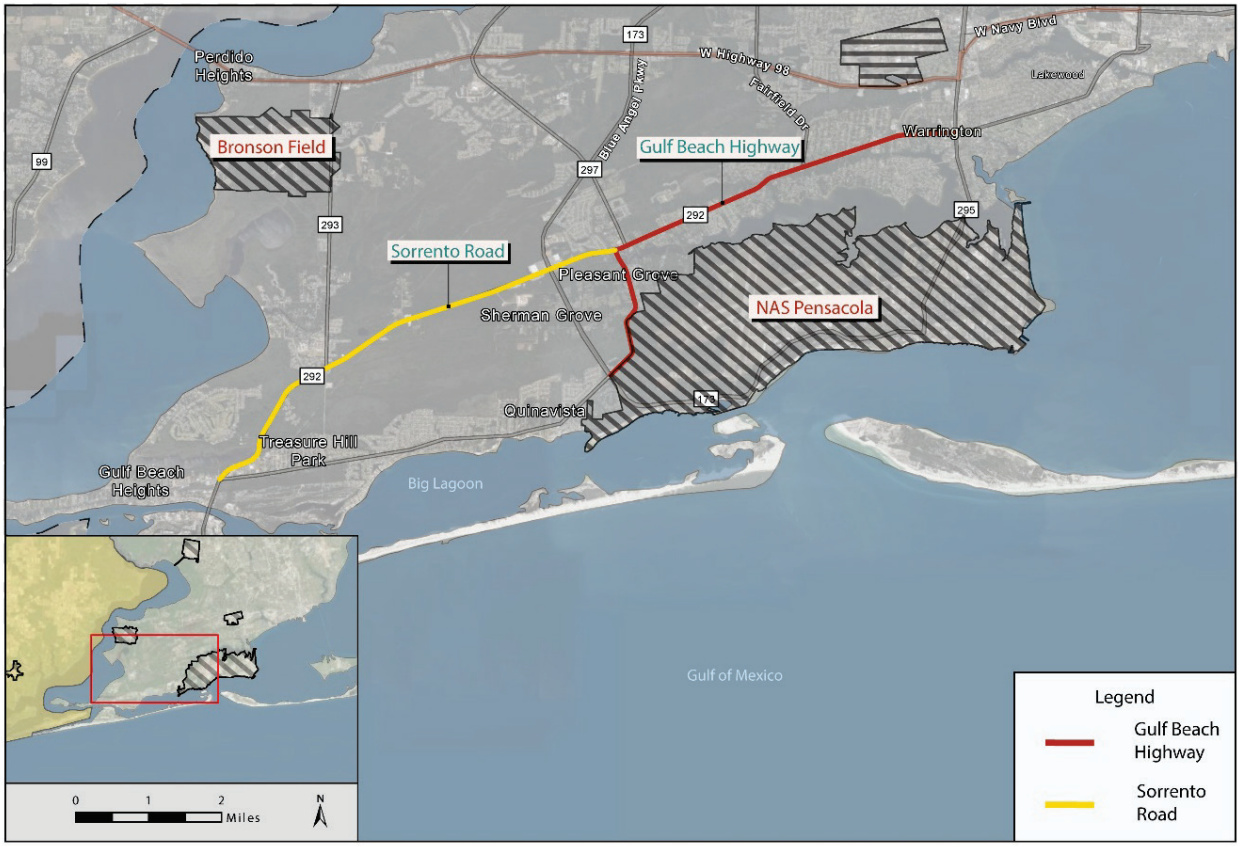
1. Sorrento Road from Innerarity Point Road to Blue Angel Parkway. The Project Development and Environment (PD&E) study is funded, and Design is Non-SIS Priority #8 for the Florida-Alabama TPO.
2. Gulf Beach Highway from Fairfield Drive to Navy Boulevard is the Florida-Alabama TPO's Non-SIS Priority #17 for design.
3. Gulf Beach Highway from Blue Angel Parkway to Fairfield Drive is the Florida-Alabama TPO's Priority #18 for design.

Actions

1. **Conduct PD&E and design for Sorrento Road.** Incorporate enhanced pedestrian and protected cycling infrastructure and upsized stormwater drainage systems for future conditions.
2. **Design the Gulf Beach Highway segments**.
3. **Acquire right-of-way (ROW) and construct.** Acquire ROW for the expanded roadway.

Figure 5-9 shows the location of Gulf Beach Highway and Sorrento Road improvements.

Figure 5-9. Gulf Beach Highway and Sorrento Road Improvements



Community Resilience Benefits

These enhancements will significantly reduce congestion, improve road safety, and enhance the overall quality of life for the community. By improving connectivity to NAS Pensacola and other key locations, the project supports military operations and economic development.

Project Team

The project lead is FDOT, and project partners include NAS Pensacola, Florida-Alabama TPO, and Escambia County.

Funding Opportunities

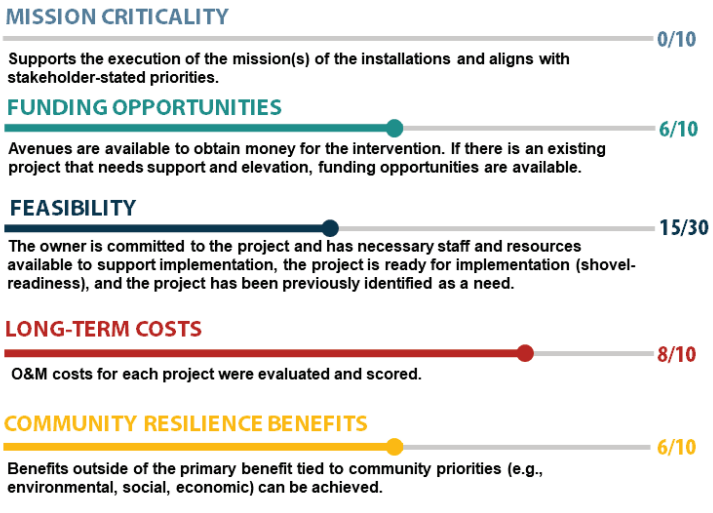
Elements of the project are included in the Florida-Alabama TPO's 2045 LRTP and the FDOT District 3 Work Program, reflecting its priority within regional transportation planning. Additional support may be sourced from state and federal transportation and infrastructure funds.

There is funding allocated for resurfacing included for FYE 2025 under the current FDOT District 3 Work Program. Potential funding sources include:

- FDOT Five Year Work Program
- Defense Access Roads
- PROTECT (Formula and Competitive Discretionary programs)
- Defense Community Infrastructure Program

5.5.8 Navy Point Community Improvements





Project Description

Neighborhoods surrounding NAS Pensacola do not directly impact the installation mission. However, installation personnel and other community members reside in these neighborhoods, which makes them relevant to the base. Navy Point is one neighborhood located off Gulf Beach Highway (shown on Figure 5-10) that has a large contingent of military personnel.

The Navy Point neighborhood faces various threats that have negative impacts on the community members. Because of elevated traffic congestion on Gulf Beach Highway (the primary access road to the neighborhood), accessibility to the neighborhood can be hindered. Additionally, various upgrades and improvements to infrastructure throughout the neighborhood are needed. When neighborhood infrastructure does not operate properly, there are impacts on the overall quality of life throughout the community.

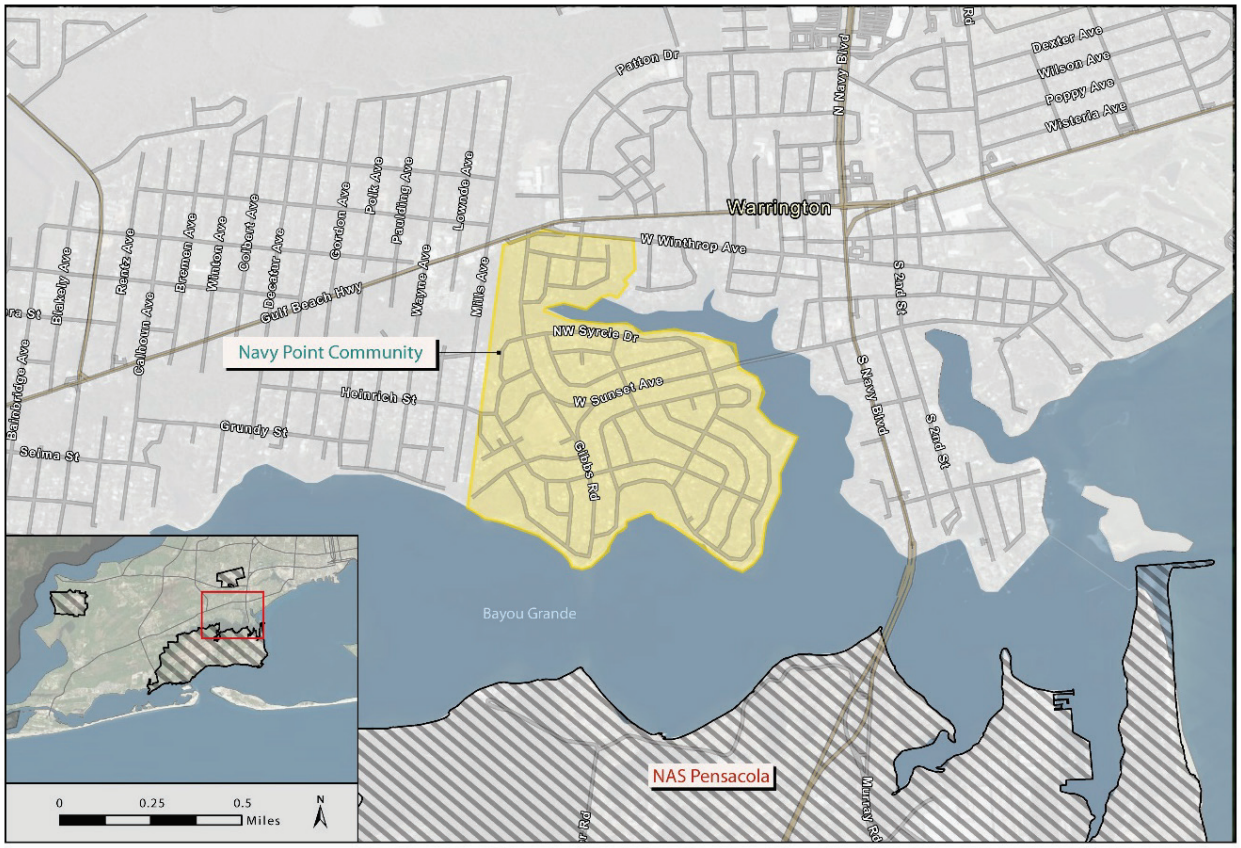
Actions

Multiple projects have been identified that will address the threats to community quality of life. Proposed projects that improve the neighborhood include the widening of Gulf Beach Highway and septic-to-sewer projects, discussed further in the following:

1. **Widening of roads.** The widening of Gulf Beach Highway has been proposed. This project is not directly in the Navy Point neighborhood but will help reduce traffic congestion concerns. A PD&E assessment has been completed for the eastern portion of the roadway to assess the social, economic, and environmental impacts on the installation and surrounding communities. For the western portion of the project, east Sorrento Road, PD&E is underway. The next phase of the project includes design, ROW acquisition, and construction.

2. **Septic-to-sewer projects.** Multiple septic-to-sewer projects have been proposed within the Navy Point neighborhood. Currently, this project is in the planning and designing phase. However, further development and approvals are needed before construction can begin.

Figure 5-10. Navy Point Neighborhood



Community Resilience Benefits

Projects to widen Gulf Beach Highway and improve utility infrastructure will benefit the community living in Navy Point. Widening Gulf Beach Highway will reduce traffic congestion surrounding the neighborhood and increase neighborhood accessibility. Completing septic-to-sewer projects within Navy Point will provide more reliable sewage disposal and reduce maintenance needs.

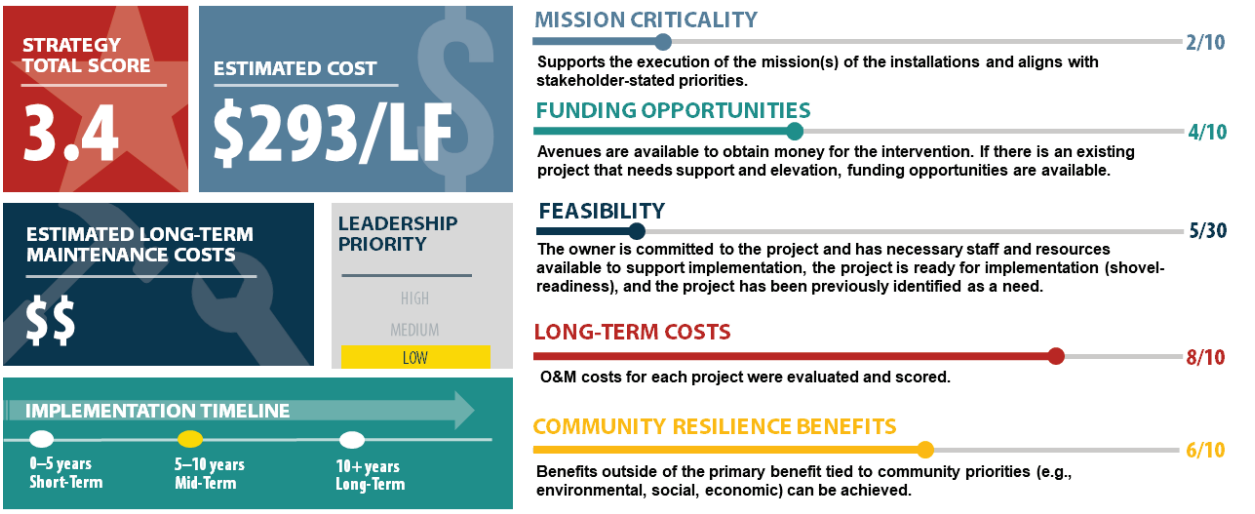
Project Team

The project lead is Escambia County, and project partners include ECUA and FDOT.

Funding Opportunities

Opportunities for funding include the Community Development Block Grant Entitlement Program.

5.5.9 Trout Point Preserve



Project Description

Trout Point is an area of land owned and maintained by NAS Pensacola within the installation boundary. The site is bordered on the east by the Landfall community and on the north by the Heron's Forest Homeowner's Association. It is a popular area for birding and fishing and is generally used by members of the neighboring communities.

Trout Point functions as a natural buffer and should be maintained as a natural area. The site is located within the 100-year floodplain and building housing onsite is inadvisable.

Actions

1. **Site cleanup.** Improvements consist of fencing off the area, removing the boardwalks, and increasing signage. Implementing these improvements will support Trout Point as a natural area and prevent trespassing.
2. **Rename the site as Trout Point preserve.** Establishing the site as a preserve protects the installation from encroachment while preventing future development in the floodplain.

Figure 5-11 shows the location of Trout Point preserve.

Figure 5-11. Trout Point Preserve



Community Resilience Benefits

This project provides environmental benefits. Maintaining the land as a preserve protects the homes from SLR and provides a buffer against coastal flooding. It also protects the existing ecosystem.

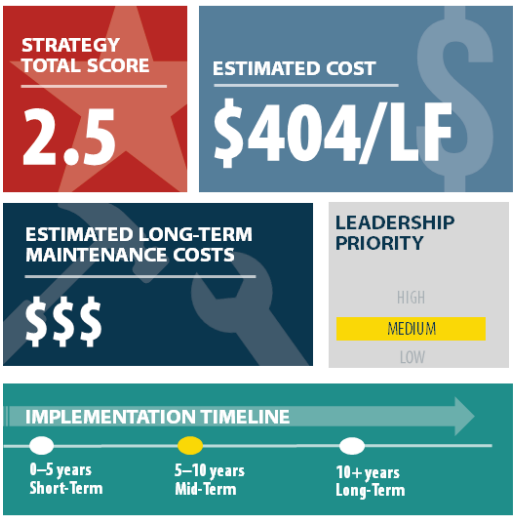
Project Team

The project lead is NAS Pensacola, and project partners include Escambia County and PPBEP.

Funding Opportunities

Opportunities for funding include FDEP Resilient Florida.

5.5.10 Alternative Water Supply Line for Corry Station



Project Description

Corry Station has water production wells, water treatment facilities, and water distribution infrastructure located within the fence line. These water production wells also supply water to the water distribution network on NAS Pensacola. Current water production meets the capacity needs of the installation, and there is an undersized single interconnection with ECUA's water system on the southwest corner of Corry Station.

An additional interconnection is necessary to meet the installation's water demands in an emergency. ECUA has proposed this additional water system interconnection near the northeast corner of Corry Station. ECUA has the intent and interest to construct this new interconnection, but construction funding is the biggest obstacle.

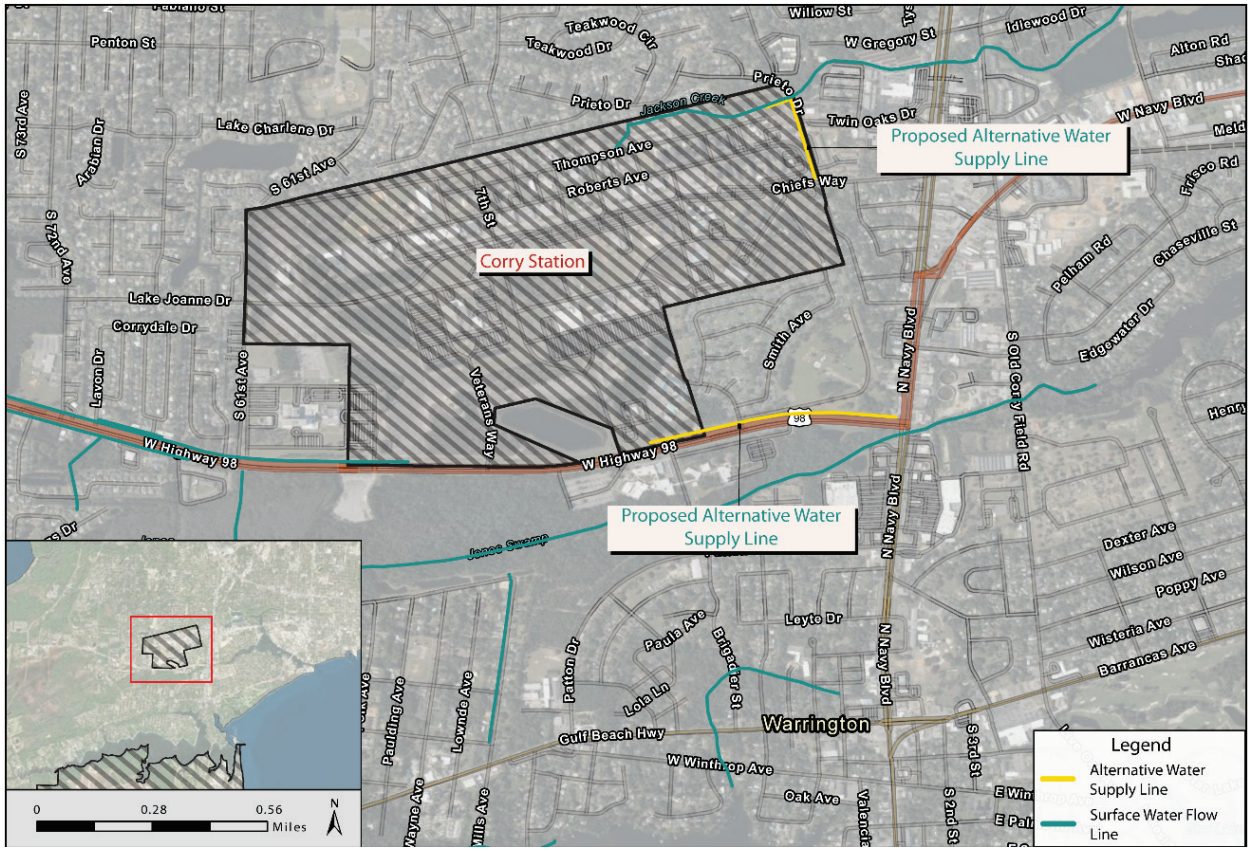
Another possible interconnection that was proposed was along US-98 on the southside of the installation. This could be completed if the existing water main is extended and then connected to Corry Station's water system. The connection point would be near the existing Navy water line that crosses under US-98 near PSC's Warrington campus.

Figure 5-12 shows locations of alternative water supply lines for Corry Station.

Actions

1. **Design and engineering study** for additional water supply line.
2. **Construction of water supply line**.

Figure 5-12. Alternative Water Supply Line for Corry Station



Community Resilience Benefits

Installing an alternative water supply line for Corry Station will benefit the community surrounding the installation. Benefits to the community include creating a redundant water supply for emergencies and minimizing water service disruptions.

Project Team

The project lead is NAS Pensacola-Corry Station, and project partners include ECUA.

Funding Opportunities

Opportunities for funding include the Clean Water and Drinking Water SRF, Defense Community Infrastructure Program, and Military Construction funding.

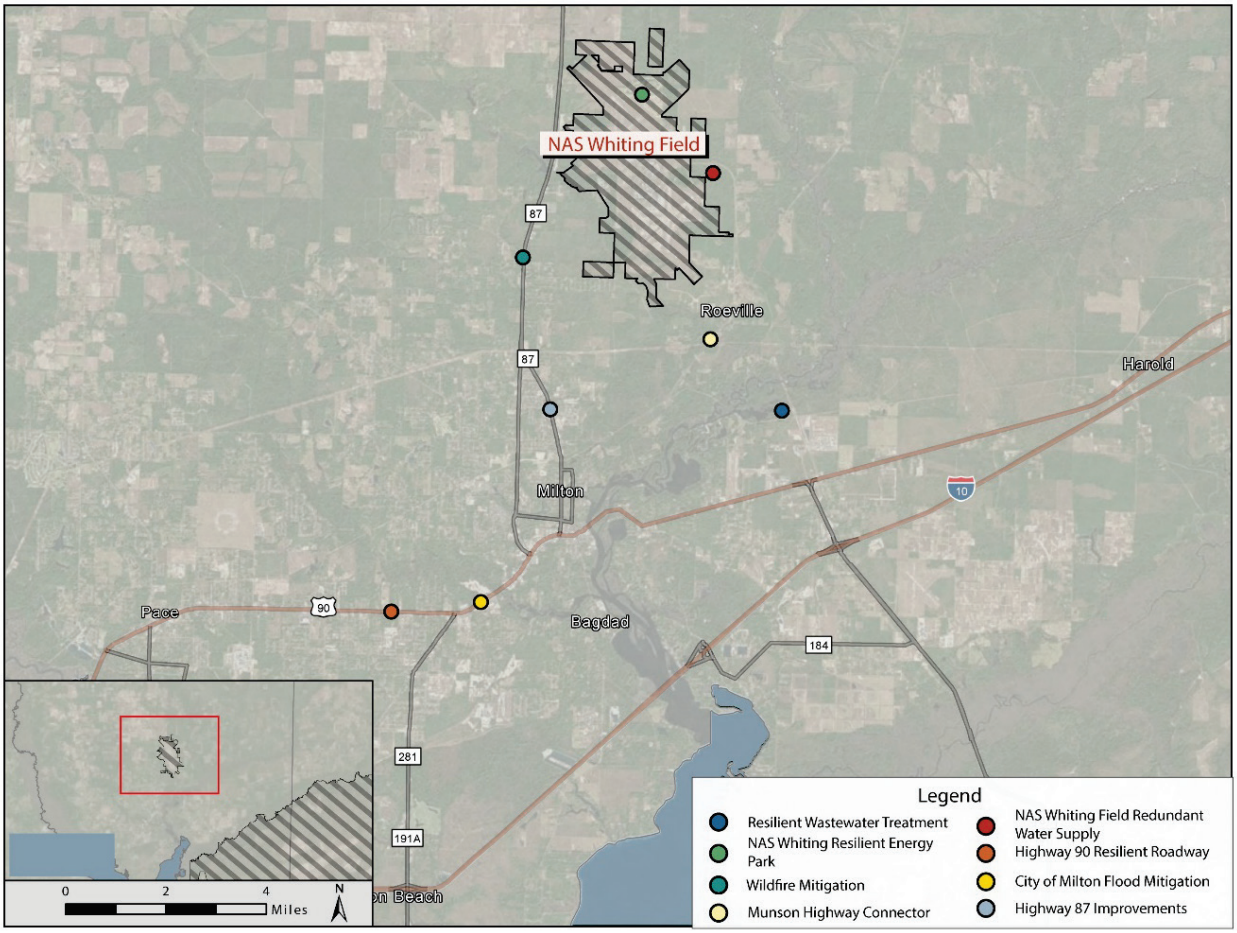
5.6 NAS Whiting Field

Eight resilience projects were identified for NAS Whiting Field. Table 5-3 outlines the projects and their respective strategy scores. Figure 5-13 shows the approximate project locations.

Table 5-3. NAS Whiting Field Resilience Projects

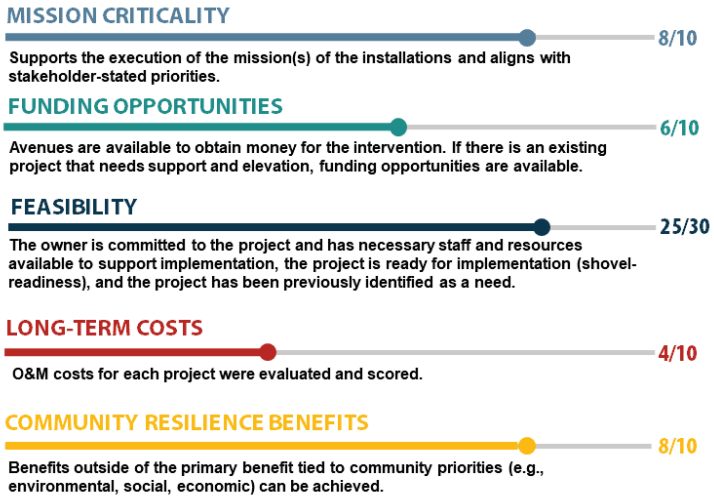
Project Name	Strategy Score
Resilient Wastewater Treatment	7.2
NAS Whiting Field Resilient Energy Park	7.0
Wildfire Mitigation	6.5
Munson Highway Connector	5.6
NAS Whiting Field Redundant Water Supply	5.4
Highway 90 Resilient Roadway	4.8
City of Milton Flood Mitigation	3.6
SR 87 Improvements	3.0

Figure 5-13. Approximate Locations of NAS Whiting Field Resilience Projects



5.6.1 Resilient Wastewater Treatment





Project Description

There is limited wastewater treatment capacity in central Santa Rosa County and local municipalities are actively working to address this issue. The construction of a new WWTP is necessary to accommodate current and future wastewater treatment capacity, as well as addressing environmental concerns from discharging treated wastewater effluent to nearby bodies of water. The newly constructed WWTP should include resilient design standards.

Figure 5-14 shows the location of the proposed new WWTP.

Actions

1. **Reduce flood exposure at future treatment plant site.** Moving the WWTP out of the 100- and 500-year floodplain will reduce flood exposure and eliminate flood vulnerability.

2. **Incorporate resilient design standards in future WWTP**. The City of Milton's wastewater utility should incorporate resilient design principles that improve system resilience to flood and fire. These standards can include elevating, hardening, dry floodproofing, or wet floodproofing critical buildings and equipment. If the system is in a heavily wooded area and exposed to fire, buildings should incorporate fire-resistant design.

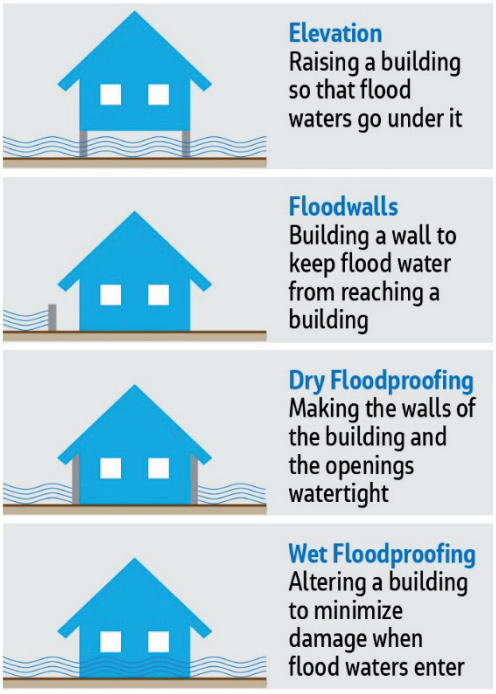
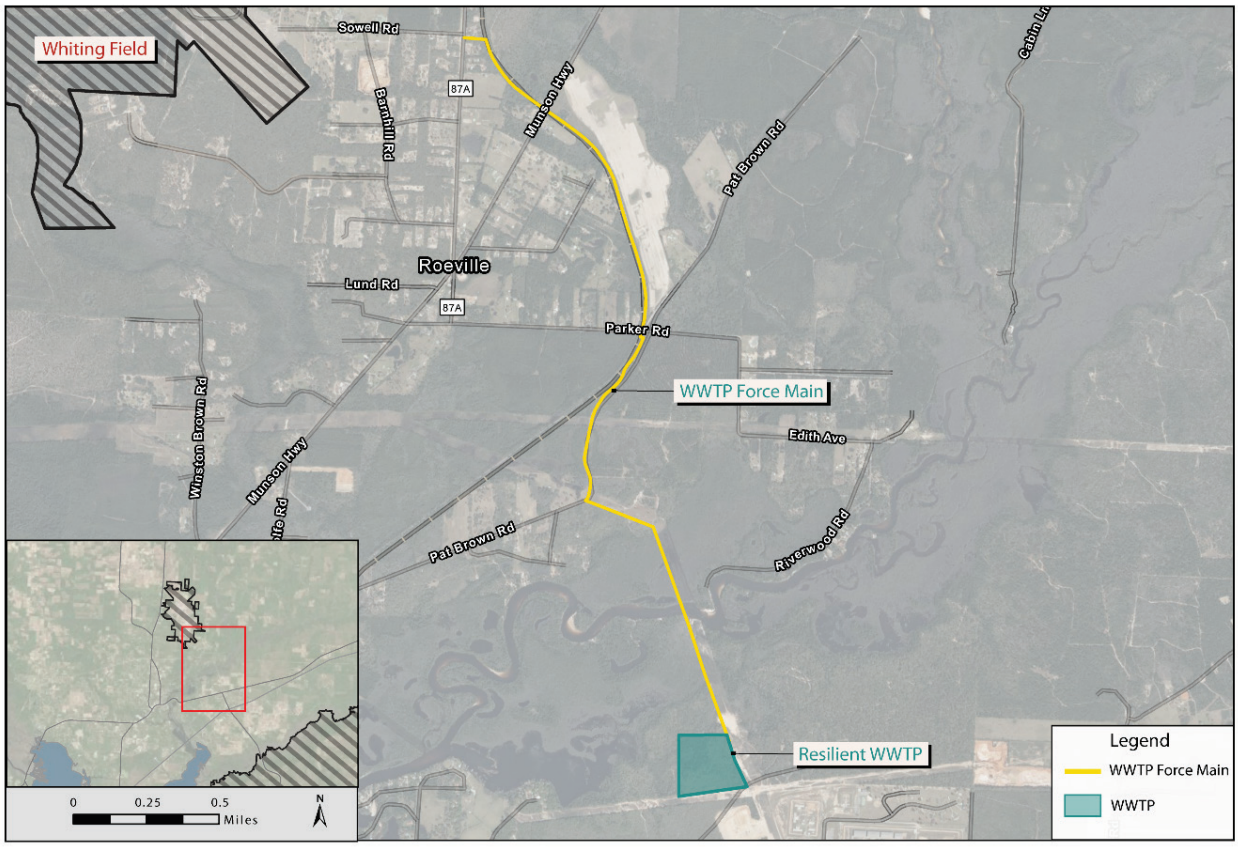


Figure 5-14. Resilient Wastewater Treatment



Community Resilience Benefits

The implementation of this project will create infrastructure, social, economic, and environmental improvements that will benefit the surrounding communities. Infrastructure improvements include improving the quality of wastewater services. There are social improvements resulting from additional wastewater treatment capacities supporting new housing developments in the area. Similarly, additional wastewater treatment capacities provide economic improvements as a result of furthered business development in Santa Rosa County. Environmental improvements are seen as the new WWTP can support additional wastewater treatment needs that enables more septic-to-sewer conversions.

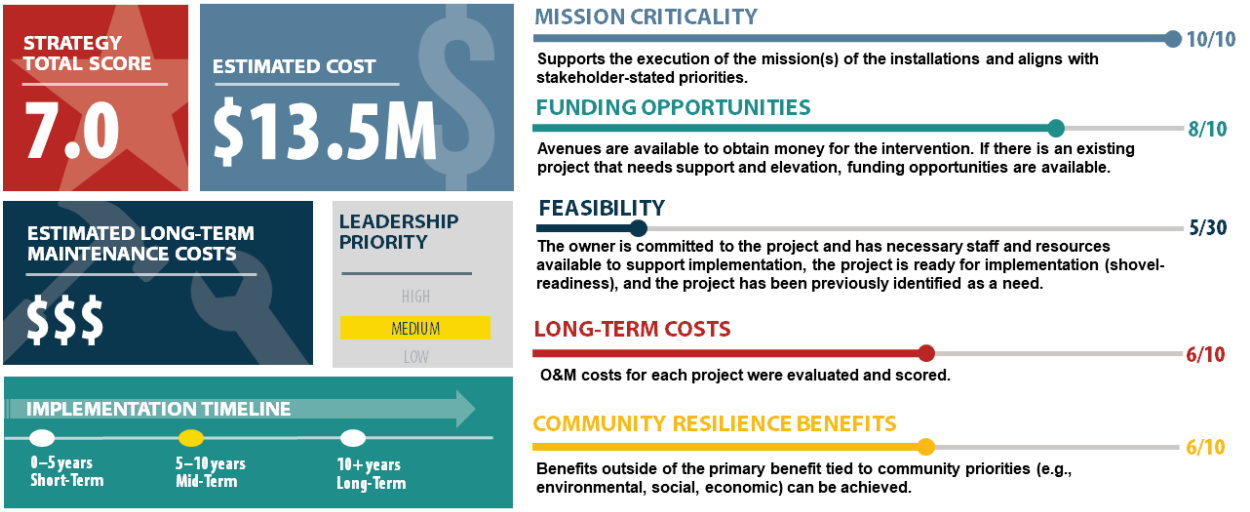
Project Team

The project lead is the City of Milton, and project partners include Santa Rosa County, NWFWMD, and FDEP.

Funding Opportunities

Opportunities for funding include Section 205 CAP - Flood Damage Reduction, Sewer Overflow and Stormwater Reuse Municipal Grants Program, Clean Water and Drinking Water SRF, and Defense Infrastructure Grant.

5.6.2 NAS Whiting Field Resilient Energy Park



Project Description

Electric power is a primary mission-critical asset required for operation of the runways and simulation centers within NAS Whiting Field. The installation's power is supplied by two FPL substations: the Whiting substation east of the installation and the J Road substation southwest of the installation.

The power transmission lines and the substation on the east side of the installation are vulnerable to wildfire.

Improving the resilience of Whiting Field's energy system will enable the installation to resume its training mission after large-scale events that disrupt the power supply. The Whiting Resilient Energy Park project consists of multiple components that facilitate electrical resilience for the installation.

Actions

1. **Add an automatic transfer switch at the Whiting substation**. The ATS is an intelligent device that ensures continuous power delivery by automatically switching from the primary power source to the second source. Adding an ATS at the Whiting substation will allow the installation to automatically transfer load to the J Road substation, improving response times to outages at the Whiting substation.

2. **Remove vegetation around the substation**. FPL has a robust vegetation removal program; however, the energy sector reliability analysis revealed that the power distribution lines and substation are closer than necessary to the surrounding vegetation. Regular removal of vegetation around the substation and distribution lines will reduce wildfire exposure and is more cost-effective than undergrounding the power lines.

3. **Conduct a microgrid feasibility study**. This study will determine the viability of an on-base microgrid, defining the microgrid boundary and associated infrastructure needed to support it. The facility can be located on the installation at the location of the former onsite golf course. The microgrid footprint can include solar panels, battery storage, and 14 days' worth of alternative fuel storage.

4. **Add an additional substation in the Whiting Aviation Park**. An additional substation located on the west side of the installation can both isolate the base from the grid as needed (for example, to prevent back-feeding during emergencies) and support additional development in the Park.

Figure 5-15 shows the location of the proposed resilient energy park.

Community Resilience Benefits

Constructing the NAS Whiting Field resilient energy park will allow for both economic and infrastructure improvements that will benefit the surrounding communities. The new substation at Whiting Aviation Park can support growth in the Whiting Aviation Park as well as south of the installation, which will provide economic improvements. There will be improvements in infrastructure services because back-feed from the microgrid can provide electric power within the community.

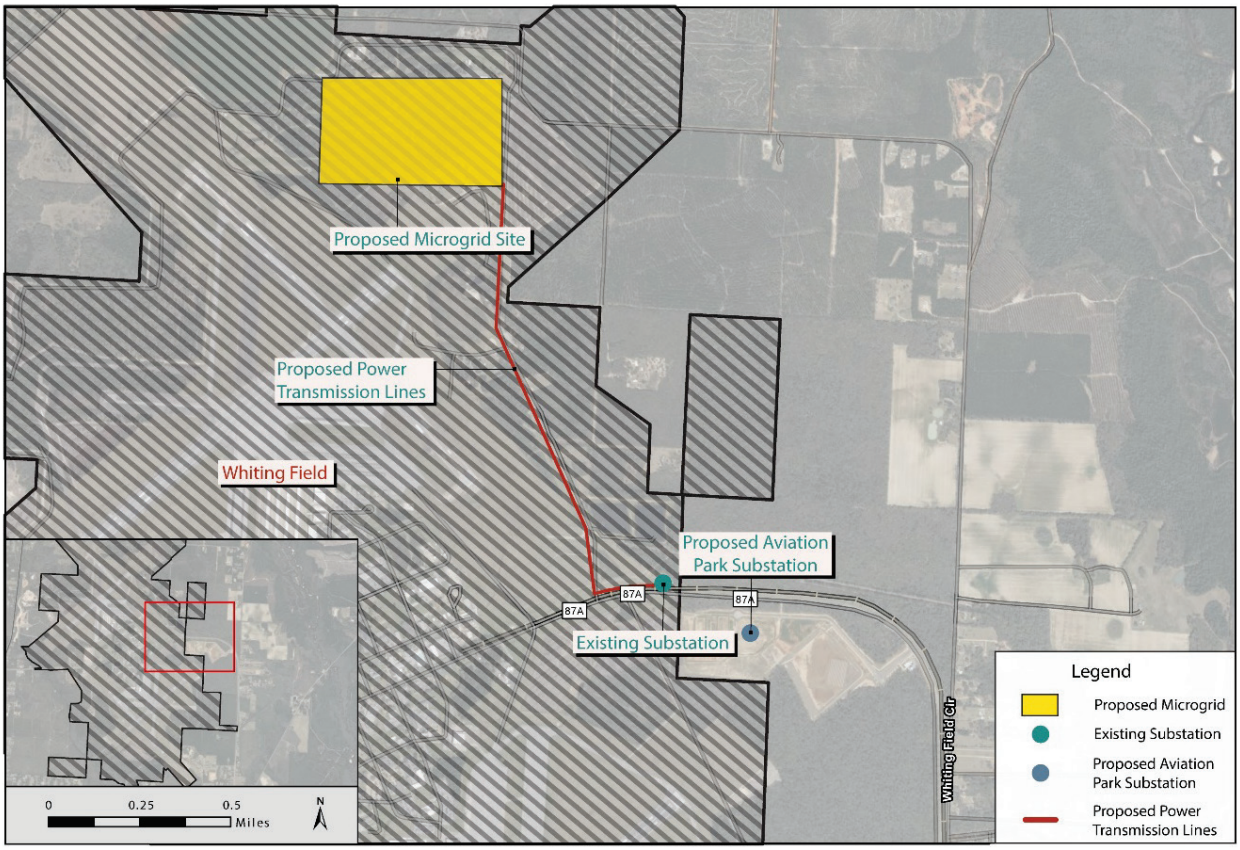
Project Team

The project lead is NAS Whiting Field, and project partners include FPL and Santa Rosa County.

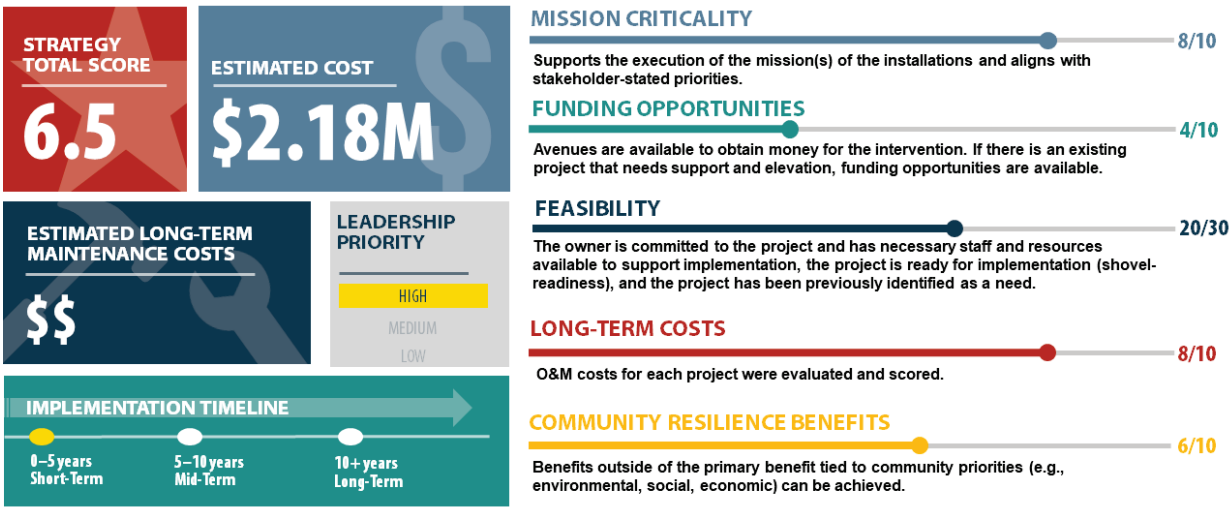
Funding Opportunities

Opportunities for funding include the Defense Community Infrastructure Program, Building Resilient Infrastructure and Communities, and Grid Resilience State Formula Grants.

Figure 5-15. Whiting Resilient Energy Park



5.6.3 Wildfire Mitigation



Project Description

Much of Santa Rosa County is rural and lies in the wildland-urban interface. Development in the WUI has greater exposure to wildfire and its effects than urban development.

Many of the critical assets that support NAS Whiting Field and the surrounding community, including electrical production and supply facilities, roadways, water wells, and various community and emergency facilities, are directly or indirectly exposed to wildfire. Fire can damage or destroy structures, and smoke from fires can impact pilot sightlines during training.

NAS Whiting Field, the Longleaf Alliance, Santa Rosa County, the U.S. Fish and Wildlife Service, the Florida Forest Service, and the Gulf Coast Plain Ecosystem Partnership (GCPEP) already cooperate for wildfire mitigation, land management, and invasive species control efforts. The groups work together to conduct prescribed burns, thin vegetation, and construct firebreaks. The following actions will further improve community resilience to wildfire.

The 2020-2024 Santa Rosa County Local Mitigation Strategy (Santa Rosa County 2010) identifies areas with wildfire impact potential and at-risk communities.

Actions

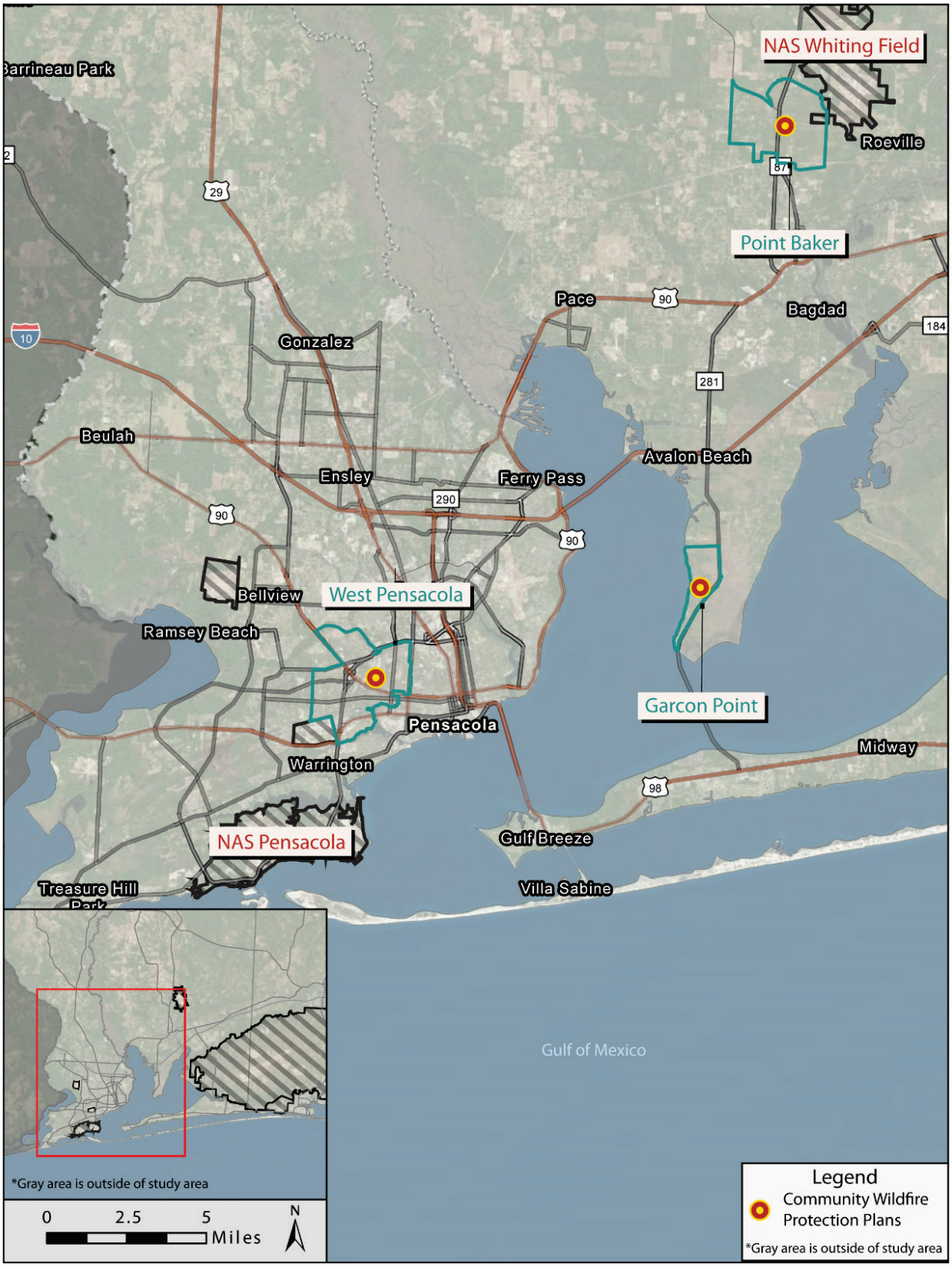
1. **Purchase needed equipment for land management.** Additional equipment is required by the Blackwater River State Forest and GCPEP for wildfire control activities. This includes:
   - Two heavy dozers with transport (Cat D-5, Road Tractor, Lowboy Trailer)
   - General fire needs (drip torches and tools, appliances, fittings for engines, etc.)
   - (4) four-wheelers or two side-by-sides to conduct prescribed burns
   - Type 6 wildland engine (Bush trucks)

2. **Develop a Community-Specific Wildfire Protection Plan (CWPP).** Develop CWPPs for the east side of Garcon Point, West Pensacola, and the Point Baker communities (Figure 5-16). Note that although West Pensacola is in Escambia County, collaboration on wildfire mitigation is essential because of shared risks in the region.

3. **Explore the feasibility of implementing a wildland-urban interface code.** There are currently independent initiatives to educate rural homeowners about land management and wildfire risk. However, Santa Rosa County currently does not have a code that governs development within the WUI. A WUI code dictates appropriate structure materials, vegetation setback, and other design criteria that reduce the asset sensitivity to fire. One of the challenges with such regulations is that they can impose a cost burden for improvements on rural landowners.

Figure 5-16. Community Wildfire Protection Plan Locations

Note the polygons are generalizations of the areas the plans may include.



Community Resilience Benefits

Conducting wildfire mitigation projects will benefit surrounding communities and the environment. Potential benefits include reducing community vulnerability to wildfire, reducing the likelihood of fire hazard with additional land management work, and improving land management activities within the Blackwater River State Forest.

Project Team

The project lead is Santa Rosa County, and project partners include GCPEP, NAS Whiting Field, Florida Forest Service, and Blackwater River State Forest.

Funding Opportunities

Opportunities for funding include Fire Management Assistance Grants, Hazard Mitigation Grant Program, and Building Resilient Infrastructure and Communities.

5.6.4 Munson Highway Connector





Project Description

The Munson Highway Connector is designed to significantly enhance access between the community at large to both NAS Whiting Field and the emerging Whiting Aviation Park, a new industrial park that will have direct access to NAS Whiting Field's airfield. This project is critical for facilitating the growth of businesses that will contribute to both the installation and the local economy. The new roadway will provide a crucial link for transporting goods and services, improving logistic efficiencies, and bolstering economic development.

Currently, the lack of direct and efficient roadway connections poses significant challenges for potential businesses and existing operations at NAS Whiting Field, limiting growth opportunities and operational efficiencies. The area's development potential is constrained by inadequate infrastructure, which impacts the ability to attract and retain industrial and commercial enterprises.

The proposed connection involves constructing a new road segment that will link key points along Munson Highway directly to Whiting Aviation Park and NAS Whiting Field. This initiative will include not only the roadway construction but also the integration of necessary utilities and services to support industrial activities. Plans for the road include features that accommodate heavy and commercial traffic, ensuring robust infrastructure that meets industrial standards.

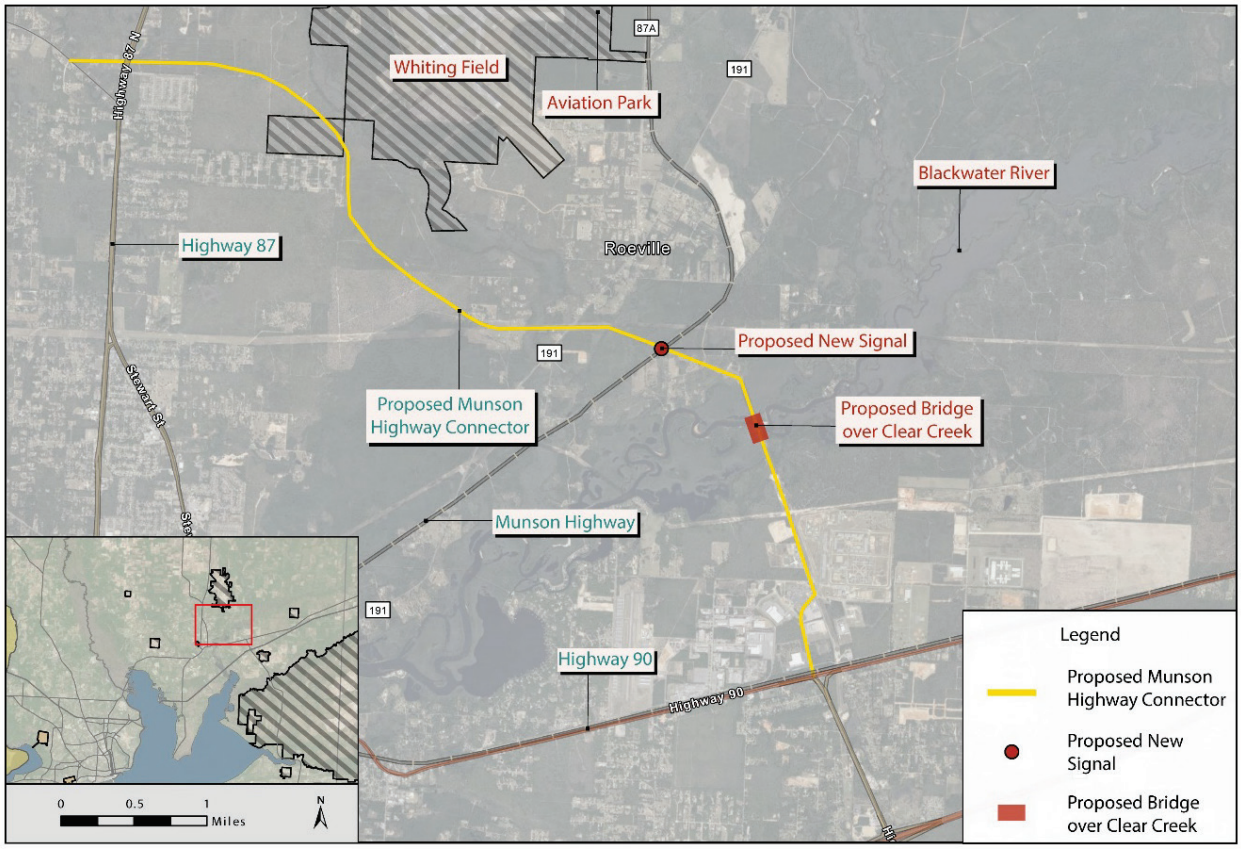
Actions

1. **Designate Whiting Field as part of the SIS**. Designating the installation as part of the SIS opens up additional avenues for state and federal transportation funding.

2. **Construct the SR 87A Connector.** The new construction of approximately 10 miles of SR 87A will primarily consist of a new alignment from east of CR 191 (Munson Highway) to east of SR 87 North. The SR 87A Connector is proposed to ultimately be a four-lane divided highway. However, it is the intent of this project to build an interim, two-lane facility. The proposed construction will include the realignment of CR 191 (Munson Highway) at the intersection of SR 87A and a new connection from SR 87N to SR 89. The project will also include paved shoulders, buffered bicycle lanes, a new bridge over Clear Creek, a new signal at CR 191 (Munson Highway), a new signal at SR 87N, stormwater ponds, signs, and pavement markings. The proposed construction will include acquiring ROW for the ultimate four-lane build out, including stormwater ponds. Neither final design, ROW, nor construction is currently funded.

Figure 5-17 shows the proposed alignment of the Munson Highway Connector.

Figure 5-17. Munson Highway Connector



Community Resilience Benefits

This new connection will unlock numerous economic opportunities by providing essential infrastructure that supports the industrial park and enhances its attractiveness to businesses specializing in aviation, manufacturing, and other sectors that benefit from proximity to NAS Whiting Field. The project will reduce travel times, enhance supply chain logistics, and provide much-needed capacity for future growth. By facilitating smoother connections to the airfield and surrounding areas, the Munson Highway Connector will play a pivotal role in economic revitalization and job creation in the region.

Project Team

The project lead is FDOT, and project partners include the following:

- NAS Whiting Field
- Santa Rosa County Economic Development Office
- Local municipalities
- Potential private-sector stakeholders interested in investing in Whiting Air Park

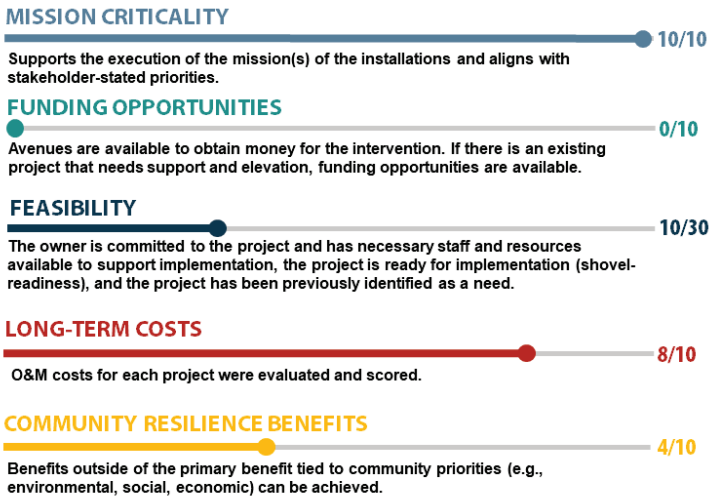
Funding Opportunities

Opportunities for funding include the following:

- Defense Community Infrastructure Program
- Triumph
- State Defense Infrastructure Grant funding
- FDOT Five-Year Work Program
- Defense Access Roads
- EPA's HMGP

5.6.5 NAS Whiting Field Redundant Water Supply





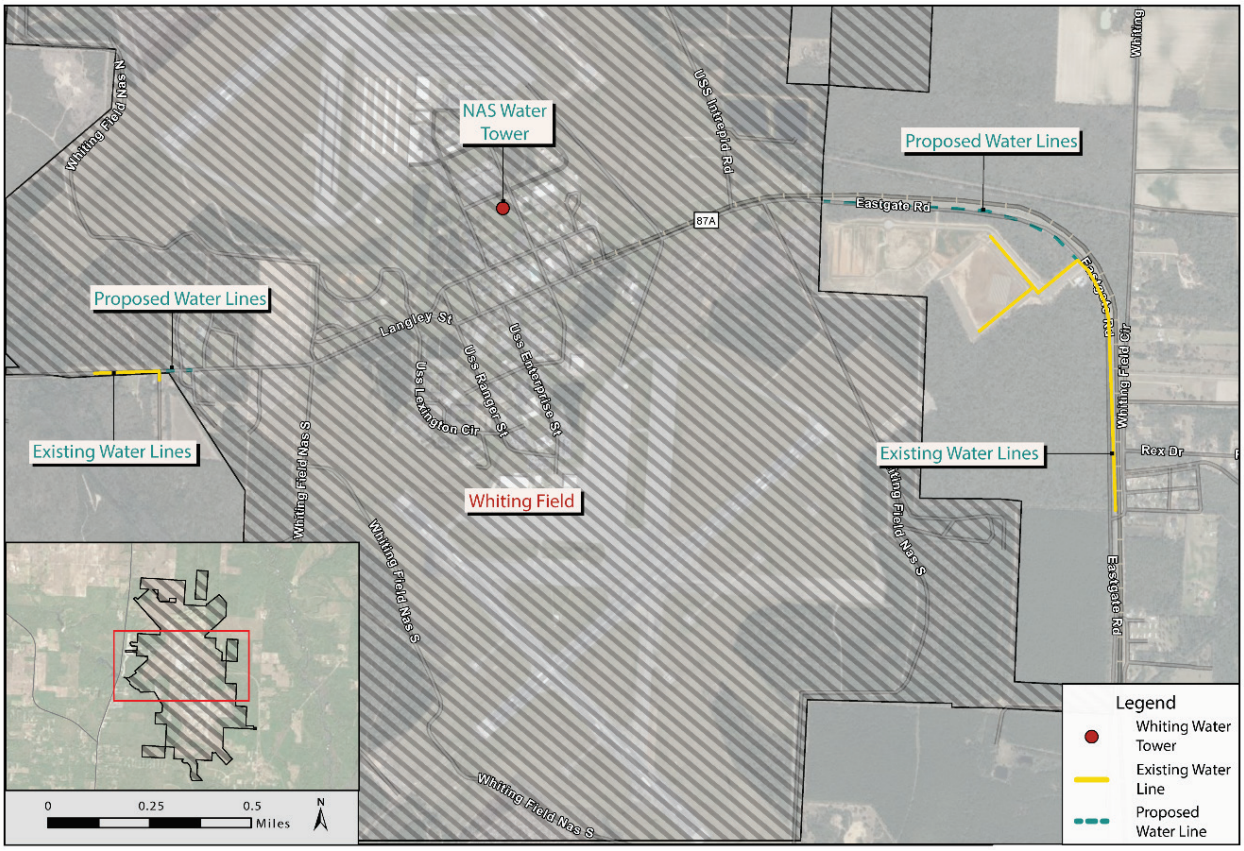
Project Description

NAS Whiting Field owns and operates a potable water system that includes water production and distribution facilities within the installation's fence line. The water production is currently sufficient to meet the installation's daily demand and there are no current water system interconnections with the nearby water systems operated by others. The water systems provide drinking water to the installations facilities and fire suppression systems.

Offsite wildfires and rarely occurring installation fires are problematic for the installation's mission-critical aircraft flight operations. Smoke reduces air and sky visibility, which can prevent aircraft takeoff and landing operations, and flight control tracking. Water production and distribution within the installation is crucial for fire suppression and extinguishing to continue successful mission operations.

A project has been identified that would provide emergency water supply to the installation's water distribution system. It consists of constructing a water line connection to nearby water system's distribution system. There are two feasible redundant water main interconnections, as shown on Figure 5-18.

Figure 5-18. Alternative Potable Water Supply



Project Actions

1. **Evaluate water system capacity.** Use existing modeling or build a new hydraulic model to understand system hydraulics prior to tapping into existing water systems.

2. **Connect to Point Baker Water System.** Point Baker Water System (PBWS) owns and maintains an existing water main along Langley Street on the west side of the installation. A redundant water main connection to the installation's system would be possible if a water main is constructed along Langley Street from the existing PBWS water main eastward to the installation. In addition to the necessary construction of the water main, a water capacity analysis of PBWS would be required to determine whether the current PBWS meets the capacity requirements, and a hydraulic model of the system would also need to be completed to determine whether the existing system could hydraulically support the installation's water system.

3. **Connect to City of Milton's Water System.** The City of Milton owns and operates a water main located along East Gate Road. Additionally, a new aviation park is being constructed off East Gate Road near the east gate entrance to the installation. The City of Milton will need to construct a water main for this new aviation park, which increases the feasibility of an interconnection to the City's water system. In addition to the necessary construction of the water main, a water capacity analysis of the City's water system would be required to determine whether the current City water system meets the capacity requirements, and a hydraulic model of the system would also need to be completed to determine whether the existing system could hydraulically support the installation's water system.

4. **Construct an elevated storage tank for City of Milton on-base.** The City of Milton and NAS Whiting Field are in discussions about adding a water tower to the installation. This elevated storage tank would help pressurize the City's water system and would provide extra water storage for the installation.

Community Resilience Benefits

Projects to improve the NAS Whiting Field redundant water supply will benefit surrounding communities. These projects will provide infrastructure improvements by improving system pressurization with the water tower, which improves the service to the community.

Project Team

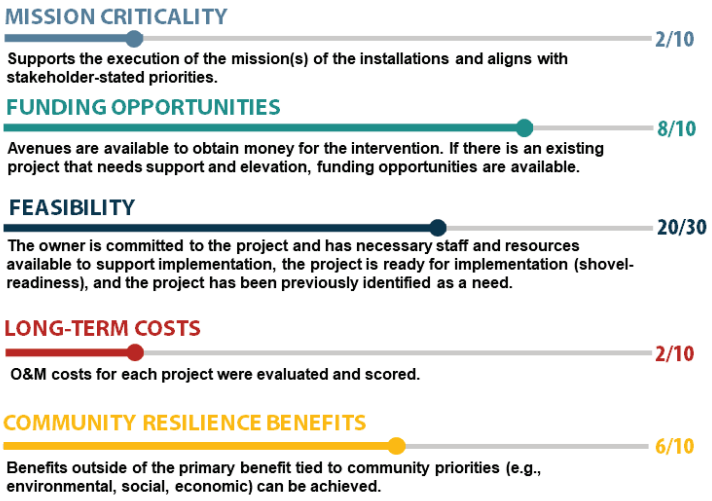
The project leads are the City of Milton and PBWS, and project partners include NAS Whiting Field.

Funding Opportunities

Opportunities for funding include Clean Water and Drinking Water SRF and Defense Community Infrastructure Program.

5.6.6 Highway 90 Resilient Roadway





Project Description

Highway 90, particularly the segments extending through Santa Rosa County, is a crucial corridor facilitating connectivity and supporting logistics for NAS Whiting Field. This roadway plays a significant role in regional transportation, providing a critical link between various community and military facilities. The project's focus is on enhancing the resilience and capacity of this corridor to ensure it can adequately support both current and future transportation needs.

Current challenges along these segments include congestion, which is compounded by limited capacity and aging infrastructure. The road is also prone to flooding in certain key segments, which disrupts connectivity and poses risks to safety and property. Enhancing the roadway involves not just widening but also implementing modern drainage systems to manage stormwater effectively and constructing multi-use paths to support non-motorized traffic, promoting safer and more sustainable transportation options.

Actions

Initiatives for Highway 90 involve several key segments, as follows:

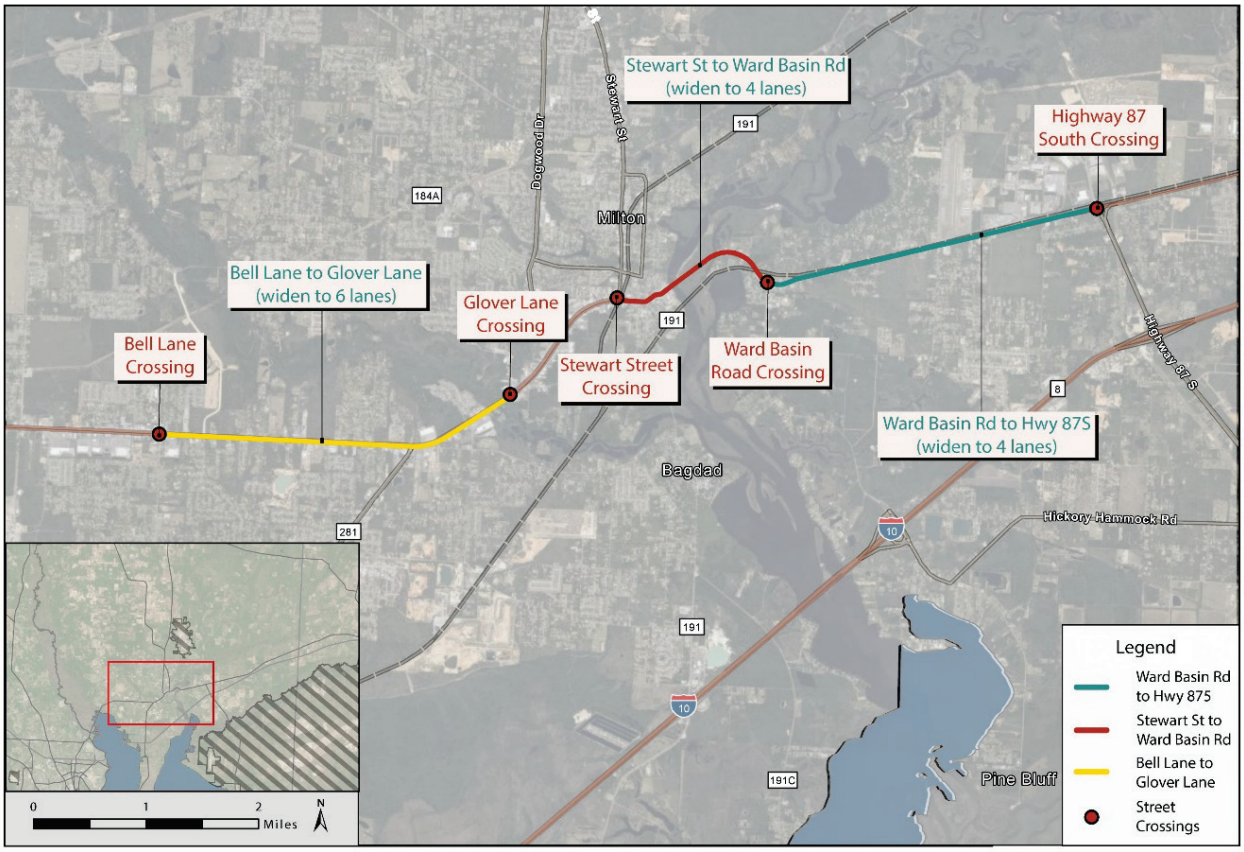
1. **Widen segment to four lanes.** The section from SR 87 N (Stewart Street) to County Road (CR) 89 (Ward Basin Road) and from CR 89 to SR 87 S is targeted for widening to four lanes to improve traffic flow and safety.

2. **Expand segment to six lanes.** The segment from Bell Lane to Glover Lane is planned to expand to six lanes, addressing the increased traffic demands and improving overall roadway efficiency.

3. **Implement drainage improvements.** Model specific roadway flooding and design and implement roadway improvements, incorporating future conditions.

Figure 5-19 shows locations of proposed improvements to Highway 90.

Figure 5-19. Highway 90 Resilient Roadway



Community Resilience Benefits

Upgrading Highway 90 will significantly enhance its capacity, safety, and resilience. The enhancements include better accommodation of increasing traffic volumes, improved emergency response capabilities, and reduced congestion-related delays. The multi-use paths will promote healthier lifestyles and environmental sustainability by encouraging walking and cycling. Overall, these improvements will support the operational needs of NAS Whiting Field and contribute positively to the local community's quality of life.

Project Team

The project lead is FDOT, project partners include the following:

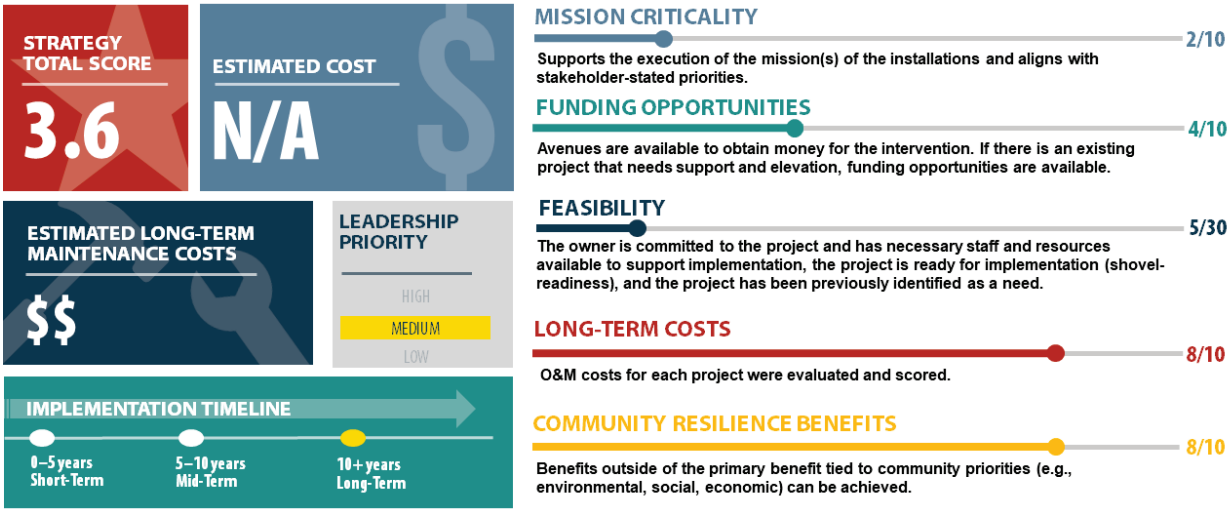
- NAS Whiting Field
- Santa Rosa County
- Florida-Alabama TPO
- Local municipalities

Funding Opportunities

The project segments from SR 87 N to Ward Basin Road and from CR 89 to SR 87 S are funded under the Florida-Alabama TPO 2045 LRTP, indicating committed support for these upgrades. The segment from Bell Lane to Glover Lane is also funded for expansion to six lanes. Efforts will continue to secure funding for the multi-use path and other unfunded portions to ensure comprehensive development along the entire corridor.

- FDOT Five-Year Work Program
- PROTECT (Formula and Competitive Discretionary programs)

5.6.7 City of Milton Flood Mitigation



Project Description

The City of Milton is located along the Blackwater River. Localized flooding poses recurrent challenges to the community, particularly during heavy rain events or hurricanes. Roadways near low-lying areas are susceptible to inundation, which impacts residential neighborhoods, businesses, and infrastructure. Highway 90 at Pond Creek is one such roadway that is at risk of flooding during a severe storm event. Because Highway 90 is a major corridor, flooding can impinge access to NAS Whiting Field for travelers.

This project addresses flooding within the City of Milton and aims to generate alignment between ongoing initiatives in Santa Rosa County, with the goal of reducing flood risk. This project requires coordination with FDOT, Santa Rosa County, and community members to identify acceptable flood resilience projects.

Actions

1. **Coordinate with FDOT on roadway improvements.** Roadway drainage system improvements for Highway 90 should incorporate a safety factor added to rainfall depths to appropriately size drainage infrastructure to account future conditions (e.g., higher rainfall intensities).

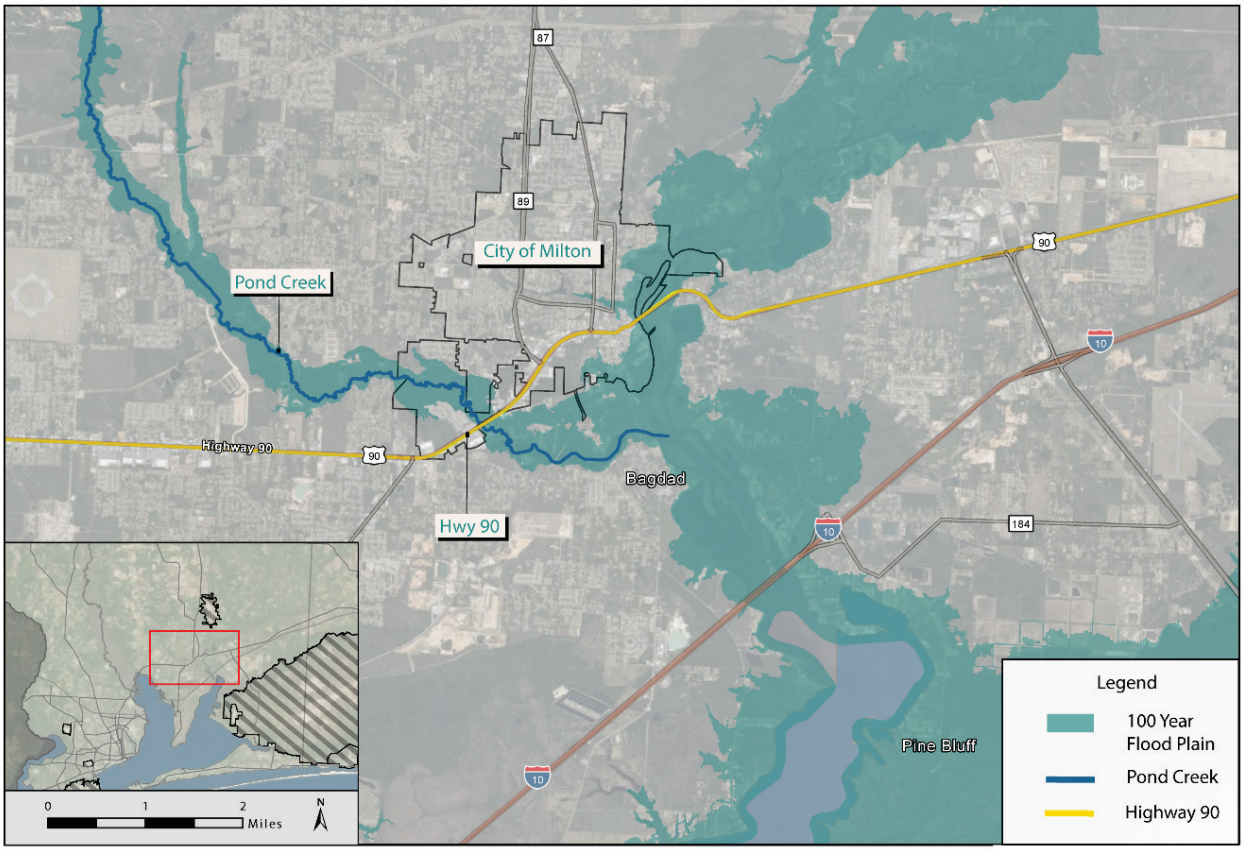
2. **Identify areas of flooding within the Santa Rosa County Stormwater Master Plan and Vulnerability Assessment.** These ongoing studies should include areas of flood vulnerability (pluvial, fluvial, and coastal). Inclusion of these roadways in state-compliant vulnerability assessments will make future projects eligible for Resilient Florida Grant Program funding.

3. **Create forward-looking design guidelines for the City of Milton.** Implementing local policies for design guidelines that incorporate future conditions will make infrastructure more resilient to future flooding.

4. **Conduct a drainage study to identify best methods for addressing flooding.** The drainage study should include detailed stormwater models for existing and proposed conditions under climate change that evaluates the occurrence of and interaction between riverine, rainfall, coastal flooding, and the local drainage system. Stormwater pump stations and blue-green infrastructure options can be considered as part of the solution.

Figure 5-20 shows the proposed area for flood mitigation measures.

Figure 5-20. City of Milton Flood Mitigation



Community Resilience Benefits

This project will support economic and social growth and development within the City of Milton. Reducing flooding improves the quality of life for residents and improves the desirability of the city as a place to live, work, and play. Reducing flood risk will also improve access through the city for commuters.

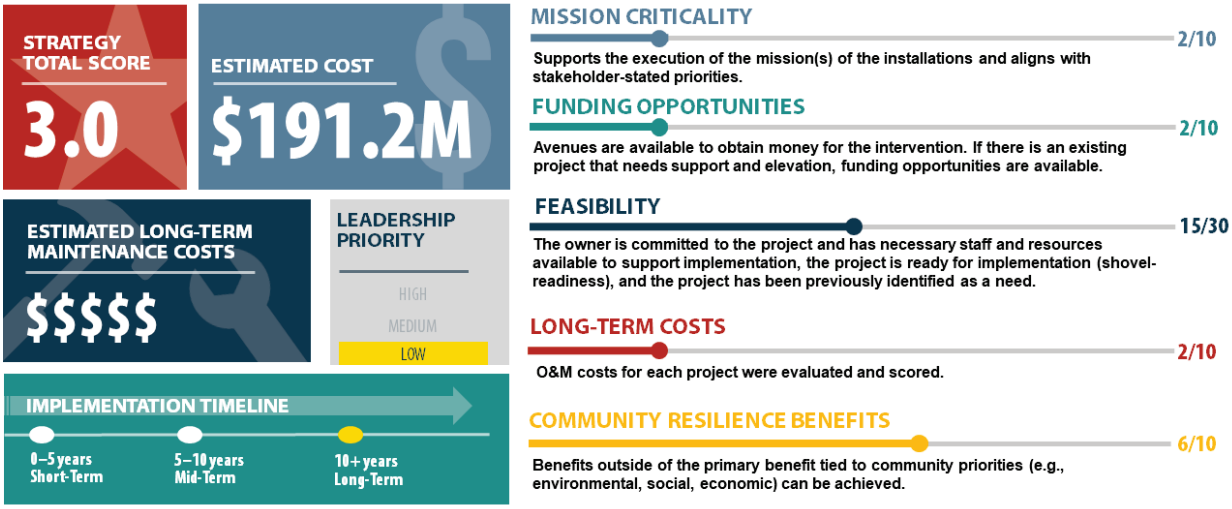
Project Team

The project lead is the City of Milton, and project partners include Santa Rosa County and NWFWMD.

Funding Opportunities

Opportunities for funding include Section 205 CAP - Flood Damage Reduction and Sewer Overflow and Stormwater Reuse Municipal Grants Program.

5.6.8 SR 87 Improvements



Project Description

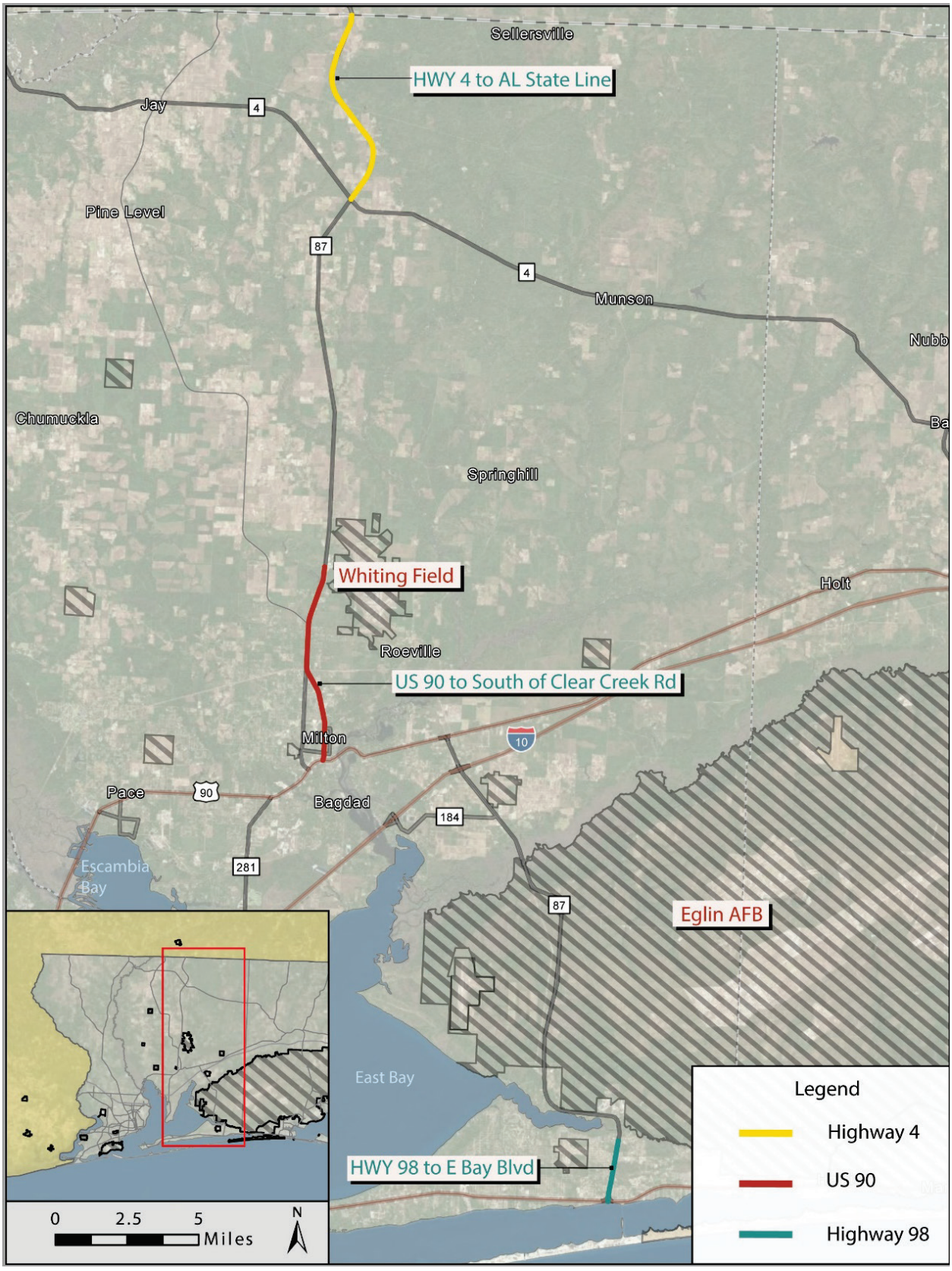
SR 87 is crucial for facilitating access to NAS Whiting Field and from the installation to its various OLFs. This corridor plays a significant role in regional mobility, providing a critical link between various community facilities and the military base. The project aims to enhance the road's capacity, safety, and resilience to ensure it can support both current and future transportation demands.

The current condition of SR 87 presents several challenges, including deterioration from heavy usage and environmental wear, which impacts the road's safety and functionality. The corridor also faces congestion issues, particularly during peak hours, which can lead to delays and increase the risk of accidents.

The proposed improvements for SR 87 include comprehensive resurfacing of the existing roadway to address wear-and-tear issues, ensuring a smoother and more durable driving surface. Additionally, plans are in place to develop a new connector, SR 87A, from Highway 90 to CR 191 (Munson Highway) to enhance the corridor's capacity and improve overall traffic flow.

Figure 5-21 shows Highway 87 improvements.

Figure 5-21. Highway 87 Improvements



Actions

Project Components

1. There is an ongoing resurfacing plan with specific allocations for fiscal years 2025 through 2028 under the FDOT District 3 Current Work Program.
2. SR 87 from South of Alabama State Line to north of State Road 4. Design in FYE24 and Construction in FYE26.
3. SR 87 from US 98 to East Bay Blvd. in current FDOT District 3 Five Year Work Plan. Design in FYE 24 Construction FYE 26.
4. SR 87 from Highway 90 to South of Clear Creek. Design FYE 25 ROW FYE 26 Construction FYE 28.
5. Address riverine flooding.
6. Improving SR 87/Langley St. intersection safety and capacity.
7. Construct the new SR 87A connector. This new roadway is recognized as a needed improvement in the Florida-Alabama TPO 2045 LRTP. It is currently in design but lacks funding for construction.

Community Resilience Benefits

The resurfacing and expansion of Highway 87 will significantly improve road safety and driving conditions, reducing maintenance costs and enhancing user satisfaction. The new connector will alleviate congestion, facilitate faster and safer travel, and promote economic development by improving access to local businesses and residential areas. Overall, these improvements will support the operational needs of NAS Whiting Field and contribute to the safety and wellbeing of the surrounding communities.

Project Team

The project lead is FDOT, and project partners include the following:

- NAS Whiting Field
- Santa Rosa County
- Florida-Alabama TPO
- Local Municipalities

Funding Opportunities

The resurfacing project is scheduled with specific allocations for fiscal years 2025 through 2028 under the FDOT D3 Current Work Program, reflecting committed support for these upgrades. The new connector, SR 87A, currently lacks funding but is recognized as a needed improvement in the Florida-Alabama TPO 2045 LRTP. Efforts will continue to secure funding for this critical component to ensure comprehensive development along the entire corridor.

Opportunities for funding include FDOT Five-Year Work Program.

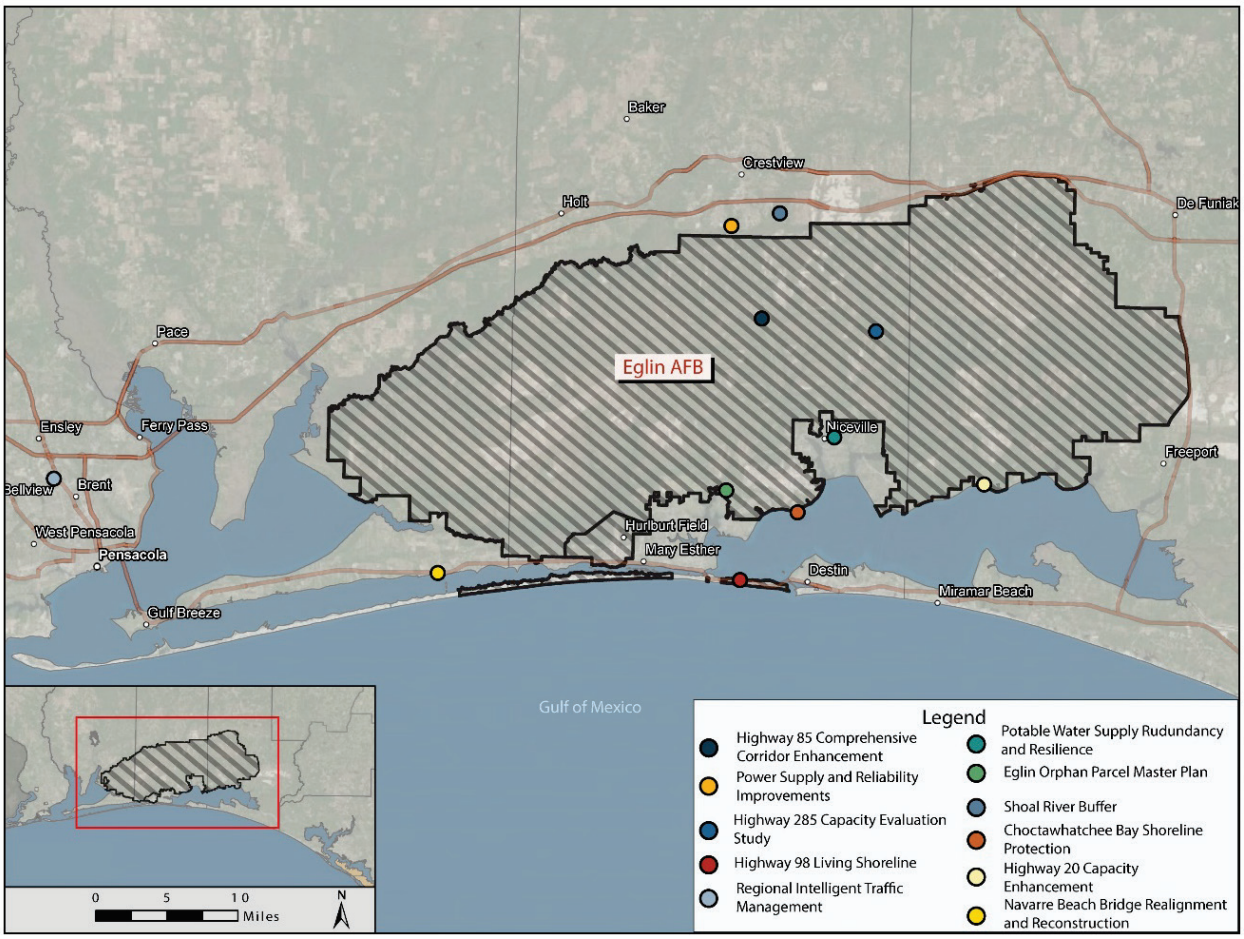
5.7 Eglin AFB

Eleven resilience projects were identified for Eglin AFB. Table 5-4 outlines the projects and their respective strategy scores. Figure 5-22 shows the approximate project locations.

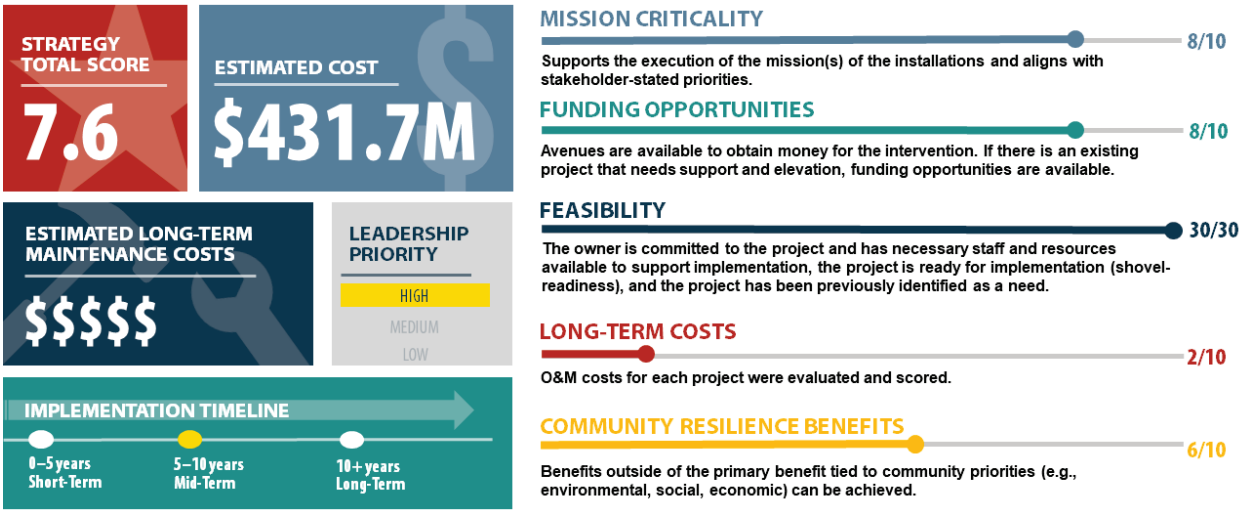
Table 5-4. Eglin AFB Resilience Projects

Project Name	Strategy Score
SR 85 Comprehensive Corridor Enhancement	7.6
Power Supply and Reliability Improvements	6.8
SR 285 Capacity Evaluation Study	6.1
US 98 Living Shoreline	5.8
Regional Intelligent Traffic Management	5.7
Potable Water Supply Redundancy and Resilience	5.6
Eglin Orphan Parcel Master Plan	5.1
Eglin Air Force Base Strategic Buffering	4.7
Choctawhatchee Bay Shoreline Protection	4.4
Highway 20 Capacity Enhancements	4.3
Navarre Beach Bridge Realignment and Reconstruction	3.9

Figure 5-22. Approximate Locations of Eglin AFB Resilience Projects



5.7.1 SR 85 Comprehensive Corridor Enhancement



Project Description

SR 85 serves as a crucial north–south artery, facilitating access to Eglin AFB and connecting northern Okaloosa County to the beaches in the south and to Covington County, Alabama, in the north. Its strategic importance is underscored by its function as one of only three corridors traversing the Eglin Range and as a critical hurricane evacuation route. The daily traffic includes a mix of military and civilian personnel and is heavily impacted during the tourist season. For these reasons, a broad spectrum of improvements is needed to accommodate the diverse transportation needs on SR 85.

The corridor currently experiences significant congestion issues, particularly around Eglin AFB's west gate, which compromises base operations and personnel welfare. The infrastructure, including the Shoal River Bridge, is outdated, with the bridge at risk of flooding under extreme weather conditions. Such vulnerabilities pose risks during critical evacuation periods and must be addressed to ensure operational and public safety. There is currently ongoing resurfacing and restriping on the roadway.

Actions

1. **Widen the highway.** Widening SR 85 to six lanes, with the goal of increasing capacity, is documented in the LRTP via three component projects:
   - SR 85 from SR 123 to McWhorter Avenue (SIS Priority #8). Includes addition of Complete Streets elements, such as sidewalks, shared-use paths, and bike lanes.
   - SR 85 from McWhorter Avenue to PJ Adams Parkway (SIS Priority #2). This project consists of highway widening to six lanes and improvement of intersections and pedestrian pathways. It also includes reconstruction of the Shoal River Bridge.
     - Expansion to six lanes to manage increased traffic flow.
     - Improvement of intersections and pedestrian pathways.
     - Reconstruction of the Shoal River Bridge to enhance resilience against flooding ($227 million construction cost).
   - SR 85 from PJ Adams Parkway to Mirage (SIS Priority #3):
     - Expansion to six lanes to manage increased traffic flow.
     - Improvement of intersections and pedestrian pathways.

2. **Elevate the Shoal River Bridge for flood resilience.** The Shoal River Bridge gets flooded during high magnitude flood events. This critical evacuation route should be elevated a minimum of 1 foot above the 500-year floodplain.

3. **Conduct a Complete Streets/Corridor Study for SR 85 S. Ferdon Boulevard from SR 123 to Mirage Avenue.** Implement a Corridor Management Study, with a focus on development of multimodal transportation enhancements including lighting, landscaping, medians, turn lanes, sidewalks, and drainage systems.

4. **Implement intersection improvements**. Improve the intersections at Mirage Avenue and Redstone Avenue to facilitate safer and more efficient travel. In addition, add a right-turn lane at PJ Adams Parkway to improve connectivity and traffic flow.

5. **Continue the Eglin Westside Expansion Plan, including SR 85 Realignment.** The primary purpose of the Eglin Westside Expansion Plan is for Eglin AFB and its tenants to have optimum land development opportunities by expanding the available developable land within the Eglin main cantonment area. The additional area is needed to support current and future mission-related activities and to support and sustain a fully capable installation that is adaptable to the requirements of future generation weapon systems and associated facility infrastructure. There are multiple components of the Plan:

    - The Westside Expansion Plan analyzed the state roadway realignment of SR 85 and SR 189 to allow for the expansion of the western portion of the main cantonment area. The result of Phase I was an Eglin preferred state roadway realignment corridor that has been shared with FDOT.
    - In addition to providing the needed area to support current and future mission requirements, the realignment corrects safety and security deficiencies at the west gate and alleviates traffic problems on SR 85 and at the SR 85/SR 189 intersection.
    - Phase II of the Westside Expansion Plan: The Eglin West Gate Location Study examined the connection of the realigned state road corridor to a future relocated west gate entry control facility.

Figure 5-23 shows the location of the Highway 85 corridor enhancement.

Community Resilience Benefits

The comprehensive enhancement of SR 85 will drastically reduce travel times, increase safety, and improve the overall capacity of the corridor. These upgrades are critical for supporting efficient base operations, enhancing civilian evacuation capabilities during emergencies, and promoting regional economic development. The integration of Complete Streets principles will ensure the corridor is accessible and safe for all users, promoting a healthier, more sustainable community environment.

Project Team

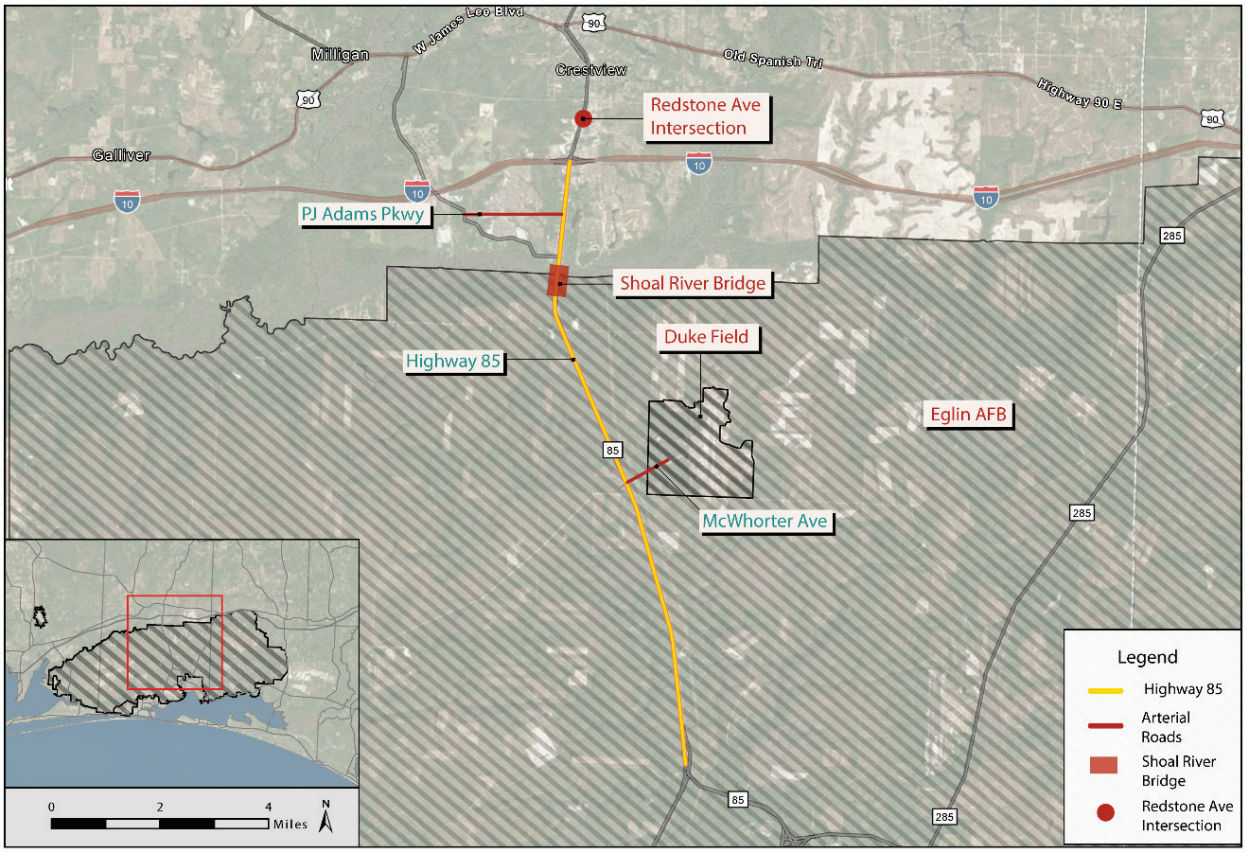
The project lead is FDOT, and project partners include Eglin AFB, Okaloosa-Walton TPO, Okaloosa County, and ECRC.

Funding Opportunities

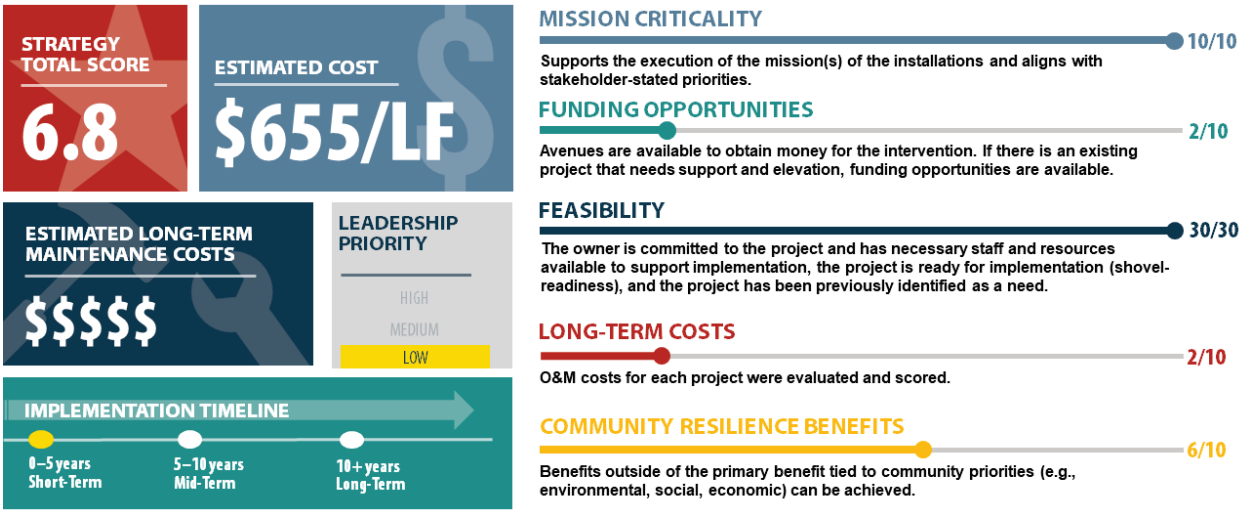
Opportunities for funding include the following:

- PROTECT (Formula and Competitive Discretionary programs)
- Building Resilient Infrastructure and Communities
- Defense Community Infrastructure Program
- Defense Access Roads
- Bridge Investment Program
- Safe Streets and Roads for All Program
- Active Transportation Infrastructure Investment Program
- Rebuilding American Infrastructure with Sustainability and Equity Program
- Transit Ridership Incentive Program

Figure 5-23. SR 85 Comprehensive Corridor Enhancement



5.7.2 Power Supply and Reliability Improvements



Project Description

Eglin AFB has two power suppliers: FPL on the west side and CHELCO on the east side. These utilities work closely with the installation to coordinate power for the base.

The growing missions at Eglin and Hurlburt require additional power—these capacity requirements place additional strain on the grid outside the fence line. In addition, the grid is exposed to lightning and wildfire. Both utilities mitigate wildfire risk through ongoing vegetation management programs. This project bundle identifies a mixture of physical infrastructure intervention activities that will support mission growth at Eglin AFB and the community at large.

Actions

1. **Continue to work with Eglin AFB to harden infrastructure within the installation.** While outside of the scope of the MIRR, it is important to recognize that the large network of infrastructure inside the installation requires hardening. Portions of the system are currently being installed underground, and wood poles are being replaced with concrete where appropriate. This work must be continued and requires continued funding from the DoD.

2. **Establish regular communications between both utilities and the installation regarding power supply.** While the installations are in contact with both utilities, there is an opportunity to improve communication regarding demand changes. All groups should set aside a specific time (e.g., every 6 months) during which the groups involved with the installation can communicate upcoming activities and associated changes to power demand requirements. This can help the utilities plan ahead for future capacity improvements.

3. **Notify utilities regarding upcoming controlled burns**. Jackson Guard and the Florida Forest Service should notify the utilities (FPL and CHELCO) prior to conducting a prescribed burn, as these fires can damage poles and wires.

4. **CHELCO – Implement Grid Capacity Improvements and Hardening both inside and outside the Eglin AFB fence line.**

    - **Install additional TripSaver 2.0 devices.** CHELCO has been adding the TripSaver 2.0, an electronic reclosing device that improves service reliability, to both its systems inside and outside the fence line. FPL has already added 80,000 of these same devices, resulting in significant improvements to speed of power restoration after Hurricane Irma (S&C Electric Company 2017) and significant reduction in momentary power disruption. CHELCO is interested in purchasing 652 of the TripSaver2.0 at a total cost of $14 million for design, purchase, and installation.
    - **Increase the capacity of Bluewater Bay assets.** Upgrade the wire size of the transmission line that feeds the Bluewater Bay substation to prepare the grid for new load growth.
    - **Harden and expand capacity for CHELCO's privatized system inside the fence.** While not necessarily within the scope of the MIRR, CHELCO's privatized power system within the installation boundary requires funding to upgrade both the resilience (hardening) and reliability (capacity) of the system to align with industry standards.
    - **Convert wood poles to concrete poles.** In highly vegetated areas, CHELCO should consider upgrading wood poles to concrete to reduce transmission system vulnerability to wildfire.

5. **FPL – Implement Grid Improvements and Hardening.** Expand the capacity of the FPL transmission lines on the west side of the installation to serve future mission needs.

Community Resilience Benefits

Conducting power supply and reliability improvements will provide benefits to both physical and economic infrastructure surrounding the installation. Physical infrastructure improvements include improving the community power supply reliability. Economic infrastructure improvements include supporting community growth and development.

Project Team

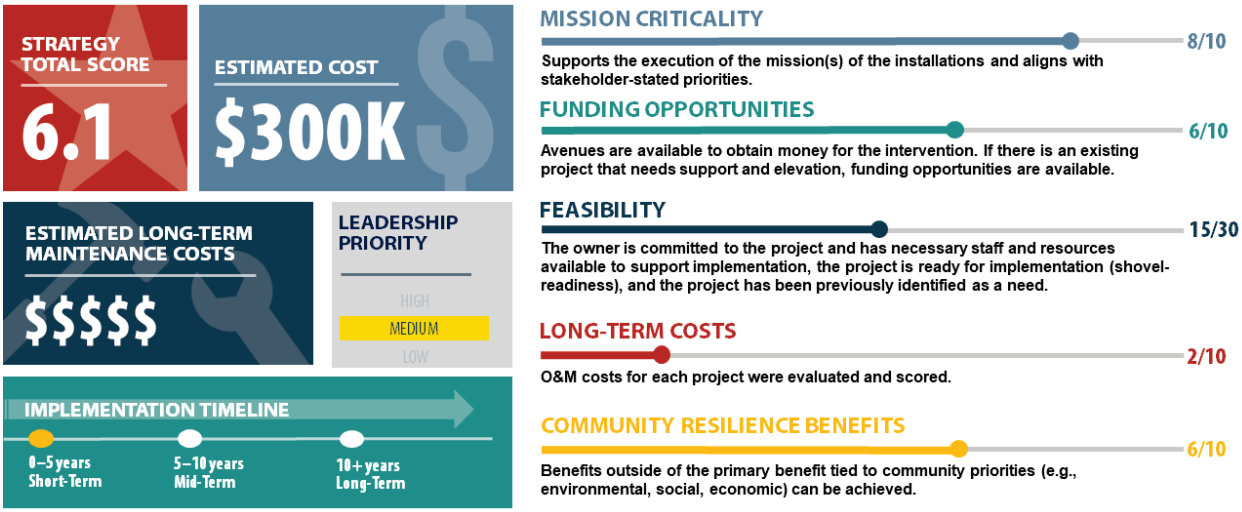
The project leads are CHELCO and FPL, and project partners include Eglin AFB, Jackson Guard, and Florida Forest Service.

Funding Opportunities

Opportunities for funding include the following:

- Defense Community Infrastructure Program
- Building Resilient Infrastructure and Communities
- Grid Resilience State Formula Grants
- Grid Resilience and Innovation Partnerships Program

5.7.3 SR 285 Capacity Evaluation Study



Project Description

SR 285 serves as an essential connector for Eglin AFB and the surrounding communities, currently operating as a two-lane road. Despite FDOT assessments based on 2019 data indicating that the road performs within standards, local perceptions suggest that these measures are outdated because of significant changes in traffic volumes and regional development. Concerns from the installation and local communities highlight the need for a revised evaluation to accurately assess the road's capacity and safety under current conditions.

The project will involve conducting a capacity evaluation study to reevaluate the road's performance and explore widening it to four lanes. This study will incorporate the latest traffic data, growth projections, and community input to provide a current and comprehensive assessment of SR 285's transportation needs (Figure 5-24).

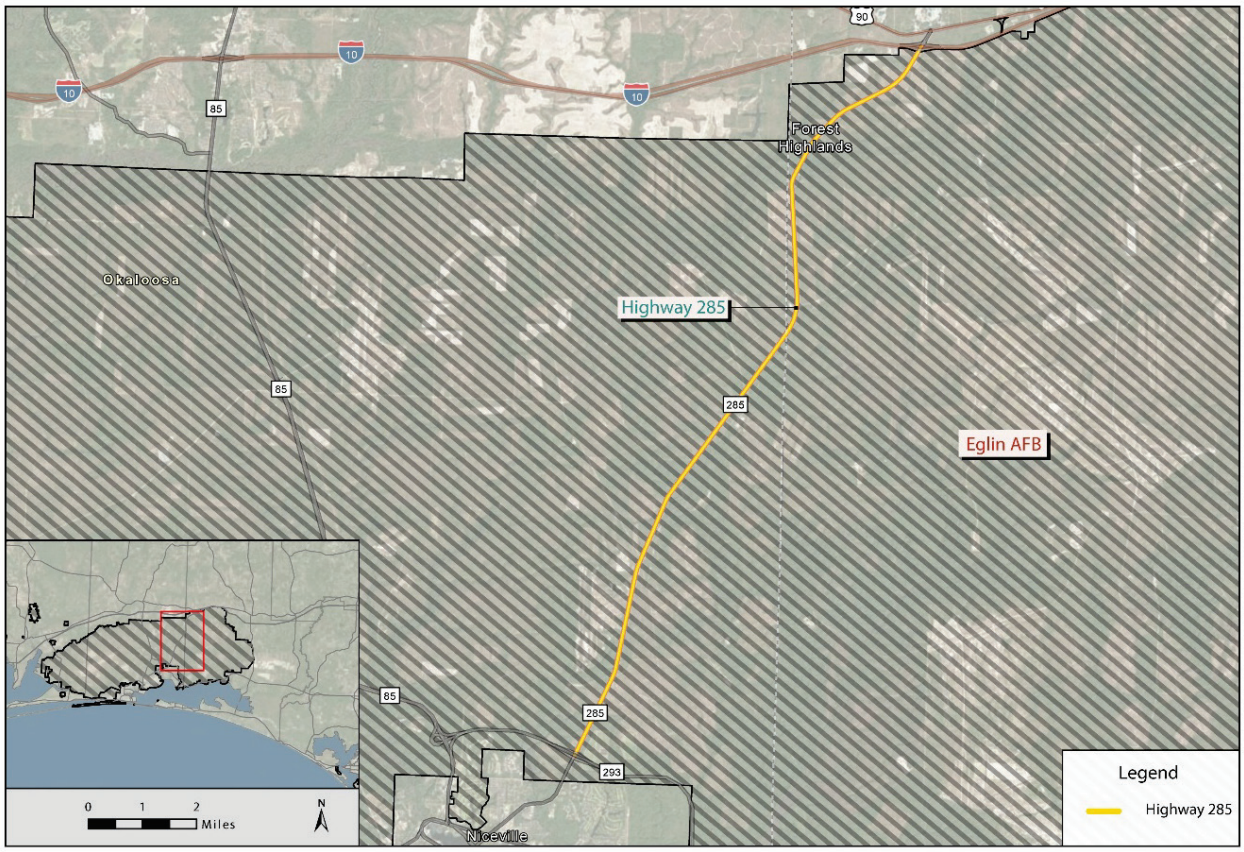
Actions

1. **Conduct the capacity evaluation study.** The project will involve conducting a new capacity evaluation study to reevaluate the road's performance and explore the necessity of widening it to four lanes (including the need for passing lanes and minor improvements). This study will incorporate the latest traffic data, growth projections, and community input to provide a current and comprehensive assessment of SR 285's transportation needs.

Community Resilience Benefits

If the study determines that widening is warranted, the potential expansion of SR 285 could significantly improve traffic flow, enhance safety, and reduce congestion, thereby supporting the operational needs of Eglin AFB and the daily commute requirements of local residents. An upgrade would also facilitate economic development by improving access to the area and accommodating future growth more effectively.

Figure 5-24. SR 285 Capacity Evaluation Study



Project Team

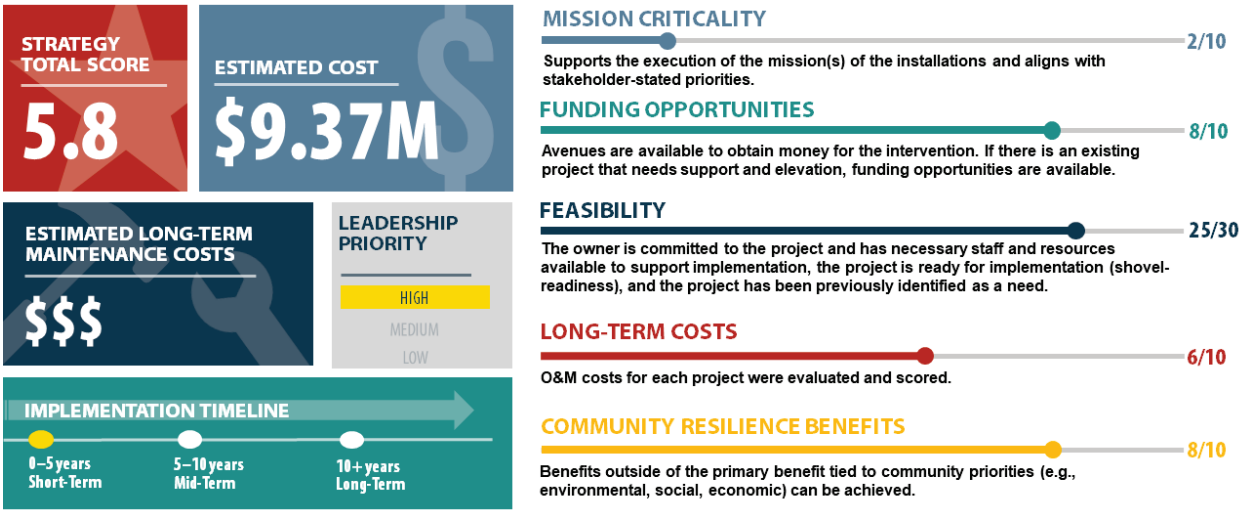
The project lead is FDOT, and project partners include Eglin AFB, Okaloosa-Walton TPO, and ECRC.

Funding Opportunities

Opportunities for funding include the following:

- Building Resilient Infrastructure and Communities
- Defense Community Infrastructure Program
- Defense Access Roads
- Safe Streets and Roads for All Program
- Rebuilding American Infrastructure with Sustainability and Equity Program

5.7.4 US 98 Living Shoreline



Project Description

US 98 is a major east–west corridor through Northwest Florida and the only method of east–west vehicle travel along the southernmost portion of Okaloosa County. This is a critical roadway for both Hurlburt Field, Eglin AFB, and the surrounding community.

The Living Shoreline project along US 98 on Okaloosa Island represents a strategic effort to combat coastal erosion while enhancing marine habitats. Spanning 4,500 feet, this initiative combines nature-based and engineered solutions—termed a 'green-gray' approach—to stabilize the shoreline and mitigate the impact of wind and waves. The project involves constructing a limestone breakwater in the nearshore intertidal area and planting native vegetation on the landward side, which includes species such as sea oats and other native grasses.

The proposed project would create a large-scale living shoreline alongside a 4,500-linear-foot stretch of a highly vulnerable section of US 98 on Okaloosa Island (Figure 5-25). This multi-phase project will include site design, permitting, construction, and monitoring. The purpose of this project is to re-stabilize the shoreline along US 98 and prevent erosion.

Unlike hardened infrastructure such as a concrete seawall, a living shoreline combines both nature-based solutions and an intertidal breakwater to help stabilize shorelines, thus protecting vulnerable sections of US 98. This approach has been shown to significantly reduce erosion and increase coastal resiliency, while also providing essential habitat for numerous commercially, recreationally, and ecologically important estuarine animals and plants.

Figure 5-25. US 98 Living Shoreline



Actions

1. **Design and obtain permitting for the living shoreline.** While the Okaloosa County Coastal Resource staff have experience in living shoreline site design and extensive experience with environmental permitting and monitoring, it is anticipated that site design and permitting will be contracted through an environmental engineering firm. The design will incorporate limestone rock breakwaters for wave attenuation and native vegetation.

2. **Build the living shoreline.** The construction phase will include the strategic placement of limestone rock breakwaters to provide habitat and reduce wave energy. Native salt-tolerant vegetation will be planted along the shoreline to stabilize the soil and dunes, reducing sediment loss and enhance sediment accretion. This, in effect, minimizes any maintenance and replacement costs relative to a hardened structure.

   - **Construction of Limestone Breakwater:** A nearshore breakwater will be constructed to diminish the energy of incoming waves, thereby protecting the shoreline from further erosion.
   - **Vegetation Planting:** Following the breakwater installation, the project will reintroduce native vegetation to stabilize the soil and dunes, enhancing the ecological integrity of the shoreline.
   - **Habitat Creation:** The combined green-gray approach is expected to create more than 1.5 acres of intertidal reef habitat and protect approximately 6.2 acres of seagrass recruitment areas, significantly boosting local biodiversity.

3. **Monitor establishment.** Routine monitoring of plant growth, shoreline condition, and habitat-use will be conducted to document the project's success. Unlike seawalls or other hardened structure that have a finite lifespan, living shorelines become self-sustaining as natural growth of the living elements compound over time.

Community Resilience Benefits

This project is designed to protect the critical infrastructure of US 98, which serves as the primary east–west corridor in southern Okaloosa County. By reducing erosion and mitigating flood risks, the living shoreline will preserve the road's integrity and ensure safe, reliable transportation routes. Additionally, the project will create valuable marine and terrestrial habitats, improving local biodiversity and offering new recreational opportunities for fishing and nature observation, thereby enhancing the community's connection to their natural surroundings.

Project Team

The project lead is Okaloosa County, and project partners include the following:

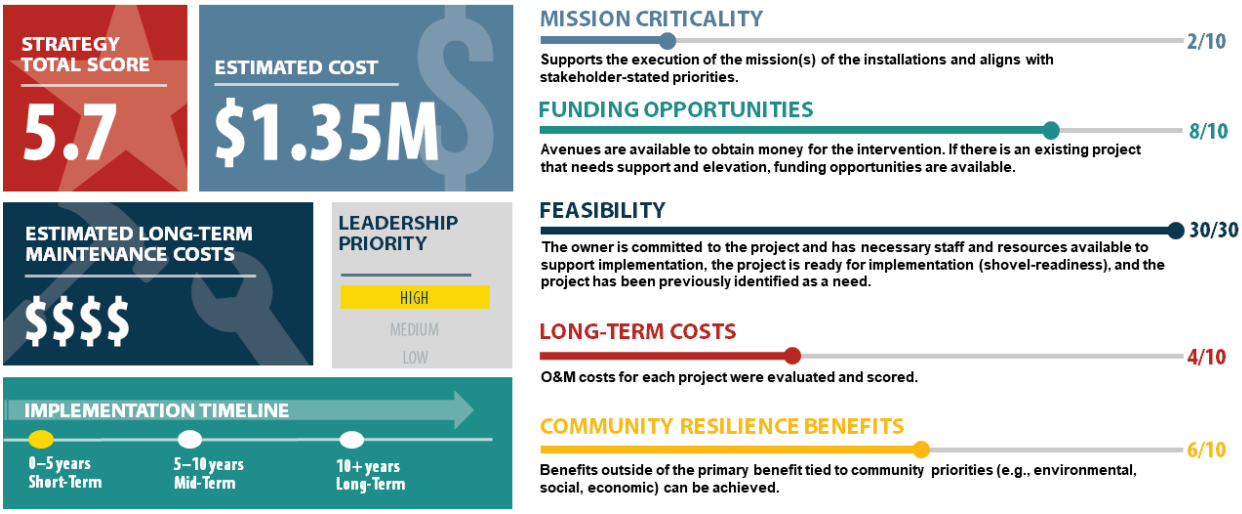
- The Nature Conservancy
- Eglin AFB
- FDOT
- Choctawhatchee Bay Estuary Program
- Choctawhatchee Basin Alliance

Funding Opportunities

The project is pursuing various grant opportunities, including NOAA's Transformational Habitat Grant and the National Coastal Resiliency Fund. Additional support is being sought through the DoD's REPI program. Funding opportunities include:

- Transformational Habitat Restoration and Coastal Resilience
- Section 103 CAP - Beach Erosion and Hurricane and Storm Damage Reduction REPI Challenge
- National Coastal Resilience Fund

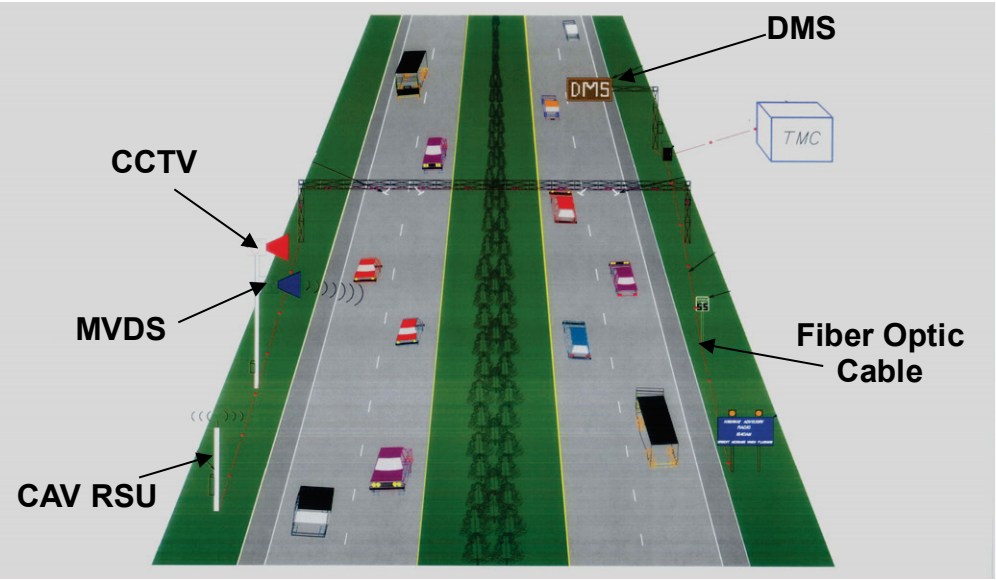
5.7.5 Regional Intelligent Traffic Management



Project Description

The Regional Intelligent Traffic Management initiative is set to improve traffic control across multiple jurisdictions through the integration of advanced technologies. This project aims to implement a dynamic traffic management system that uses real-time data to optimize traffic flow and reduce congestion. These programs are high priority for the TPOs. Figure 5-26 shows the potential technologies as part of the intelligent traffic management initiative.

Figure 5-26.Regional Intelligent Traffic Management Schematic



Note:
CCTV: Closed-circuit camera television
MVDS: Microwave vehicle detection system
CAV RSU: Connect autonomous vehicles roadside unit
DMS: Dynamic message signs

Actions

1. **Deploy new technology.** Install sensors, cameras, and smart traffic signals across key intersections and traffic hotspots to monitor and manage traffic flow in real time. Technologies to be used in the system include fiber optic cable, closed-circuit television cameras, microwave vehicle detection systems (for data gathering) and arterial Dynamic Messaging Signing. Connected and autonomous vehicle technology should also be considered for inclusion (or deployment in the future) because of the rapid development and likely eventual implementation of autonomous vehicles.

2. **Establish a central control center.** The purpose of the central traffic control center is to coordinate data and manage traffic across the region. It will use advanced software for traffic prediction and management.

3. **Develop a public information system.** This system provides real-time traffic updates to commuters, aiding in travel planning and congestion avoidance.

Community Resilience Benefits

This system will not only enhance vehicular traffic efficiency but also improve public safety by reducing accident rates and managing traffic flows more effectively during emergencies. By reducing congestion, the initiative also aims to lower vehicle emissions, contributing to environmental sustainability.

Project Team

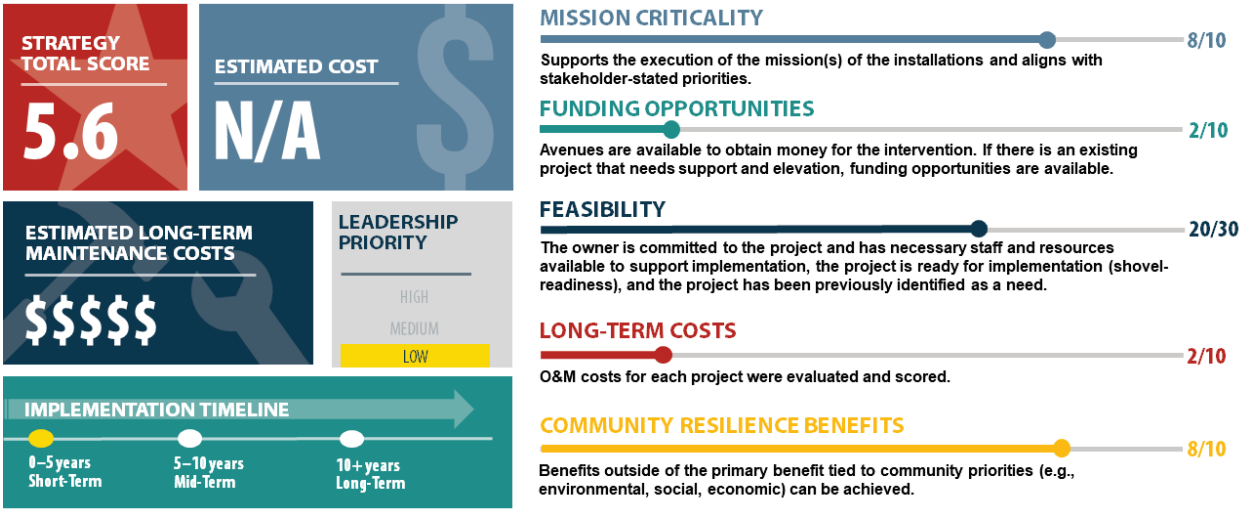
The project leads are FDOT and Okaloosa County TPO. Project partners include local municipalities and technology providers.

Funding Opportunities

Funding for this project will be sought from federal Smart City and transportation grants, state funds, and partnerships with technology firms specializing in traffic management solutions. This type of project would be a good

candidate for the U.S. Department of Transportation's Advanced Transportation Technology and Innovation program.

5.7.6 Potable Water Supply Redundancy and Resilience



Project Description

Much of southern Okaloosa County, including the City of Niceville and the City of Mary Esther, rely on groundwater in the Floridan aquifer for their potable water supplies. This aquifer is experiencing saltwater intrusion from over pumping – this issue was identified in the early 2000s. The NWFWMD projects that water demand will increase between 22% and 25% from 2020 to 2045 (NWFWMD 2023b), stemming in part from population growth in the region. The saltwater intrusion issue is expected to be exacerbated by SLR, which will result in greater salinity levels in the aquifer.

This project builds on the work of the NWFWMD to provide a comprehensive approach to water conservation and reliability across the region.

Actions

1. **Continue to implement conservation programs and education.** The region has been historically successful in reducing per capita water use. Conservation efforts can include smart water systems that identify leaks and educating the public on direct potable reuse.

2. **Add interconnections with other water utilities.** Interconnects with northern communities are being explored. One such connection is an interconnect with the City of Crestview that would travel southward along Highway 85 to the southern end of Okaloosa County. This interconnection can support the City of Niceville and Eglin AFB.

3. **Expand use of reclaimed water facilities and infrastructure**. The region already uses reclaimed water in spray fields. Using reclaimed water for additional uses can help protect the existing groundwater supply.

4. **Develop a plan to protect groundwater resources through physical and/or hydraulic barriers.** The Floridan aquifer can be protected by a physical or hydraulic barrier. Physical barriers can be a physical wall, such as a slurry wall or cutoff wall. Hydraulic barriers consist of injection wells being placed downgradient of existing extraction wells and injecting water (either potable or reclaimed) to create a positive hydraulic barrier between the intruding saltwater and the aquifer. A feasibility study can help NWFWMD understand the optimal method of protecting groundwater supplies from saltwater intrusion.

Community Resilience Benefits

This project ensures communities have continuous access to clean water during emergencies such as natural disasters or infrastructure failures, safeguarding public health and reducing disruption to daily life. By maintaining multiple sources and backup systems, communities enhance their ability to withstand challenges and ensure equitable access to a vital resource for all residents.

Project Team

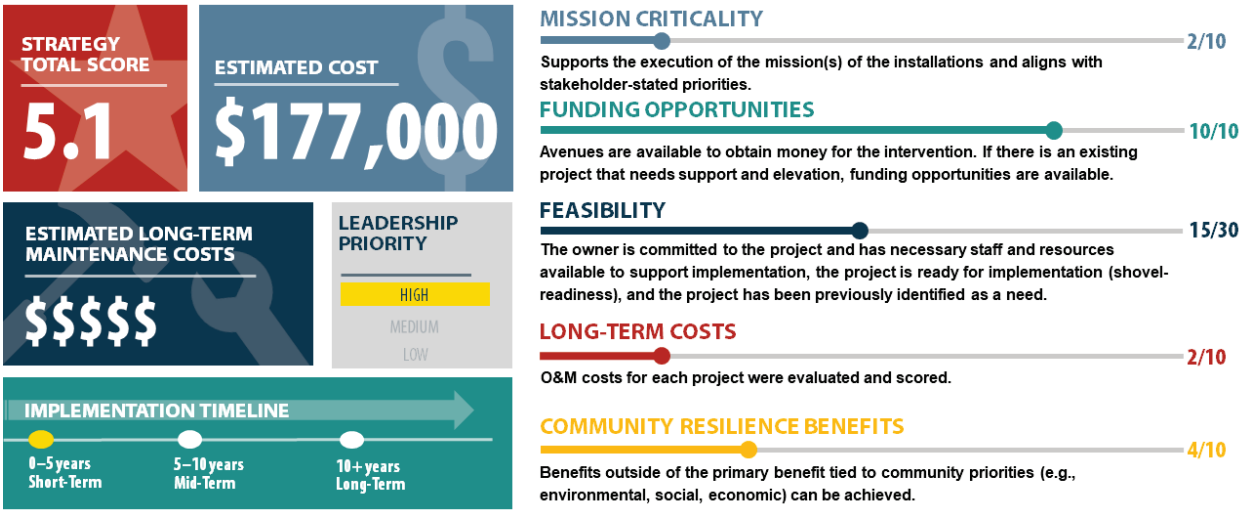
The project lead is NWFWMD, and project partners include the following:

- Okaloosa County
- Santa Rosa County
- Walton County
- Choctawhatchee Basin Alliance
- Eglin AFB
- Hurlburt Field

Funding Opportunities

Opportunities for funding include the Clean Water and Drinking Water SRF, the Defense Community Infrastructure Program, and Building Resilient Infrastructure and Communities.

5.7.7 Eglin Orphan Parcel Master Plan



Project Description

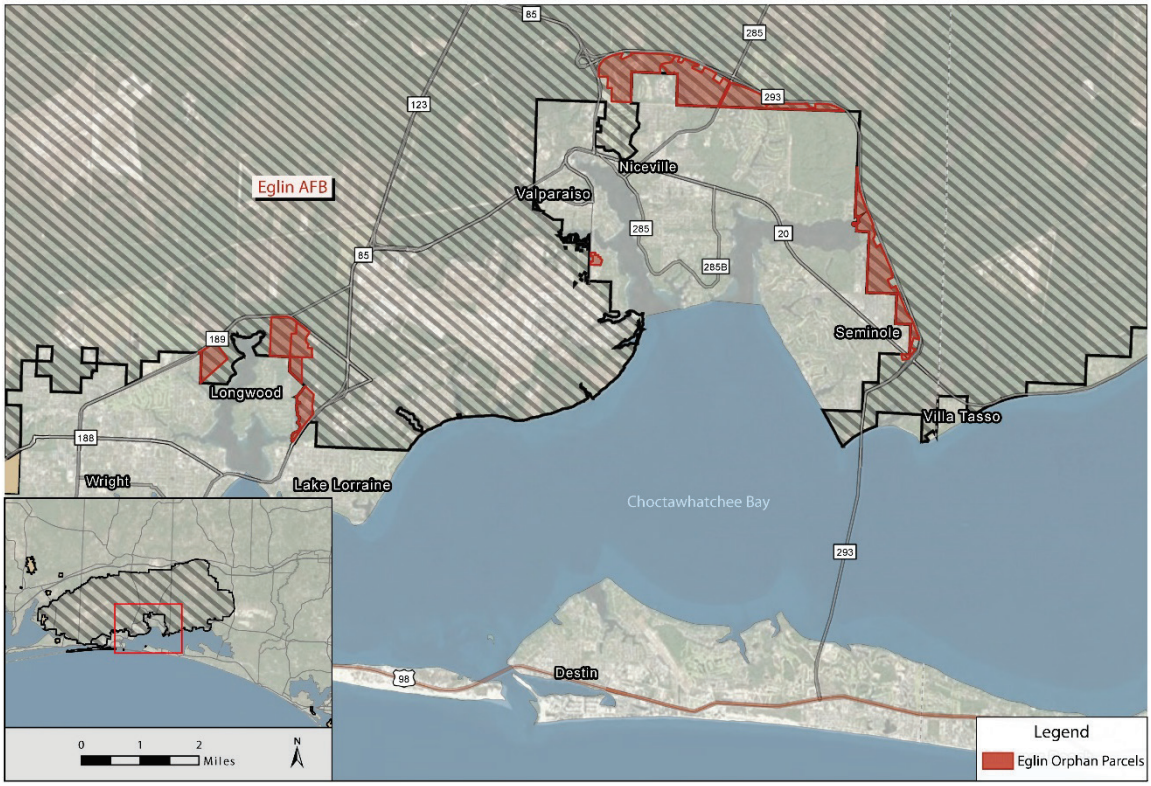
The Okaloosa County Attainable Housing Strategic Plan identifies a number of strategies, including Strategy 2.1: Partner with Department of Defense to Utilize Orphaned Parcels for Attainable Housing Development. The Plan notes that there are “properties which, though owned by the Air Force, are not ideally suited for military use, and could be made available for other purposes” (Okaloosa County 2024).

One such set of parcels are located near the center of Eglin AFB, north of College Boulevard and east of SR 85 (Figure 5-27). These parcels are a mixture of wooded areas and wetlands and can potentially be developed to support the installation with housing, childcare, or a mixture of other mission-supportive uses.

In January 2024, the Orphan Parcels Strategic Plan, Phase II: Allocating Land Uses Okaloosa County was delivered. The plan identified potential uses for the orphaned parcels to help meet needs of the wider community and gather

feedback on potential land use of the parcels. This strategy proposes to create an Orphan Parcels Master Plan to build on the findings of the strategic plan.

Figure 5-27. Eglin Orphan Parcel Master Plan



Actions

1. **Generate an inventory of orphaned parcels.** Per the Okaloosa County's Housing Strategic Plan, Eglin AFB, Okaloosa County, and developers should work together to develop a list of orphaned parcels and prioritized uses.

2. **Develop a master plan for the parcels.** The master plan can explore alternative uses and ownership strategies for the parcels and propose a path forward that supports the installation mission, such as an Enhanced Use Lease. The master plan will do the following:

   - Include stakeholder feedback
   - Determine market viability and site suitability by parcel
   - Understand the potential mechanisms for reuse/development
   - Prioritize parcel development based on agreed criteria
   - Develop concept plans for agreed parcels(certain number, size, priority)
   - Detail actionable steps to develop parcels consistent with concept plans

Community Resilience Benefits

Developing the Eglin Orphan Parcel Master Plan will provide benefits to the community surrounding the installation. Benefits of this project will vary and depend on the use of the parcels—benefits could include affordable housing, childcare, and commercial development.

Project Team

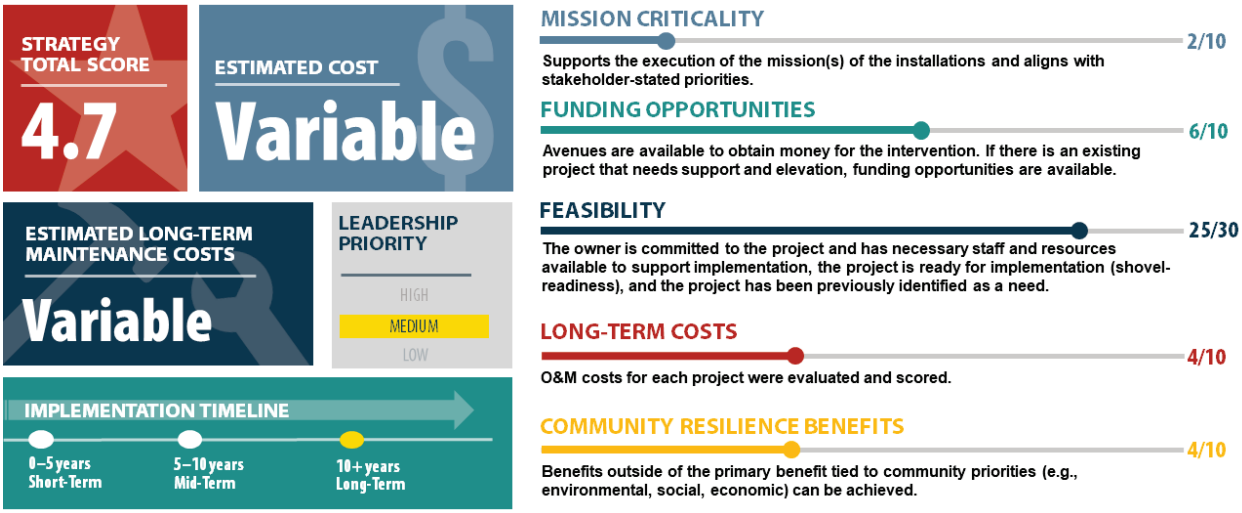
The project lead is Okaloosa County, and project partners include the following:

- Eglin Air Force Base
- City of Niceville
- City of Fort Walton Beach
- City of Destin
- Northwest Florida State College

Funding Opportunities

Opportunities for funding include the Community Development Block Grant Program and Florida Housing Finance Corporation Programs.

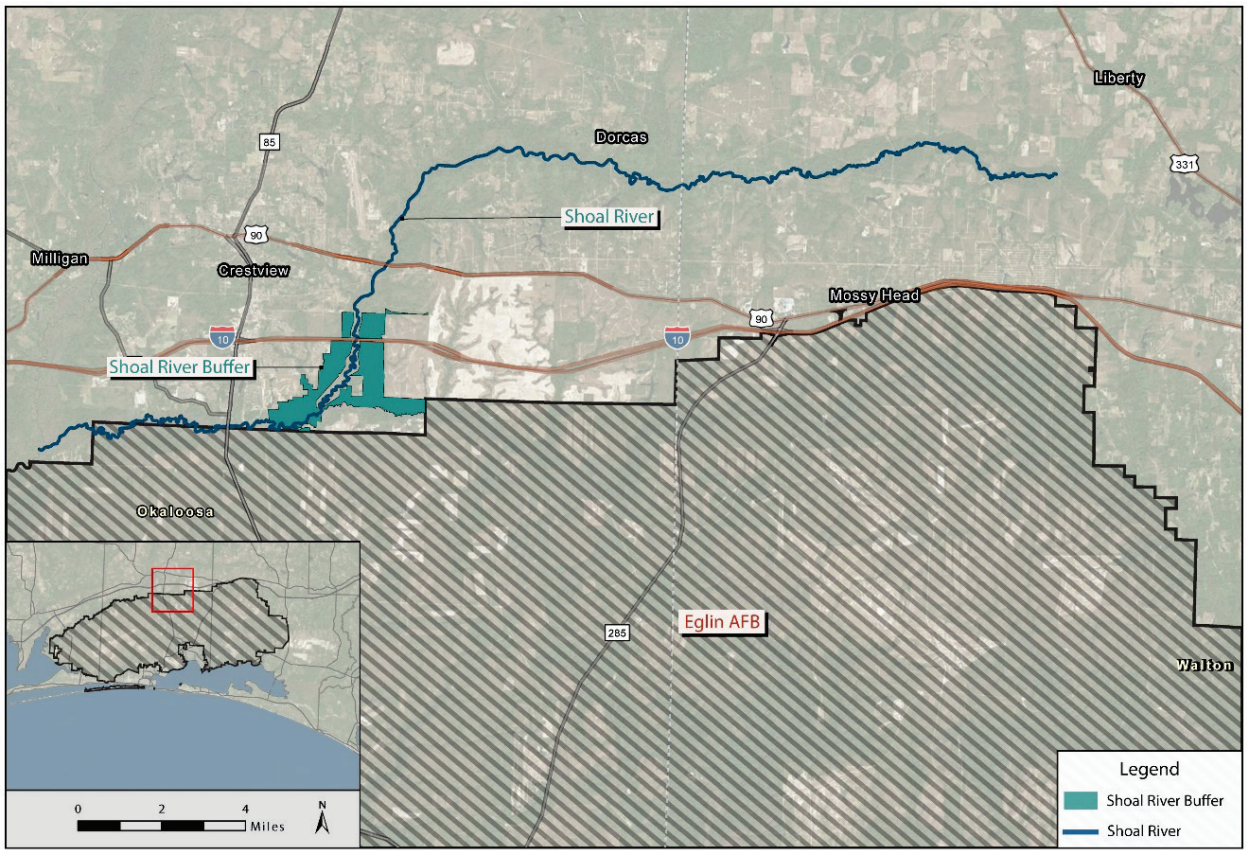
5.7.8 Eglin Air Force Base Strategic Buffering



Project Description

The goals of this strategic buffering project are to promote the sustainability of the military mission, preserve the high biodiversity of the area, enhance low-density outdoor recreation, and maintain valuable agricultural and working lands. This project seeks to create strategic corridors of federally and state-managed lands, conservation organization lands, and private agricultural working lands to buffer the Eglin Test and Training Complex. Development would be limited within these corridors, which promotes biodiversity while also assuring low population densities and land use compatibility over military training routes, critical approaches, and restricted airspace. Parcel location and parcel attributes will determine the best suited funding opportunity. DoD assistance in the establishment of the Nokuse Plantation and the Shoal River Buffer (Figure 5-28) are two examples of how partners have successfully worked together to sustain the Eglin AFB mission.

Figure 5-28. Shoal River Buffer



Actions

1. Leverage the Northwest Florida Sentinel Landscape to enable collaborative efforts and provide greater access to funding assistance from federal, state, and local governments and private sector programs. Designate the desired owner and the management plan.

2. Utilize the Northwest Florida Sentinel Landscape and land trust partners to conduct outreach, education, and technical assistance to landowners on available programs, and funding assistance within target corridors.

Community Resilience Benefits

This project provides social and environmental co-benefits. Preserving natural areas and protecting working lands typically improves water quality within the landscape, protects habitat for imperiled species, and increases area for outdoor recreation.

Project Team

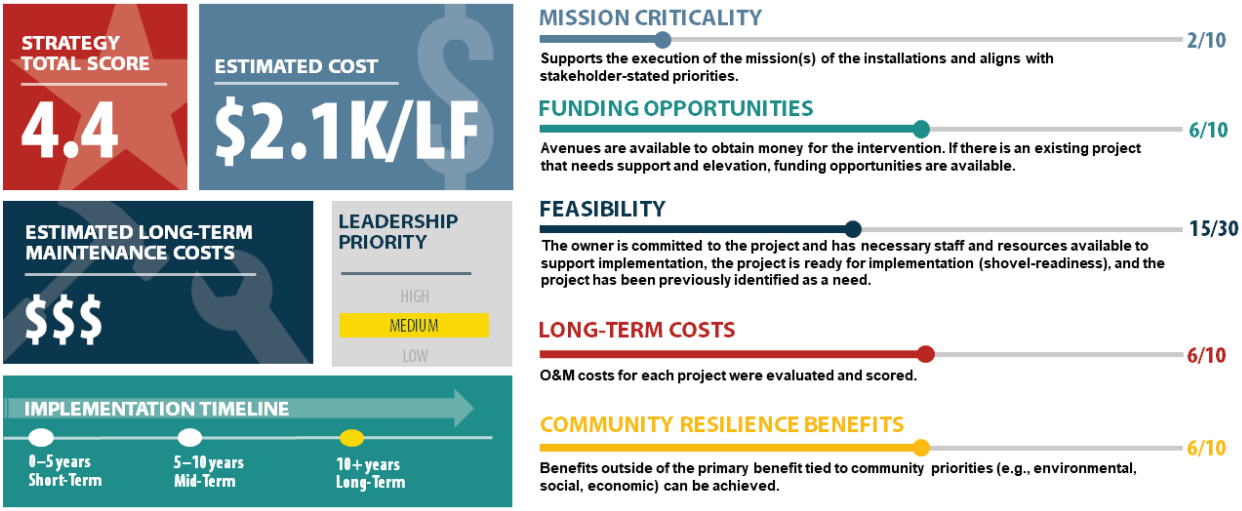
The project lead is Eglin AFB and project partners include:

- Okaloosa County
- Florida Fish and Wildlife Commission
- Conservation Florida
- NWFWMD
- Eglin Air Force Base
- Northwest Florida Sentinel Landscape Partners

Funding Opportunities

Opportunities for funding include REPI, REPI Challenge, National Coastal Resilience Fund, NOAA Transformational Habitat and Coastal Resilience, Readiness and Recreation Initiative, Florida Rural and Family Lands Protection Program, and Florida Forever.

5.7.9 Choctawhatchee Bay Shoreline Protection



Project Description

Shorelines along Eglin AFB and Hurlburt Field, as well as within their surrounding communities, were identified as being vulnerable to SLR, coastal flood events, and coastal erosion (Figure 5-29).

There are currently several living shoreline projects that are occurring throughout the Choctawhatchee Bay. This project describes a holistic shoreline protection plan that encompasses shoreline protection.

Actions

1. **Understand the goals of the projects.** It is important to identify the goals and planning horizons of the projects, with the intent of applying the correct solution for the appropriate challenge. For example, a living shoreline is not suitable for flood risk reduction; however, it is a great option for mitigating erosion.

2. **Create shoreline protection initiatives that match the local environment.** Shoreline protection projects should be sited in appropriate areas as designated by prior studies. For example, oyster reefs should be implemented in accordance with the parameters set in the Choctawhatchee Bay Oyster Habitat Suitability Model.

3. **Develop the Choctaw Beach Living Shoreline project along Highway 20.** This living shoreline project in Walton County consists of nearshore reef and intertidal marsh habitat, using an innovative design approach of irregularly shaped, submerged patch reefs that can be transferable to other shorelines in the area, with the goal of protecting Highway 20 from erosion. Proposed activities include stakeholder engagement, data collection and analysis, and conceptual design (30%). Future funding will be needed for complete design and construction.

4. **Construct living shoreline projects at Sound Park.** This shoreline consists of approximately 250 linear feet of oyster reef breakwaters and saltmarsh habitat, respectively. It will reduce erosion and protect US 98.

Community Resilience Benefits

The benefits of the shoreline protection projects depend on the protection solution. Using a living shoreline can prevent erosion (potentially protecting structures, depending on the site), provide habitat, and potentially even sequester carbon. A seawall can protect an area from flooding and damaging wave action.

Project Team

The project lead is Choctawhatchee Bay Estuary Program, and project partners include the following:

- Okaloosa County
- Santa Rosa County
- Walton County
- Choctawhatchee Basin Alliance
- Eglin AFB
- Hurlburt Field
- Private landowners

Figure 5-29. Choctawhatchee Bay Shoreline Protection

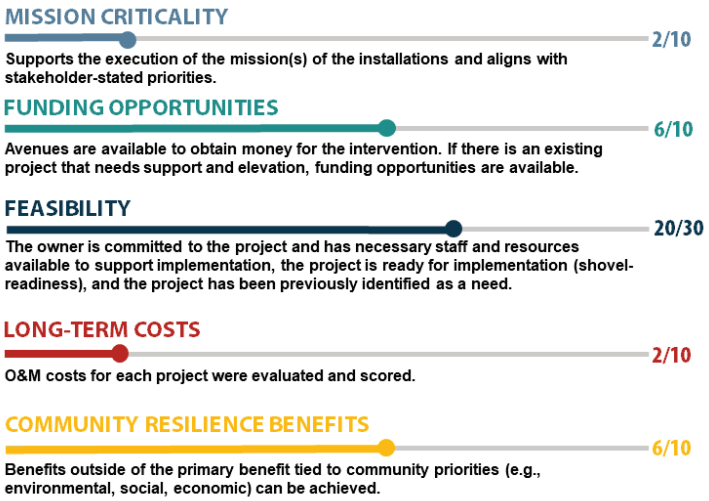


Funding Opportunities

Opportunities for funding include Transformational Habitat Restoration and Coastal Resilience, Section 103 CAP - Beach Erosion and Hurricane and Storm Damage Reduction, and National Coastal Resilience Fund.

5.7.10 Highway 20 Capacity Enhancement





Project Description

Highway 20 is a critical east–west transportation corridor that serves as a key link between the Eglin AFB and broader regional networks (Figure 5-30). This project focuses on expanding the capacity of Highway 20 to accommodate increasing traffic demands, enhance access to the base, and support local community growth. The initiative aims to improve safety, reduce congestion, and facilitate smoother travel for military personnel, local residents, and commuters. This resilience strategy aligns with the strategic needs of the region and the operational requirements of Eglin AFB. Detailed cost estimates and timelines will be developed during the initial study phases. However, projects of this nature typically require significant investment and several years of planning and construction to complete. Although the corridor may eventually need to be widened to four lanes, significant ROW acquisition and range encroachment concerns need to be resolved first.

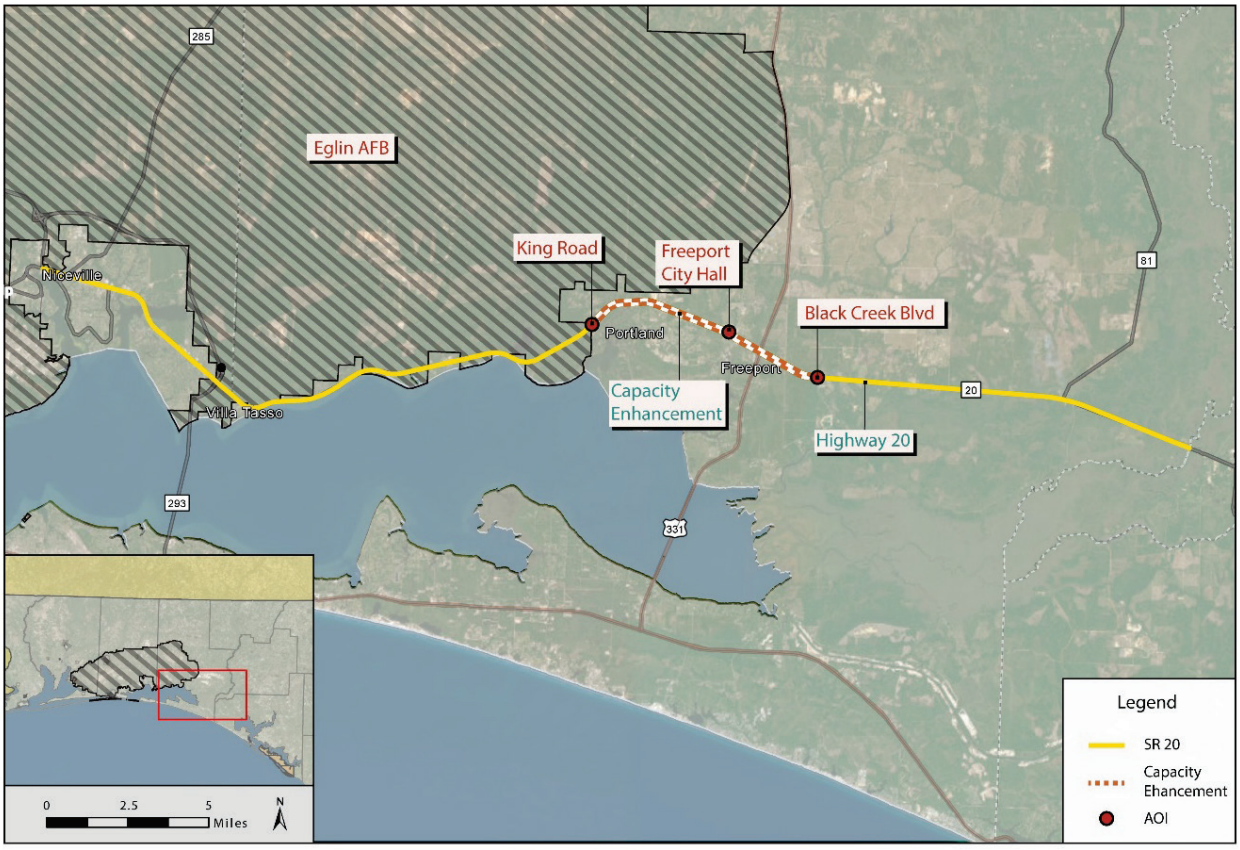
Actions

1. **Enhanced road infrastructure.** The project will upgrade intersections, add turn lanes, install modern traffic signals, and improve pedestrian and bicycle paths to ensure comprehensive road safety and accessibility.

2. **Install erosion and flood protection features where applicable.** Coordinate with the Choctawhatchee Basin Alliance for shoreline protection features for erosion. For areas where the roadway is vulnerable to flooding, gray solutions, such as berms or seawalls, may be the best option for flood risk reduction.

3. **Widen Highway 20.** Eventually, the highway may be widened from two lanes to four lanes, ensuring it can handle future traffic increases and reduce bottlenecks that currently impact travel efficiency and safety.

Figure 5-30. Highway 20 Capacity Enhancements



Community Resilience Benefits

Improving Highway 20 capacity will significantly improve traffic flow and reduce travel times, contributing to economic development by making the area more accessible for businesses and tourism. The improvements will also enhance emergency response capabilities by providing better access to and from Eglin AFB and surrounding areas. Additionally, upgraded infrastructure will improve road safety for all users, including pedestrians and cyclists, thus promoting healthier, more sustainable transportation options.

Project Team

The project lead is FDOT, and project partners include Eglin AFB, local municipalities along Highway 20, and Okaloosa-Walton TPO.

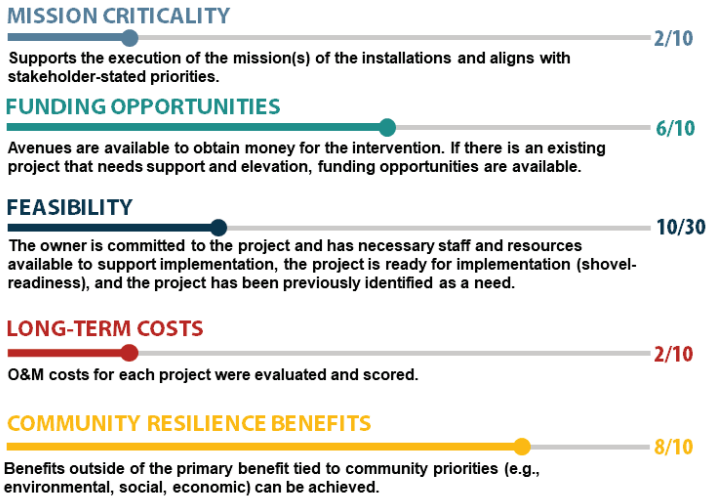
Funding Opportunities

The project will seek funding from federal and state transportation budgets, potentially supplemented by local funding initiatives and grants dedicated to improving military base accessibility and regional infrastructure. Funding opportunities include the following:

- PROTECT (Formula and Competitive Discretionary programs)
- Building Resilient Infrastructure and Communities
- Defense Community Infrastructure Program
- Defense Access Roads
- FDOT Five-Year Work Program

5.7.11 Navarre Beach Bridge Realignment and Reconstruction





Project Description

The Navarre Beach Causeway Bridge Realignment and Reconstruction project is a critical infrastructure initiative aimed at addressing the existing bridge's deficiencies and accommodating future traffic increases resulting from new developments on Navarre Beach. The current bridge does not meet USCG standards for clearance heights, creating navigational hazards in the intercoastal waterway. Additionally, it fails to meet FDOT bridge design standards. With nearly 900 new residential units planned, the expected increase in vehicular traffic necessitates a more robust and strategically aligned bridge.

Figure 5-31 illustrates realignment alternatives.

Actions

1. **Conduct a PD&E.** Santa Rosa County is beginning the process for conducting a PD&E. This study will evaluate the best possible alignments and designs for the new bridge, considering environmental, social, and economic impacts. The PD&E study is projected to cost at least $1.4 million and take between two to four years to complete. The overall bridge replacement is estimated to cost between $80 million and $120 million, with construction potentially commencing a decade from the study's completion.

2. **Incorporate additional mobility options into the design.** Santa Rosa County currently wants five lanes, consisting of two travel lanes in each direction along with a center lane for emergency travel. It is recommended that additional mobility options, such as bike or bus lanes, be considered in the design. The incorporation of multimodal transportation into the design creates additional funding opportunities.

3. **Incorporate shoreline protection and nesting bird habitat into the design.** A hybrid living shoreline can minimize erosion around the bridge pilings while providing environmental co-benefits, such as protecting nesting bird habitat. Incorporating natural infrastructure also creates additional funding opportunities.

4. **Obtain installation support.** A letter of support from Eglin AFB and Hurlburt Field will help increase funding opportunities.

Figure 5-31. Navarre Beach Bridge Realignment and Construction



Community Resilience Benefits

The new bridge will significantly enhance the safety and functionality of the critical east–west corridor connecting the City of Navarre to the City of Fort Walton Beach. It will improve traffic flow, reduce congestion, and meet current navigational and safety standards, thereby supporting economic growth and regional connectivity. It can also provide environmental co-benefits through the incorporation of nesting bird habitat.

Project Team

The project lead is Santa Rosa County, and project partners include the following:

- Florida Department of Transportation
- USCG
- Local business councils
- Fish and Wildlife Service

Funding Opportunities

Opportunities for funding include the following:

- PROTECT (Formula and Competitive Discretionary programs)
- Building Resilient Infrastructure and Communities
- Defense Community Infrastructure Program
- Bridge Investment Program

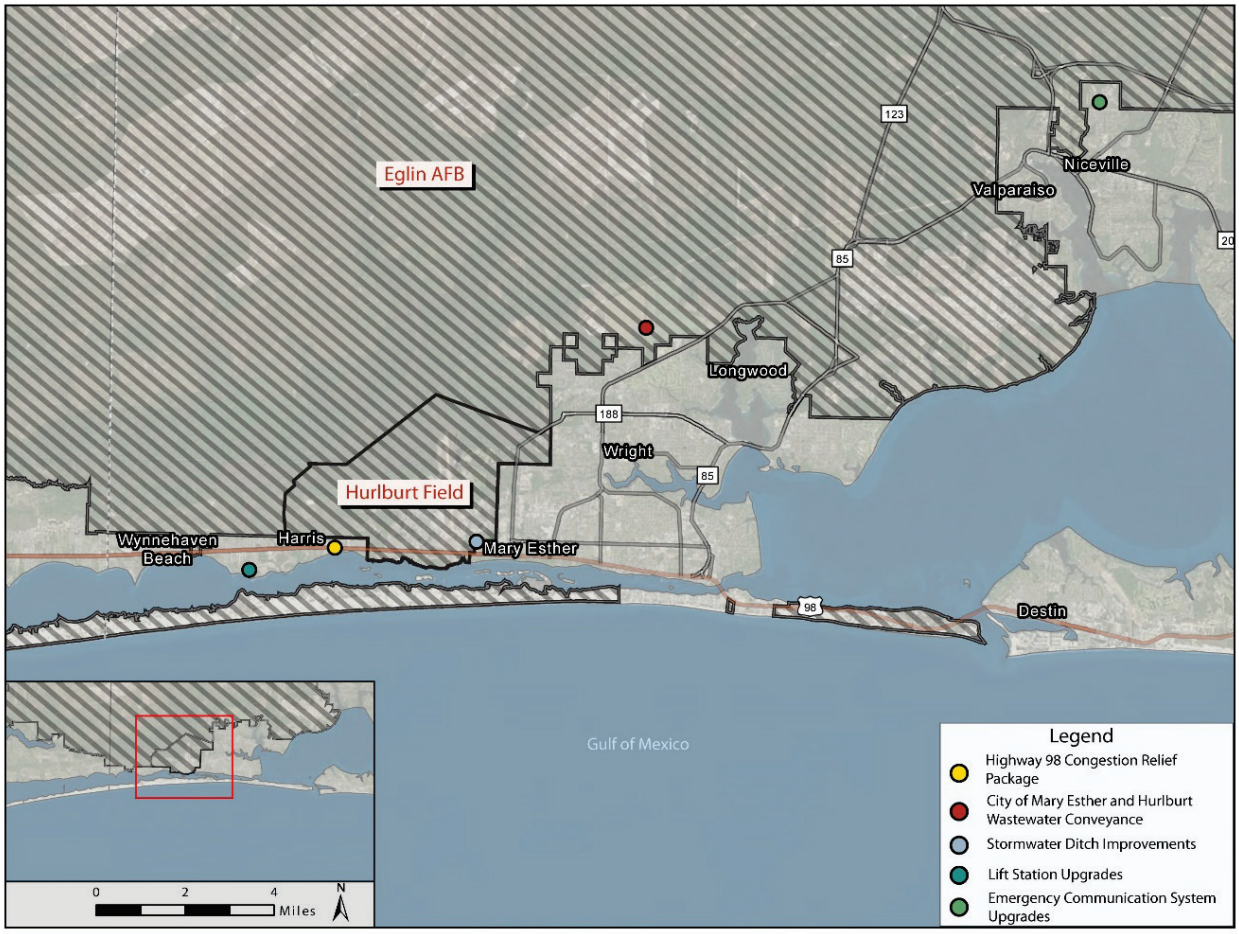
5.8 Hurlburt Field

Eleven resilience projects were identified for Hurlburt Field. Table 5-5 outlines the projects and their respective strategy scores. Figure 5-32 shows the approximate project locations.

Table 5-5. Hurlburt Field Resilience Projects

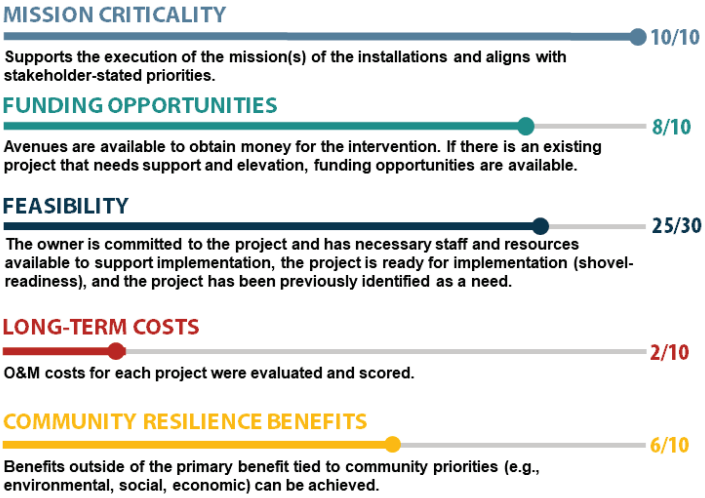
Project Name	Strategy Score
Highway 98 Congestion Relief Package	8.0
City of Mary Esther and Hurlburt Wastewater Conveyance	6.1
Stormwater Ditch and Improvements	4.7
Lift Station Upgrades	2.9
Emergency Communication System Upgrades	2.7

Figure 5-32. Approximate Locations of Hurlburt Field Resilience Projects



5.8.1 Highway 98 Congestion Relief Package





Project Description

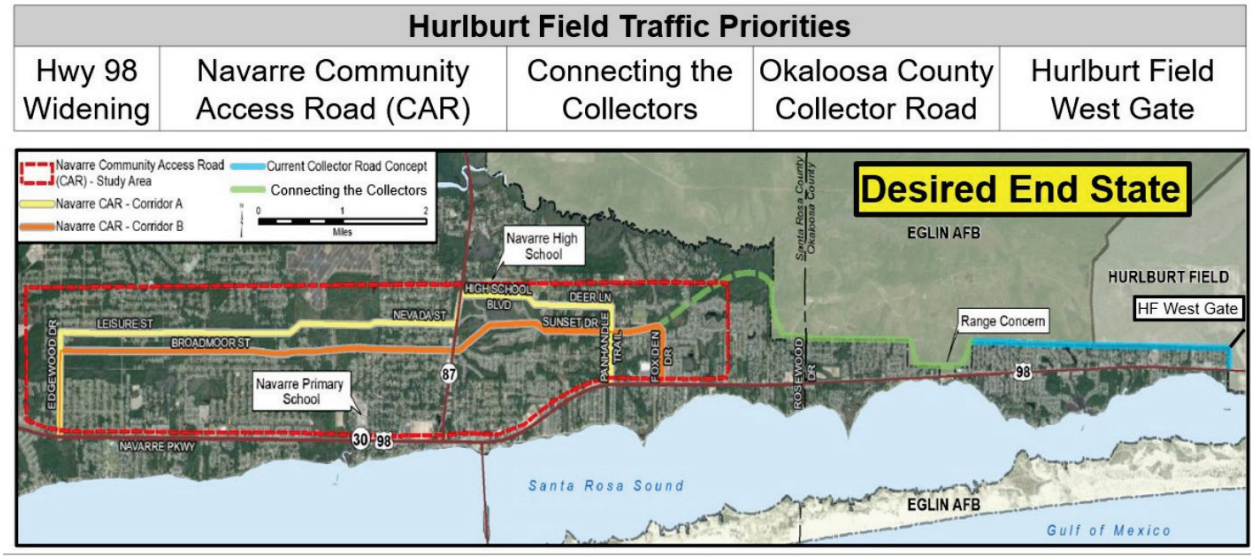
The US Highway 98 Congestion Relief Package is a multi-faceted project designed to alleviate traffic congestion and enhance transportation infrastructure in areas heavily used by both military personnel and civilians. This package includes several critical elements which combined will alleviate traffic flow and safety concerns along US Highway 98. The various elements detailed in the following text include projects at a variety of stages from early concepts to ongoing funded projects (Figure 5-33).

Actions

1. **Widen U.S. Highway 98.** This element involves multiple segments across different stages of planning and development within the Florida-Alabama and Okaloosa-Walton TPOs' areas. The widening efforts aim to expand Highway 98 from its current capacity to handle increased traffic volumes more efficiently. Each segment's specifics, including the extent of widening and the targeted areas, will be detailed based on the inputs from the TPOs' Long Range Transportation Plans and FDOT's ongoing work program:
   - US 98 from Santa Rosa County to east of Cody Lane Interchange (#1 SIS Priority). Design is scheduled for fiscal year 2024 and an estimated $38 million of funding to secure the ROW is needed.
   - US 98 from Beal Parkway to Brooks Bridge (also known as Around the Mound) (#4 SIS Priority). The PD&E is ongoing. This project would require design and ROW funding. The City of Fort Walton Beach committed $100,000 for design in April 2024.
   - East of Cody Lane to Mary Esther Boulevard (#12 SIS Priority). The PD&E is ongoing along with the segment from the Santa Rosa County line to east of Cody Lane. The design is funded for fiscal year 2024.
2. **Design the Navarre Community Access Road.** Designed as an east–west connector north of US 98, this proposed roadway aims to alleviate overflow during peak traffic periods. The access road will link Edgewood Drive on the west to an area east of Highway 87. The final route will be determined as the PD&E is completed. The project is focused on enhancing safety and system connectivity. This road will feature pedestrian and cyclist infrastructure, part of a broader strategy to encourage multimodal transportation within the Navarre area.
3. **Design the Hurlburt Field West Gate Collector Road.** Proposed to run parallel to Highway 98 west of Hurlburt Field, this new roadway aims to significantly relieve congestion for residential areas and improve access to local schools by rerouting school traffic away from Highway 98. The construction of this collector road would likely coincide with the creation of a new Hurlburt west gate. The ongoing PD&E for this collector road funded by Okaloosa County also includes a conceptual utility corridor that could support the utility relocations required by the planned widening of Highway 98.

4. **Develop a conceptual design for the connector road.** This conceptual element aims to link the Navarre Community Access Road and the new collector road, creating a complete route that allows traffic to circumvent US 98 entirely for local east–west travel. However, its development faces significant challenges because of potential environmental impacts, including wetland, endangered species considerations, and strategic concerns given its encroachment into Eglin AFB's operations on Site A-21.

Figure 5-33. Highway 98 Congestion Relief Package



Community Resilience Benefits

The comprehensive approach of the US Highway 98 Congestion Relief Package is expected to significantly enhance traffic flow, reduce travel times, and improve safety along one of Florida's most critical transportation corridors. By addressing both immediate and long-term traffic demands, the project supports regional economic development, military operations, and the quality of life for local residents.

Project Team

The project lead is FDOT, in collaboration with local county governments, military installations, and transportation planning organizations. Project partners include the following:

- Hurlburt Field
- Eglin AFB
- Okaloosa County
- Santa Rosa County
- Florida-Alabama TPO
- Okaloosa-Walton TPO
- Local municipalities
- Community stakeholders

Funding Opportunities

Opportunities for funding include the following:

- PROTECT (Formula and Competitive Discretionary programs)
- FDOT Five-Year Work Program
- Nationally Significant Multimodal Freight & Highway Projects (INFRA)
- Defense Community Infrastructure Program

5.8.2 City of Mary Esther and Hurlburt Wastewater Conveyance

STRATEGY TOTAL SCORE
6.1

ESTIMATED COST
N/A

ESTIMATED LONG-TERM MAINTENANCE COSTS
$$$$

LEADERSHIP PRIORITY
HIGH
MEDIUM
LOW

IMPLEMENTATION TIMELINE
0–5 years Short-Term
5–10 years Mid-Term
10+ years Long-Term

MISSION CRITICALITY 8/10
Supports the execution of the mission(s) of the installations and aligns with stakeholder-stated priorities.

FUNDING OPPORTUNITIES 6/10
Avenues are available to obtain money for the intervention. If there is an existing project that needs support and elevation, funding opportunities are available.

FEASIBILITY 15/30
The owner is committed to the project and has necessary staff and resources available to support implementation, the project is ready for implementation (shovel-readiness), and the project has been previously identified as a need.

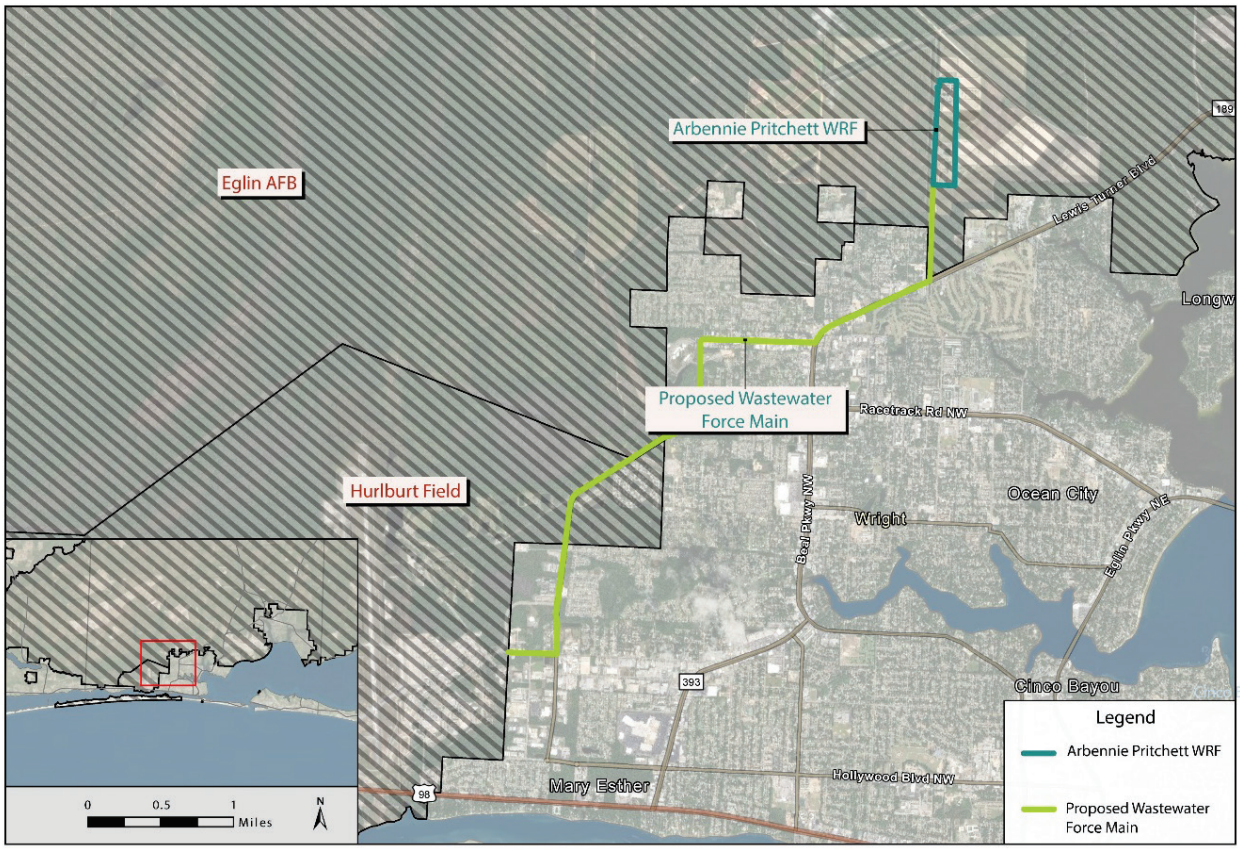
LONG-TERM COSTS 4/10
O&M costs for each project were evaluated and scored.

COMMUNITY RESILIENCE BENEFITS 4/10
Benefits outside of the primary benefit tied to community priorities (e.g., environmental, social, economic) can be achieved.

Project Description

While Hurlburt's mission-supportive wastewater system was found to have low risk to mission, the installation is interested in diverting flows from and eventually shutting down its aging wastewater system. This would be done by connecting a force main to the fence line and conveying the installation's flows to the Arbennie Pritchett WRF (Figure 5-34). This need has been identified in a prior study and Hurlburt Field has a letter of support for this effort.

Figure 5-34. Wastewater Force Main Conceptual Alignment



Actions

1. **Feasibility/Alternatives Analysis.** Determine feasibility of diverting effluent from Hurlburt Field and City of Mary Esther WWTP to Arbennie Pritchett WRF along with alternatives and cost-benefit analysis.

2. **Design the Force Main.** This process would include conceptual and detailed design of the wastewater line.

Community Resilience Benefits

This project benefits wastewater conveyance in the City of Mary Esther and can support the community's future growth. This project could also remove the aging City of Mary Esther WWTP offline and pump septage to be treated at the Arbennie Pritchett WRF.

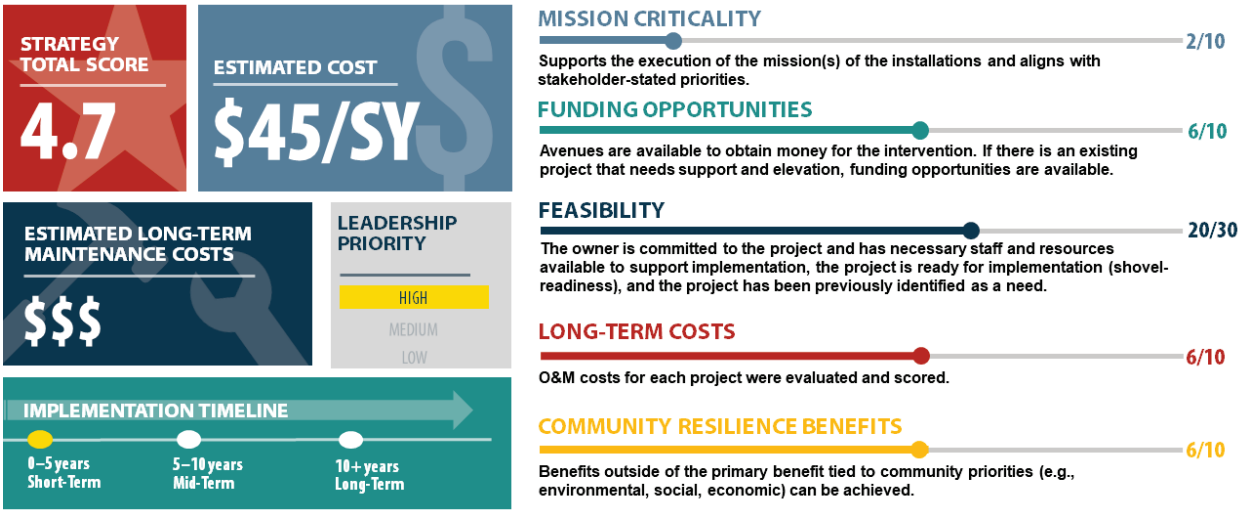
Project Team

The project lead is the City of Mary Esther, and project partners include Hurlburt Field and Okaloosa County.

Funding Opportunities

Opportunities for funding include Clean Water and Drinking Water SRF, OLDCC Installation Resilience Program, and Defense Community Infrastructure Program.

5.8.3 Stormwater Ditch and Improvements



Project Description

Near the south side of Hurlburt Field, there is a stormwater ditch that serves both the City of Mary Esther and Hurlburt Field. Historically, stormwater conveyance in this area has been an issue for the neighborhood. The City has been making improvements to stormwater conveyance in the neighborhood and recently contracted for design of Ray's Pond, which lies to the southeast of the ditch on the corner of North Street and Pryor Street. There is an existing, underutilized ball field just south of the western terminus of the stormwater ditch. One solution for improving the stormwater management system in the area is to create an additional stormwater park on this parcel. This would reduce flood risk in the community and improve stormwater quality in the area.

Figure 5-35 shows the location of stormwater improvements at Hurlburt.

Figure 5-35. Hurlburt Field Stormwater Improvements



Actions

1. **Upgrade the drainage ditch.** This project is currently in the design phase and requires funding for construction.
2. **Convert the existing baseball field into a community stormwater park.** The local park site presents an opportunity for a regional stormwater management pond. This pond could accommodate and attenuate large flows while also providing environmental and social co-benefits.

Community Resilience Benefits

Conducting stormwater ditch improvements will create physical and environmental improvements that will benefit surrounding communities and the environment. Physical improvements include community flood risk reduction. Environmental improvements include improved runoff water quality.

Project Team

The project lead is the City of Mary Esther, and project partners include Hurlburt Field and NWFWMD.

Funding Opportunities

Opportunities for funding include the Defense Community Infrastructure Program, the Sewer Overflow and Stormwater Reuse Municipal Grants Program, and Building Resilient Infrastructure and Communities.

5.8.4 Lift Station Upgrades

STRATEGY TOTAL SCORE
2.9

ESTIMATED COST
$290K/EA

ESTIMATED LONG-TERM MAINTENANCE COSTS
$$$

LEADERSHIP PRIORITY
HIGH
MEDIUM
LOW

IMPLEMENTATION TIMELINE
0–5 years Short-Term
5–10 years Mid-Term
10+ years Long-Term

MISSION CRITICALITY 2/10
Supports the execution of the mission(s) of the installations and aligns with stakeholder-stated priorities.

FUNDING OPPORTUNITIES 2/10
Avenues are available to obtain money for the intervention. If there is an existing project that needs support and elevation, funding opportunities are available.

FEASIBILITY 15/30
The owner is committed to the project and has necessary staff and resources available to support implementation, the project is ready for implementation (shovel-readiness), and the project has been previously identified as a need.

LONG-TERM COSTS 6/10
O&M costs for each project were evaluated and scored.

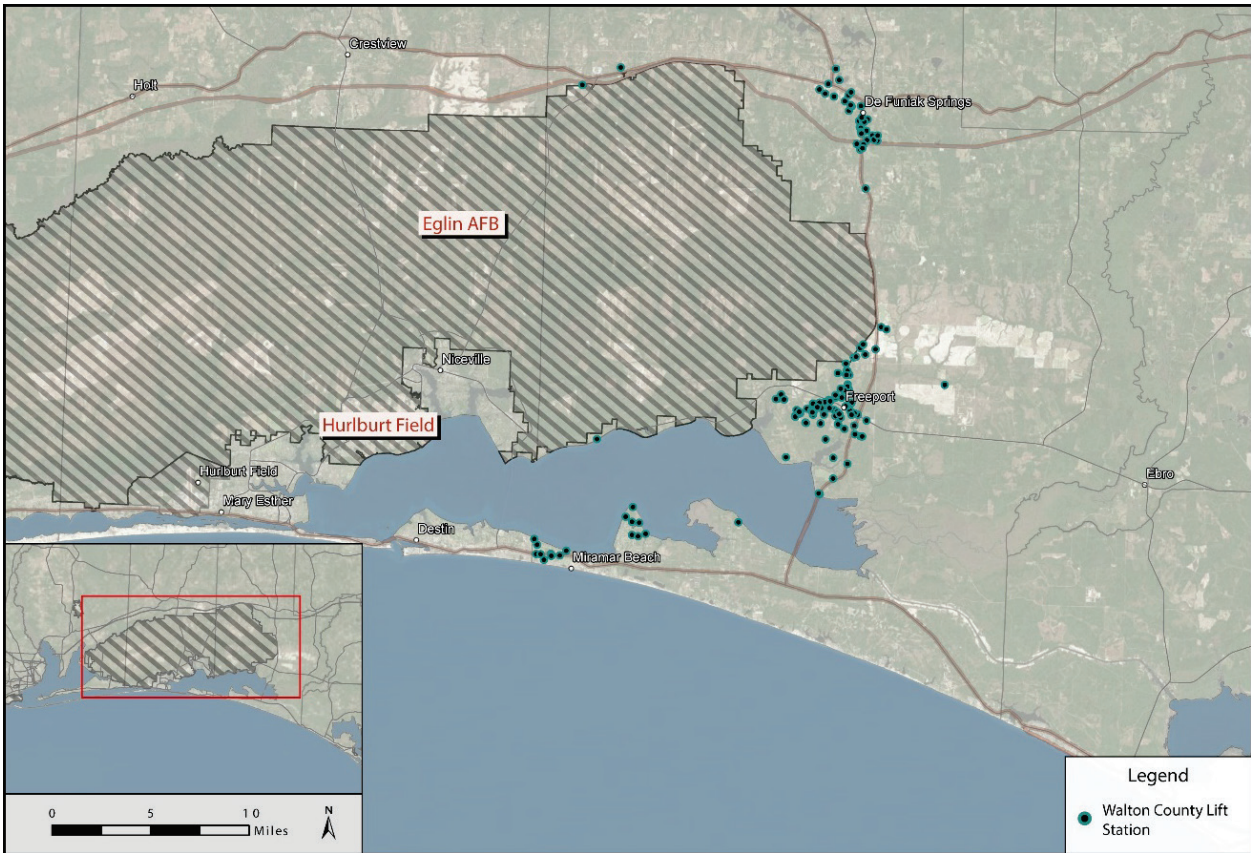
COMMUNITY RESILIENCE BENEFITS 6/10
Benefits outside of the primary benefit tied to community priorities (e.g., environmental, social, economic) can be achieved.

Project Description

There are several wastewater utility providers in the communities surrounding Eglin AFB and Hurlburt Field that own and maintain dozens of lift stations (Figure 5-36). Many lift stations in coastal communities are at risk of coastal flooding. Lift stations are critical infrastructure within the sewer transmission system that convey sewer to wastewater treatment facilities.

Figure 5-36. Lift Station Upgrades

Note that because of an NDA with Okaloosa County Utilities, County lift stations were not included on the map.



The utilities' ability to complete lift station upgrades is budget-dependent and often only a limited number of lift stations can be upgraded in a fiscal year. Typical lift station upgrades should include elevating the electrical control panels above the current 100-year floodplain elevation. Wet wells can often be modified so that the wet well is extended above the 100-year floodplain elevation. New lift stations being constructed should consider the floodplain elevations and be hardened as necessary.

The utilities should implement engineering standards and design requirements for lift station hardening and continue to maintain an interest and commitment to lift station hardening. Funding should regularly be sought to upgrade lift stations that are in need of hardening. However, annual budgets are usually the funding source for lift station upgrades, which are expensive and limit the amount of lift station upgrades possible.

Actions

1. **Develop resilient design standards.** Engineering standards and design requirements incorporating resilience for lift station hardening should be implemented across utilities.
2. **Conduct site-specific assessments of vulnerable lift stations.** While vulnerable lift stations are identified in this MIRR, a site level assessment will help identify specific improvements (e.g., dry or wet floodproofing, asset elevation) needed at vulnerable sites.
3. **Document vulnerable facilities in Okaloosa County and Walton County vulnerability assessments.** Utilities should create a funding plan that identifies grant opportunities for necessary lift station upgrades.

Community Resilience Benefits

Conducting lift station upgrades will benefit the community and environment surrounding the installation. Infrastructure will be improved through reducing inflow and infiltration into the sewer system and preventing the loss of equipment/infrastructure to stormwater or storm surge. Community benefits include minimizing sewer service disruptions and reducing the quantity and volume of sanitary sewer overflows.

Project Team

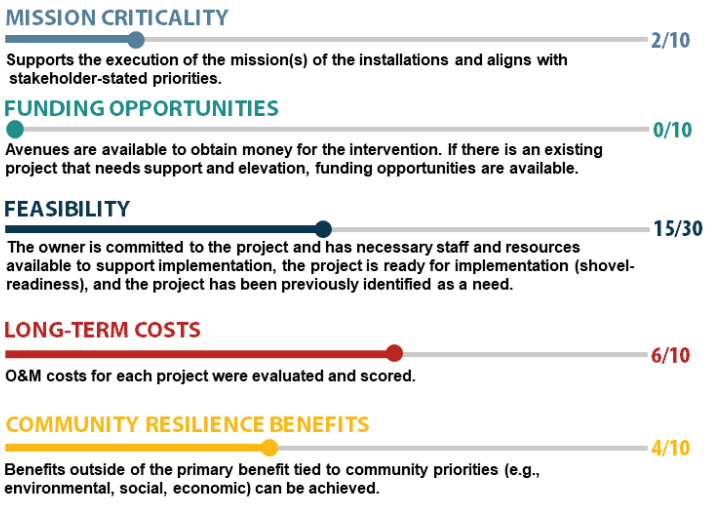
The project lead are the lift station owners, and project partners include municipalities and local utilities.

Funding Opportunities

Funding opportunities include Clean Water and Drinking Water SRF.

5.8.5 Emergency Communication System Upgrades





Project Description

There is a need for enhanced communication between Eglin AFB, Hurlburt Field, and the surrounding municipalities during an emergency.

Eglin AFB and Hurlburt Field currently use Command and Control Incident Management Emergency Response Application (C2IMERA) for emergency communications. C2IMERA is an automated command and control and emergency management system providing enhanced situational awareness through "a single pane of glass" to wing commanders, staff, and their subordinates, whether in garrison or deployed. The system provides an integrated composite picture of wing/unit resources used for planning, force deployment, emergency management, command and control monitoring, and reporting. C2IMERA is government-owned software that supports agile combat employment on all levels. The platform serves as the installation hub connecting people and systems, aggregating operational data in a format that helps commanders and support elements make higher quality decisions at improved speeds.

Despite C2IMERA providing built-in alerts, system-wide notices, automatic backups, and shared work screens, the system does not allow communication with off-base partners. Currently the installations are using unencrypted radio to maintain communication with off-base emergency service personnel.

Actions

1. **Determine the platforms** the community's military and civilian emergency response centers are using and to what degree these systems can be integrated.
2. **Document the current modes of communication** in Emergency Response Plans and/or Standard Operating Procedures.

Community Resilience Benefits

Increased communications between the installations and community emergency managers can improve response times in the event of a disaster. It could also lead to cost-sharing and enhanced memoranda of agreement that benefits the greater community.

Project Team

The project lead is Okaloosa County, and project partners include Eglin AFB and Hurlburt Field.

Funding Opportunities

Opportunities for funding include Defense Community Infrastructure Program and Building Resilient Infrastructure and Communities.

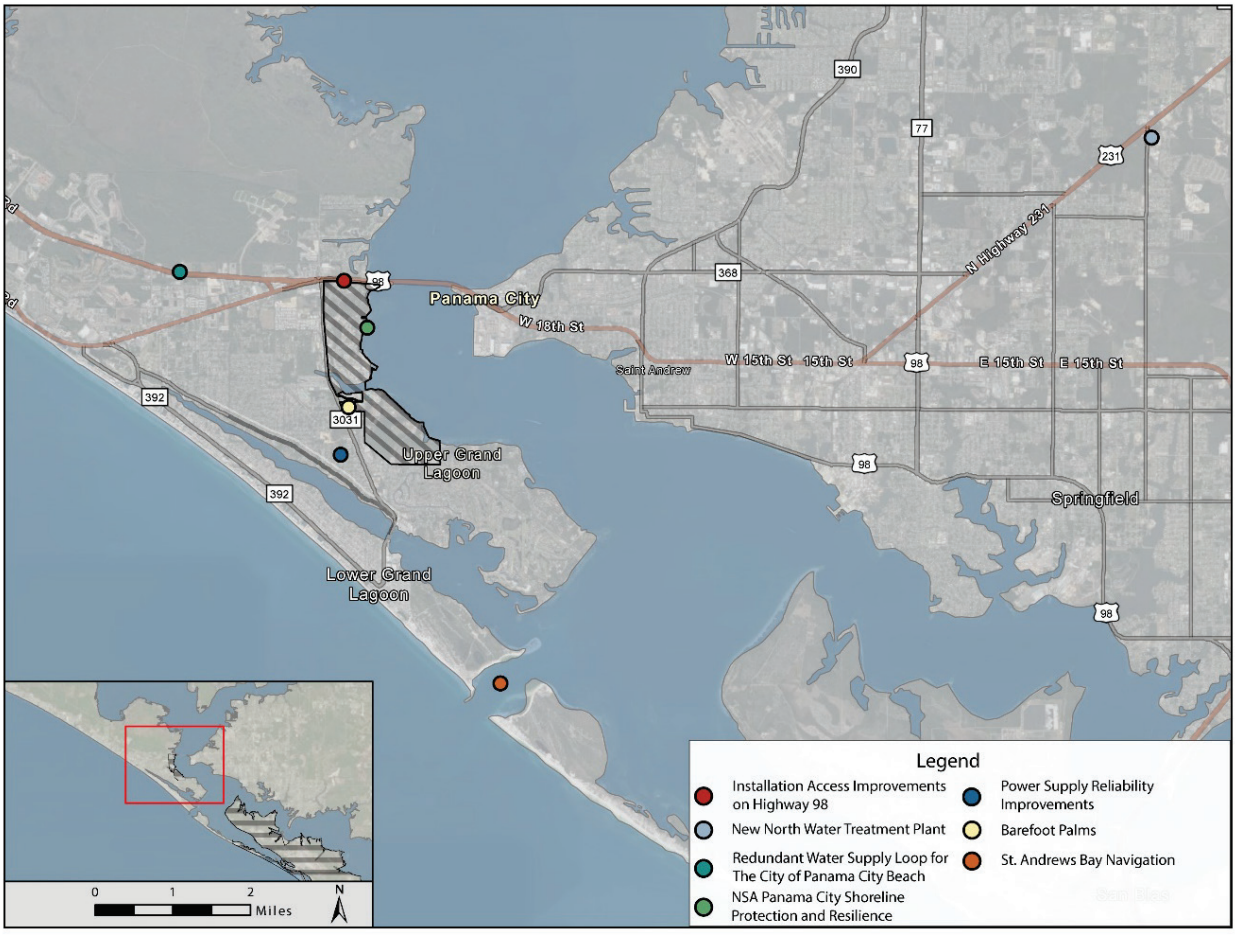
5.9 NSA Panama City

Seven resilience projects were identified for NSA Panama City. Table 5-6 outlines the projects and their respective strategy scores. Figure 5-37 shows the approximate project locations.

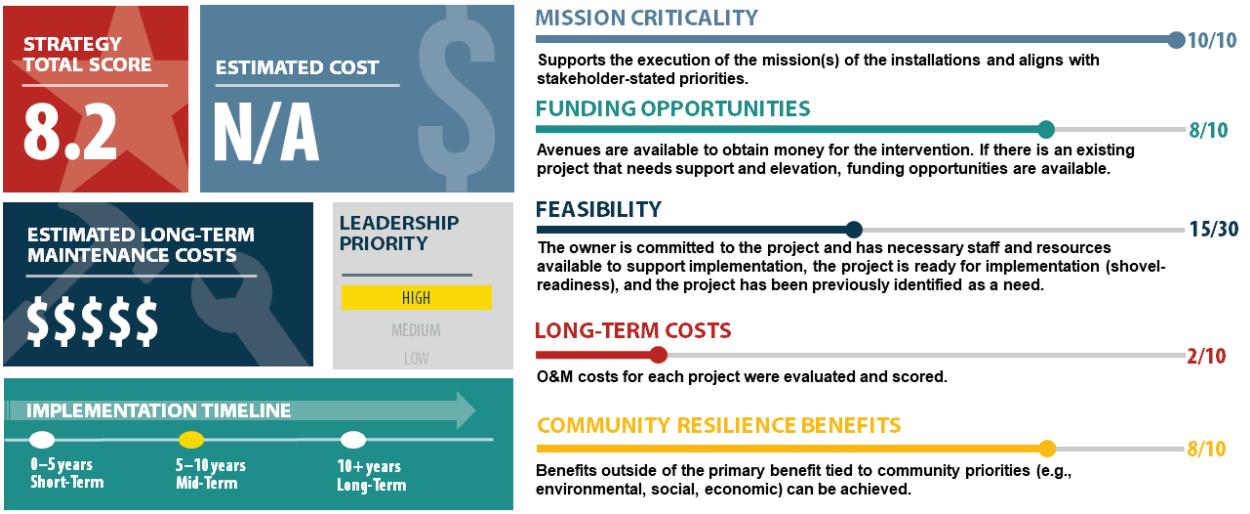
Table 5-6. NSA Panama City Resilience Projects

Project Name	Strategy Score
Installation Access Improvements on Highway 98	8.2
New North Water Treatment Plant	7.5
Redundant Water Supply Loop for the City of Panama City Beach	7.3
NSA Panama City Shoreline Protection and Resilience	5.5
Power Supply Reliability Improvements	5.3
Barefoot Palms	4.9
St. Andrew Bay Navigation	2.5

Figure 5-37. Approximate Locations of NSA Panama City Resilience Projects



5.9.1 Installation Access Improvements on Highway 98



Project Description

US 98, also known in this area as the Panama City Beach Parkway, is a crucial transportation corridor that facilitates significant civilian and military traffic between various regions and installations, including NSA Panama City (Figure 5-38). This road is currently undergoing improvements. It is important that these plans consider NSA Panama City's plans to reopen its north gate. This reopening will require coordination with FDOT and the Navy to integrate access enhancements into the existing roadway design to ensure efficient and secure operations.

The improvement plan for US 98 involves widening the road from Richard Jackson Boulevard to Hathaway Bridge into six lanes, enhancing drainage systems to manage stormwater effectively, and constructing new intersections to facilitate access to the north gate of NSA Panama City. Upgrades will also include modernizing traffic signals and signage to improve traffic management and safety.

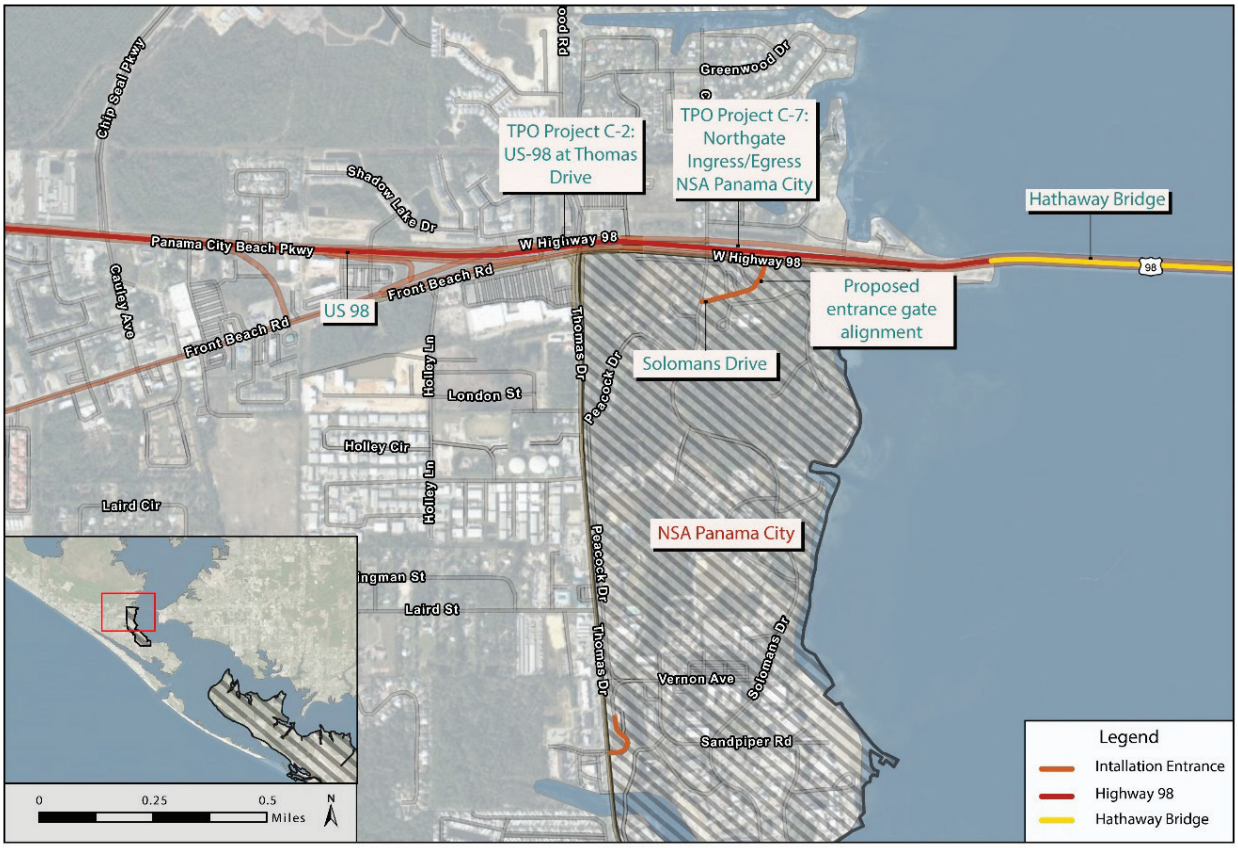
Actions

The US 98 improvements are detailed in the Bay County TPO 2045 LRTP as a funded project, specifically listed under the "Widen to 6 Lanes" category from Richard Jackson Boulevard to Hathaway Bridge (Bay County TPO 2021). There are two projects within the LRTP that fall under this project, C-2 and C-7. Project C-2 improvements include "interchange phases II and III" and project C-7 improvements include opening a new intersection to provide northern access to the installation.

1. **TPO Project C-2: US 98 at Thomas Dr.** This component of the project provides major improvements to the interchange at Thomas Drive and US 98, enhancing connectivity between Panama City and Panama City Beach and improving access to NSA Panama City. PD&E has already been completed for this project. The action items for this project include completing the design, obtaining ROW, and beginning construction. This project is a SIS priority.

2. **TPO Project C-7: Northgate Ingress/Egress NSA Panama City at Solomans Drive and Woodlawn Drive.** This project would provide an additional ingress/egress gate on the northern portion of the base. The proposed location for this gate would be at Solomans Drive. This project will improve access to NSA Panama City and help prevent traffic backups on the main entrance at Thomas Drive. The Northgate Ingress/Egress Project requires a PD&E and design prior to ROW acquisition and construction. This project is a SIS priority.

Figure 5-38. Installation Access Improvements on Highway 98



Community Resilience Benefits

These enhancements will significantly improve access to NSA Panama City, facilitate smoother and more secure ingress and egress, and improve overall traffic management across the region. The project will also bolster emergency response capabilities and civilian evacuation efficiency, especially critical during hurricane season.

Project Team

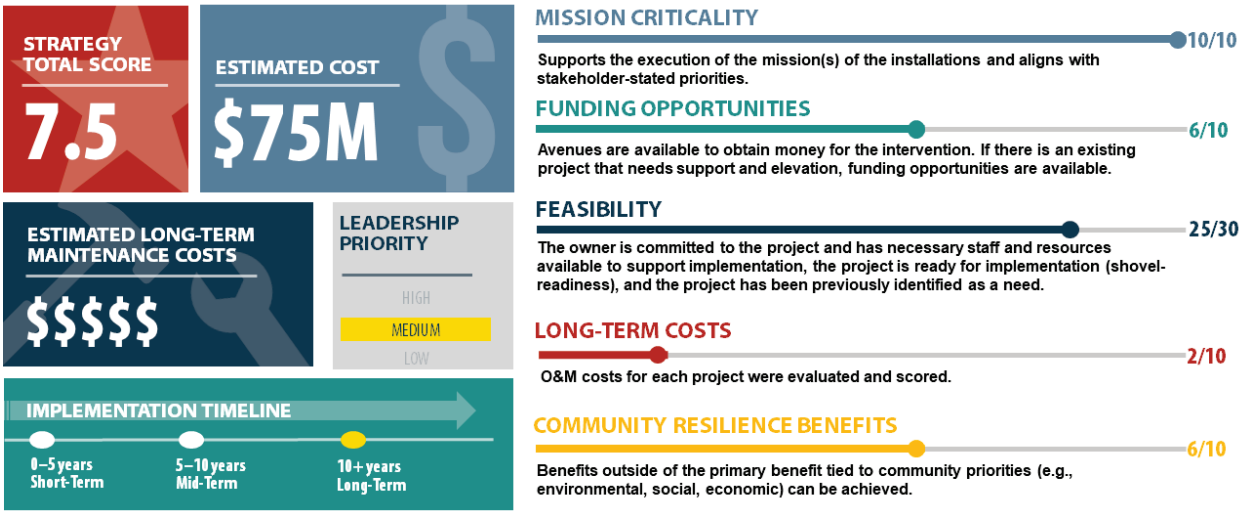
The project lead is FDOT, and project partners include the following:

- NSA Panama City
- Bay County
- ECRC
- Bay County TPO

Funding Opportunities

The project is included in the Bay County TPO 2045 LRTP and is currently funded, reflecting its critical importance to regional infrastructure development. Additional federal and state transportation funds are expected to support the comprehensive enhancements needed. Opportunities for funding include Defense Community Infrastructure Program, Defense Access Roads, and FDOT Five-Year Work Program.

5.9.2 New North Water Treatment Plant



Project Description

NSA Panama City requires potable water for its daily operations, which makes potable water assets mission-critical for the installation.

The installation receives its potable water from the Bay County WTP, a surface water treatment plant located on Transmitter Road that treats raw water from Deer Point Lake. The WTP is permitted for 60 million gallons per day (mgd); however, a stress test conducted on the WTP by an engineering consultant indicated the true treatment capacity is closer to 52 mgd. Additionally, the WTP is the only potable water source for Bay County and the County does not have any other WTPs nor groundwater production wells, making this a single point of failure for all of Bay County's water supply.

A redundant WTP would remove the current one as a single point of failure. Bay County has already begun exploring this topic: preliminary engineering work defines that the new WTP would have a treatment capacity of 25 mgd. In addition, the new facility would require two 5-million-gallon clearwell storage tanks, three 5-mgd high-service pumps, three 8-mgd high-service pumps, and a short length of water main.

Actions

1. **Conduct a feasibility study.** This study will identify potential locations for the new WTP. Bay County has already completed preliminary efforts for exploring the site and the County anticipates the new plant will be sited in Southport. A feasibility study will identify the final location for the new facility.

2. **Design and construct a new WTP.** Based on the results of the feasibility study, Bay County will lead the design and construction of the new WTP. This plant can be designed to support future growth in the northern regions of the County.

Community Resilience Benefits

Constructing the new North WTP will allow for infrastructure improvements that will benefit surrounding communities. This project will allow the WTP to meet peak day system demand in the City of Panama City Beach.

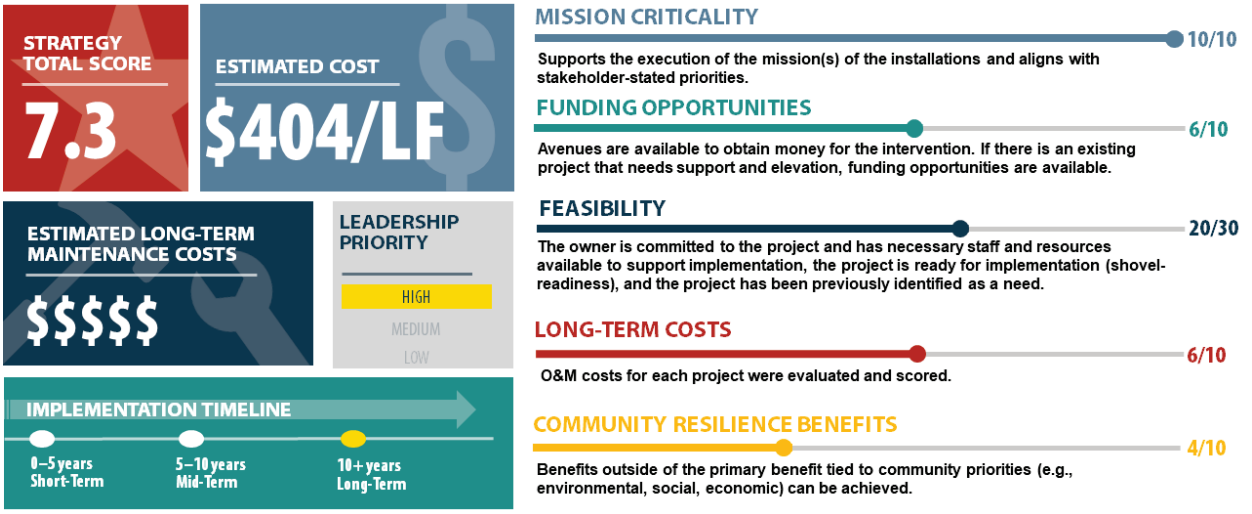
Project Team

The project lead is Bay County, and project partners include the City of Panama City Beach and NWFWMD.

Funding Opportunities

Opportunities for funding include Clean Water and Drinking Water SRF, Defense Community Infrastructure Program, and Building Resilient Infrastructure and Communities.

5.9.3 Redundant Water Supply Loop for the City of Panama City Beach



Project Description

Water supply is mission-critical for NSA Panama City; the installation uses water for testing and training in its facilities. Panama City Beach area drinking water is supplied by Bay County. There are two water supply lines from the water treatment plant on Transmitter Road to Panama City Beach: from the north along SR-388 and from the east along US-98 via Hathaway Bridge. Though there are two water supply lines, a single supply line does not carry enough capacity to distribute water to the entire Panama City Beach water distribution network. For Panama City Beach's water distribution network to remain online with a single water supply line, a large-diameter pipeline interconnect between the two water supply lines is necessary for "looping" the two water supply lines (Figure 5-39).

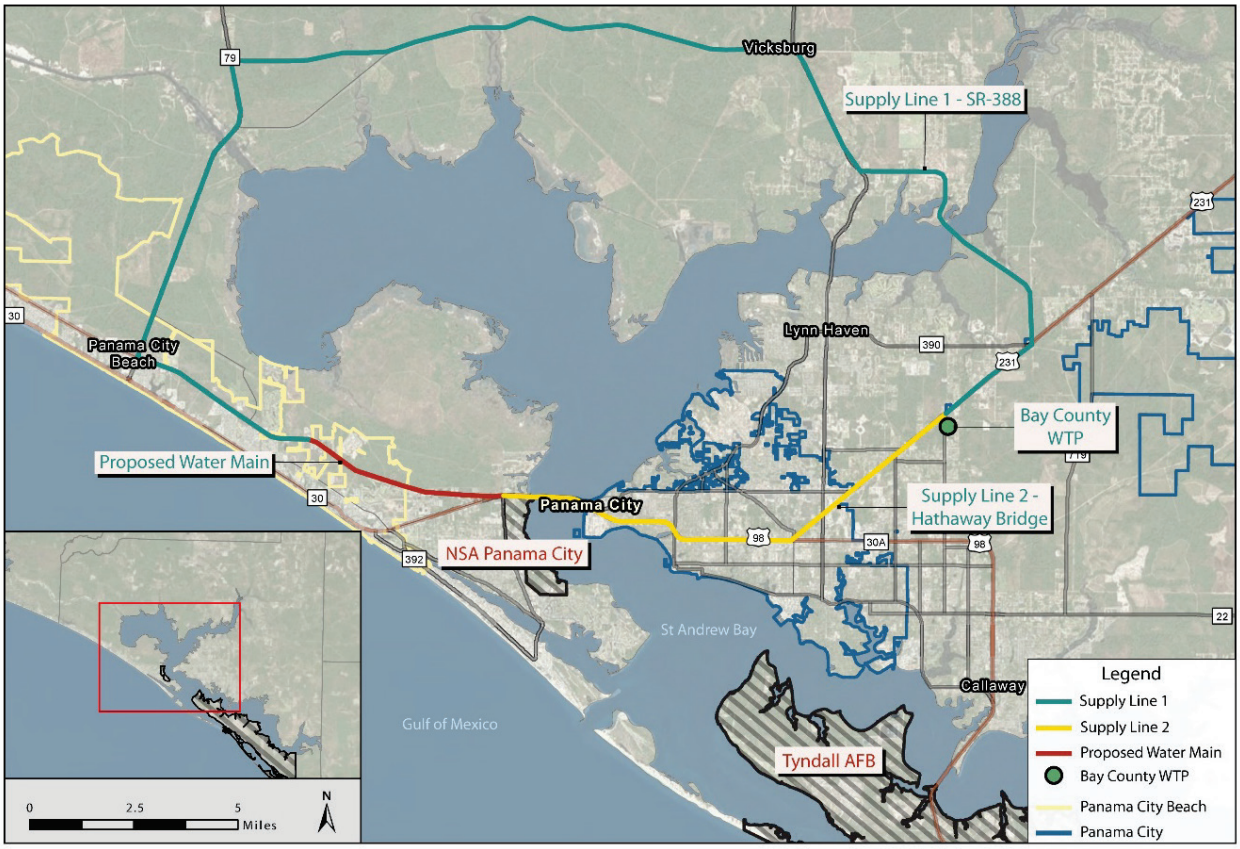
Actions

1. **Design and construct the connecting loop.** Design and build the water main that connects the two water supply lines. This main will be approximately 4.3 miles long and will travel along US-98.

Community Resilience Benefits

The installation of a redundant water supply loop for the City of Panama City Beach will result in infrastructure improvements that will benefit community members. Infrastructure improvements will include improving the water supply service and maintaining a reliable level of service.

Figure 5-39. Redundant Water Supply Loop for the City of Panama City Beach



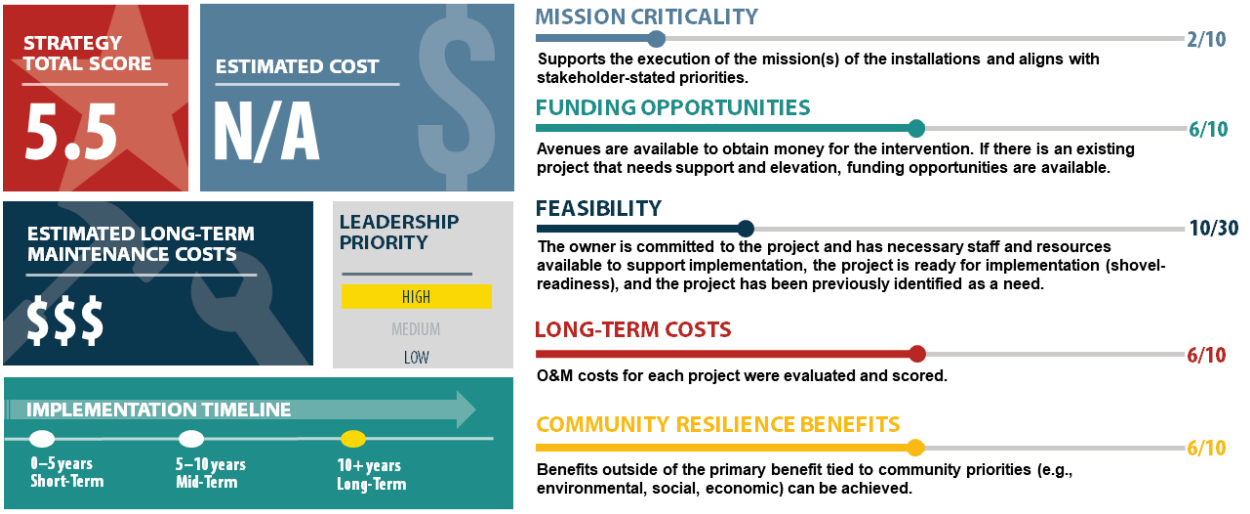
Project Team

The project lead is Bay County, and project partners include the City of Panama City Beach.

Funding Opportunities

Opportunities for funding include Clean Water and Drinking Water SRF, Defense Community Infrastructure Program, and Florida Defense Infrastructure Grant.

5.9.4 NSA Panama City Shoreline Protection and Resilience



Project Description

NSA Panama City is a coastal military installation that relies on its shorelines as a means of defense from wave action and erosion. The installation has approximately 12 miles of shoreline (Figure 5-40). In addition, USCG Panama City, which is co-located with the installation, is a secondary mission-critical asset that supports the installation. Both installations are exposed to flooding.

Flooding and erosion threaten the installation shorelines. Historically, NSA Panama City has not experienced significant storm surge impacts (Hurricane Michael in 2018 caused only minimal damage from surge). However, future storm events may cause more severe damage that could threaten infrastructure and the mission. In addition, SLR threatens to permanently inundate portions of the installation coastline, further reinforcing the need for additional protections.

NSA Panama City is bounded by coastal communities on the north and south and it must work with its neighbors (with whom the installation already has good relationships) to project a united front against shoreline degradation. This project combines multiple separate actions from multiple entities to develop a resilient installation.

Actions

1. **Continue existing efforts to protect installation shorelines.** NSA Panama City has ongoing shoreline protection projects. These efforts should be continued.

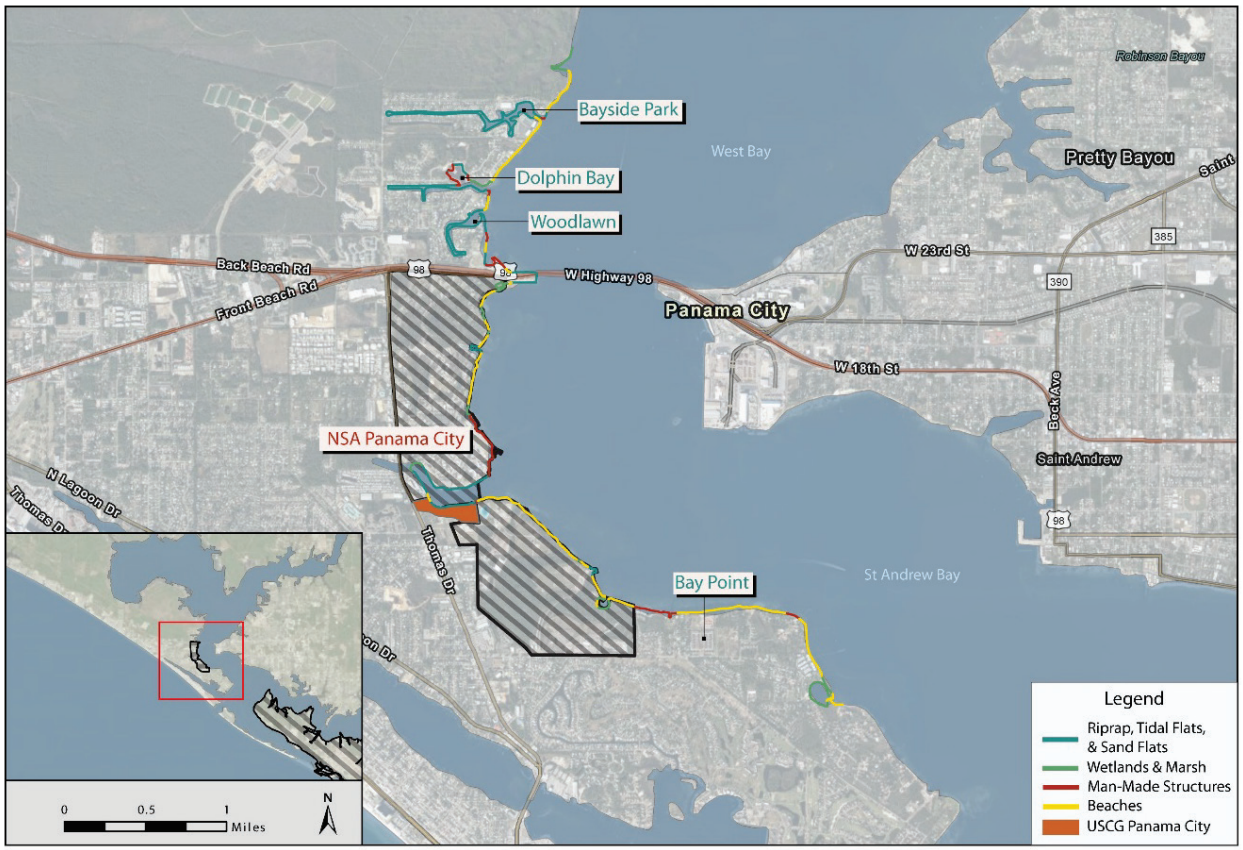
2. **Complete the Living Shoreline Suitability Study.** The St. Andrew and St. Joseph Bays Estuary Program is currently in the process of completing its Living Shoreline Suitability Study. This study will define what the best options and areas for shoreline protection are for the neighboring communities.

3. **Develop a coastal resilience plan for USCG Panama City.** The USCG facility should coordinate its coastal resilience efforts with NSA Panama City. Both entities should use consistent design standards for shoreline protection, whether the solutions are green or gray. The coastal resilience plan should focus on flood risk reduction and erosion reduction.

4. **Facilitate discussions about shoreline protection between NSA Panama City and neighboring communities.** Protecting all coastal property up to the same standard will create stronger regional protection against flooding around the installation. Additional actions including sharing the results of the Living Shoreline Suitability Study to the communities (including Bayside Park, Dolphin Bay, Woodlawn, and Bay Point) and holding discussions with them on shoreline protection and resilience.

5. **Incorporate layered defense systems into the shoreline protection designs.** The best protection for the installation coastlines is a layered defense strategy consisting of both green and gray infrastructure. In-water protections, such as breakwaters or oyster reefs, can attenuate wave action and reduce erosion. On-shore green features, such as vegetated shorelines, can further minimize erosion. Gray infrastructure, such as bulkhead walls, can protect a property against flooding. While the physical shorelines are property of the installation itself and lie outside the scope of the MIRR, in-water protections can be implemented by Bay County. This project requires coordination between all stakeholders, particularly if the projects are funded via differing mechanisms.

Figure 5-40. NSA Panama City Shoreline Protection



Community Resilience Benefits

Conducting projects to improve NSA Panama City shoreline protection and resilience will have social and environmental improvements that will benefit community members and the environment. Social improvements include community property protection, and environmental improvements include habitat creation, erosion reduction, wave attenuation, and the promotion of biodiversity.

Project Team

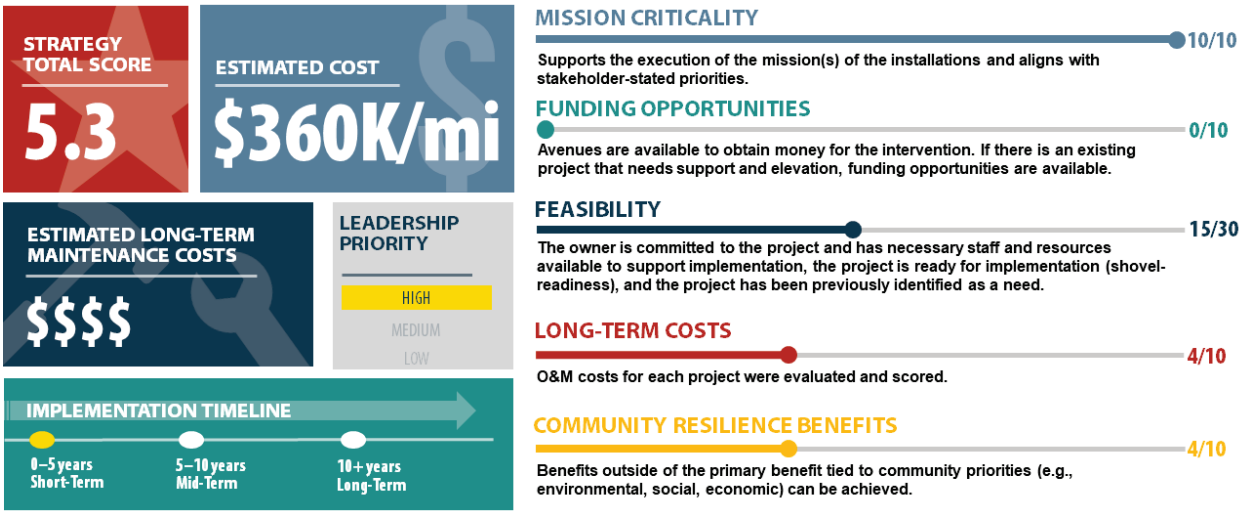
The project lead is St. Andrew and St. Joseph Bays Estuary Program, and project partners include the following:

- Bay County
- U.S. Army Corps of Engineers Engineering With Nature
- NSA Panama City
- USCG

Funding Opportunities

Opportunities for funding include the Army Corps Feasibility Study and Transformational Habitat Restoration and Coastal Resilience.

5.9.5 Power Supply Reliability Improvements



Project Description

NSA Panama City requires electric power to operate its facilities and for training. The energy reliability analysis showed that the installation had a moderate electric vulnerability score. Energy resilience for the installation can be improved by hardening the infrastructure and adding a microgrid.

Actions

1. **Harden distribution lines.** A set of power distribution lines with wood poles that connect the installation to the substation along Pine Drive. Converting the poles from wood to concrete makes the system more resilient against wind hazards, improving power supply reliability.

2. **Evaluate feasibility of a microgrid for the installation.** A microgrid can provide a reliable secondary source of electric power for the installation. The microgrid can potentially be sited at the Barefoot Palms site (depending on the results of the feasibility study).

Community Resilience Benefits

This project will enhance power supply reliability for the surrounding community during storm events.

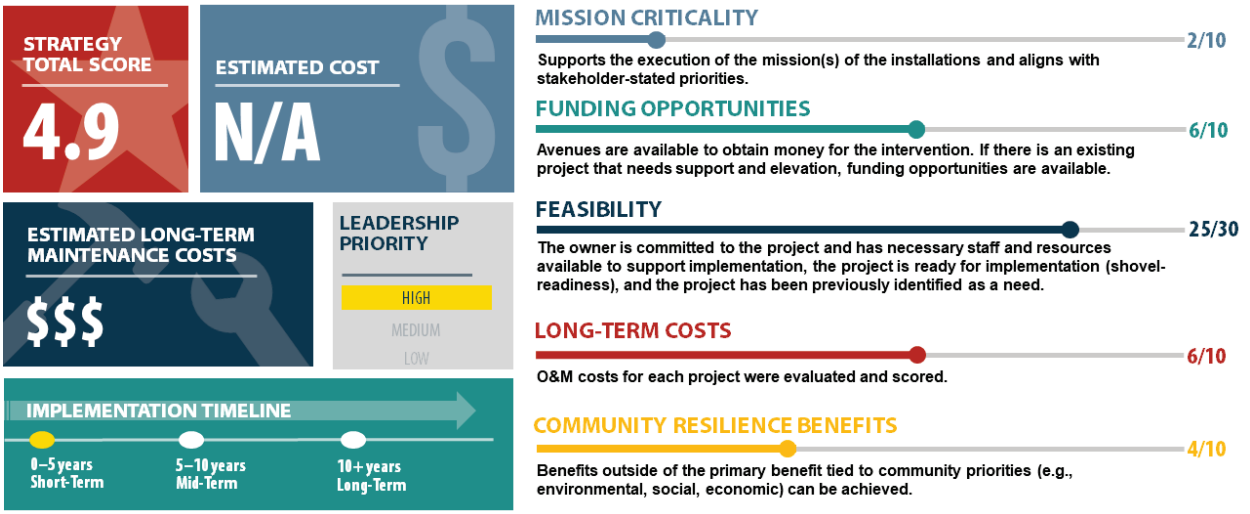
Project Team

The project lead is FPL, and project partners include NSA Panama City.

Funding Opportunities

Opportunities for funding include Defense Community Infrastructure Program, Building Resilient Infrastructure and Communities, and Grid Resilience State Formula Grants.

5.9.6 Barefoot Palms



Project Description

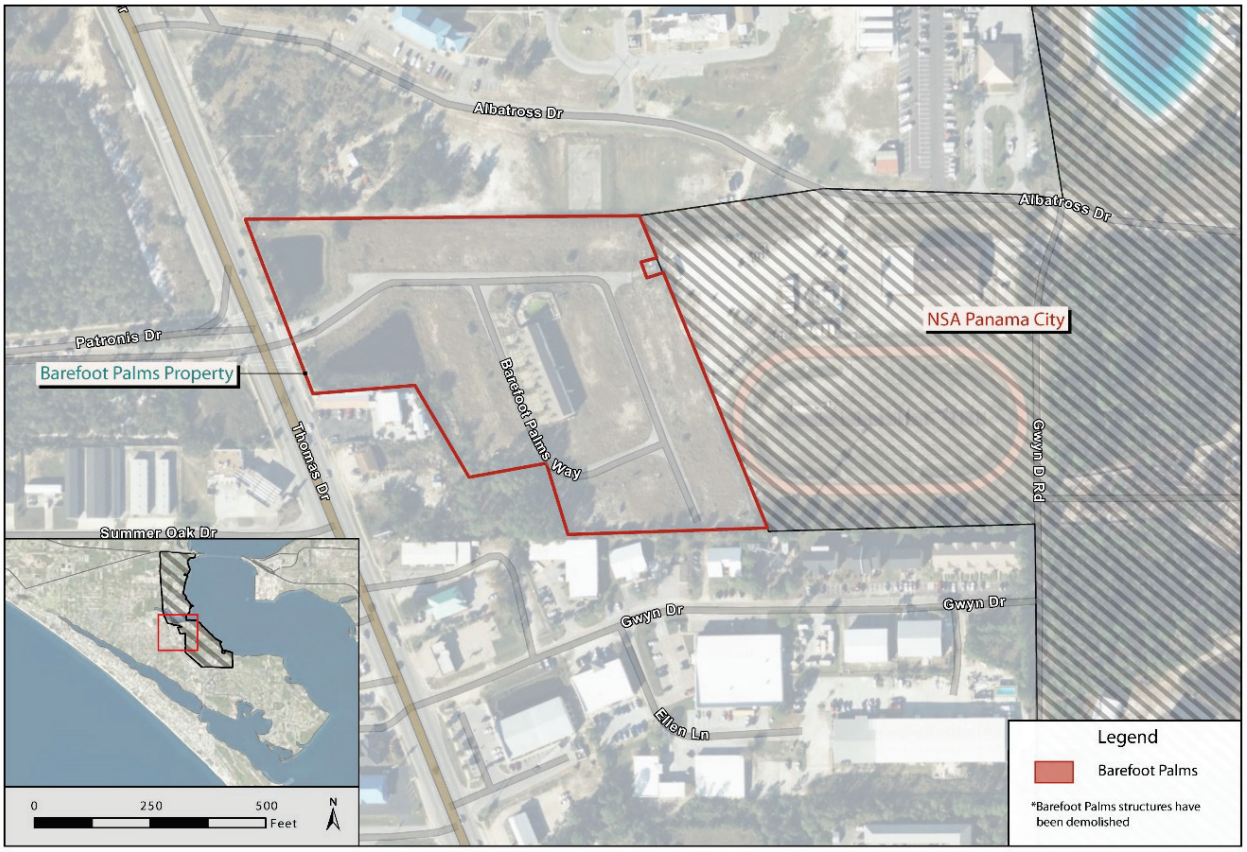
Barefoot Palms is an 8.4-acre parcel on the southwest perimeter of NSA Panama City. In 2010, Bay County purchased the land from a private developer. The state of Florida purchased the land from the County in 2016 to prevent development along the two sides of NSA Panama City. Both Bay County's Joint Land Use Study and NSA Panama City's Encroachment Action Plan identify the subject parcel as an encroachment concern because of Anti-Terrorism and Force Protection issues (Matrix Design Group 2009). However, the Navy cannot actively manage the subject parcel until it has an interest in the subject parcel, such as a lease agreement. Bay County has agreed to be the interim manager until the Navy can accept the property from the state of Florida. This site presents an opportunity for a physical infrastructure project that can support both the installation and the community.

Project Actions

1. **Physically denote the site boundary.** The site needs a fence that extends around the perimeter demarcating the property boundaries. (Figure 5-41).

2. **Conduct a site analysis and feasibility study.** To make the best use of the parcel, the site needs an area plan that evaluates potential uses. The study will provide an understanding of the existing site and what kinds of projects are financially or practically viable. The site analysis will yield a complete understanding of potential uses of the property.

Figure 5-41. Barefoot Palms Site Area



Community Resilience Benefits

The community resilience benefits of the project will depend on the final use of the site. Potential uses with community benefit include a microgrid that back-feeds into the electric grid or housing for NSA Panama City (which indirectly opens up housing in the community for non-military individuals and families).

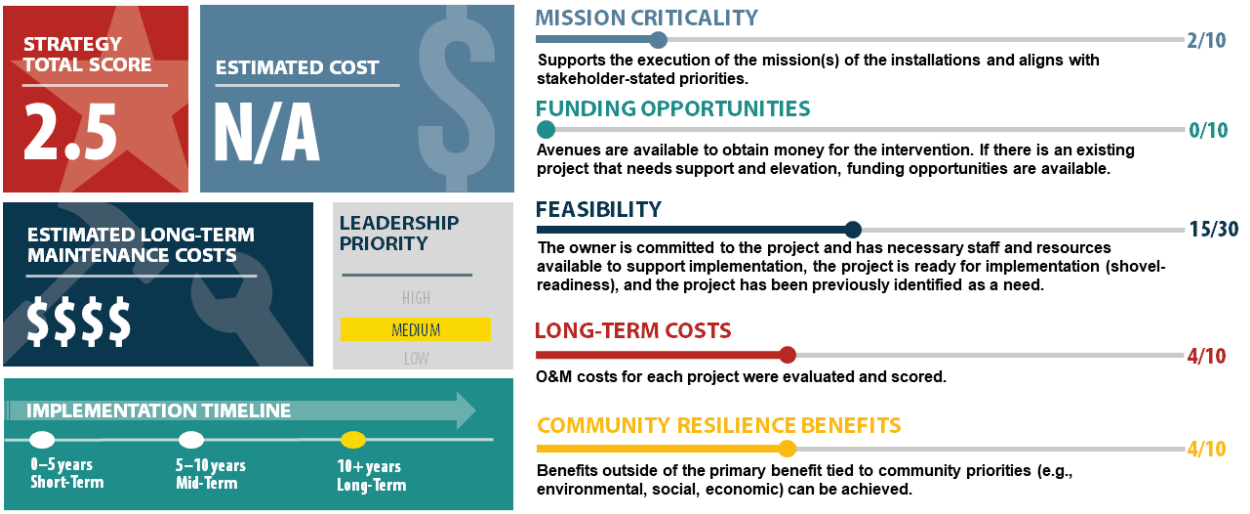
Project Team

The project lead is Bay County, and project partners include NSA Panama City.

Funding Opportunities

Opportunities for funding include the REPI Challenge and Defense Reinvestment Grant.

5.9.7 St. Andrew Bay Navigation



Project Description

St. Andrew Bay is a mission-critical asset for NSA Panama City that is used for both training and access to the Gulf of Mexico. The Bay is also used by the Panama City Port Authority. NSA Panama City, the Panama City Port Authority, and the City of Panama City are already in discussions regarding management of the Bay. The City of Panama City contracts out small-scale dredging projects while the Port Authority is responsible for larger-scale dredging projects and is currently developing a full harbor plan to address issues in the Bay.

Prior improvements to Bay Harbor Channel include deepening the channel to 36 feet to accommodate larger vessels (Figure 5-42).

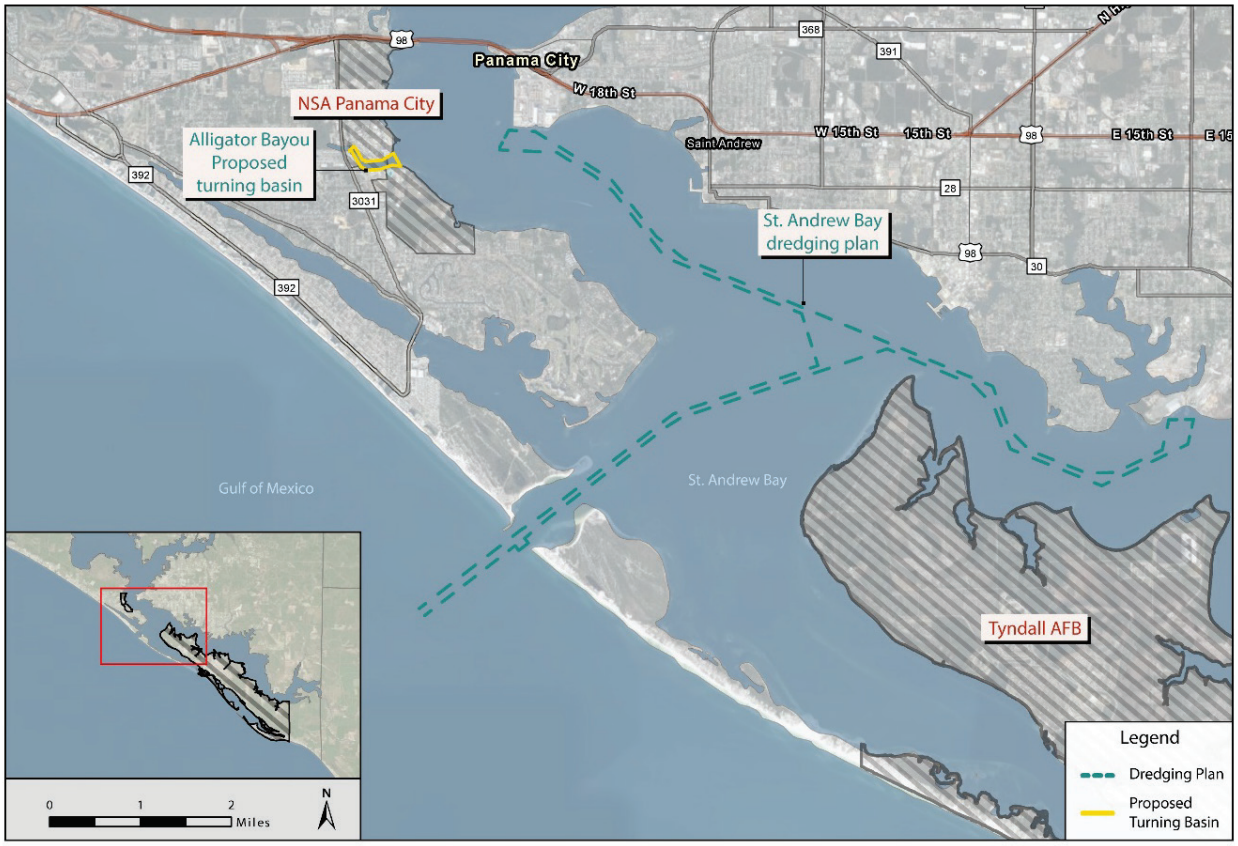
Actions

1. **NSA Panama City to evaluate future needs and continue coordination with the Panama City Port Authority and the City of Panama City.** NSA Panama City should evaluate its future navigation needs in accordance with changes in tenant commands. The installation should coordinate with the Bay County and Port Authority on needed dredging activities to support new missions.

2. **Dredge a turning basin into Alligator Bayou.** Currently, ships that pilot into Alligator Bayou need to reverse pilot into the installation. A turning basin in the bayou will improve the ease of access into the installation.

3. **Incorporate beneficial reuse of dredged material into plans and projects.** Updating the Port's dredge spoil management plan with a dredged material management component that includes beneficial reuse of dredged material. The dredge spoil management plan identifies opportunities for placement of material that is to be dredged from the Bay. There are multiple opportunities for using dredged material as a resource instead of a waste product: beach nourishment, habitat creation and restoration, and site remediation.

Figure 5-42. St. Andrew Bay Navigation



Community Resilience Benefits

Improving navigation within St. Andrew Bay will result in economic and social improvements that will benefit surrounding communities and the environment. Economic benefits will occur resulting from coordination of navigation improvements that can support shipping within the Bay. Environmental benefits can be seen as dredged materials can potentially be used to support living shoreline projects throughout the area.

Project Team

The project lead is Panama City Port Authority, and project partners include Bay County, U.S. Army Corps of Engineers, and NSA Panama City.

Funding Opportunities

Opportunities for funding include Army Corps Feasibility Study and Section 107 CAP - Small Navigation Projects, FDOT Florida Seaport Transportation and Economic Development Program, and U.S. Department of Transportation Maritime Administration Port Infrastructure Development Program.

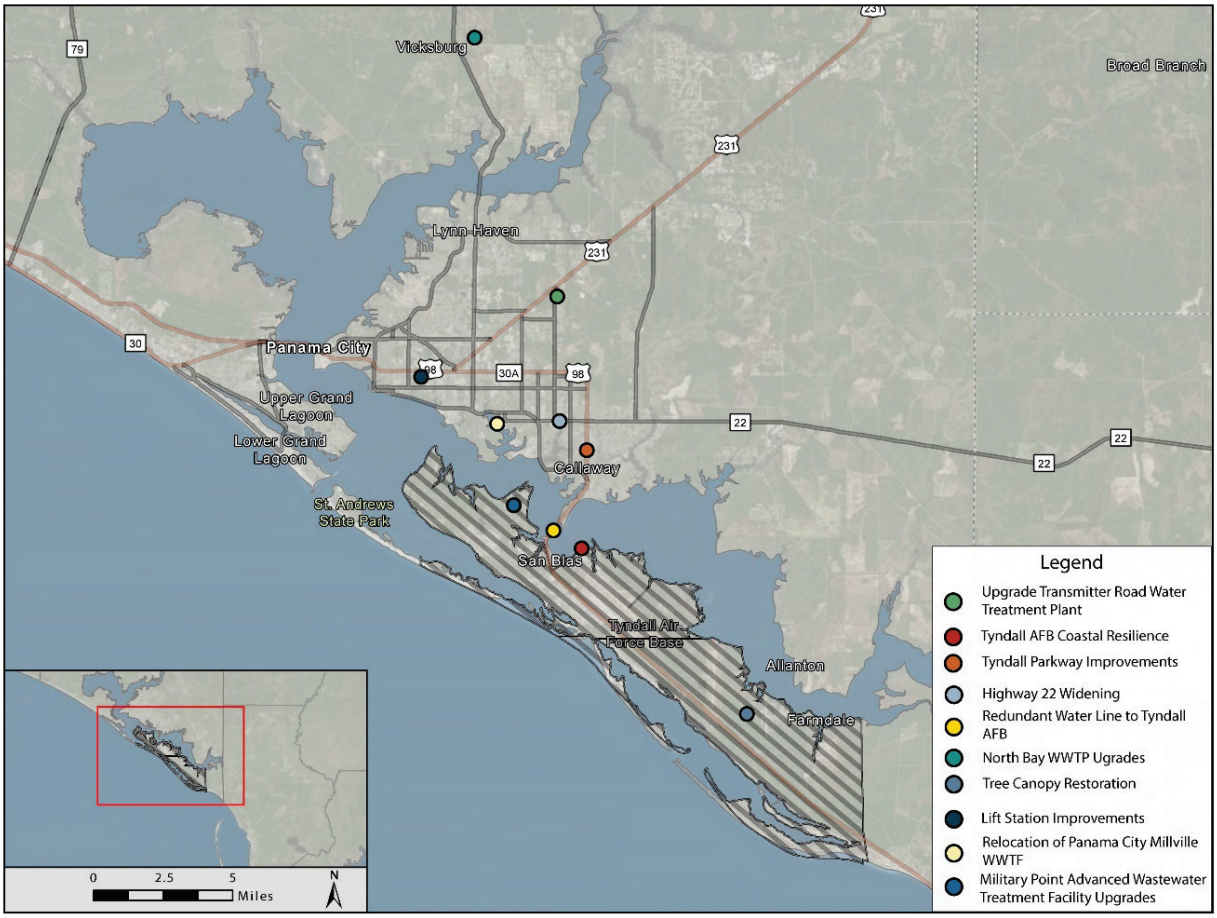
5.10 Tyndall AFB

Ten resilience projects were identified for Tyndall Air Force Base. Table 5-7 outlines the projects and their respective strategy scores. Figure 5-43 shows the approximate project locations.

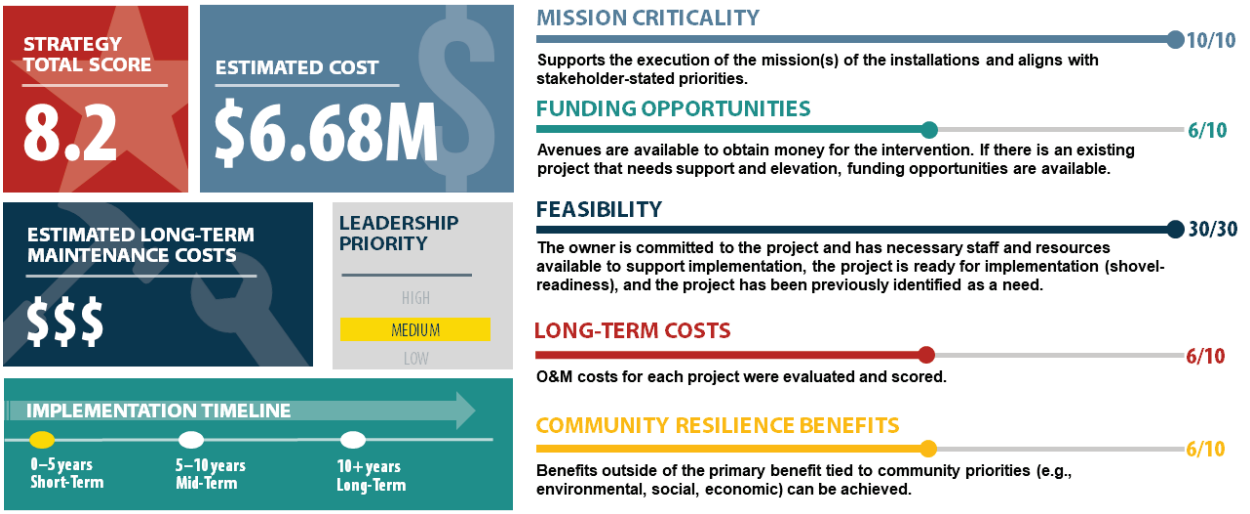
Table 5-7. Tyndall AFB Resilience Projects

Project Name	Strategy Score
Upgrade Transmitter Road Water Treatment Plant	8.2
Tyndall AFB Coastal Resilience	6.3
Tyndall Parkway Improvements	6.3
SR-22 Widening	4.9
Redundant Water Line to Tyndall AFB	4.4
North Bay WWTP Upgrades	4.1
Tree Canopy Restoration	4.1
Lift Station Improvements	3.7
Relocation of Panama City Millville Wastewater Treatment Facility (WWTF)	3.6
Military Point Advanced Wastewater Treatment (AWT) Facility Upgrades	3.0

Figure 5-43. Approximate Locations of Tyndall AFB Resilience Projects



5.10.1 Upgrade Transmitter Road Water Treatment Plant



Project Description

The existing WTP located on Transmitter Road is owned and maintained by Bay County (Figure 5-44). This treatment plant is the only source of drinking water for Bay County and is categorized as critical infrastructure. Because of the age of the plant, the existing onsite treatment plant electrical system and distribution is unreliable. This results in facility electrical brownouts that cause critical water treatment to go offline unexpectedly.

Upgrading the onsite power systems would increase the reliability of the WTP by improving the redistribution of power within the water treatment plant site. County staff are committed to completing the necessary electrical upgrades to the facility. Bay County staff will need funding assistance for the design and construction of the electrical upgrades to the facility.

Actions

1. **Add additional filtration capabilities.** The WTP requires additional filtration capabilities, needing three new filters with a capacity of 6 mgd. Design of this system is currently in progress and funding is the next step.
2. **Improve power supply and distribution within the facility.** Power supply and distribution upgrades within the WTP are necessary. Upgrades would improve electrical supply and reliability and decrease the risk for electrical brownouts.

Community Resilience Benefits

Upgrading the Transmitter Road WTP will provide benefits to the communities surrounding the installation. Infrastructure will be improved as project implementation will decrease the risk of the water treatment plant going offline because of power issues.

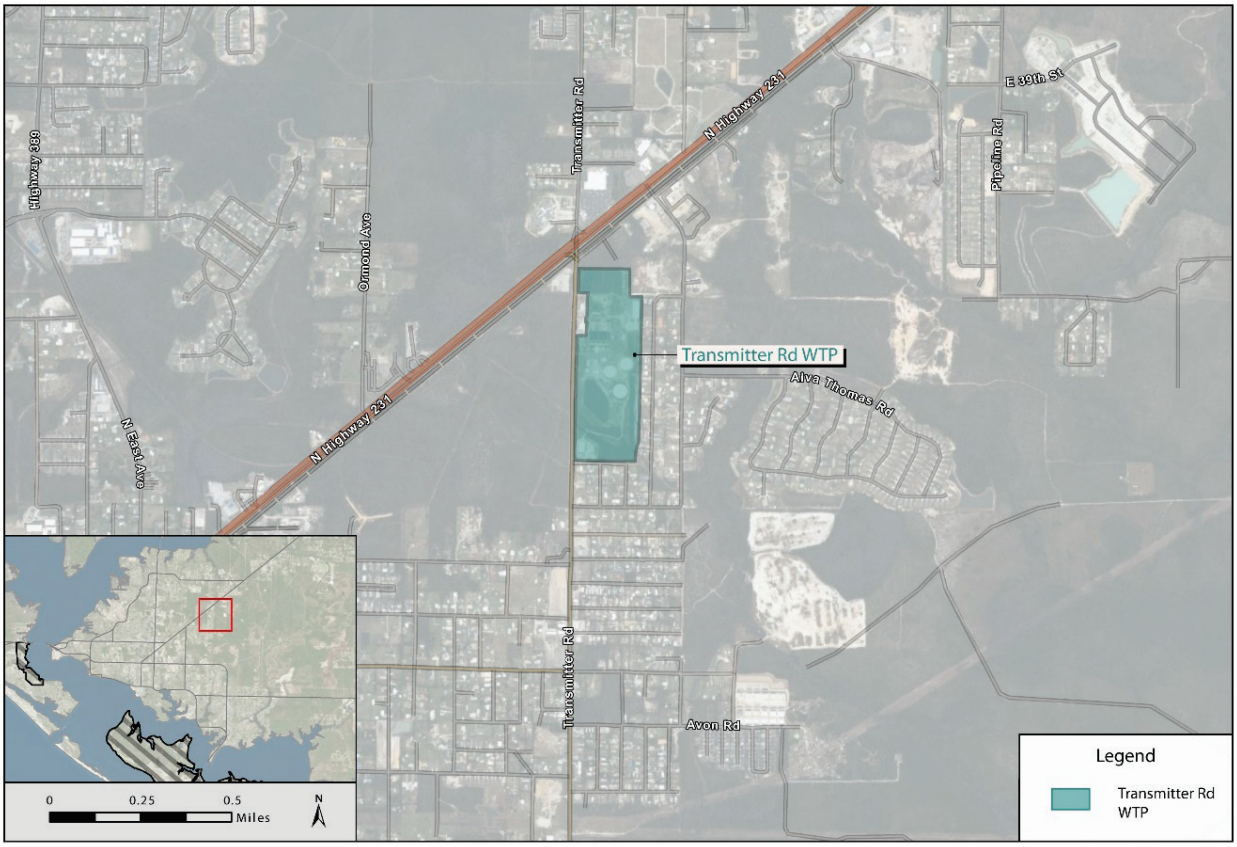
Project Team

The project lead is Bay County, and project partners include FPL.

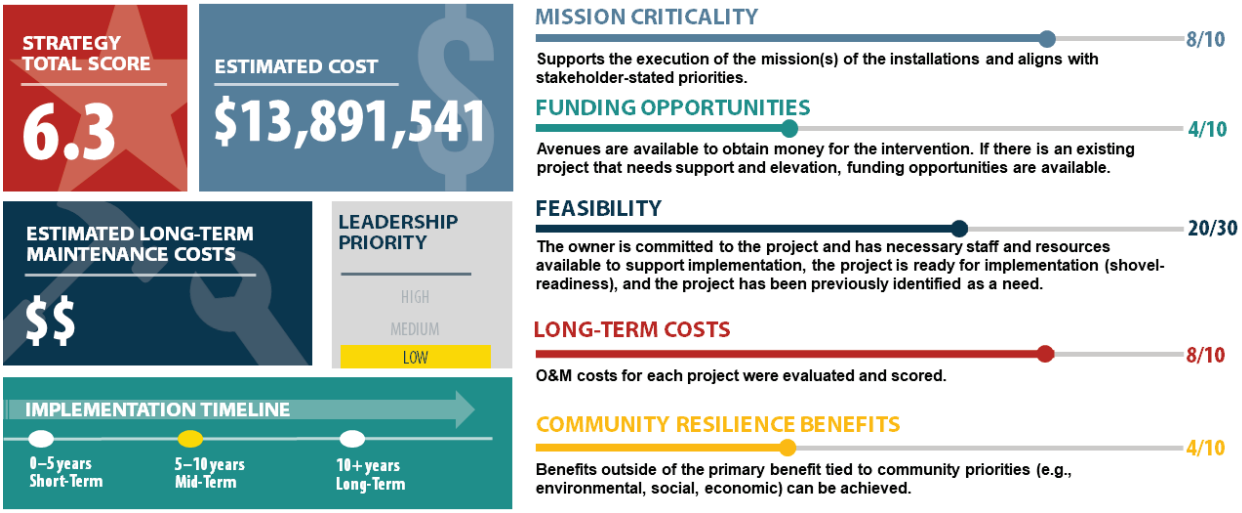
Funding Opportunities

Opportunities for funding include Clean Water and Drinking Water SRF.

Figure 5-44. Upgrade Transmitter Road Water Treatment Plant



5.10.2 Tyndall AFB Coastal Resilience



Project Description

Shorelines surrounding Tyndall AFB are classified as primary mission-critical assets. Shorelines at and around the installation are critical for protecting the installation from wave action during storm events. Additionally, healthy shorelines act as a habitat for marine life and are crucial for biodiversity preservation.

As a result of Hurricane Michael, shorelines surrounding the installation experienced significant erosion. More than 10 feet of beach and dune erosion occurred around the installation during this storm event. Excessive erosion of shorelines threatens installation assets. This project proposes the expansion of the existing dredging and pilot program, as well as the living shoreline and sea grass projects in the Tyndall AFB Coastal Resilience Implementation Plan.

Actions

Tyndall AFB developed a Coastal Resilience Implementation Plan with the intention of repairing and improving its shorelines. Two coastal lines of defense were identified in the CRIP: the barrier islands and the relic dune line on the installation proper. Various pilot projects have been proposed to enhance these defenses including physical reinforcement of dunes, promoting dune growth via sand trapping, strategic sediment placement, and implementing nature-based solutions in the Back Bay Area (Jacobs 2022). Proposed pilot projects are outlined in Figure 5-45. Currently, this project is fully designed, permitted and ready to undergo construction.

1. **Pilot Project #1: Reinforcing the Second Line of Defense.** This project will test innovative methods for building and enforcing enlarged dunes along the southern edge of the base. The goal of this project is to place defenses in front of vulnerable areas of the base and increase habitat areas.

2. **Pilot Project #2: Alternative Techniques to Promote Dune Growth.** This project will include rebuilding dunes located on the barrier islands to the south of the base through trapping naturally blown sand. Alternative methods that have been proposed include sand fences, woody debris from wind damaged trees, and new plantings.

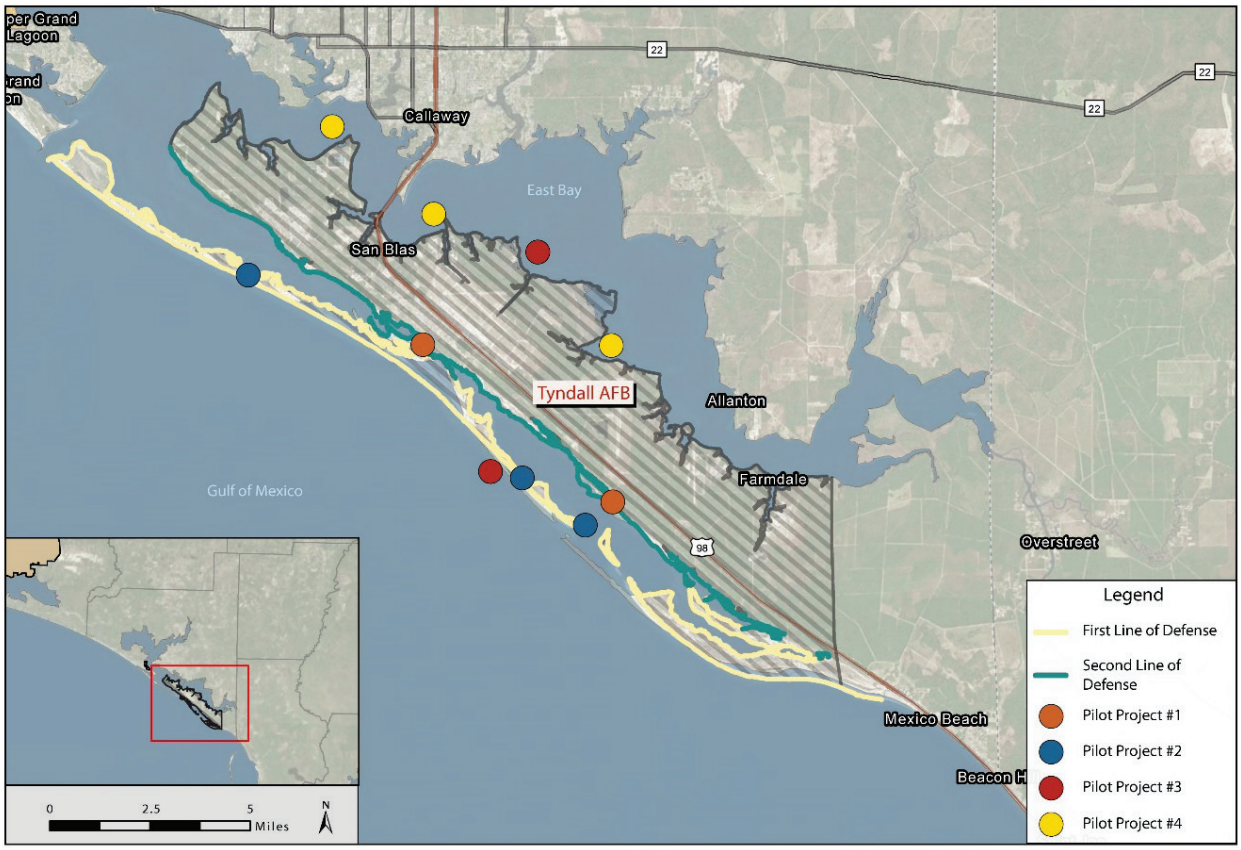
3. **Pilot Project #3: Strategic Sediment Placement Techniques.** Efforts associated with this project will include conducting a feasibility study and using modeling to identify locations where wave and tidal erosion is most prevalent. Strengthening these areas will help buffer wave energy during storms and assist in lowering installation water levels.

4. **Pilot Project #4: Evaluation of Nature-Based Solutions for the Back Bay Area.** The fourth proposed pilot project will include conducting a feasibility study of nature-based solutions along the north side of the base. Potential outcomes will include enhancing intertidal flats and salt marshes, using oyster reefs to reduce erosion, and constructing low-gradient levees.

Community Resilience Benefits

The implementation of these shoreline enhancement and rebuilding projects will be beneficial to the surrounding community and the environment. Protecting and stabilizing the shorelines surrounding Tyndall AFB will reduce the vulnerability of installation assets to natural hazards such as wave action. Shoreline protection efforts will also benefit environmental health by enhancing natural habitats for vegetation and wildlife.

Figure 5-45. Proposed CRIP Pilot Projects



Project Team

The project lead is Tyndall AFB, and project partners include St. Andrew and St. Josephs Bays Estuary Program and U.S. Army Corps of Engineers.

Funding Opportunities

Opportunities for funding include Transformational Habitat Restoration and Coastal Resilience, and National Coastal Resilience Fund.

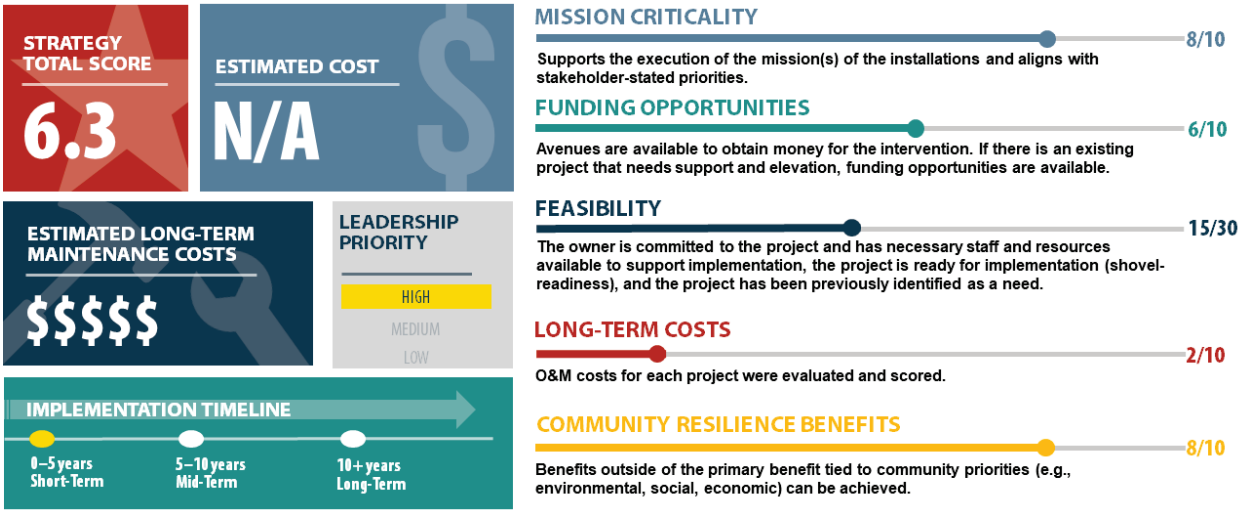
Project Description

Tyndall Parkway is a crucial arterial route that supports both civilian and military operations, enhancing the operational capabilities and daily activities at Tyndall AFB. The Parkway is essential for efficient logistic movements, hurricane evacuation, and emergency response capabilities, making its enhancement vital for the base's accessibility and the overall traffic flow in the region.

Tyndall Parkway currently faces challenges with congestion and safety resulting from increasing traffic demands. The improvements to Tyndall Parkway will involve improving the road to better accommodate traffic, enhancing drainage systems to address flooding issues, and integrating advanced traffic management systems to optimize flow and increase safety. The project will also include environmental enhancements such as landscaping and pedestrian pathways to improve the overall aesthetics and functionality of the roadway.

A related project, the DuPont Bridge replacement, is designed and is funded for construction (Figure 5-46).

5.10.3 Tyndall Parkway Improvements



Actions

The Tyndall Parkway improvements are part of the FDOT District 3 work plan and are recognized as a key element in the Bay County TPO's 2045 Long Range Transportation Plan. A lighting project on Tyndall Parkway from Callaway Commons to SR-22 is currently on the FDOT Five-Year Work Plan for FYE 25. Multiple projects have been identified that would reduce traffic congestion on Tyndall Parkway. These projects include the widening of roads, implementing improvements for the DuPont Bridge , and the Tyndall Flyover Project.

1. **Widening of Roads.** The plan to widen Tyndall Parkway from four lanes to six lanes is currently in a preliminary stage. The initial project action is to conduct a PD&E study to assess the social, economic, and environmental impacts on the installation and surrounding communities. Following the PD&E study, design and construction phases can be implemented.

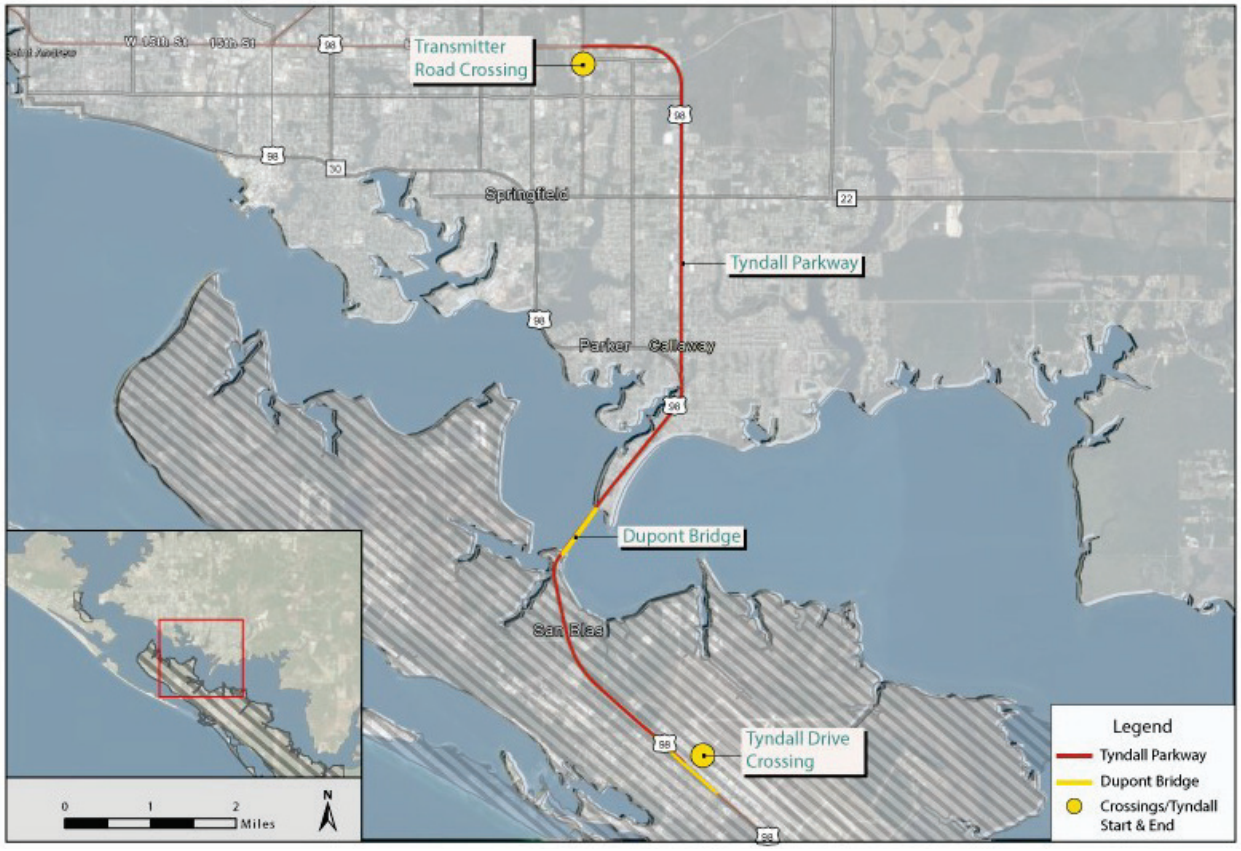
2. **Implementing Improvements for the DuPont Bridge.** Improvements to the DuPont Bridge were recently assessed in the US 98 DuPont Bridge PD&E Study. The purpose of this study was to address structural issues with the existing DuPont Bridge located over the Intracoastal Waterway. The DuPont Bridge connects Tyndall AFB and the City of Parker in Bay County. The project spans approximately 1 mile including US 98 from the Bonita Bay Outdoor Recreation Center within the installation to Oak Shore Drive.

3. **Tyndall Flyover Project – US 98 (SR-30).** The Tyndall Flyover Project is an ongoing effort to reduce traffic congestion on Tyndall Parkway and US 98. The goal of this project is to elevate the US 98 travel lanes above Airey Avenue/Tyndall Drive and Louisiana Avenue to separate Tyndall AFB traffic and US 98 traffic. This project is currently under construction and estimated for completion in fall 2024.

Community Resilience Benefits

Enhancing Tyndall Parkway will directly benefit Tyndall AFB by ensuring smoother and more reliable access, which is critical for emergency responses and daily operations. The improvements will also reduce traffic congestion, improve safety for all road users, and support local economic activities by providing better connectivity to commercial and residential areas.

Figure 5-46. Tyndall Parkway Improvements



Project Team

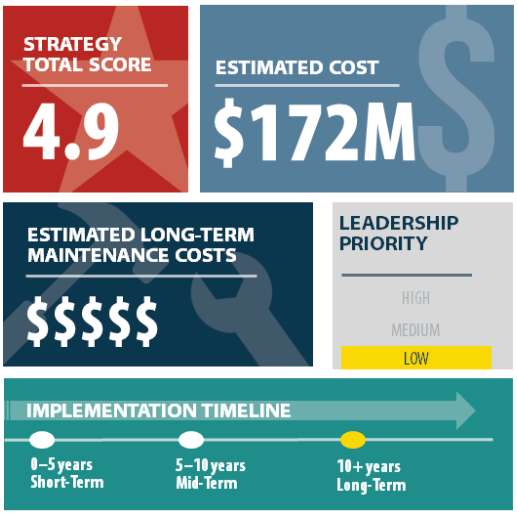
The project lead is FDOT, and project partners include the following:

- Bay County
- ECRC
- Bay County TPO
- Tyndall AFB
- City of Panama City

Funding Opportunities

The project is anticipated to receive funding through federal and state transportation grants, with additional support potentially coming from military-specific funding streams given its impact on base operations. Opportunities for funding include FDOT Five-Year Work Program, Bridge Investment Program, and Defense Access Roads.

5.10.4 SR-22 Widening



Project Description

SR-22 serves as a critical transportation artery linking Business 98 to Star Avenue. Traffic flow on SR-22 is crucial to those commuting to Tyndall AFB as well as traffic flow in the broader Bay County area (Figure 5-47). This roadway is instrumental in supporting the base's rebuilding and expansion, especially as it will provide access to new housing for service members and contractors, enhancing the operational capabilities and readiness of Tyndall AFB. Parts of SR-22 are vulnerable to flooding and inundation during heavy rain events.

The current two-lane configuration of SR-22 is inadequate to handle increasing traffic volumes, leading to congestion and safety concerns. The widening project will transform SR-22 into a four-lane urban roadway complete with modern amenities, such as curbs, gutters, landscaped medians, bike lanes, and sidewalks. The project will also include the installation of exclusive left-turn lanes at key intersections to streamline traffic flow and reduce congestion. These enhancements are designed to meet current and future transportation demands, ensuring the road's resilience and functionality.

FDOT has completed the PD&E study for this portion of SR-22. FDOT has funding to finish design. For the next steps, this project has been split into two segments by FDOT. The Bay County TPO has prioritized the portion of SR-22 to the east of US 98 to Star Avenue. Currently ROW acquisition and construction are unfunded, but they are a high priority for the Bay County TPO. The #2 Non-SIS project for the Bay County TPO is ROW acquisition for the eastern segment of SR-22.

Actions

1. **The widening of SR-22 is currently in the design phase.** The proposed build scenario for this project, depicted in Figure 5-48, is to widen the roadway from two lanes to a four-lane urban section, with curb and gutter and a raised landscaped median. The design also includes bike lanes and sidewalks on each side of the road to enhance pedestrian accessibility. The next phase of this project is funding and ROW acquisition. For ROW acquisition, the project may be divided into smaller phases.

Figure 5-47. SR-22 Improvements

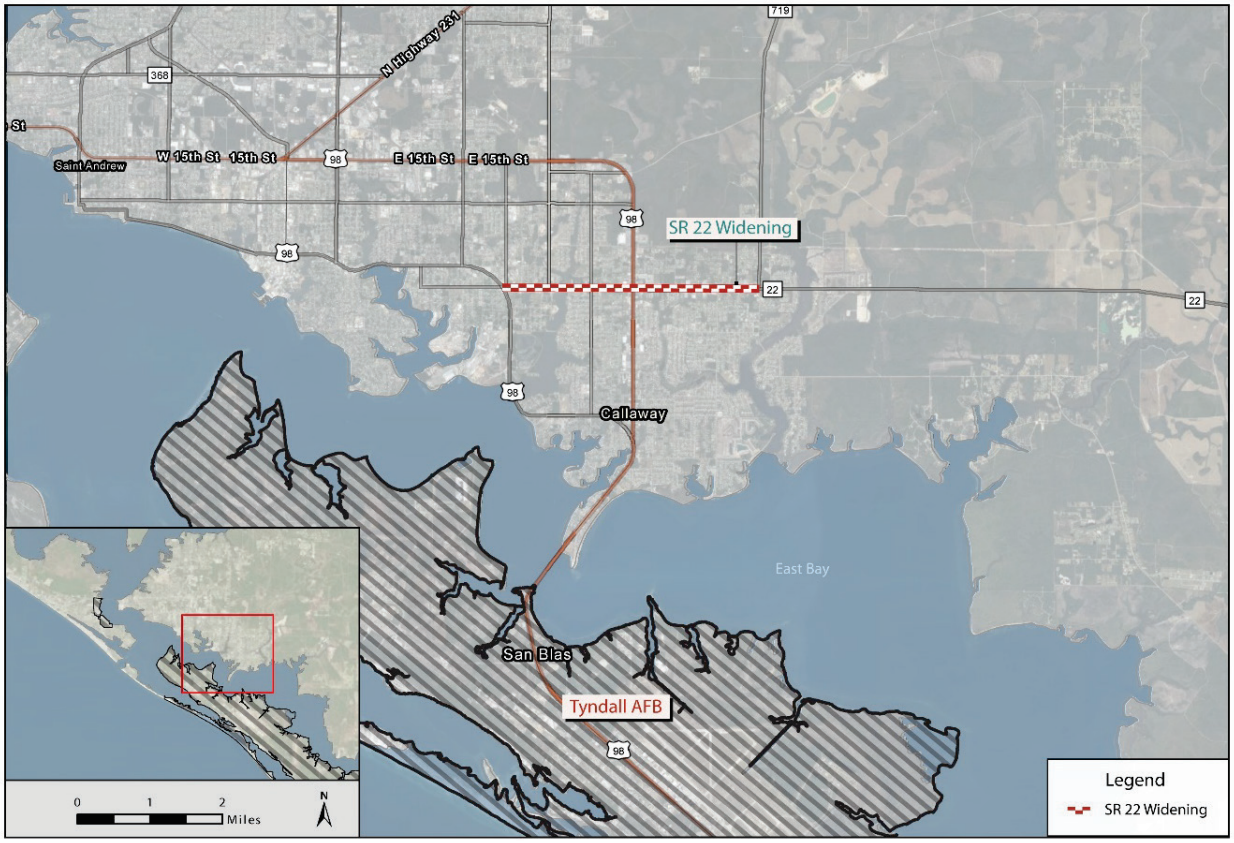
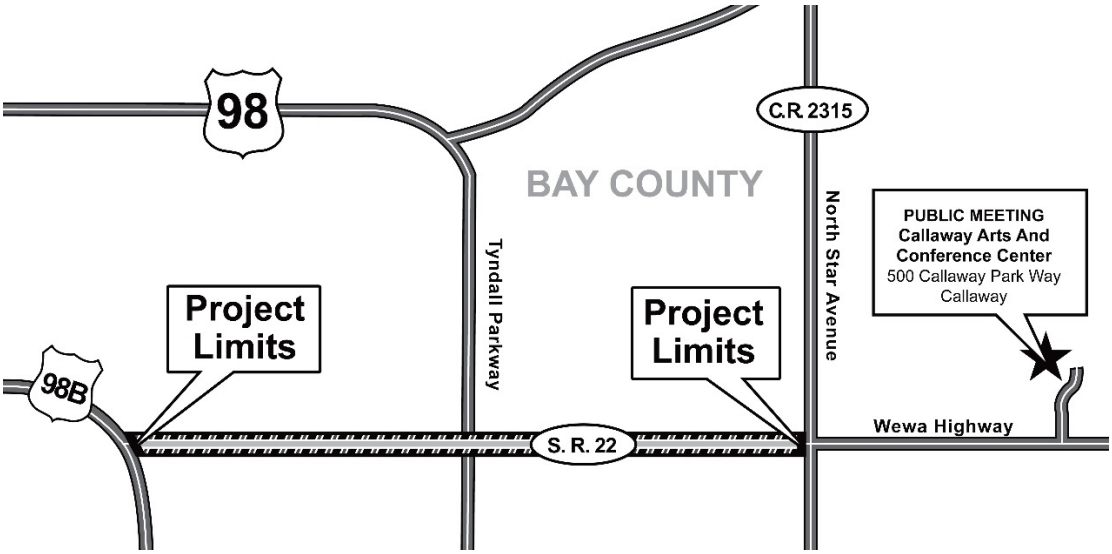


Figure 5-48. SR-22 from US 98B to Star Avenue Design Plan

Source: FDOT (n.d.)



Community Resilience Benefits

Widening SR-22 (Star Avenue to US 98) will significantly enhance traffic flow, reduce congestion, and improve safety for all road users. It will facilitate quicker and safer access to Tyndall AFB, supporting the base's mission and the daily

lives of those who work there. The project will also promote economic development and improve quality of life by providing better access to residential and commercial areas.

Project Team

The project lead is FDOT, and project partners include the following:

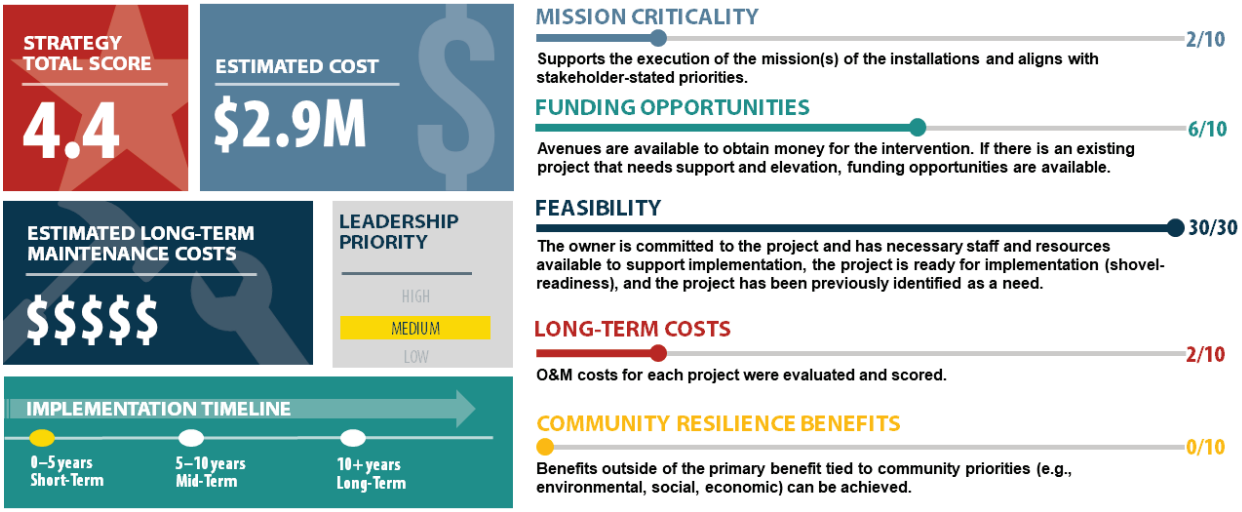
- Bay County
- ECRC
- Bay County TPO
- Tyndall AFB
- City of Callaway
- City of Springfield

Funding Opportunities

The SR-22 widening project is part of the state highway network and receives state and federal funds through FDOT. Additional funding could be sought from state and federal sources aimed at improving infrastructure that supports military installations and enhances regional connectivity. Opportunities for funding include:

- FDOT Five-Year Work Program
- PROTECT (Formula and Competitive Discretionary programs)
- Bridge Investment Program
- Defense Access Roads

5.10.5 Redundant Water Line to Tyndall AFB



Project Description

Bay County is the sole water provider for Tyndall AFB and the City of Mexico Beach. Bay County owns and maintains the existing water supply line to Tyndall AFB; this line is currently mounted to the existing DuPont Bridge (US-98).

FDOT plans to replace the DuPont Bridge because of structural defects caused by Hurricane Michael. Accordingly, there is a corresponding need to replace the existing water supply line as to minimize water service disruptions for Tyndall AFB (Figure 5-49).

Because the FDOT construction plans for the DuPont Bridge do not include the water supply line, Bay County has proposed to construct a subaqueous water supply line in parallel to the DuPont Bridge and abandon the existing water supply line mounted to the DuPont Bridge. The subaqueous water supply line would be mounted to the bay

floor and constructed with high density polyethylene pipe. The subaqueous location would be better protected and reduce the risk for human-caused water supply line disasters. The water supply line would be constructed prior to DuPont Bridge replacement construction.

Actions

1. **Construct subaqueous line to Tyndall AFB.** There is a strong commitment to the project by Bay County staff because of the need to construct the new water supply line with the imminent DuPont Bridge replacement. The design is complete and permitting has been approved, making this project ready for construction. Construction would consist of laying approximately 3,670 linear feet of subaqueous pipe. However, funding is necessary to construct the new water line.

2. **Rebuild water line beneath reconstructed DuPont Bridge.** Adding a second water line along the newly built DuPont Bridge provides a redundant water source for Tyndall AFB.

Figure 5-49. Redundant Water Line to Tyndall AFB



Community Resilience Benefits

A redundant water supply to Tyndall AFB offers significant community benefits beyond military readiness. It enhances the region's overall resilience by ensuring consistent access to clean water during emergencies, benefiting both military and local residents. This redundancy also supports economic stability by safeguarding essential services and infrastructure, fostering a more resilient community that can withstand and recover from disruption effectively.

Project Team

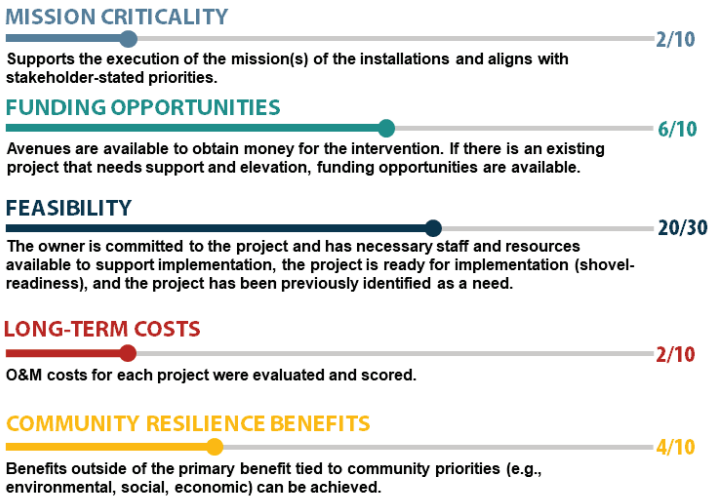
The project lead is Bay County, and project partners include the St. Andrew and St. Joseph Bay Estuary Program.

Funding Opportunities

Opportunities for funding include Defense Community Infrastructure Program.

5.10.6 North Bay WWTP Upgrades





Project Description

The North Bay Wastewater Facility is located off FL-77 in the City of Panama City (Figure 5-50). While this facility does not directly serve NSA Panama City or Tyndall AFB, it serves many of the installations' residents living in the north end of Bay County. The growing mission at Tyndall will bring more personnel and staff to the area.

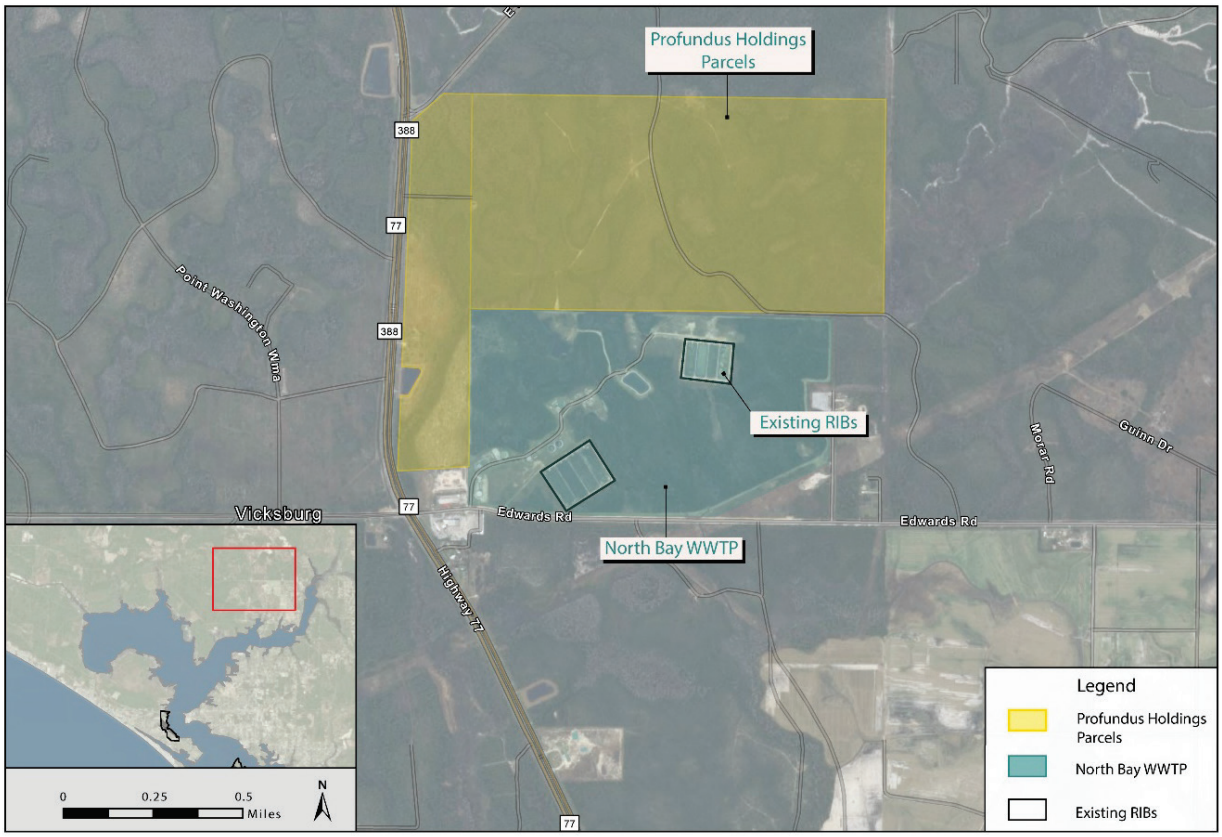
This plant is in an area of the County that is seeing tremendous growth, with some 12,000 homes having been recently proposed for the area. The growth in number of residences will require additional wastewater treatment capacity, which is currently 1.5 mgd and is expected to double during the next 5 years.

Project Actions

1. **Conduct a study to determine the best method of expansion.** The treatment plant is permitted for 1.5 mgd, however, the plant can currently only accommodate 750,000 gallons per day because of effluent disposal issues. Bay County estimates that future treatment capacity will need to be as high as 7 mgd. The County should conduct an expansion study to determine how to meet future needs.

2. **Acquire land for and construct a new rapid infiltration basin system (RIB).** The plant currently has two RIBs; however, there is a need for either additional reuse or another RIB to expose excess wastewater. There is a large landowner (Profundus Holdings Inc.) located next to the plant who is willing to partner with the County as a location for the new RIB infrastructure for these improvements.

Figure 5-50. North Bay WWTF Upgrades



Community Resilience Benefits

Implementing upgrades to the North Bay WWTF will provide benefits to community members and the surrounding environment. Infrastructure would be benefited by increasing the sewer capacity in the County. The economy will experience benefits because the project will support economic growth in the northern part of the County.

Project Team

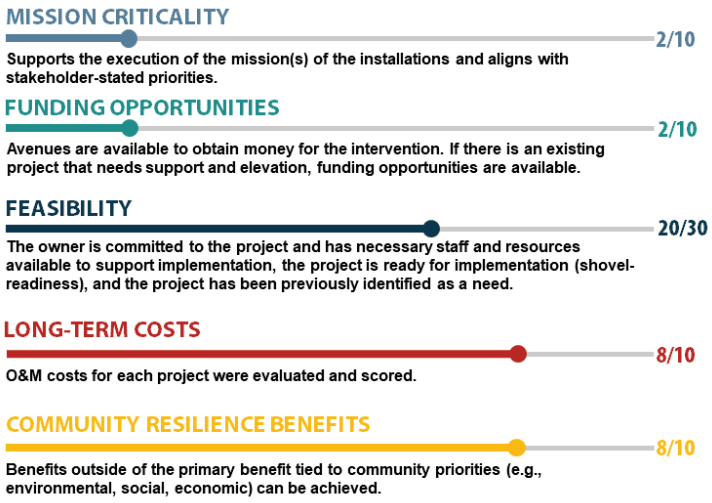
The project lead is Bay County, and project partners include FDEP and Profundus Holdings, Inc.

Funding Opportunities

Opportunities for funding include Clean Water and Drinking Water SRF.

5.10.7 Tree Canopy Restoration





Project Description

In 2018, Hurricane Michael caused the City of Panama City to lose half of its tree canopy, which amounted to 1,000,000 trees. The loss of urban tree canopy has accelerated extreme heat, increased risk of wildfires and flooding, reduced ecosystem services, and contributed to water quality degradation. The urban heat island effect has intensified, leading to rising temperatures that threaten human health and critical infrastructure and increasing water and energy demand. Fallen trees have caused damage to property and utility infrastructure and have become fuel for wildfires that have burned more than 40,000 acres.

To address this problem, multiple entities, including local governments and non-governmental organizations, are working to restore regional tree canopy. County and municipal governments as well as non-profit groups such as Panama City's ReTreePC are working toward a goal of planting 100,000 trees primarily through public tree-giveaways for the City of Panama City residents. However, funding is currently limited.

Actions

1. **Update Tree Ordinance and Establish a Tree Care Manual.** The City of Panama City could consider updating its tree ordinance by adding a comprehensive planting ordinance and incorporating guidelines for tree maintenance before and after hurricane season. The knowledge and experience from ReTreePC, local arborists, UF/IFAS Urban Forest Hurricane Recovery Program, and Florida Forest Service (FFS) should be leveraged to create a tree care manual for wind-resistant urban forests. This manual would serve as a credible knowledge base that the City could easily update to ensure a healthy urban forest, thus preventing repeated tree loss.

2. **Update and Manage Urban Tree Canopy data.** Florida Forestry Service conducted tree canopy assessments using federal hurricane relief funding to measure the damage to Florida's urban forest post-Hurricane Michael and documented the remaining tree canopy. ReTreePC established a tree inventory via the i-Tree program to track the replanted trees. Integrating FFS's assessment and ReTreePC's i-Tree data could help fill the data gap and better inform the City of Panama City's canopy management, such as maintenance, budgeting, monitoring, and progress tracking.

3. **Prioritize Reforestation with Environmental and Social Consideration.** Prioritize reforestation areas with high urban heat, low existing tree canopy, or social-economic vulnerability. From various federal, state, and environmental non-governmental organizations, open-source tools like TreePlotter CANOPY can provide baseline data to supplement the city's dataset and help identify focus areas.

4. **Develop Tree Master Plan.** The City of Panama City has initiated a formal tree planting effort, with the Quality-of-Life Department leading the ReTreePC Initiative. To further this effort, the City could consolidate various

urban canopy projects and establish a Tree Master Plan that sets clear goals and objectives. This would facilitate policy integration and enable the City to allocate budget or prepare funding applications for tree planting projects.

5. **Implement a Community Tree planting campaign.** Urban tree canopies require consistent investment and maintenance. The City of Panama City's Arbor Street program engages citizens in street tree care and maintenance. Civic engagement and education about tree planting can ensure the successful implementation of the city's planting ordinance. Campaigns for planting trees encourage planting on privately owned properties, help recruit volunteers, and raise funds for public land. NWFWMD, Tyndall AFB's division of forestry, and the Department of the Interior are seeking grants for tree planting and can serve as role models for such campaigns.

Community Resilience Benefits

Implementing tree canopy restoration will provide various benefits both socially and environmentally throughout the surrounding communities. Social benefits include the protection of public health and promoting economic vitality. Environmental benefits include the restoration of ecosystem services, mitigating stormwater runoff, promoting carbon sequestration, and improving air and water quality.

Project Team

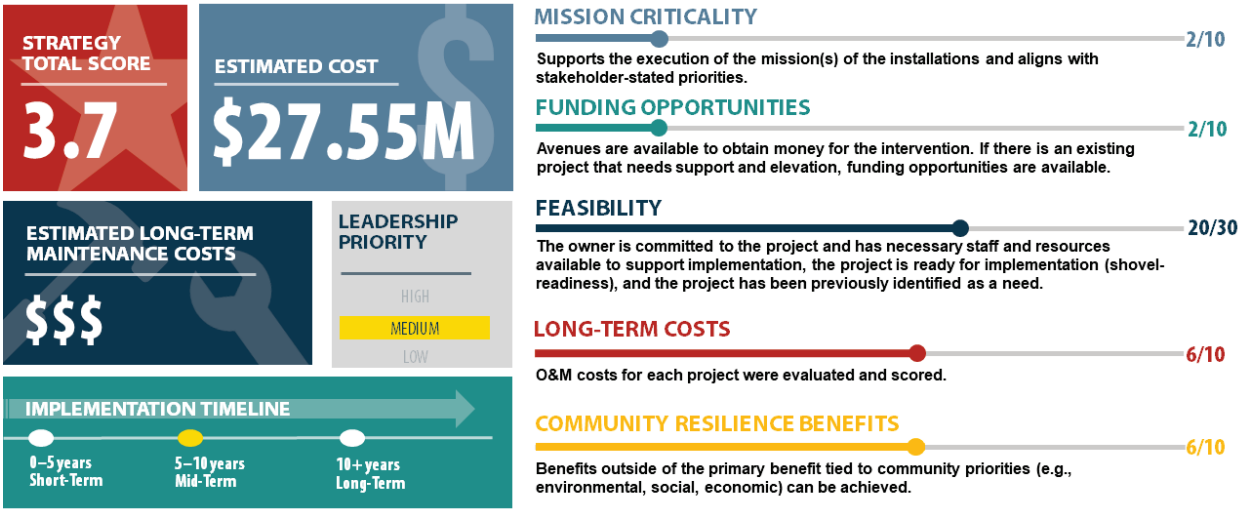
The project leads are Bay County and the City of Panama City, and project partners include the following:

- ReTreePC
- NWFWMD
- Florida Forest Service
- UF/IFAS Urban Forest Hurricane Recovery Program
- City of Callaway
- City of Lynn Haven
- City of Mexico Beach

Funding Opportunities

Opportunities for funding include Transformational Habitat Restoration and Coastal Resilience, and National Coastal Resilience Fund.

5.10.8 Lift Station Improvements



Project Description

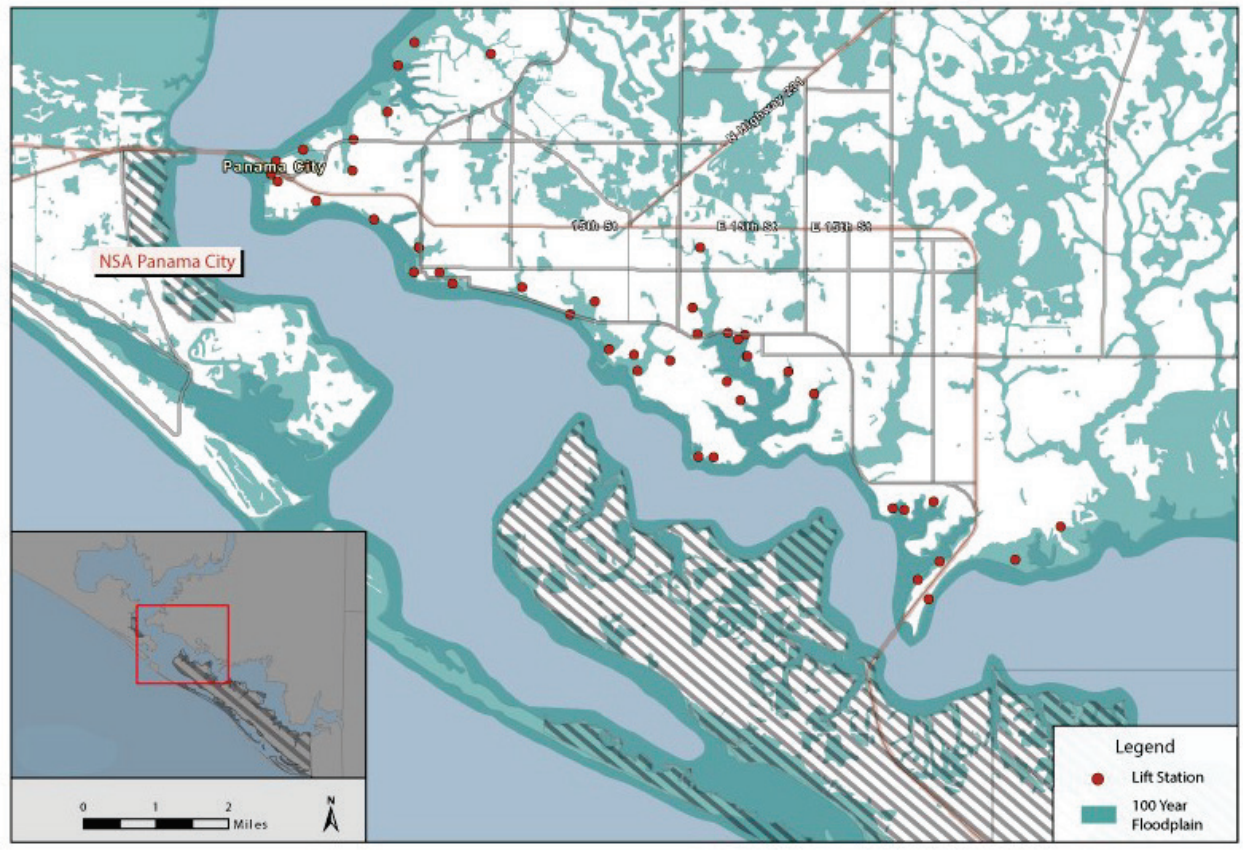
The City of Mexico Beach sewer transmission system currently uses a Tyndall AFB lift station to pump sewer to the Military Point AWT plant. Additionally, the existing force main system from the City of Mexico Beach to the Tyndall AFB lift station is antiquated and located along the bay shoreline. Tyndall AFB has prioritized completing lift station upgrades so that flows are separated, and the City of Mexico Beach's sewer transmission system no longer depends on the Tyndall AFB lift station.

There have been previous efforts by the City of Mexico Beach to obtain funding for constructing a new lift station and force main to AWT. However, post-hurricane recovery efforts have added additional challenges to the City in Resilient Florida grant matching ability and staff availability to project-manage the sewer transmission upgrade projects. Bay County staff have offered to assist with project management of sewer transmission system upgrades. However, a grant program to allow the City of Mexico Beach to apply for funding for infrastructure but project-managed by Bay County may not exist.

Actions

1. **Harden and elevate 95 medium-risk lift stations.** Harden and elevate critical components (electrical panels, wet wells) of selected Bay County lift stations (Figure 5-51).

Figure 5-51. Lift Station Improvements



Community Resilience Benefits

The implementation of lift station improvements will benefit community members and the environment. Proposed benefits include an improved sewer transmission system from Mexico Beach to Military Point AWT, eliminating risk for sanitary sewer overflows into the bay from antiquated force main breaks, and eliminating community sewer dependence on Tyndall AFB sewer infrastructure.

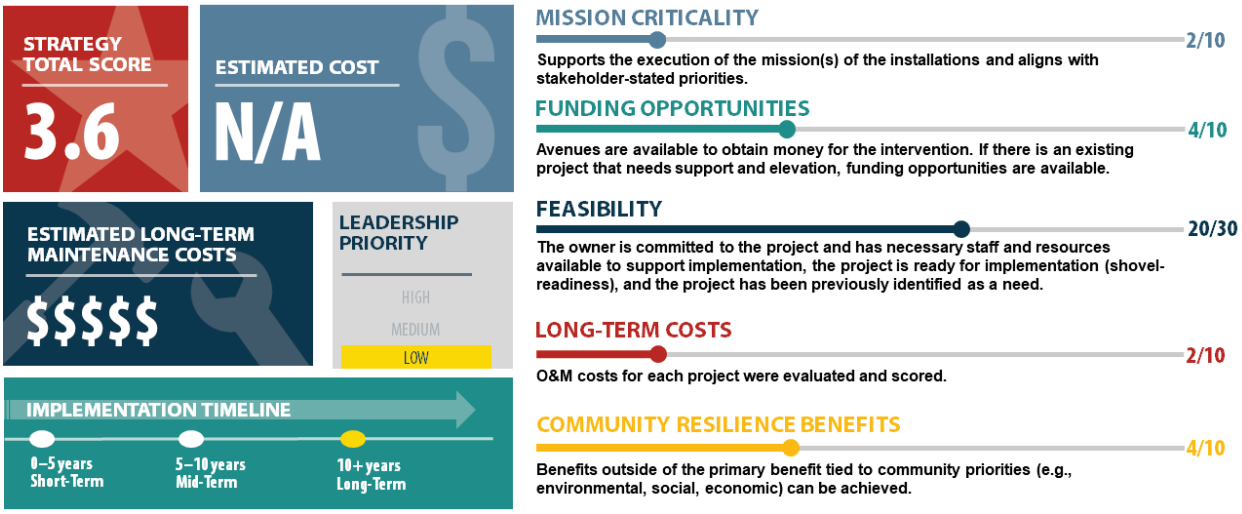
Project Team

The project lead is the Bay County.

Funding Opportunities

Opportunities for funding include the Resilient Florida Grant Program and FEMA BRIC.

5.10.9 Relocation of Panama City Millville WWTF



Project Description

Built in 1949, the Millville WWTF is located on a peninsula in Watson Bayou in the City of Panama City (Figure 5-52). This is one of three wastewater treatment facilities that serve the City of Panama City and Lynn Haven geographical area. The facility was damaged during Hurricane Michael in 2018 and again by Hurricane Sally in 2020. The facility's issues include operating at a capacity lower than its permitted 5 mgd, flood risks, and bacteriological exceedances. Additionally, the plant is outdated and in need of critical upgrades.

In 2022, FDEP awarded the City of Panama City $1.5 million to assess whether the Millville Water Treatment Plant should be repaired or relocated. The city is currently under contract with a consultant for a feasibility study of the Millville WWTF. This study includes assessment of identification and clarification of wastewater treatment issues, assessment of deficiencies in current wastewater treatment facilities and/or collection systems and barriers to future expansion, and development and analysis of potential relocation of the WWTF. A similar effort was completed in the City of Pensacola in the late 1990s when the downtown WWTP was damaged by Hurricane Opal; the treatment plant was moved inland 9 miles after the study.

Actions

1. **Complete the relocation feasibility study of the Millville WWTF.** The ongoing feasibility study will identify potential new locations for the WWTP. The new location should be located outside of the existing 100 and 500-year floodplain to the maximum extent practicable.

2. **Design and construct a new WWTF, incorporating future conditions.** The new WWTF design should include future demands and incorporate higher infiltration and inflow stemming from increased rain intensity. Depending on its location, it should be hardened for flooding (either SLR, rainfall-induced flooding, or both), incorporating planning scenarios for the length of its design life that incorporate future rainfall and/or SLR projections. The new WWTF will function as a secondary source of wastewater treatment for Tyndall AFB if the AWT facility is offline.

Figure 5-52. Relocation of Panama City Millville WWTF



Community Resilience Benefits

The implementation of this project will benefit the surrounding community and the environment. Relocating the Millville WWTF will assist with facilitating compliance with new wastewater treatment regulations while also increasing the sewer treatment capacity.

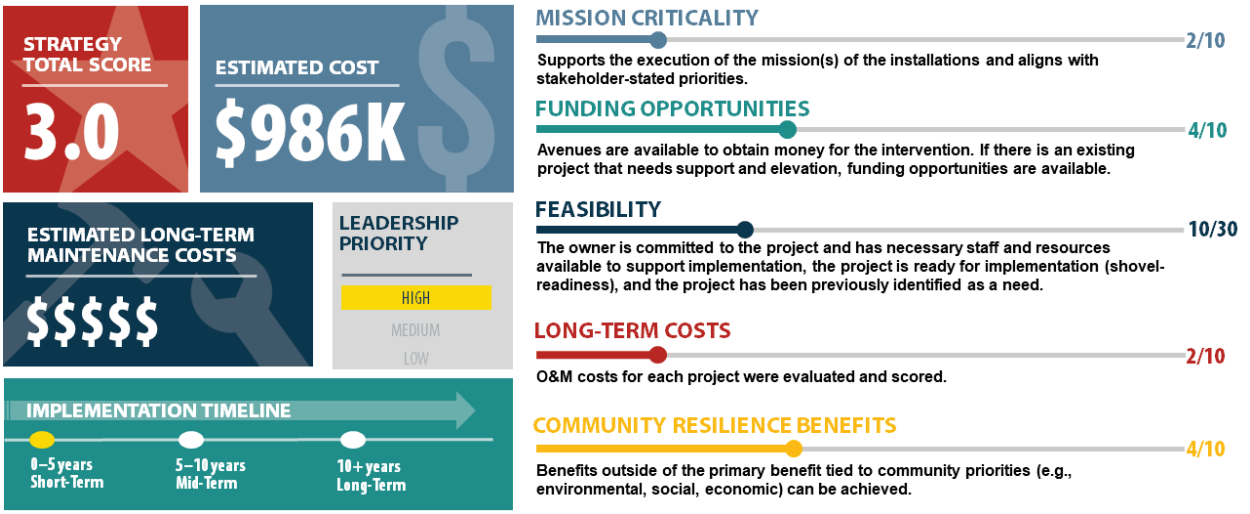
Project Team

The project lead is the City of Panama City, and project partners include Bay County and FDEP.

Funding Opportunities

Opportunities for funding include Army Corps Feasibility Study, and Clean Water and Drinking Water SRF.

5.10.10 Military Point Advanced Wastewater Treatment Facility Upgrades



Project Description

The Military Point AWT is located on Tyndall AFB west of US-98 and on the southside of East Bay (Figure 5-53). The AWT facility is the primary wastewater treatment plant for Tyndall AFB as well as the communities east and southeast of the City of Panama City limits. The City of Mexico Beach is also served by the Military Point AWT through a sewer transmission main to a lift station at Tyndall AFB. Wastewater effluent management, future plant expansion, and the City of Mexico Beach sewer transmission main upgrades were three projects identified by Bay County staff as needed upgrades for AWT.

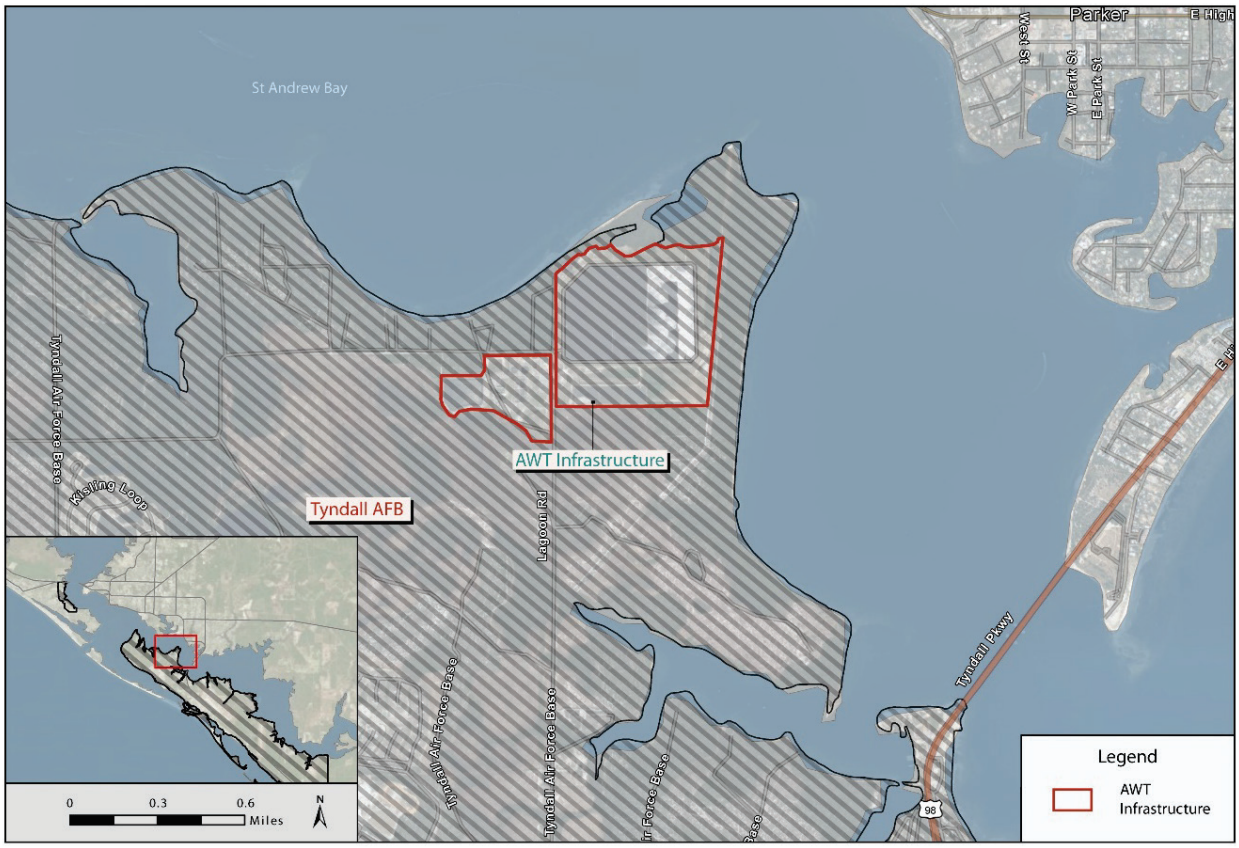
Previously, the West Rock Paper Mill near AWT was the largest consumer for reuse water. However, the paper mill facility has since ended operations and closed. The County is actively evaluating a reuse water line as an alternate wastewater effluent management method and to be compliant with the future requirements of Florida Senate Bill 64.

Actions

1. **Evaluate potential alternatives for water reuse.** A state appropriations funded study is being conducted to evaluate the feasibility of constructing a reuse water line in parallel to the raw water supply line to the Bay County WTP. The proposed reuse water line would be reversible to direct flow to Williams Bayou for water quality improvements near the raw water line intake or direct flow to a newly constructed wetland for effluent disposal.

2. **Understand future flows from the City of Mexico Beach.** The City of Mexico Beach's wastewater system is connected to the Military Point AWT via a transmission main system to a lift station at Tyndall AFB and then pumped to AWT. Because of Hurricane Michael's impacts to the City of Mexico Beach, sewer flow from the City of Mexico Beach is lower than pre-hurricane conditions and is expected to increase as the City of Mexico Beach is rebuilt. A sewer capacity analysis for the City of Mexico Beach is necessary to evaluate the current system and determine the future sewer flows. Understanding the future flows is necessary for Military Point AWT to plan future plant upgrades and expansion to accommodate future increased flows.

Figure 5-53. Military Point Advanced Wastewater Treatment Facility Upgrades



Community Resilience Benefits

Upgrading the Military Point AWT facility will provide benefits to the surrounding community and the environment. The implementation of this project will allow for wastewater effluent management that is compliant with Florida Senate Bill 64. Additional benefits include the improved raw water quality at Williams Bayou and improved AWT timely planning and implementation of upgrades.

Project Team

The project lead is Bay County, and project partners include the City of Mexico Beach and Tyndall AFB.

Funding Opportunities

Opportunities for funding include Clean Water and Drinking Water SRF.

Policy Recommendations



6. Policy Recommendations

6.1 Housing

Accessible and affordable housing is a prevalent issue for Emerald Coast military installations. There are a multitude of strategies that can be implemented to alleviate housing challenges.

6.1.1 National Recommendations

National recommendations to increase housing accessibility across military installations include the implementation and increase of the Basic Allowance for Housing (BAH) program. The current DoD policy provides a BAH to cover approximately 95% of the local average housing cost. During the initial stakeholder engagement workshops, it was noted that BAH increases are often followed by rent increases as landlords recognize they can charge more for housing, leaving installation personnel in the same financial situation they were previously. This unintended consequence is a documented issue nationally and needs to be addressed at the national level.

Recommendation

Explore housing cost stabilization measures alongside adjusting BAH to ensure that increases genuinely enhance affordability for service members and do not put an unnecessary cost burden on other community members.

6.1.2 Regional Recommendations

Regional recommendations involve the inclusion of installation representatives in community planning. Northwest Florida installations should actively communicate and coordinate with their surrounding cities and counties for the express purpose of increasing the number of resilient housing units on both sides of the fence line. This can be accomplished through continued coordination and the involvement of installation members in community planning efforts. Increasing the number of housing units will help to increase housing accessibility for installation personnel.

6.1.3 Local Recommendations

Many policy recommendations to increase housing accessibility across Emerald Coast military installations can be implemented at a local level. The following policies are some suggestions for local implementation:

- changes in land management practices
- reducing the cost of construction
- increasing variation in housing types and implementing “gentle density”
- study affordable military housing options
- reducing the number of short-term rentals in surrounding communities
- incentivizing rehabilitation of uninhabitable residential properties and create vacant property management strategies

Modify Land Management Practices

Changing land management practices is one method of increasing housing accessibility within military installations. The high cost of land is one of the primary drivers of new home prices and a significant barrier to affordability. Few methods exist to reduce this burden beyond implementing housing subsidies. Additional options may include: creating land registries to better understand development opportunities for public land, constructing housing structures on government-owned vacant properties, offering incentives to developers in return for the inclusion of

affordable housing, and implementing zoning changes to allow for smaller single-family and mixed-use developments.

Land registries can be created, maintained, and made available through public, online mapping tools. These tools can create a 'big picture' of opportunities for public land that may be suitable for housing that is both affordable and attainable. Additionally, vacant, privately owned parcels can be identified to be traded and used. Vacant or underused government-owned or acquirable property that has a higher-and-better commercial use should be identified and considered for assembly or for strategic trades for alternate sites that might otherwise be cost-prohibitive for residential development.

Altering the zoning, where appropriate, surrounding military installations can allow for increased housing accessibility. Zoning changes that allow smaller single-family homes or lots (e.g., micro units), accessory dwelling units (e.g., garage apartments or "granny flats"), and mixed use can stimulate lower-cost housing options by reducing the effective land cost per unit. This approach has already been incorporated in some South Florida governments to reduce housing affordability and attainability issues (SFRPC 2023).

Reduce Costs for Developers

Currently, escalating costs of construction, including both labor and materials, are a significant barrier to affordability. These costs can be controlled by local governments by adding predictability and expedience to their development review process and prioritizing projects that deliver the desired levels of affordability. Methods of reducing construction costs include reducing permit costs, streamlining the planning and zoning process, and identifying opportunities to promote housing near job centers and/or transit stops where parking requirements may be reduced. The reduction of total construction costs can potentially lower the cost of housing, making housing more accessible.

Affordable housing availability can be increased through offering incentives to developers. Local governments can offer developer incentives (such as increased density, height, permitting fee waivers, or discounts, or expedited permitting) in return for the inclusion of affordable or attainable units within an otherwise market-rate development. A "sliding scale" of incentives may be offered to stimulate desired levels of affordability based on the population to be served.

Move Beyond Single-Family Zoning ("Gentle Density")

Implementing "gentle density" and diversifying housing types within military installations and the surrounding communities will create more accessible housing. Currently, single-family homes are the predominant structure type in suburban communities surrounding military installations, which increase the overall cost of housing. The increasing presence of single-family housing units has led to the notion of a "missing middle." This refers to the housing types that fall between single-family homes and apartments, such as duplexes, townhomes, or courtyard clusters (Matrix Design Group 2023). These structure types used to be common but are now often forbidden by local zoning codes. Implementing zoning ordinances and overlays that allow for higher-density housing options and mixed-use developments can increase housing accessibility.



Gentle density *refers to development of duplexes, triplexes, accessory dwelling units, stacked townhouses, semi-detached homes, and small-scale apartment and condominium buildings within among single-family zoned neighborhoods. Gentle density promotes mixed-use development, with single-family homes alongside small multi-family homes, businesses, and commercial buildings aiming to retain neighborhood residential identity and feel while alleviating housing crises.*

Permitting and financing accessory dwelling units (ADUs) are another method of creating alternatives to single-family housing. ADUs are classified as independent living quarters located on the same lot as detached single-family homes. This type of housing is suitable for military personnel and can help increase the quantity of affordable housing. ADUs serve two purposes in increasing housing access, acting as a naturally occurring affordable housing because of their small size and shared

lot, and helping existing homeowners pay their mortgage by providing and additional source of income as rent from tenants.

In Minneapolis, Minnesota, a number of land use reforms, including permitting duplex and triplex construction on residential lots, have helped rents stay flat in the city while rents across Minnesota increased (Liang et al. 2024).

Study Affordable Military Housing Options

Individual neighboring municipalities (cities or counties) can work with the local installations to undertake comprehensive studies to explore affordable military housing options. These studies will provide insights into specific needs and challenges faced by military personnel and their families in accessing suitable housing. This understanding is crucial for developing targeted strategies that prioritize affordability and accessibility, potentially through partnerships with local developers and housing agencies. Such initiative not only support military readiness by ensuring service members can focus on their duties without housing concerns, but also strengthen community ties by integrating military families more seamlessly into the local fabric. By prioritizing affordable housing for service members and those who serve the installation, municipalities can enhance the quality of life for service members and contribute to a resilient and supportive community environment.

Mitigate Excessive Short-Term Rentals

The increasing number of short-term rental properties within neighborhoods makes it difficult for residents to obtain accessible housing. Reducing the number of short-term rentals (STRs) can improve housing affordability and accessibility within Florida. STRs increase the cost of long-term rentals (LTRs) and limit the quantity of LTRs available to rent. Currently in Florida, localities are prohibited from imposing new restrictions on STRs. However, cash incentives can be offered to entice STR operators to convert their properties to LTRs. Such incentives, often known as “Lease to Locals” programs, are offered in Provincetown, Massachusetts, Breckenridge, Colorado, and Sedona, Arizona. Between 2021 and 2022, the Lease to Locals program in Breckenridge converted 70 units from short-term to long-term rentals, providing housing for 156 residents in the County (Wright 2022).

Use Vacant Properties

Areas with high concentrations of vacant properties are not using land efficiently, which can worsen housing availability. Military installations throughout the Emerald Coast are experiencing high vacancy rates with a high rate of housing units sitting empty. For example, approximately 17% of Myrtle Grove’s (NAS Pensacola) housing units are vacant and Wright (near Eglin AFB) is above the recommended upper threshold of 4% vacancy rate (Matrix Design Group 2023). Vacant properties can feasibly be repurposed into suitable homes for service members. It is recommended that a comprehensive strategy is developed to identify empty properties, assess their condition, facilitate the renovation or demolition and rebuilding processes, if necessary, and encourage their rental or sale. Suggested recommendations for limiting vacant units include:

- mandating the registration of vacant properties
- expanding land banks
- transitioning from a property tax system to a split-rate tax system
- imposing a vacant property tax
- encouraging Community Land Trusts

The conversion of vacant properties into housing units can result in increased housing affordability and accessibility within and surrounding installations.

6.1.4 Government Solutions

Government-supported solutions can aid in increasing housing accessibility for installation personnel. There are a multitude of ways that the government can implement solutions. This can include the establishment of public-private partnerships and expanding on-base privatized housing.

Establishing public-private partnerships is one government-supported method of increasing housing accessibility. The rezoning of land surrounding military installations to allow for high-density residential development, in cases that do not present an encroachment or security hazard to the installation, can support public-private partnerships.

6.1.5 Live Local Act

The Live Local Act was enacted in 2023 with the intention of addressing a lack of housing accessibility in Florida. The act is a comprehensive, statewide workforce housing strategy created to increase affordable homeownership and rental housing opportunities for Florida workforce. Methods of increasing accessible housing include increasing mixed-use developments, adapting urban infill areas, using or leasing publicly owned property, addressing the needs of young adults aging out of foster care, providing housing in areas of rural opportunity, and creating more housing near military installations. The Live Local Act can reduce housing accessibility concerns for both installation personnel and the surrounding communities.

The Florida Housing Finance Corporation (FHFC) intends to assist in financing the development of affordable multi-family rental housing near military installations. The implementation of the Live Local Act is beneficial to this goal because it expanded FHFC programming capabilities. FHFC plans to fund a property in Northwest Florida near one of the Emerald Coast military installations. Proposed developments financed by FHFC will follow guidelines ensuring accessibility to both installation personnel and low-income households. The developments will offer services and programs that are specific to the diverse needs of the community. The implementation of the proposed developments will increase accessible housing opportunities for installation personnel and surrounding populations.

The proposed intended resident households will follow guidelines established by FHFC to ensure accessibility. One of the established guidelines is that at least 50% of the units must be set aside for active-duty personnel and their families or veteran households. Additional housing units will be designated for civilians and contracted workers working on the designated installation. Another guideline for the housing developments is that at least 80% of the units are required to be classified as affordable housing units. Affordable housing units serve households at or below 60% of the area median income (AMI) for the area (Table 6-1). Additionally, at least 10% of the units will be set aside for extremely low-income (ELI) households.

Table 6-1. FHFC Housing Development Income and Rent Limits

Household Type	Income	Housing Type	Rent
Bay County			
1 person HH at 60% AMI	$ 33,060	1 Bedroom Rent	$ 885
2 person HH at 60% AMI	$ 37,800	2 Bedroom Rent	$ 1,065
4 person HH at 60% AMI	$ 47,220	4 Bedroom Rent	$ 1,369
1 person HH at ELI	$ 22,820	1 Bedroom Rent	$ 611
Escambia and Santa Rosa Counties			
1 person HH at 60% AMI	$ 34,380	1 Bedroom Rent	$ 921
2 person HH at 60% AMI	$ 39,300	2 Bedroom Rent	$ 1,105
4 person HH at 60% AMI	$ 49,080	4 Bedroom Rent	$ 1,423
Okaloosa County			
1 person HH at 60% AMI	$ 39,120	1 Bedroom Rent	$ 1,047
2 person HH at 60% AMI	$ 44,700	2 Bedroom Rent	$ 1,257
4 person HH at 60% AMI	$ 55,860	4 Bedroom Rent	$ 1,620

HH = household

The FHFC also aims to have community-based services and programs onsite at the proposed housing developments.

6.2 Childcare

Childcare accessibility issues stem from a lack of availability, long waitlists, high costs of existing options, long commutes to available childcare, childcare deserts, and the military childcare waitlist system. These issues can be mitigated using childcare business initiatives, expanding Military Childcare in Your Neighborhood+ (MCCYN+) subsidy programs, assisting local Child Care Resource & Referral network (CCR&R) and installation of Child Development Centers (CDCs), increasing childcare workforce pay, supporting localized enhanced use leases (EUL), revising military installation childcare center fee structures, and creating flexible spending accounts to use pre-tax money for childcare.

6.2.1 Increasing Childcare Affordability

In some areas, childcare facilities may be present, but they are inaccessible because of high costs. The high cost of childcare can place greater strain and economic stress on installation member's households. Increasing childcare affordability can be accomplished in a multitude of ways as noted in the follow subsections.

Military Childcare in Your Neighborhood+ Subsidy Programs

Expanding the MCCYN+ subsidy programs to more installations across the state will assist in making childcare more accessible. MCCYN+ programs provide fee assistance for families of Active-Duty Service Members and full-time National Guard Association employees who are unable to access on-post childcare. MCCYN is only applicable to nationally accredited care, however, MCCYN+ can be used for both nationally accredited care and non-accredited care. Currently, MCCYN+ exists in Maryland, Nevada, and Virginia. The expansion of MCCYN (specifically MCCYN+) will make childcare more affordable and accessible to military installation personnel.

Subsidized Childcare

Increasing or subsidizing childcare workforce pay will increase accessibility of childcare on military installations. Executive Order 14095 was signed on April 18, 2023. The purpose of this order is to increase access to high-quality care and support caregivers for military personnel. Adjustments include a reduction in the number of fee categories from 14 to 11 and modifying Total Family Income categories so the highest income group is $160,001 and above. It also increases the fee assistance provider rate cap from $1,700 per child per month to $1,800. These adjustments allow for a more equitable division of fees based on family income. The DoD is also expanding eligibility to service members to qualify for Dependent Care Flexible Spending Accounts. This allows service members to contribute up to $5,000 per household per year for eligible dependent care services.

These alterations allow for military installation personnel to have increased accessibility to childcare, which helps alleviate the burden these expenses can have on a household.

Revising Installation Childcare Fee Structures

Revising the military installation childcare center fee structures will make childcare more accessible. The fee structure determines the weekly rate of childcare based on total household income. A revised fee structure was implemented in early 2024 and is outlined in Table 6-2.

Table 6-2. Revised Installation Childcare Fee Structure

Household Income	Revised Weekly Rate	Previous Weekly Rate
$45,000	$54	$82
$65,000	$74	$121
$90,000	$104	$143
$115,000	$138	$154

This revised childcare fee structure can potentially save installation members thousands of dollars each year. These savings can be allocated to other household costs and needs.

DoD Childcare Flexible Spending Accounts

The DoD plans on launching a program to create flexible spending accounts to use pre-tax income on childcare. This program allows military personnel to set aside up to $5,000 of pre-tax income in a flexible spending account. This money can be used to pay for childcare services. These accounts also help in reducing service member's overall tax burden.

6.2.2 Increasing Childcare Availability

Areas lacking any childcare facilities can be classified as childcare deserts. In areas with limited childcare facilities, there can be extensive waitlists that make childcare inaccessible. There are a number of initiatives in place and opportunities in place as discussed in the following subsections.

Florida Small Business Development Centers Childcare Initiative

The Florida Small Business Development Centers initiative consists of a 4-month training and consulting program conducted in partnership with Wells Fargo, Business & Leadership Institute for Early Learning and the TCPI – Childcare Services Committee. This program is intended for entrepreneurs seeking to open a childcare center or home-based childcare center as well as owners and managers of operating childcare centers. There are no additional course fees that makes this program widely accessible. Through conducting this course, the hope is that the number of childcare facilities/operations on military bases will increase, alleviating issues such as childcare costs, childcare deserts, and long waitlists. This program has seen success in other parts of the state, such as in Winter Park, where the Higher Learning Development Center was established thanks to support from the Florida Small Business Development Center.

Assisting Installation Child Care Resource and Referrals

Another method of improving childcare access is assisting local CCR&Rs and installation of CDCs to coordinate the marketing of available off-installation childcare options. Installation CCR&Rs often collaborate with state lead agencies to grow and provide services to installation personnel and their families. State lead agencies are designated by the chief executive of a state and serve the role of administering funds for community-based and preventive-focused programs with the goal of strengthening and supporting families (FRIENDS FCR). Improving and increasing the number of CCR&Rs and CDCs will make childcare more accessible to military installation personnel.

Enhanced Use Leases for Childcare Facilities

Childcare supply for military installations can be increased by supporting localized EULs, which allow for the funding of construction or renovations on federal property by allowing private developers to lease underused properties. These properties can be rented by private companies. The increase in EULs across military installations can allow for an increase in childcare facilities within and surrounding military installations. Potential opportunities for EULs include the orphan parcels at Eglin AFB or an unused OLF site that can be leveraged through a land swap for a childcare facility. Multiple EULs have been successfully implemented at Air Force installations throughout the country, including a solar array at Luke AFB, a water reclamation facility and fitness center at Nellis AFB, and various EULs, including the airport, at Eglin AFB (Lachman et al. 2019).

6.3 Insurance

Insurance costs are a significant stressor for the local communities and military members. State and local actions and program can help reduce insurance costs for communities.

6.3.1 State

Florida's insurance crisis stems in part from litigiousness within the state. Legislation that heads off the litigation issues went into effect in 2023 and the situation has started to rectify, as noted by the Insurance Information Institute. It is anticipated that litigation costs for insurers will continue to level off over time as court cases make their way through the system (Insurance Information Institute 2024).

6.3.2 Local

Continue to Improve Community Rating System Scores

FEMA's Community Rating System (CRS) is a voluntary program that encourages community floodplain ordinance and practices that exceed the minimum requirements of the National Flood Insurance Program. Within the CRS, communities are classified as having a class between 10 and 1. The lower the class, the greater the discount on flood insurance premiums. Almost all of the communities in the Emerald Coast participate in the CRS. Discounts range from 5% to 45% in alignment with the CRS score (Table 6-3).

Table 6-3. Community Rating System Class and Discount

Community	CRS Class	CRS Discount
Escambia County	7	15%
City of Pensacola	7	15%
Santa Rosa County	5	25%
City of Milton	6	20%
Okaloosa County	5	25%
City of Destin	6	20%
City of Niceville	6	20%
City of Fort Walton Beach	6	20%
Walton County	6	20%
Bay County	5	25%
City of Panama City Beach	5	25%
City of Panama City	5	25%

CRS scores are influenced by a number of factors, including flood warning and response, higher regulator standards, and floodplain management planning. Communities improving their CRS scores can score higher flood insurance premium discounts for their residents. Information on improvements for CRS scores can be found in the CRS Coordinator's Manual (FEMA 2017) and the associated 2021 Addendum (FEMA 2021).

Identify Supplemental or Alternative Programs

Alternative insurance opportunities outside of traditional insurers can help protect the financial wellbeing of community members. These can include community flood insurance or innovative insurance options, discussed briefly as follows:

- **Local flooding insurance affordability programs.** The City of Portland, Oregon, created its own Flood Insurance Savings Program in 2017 to help floodplain property owners obtain lower insurance prices and lower their risk. The program assists homeowners by providing free or low-cost elevation certificates, home assessments, and flood insurance counseling, resulting in average annual savings of $720 between 2017 and 2018 (Sherman and Kousky 2018).
- **Community-based insurance.** In this model, insurance is purchased or facilitated by a local or quasi-governmental body or community group covering multiple properties within a community. Community-based

insurance can complement traditional property insurance markets to meet local needs with a flexible policy (Bernhardt et al. n.d.).

- **Premium reductions for low-cost flood mitigation.** Some flood-mitigation initiatives, such as elevating a home, are expensive for homeowners while others, such as elevating electrical equipment or installation sump pumps, are more feasible. A community partner with the local government can assist with providing such mitigation services, with the goal of reducing premiums.
- **Parametric microinsurance.** Parametric microinsurance is designed to provide funds quickly after a disaster event to meet the needs of lower-income households. In this model, funds are distributed when a certain metric (e.g., wind speed or flooding) event is triggered. For example, a parametric insurance pilot program in New York City aims to get recovery dollars quickly to moderate- and low-income households at risk of rainfall flooding (Environmental Defense Fund 2023). There are a variety of models for microinsurance that can be implemented (Kousky et al. 2021), though there are challenges with finding a stable source of funding for premiums and determining sustainable and cost-effective solutions to support immediate post-disaster needs of moderate- and low-income households. This program has been found to be beneficial for low-income households.

These options have been implemented in a number case studies around the U.S. Further study and potential pilot programs at the local level can gauge the viability of such programs.

Use Building Codes and Zoning to Reduce Risk

Stronger building codes and wise planning and zoning can reduce damage to structures, thereby reducing risk and insurance costs. Local regulations, such as flood ordinances and zoning maps, can reduce asset exposure to flood hazards while building codes can reduce asset sensitivity to hazards.

Recommendations

The following actions can support reduction of insurance cost stressors in the Emerald Coast:

- Increase CRS scores by implementing floodplain ordinance and activities within a community
- Identify and pilot alternative or supplemental insurance programs
- Enhance local codes, ordinance, and zoning to reduce community and asset vulnerability to hazards

6.4 Codes and Design Standards

6.4.1 Building Codes

Flood Design Standards

Flood design requirements include building and asset elevations and structural resistance against the hydrostatic and hydrodynamic pressures. These design requirements can be incorporated into local ordinance to better reduce asset sensitivity to flooding.

Existing Standards

Federal Government

The Federal Flood Risk Management Standard requires that federal entities incorporate future flood risk into the designs. This can be done through one of three approaches listed in Table 6-4.

Table 6-4. Federal Flood Risk Management Standard Approaches

Approach	Flood Elevation
Climate-Informed Science Approach	Best available data
Freeboard Value Approach	+2 feet freeboard to the base-flood elevation (100-year flood elevation) for critical actions +3 feet freeboard to the base flood elevation (BFE) (100-year flood elevation)for non-critical actions
500-Year Floodplain	Use flood elevation for area subject to flooding by 0.2% annual chance flood event

Florida Building Code

The 2020 FBC requires that the lowest floor of a building or structure be elevated, at a minimum, 1 foot above BFE.

Local Standards

Localities can have standards that are higher than the FBC. The City of Mexico Beach, for example, requires that new or rebuilt structures in the 100- or 500-year floodplain be elevated 1.5 feet above BFE. Bay County, on the other hand, follows the requirements set in the FBC, according to its Floodplain Management Ordinance. Utilities have their own design standards as well. For example, ECUA builds all of its lift stations 3 feet above the mapped 100-year floodplain.

Recommendation

Local governments and entities should either develop or continue to implement building codes and flood ordinances that exceed minimum requirements of the FBC. In areas where jurisdictions meet, codes should be coordinated.

6.4.2 Recommendation

For the MIRR and preserving mission assurance through community resilience, it is recommended that communities and utilities continue to adopt floodplain management ordinance and/or design standards that exceed the requirements in the FBC. This applies particularly to mission-critical and supportive infrastructure.

Wind Design Standards

Florida Building Code

In 1974 Florida's state minimum building code required local governments to adopt and enforce a building code that ensured minimum standards for the public's health and safety. Local governments could amend their local codes as they desired. Deficiencies of this code's enforcement and compliance processes were revealed in 1992 after Hurricane Andrew hit South Florida and created Florida's worst insurance crisis in history. It became apparent that building codes were a statewide issue, and in 2002 Florida adopted the FBC to supersede all local building codes. The FBC is updated every 3 years to accommodate a dynamic climate. For example, it sets forth structural design wind speeds so that buildings have a minimum protection against events such as Hurricane Andrew, which are becoming more prevalent and intense with climate change. Thus, design wind speeds have changed significantly since the time the code was first adopted to ensure adequate protection against severe weather events.

Tyndall AFB Design Wind Speeds

Tyndall AFB sustained catastrophic damage when Hurricane Michael hit the Florida panhandle in October 2018. Every building suffered severe damage, with many considered a complete loss. In response, Tyndall adopted The

Design Wind Speed and Building Envelope Protection Memorandum as its own performance standards that go beyond the FBC. Tyndall leadership recognized the need to establish future wind speeds as their design standards to increase its resilience against the effects of succeeding coastal storms and implemented standards to improve the installation's ability to maintain operational continuity in the face of future disruptions.

Recommendation

When feasible, communities should adopt wind design standards that exceed the FBC, particularly for critical infrastructure.

Wildfire Codes and Best Practices

Wildfire-specific codes have been implemented in various communities throughout the country. These codes serve as a means for a means of reducing asset and structural sensitivity to wildfire. Typical components of a wildfire code can include:

- Use of ignition-resistant materials in construction
- Requirements for exterior structures (decks, walls, etc.)
- Defensible space requirements

Though they do constitute best practices, wildfire code requirements can place undue burden on rural landowners and can face stiff resistance from builders and developers. During the resilience planning process, the MIRR team learned about the prior efforts to bring wildfire codes into various communities in the Emerald Coast. Such efforts often go unsigned because of community resistance. While not a replacement for design standards, community wildfire protection plans (CWPPs) provide an additional means of reducing community vulnerability to wildfire.

Recommendation

CWPPs plans identify high-risk areas within the WUI and provide solutions, including land and fuels management. Such plans are already used by the Florida Forest Service in a number of areas within the Emerald Coast and can be developed for additional communities around the installations, including:

- West Pensacola (off Blue Angel Parkway)
- East side of Garcon Point (3 miles from Eglin AFB)
- Point Baker community (southwest of Whiting Field)
- City of Crestview
- Portions of Bay County around Tyndall AFB

The implementation of a wildfire building code can be evaluated on a case-by-case basis.

6.4.3 Design Standards

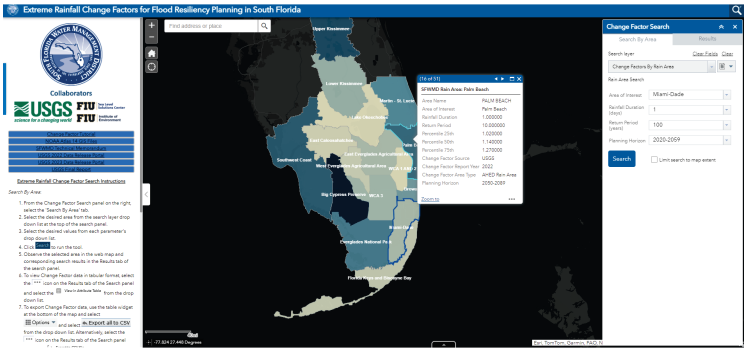
More stringent design standards can promote resilience systematically with every project and capital investment, helping every project become a resilient project. Traditionally, design codes and standards are based on prior experiences and events. Climate-informed design standards, on the other hand, are forward-looking and incorporate future conditions using climate projections, positioning infrastructure for continued operation going into the future.

Stormwater Management Design Requirements and Level of Service

Local stormwater management design requirements typically use rainfall data from NWFWMD or NOAA Atlas 14. Rainfall data sources are based on historical data and do not account for increased precipitation intensity or frequency. As of the time of writing, NOAA is drafting Atlas 15, which include adjustment factors for future projections (NOAA Office of Water Prediction 2023). Atlas 15 is projected to be released in 2026 for the continental U.S.

The U.S. Geological Survey (USGS) has released change factors for future precipitation depth-duration-frequency curves for the State of Florida (Irizarry Ortiz 2023). The South Florida Water Management District (SFWMD) has developed a GIS webmap that maps this data and displays the adjustment factors within its jurisdiction (Figure 6-1).

Figure 6-1. South Florida Water Management District's Future Rainfall Dashboard



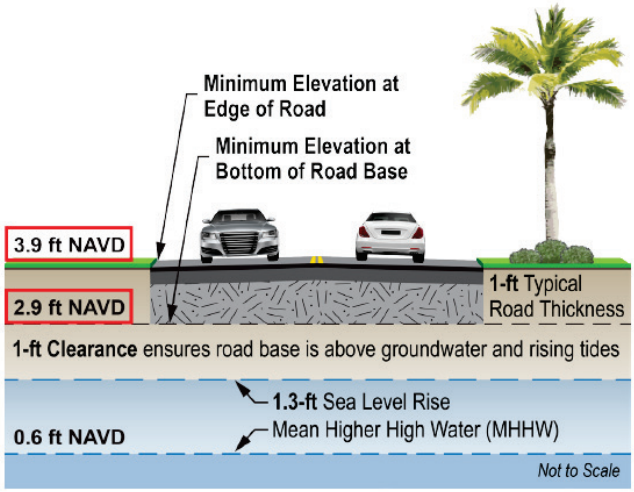
Recommendation

NWFWMD should incorporate future rainfall changes for drainage design in its region. NWFWMD can develop a similar tool to that of SFWMD, using preexisting data from USGS, to support forward-looking stormwater design criteria within the Emerald Coast.

Resilient Roadways

As a result of rising sea levels and anticipated higher future flood stages, critical access roads and highways will be impacted by road base saturation and road surface flooding. Saturation of the road base, which can cause premature pavement failure, can be mitigated through road hardening following FDOT's Flexible Pavement Design Standards, which suggest the use of black base or granular base to avoid road structural failure (FDOT 2024). Road surface flooding can be mitigated through road elevation (Figure 6-2), along with roadway drainage and stormwater management system improvements, tidal barriers, and stormwater pump stations where warranted.

Figure 6-2. Road Elevation Example



Collectively, these strategies can reduce flood risk for roads to ensure accessibility before, during, and after extreme storm events. This is particularly important for the many coastal roads in the project area, including Highway 98, Blue Angel Parkway, and Highway 90 in the City of Milton.

Resilient Water and Wastewater Utilities

A number of resilience strategies can be implemented to make water and wastewater utilities more resilient, as follows:

- **Reduce lift station exposure and sensitivity to flooding.** This can be done by elevating the electrical panel to prevent floodwaters from reaching the electronics contained within (Figure 6-3). Raising the wet well vent and sealing the entrance through installation of a water-resistant cover can also prevent water intrusion during flooding.

Figure 6-3. ECUA Elevated Lift Station



- **Conduct risk and resilience assessments.** Water and wastewater utilities can conduct risk and resilience assessments to understand malevolent, natural, dependency, and proximity hazards and their effect on utility critical assets. These assessments can provide an understanding of mission-defeating risks and identify opportunities for risk reduction. There are a number of frameworks available, including the American Water Works Association J100 methodology and the EPA Vulnerability Self-Assessment Tool, that can be used to conduct these assessments.

Heat Protection

Because of the increasing frequency of extreme heat days in the Emerald Coast, it is recommended that entities, whether they are utilities or local governments, consider enhancing operational practices regarding heat to protect critical, heat-sensitive infrastructure. Components of a heat protection policy for assets can include:

- Avoiding direct sun exposure for outdoor electrical facility, providing shade if applicable.
- Increasing the capacity of radiators and blower fans to provide sufficient power for cooling equipment.
- Monitoring air temperature around heat-sensitive equipment.
- Observing energy consumption during warmer days. Adopt a rolling blackout to preserve power supply for critical facilities.

- Replacing heat-susceptible mechanical components with those with higher heat tolerances.
- Raising temperature specifications for materials of mechanical equipment and construction to account for rising temperatures that will occur during the service life of the equipment.
- Increasing heating, ventilation, and air conditioning (HVAC) capacity for future warming climate.
- Providing HVAC (cooling) system redundancy for critical equipment.
- Considering thermal comfort requirements for facility design and operation, including ventilation, cooling, shade design, and reflection.

6.5 Protecting the Eglin Gulf Test and Training Range

On May 15, 2024, Governor Ron DeSantis signed House Bill 1645, which prohibits offshore wind energy facilities within 1 mile of the coastline or the Gulf Intercoastal Waterway (FL Legislature. Assembly. 2024). This new state language also prevents wind farm development in state waters (out to 3 nautical miles). The legislation applies to wind farms in state lands and waters and transmission infrastructure that passes through state lands. These efforts protect military activities within the EGTTR from encroachment by wind energy development.

While the state is protecting portions of the EGTTR within its jurisdiction, there are additional gaps that must be addressed. Oil and gas development still poses an encroachment risk for military activities within the EGTTR - any horizontal or vertical infrastructure above or below the water can impact and limit military activities. To address these gaps, **it is recommended that federal protections be implemented for the EGTTR – federal legislation must prohibit all energy development (oil, gas, and wind) that presents an encroachment challenge for unencumbered military use of the Range.**

6.6 Quality of Life Initiatives

6.6.1 Regional Trail Systems and Natural Recreation Areas

Quality of life is crucial in maintaining the wellbeing and morale of service members and their families stationed at Emerald Coast military installations. Ensuring access to recreational amenities and outdoor spaces enhances community wellbeing and provides valuable outlets for physical activity and family engagement. The Emerald Coast region has recognized the value of preserving natural recreation areas and expanding regional trail systems to support these needs.

Regional trail systems, such as the Florida Greenways and Trails System, provide recreational opportunities and enhance connectivity between communities and military installations. These trails offer a safe, accessible way for residents and military personnel to engage with nature while supporting local economic development through increased tourism. Additionally, maintaining and enhancing green spaces and natural areas, such as Blackwater River State Forest and the Gulf Islands National Seashore, ensures long-term access to quality recreational amenities.

6.6.2 Recommendation

Continue expanding the regional trail network and preserving natural recreation areas. Collaborative efforts between installations, local governments, and state agencies can enhance the trail systems, support the development of trailheads, and secure funding for ongoing maintenance and improvements.

6.7 Threatened and Endangered Species Preservation

6.7.1 Species Management and Coordination

The preservation of threatened and endangered species within and around military installations is a priority in the region. These efforts often require balancing species protection with the need for ongoing development and mission-critical activities. Successful management and conservation can have significant positive impacts, as demonstrated

by delisting the Okaloosa darter in 2021, a collaborative effort between Eglin AFB and local partners (USFWS 2021). It is possible to manage species recovery while maintaining operational readiness effectively.

However, other species, such as the red-cockaded woodpecker, flatwoods salamander, and Panama City crayfish among others, present ongoing challenges for development, both inside and outside the fence line of installations. These species have specific habitat requirements that often intersect with areas targeted for development, leading to conflicts over land use. For example, the red-cockaded woodpecker, which nests in mature pine forests, often restricts timber operations and development on both public and private lands. The flatwoods salamander, found in isolated wetlands, requires careful management of hydrological conditions, which complicates stormwater management and construction activities. Similarly, the Panama City crayfish, which inhabits specific wetland areas in Bay County, can pose challenges for roadway expansions, stormwater management, and other infrastructure improvements.

6.7.2 Recommendation

Military installations and local governments should continue to collaborate on species management plans that protect sensitive habitats while allowing for necessary development. This includes implementing best management practices and conservation banking to offset the impacts of development. For installations, ongoing coordination with state and federal agencies can help identify solutions that preserve critical habitats without disrupting military readiness. Additionally, incorporating species considerations into early planning stages can prevent costly delays and ensure compliance with environmental regulations.

To minimize conflicts, it is recommended that installations develop comprehensive species management strategies that include habitat restoration, buffer zone establishment, and, where appropriate, relocation efforts. Public education and stakeholder engagement are also critical components, as they build community support for preservation initiatives and foster a shared commitment to the region's environmental stewardship.

Implementation and Next Steps



7. Implementation and Next Steps

7.1 Resilience Organization

During the 18-month-long Emerald Coast MIRR process, the collaboration and bond among regional and military staff and planners has grown and strengthened. As this initial assessment and planning phase of Emerald Coast MIRR concludes, the Emerald Coast Area Resilience Collaborative will maintain momentum and facilitate communication among regional and military planners, elected leaders and military command leadership, and local, state, and Federal stakeholders. Started through a seed grant from the American Flood Coalition in 2021, the ECRC-ARC is a team of individuals from backgrounds such as education, research, economics, environment, planning, government, emergency management, and utilities/infrastructure (Figure 7-1). The Collaborative represents a seven-county region including Escambia County, Santa Rosa County, Okaloosa County, Walton County, Holmes County, Washington County, and Bay County. Through this collaborative, Northwest Florida's leaders will work to secure funding to implement the resilience projects identified in the Emerald Coast MIRR, continue updating resilience strategies as new challenges arise, monitor progress of implementation, and provide periodic public updates.

Figure 7-1. ECRC Will Facilitate Next Steps



To maintain and enhance the larger group dynamic and momentum, as well as ensure individual project pursuits, the TAC discussed implementation options at its final meeting in June 2024. Working in partnership with the TAC, PC, and other regional stakeholders such as the NWFSL, the ECRC (as the staffing agency to the EC-ARC) will facilitate the continued work of the Collaborative to further increase the resilience of the region's miliary installations, commands, and communities.

ECRC has well-established relationships with not only elected officials and staff in Northwest Florida but also the Economic Development Organizations; Chambers of Commerce; NWFWMD, NWFSL, the Florida departments of Transportation, Environmental Protection, Commerce, and Emergency Management; and other regional stakeholders. The Council's working relationships with federal partners include, but are not limited to, the U.S. DoD OLDCC, U.S. Environmental Protection Agency, U.S. Department of Transportation, and U.S. Economic Development Administration.

The Council also brings to the Emerald Coast MIRR, and subsequent implementation efforts, experienced planning staff that is well-versed in a multitude of planning areas including transportation, economic development, attainable housing, geospatial analysis, and resilience. Its proven and successful track record of developing and furthering the work of inter-disciplinary regional partnerships in Northwest Florida, including the five-county region where the Emerald Florida MIRR installations are based, will be a great benefit to the partnership and its future implementation activities. The ECRC will continue to provide support in coordination, collaboration, and seeking funding opportunities. The ECRC is ready to continue assisting the implementation team by fostering relationships with federal, state, and local military representatives and identifying additional creative funding opportunities. The Emerald Coast MIRR stakeholders are active and eager to implement local resilience efforts. They are well-equipped to drive the Emerald Coast MIRR recommended projects forward.

7.2 Implementation

The following prioritized list of actions are recommended for Emerald Coast MIRR implementation:

1. Work with the ECRC and regional stakeholders to grow EC-ARC as the focal point of regional collaboration for resilience.

   6-Month Milestones

   - Host a stakeholder meeting in fall 2024 to kick-off efforts and review the Emerald Coast MIRR implementation plan.
   - Create a meeting schedule, gain consensus, and commitment to meet and monitor progress, as well as advocate for additional implementation dollars.

2. The EC-ARC shall determine the staff structure and meeting cadence.

   8-Month Milestones

   - Update the prioritization of local projects as needed based on national security for funding, planning, designing, and building improvements, using the Emerald Coast MIRR Implementation Strategy.
   - Confirm installations are on the Critical Infrastructure List for service providers including FPL, FDEM, NWFWMD, and USACE.
   - Understand existing intergovernmental agreements.
   - Stand up new or amend existing Memorandums of Understanding.

3. Prioritize the pursuit of funding for continued momentum.

   12-Month Milestones

   - Establish timeline with milestones to achieve implementation of highest priority improvements.
   - Apply for grants for immediate continued planning and collaboration, as well as implementation dollars for design and construction of highest priority improvements as outlined in the plan.

7.3 Working Together for Mission Assurance through Community Resilience

The EC-ARC should have at a minimum the following representatives actively engaged:

- DoD OLDCC Leadership and community liaisons from each installation in the study area
- County representatives as necessary (transportation, parks, planning etc.)
- City representatives (planning, parks, emergency management, as determined by the city)
- Northwest Florida Sentinel Landscape
- Local Defense Alliances (TCPI, NWFL Defense Coalition, Bay Defense Alliance)
- Relevant state agencies (FDOT, Florida Forest Service)

- Utility providers
- Private and non-profit sector representatives, as needed.

For continued and effective collaboration, the following considerations are recommended:

- Municipal and installation planners should consider dedicating existing in-kind resources for the first year of coordination.
- The EC-ARC partners should include military presence in regional workshops and meetings.
- The Partnership should communicate with the State of Florida Chief Resilience Officer and resilience team to continue momentum at a regional level in coordination with other regional planning councils engaged in MIRR work. Items for this discussion include funding, statewide information sharing, and formalizing relationships with state agencies given that other MIRR studies have been completed, are currently underway, or are being planned across the state by several of Florida's regional planning councils.
- Annual reports to the leadership of participant agencies, as well as future funders, highlighting accomplishments and performance milestones should be crafted and are highly recommended to celebrate success and continue funding momentum.

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APPENDIX A

Stakeholder Engagement



August 2023

WORKSHOP & SITE VISIT

NAS PENSACOLA



EMERALD COAST MILITARY INSTALLATION
RESILIENCY REVIEW

EMERALD COAST REGIONAL COUNCIL

Jacobs
Challenging today.
Reinventing tomorrow.

Meeting Agenda

Jacobs

Northwest Florida Military Installation Resilience Review (MIRR) Workshop & Site Visit – NAS Pensacola

August 14th - 15th, 2023

Pensacola Bay Center

201 E Gregory St, Pensacola, FL 32502

NAS Pensacola Day 1: Information Sharing

9:00am Working Group Welcome & Introductions

The workshop will open with a welcome message and introductions led by Jacobs and ECRC. A review of the scope of the grant and project timeline will be given, followed by a recap of comments from the kickoff meeting, and discussion of goals of the site visit. Representatives from NAS Pensacola are invited to give an overview of issues and opportunities they have observed to the group; representatives from the surrounding communities are then invited to do the same. This session will also touch on guiding policy requirements.

- *Project scope & overview- ECRC / Jacobs*
- *Goals of the workshop- Jacobs*
- *Mission overview, issues, and observations- NAS Pensacola*

9:20am Data Review: Site Inventory and Analysis

Jacobs Team will lead a dialogue about the data that has been received, identifying existing concerns, regional relationships, and potential extents and context of study areas. The team will answer questions related to the assessment and analysis of the study areas.

- *Data & resource checklist*
- *Extents of study area*
- *Identify regional relationships*

9:45am Breakout Session #1

With regards to mission assurance and the communities surrounding NAS Pensacola, the group will develop a list of potential threats and hazards, ongoing mitigation efforts, and potential projects related to the sectors below. 1-hour to discuss – debrief begins by 10:45 am.

- *Utilities Infrastructure (Water, Sewer, and Solid Waste)*
- *Utilities Infrastructure (Power and Communications)*

11:00 am Lunch

Lunch will be catered.

11:30am Breakout Session #2:

With regards to mission assurance and the communities surrounding NAS Pensacola, the group will develop a list of potential threats and hazards, ongoing mitigation efforts, and potential projects related to the sectors below. 1-hour to discuss – debrief begins by 12:30 pm.

- *Economic, Housing, and Environmental Related Stresses*
- *Transportation, Education, and Childcare*

12:45pm Outbrief and Next Steps

1:00pm Depart

NAS Pensacola Day 2: Virtual Site Visits

9:00 am NAS Pensacola Brief

Day #2 will open with a welcome message and introductions led by Jacobs and ECRC. A short installation brief will be given by representatives from NAS Pensacola focusing on the mission of each installation.

- 9:00 am – 9:30 am – NAS Pensacola Brief and Discussion

9:30 am Review and Discussion of Day #1 Project Recommendations

A preliminary discussion will explore potential adaptation strategies, project types and locations. A brief description of the project next steps.

11:15am Outbrief and Next Steps

11:30am Depart

Meeting Summary

Northwest Florida Military Installation Resilience Review (MIRR) Workshop & Site Visit – NAS Pensacola

August 14th – 15th, 2023

Pensacola Bay Center

201 E Gregory St, Pensacola, FL 32502

On August 14th and August 15th, 2023, the project team for NWFL Military Installation Resilience Review (MIRR) conducted a workshop for the NAS Pensacola.

The purpose of the MIRR project is to identify the hazards, vulnerabilities, and risks of concern as it relates to the ability of the military to carry out its missions on the installation that could be mitigated through solutions outside the fence line in the community. This project uses the planning horizons of 2040 and 2070 for projections, forecasted vulnerabilities, and 'shocks' in addition to current, everyday 'stresses' that are being faced by the installation. The purview of the project will define a series of pilot projects that decrease risks associated with the identified vulnerabilities by improving the natural, physical, and social infrastructure systems that supports NAS Pensacola, their mission, and their community. The objectives of the workshop for the MIRR project team included:

- Confirm the issues and observations of stakeholders through discussion and tours.
- Understand the constraints and gaps being faced and ongoing / current efforts that are underway through research and data collection.
- Gain consensus on and start to define what a resilient NAS Pensacola and its community means through dialogue and continuous engagement with stakeholders.

The workshop was facilitated by Jacobs and the Emerald Coast Regional Council. Attendees included representatives from NAS Pensacola, the City of Pensacola, Escambia County, regional communication companies, regional defense groups, and regional conservation groups. The agenda focused on confirming and expounding upon the hazards and threats recorded during the NWFL MIRR Kickoff Meeting Visioning Session and brainstorming potential mitigation strategies and projects.

Day 1: NAS Pensacola Workshop

Information Sharing

Working Group Welcome & Introductions

On the first day of the workshop, the group gathered in-person at the Pensacola Bay Center for a quick round of introductions and overview of the day ahead. Eric Christianson and Tanya Gallagher gave an overview of the project, including its scope, and the goals for the workshop.

Discussion included acknowledgement that NAS Pensacola and the surrounding community already boast an amiable relationship, there are areas of improvement for building even stronger ties. With the region's military installations supporting one-third of Northwest Florida's total gross regional product, the need for infrastructural and socio-economic improvements which ensure mission feasibility is critical to both entities. In the afternoon breakout sessions, discussion of threats and hazards identified by the participants included redundancy of utility services, communication advancements, increases in housing (availability and affordability), access to common services, as well as promoting the effort to get NAS Pensacola designated as a Strategic Intermodal System (SIS).



Figure 1: Eric Presenting the Group Welcome

Data Review: Data Gaps and Needs

A review of the data compiled before the workshop revealed significant gaps in information about NAS Pensacola and the surrounding community. Alec Rodriguez, the technical lead on the Jacobs project team, highlighted that many GIS data are needed from both utility providers as well as additional layers from Escambia County and the City of Pensacola. These layers are crucial for the project team's ability to visualize where critical points, areas of stress, and valuable assets are located. The group had discussions about data sensitivity and how classified data will be presented.



Figure 2: Participants in the Onsite Workshop

The representatives from the communications companies surrounding the base suggested an arrangement of NDAs before releasing the requested information about critical communication assets and plans for expansion. This information will help bolster existing communication infrastructure and expand the capabilities of 5G service. Relevant information from the other attendees is expected to aid in the development of suitable housing, childcare solutions, utility resilience, and infrastructure enhancement which will benefit the community and mitigate threats to the mission of NAS Pensacola.

Alec then led a discussion surrounding the data that has currently been collected to support the vulnerability analysis of this installation and asked questions to find the appropriate sources for any gaps in the analysis.

Interactive Session

Workshop Breakout Session

Afterwards, the Jacobs team led the group through a discussion of potential mitigation projects to address the resilience issues that had been documented. Two breakout sessions were conducted. The first breakout session discussed Utility Infrastructure and split into two groups. The first group discussed Water, Sewer, and Solid Waste and the second group discussed Electrical and Communications. The second breakout session also was split into two groups. The first group discussed Transportation, Childcare, and Education and the second group discussed Housing, Environment, and Economic related

stresses. Each of the groups gathered around a map to plot out project ideas. Identified mitigation opportunities that were discussed are categorized and listed below:

Water/Sewer/Solid Waste:

Threats / Hazards:

- FM on Taylor/Radford Rd needs improvements
- I & I issues during large storm events, tidal, flooding and pump station
- PFAS Standards (filters on wells and filter disposal)
- Trees busting water/sewer lines during storms
- Funding Strategies
- Pump station at back gate overflow (discharges to bay)

Ongoing Efforts:

- All pump stations have backup power generators (2-3 days) and fuel trailer
- NAS Living Shoreline project
- ECUA 2013 capacity analysis & CIP developed for future projects
- Northeast FM to get more capacity in downtown Pensacola
- Upsizing 9th avenue outfalls
- Updated utilities at Innerarity Point Rd

Potential Projects:

- Second sewer line leaving NAS (single source of failure now)
- Emergency access to NAS for ECUA
- Need well at Corey Station/NAS during max demands
- Parallel FM to increase capacity pumping north as an alternate to main FM

Energy/Communications:

Threats / Hazards:

- High winds
- Flooding at Clean Energy Center
- Controlled burns near transmission lines
- Flood risks downtown
- Lack of cell capacity during storms
- Limitations on federal funds and grants

Ongoing Efforts:

- Tracking heat issues and equipment
- FPL has agreement with solar providers
- 13 solar centers in NWFL region
- FPL has been improving service reliability
- County has redundant communication systems for emergencies
- Natural gas is looped and tied out throughout Escambia

Potential Projects:

- Being able to use state funds for inside the fence work
- Remedy dead spots on west side of installation and scenic highway
- Could use natural gas capacity for backup power for NAS

Economic:

Threats / Hazards:

- Oil spill/disaster affecting tourism
- Limited workforce availability
- Shutdown (pandemic)
- Lower income families being pushed out
- Two-legged economy (tourism & DoD)
- Aging infrastructure

Ongoing Efforts:

- City has $59 million for infrastructure
- Economic assessment for estuaries
- City of Pensacola hired Director of Economic Development
- Pensacola State College has CDL training program

Potential Projects:

- County can expand into aviation sector
- Infrastructure projects/plans to support growth

Housing:

Threats / Hazards:

- Growth outpacing housing availability
- Large homeless population
- Built housing is middle or high income
- People want to live near good schools which are far

Ongoing Efforts:

- City of Pensacola conducting housing study
- Hometown Revitalization Grant to build affordable housing
- Looking to turn Pensacola Motor Lodge into affordable homes
- Pensacola looking at acquiring Baptist Hospital land

Potential Projects:

- Incentive for tiny homes
- Incentivize affordable/attainable housing construction
- Improve safety issue around Corey Station

Environmental:

Threats / Hazards:

- Shoreline erosion
- Septic tanks (whole west side of Pensacola)
- Pluvial flooding
- Water quality
- Endangered species

Ongoing Efforts:

- NAS protected wetlands west of base using REPI funds
- Living Shoreline
- Estuary program has NOAA funds to making living shoreline on Bronson Field
- Compound flooding and VA for Escambia County
- Estuary joint partnership with ECUA and County and City for septic sewer conversions

Potential Projects:

- Conservation opportunities
- Get construction money for Bronson Field living shoreline

Transportation:

Threats / Hazards:

- Capacity around base
- 2 entrances to base (1 for guests)

Ongoing Efforts:

- Right turn lane at Sunset and paved shoulders (FDOT)
- 4 lane projects
- Navy blvd from New Warrington to Bayou Chico beautification project
- Old Corey resurfacing, sidewalks, lighting

Potential Projects:

- 4 lane Gulf Breach HWY
- Multimodal transportation at entrance of base and Navy blvd areas
- Chiefs Way improvements
- Alternative transportation planning

Childcare:

Threats / Hazards:

- Attracting talent due to school districts and lack of childcare

Ongoing Efforts:

- In-home certification for childcare
- CDC transports kids to/from school

Potential Projects:

- Potential partnerships with local childcare facilities to get priority and funding

Education:

Threats/Hazards:

- Attracting talent due to school districts and lack of childcare

Ongoing Efforts:

- In-home certification for childcare
- CDC transports kids to/from school

Potential Projects

- Improve public messaging and education (EMA)
- Funding for schools with increasing students
- Automatic enrollment in schools

Outbrief: Next Steps

The workshop was concluded with Alec Rodriguez and Tanya Gallagher detailing the next steps for the project team, when they will be meeting, and the critical asset and vulnerability assessment timeline.



Figure 3: The Blue Angels Flying

Day 2: Site Visit

NAS Pensacola Outbrief

Meeting with NAS Pensacola Community Liaison and Staff

On day two of the NAS Pensacola workshop/site visit, Jacobs and ECRC staff met with Steve Opalenik of NAS Pensacola and staff for a brief of the base. The brief highlighted the mission and operations of the base as well as the tremendous economic impact they have on the surrounding community. The primary mission of NAS Pensacola is training. The presentation concluded with a list of grant opportunities the base has engaged in as well as a discussion with staff on vulnerabilities and threats to the base.

Conclusion

The 2-day program was successful and well-received by the attendees, with the goals and objectives achieved for the project team.

Action Items

Follow-up action items include:

- Set up interview with FPL.
- Request Economic Assessment and list of projects from Pensacola and Perdido Bay Estuary Program
- Conduct follow up interview with Pensacola Energy
- Interview with ECUA
- Follow up with Jeremy Holcomb - ECUA

Northwest Florida Military Installation Resilience Review (MIRR)

NAS Pensacola Workshop Attendance List

August 14th – August 15th, 2023

Last Name	First Name	Role	Company	Contact Email
McKenzie	Scott		Escambia Emergency Management	gsmckenzie@myescambia.com
Helton	Isaiah		Escambia Emergency Management	iphelton@myescambia.com
Phillips	Chris		Escambia County Engineering	tcphillips@myescambia.com
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Hollon	Joel		City of Pensacola	jhollon@cityofpensacola.com
Boyer	Kevin		City of Pensacola	kboyer@cityofpensacola.com
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Hayden	Stacy		ECUA	Stacy.hayden@ecua.fl.gov
Posner	Matt		Pensacola & Perdido EP	mjposner@ppbep.org
Graham	Debi		Pensacola Chamber	dgraham@pensacolachamber.com
Vick	Chris		FPL	Christopher.vick@fpl.com
Johnson	Bernard		FPL	Bernard.johnson@fpl.com
Wimmer	Kent		NWFL Sentinel Landscape	kwimmer@defenders.org
Christianson	Eric		ECRC	Eric.christianson@ecrc.org
Mount	Austin		ECRC	Austin.mount@ecrc.org
Bates	Tiffany		ECRC	Tiffany.bates@ecrc.org

Last Name	First Name	Role	Company	Contact Email
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Cristea	Bill		NAVFAC SE Pensacola	William.cristea@us.navy.mil
Harris	Lynette		NAVFAC SE PWD	Lynette.b.harris.civ@us.navy.mil
Klein	Josh		Utility Manager - NASP	(online)
Paul	Dylan		Planner – NASP	(online)
Hayenga	Sarah		Planner – NASP	(online)
Chmura	Mike		Production Division Director – NASP	(online)
Kane	Caleb	Facilitator	Jacobs	Caleb.kane@jacobs.com
Rentschler	Lori	Facilitator	Jacobs	Lori.rentschler@jacobs.com
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Jernigan	Scott	Facilitator	Jacobs	Scott.jernigan@jacobs.com

July 2023

WORKSHOP & SITE VISIT

NAS Whiting Field



EMERALD COAST MILITARY INSTALLATION
RESILIENCY REVIEW

EMERALD COAST REGIONAL COUNCIL

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Challenging today.
Reinventing tomorrow.

Northwest Florida Military Installation Resilience Review (MIRR) Workshop & Site Visit

NAS Whiting Field

June 20-21, 2023

Santa Rosa County Extension Services

6263 Dogwood Drive, Milton, Florida 32570

NAS Whiting Field Workshop Day 1: Information Sharing

9:30am Working Group Welcome & Introductions

The two-day workshop will open with a welcome message and introductions led by Jacobs and ECRC. A review of the scope of the grant and project timeline will be given, followed by a recap of comments from the kickoff meeting, and discussion of goals of the site visit. Representatives from NAS Whiting Field are invited to give an overview of issues and opportunities they have observed to the group; representatives from Santa Rosa County and City of Milton are then invited to do the same. This session will also touch on guiding policy requirements.

- Project scope & overview- *ECRC / Jacobs*
- Goals of the workshop- *Jacobs*
- Mission overview, issues and observations- *Whiting Field*
- Community perspective, plans and projects- *Santa Rosa County, City of Milton*

10:30am Data Review: Site Inventory and Analysis

Jacobs Team will lead a dialogue about the data that has been received, identifying existing concerns, regional relationships, and potential extents and context of study areas. The team will answer questions related to the assessment and analysis of the study areas.

- *Data & resource checklist*
- *Extents of study area*
- *Identify regional relationships*

11:30am Lunch Break

Lunch will be catered.

12:30pm Breakout Session #1

With regards to mission assurance and the communities surrounding NAS Whiting Field, the group will develop a list of potential threats and hazards, ongoing mitigation efforts, and potential projects related to the sectors below.

- *Utilities Infrastructure (Water & Sewer)*
- *Utilities Infrastructure (Electrical and Communications)*

1:45pm Break

2:00pm Breakout Session #2:

With regards to mission assurance and the communities surrounding NAS Whiting Field, the group will develop a list of potential threats and hazards, ongoing mitigation efforts, and potential projects related to the sectors below.

- Social & Economic Infrastructure & Related Stresses
- Transportation

3:30pm Jacobs Team Internal Working Session

Day 2: Site Visit to Whiting Field

8:30am Meet at Whiting RV Park

Site Visit Tour (Jacobs Team, installation tour guide needed)

A representative of the installation will guide attendees around the site to observe issues and verify survey information.

Attire: Walking shoes, hat, sunglasses

11:30am Drive back to Santa Rosa County Chamber of Commerce

12:00pm Lunch and Outbrief: Next Steps

A preliminary discussion will explore potential adaptation strategies, project types and locations.

A brief description of the project next steps.

3:00pm Depart

Meeting Summary

Jacobs

Northwest Florida Military Installation Resilience Review (MIRR) Workshop & Site Visit

NAS Whiting Field

June 20-21, 2023

Santa Rosa County Extension Services

6263 Dogwood Drive, Milton, Florida 32570

On June 20th and June 21st, 2023, the project team for NWFL Military Installation Resilience Review (MIRR) conducted a workshop for the NAS Whiting Field Working Group.

The purpose of the MIRR project is to identify the hazards, vulnerabilities, and risks of concern as it relates to the ability of the military to carry out its missions on the installation that could be mitigated through solutions outside the fence line in the community. This project uses the planning horizons of 2040 and 2070 for projections, forecasted vulnerabilities, and 'shocks' in addition to current, everyday 'stresses' that are being faced by the installation. The purview of the project will define a series of pilot projects that decrease risks associated with the identified vulnerabilities by improving the natural, physical, and social infrastructure systems that support NAS Whiting Field, its mission, and its community. The objectives of the workshop for the MIRR project team included:

- Confirm the issues and observations of stakeholders through discussion and tours.
- Understand the constraints and gaps being faced and ongoing / current efforts that are underway through research and data collection.
- Gain consensus on and start to define what a resilient NAS Whiting Field and its community means through dialogue and continuous engagement with stakeholders.

The workshop was facilitated by Jacobs and the Emerald Coast Regional Council. Attendees included representatives from NAS Whiting Field, the City of Milton, Santa Rosa County, regional communication companies, regional defense groups, and regional conservation groups. The agenda focused on confirming and expounding upon the hazards and threats recorded during the NWFL MIRR Kickoff Meeting Visioning Session and brainstorming potential mitigation strategies and projects.

Day 1: NAS Whiting Field Workshop

Information Sharing

Working Group Welcome & Introductions

On the first day of the workshop, the group gathered in-person at the Santa Rosa County Extension Office for a quick round of introductions and overview of the day ahead. Eric Christianson and Tanya Gallagher gave an overview of the project, including its scope, and the goals for the workshop.

Discussion included acknowledgement that while NAS Whiting Field and the surrounding community already boast an amiable relationship, there are areas of improvement for building even stronger ties. With NAS Whiting Field supporting one-third of Santa Rosa County's total gross regional product, the need for infrastructure and socio-economic improvements which ensure mission feasibility is critical to both entities. In the afternoon breakout sessions, discussion of threats and hazards identified by the participants included redundancy of utility services, communication advancements, increases in housing (availability, affordability, and attainability), access to common services, as well as promoting the effort to get NAS Whiting Field designated as a Strategic Intermodal System (SIS).



Figure 1: Participants in the Onsite Workshop

Data Review: Data Gaps and Needs

A review of the data compiled before the workshop revealed significant gaps in information about NAS Whiting Field and the surrounding community. Alec Rodriguez, the technical lead on the Jacobs project team, highlighted that many GIS data are needed from both utility providers as well as additional layers from Santa Rosa County and the City of Milton. These layers are crucial for the project team's ability to visualize where critical points, areas of stress, and valuable assets are located. The group had discussions about data sensitivity and how classified data will be presented.



The representatives from the communications companies surrounding the base suggested an arrangement of NDAs before releasing the requested information about critical communication assets and plans for expansion. This information will help bolster existing communication infrastructure and expand the capabilities of 5G service. Relevant information from the other attendees is expected to aid in the development of suitable housing, childcare solutions, utility resilience, and infrastructure enhancement which will benefit the community and mitigate threats to the mission of NAS Whiting Field.

Alec then led a discussion surrounding the data that has currently been collected to support the vulnerability analysis of this installation and asked questions to find the appropriate sources for any gaps in the analysis.

Interactive Session

Workshop Breakout Session

Following lunch, the Jacobs team led the group through a discussion of potential mitigation projects to address the resilience issues that had been documented. Two breakout sessions were conducted. The first breakout session discussed Utility Infrastructure and split into two groups. The first group discussed Water and Sewer and the second group discussed Electrical and Communications. The second breakout session also split into two groups. The first group discussed Transportation and the second group discussed Social and Economic related stresses. Each of the groups gathered around a map to plot out project ideas. Identified mitigation opportunities that were discussed are categorized and listed below:

Water:

During the discussion on water, the following items were mentioned as possible opportunities for improvement:

- Provide additional and improved potable water connections to Whiting Field for redundancy:
    - Point Baker Water System- find ways to bring water line across easements to base
    - Increase height of City of Milton water tower to provide better pressure to Whiting Field
- Improved water distribution is needed throughout Whiting Field
- Relocating the Skyline fire station to the aviation park

Sewer:
The discussion of potential mitigation ideas for sewer brought up the following items that need improvement:

- Whiting Field desires to remove all septic treatment, which will increase reliance on the sewer system
- Milton Wastewater Treatment plant is currently at capacity
    - Increased treatment capacity is required to support growth
    - I&I study to improve sewer system

Electrical:

During the breakout considering possible electrical improvements, the following items were discussed:

- Whiting Field desires a microgrid on base to alleviate single point failure
- Increase power supply at back up substation-currently only capable of supplying 60% of required power
    - Could tie into EREC power grid at this location. EREC supplies power to the area on the northside of the base
    - Auto-switch for substation to provide automatic power if primary supply goes down
- PLASMA Energy has approached Whiting Field and Santa Rosa County to discuss a 15-year $100M agreement that will supply energy by converting landfill waste. This will require 5 to 7 acres of land off-base
- Adding power guidelines to poles will remove risk of lightning damage
- Erosion control for gullies forming in FPL easements around power poles

Communications:

Whiting Field and its Outlying Landing Fields (OLFs) have consistent connectivity issues that lead to communication problems throughout the area. The ideas for improvement discussed in the breakout session are listed below:

- Broadband expansion to Whiting Field, OLFs, and the rural communities
    - Whiting field has an existing 2-inch spare conduit line running throughout the base that could be used
    - AT&T and Cox may provide more information about existing expansion plans under an NDA
- Fiber expansion to OLFs would be a great asset to the base's mission
- Building a cell tower on or near the installation
    - Whiting field has selected a location on base across from Wiggley park that would work well for a 5G tower

Socio-Economic:

Whiting Field brings many military and civilian families to the area, items discussed for possible improvements to support these families are listed below:

- Affordable housing is greatly needed
    - Mixed-use housing
    - High Density Housing
        - There is a demand for this and the associated amenities because of the young students training on base.
    - Increased options for insurance (house and flood).
    - Florida's insurance crisis is impacting affordable housing options for service members
- There are opportunities to perform a land swap initiative / leveraging land between Whiting Field and Santa Rosa County to create win-win for Navy and County including these areas: Santa Rosa OLF for industrial zoned areas, Spencer Field OLF, Airfields in Alabama (2), and Holley OLF once the lease is up with FPL
- Continue to explore land expansion for community projects
- Increase in capacity for children in local schools to support the growth of the area
- A lack of Childcare capacity was identified
    - Whiting is eventually getting Childcare facility – predicted to get it 2037
- IGSA's for community partnerships
- Peter Prince Air Field's increased flight traffic and close proximity to Whiting is a challenge for the installation
    - Whiting's airspace is often violated on accident by IFS students from Peter Prince

Environmental:

The following environmental priorities were discussed:

- Recommend habitats near base for endangered species
    - Gopher tortoises are endangered and need protection
    - Keep habitat spaces available for all animals to remove them from the base

Transportation:

No significant transportation-related projects were identified as needs because most of them are funded or planned, but the following items were discussed:

- Widening of Highway 90 (planned and potentially funded)
- Updated controls at all intersections (planned and funded)
- Old roads in the area need updating
- Spencer Field is surrounded by residential areas with traffic issues. Roundabouts have been considered as an option to alleviate traffic
- SRC implemented public transport previously - was underutilized and discontinued

Outbrief: Next Steps

The workshop was concluded with Alec Rodriguez and Tanya Gallagher detailing the next steps for the project team, when they will be in touch with the group again, and the final delivery timelines.



Figure 3: A Blue Angel at Whiting Field

Day 2: Site Visit

NAS Whiting Field Tour

Meeting with NAS Whiting Field Commanding Officer and Staff

On day two of the NAS Whiting Field workshop/site visit, Jacobs and ECRC staff met with Captain Paul Flores and his team for a brief of Naval Air Station Whiting Field. The brief highlighted the mission and operations of the base as well as the tremendous economic impact the base has on the surrounding community. NAS Whiting Field is comprised of over 17,000 acres of land spread over 2 states (Alabama and Florida) and 4 counties (Santa Rosa County in Florida, and Baldwin Conecuh, and Escambia Counties in Alabama). In addition to having three separate and fully operational airfields, NAS Whiting Field boasts 12 outlying landing fields (56% of the Navy's OLF footprint). With the primary mission being the training of nearly 1,200 aviators per year (Navy, Marine Corp, and Coast Guard), NAS Whiting Field also supports CNATT, EOD School, and Special Ops Command. The base historically averages over 1 million flight operations per year or some 17% of USN flight hours. The base has over 3,300 onboard personnel and provides nearly 16,331 jobs across Santa Rosa County. The presentation concluded with a list of grant opportunities the base has engaged in as well as a discussion with staff on vulnerabilities and threats to the base.

Base Tour

Community Planning and Liaison officer, Randy Roy, gave the Jacobs and ECRC team a tour of the base and surrounding areas. The tour highlighted base infrastructure (substations, hangers, water lines, stormwater conveyance) as well as greenspace, and future expansion. The team visited the new Santa Rosa County Aviation Park where future developments will include taxiway connecting to Whiting Field. The tour also discussed the ongoing updates to installation facilities and the recent plans for the Navy to acquire 130 TH-73A helicopters that will replace the installations' 35-year-old TH-57 "Sea Ranger." The aircraft was acquired as a "system" that will bring infrastructure and employ an aircraft that improved pilot training and skills using current cockpit technologies and modernized training curriculum.

The base tour was concluded at the Santa Rosa County Chamber of Commerce in which Randy Roy, ECRC and Jacobs staff debriefed on site visit tour and project ideas brought forth a the previous day's workshop.

Conclusion

The 2-day program was successful and well-received by the attendees, with the goals and objectives achieved for the project team.

Action Items

Follow-up action items include:

- Follow up meetings and NDA agreements with AT&T and Cox Communication.
- Jacobs is working with FPL and EREC for more GIS and location information on the lines that feed into the base.
- Follow-up with Darliene Stanhope on missing critical infrastructure and other layers from Santa Rosa County
- Coordinate with Tanya Linzy and UWF team working on SRC's vulnerability assessment and adaptation action plan identify how projects in that plan can be incorporated into the NWFL MIRR implementation plan.
- Follow up with Kyle Holly on SRC's broadband expansion efforts and ongoing study.
- Take Kent Wimmer's suggestions on downloading statewide hazard data.

Northwest Florida Military Installation Resilience Review (MIRR)

NAS Whiting Field Workshop Attendance List

June 20th, 2022

Santa Rosa County Extension Office
6263 Dogwood Drive,
Milton, Florida 32570

Last Name	First Name	Role	Company	Contact Email
Roy	Randy	Aviation/Community Planner	NAS Whiting	randy.roy@navy.mil
Baker	Brad	Assistant County Administrator	Santa Rosa County	bradb@santarosa.fl.gov
Marinan	Bob	Chair	DSI (SR/Ok/Walton)	Bobmar422@yahoo.com
Harrell	Joey	Asst. Supt. For Administrative Services	SR Schools	harrelj@santarosa.k23.fl.us
Anderson	Dylan		SRC Planning & Zoning	dylana@SantaRosa.fl.gov
Stanhope	Darliene	Senior Planner	SRC Planning & Zoning	darlienes@SantaRosa.fl.gov
Linzy	Tanya	Assistant Environmental Director	SRC Environmental	tanyal@santarosa.fl.gov
Derbes	Thomas	SRC UF/IFAS Extension Agent	US Sea Grant	tjderbes@ufl.edu
Alexander	Shelley	Environmental Programs Coordinator	SRC Environmental	shelleya@santarosa.fl.gov
Spears	Ed	Director of Economic Development	City of Milton	espears@miltonfl.org
Dolar	Naisy	Program Manager	Santa Rosa County	naisyd@santarosa.fl.gov
Wimmer	Kent	Coordinator and Senior Rep.	NWFSL	kwimmer@defenders.org
Boudreau	Darryl	Resource Planning Program Manager	NWFWMD	Darryl.boudreau@nwfoler.com

Thompson	Eddie	Regional Director External Affairs	AT&T	wt921R@att.com
Taylor	Matt		EREC	mtaylor@erec.com
David	Deliman	Market Vice President	Cox	David.deliman@cox.com
Padich	Maddy	Facilitator	Jacobs	Madelyn.padich@jacobs.com
Gallagher	Tanya	Facilitator	Jacobs	Tanya.gallagher@jacobs.com
Rodriguez	Alec	Facilitator	Jacobs	Alec.rodriguez@jacobs.com
Danley	Daryal	Facilitator	Jacobs	Daryal.danley@jacobs.com
Jernigan	Scott	Facilitator	Jacobs	Scott.jernigan@jacobs.com
Kane	Caleb	Facilitator	Jacobs	Caleb.kane@jacobs.com
Jorgenson	Randy	City Manager	City of Milton	

July 2023

WORKSHOP & SITE VISIT

Eglin AFB / Hurlburt Field



EMERALD COAST MILITARY INSTALLATION RESILIENCY REVIEW

EMERALD COAST REGIONAL COUNCIL

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Northwest Florida Military Installation Resilience Review (MIRR) Workshop & Site Visit - Eglin Air Force Base / Hurlburt Field

June 20-21, 2023

Okaloosa County Board of County Commissioners Admin Training Room

1250 N Eglin Parkway, Shalimar, Florida, 32579

Eglin Air Force Base / Hurlburt Field Day 1: Information Sharing

9:30am Working Group Welcome & Introductions

The workshop will open with a welcome message and introductions led by Jacobs and ECRC. A review of the scope of the grant and project timeline will be given, followed by a recap of comments from the kickoff meeting, and discussion of goals of the site visit. Representatives from Eglin Air Force Base and Hurlburt Field are invited to give an overview of issues and opportunities they have observed to the group. This session will also touch on guiding policy requirements.

- Project scope & overview- *ECRC / Jacobs*
- Goals of the workshop- *Jacobs*
- Mission overview, issues, and observations- *Eglin Air Force Base / Hurlburt Field*

10:15am Data Review: Site Inventory and Analysis

Jacobs Team will lead a dialogue about the data that has been received, identifying existing concerns, regional relationships, and potential extents and context of study areas. The team will answer questions related to the assessment and analysis of the study areas.

- *Data & resource checklist*
- *Extents of study area*
- *Identify regional relationships*

11:00am Lunch Break

Lunch will be catered.

12:00pm Breakout Session #1

With regards to mission assurance and the communities surrounding Eglin AFB and Hurlburt Field, the group will develop a list of potential threats and hazards, ongoing mitigation efforts, and potential projects related to the sectors below.

- *Utilities Infrastructure (Water & Sewer)*
- *Utilities Infrastructure (Electrical and Communications)*

1:30pm Break

2:00pm Breakout Session #2:

With regards to mission assurance and the communities surrounding Eglin AFB and Hurlburt Field, the group will develop a list of potential threats and hazards, ongoing mitigation efforts, and potential projects related to the sectors below.

- *Economic, Housing, and Environmental Related Stresses*
- *Transportation, Education, and Childcare*

3:30pm Jacobs Team Internal Working Session

Eglin Air Force Base / Hurlburt Field Day 2: Virtual Site Visits

9:00 am Eglin / Hurlburt Field Base Briefs

Day #2 will open with a welcome message and introductions led by Jacobs and ECRC. A short installation brief will be given by representatives from Eglin Air Force Base and Hurlburt Field focusing on the mission of each installation.

- 9:00 am – 9:30 am – Eglin Base Brief and Discussion
- 9:30 am – 10:00 am - Hurlburt Base Brief and Discussion

10:00 am Review and Discussion of Day #1 Project Recommendations

A preliminary discussion will explore potential adaptation strategies, project types and locations. A brief description of the project next steps.

11:45pm Outbrief and Next Steps

12:00pm Depart

12:00 pm – 2:00 pm Jacobs Team Internal Working Session

Meeting Summary

Northwest Florida Military Installation Resilience Review (MIRR)

Workshop & Site Visit - Eglin AFB / Hurlburt Field

July 10th – 11th, 2023

Okaloosa County Administration Building

Shalimar, Florida 32570

On July 10th and July 11th, 2023, the project team for NWFL Military Installation Resilience Review (MIRR) conducted a workshop for the Eglin Air Force Base and Hurlburt Field Working Group.

The purpose of the MIRR project is to identify the hazards, vulnerabilities, and risks of concern as it relates to the ability of the military to carry out its missions on the installation that could be mitigated through solutions outside the fence line in the community. This project uses the planning horizons of 2040 and 2070 for projections, forecasted vulnerabilities, and 'shocks' in addition to current, everyday 'stresses' that are being faced by the installation. The purview of the project will define a series of pilot projects that decrease risks associated with the identified vulnerabilities by improving the natural, physical, and social infrastructure systems that support Eglin AFB and Hurlburt Field, their mission, and their community. The objectives of the workshop for the MIRR project team included:

- Confirm the issues and observations of stakeholders through discussion and tours.
- Understand the constraints and gaps being faced and ongoing / current efforts that are underway through research and data collection.
- Gain consensus on and start to define what a resilient Eglin AFB/Hurlburt Field and its community means through dialogue and continuous engagement with stakeholders.

The workshop was facilitated by Jacobs and the Emerald Coast Regional Council. Attendees included representatives from Eglin AFB/Hurlburt Field, the City of Mary Esther, the City of Fort Walton Beach, Santa Rosa County, Okaloosa County, Walton County, regional communication companies, regional defense groups, and regional conservation groups. The agenda focused on confirming and expounding upon the hazards and threats recorded during the NWFL MIRR Kickoff Meeting Visioning Session and brainstorming potential mitigation strategies and projects.

Day 1: NAS Whiting Field Workshop

Information Sharing

Working Group Welcome & Introductions

On the first day of the workshop, the group gathered in-person at the Okaloosa County Administrative Building in Shalimar, Florida for a quick round of introductions and overview of the day ahead. Eric Christianson and Tanya Gallagher gave an overview of the project, including its scope, and the goals for the workshop.

Discussion included acknowledgement that Eglin AFB/Hurlburt Field and the surrounding community already boast an amiable relationship, but that there are areas of improvement for building even stronger ties. With the region's military installations supporting one-third of Northwest Florida's total gross regional product, the need for infrastructural and socio-economic improvements which ensure mission feasibility is critical to both entities. In the breakout sessions, discussion of threats and hazards identified by the participants included redundancy of utility services, communication advancements, increases in housing (availability and affordability), mitigating traffic/congestion on busy corridors, as well as increasing access and availability of childcare.



Figure 1: Participants in the Onsite Workshop

Data Review: Data Gaps and Needs

A review of the data compiled before the workshop revealed some gaps in information about Eglin AFB/Hurlburt Field and the surrounding community. Alec Rodriguez, the technical lead on the Jacobs project team, highlighted that some additional GIS data are needed from both utility providers as well as additional utilities layers from Okaloosa County. These layers are crucial for the project team's ability to visualize where critical points, areas of stress, and valuable assets are located. The group had discussions about data sensitivity and how classified data will be presented.



Figure 2: Participants in the Onsite Base Briefs

Jacobs followed up with representatives from Okaloosa County and other utility providers about the arrangement of NDAs before releasing the requested information about critical utility assets. Relevant information from other attendees is expected to aid in the development of suitable housing, childcare solutions, utility resilience, and infrastructure enhancement which will benefit the community and mitigate threats to the mission of Eglin AFB/Hurlburt Field.

Alec then led a brief discussion about the data that has currently been collected to support the vulnerability analysis and asked questions to find the appropriate sources for any gaps in the analysis.

Interactive Session

Workshop Breakout Session

The Jacobs team then led the group through a discussion of potential mitigation projects to address the resilience issues that had been documented. Two breakout sessions were conducted. The first breakout session discussed Utility Infrastructure and split into two groups. The first group discussed Water and Sewer and the second group discussed Energy and Communications.

The second breakout session also was split into two groups. The first group discussed Economic, Housing, and Environmental Related Stresses and the second group discussed Transportation, Education, and Childcare. Each of the groups gathered around regional maps to plot out project ideas. Identified mitigation opportunities that were discussed are categorized and listed below:

Potable Water Utility Infrastructure:

During the discussion on water, the following items were mentioned as possible opportunities for improvement (*note that aside from the Jacobs facilitator, there were not any community SMEs on Water systems in the group during this discussion – additional interviews will be conducted with the appropriate local water utility experts to fill in any gaps*):

- Destin is the largest concern regarding storm surge flooding, with about 6-7 substations along the coast; Santa Rosa County also has substations at risk from storm surge flooding that are located West of Mary Esther
- Hurricane Sally in 2020 dropped nearly 30 inches of rain causing localized flooding causing strain on area utilities.
- During Hurricanes (Sally -2020, Ivan - 2004) wind damage impacted functionality of the Okaloosa County water facilities. This was especially true during Hurricane Ivan which packed Category 4 winds.
- Water quality related to stormwater runoff was another concern discussed, particularly sedimentation and nutrient runoff to local waterways. – Okaloosa County noted that there is a stormwater master plan that they will share with the project team.

Gas Infrastructure:

The discussion of gas infrastructure hazards included the following:

- According to Okaloosa Gas representative, there is a gas line that runs from Cantonment in Pensacola, through Milton, along 87. There is also one feed in Escambia County, one in Santa Rosa County, a series of loops down 31, back 98, to Fort Walton Beach, loops down 98 to 87 and interconnects with the transmission line there; one line stops at Seminole, one stops at Hammock Bay. Okaloosa Gas just received a grant to connect those lines in Niceville and Freeport (15 miles); will be close to site C6; already funded; one year to build it out, in need of an easement from the Air Force.
- Challenges present due to wetlands, coastal erosion, but the lines will be underground; only coastal erosion issues are on Okaloosa Island, but there has been a sea wall built to help mitigate and prevent this from occurring.
- Eglin has gas coming in from 2 sides of base, Hurlburt is fed off of 98 in south; current planned improvements are all on-base.
- Gas Utility ongoing projects:
    - Hardening, bridge crossings—permit open now to try to complete it, with air force and DoD, undergrounding lines.
    - FDOT will 6-lane US98 west of 87 between Mary Esther and Navarre, requiring relocation of utilities during that process, will need to acquire new easements to relocate off main roadway—this currently poses a concern.

Electrical:

During the breakout considering possible electrical improvements, the following items were discussed:

- Gulf Clean Energy Center in Pensacola powers Eglin/Hurlburt communities, with a second plant in Panama City; there are about 15 substations between Fort Walton and Destin; the last area of service to the East is Walmart on 98; Chelco serves the border regions where FPL does not; Chelco is headquartered out of Defuniak Springs, Florida.

- There are special projects from the DoD to create new regional supplemental power plants; solar centers are also being used to shift dependency from natural gas—13 solar centers (74.5 MW each, 600 acres, 30k panels)
- If one plant goes down, function is still possible. Not a true single point of failure; it was noted that radio is a bigger liability single point of failure.
- Liability resilience for poles—replacing wood poles with concrete and steel.
- There is a push for charging stations to be built; more are being built on Okaloosa Island and Crestview; will have ~8 charging stations in the region; individual houses have the opportunity to install a charging station; electric vehicle influx is largely driven by visitors and tourists; on base electric charging is mandated because of the executive order mandating all new vehicles must be electric by 2035

Communications:

Eglin AFB and Hurlburt Field have consistent connectivity issues that lead to communication problems throughout the area. The ideas for improvement discussed in the breakout session are listed below:

- Eglin has limitations for where cell towers and cell stations can be located.
    - The Tri-County initiative currently has resources trying to find solutions the communications issues.
    - Cell companies are reluctant to build because of costs.
    - Some initiatives for rural broadband are underway in Okaloosa County.
    - Military is dependent on civilian communication networks.
    - Coverage is spotty and may impact mission on-base, making this an issue for both the base and surrounding community.
    - Service along Hwy 20 is questionable; the "dead spots" may complicate communications abilities.
- Infrastructure for internet
    - Defense contractors often complain about internet service.
    - Interruptions and loss of connectivity presents challenges for many military contractors.
    - Okaloosa County, Crestview, Valparaiso, Fort Walton Beach, Holt; Live Oak; Shalimar now have fiber in the community and are providing broadband internet service which is an improvement on what has been previously available.
- Remote work or working from home may stress internet capacities, which poses challenges to emergency communications, accounting for families and service members; we should emphasize the importance of internet capabilities and recognize the critical vulnerability that the current infrastructure poses to emergency and crisis operations; it also ripples out to utilities and gas supply when trying to coordinate, especially for emergency or critical situations

Socio-Economic:

Eglin AFB and Hurlburt Field bring many military and civilian families to the area, items discussed for possible improvements to support these families are listed below:

- Housing
    - Affordable/attainable housing is greatly needed across the region.
    - Mixed-use housing
    - High Density Housing
        - Not usually well received, but there is a demand for this and the associated amenities because of the young students training on base.
    - Increased options for insurance (house and flood), insurance in the area is currently too expensive.

    - Okaloosa County recently hired a consultant to develop an attainable housing model for the workforce:
        - Cost of land, cost of materials, and scarcity of labor are all contributing factors.
    - Much of the housing supply is being flipped and turned into short-term rentals and vacation homes.
        - Local governments feel pressured to not impose ban short-term rentals as enforcement is often difficult or impossible.
    - Economic and housing stressors- Shoal River Industrial Site hopes to produce jobs just outside of Crestview; this will drive the need for additional housing and will diversify the economy. However, Eglin has low level critical approach zones and military training routes on corridor 343 so there are limits to how much can be built in that area.
    - Continue to explore land expansion for community projects.
- Education
    - There is a high demand across the region for trades and skilled workers.
    - Issue with retaining work forces as wages do not keep up with cost of living.
    - Retaining and attracting workers is difficult, but community has had some success through partnering with local schools.
    - Look at land use and eliminate barriers from using land and permitting.
        - Commercial land use recommendation would be helpful.
- Childcare
    - Capacity and lack of workers in childcare is a threat.
    - TCPI has several great initiatives ongoing; CDC wage increase, dual licenses no longer needed; working to increase number of people certified for home programs; UWF has new program to help increase CDC opportunities.
    - 4-5k personnel expected to come into Eglin
    - Partner with churches and civilians in childcare and workforce; pre-vs-post-pandemic disconnect.
- Economic
    - Conflict between military and tourism, military is foundation of economy, but tourism is another large part—very easily destabilized by oil spills, storms, etc. so economic diversification is needed.

Environmental:

The following environmental priorities were discussed in the breakout session:

- Many endangered/threatened species endemic to the area, woodpecker, salamander, Okaloosa darter, Rice's whales, plants, beach mouse. This presents limitations on development opportunities for civilian communities. Several Native American sites and places of note are located on the base or around the base which must be preserved and protected.
- Land acquisition to help preserve the endangered/threatened species may help the military mission capabilities and preserve environmental resources; Florida Forever and REPI may be avenues to explore for future land acquisitions.
- Two Florida Forever projects currently exist which help endangered species—watershed and water supply protection—shoal river buffer project, existing Florida forever project; 800-900 acres Walani Forest Watershed with many wetlands; specifically identify these overlapping lands and provide support for these projects to help the mission and protect species.
- Coordination w TPO and REPI projects to protect species and base.
- Nature conservancy and greenways- MOU between military and state to reduce encroachment.

Transportation:

Several transportation-related projects were identified and are listed below:

- Increase access to base (potentially additional ingress/egress points) to help mitigate traffic issues in the area during rush hours.
- Hwy 98 is the main artery to the south of both Eglin and Hurlburt. Current efforts are underway for assessing redundancies and alternatives.
- FDOT is currently widening 98 in SR County (6 lanes) in Okaloosa, Santa Rosa, and Walton Counties.
- Widening of 20 in Walton County, 285 N to 4 lanes, 85 to 6 lanes
- Another gate or road which is military-only with on-ramps via Hwy 98.

Outbrief: Next Steps

The workshop was concluded with Alec Rodriguez and Tanya Gallagher detailing the next steps for the project team, when they will be meeting, and the critical asset and vulnerability assessment timeline.



Figure 3: Planes at Eglin Air Force Base

Day 2: Site Visit

NAS Whiting Field Tour

Meeting with Eglin AFB and Hurlburt Field Commanding Officer and Staff

On day two of the Eglin AFB and Hurlburt Field workshop/site visit, Jacobs and ECRC staff met with leadership teams from Hurlburt Field and Eglin AFB. Briefs were presented by Keith Cutshaw of Hurlburt Field and Dale Marks of Eglin AFB. The brief highlighted the mission and operations of the base as well as the tremendous economic impact the base has on the surrounding community. Eglin AFB is over 724 square miles of land with a primary mission of testing and training. Employing over 20,000 military service members and civilians, Eglin AFB and Hurlburt field have a combined economic contribution of nearly $9.2 billion. The presentation concluded with a list of grant opportunities the installations have engaged in as well as a discussion with leadership from both installations about the vulnerabilities and threats to the base. The project ideas from Day 1 were discussed further with the installation teams and feasibility and rough timelines for each project were discussed.

Conclusion

The 2-day program was successful and well-received by the attendees, with the goals and objectives achieved for the project team.

Action Items

Follow-up action items include:

- FPL – follow up at end of August with NDA / Meeting – Bernard Johnson, Chris Vick
- Chelco – Tina Rushing – follow up with ECRC to meet with Chelco team and enact NDA.
- Eglin – Karen Taporco – GIS and Jackson Guard contacts (encroachment, utility data, etc.)
- Gas lines – go to national pipeline mapping system and download natural gas layers.
- Communications providers – Eddie Thompson at AT&T, David Deliman at Cox, T-Mobile and Verizon (get contacts for T-Mobile & Verizon – Kay Rasmussen has Verizon contacts).
- NDA and Meeting for AT&T and Cox
- Kristen Shell – Walton County – follow up about plans and GIS data.
- Create template NDA to share with utilities.
- Okaloosa Utilities – follow up with NDA for data (Sheila Fitzgerald, Eddie Quinlin)
- Okaloosa Utilities – Mark/John – follow up about offline reservoir in North End of the County.
- Get following studies: JLUS 2009, Estuary Program studies, north end of the county planning study, long range transportation plans (Tiffany Bates).

Northwest Florida Military Installation Resilience Review (MIRR)

Eglin AFB / Hurlburt Field Workshop Attendance List

July 10th – July 11th, 2023

Last Name	First Name	Role	Company	Contact Email
Cobb	Jared		City of Mary Esther	jcobb@cityofmaryesther.com
Gibson	Tim		City of Ft. Walton Beach	tgibson@fwb.org
Frassetti	Chris		City of Ft. Walton Beach	cfrassetti@fwb.org
King	Gordon		Okaloosa Gas District	gordonking@okaloosagas.com
Boudreau	Darryl		NWFWMD	Darryl.boudreau@NWFwater.com
Osuigwe	Zee		SRC	Zakkiyyaho@santarosa.fl.gov
Evans	Jane		Okaloosa	jevans@myokaloosa.com
Christianson	Eric		ECRC	eric.christianson@ecrc.org
Buckles	Tim		ECRC	timothy.buckles@ecrc.org
Bates	Tiffany		ECRC	tiffany.bates@ecrc.org
Shell	Kristen		Walton County	shekristen@co.walton.fl.us
Nose	Jans		USAF	Jansnfh2@us.af.mil
Aymami	Dawn		USAF	Dqn.aymami@us.af.mil
Cutshaw	Keith		Hurlburt	David.cutshaw@us.af.mil
Nelson	Alex		Hurlburt	Alexander.nelson.28@us.af.mil
Marks	Dale		Eglin	Dale.Marks@us.af.mil
Taylor	Eddie		Eglin	Eddie.taylor.7@us.af.mil
Lokken	Steve		Hurlburt	Steven.loku.2@us.af.mil
Davidson	Scott		Hurlburt AF	Scott.davidson.8@us.af.mil
Alexander	Shelley		Santa Rosa County	shelleya@santarosa.fl.gov
Rasmussen	Kay		EDC/DSL	kay@oneokaloosa.org

Last Name	First Name	Role	Company	Contact Email
Verlinde	Chris		Santa Rosa County	Christinou@santarosa.fl.gov
Norberg	Mike		Okaloosa Coastal Resources	mnorberg@myokalossa.com
Fanto	Jeff		EDS LLC	Jeff.fanto@eds.net
Quinlan	Eddie		Okaloosa County GIS	equinlan@myokaloosa.com
Johnson	Bernard		FPL	Bernard.johnson@fpl.com
Bitterman	Scott		Okaloosa Public Works	sbitterman@myokaloosa.com
Vick	Chris		FPL	Christopher.vick@fpl.com
Kampert	Elliot		Okaloosa County Growth Management	ekampert@myokaloosa.com
Autrey	Jason		Okaloosa County PW	Jautrey@myokaloosa.com
Taporco	Karen		Eglin AFB	Karen.taporco@us.af.mil
Padich	Maddy	Facilitator	Jacobs	Madelyn.padich@jacobs.com
Gallagher	Tanya	Facilitator	Jacobs	Tanya.gallagher@jacobs.com
Rodriguez	Alec	Facilitator	Jacobs	Alec.rodriguez@jacobs.com
Danley	Daryal	Facilitator	Jacobs	Daryal.danley@jacobs.com
Jernigan	Scott	Facilitator	Jacobs	Scott.jernigan@jacobs.com
Kane	Caleb	Facilitator	Jacobs	Caleb.kane@jacobs.com

July 2023

WORKSHOP & SITE VISIT

Tyndall AFB / NSA Panama City



EMERALD COAST MILITARY INSTALLATION
RESILIENCY REVIEW

EMERALD COAST REGIONAL COUNCIL

Jacobs
Challenging today.
Reinventing tomorrow.

Northwest Florida Military Installation Resilience Review (MIRR) Workshop & Site Visit - Tyndall AFB / NSA Panama City

July 26th - 27th, 2023

Florida State University Panama City

4750 Collegiate Dr., Panama City, Florida, 32579

Bayside Building (Auditorium)

Tyndall AFB / NSA Panama City Field Day 1: Information Sharing

9:00am Working Group Welcome & Introductions

The workshop will open with a welcome message and introductions led by Jacobs and ECRC. A review of the scope of the grant and project timeline will be given, followed by a recap of comments from the kickoff meeting, and discussion of goals of the site visit. Representatives from Tyndall Air Force Base and NSA Panama City are invited to give an overview of issues and opportunities they have observed to the group; representatives from the surrounding communities are then invited to do the same. This session will also touch on guiding policy requirements.

- *Project scope & overview- ECRC / Jacobs*
- *Goals of the workshop- Jacobs*
- *Mission overview, issues, and observations- Tyndall AFB and NSA Panama City*

9:20am Data Review: Site Inventory and Analysis

Jacobs Team will lead a dialogue about the data that has been received, identifying existing concerns, regional relationships, and potential extents and context of study areas. The team will answer questions related to the assessment and analysis of the study areas.

- *Data & resource checklist*
- *Extents of study area*
- *Identify regional relationships*

9:45am Breakout Session #1

With regards to mission assurance and the communities surrounding Tyndall AFB and NSA Panama City, the group will develop a list of potential threats and hazards, ongoing mitigation efforts, and potential projects related to the sectors below. 1-hour to discuss – debrief begins by 10:45 am.

- *Utilities Infrastructure (Water, Sewer, and Solid Waste)*
- *Utilities Infrastructure (Power and Communications)*

11:00 am Lunch

Lunch will be catered.

11:30am Breakout Session #2:

With regards to mission assurance and the communities surrounding Tyndall AFB and NSA Panama City, the group will develop a list of potential threats and hazards, ongoing mitigation efforts, and potential projects related to the sectors below. 1-hour to discuss – debrief begins by 12:30 pm.

- *Economic, Housing, and Environmental Related Stresses*
- *Transportation, Education, and Childcare*

12:45pm Break

- *Set up for Tyndall AFB Coastal Resilience Stakeholder Group Meting*
- *NSA PC transitions to other room*

1:00pm Tyndall Coastal Resilience Stakeholder Group Meeting / NSA PC Breakout Session

- *Those involved/interested in attending the Tyndall AFB Coastal Resilience Stakeholder group call led by the St. Andrews Bay Estuary Program are welcome to stay in the auditorium for that discussion.*
- *Those interested in discussing NSA Panama City specific stressors and issues are welcome to join this discussion the adjoining classroom.*

2:30pm Break

2:45pm Outbrief and Next Steps

3:00pm Depart

Tyndall AFB / NSA Panama City Field Day 2: Outbrief

9:00 am Tyndall AFB / NSA Panama City Briefs

Day #2 will open with a welcome message and introductions led by Jacobs and ECRC. A short installation brief will be given by representatives from Tyndall Air Force Base and NSA Panama City focusing on the mission of each installation.

- 9:00 am – 9:30 am – Tyndall AFB Brief and Discussion
- 9:30 am – 10:00 am – NSA Panama City Brief and Discussion

10:00 am Review and Discussion of Day #1 Project Recommendations

A preliminary discussion will explore potential adaptation strategies, project types and locations. A brief description of the project next steps.

11:45pm Outbrief and Next Steps

12:00pm Depart

Meeting Summary

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- Confirm the issues and observations of stakeholders through discussion and tours.
- Understand the constraints and gaps being faced and ongoing / current efforts that are underway through research and data collection.
- Gain consensus on and start to define what a resilient Tyndall AFB / NSA Panama City and its community means through dialogue and continuous engagement with stakeholders.

The workshop was facilitated by Jacobs and the Emerald Coast Regional Council. Attendees included representatives from Tyndall AFB / NSA Panama City, the City of Panama City, the City of Panama City Beach, Mexico Beach, Bay County, regional communication companies, regional defense groups, and regional conservation groups. The agenda focused on confirming and expounding upon the hazards and threats recorded during the NWFL MIRR Kickoff Meeting Visioning Session and brainstorming potential mitigation strategies and projects.

Day 1: Tyndall AFB / NSA PC Field Workshop

Information Sharing

Working Group Welcome & Introductions

On the first day of the workshop, the group gathered in-person at the FSU Campus for a quick round of introductions and overview of the day ahead. Eric Christianson and Tanya Gallagher gave an overview of the project, including its scope, and the goals for the workshop.

Discussion included acknowledgement that Tyndall AFB / NSA Panama City and the surrounding community already boast an amiable relationship, there are areas of improvement for building even stronger ties. With the region's military installations supporting one-third of Northwest Florida's total gross regional product, the need for infrastructural and socio-economic improvements which ensure mission feasibility is critical to both entities. In the afternoon breakout sessions, discussion of threats and hazards identified by the participants included redundancy of utility services, communication advancements, increases in housing (availability and affordability), access to common services, as well as promoting the effort to get Tyndall AFB / NSA Panama City designated as a Strategic Intermodal System (SIS).



Figure 1: Alec Presenting the Data Review

Data Review: Data Gaps and Needs

A review of the data compiled before the workshop revealed significant gaps in information about Tyndall AFB / NSA Panama City and the surrounding community. Alec Rodriguez, the technical lead on the Jacobs project team, highlighted that many GIS data are needed from both utility providers as well as additional layers from Okaloosa County and the City of Panama City. These layers are crucial for the project team's ability to visualize where critical points, areas of stress, and valuable assets are located. The group had discussions about data sensitivity and how classified data will be presented.



Figure 2: Participants in the Onsite Workshop

Alec then led a discussion surrounding the data that has currently been collected to support the vulnerability analysis of this installation and asked questions to find the appropriate sources for any gaps in the analysis.

Interactive Session

Workshop Breakout Session

The Jacobs team led the group through a discussion of potential mitigation projects to address the resilience issues that had been documented. Two breakout sessions were conducted. The first breakout session discussed Utility Infrastructure and split into two groups. The first group discussed Water, Sewer, and Solid Waste and the second group discussed Electrical and Communications. The second breakout session also was split into two groups. The first group discussed Transportation, Childcare, and Education and the second group discussed Housing, Environment, and Economic related stresses. Each of the groups gathered around a map to plot out project ideas. Identified mitigation opportunities that were discussed are categorized and listed below:

Water/Sewer/Solid Waste:

Threats / Hazards:

- Redundancy
- Need to intercept Mexico Beach flows to not mix with Tyndall
- Subaqueous line going to Navy Base
- Masterplan transmission main for water
- SLR in Deer Point Dam
- Capacity concerns
- Flooding

Ongoing Efforts:

- Dupont Bridge (subaqueous line, waterline on bridge)
- AWT on base – feasibility study
- HMGP grants – Robinson Bayou, LS hardening, backup water to 2 hospitals
- Defense infrastructure grant to design Mexico Beach bypass

Potential Projects:

- Intercept Mexico Beach WW before getting to Tyndall
- Additional capacity at AWT
- Panama City Vulnerability Assessment
- New WTP at South Fork
- New WWTP at Panama City North
- Need redundancy for WTP at Transmitter Road – solution for unbalance power loading
- Loop connection on Philip Griffith Sr Prky
- Landfill and Transfer Station – Regionally
- Reroute 16" Force Main

Energy/Communications:

Threats / Hazards:

- High winds and flooding at substations
- Power outages from squirrels, trees, etc.
- Tyndall Power
    - Comes from FPL transmission via 1 feed/substation on Hwy 98
- Two transmission lines cross the Bay from north
- Gulf Coast Power owns power distribution system on Tyndall (50-year service contract)
    - Most of system is underground
- Electric system relies on communications as critical infrastructure for operations
- New fiber lines being built to support SCADA, operational status, etc.
- Fire

- Supply lead times for equipment (from vendors)
- New developments putting pressure on existing infrastructure
- Hathaway Bridge
    - 15 years old and has a major crack
    - FDOT is looking at internal truss to shore it up

Ongoing Efforts:

- 4-year work plan by Elec. Cooperative
- New design standards for Cities ad Counties for new neighborhoods
- EV growth (new charging stations, driving additional demand)
- EDA – possible new elec. transformer supplier coming to Bay County
- Tyndall
    - Received (EDA) grant to run fiber 144 pairs, to main gate, over Dupont Bridge connected to County network. POP at downtown Panama City
    - 2 lines from Tyndall to Navy Base
    - EDA grant was intended to super high speed communications lines along interstate
- Gaining interest in Star link (robust service)

Potential Projects:

- Undergrounding of distribution infrastructure (Springfield, Callaway, Parker)
- Create redundant loop from Southport to Gaskin through Bayou George
- Add redundant electrical feed to Tyndall via substation at east end of Tyndall
- Develop additional installation resilience on Tyndall w/ PV system
- Microgrid at EOC location

Economic:

Threats / Hazards:

- Lack of economic diversity
- Lack of benefits for non-military families
- Challenges with finding skilled workers
- Disparity for household budgets coming from higher COL areas
- FL Insurance Crisis

Ongoing Efforts:

- Lots of business growth in Bay County (300+ ytd)
- Incoming major R+D facilities (Suzuki)
- Economic Development Alliance
- Robust medical system (but also apparently a lack of specialized healthcare in the area)
- Higher regional design standards to reduce insurance premiums (3 feet of freeboard)
- Enhance NFIP Community Rating System score

Housing:

Threats / Hazards:

- Housing attainability
- 2.5 year lead time for construction of new electrical substation
- High cost of housing
- 80% of housing was damaged or destroyed from Hurricane
- Limits on banning short term rentals

Ongoing Efforts:

- $2.4B rebuild in area surrounding post Hurricane
- State of FL passed law stating that Cities can operate their own flood mitigation banks

- City of Panama City is using state building code requirement for 1-ft freeboard above BFE
- 1st time homebuyers program
- Alternative home initiatives (container, tiny homes)

Potential Projects:

- DoD should assess housing allowance in region

Environmental:

Threats / Hazards:

- Sea level rise
- Flooding
    - Rainfall-induced
    - Groundwater
- Compound flooding
- Increased impacts of extreme heat due to lack of tree canopy
- Wildfire
- Water quality (SSOs, septic systems)
- Coastal erosion
- Loss of habitat

Ongoing Efforts:

- Fire breaks
- $6.2M project to relocate WW LS and piping impacted by coastal erosion
- Voluntary home buyout program for regional stormwater treatment facilities
- 4-year feasibility study for East Pass
- Bay Defense Alliance
- Panama City Septic to Sewer Program
- Invasive species removal programs (Cogon grass)

Potential Projects:

- Develop WUI Code
- Expand regional fuels management programs (Sentinel Landscape)
- Expand focus on water reuse
- Look at a OneWater approach (water security)
- Nature-based solutions and multiple lines of defense to achieve coastal resilience
- Find 2,000 acres of crayfish habitat
- Expand septic to sewer program (King's Pt., Grand Lagoon, Deer Pt. Lake, Bayou George)

Transportation:

Threats / Hazards:

- Flooding
- SLR
- Deer Point Dam (67 years old)

Ongoing Efforts:

- PD&E – Deer Point Dam
- Dupont Bridge
- Flyovers on 98
- Thomas Drive
- 390 under design for 6 lane
- Smart Bay
- 50 vehicles outfitted with smart technology

- Enterprise fund to move utilities

Potential Projects:

- Deer point dam (SLR concerns)
- 6-lane Hwy 390
- Funding to move utilities ROW
- 389 – 4 lane
- Transmitter Road – 4 lanes
- 2nd gate at NSA PC (Thomas Dr)
- Star avenue widening
- Light timing initiative on Tyndall Pkwy
- Figuring out a better way of getting past HWY 98
- Toll bridge north of Franklin Ave up to Airport

Childcare:

Threats / Hazards:

- Lack of workers
- Lack of available/affordable space
- Long waitlists
- No pediatric specialized care (pediatric orthopedics)
- Lack of special needs programs

Ongoing Efforts:

- Task force set up by Chamber
- New facility at Tyndall (305 spots)

Potential Projects:

- Training for child workers
- Incentives for childcare facilities

Education:

Threats/Hazards:

- School at capacity

Ongoing Efforts:

- New Tyndall Academy public school (2026)
- FSU Collegiate School

Potential Projects

- Additional schools
- Workforce assessment

Outbrief: Next Steps

The workshop was concluded with Alec Rodriguez and Tanya Gallagher detailing the next steps for the project team, when they will be meeting, and the critical asset and vulnerability assessment timeline.



Figure 3: A Plane at Tyndall Air Force Base

Day 2: Site Visit

Tyndall AFB / NSA Panama City Outbrief

Meeting with Tyndall AFB and NSA Panama City Commanding Officer and Staff

On day two of the Tyndall AFB / NSA Panama City workshop/site visit, Jacobs and ECRC staff met with John Skaggs of NSA Panama City and Brain Stahl of Tyndall AFB and their teams for a brief of each base. The brief highlighted the mission and operations of the bases as well as the tremendous economic impact they have on the surrounding community. The primary mission is testing and training. The presentation concluded with a list of grant opportunities the base has engaged in as well as a discussion with staff on vulnerabilities and threats to the base.

Conclusion

The 2-day program was successful and well-received by the attendees, with the goals and objectives achieved for the project team.

Action Items

Follow up on outstanding data requestions from stakeholders

Northwest Florida Military Installation Resilience Review (MIRR)

Tyndall AFB / NSA Panama City Workshop

Attendance List

July 26th – July 27th, 2023

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APPENDIX B

Vulnerability Assessment and Risk Analysis Methodology



Emerald Coast Military Installation Resilience Review Vulnerability Assessment and Risk Analysis Introduction and Methodology

Prepared for
Emerald Coast Regional Council

January 2024

Executive Summary

Introduction

The Emerald Coast Military Installation Resilience Review (MIRR) is assessing the resilience of supporting infrastructure outside the fence line of military installations across the northwest Florida region. The Emerald Coast area is approximately 100 miles long and includes five counties: Escambia, Santa Rosa, Okaloosa, Walton, and Bay. A vulnerability and risk assessment was conducted for the six installations located in the Emerald Coast planning area, including Naval Air Station Pensacola, Naval Air Station Whiting Field, Hurlburt Field, Eglin Air Force Base (AFB), Naval Support Activity Panama City, and Tyndall AFB.

This document provides an overview of the hazards evaluated, the vulnerability and risk assessment methodology, and process for determining mission criticality of supporting infrastructure for the MIRR. Subsequent documents provide detailed reviews of the hazards facing the infrastructure at each individual installation and the results of the vulnerability and risk analyses. The information provided in these assessments will support adaptation strategies developed during the MIRR project.

Summary of Hazards

This assessment reviews the following hazards:

- Flooding (including the 100-year flood, sea level rise, and storm surge)
- Extreme wind
- Extreme heat
- Wildfire
- Aging infrastructure
- Economic stresses (lack of diversity in economic activity, housing attainability, and Florida homeowner's insurance crisis)
- Social stresses (lack of childcare, and education challenges)
- Environmental stresses (shoreline erosion and endangered species)
- Encroachment

Of the listed hazards, flooding, extreme wind, extreme heat, wildfire, and lightning are used to quantify asset vulnerability scores, while the others are considered via a qualitative analysis.

Vulnerability and Risk Assessment Process

The vulnerability of facilities was determined using a desktop analysis based on readily available information provided by stakeholders from May 2023 through November 2023.

This vulnerability analysis follows a standardized, step-by-step approach to evaluate vulnerability and assign a numerical score, as described in the State of Florida's *Standardized Vulnerability Assessment: Scope of Work Guidance* (FDEP 2022). This guidance defines the following key terms used in this analysis:

- **Exposure**: Evaluate proximity of facilities and assets to the identified hazards and threats currently and over select future time horizons.
- **Sensitivity**: Evaluate the degree to which a facility or asset would be impaired by hazard and threat exposure.

- **Adaptive Capacity**: Evaluate the asset's inherent ability to adapt to maintain its primary function when exposed to hazards/threats. For consideration only; not included in quantified assessment.

Exposure and sensitivity are then incorporated into the vulnerability equation, given as follows:

Vulnerability = Exposure + Sensitivity

Asset exposure and sensitivity were determined for each of the quantitatively assessed hazards (flooding, extreme heat, extreme wind, lightning, and wildfire) in both GIS and via a spreadsheet model. Exposure and sensitivity scores were then calculated for each asset—the higher the score, the more vulnerable the asset is to the hazard or the greater the degree of impairment by the hazard.

Once vulnerability scores are developed, a simple analysis of risk is performed as a function of likelihood and consequence using the following definitions.

Likelihood: Probability of and event occurring and causing an impact or service disruption to an asset.

Consequence: Resulting impact to asset if exposed to a hazard; presented in terms of degree of impact on an asset and impact of asset failure on the installation mission.

Risk scores were calculated using the following equation:

Risk = Likelihood x Consequence

By assessing the likelihood of the hazard occurring, and the consequence of the hazard impacting the asset, the risk analysis provides a holistic understanding of the risk to the assets that support the military installations.

Mission Criticality

The assets (transportation and evacuation routes, critical infrastructure, and critical community and emergency facilities) supporting the military installations were classified as either being primary mission-critical, secondary mission-critical, or mission-supportive. This information was incorporated into the risk analysis – the asset criticality ranking affects the risk score, reflecting the risk to the installation missions.

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Acronyms and Abbreviations

AFB	Air Force Base
CDC	Centers for Disease Control
DoD	Department of Defense
FDEP	Florida Department of Environmental Protection
FEMA	Federal Emergency Management Agency
FIRM	Flood Insurance Rate Map
MIRR	Military installation resilience review
NAS	Naval Air Station
NFSL	Northwest Florida Sentinel Landscape
NHC	National Hurricane Center
NOAA	National Oceanic and Atmospheric Administration
NSA	Naval Support Activity
RCP	representative concentration pathway
SLOSH	Sea, Lake, and Overland Surges from Hurricanes
SLR	sea level rise
VA	Vulnerability Assessment
WUI	Wildland Urban Interface

Definitions

Adaptive capacity: The ability of an asset to adapt to evolving conditions presented by a given hazard over time.

Consequence: Degree of impact that a hazard has on an asset.

Exposure: The proximity of an asset with a hazard.

Likelihood: the probability of occurrence, given as a percentage

Risk: The combination of consequence and likelihood. Reflects the impacts and likelihood of a hazard affecting an asset.

Sensitivity: The responsiveness of a system to hazard impacts.

Vulnerability: The combination of exposure, sensitivity, and adaptive capacity. Identifies whether an asset may be affected by a hazard.

Wildland-Urban Interface: The urban interface (WUI): the zone of transition where developed lands and unoccupied, lands intersect (wilderness).

1. Introduction

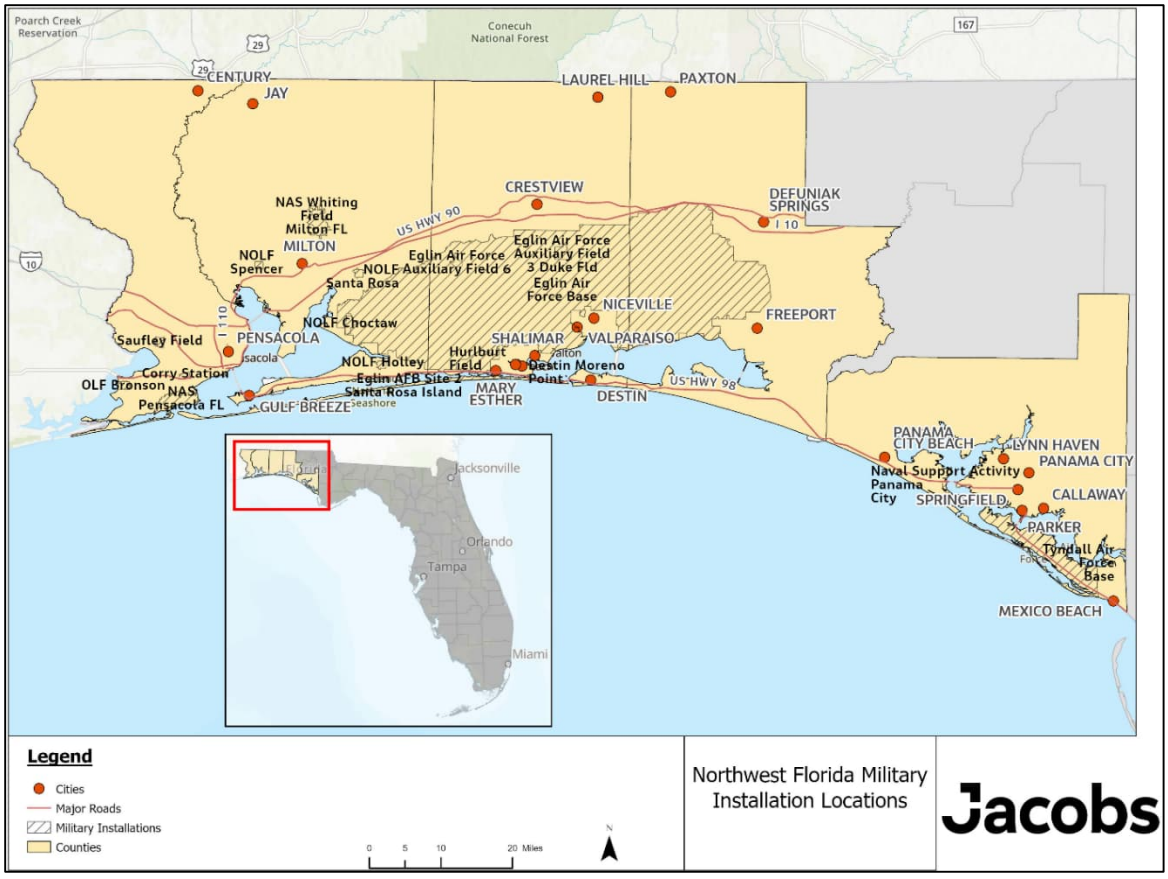
The Emerald Coast Regional Council received a grant from the Department of Defense (DoD) Office of Local Defense Community Cooperation to conduct a military installation resilience review (MIRR) in the northwest Florida region. The Emerald Coast area is approximately 100 miles long and includes five counties: Escambia, Santa Rosa, Okaloosa, Walton, and Bay. The purpose of the MIRR is to promote mission assurance for the military installations through community resilience. By identifying vulnerabilities to supporting infrastructure outside the fence line, the MIRR can subsequently identify adaptation interventions that can reduce risk and enhance the installations' ability to execute their missions.

The six DoD installations included in this MIRR are:

- Naval Air Station Pensacola (NASP), in Pensacola, Escambia County
- NAS Whiting Field (NASWF), north of the City of Milton in Santa Rosa County
- Eglin Air Force Base (AFB), which spans Santa Rosa, Okaloosa, and Walton Counties
- Hurlburt Field, located in Okaloosa County
- Naval Support Activity (NSA) Panama City, west of Panama City, Bay County
- Tyndall AFB, south of Panama City in Bay County (Figure 1-1)

While these installations have different missions, they all have deep roots and connections with their surrounding communities.

Figure 1-1. Emerald Coast Military Installations



Six vulnerability assessments and risk analyses (VAs), one per installation, were conducted as part of this MIRR. This technical memorandum reviews the methodology and approach used in the installation-specific VAs.

2. Identified Hazards

Each installation-specific VA identifies and assesses the vulnerability of assets that are critical to or support the installation operations or mission, as well as additional hazards (shocks or stresses) of concern identified during the stakeholder engagement process. Four stakeholder workshops were conducted with representatives of the installations, community, utilities, and local nongovernmental organizations between June and August 2023. Table 2-1 summarizes the hazards and includes both those in the quantitative vulnerability scoring and those described only in qualitative terms for consideration in the development of adaptation actions to enhance service reliability and operational continuity for the installations.

Table 2-1. Shocks and Stresses Evaluated in VAs

Shock or Stress Name	Hazard of Concern?	Quantitative Assessment	Qualitative Review	Notes
Flooding	Yes	Yes	No	Includes rainfall, sea level rise, storm surge, and extreme tides
Extreme Heat	Yes	Yes	No	
Extreme Wind	Yes	Yes	No	Includes high wind from hurricanes
Wildfire	Yes	Yes	No	
Lightning	Yes	Yes	No	
Shoreline Erosion	Yes	Yes	No	
Aging Infrastructure	Yes	No	Yes	
Economic Stressors	Yes	No	Yes	Considers lack of economic diversity and Florida insurance crisis
Social Stressors	Yes	No	Yes	Considers housing attainability, lack of childcare, and education challenges
Environmental Stressors	Yes	No	Yes	Considers coastal erosion, and endangered species
Encroachment	Yes	No	Yes	Considers encroachment of non-compatible development or activities

The following text discusses each hazard listed in Table 2-1 as an overview. Installation-specific hazards are listed at the end of this section and are discussed in greater depth in each installation's respective VA.

2.1 Natural Hazards

Natural hazards include a variety of severe weather and extreme events, including the anticipated effects on those hazards from climate change, where applicable.

2.1.1 Flooding

This MIRR assesses multiple flood scenarios to account for the varied flood hazards in the region. There are three types of flooding assessed herein: pluvial (rainfall) flooding, represented by the 100-year flood; hurricanes, represented by storm surge; and sea level rise (SLR).

2.1.1.1 The 100-Year Flood

The 1% annual chance flood event, also known as the 100-year flood, is a common standard for flood risk assessment in the United States. Another common return period incorporated in the Federal Emergency Management Agency (FEMA) Flood Insurance Rate Map (FIRM) panels is the 0.2% annual chance event, also known as the 500-year flood. Historically these events are rare and large in magnitude, though they are expected to be more common as flood risk increases with climate change. FEMA FIRM maps are used to determine floodplain boundaries and flood depths for insurance purposes and as a regulatory tool to inform building design, per the Florida Building Code. These FEMA data have been incorporated into the Emerald Coast MIRR VAs. The 100-year flood event is used in the vulnerability assessment while the 500-year flood event is analyzed in exposure mapping only.

2.1.1.2 Sea Level Rise

Rising sea levels threaten coastal infrastructure over time as well as magnify other flood hazards. The Emerald Coast MIRR analyzes four SLR scenarios, in compliance with the Florida Department of Environmental Protection (FDEP) and the Florida Resilient Grant Program (s. 380.093, F.S). The following National Oceanographic and Atmospheric Association (NOAA) 2017 SLR projections, based on select future planning horizons, have been incorporated into the future flood scenarios (NOAA 2017):

1. 2040 NOAA intermediate low SLR
2. 2040 NOAA intermediate high SLR
3. 2070 NOAA intermediate low SLR
4. 2070 NOAA intermediate high SLR

2.1.1.3 Storm Surge

For this analysis, storm surge represents flooding from hurricanes. Strong winds can drive wave action that can affect coastal areas and travel inland through rivers. Storm surge can cause significant damage to structures and other assets from both wave energy impacts and inundation.

Storm surge data for all five hurricane categories was obtained from the National Hurricane Center's (NHC) Sea, Lake, and Overland Surges from Hurricanes (SLOSH) Model and is analyzed in the vulnerability assessment.

2.1.2 Wildfire

Significant portions of the northwest Florida region are located in the wildland-urban interface (WUI). Expanding development is pushing further into the WUI, increasing community exposure to wildfire. Arson, lightning, or debris burnings can cause wildfires that can destroy structures and infrastructure.

Smoke from wildfires also poses a threat to both the installations and their surrounding communities. Smoky conditions can interfere with pilot training and operations at the installation. In addition, it is detrimental to human health, having the greatest impact on vulnerable populations.

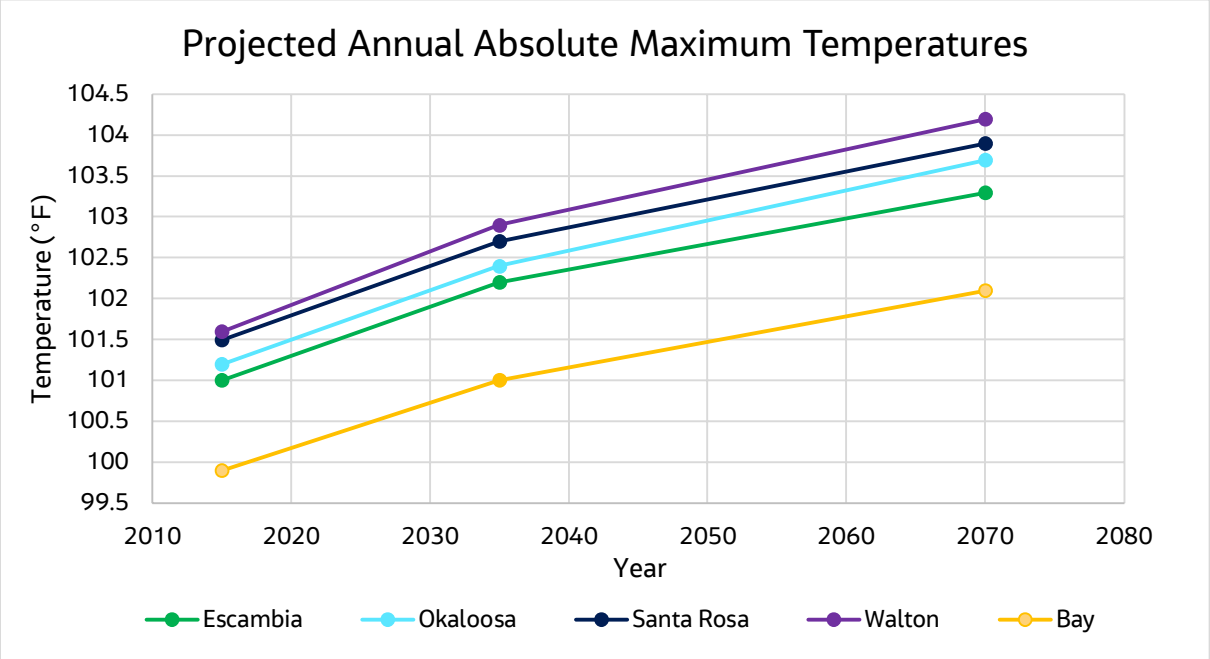
2.1.3 Extreme Heat

Extreme heat is a period of high heat and humidity with temperatures above 90 degrees for at least 2 to 3 days. It can cause heat-related illnesses, such as heat stroke and heat exhaustion. Extreme heat is a deadly climate hazard, causing the highest number of deaths among all weather-related disasters (FEMA 2018).

Extreme heat can negatively affect infrastructure as well. It causes concrete to expand, crack, and buckle, affecting structural integrity. It can also overheat electrical or mechanical equipment. Extreme heat may also limit the period of construction and outdoor activities and increase energy consumption for cooling systems, transportation, and storage.

The Emerald Coast is projected to have both increasing temperatures and an increase in the number of days with hotter temperatures over the next 50 years, according to data presented in the U.S. Climate Explorer. In addition, average annual summer temperatures are expected to increase by up to 3 degrees Fahrenheit by the year 2070 (U.S. Federal Government n.d.). Figure 2-1 shows projected annual maximum temperatures for the five counties, which are projected to increase by approximately 2 degrees between 2030 and 2040.

Figure 2-1. Northwest Florida Projected Annual Absolute Maximum Temperatures



Source: (U.S. Federal Government n.d.)

Heat data from U.S. Climate Explorer website includes days above 90°F, 95°F, 100°F, and 105°F; annual single highest maximum temperature; and annual single highest maximum temperature during a 5-day period (U.S. Federal Government n.d.). Heat projections are available under multiple representative concentration pathways (RCPs), which are climate change projections that depend on greenhouse gas emissions scenarios. RCP 8.5, the high emissions scenario, was used for temperature projections.

2.1.4 Extreme Wind

Extreme wind can result from severe storms, hurricanes, or tornadoes. Severe wind events can cause extensive damage to critical infrastructure and buildings, interrupting access to utilities, emergency services, and transportation corridors, and can impact the critical operations of both the military installations and the surrounding communities. This assessment evaluates the vulnerabilities and risks associated with extreme winds from hurricanes.

The Emerald Coast has experienced significant disruption from extreme wind events stemming from hurricanes. Hurricane Michael (2018) and Hurricane Sally (2020) struck the Florida panhandle, impacting the entirety of the Emerald Coast. Bay County and Tyndall AFB sustained the greatest impacts from Hurricane Michael, while Hurricane Sally caused severe damage to NASP and disrupted missions at NASWF, Eglin AFB, and Hurlburt Field.

2.1.5 Lightning

Florida is the lightning capital of the world, having the highest level of thunderstorm activity and cloud to ground lightning density in the continental United States. (Vaisala 2023) On average, the northwest Florida region experiences between 135 lightning events annually (NRI 2023). Lightning vulnerability is assessed quantitatively in this report.

2.2 Economic Stresses

One consistent theme during the stakeholder engagement workshops was the economic issues facing all of the installations and their surrounding communities: a lack of economic diversity, housing attainability, and the Florida insurance crisis.

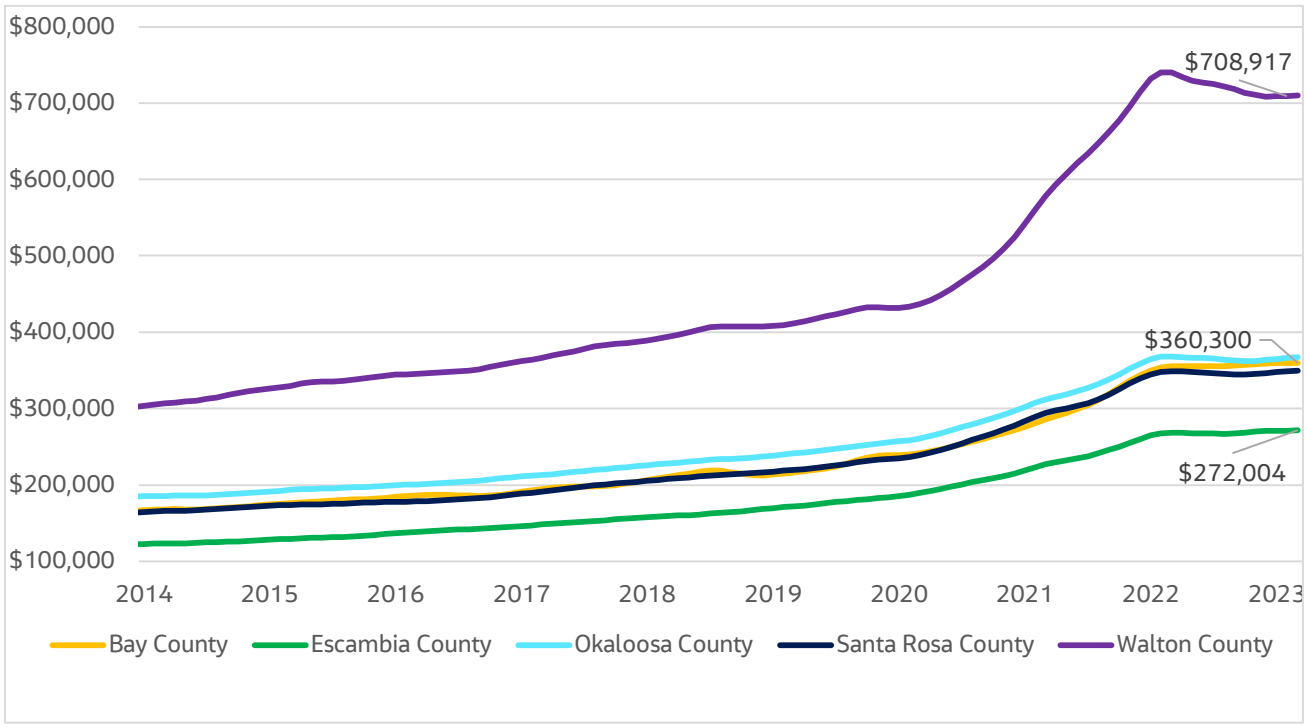
2.2.1 Stratified Economy

It was noted during the workshops that the Emerald Coast in general has two main economic drivers: the military and tourism. The region faces challenges such as economic dependencies on these industries, vulnerability to fluctuations in defense spending, and the seasonal nature of tourism, and the need for diversification to enhance resilience against economic shocks. For example, the tourism sector is vulnerable to external shocks, such as hurricanes, oil spills, and other extreme weather events. Additionally, striking a balance between military activities and environmental conservation, as well as managing the impacts of seasonal tourism on local communities, poses ongoing challenges for economic stability across the region.

2.2.2 Housing Attainability

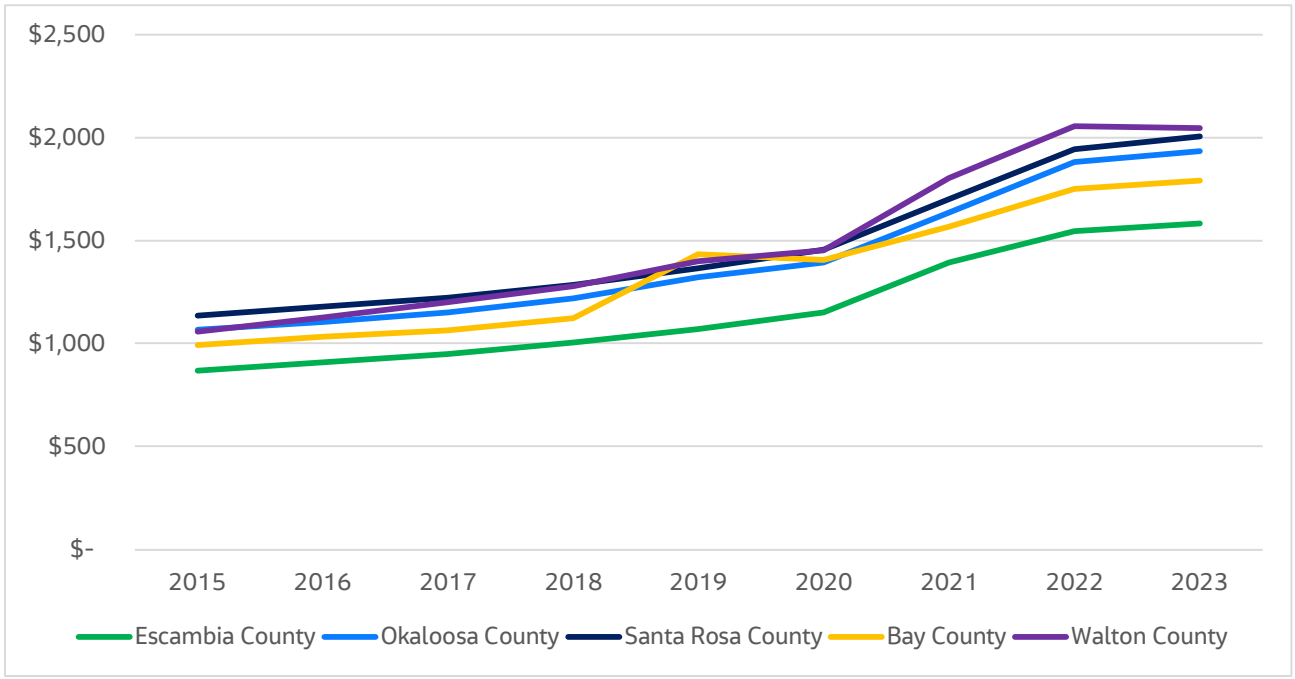
The noteworthy population growth in northwest Florida has put significant stress on housing availability and affordability. Insufficient housing capacity stems from the limited affordable housing options for both installation personnel and community members. In addition, high home prices and rents place additional stress on family budgets. Figure 2-2 shows the typical home prices by County, which have risen significantly since 2014. Monthly rents have experienced a similar increase, as shown on Figure 2-3.

Figure 2-2. Emerald Coast Average Home Prices, 2014–2023



Source: Zillow Home Value Index (Zillow n.d.)

Figure 2-3. Emerald Coast Average Rent Prices, 2015–2013



Source: Zillow Home Value Index 2023

Rents have increased from an average of $1,024 in 2015 to $1,873 in 2023. This places additional stress on budgets for civilian and military families in the region. In some areas, such as in Santa Rosa County and western Bay County, and large portions of Escambia County, the basic allowance for housing (provided by the DoD to military families to cover housing costs) covers less than 95% of the median monthly mortgage payment (Florida Defense Support Task Force 2023).

2.2.3 Insurance

High hazard insurance costs are putting significant financial strain on communities across the Emerald Coast. Hazard insurance premiums throughout the state are, on average, $6,000 per dwelling, compared to a U.S. average of $1,700 (Insurance Information Institute 2023). Rising insurance premiums affect all residents, with the greatest impacts on local residents who cannot move to another area and lower-income populations. The issue is further exacerbated by the fact that more than fifteen insurers have either left the state or have reduced coverage in high-risk areas, including northwest Florida. These costs impact both communities and the installation personnel who live there.

While high insurance costs reflect the risks associated with living in the state, some of the costs stem from fraudulent property claim lawsuits and expensive litigation. Until recently, when new state legislation was enacted, fraudulent roof scams resulted in significant costs in litigation for insurers. Attorneys are encouraged to litigate insurance claims because of contingency fee multipliers, which reward attorneys multiple times their hourly billing rates when the courts rule in favor of policyholders. These issues have created a legal and financial environment that encourages costly litigation and, as a result, is hostile to insurers.

2.3 Social Stresses

Three common social stresses were noted during the stakeholder workshops: housing affordability and attainability, lack of childcare, and education challenges.

2.3.1 Lack of Childcare

Childcare services are severely limited in the Emerald Coast. A lack of available staff and facilities is putting additional strain on the industry. This can make it difficult for service members to balance their professional responsibilities with family obligations. Insufficient childcare options can result in increased stress for military parents, potentially affecting their readiness and focus on their duties. Additionally, it could lead to decreased retention rates as military personnel face challenges in sustaining a long-term career due to family-related concerns. Addressing this issue is crucial for maintaining the overall effectiveness and resilience of military installations across the Emerald Coast.

2.3.2 Education Challenges

Challenges associated with education options in northwest Florida were a repeating theme in the stakeholder engagement workshops. Issues such as uneven access to quality educational institutions, overcrowding of classrooms, limited specialized programs, and potential disparities in educational outcomes across different communities were all discussed.

The issue of overcrowding of schools was the most frequently discussed topic regarding education. Overcrowding results in larger class sizes, fewer resources for students, and a more challenging classroom environment for teachers. Overcrowded schools may struggle to provide individualized attention to students, affecting learning outcomes. Additionally, issues related to infrastructure, such as limited space

for extracurricular activities and inadequate facilities, can arise. Addressing this issue requires proactive planning, resilient infrastructure, and community collaboration to mitigate the effects of both overcrowding and hurricane-related disruptions on the education system.

2.4 Environmental Shocks and Stresses

2.4.1 Coastal Erosion

Increased wave action, stronger and higher storm surge, and higher sea levels are increasing the rate of erosion of coastal regions, especially during storm events such as Hurricane Michael and Hurricane Sally. Coastal erosion is anticipated to increase over time with SLR, undermining the first line of coastal defense, such as sand dunes, rip rap, and other forms of shoreline and slope stabilization/armoring and bulkheads, thereby threatening coastal assets. Higher storm surge/coastal flooding events will continue to cause erosion and scour of the unprotected areas behind these coastal defenses. Eroding coastlines pose a threat to the operational and training areas of all installations in the Emerald Coast MIRR except for NASWF, which is located away from the coast in Santa Rosa County.

2.4.2 Endangered Species

Northwest Florida is home to many endangered species, with a number of these species residing within installation boundaries. The presence of federally protected flora and fauna can pose a threat to installation operations because of potential restrictions on land use and activities. However, the installations are well-versed in protecting both the species and the installations' missions.

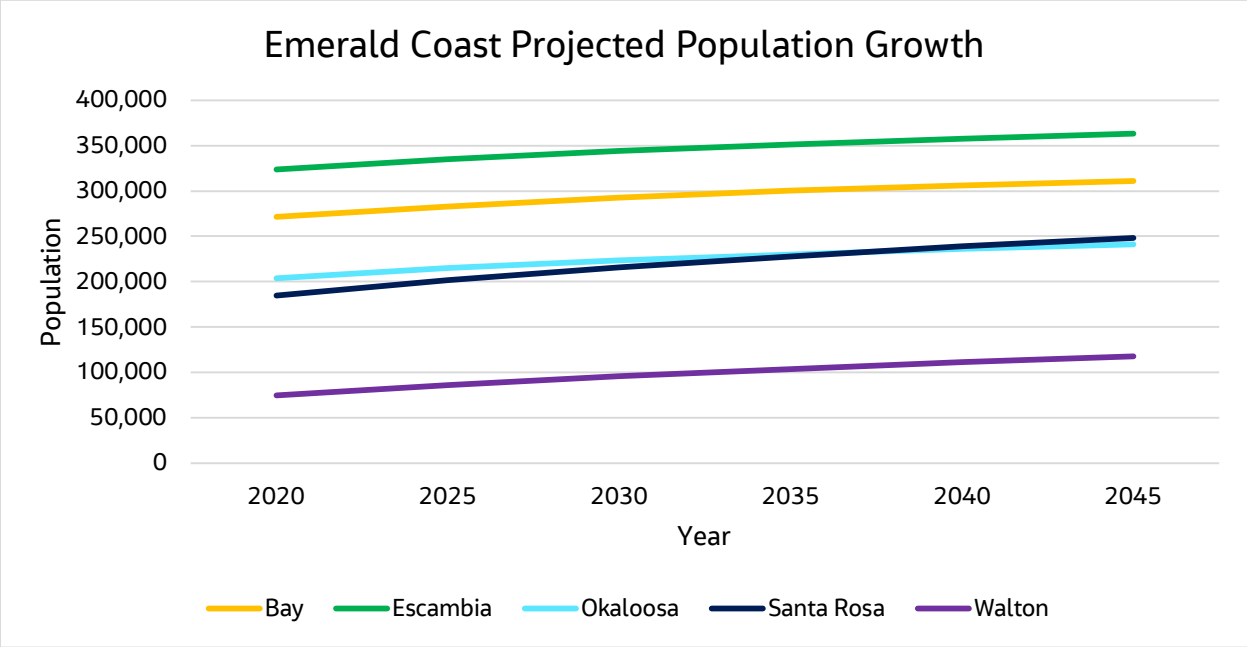
2.5 Encroachment

The Department of Defense defines encroachment as "external, as well as internal, DoD factors and influences that constrain or have the potential to inhibit the full access or operational use of the live training and test domain. It includes, but is not limited to, endangered species and critical habitat, unexploded ordnance and munitions, radio frequency spectrum, maritime or airspace restrictions, air quality, airborne noise, urban growth, physical obstructions, and renewable energy projects" (GAO 2016).

Of the six Emerald Coast installations, staff at NASP and Eglin AFB face the greatest risk from encroachment, particularly from adjacent land development, urban growth, radio frequency spectrum (Eglin only), and endangered species and critical habitat. Population growth in the northwest Florida region is a primary driver for most forms of encroachment.

The total population of the five counties in the Emerald Coast MIRR study area is projected to increase by 21% from 2020 to 2025 (BEBR 2021). Figure 2-4 shows the population growth by County.

Figure 2-4. Emerald Coast Counties Projected Population Growth



Source: Rayer and Wang 2021

The population growth is accompanied by increasing development, particularly in the open spaces around the installations. This leads to potentially incompatible land uses that can negatively impact the missions of the installations.

The Northwest Florida Sentinel Landscape (NFSL) was formed in 2022 by a coalition of local, regional, state, and federal entities (Sentinel Landscapes. n.d.). The purpose of NFSL is to protect mission assurance and the lands in northwest Florida (Figure 2-5).

NFSL covers land management and endangered species and has identified land purchases that can further protect the installations. The encroachment challenges are discussed in greater detail in each installation's respective VA.

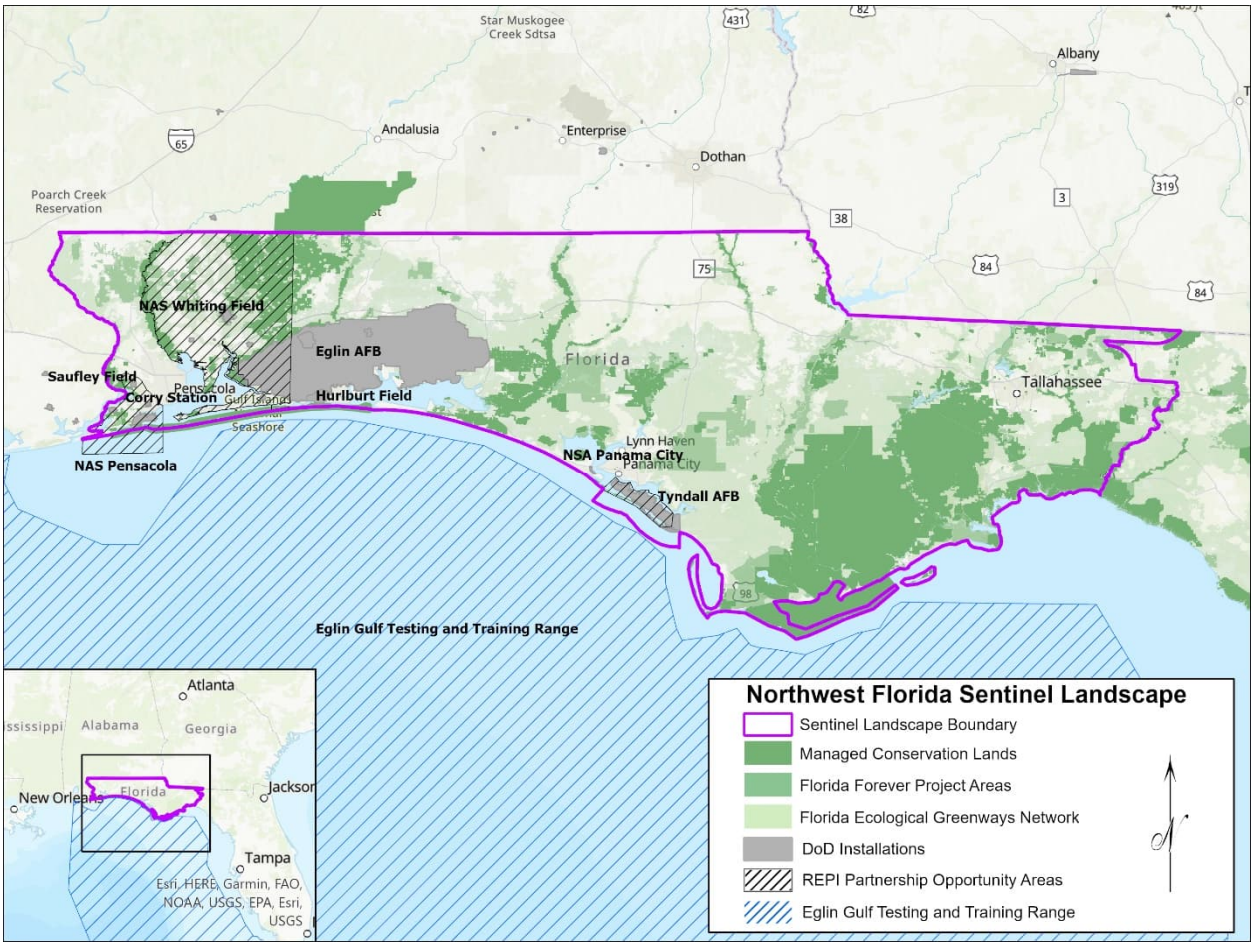
2.6 Infrastructure Stressors

2.6.1 Aging Infrastructure

Aging infrastructure poses a threat throughout the region for a variety of reasons. Some examples of this include:

- Infiltration and inflow can overload wastewater lines, causing sanitary sewer overflows that can damage property and the environment.
- Aging septic systems are a concern because old septic tanks can leak untreated wastewater into the groundwater, affecting groundwater quality.
- Deferred maintenance and lack of investment in critical infrastructure can lead to service disruptions and pose health risks to adjacent populations.

Figure 2-5. Northwest Florida Sentinel Landscape Map



Source: Northwest Florida Sentinel Landscape (Sentinel Landscapes. n.d.)

2.6.2 Energy Disruption

Energy disruption is inherently detrimental as it can lead to widespread economic setbacks, compromise public safety, and impede critical services, underscoring the urgency to assess vulnerabilities and implement safeguards to minimize the adverse impact on both local communities and military installations. Hazards that impact the stability and function of energy infrastructure and cause energy disruption include:

- **Flooding**: extended exposure to water can cause malfunction and power transmission line poles to weaken and decay, reducing their load-bearing capacity. The flood events that can affect transmission poles include:
  - Current and future 100-year flood plain
  - Sea Level Rise
  - Storm Surge
- **Heat**: extreme temperatures can cause transmission lines and distribution systems to sag, which can lead to power outages or equipment damage.
- **Lightning**: lightning strikes electric substations and power transmission line poles and causes:

  - **Fire risks**: Lightning strikes have the capacity to trigger fires or disrupt equipment, resulting in power outages and safety concerns.
  - **Electrical surges**: Power surges induced by lightning can not only harm the infrastructure themselves but also affect connected electrical systems, causing extensive disruptions.
  - **Equipment malfunction**: Lightning strikes pose a threat to electronic devices on or in proximity to utility poles, leading to permanent damage.
- **Wildfires**: uncontained wildfires can damage or destroy transmission lines, substations, and other critical components, leading to widespread power outages and disruptions.
- **Hurricanes**: strong sustained wind and fallen trees can cause permanent damage to structures or equipment.

2.7 Threats Discussed in the Stakeholder Engagement Process

Both data and anecdotes of existing vulnerabilities were collected during the stakeholder engagement workshops. Threats were discussed for the following sectors: transportation, water, wastewater, stormwater, power, communications, housing, childcare, environment, and economy. The threats contained in these lists are a combination of hazards examined in detail during the geospatial vulnerability assessment as well as threats that have been reviewed with the project's Technical Advisory Committee. These threats are discussed in further detail in the installation-specific vulnerability assessments.

Naval Air Station Pensacola

- Aging infrastructure
- Upended trees damaging pipes during hurricanes
- Pump station at back gate discharges to Pensacola Bay
- Flood risk in downtown Pensacola (lack of stormwater capacity)
- Flooding near NASP fence line (Pleasant Grove ditch)
- Flooding on north side of Correy Station
- Insufficient capacity at PSC Ditch at Saufley field
- Flood at Florida Power & Light Clean Energy Center
- Controlled burns near power transmission lines
- Insufficient cell service capacity (cell towers) during storm events
- High costs prohibit projects and startup businesses
- Aging infrastructure
- Businesses closing because local economy unable to support them
- Population growth outpacing housing availability
- Large homeless population
- Constructed housing is middle or high income
- Educational commuting challenges
- Housing efforts are siloed (many organizations are working on the housing crisis in their own way, with little coordination)
- PFAS[1] in groundwater
- Septic tanks impacting water quality
- Endangered species

[1] PFAS are a large group of human-made environmentally persistent organic compounds with properties that make many of them toxic and persistent in the environment (EPA 2021).

- Limitations on federal funds and grants
- Two-pronged economy (DoD and tourism)
- Limited workforce availability
- High costs of living (pushing out lower-income families)
- Urban blight near installation
- Capacity of evacuation routes and times
- Installation ingress and egress capacity
- Long childcare waitlists
- Lack of workers
- Overcrowding in schools

Naval Air Station Whiting Field

- Hurricanes
- Single point of failure on I-90 at the bridge
- Smoke from wildfire
- Regional sanitary sewer capacity
- Erosion (gullies) near power transmission lines
- Aging infrastructure (infiltration and inflow)
- Lack of childcare capacity
- Population growth
- Florida insurance crisis
- Schools struggling to accommodate students
- Lack of attainable housing
- Lack of childcare capacity
- Lightning affecting transmission lines

Eglin AFB and Hurlburt Field

- Aging infrastructure
- Wastewater capacity concerns
- Hurricanes affecting transmission and distribution power infrastructure
- Lack of fuel storage
- Encroachment on Eglin AFB
- Lack of economic diversity in Okaloosa County
- Sea level rise
- Coastal erosion
- Septic tanks impacting water quality
- Saltwater intrusion
- Flooding
- Wildfire
- Flooding at Shoal River Bridge
- Traffic congestion
- Lack of capacity in evacuation routes
- Lack of childcare capacity
- Gap in workforce for childcare and education
- Cost of living issues for teachers and childcare workers

NSA Panama City and Tyndall AFB

- Pluvial flooding
- More severe heat impacts due to loss of urban tree canopy after Hurricane Michael
- Sanitary sewer overflows
- Panama City crayfish
- Coastal erosion
- Insufficient housing supply
- Disparity for household budgets coming from higher cost of living areas
- Power outages in historic downtown Panama City
- Additional stress on communications infrastructure due to teleworking
- Long lead times for equipment for utilities

- Three new squadrons moving into base; insufficient housing available (Tyndall)
- Insufficient supply of affordable housing
- Lack of benefits for non-military families
- Difference between housing development and utility timelines (housing developments being built faster than utilities can accommodate)
- Growth in electric vehicle infrastructure that may place stress on power system capacity
- Lack of early education and childcare services
- Lack of childcare workers
- Aging infrastructure at Deer Point Dam
- Lack of redundancy at Deer Point Water Treatment Plant

3. Methodology

The scope of the installation VAs extends to study areas around the facilities and the hazards of concern identified herein. The study areas are defined to include assets that are critical to the installations' operations or mission. These include: transportation assets and evacuation routes, including roadways, evacuation routes, airports, railroads, ports, and transit facilities; critical infrastructure assets, including water, wastewater, stormwater, power, gas, and communications utilities; and critical community and emergency facilities, including educational facilities, emergency services, and government facilities.

3.1 Vulnerability Assessment Methodology

The methodology for the vulnerability assessments was developed based on the State of Florida's Vulnerability Assessment Methodology, as outlined in the Standard Vulnerability Assessment: Scope of Work Guidance (FDEP 2022).

Assets and hazards were mapped using ESRI ArcGIS and combined into a single geodatabase. By overlaying the assets on the hazards, the MIRR team was able to identify intersections to determine assets' exposure to hazards. The results of the exposure analysis were exported to Jacobs' vulnerability assessment tool, which quantifies the exposure and sensitivity to determine asset vulnerability to natural hazards.

A dedicated analysis on the energy infrastructure vulnerability was conducted because of its critical significance to both the local community and military installations in the region. Recognizing the pivotal role of energy systems in sustaining essential services, national security, the economy, and public health and safety, the focused assessment aims to comprehensively evaluate potential vulnerabilities specific to this vital sector and address the implications of energy infrastructure failure.

3.1.1 Exposure Analysis

Exposure is defined as the proximity of assets to hazards. Exposure scoring criteria are given as a numerical score on either a sliding scale (between 0 and 1) or binary scale (0 or 1). Exposure for each hazard is defined in the following text.

Flooding: Flood exposure is determined by both the proximity of the asset or facility to the floodplain and the depth of flooding. Assets within a floodplain are exposed to flooding; the depth of flooding influences the degree of exposure. Underground assets are assumed to not be exposed to flooding. Exposure was analyzed for the 100-year flood event, all five storm surge categories, and the four SLR scenarios, the criteria for which are shown in Table 3-1.

Table 3-1. Flood Exposure Criteria

Flood Scenario	Description	Scoring Criteria (Per Scenario)
Current 100-year flood	Based on effective FEMA FIRM flood zone extents	Flood depth <12 inches = 0.33 12 inches <Flood depth <30 inches = 0.67 Flood depth <30 inches = 1
2040 Intermediate low SLR	Based on future flood extents for the 100-year event in 2040 and 2070	SLR depth <12 inches = 0.33 12 inches <SLR depth <30 inches = 0.67 SLR depth <30 inches = 1
2040 Intermediate high SLR		
2070 Intermediate low SLR		

Table 3-1. Flood Exposure Criteria

Flood Scenario	Description	Scoring Criteria (Per Scenario)
2070 Intermediate high SLR		
Storm Surge (Hurricane Categories 1,2,3,4,& 5)	Based on NHC SLOSH modeling	Surge depth <12 inches = 0.33 12 inches <Surge depth <30 inches = 0.67 Surge depth <30 inches = 1

Storm surge cannot be directly determined by hurricane category alone because of many factors associated with hurricanes, including storm direction, speed, pressure, tidal conditions and other factors. However, the SLOSH modeling results used for hurricane evacuation purposes provide a general review of potential exposure based on topography and possible flood pathways. Therefore, modeling results are used in this analysis to provide a general evaluation of potential flood exposure for major storm events.

Facility exposure scores are calculated by summing the scores from the ten flood scenarios and then normalizing the score by dividing by 10. An asset with the greatest exposure to flood will have a maximum flood exposure score of 1. The facility exposure equation is shown in the following example:

Example: Coastal asset exposed to all flood events

Scenario 1: Inside 100-year flood zone	*(1)*
Scenario 2: Inside 2040 Intermediate Low	*(1)*
Scenario 3: Inside 2040 Intermediate High	*(1)*
Scenario 4: Inside 2070 Intermediate Low	*(1)*
Scenario 5: Inside 2070 Intermediate High	*(1)*
Scenario 6: Inside Cat 1 Storm Surge	*(1)*
Scenario 7: Inside Cat 2 Storm Surge	*(1)*
Scenario 8: Inside Cat 3 Storm Surge	*(1)*
Scenario 9: Inside Cat 4 Storm Surge	*(1)*
Scenario 10: Inside Cat 5 Storm Surge	*(1)*
Total Flood Exposure Score:	***10/10 = 1***

The following equation shows an example of a facility not exposed to flooding until the NOAA 2070 intermediate high projection and Cat 4 storm surge:

Example: Inland asset exposed to NOAA 2070 intermediate high SLR and Cat 4 and 5 storm surge

Scenario 1: Inside 100-year flood zone	*(0)*
Scenario 2: Inside 2040 Intermediate Low	*(0)*
Scenario 3: Inside 2040 Intermediate High	*(0)*
Scenario 4: Inside 2070 Intermediate Low	*(0)*
Scenario 5: Inside 2070 Intermediate High	*(1)*
Scenario 6: Inside Cat 1 Storm Surge	*(0)*
Scenario 7: Inside Cat 2 Storm Surge	*(0)*
Scenario 8: Inside Cat 3 Storm Surge	*(0)*
Scenario 9: Inside Cat 4 Storm Surge	*(1)*
Scenario 10: Inside Cat 5 Storm Surge	*(1)*
Total Flood Exposure Score:	***3/10 = 0.3***

Wildfire: Wildfire exposure data were obtained from the U.S. Forest Service and are categorized as either directly or indirectly exposed. Direct exposure is the result of a facility or asset being located adjacent to wildland vegetation while indirect exposure occurs from fire sources such as embers or structure-to-structure ignition. Table 3-2 provides the wildfire exposure categories and associated scores.

Table 3-2. Wildfire Exposure Categories

Exposure Category	Exposure Score
Directly Exposed	1
Indirectly Exposed: High	0.75
Indirectly Exposed: Moderate	0.5
Indirectly Exposed: Low	0.25
No Exposure	0

Extreme Heat: Assets that are at grade or aboveground are exposed to extreme heat while belowground assets are not. A score of 1 or 0 was given for aboveground and belowground assets, respectively.

Extreme Wind: Aboveground assets are exposed to wind while belowground assets are not, with corresponding scores of 1 and 0.

Lightning: Aboveground assets and facilities are exposed to lightning while belowground assets are not exposed, with corresponding scores of 1 and 0.

Asset total exposure scores are calculated by summing the scores from all hazards. An asset with the greatest exposure to all hazards will have a total exposure score of 7. The asset exposure equation is shown in the following examples:

- **Example: Aboveground coastal asset (for example, a wastewater lift station)**
  - *Combined flood exposure:* *(0.7)*
  - *Wildfire: Indirectly Exposed, low* *(0.25)*
  - *Extreme Heat: Aboveground* *(1)*
  - *Extreme Wind: Aboveground* *(1)*
  - *Lightning: Aboveground* *(1)*
  - ***Total Exposure Score:*** ***=4.7***
- **Example: Belowground inland asset (for example, a pipeline)**
  - *Combined flood exposure:* *(0.1)*
  - *Wildfire: Directly Exposed* *(1)*
  - *Extreme Heat: Belowground* *(0)*
  - *Extreme Wind: Belowground* *(0.25)*
  - *Lightning: Belowground* *(0)*
  - ***Total Exposure Score:*** ***=1.35***

3.1.2 Sensitivity Analysis

Sensitivity is the responsiveness of a system to hazard impacts. It is typically asset-dependent. For example, while an electric substation and a power transmission line may both be in a 100-year floodplain, the electric substation will exhibit greater sensitivity to flooding because of its ground-level electrical equipment. An asset that is not exposed to a hazard also does not display sensitivity to that hazard. Asset types were evaluated against hazards in a matrix to determine sensitivity and assign scores. The maximum

possible asset sensitivity score for all hazards is 5. Sensitivity scoring was assigned based on hazard-dependent criteria, which are discussed below.

Flood Sensitivity: The following questions were used to inform flood sensitivity scores:

- Does the asset have critical electrical or mechanical equipment that can be damaged by floodwaters?
- Is the asset material subject to corrosion or damage by flood inundation? Material can include structure type or interior building finishes.
- Is the operation of the asset impacted by the presence of floodwaters (including access)?
- Can there be erosion or scour (washout) that affects the facility or asset?

These questions provide a baseline understanding of the effect of flood hazards on the asset. Each "yes" for the question is given a score of 0.25; an asset that is most sensitive to flooding will have a total flood sensitivity score of 1 for each flood hazard (100-year flood, SLR, and/or storm surge), for a maximum flood sensitivity score of 3.

Extreme Heat Sensitivity: An asset or facility is sensitive to extreme heat when the projected maximum summer temperature exceeds the asset's heat threshold temperature. Table 3-3 shows sensitivity values for heat.

Table 3-3. Asset Heat Sensitivities

Asset Category	Applicable Asset Categories	Temperature (°F)
Human Health	Critical community and emergency facilities	95
Outdoor Electrical Equipment	Drinking water facilities (pump stations, water treatment plants, well pumps), wastewater facilities (wastewater treatment plants, lift stations, pump stations), electric production and supply facilities, communications facilities	104[a]
Roadway Pavement	Roadways, evacuation routes	100
Railway Operation	Rail facilities, railroad bridges	95
Aviation	Airstrip pavement	120

[a] The maximum ambient temperature at which electrical equipment can operate varies greatly and depend on the equipment itself. The nameplate temperature for electrical equipment can vary between 86 and 104°F. For the purposes of this MIRR, electrical equipment is being given an assumed temperature threshold of 104°F. This value captures the fact that utility providers are aware of the heat in which their equipment is operating while also accounting for increasing vulnerability as temperatures increase.

Asset heat sensitivity is compared to projected temperature threshold scores for RCP 8.5 for the 2040 and 2070 planning horizons. If the asset heat sensitivity threshold exceeds the extreme heat temperature projected by the RCP, it receives a score of 1. Total heat sensitivity is determined by summing the sensitivity scores (maximum of 2) and normalizing them by dividing by 2, for a final total sensitivity score of 1.

Wildfire Sensitivity: Asset sensitivity to wildfire depends on the asset type and materials. For this assessment, wildfire sensitivity was assessed based on its ability to impact operation and equipment:

- Would fire significantly impact operation?
- Does the asset have critical electrical or other fire-susceptible equipment or materials?

Each "yes" for the above questions is given a score of 0.5; an asset that is most sensitive to wildfire will have a total flood sensitivity score of 1.

Extreme Wind Sensitivity: Asset sensitivity to extreme wind depends on the following:

- Would high winds (that is, Category 3 or higher hurricane) inhibit operation of the asset?
- Can high winds or wind-borne debris damage the asset or building envelope (for example, facade, roof) or critical equipment?
- Can the high winds damage the asset structure itself (structural deformation)?

Each "yes" for the above questions is given a score of 0.33; an asset that is most sensitive to wind will have a total wind sensitivity score of 1.

Lightning Sensitivity: Assets are more sensitive to lightning when they are aboveground or contain critical equipment. The following questions are asked in the sensitivity matrix:

- Is the asset an aboveground structure that is likely to attract lightning (that is, conductive materials or tall structure)?
- Does the asset have critical electrical equipment that could be damaged by lightning?

Each "yes" for the above questions is given a score of 0.5; an asset that is most sensitive to lightning will have a total lightning sensitivity score of 1.

3.1.3 Adaptive Capacity

Adaptive capacity is the ability of an asset to adapt to evolving conditions presented by a given hazard over time. For example, in a pump station, electrical equipment can be elevated, thereby reducing vulnerability. Adaptive capacity is asset-dependent and relies on a detailed understanding of a specific facility or asset. Because of the planning-level assessment conducted for this MIRR, adaptive capacity is not considered when calculating vulnerability but is considered when developing recommended actions.

3.1.4 Vulnerability Analysis

Vulnerability is the combination of exposure, sensitivity, and adaptive capacity. The greater the exposure and sensitivity of an asset, the greater the vulnerability of the asset to the given hazard. For the purposes of this MIRR, vulnerability is defined as the combination of exposure and sensitivity and is given as:

Vulnerability = Exposure + Sensitivity

Exposure and sensitivity scores for each hazard were added to derive a hazard vulnerability score. The hazard vulnerability scores for all corresponding infrastructure assets were subsequently summed to obtain a total vulnerability score for each installation. Assets with high vulnerability scores, relative to each installation, were carried forward into the risk analysis.

3.1.5 Sector-Specific Vulnerability Analysis: Energy Sector

To determine areas where the most prevalent energy infrastructure vulnerability exist within the Emerald Coast Region, The Five Rs of Energy System Resilience by Air Force Civil Engineering Center are considered **(Figure 3-1)**. These include robustness, redundancy, resourcefulness, response, and recovery. Drawing from these principals, the following vulnerability indicators and metrics were considered for NWFL MIRR

energy sector vulnerability assessment: 1) exposure to major natural threats to energy infrastructure, 2) energy burden within the county and Census tract of the installations, 3) known vulnerabilities, 4)hardening efforts for the energy infrastructure, 5) presence of microgrid and Combined Heat and Power facilities for redundancy, and 6) proximity of infrastructure to power recovery priority facilities, such as hospitals and emergency medical service stations. It is important to note that debris management and regular maintenance for the energy infrastructure are considered as important factors that can impact the stability and function of the energy systems.

These metrics were evaluated in asset, county, and military installation scales, with each being awarded a final vulnerability score to rank their energy-related condition from "poor" to "good". The intention of this ranking system is to inform an adaptation strategy that prioritizes installations and assets ranked as "poor" for improvement.

Figure 3-1. Five Rs of Energy System Resilience by Air Force CE Center (Adapted from NREL, 2019)

Characteristic	Qualities	Examples
Robustness Are systems physically secure?	• Physically secure • Cybersecure • Hardened infrastructure • Performance monitoring	• Active performance monitoring and maintenance • Critical equipment and facilities physically secured and cybersecured • Resilient building and infrastructure design (drainage, underground lines, elevation) • Temporary or permanent relocation of critical missions
Redundancy Are there single points of failure?	• Eliminate single points of failure	• Backup power (i.e., generators or microgrid) and modular assets • Redundant electric, water, wastewater, transportation, and communication systems • Mesh or loop networks to route power from multiple directions • Mission capability duplicated at other sites and multiple staff trained in critical skills
Resourcefulness Do we have diverse options?	• Available power generation • Energy storage • Community coordination	• Diversified generation and fuel sources (generators, renewable energy, and storage) • Diversified water, wastewater, transportation, and communication sources • Load shedding • Community mutual aid agreements and diversified supply chain
Response Are systems automated and self-healing?	• Automated • Self-healing • Performance indicators • Training and exercise	• Training and exercises for outage scenarios, documented procedures • Fault tolerance (controlled cooldown for safe recovery) • Inclement weather response plans • Smart control systems
Recovery Can systems recover?	• Standardized components • Spare parts inventory • Damage assessment • Prioritization of repowering	• Spare parts inventory, preferably using commercial off-the-shelf parts • Utility coordination and agreements • Development of staff support programs to institutionalize resilience and build capacity

3.2 Risk Analysis Methodology

Vulnerability alone does not provide the complete picture. Incorporating likelihood and consequence assists with providing a more complete understanding of the risk being faced by an asset as well as the associated risk to the mission of the military installation. Risk is calculated using the following equation:

Risk = Consequence x Likelihood

The infrastructure assets with the highest vulnerability have been carried forward into the risk analysis, along with any critical/high priority assets or facilities that were discussed during the stakeholder engagement workshops. The following subsections provide an overview of the likelihood and consequence analyses.

3.2.1 Likelihood

Likelihood is the probability of occurrence for a given hazard. Table 3-4 contains the likelihood of occurrence for select hazards.

Table 3-4. Hazard Likelihood of Occurrence

Hazard	Description and/or Scenario	Likelihood (Annual Probability)	Source
Severe Rainfall	100-Year Flood Event	1.0%	FEMA Flood Insurance Rate Maps
Storm Surge	Return Period for Hurricane (Category 1 or 2) Return Period for Major Hurricane (Category 3 or greater)	0.11 0.036–0.045	National Hurricane Center SLOSH Model
Sea Level Rise	2040 NOAA Intermediate Low 2040 NOAA Intermediate High 2070 NOAA Intermediate Low 2070 NOAA Intermediate High	0.135[a], 0.119[b] 0.029[a], 0.026[b] 0.019[a], 0.017[b] 0.002	NOAA Sea Level Rise Projections
Wildfire	Likelihood of wildfire event	Variable; depends on location of asset. Likelihoods range from 1% to 0.	United States Department of Agriculture and U.S. Forest Service
Heat	Number of days per year of an extreme heat event greater than the asset threshold temperature occurring.	Variable; depends on county and asset threshold temperature.	U.S. Climate Resilience Toolkit Climate Explorer
Lightning	Annualized Frequency (by County)	Bay County: 0.026% Escambia: 0.015% Okaloosa: 0.019% Santa Rosa: 0.02% Walton: 0.035%	FEMA National Risk Index
Extreme Wind	Return Period for Major Hurricane	0.036–0.045	National Hurricane Center

[a] Applicable to Bay County

[b] Applicable to Escambia, Santa Rosa, Okaloosa, and Walton Counties

3.2.2 Consequence

In this MIRR, the consequence resulting from hazard exposure affecting an asset is assessed at a planning level. Incorporating the information gleaned from interviews with the stakeholders and information from

the workshops, the MIRR team asked the following questions to determine the level of severity stemming from a hazard impacting an asset:

- **Does the failure of the asset impact the mission of the installation?** If the failure of the asset has a detrimental impact on the installation, to the point that the installation is unable to complete its mission, then the consequence is greater. This parameter informs the risk to the mission of the installation.
- **Does the asset fail?** Asset failure caused by hazard exposure result in a higher consequence. Partial failure or a short outage causes lesser consequence.
- **Are there redundant systems or assets?** Redundant assets or systems can mitigate the effect of asset failure. Even if the asset fails, operational continuity can be ensured through redundancy. As a result, redundant assets and systems mitigate the overall consequence and result in a lower overall consequence score.
- **Does the asset have protection against the hazard?** Hazard protections, such as elevated equipment for flooding or lightning arrestors, can reduce impacts to the system, and therefore the consequence. Information on hazard protection was obtained from stakeholder interviews and workshops.

Using the above criteria, impacts for each hazard are quantified as a hazard impact score and then added to the mission impact score using the below equation:

$$Consequence = Mission\ Impact\ Score + \Sigma(Hazard\ Impact\ Scores)$$

The resulting consequence score informs the risk score.

3.2.3 Risk

Risk scores were calculated by multiplying the likelihood scores by consequence scores, which yield a numerical risk score. Risk scores were then ranked in accordance with the criteria listed in Table 3-5.

Table 3-5. Risk Scores and Ranking

Risk Score	Risk Ranking
0–60	Low
60–120	Medium
120–180	High
180+	Extreme

Assets with a "high" or "extreme" risk ranking will be prioritized for adaptation interventions during the adaptation planning process.

4. Mission-Critical Infrastructure

The purpose of the Emerald Coast MIRR is to promote mission assurance through community resilience. As a result, this assessment focuses on infrastructure, assets, and community facilities that support the installations' ability to execute their primary and secondary missions. All assets were assigned a mission criticality score based on their support to the mission of the installation. Mission criticality was identified as one of four categories, as shown in Table 4-1.

Table 4-1. Mission Criticality Categories

Mission Criticality Category	Description
Primary Mission-Critical	Asset directly supports the primary mission of the installation.
Secondary Mission-Critical	Asset directly supports the secondary mission of the installation.
Mission-Supportive	While not directly affecting the mission of the installation, the asset otherwise supports the installation operations. Examples can include roadways in neighborhoods where installation personnel live or community health facilities.
Not Mission-Critical	Asset does not affect the mission of the installation.

Asset mission criticality varies and depends on the installation and the assets surrounding it; the same type of asset may have two different criticality ratings at two installations. For example, a water treatment plant may be primary mission-critical at one installation that relies on that facility for drinking water while mission-supportive in a community in which personnel live. In addition, mission criticality rankings are often not the same for all types of assets. For example, within the asset class of major roadways, evacuation routes, and highways may be ranked primary mission-critical while roadways in neighborhoods where personnel live are mission-supportive.

A mission criticality classification was applied to all assets and are discussed in further detail in each installation's respective VA.

5. Next Steps

The results of the vulnerability assessments and risk analyses, coupled with information obtained from the stakeholder engagement process, will be used to inform the development of adaptation interventions. Adaptation workshops will be held with each set of installations to determine the highest priority adaptation interventions and strategies.

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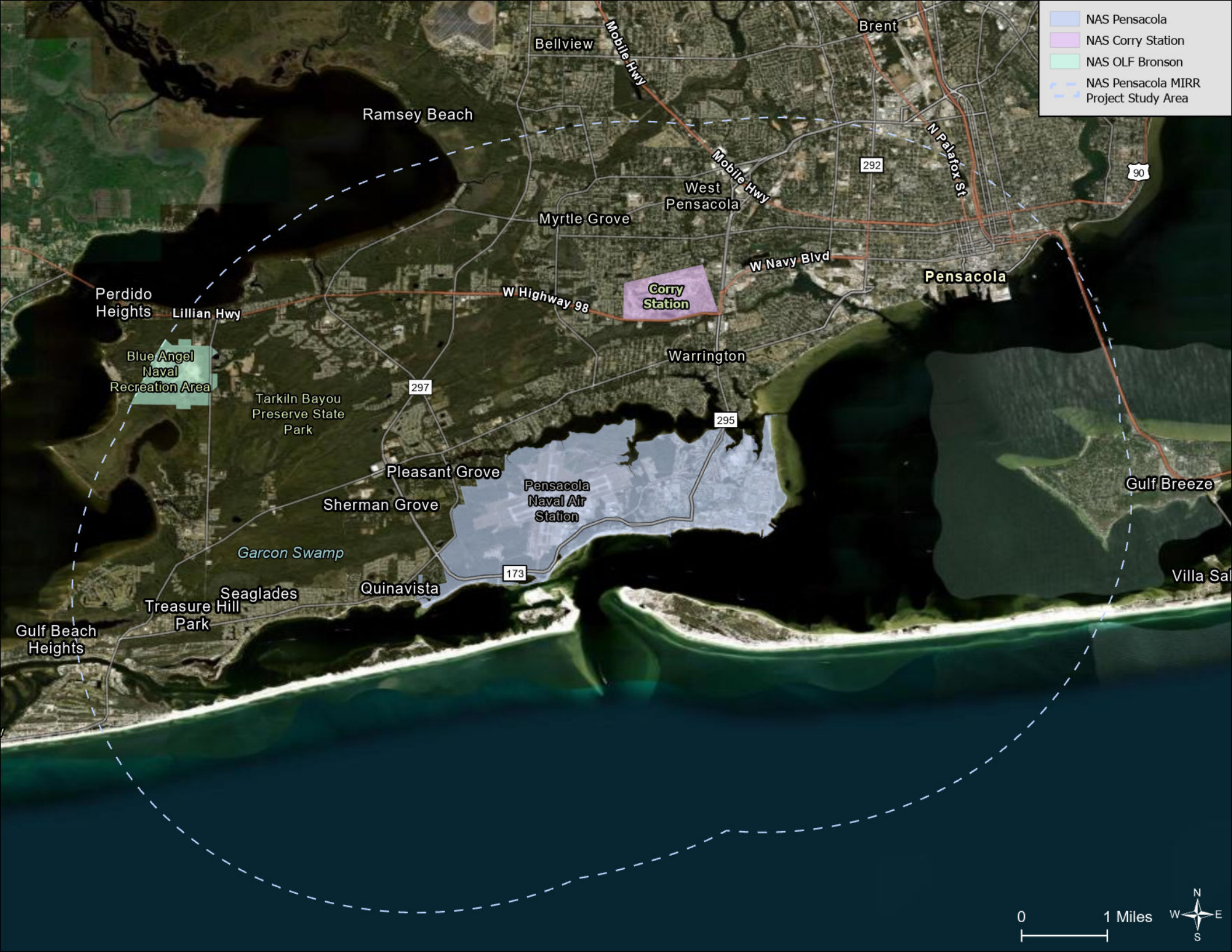
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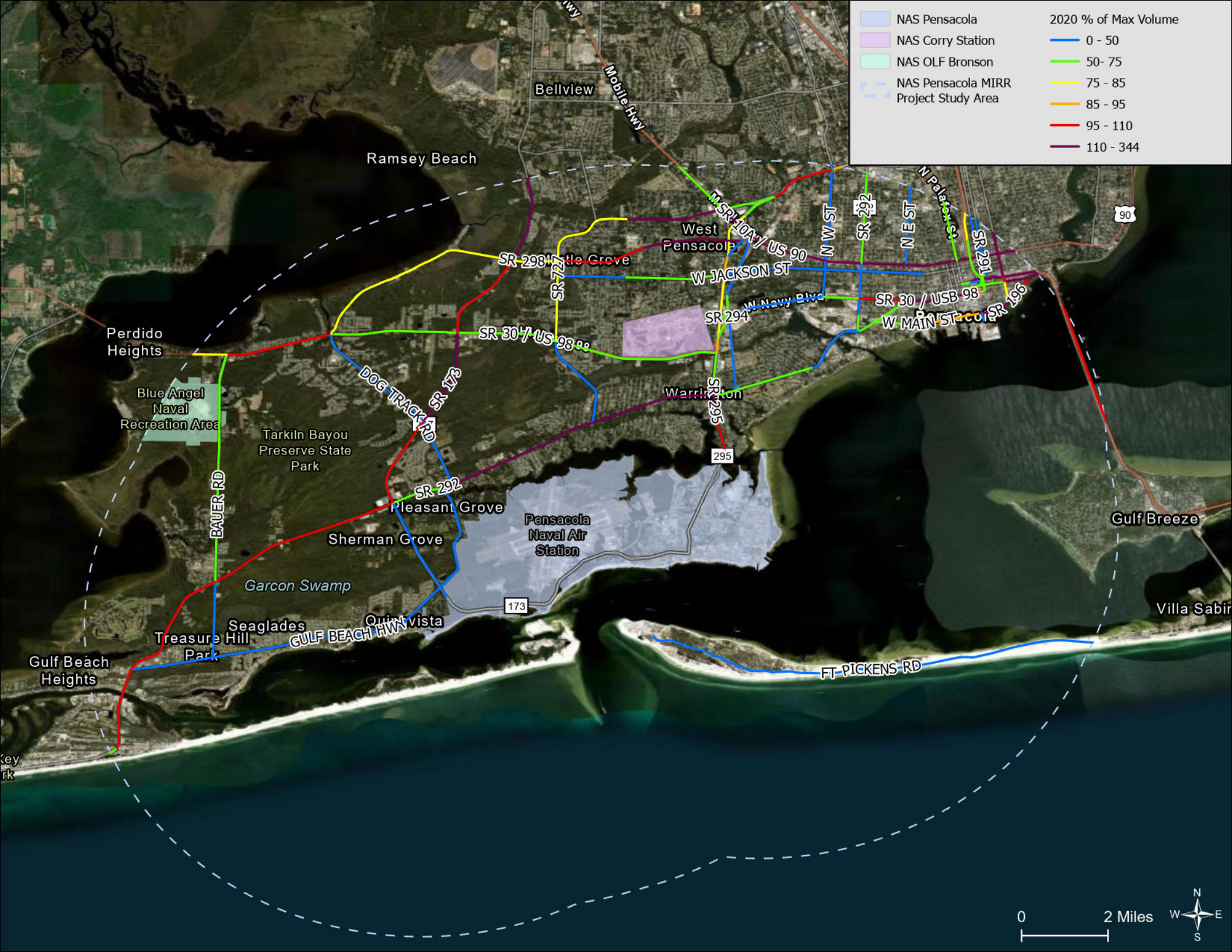
Zuzak, C., E. Goodenough, C. Stanton, M. Mowrer, A. Sheehan, B. Roberts, P. McGuire, and J. Rozelle. 2023. National Risk Index Technical Documentation. Federal Emergency Management Agency, Washington, DC.

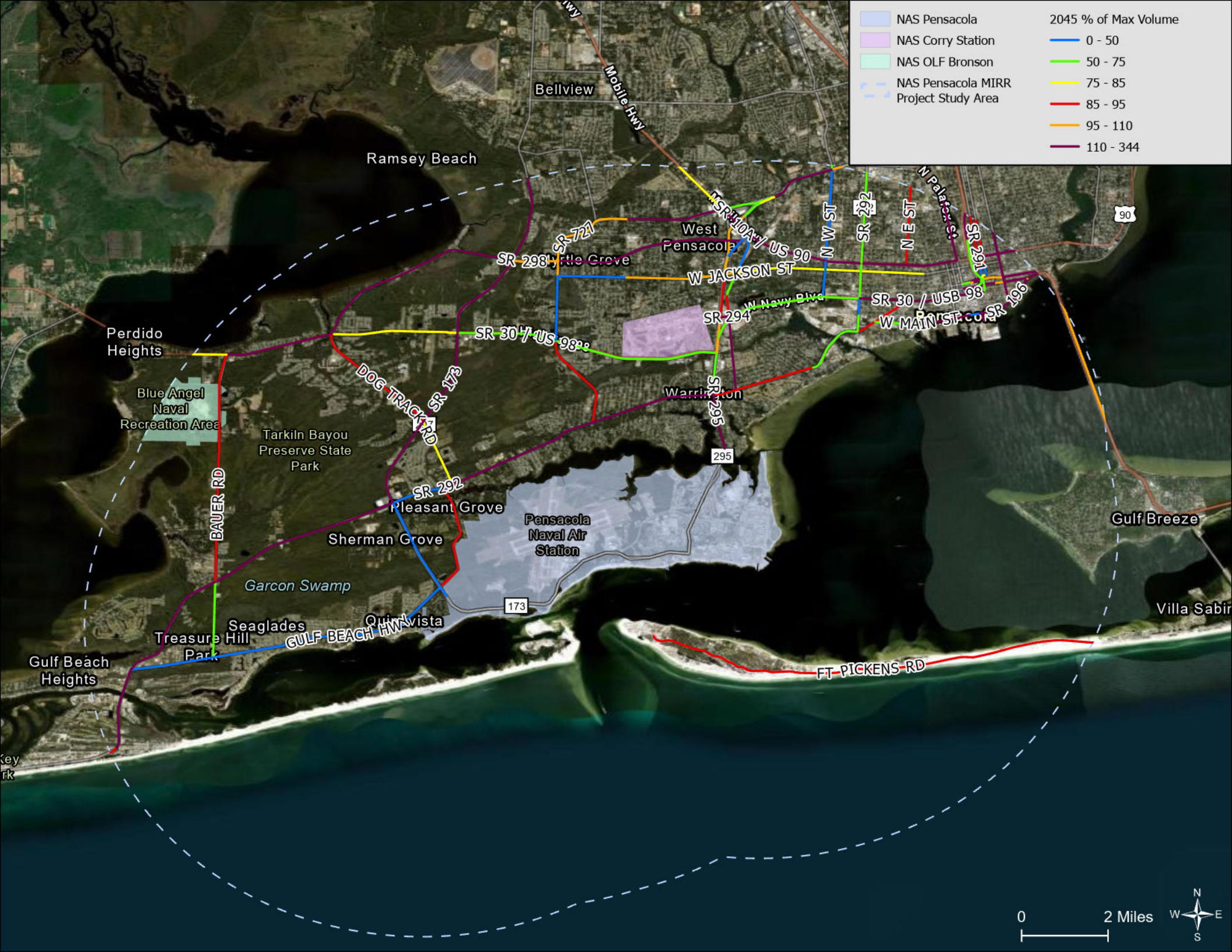
APPENDIX C

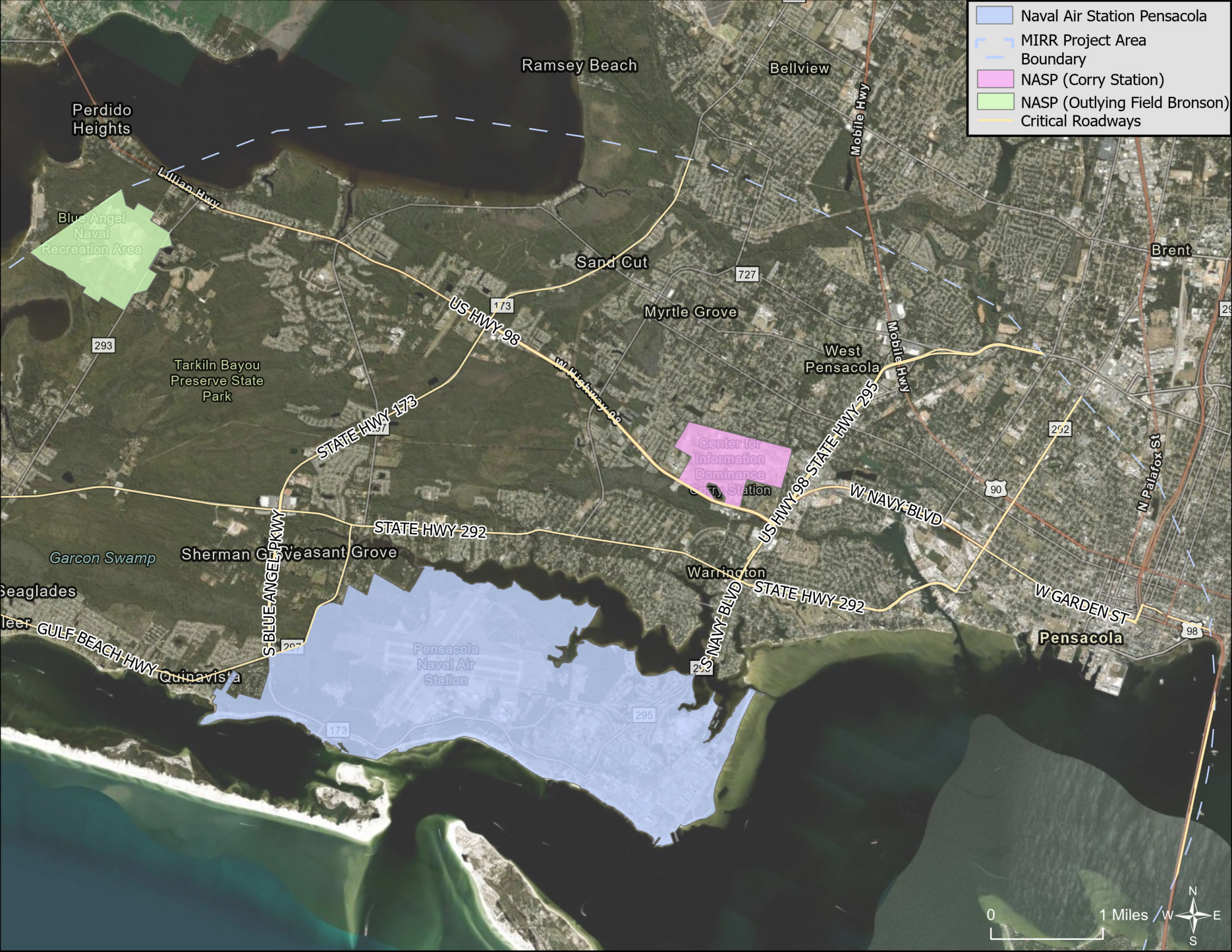
Study Area Asset and Hazard Maps

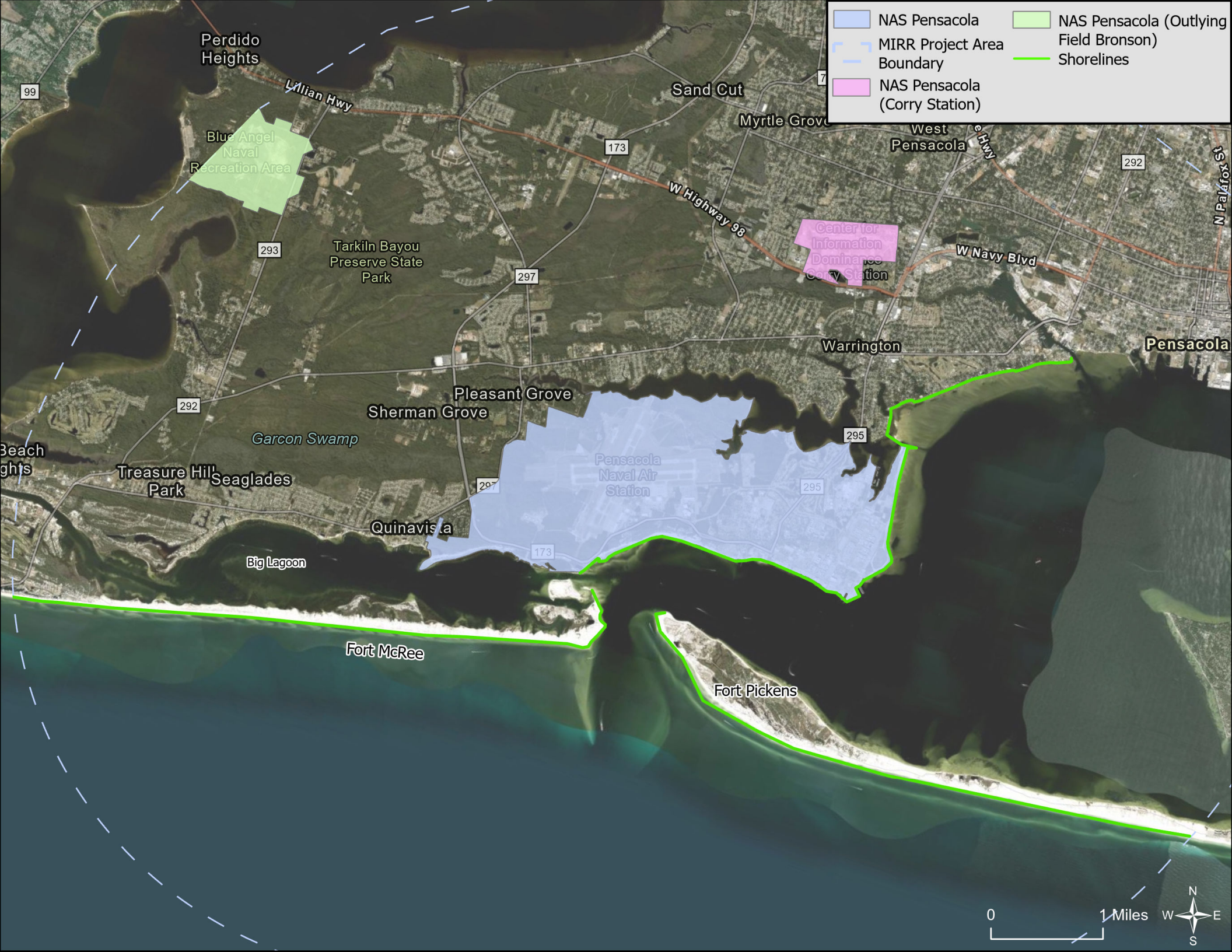


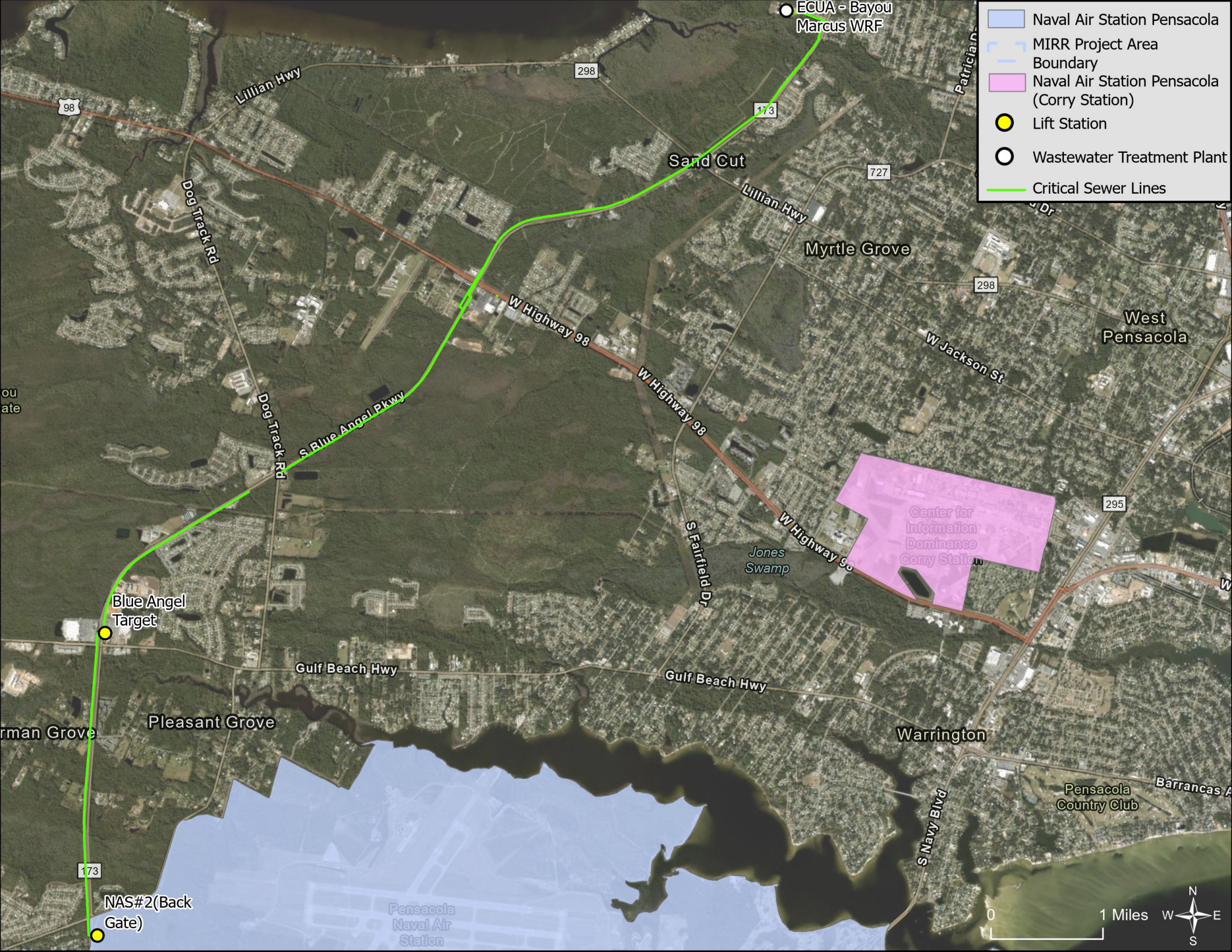

NAS Pensacola
NAS Corry Station
NAS OLF Bronson
NAS Pensacola MIRR Project Study Area
Brent
Bellview
Mobile Hwy
Ramsey Beach
N Palafox St
292
90
West Pensacola
Myrtle Grove
W Navy Blvd
Pensacola
Perdido Heights
Lillian Hwy
W Highway 98
Corry Station
Warrington
Blue Angel Naval Recreation Area
297
Tarkiln Bayou Preserve State Park
295
Pleasant Grove
Pensacola Naval Air Station
Gulf Breeze
Sherman Grove
Garcon Swamp
173
Villa Sal
Seaglades
Quinavista
Treasure Hill Park
Gulf Beach Heights
0
1 Miles
N
W
E
S

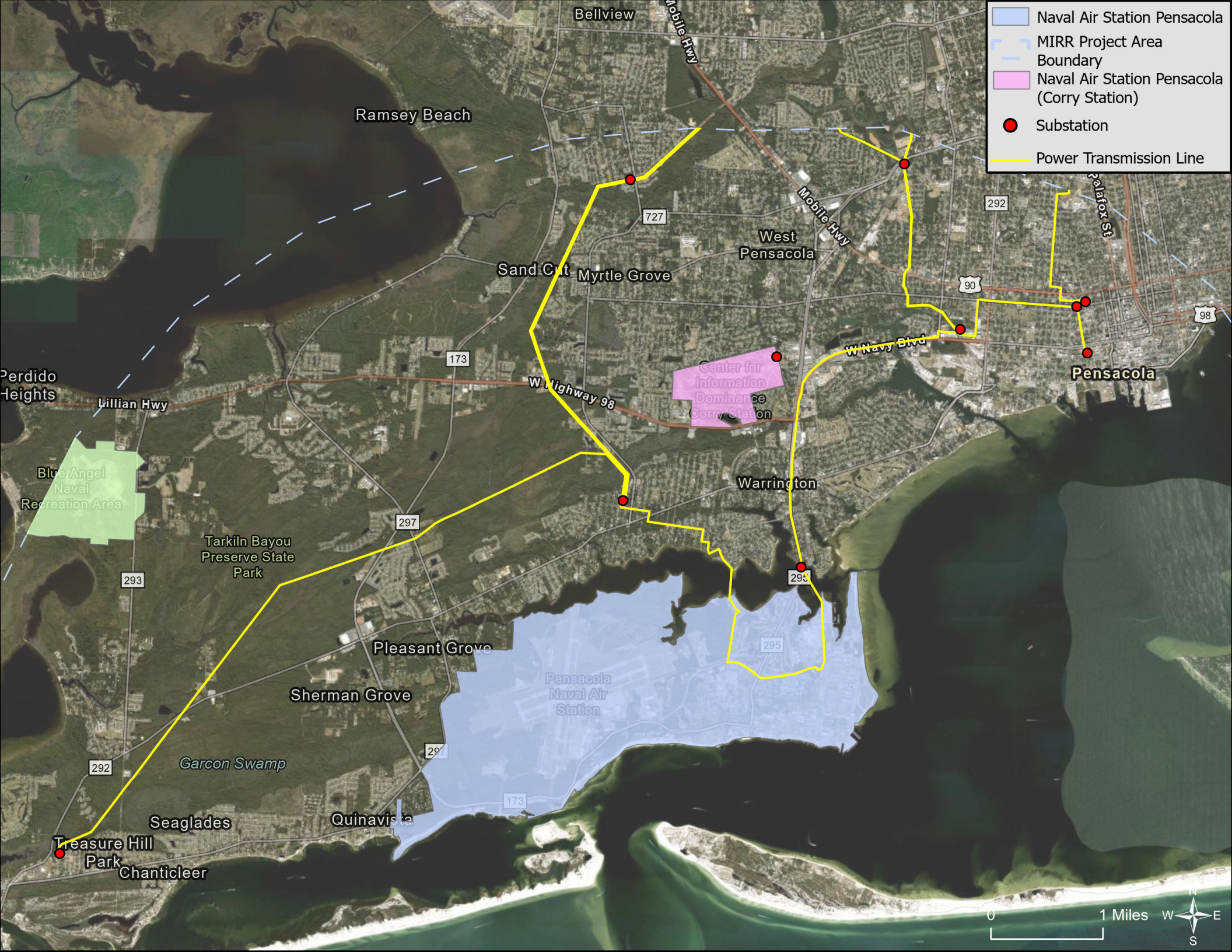

NAS Pensacola
NAS Corry Station
NAS OLF Bronson
NAS Pensacola MIRR Project Study Area
2020 % of Max Volume
0 - 50
50- 75
75 - 85
85 - 95
95 - 110
110 - 344
Bellview
Mobile Hwy
Ramsey Beach
West Pensacola
SR 298
SR 727
SR 10A / US 90
W JACKSON ST
N W ST
SR 292
N E ST
N Palafox St
SR 291
90
SR 30 / USB 98
W Navy Blvd
SR 294
W MAIN ST
SR 196
Perdido Heights
SR 30 / US 98
DOG TRACK RD
SR 173
Blue Angel Naval Recreation Area
Tarkiln Bayou Preserve State Park
Warrington
SR 295
295
BAUER RD
SR 292
Pleasant Grove
Sherman Grove
Pensacola Naval Air Station
Gulf Breeze
Garcon Swamp
173
Villa Sabin
Seaglades
Quintvista
Treasure Hill Park
GULF BEACH HWY
Gulf Beach Heights
FT PICKENS RD
0
2 Miles
N
W
E
S

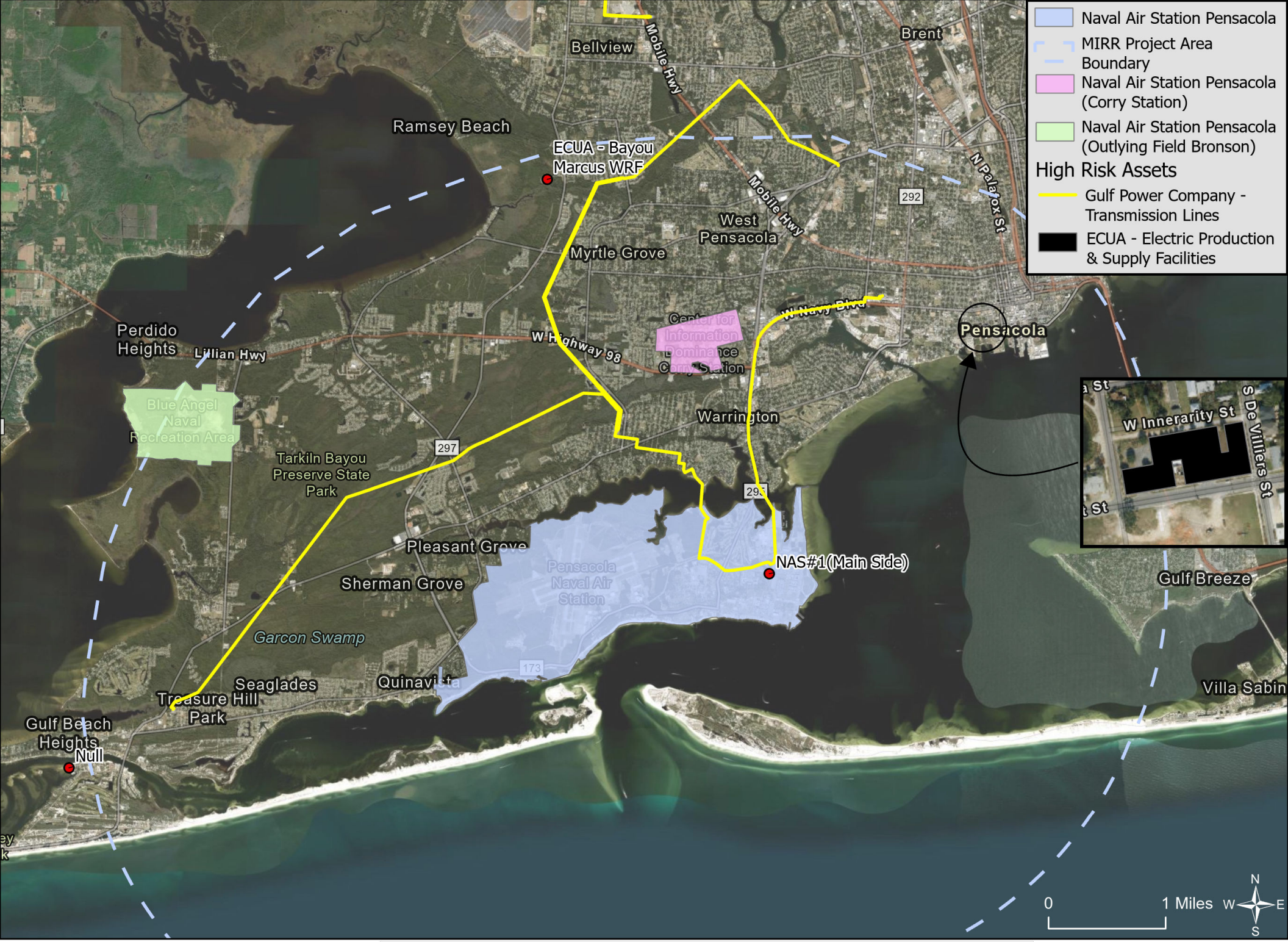

NAS Pensacola
NAS Corry Station
NAS OLF Bronson
NAS Pensacola MIRR Project Study Area
2045 % of Max Volume
0 - 50
50 - 75
75 - 85
85 - 95
95 - 110
110 - 344
Bellview
Mobile Hwy
Ramsey Beach
West Pensacola
SR 727
SR 298
Myrtle Grove
US 90
W JACKSON ST
N W ST
SR 292
N E ST
SR 291
SR 30 / USB 98
W Navy Blvd
SR 294
W MAIN ST
SR 196
90
Perdido Heights
SR 30 / US 98
DOG TRACK RD
SR 173
Blue Angel Naval Recreation Area
Tarkiln Bayou Preserve State Park
Warrington
SR 295
295
BAUER RD
SR 292
Pleasant Grove
Sherman Grove
Pensacola Naval Air Station
Gulf Breeze
Garcon Swamp
173
Villa Sabin
Seaglades
Quietwater
Treasure Hill Park
GULF BEACH HWY
Gulf Beach Heights
FT PICKENS RD
0
2 Miles
N
W
E
S


Naval Air Station Pensacola
MIRR Project Area Boundary
NASP (Corry Station)
NASP (Outlying Field Bronson)
Critical Roadways
Ramsey Beach
Bellview
Perdido Heights
Lillian Hwy
Blue Angel Naval Recreation Area
Sand Cut
Myrtle Grove
Brent
US HWY 98
West Pensacola
Tarkiln Bayou Preserve State Park
STATE HWY 173
Center for Information Dominance
STATE HWY 295
W NAVY BLVD
STATE HWY 292
Garcon Swamp
Sherman Grove
Pleasant Grove
S BLUE ANGEL PKWY
Warrington
S NAVY BLVD
W GARDEN ST
Pensacola
GULF BEACH HWY
Quinavista
Pensacola Naval Air Station
N Palafox St
Mobile Hwy
0
1 Miles
N
S
E
W


NAS Pensacola
MIRR Project Area Boundary
NAS Pensacola (Corry Station)
NAS Pensacola (Outlying Field Bronson)
Shorelines
Perdido Heights
Lillian Hwy
Sand Cut
Myrtle Grove
West Pensacola
Blue Angel Naval Recreation Area
Tarkiln Bayou Preserve State Park
W Highway 98
W Navy Blvd
Center for Information Dominance Corry Station
Warrington
Pensacola
Pleasant Grove
Sherman Grove
Garcon Swamp
Treasure Hill Park
Seaglades
Quinavista
Big Lagoon
Pensacola Naval Air Station
Fort McRee
Fort Pickens
99
173
292
293
297
295
0
1 Miles
N
W
E
S


Naval Air Station Pensacola
MIRR Project Area Boundary
Naval Air Station Pensacola (Corry Station)
Lift Station
Wastewater Treatment Plant
Critical Sewer Lines
ECUA - Bayou Marcus WRF
Lillian Hwy
298
98
173
727
Sand Cut
Dog Track Rd
W Highway 98
Myrtle Grove
West Pensacola
W Jackson St
S Blue Angel Pkwy
295
Center for Information Dominance Corry Station
Jones Swamp
S Fairfield Dr
Blue Angel Target
Gulf Beach Hwy
Pleasant Grove
Warrington
S Navy Blvd
Pensacola Country Club
NAS#2(Back Gate)
Pensacola Naval Air Station
0
1 Miles
N
W
E
S

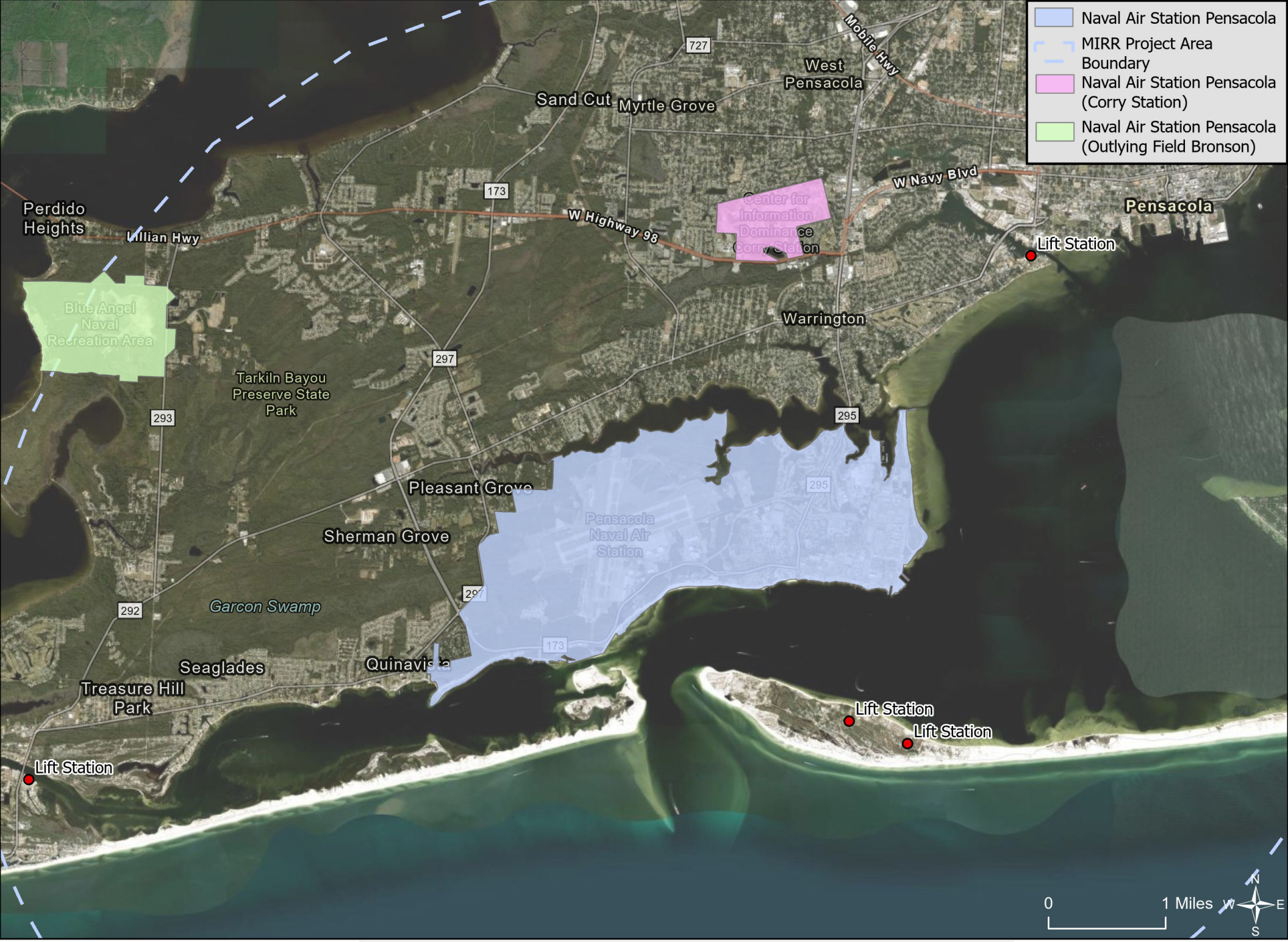

Naval Air Station Pensacola
MIRR Project Area Boundary
Naval Air Station Pensacola (Corry Station)
Substation
Power Transmission Line
Bellview
Mobile Hwy
Ramsey Beach
727
West Pensacola
Sand Cut
Myrtle Grove
292
Palafox St
90
98
173
W Navy Blvd
Pensacola
Perdido Heights
Lillian Hwy
W Highway 98
Center for Information Dominance Corry Station
Blue Angel Naval Recreation Area
Warrington
297
Tarkiln Bayou Preserve State Park
293
295
Pleasant Grove
Pensacola Naval Air Station
Sherman Grove
Garcon Swamp
Seaglades
Quinavista
Treasure Hill Park
Chanticleer
0
1 Miles
N
W
E
S



NAS Pensacola High Risk Assets

EMERALD COAST MILITARY INSTALLATION RESILIENCY REVIEW

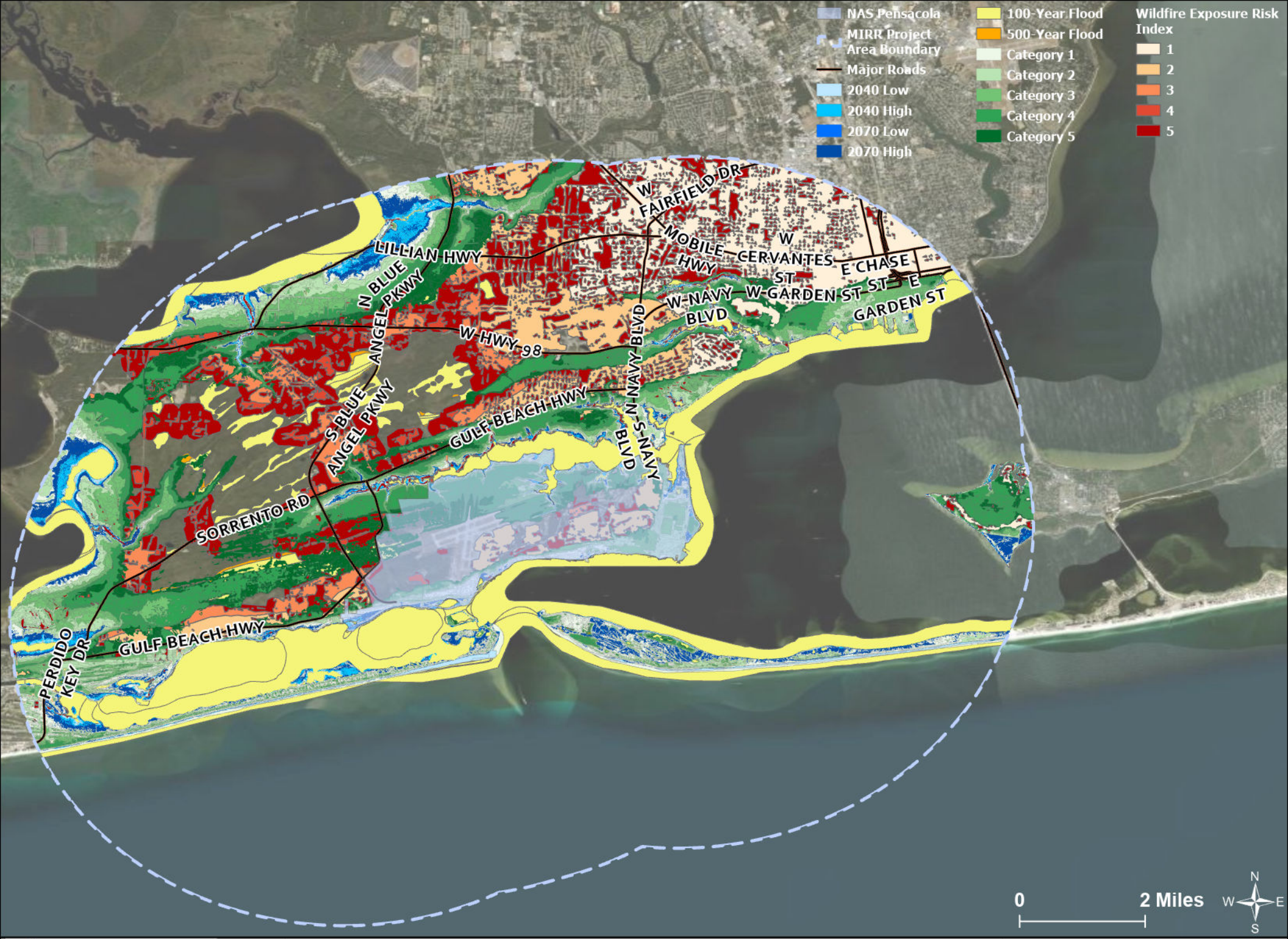
Jacobs



EMERALD COAST MILITARY INSTALLATION RESILIENCY REVIEW

NAS Pensacola High Flood Risk Assets

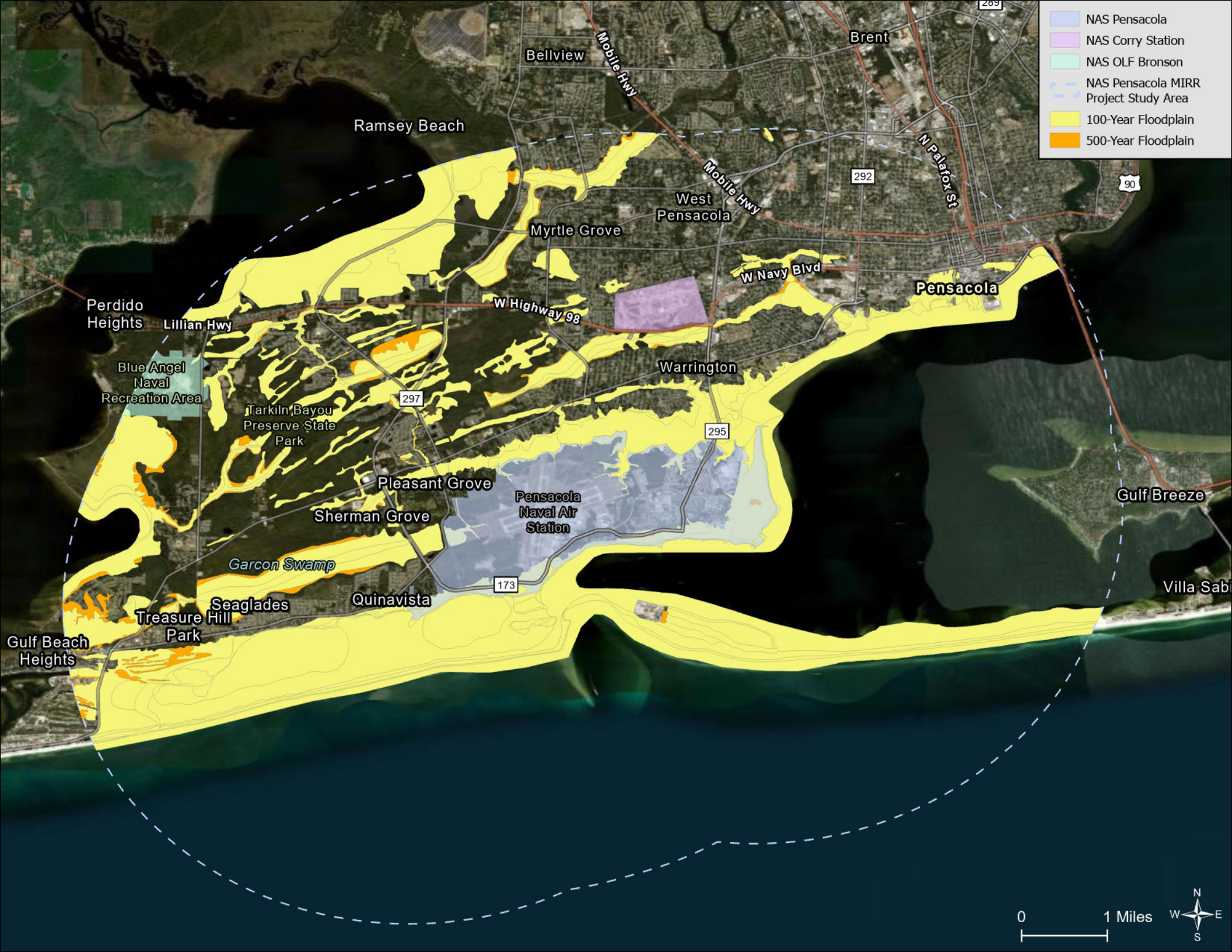
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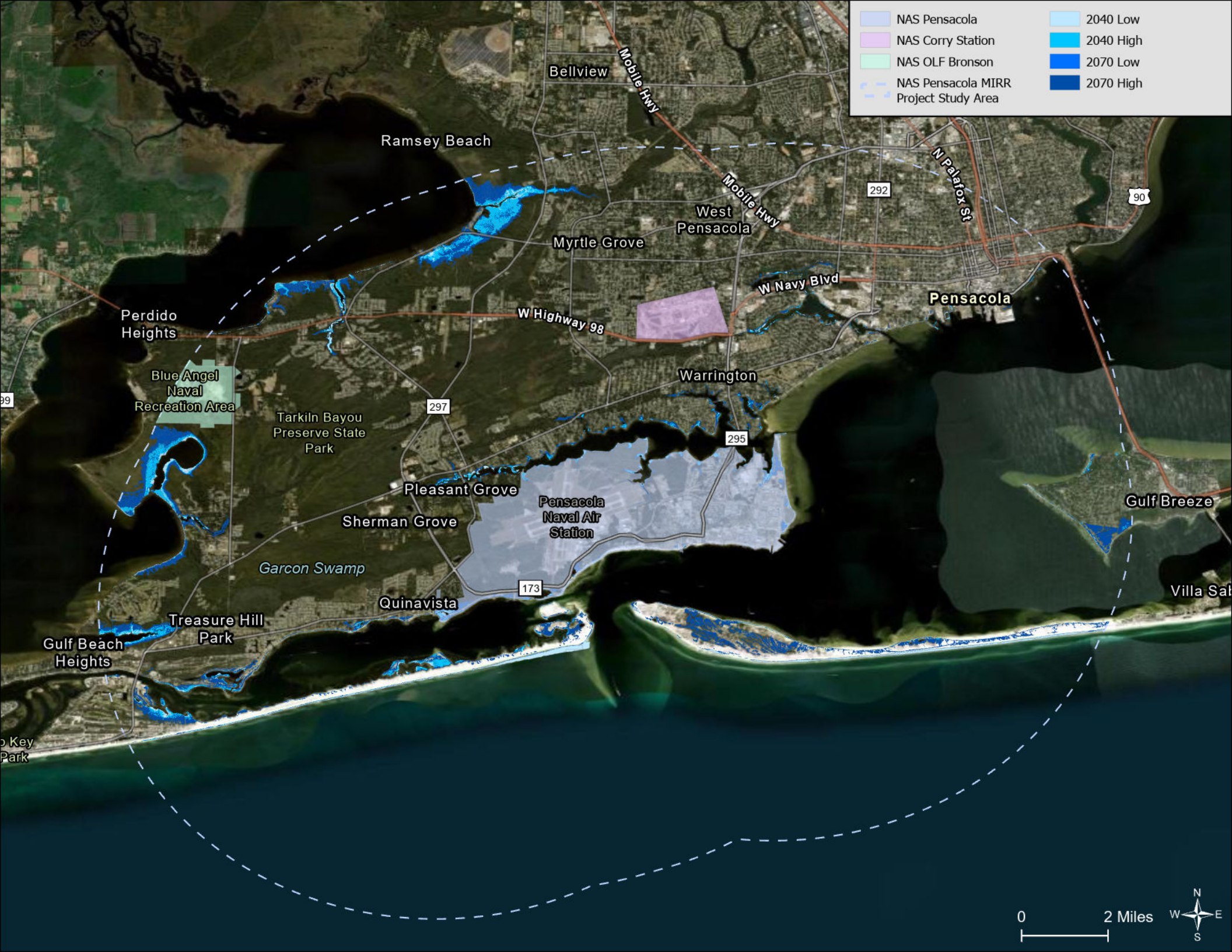


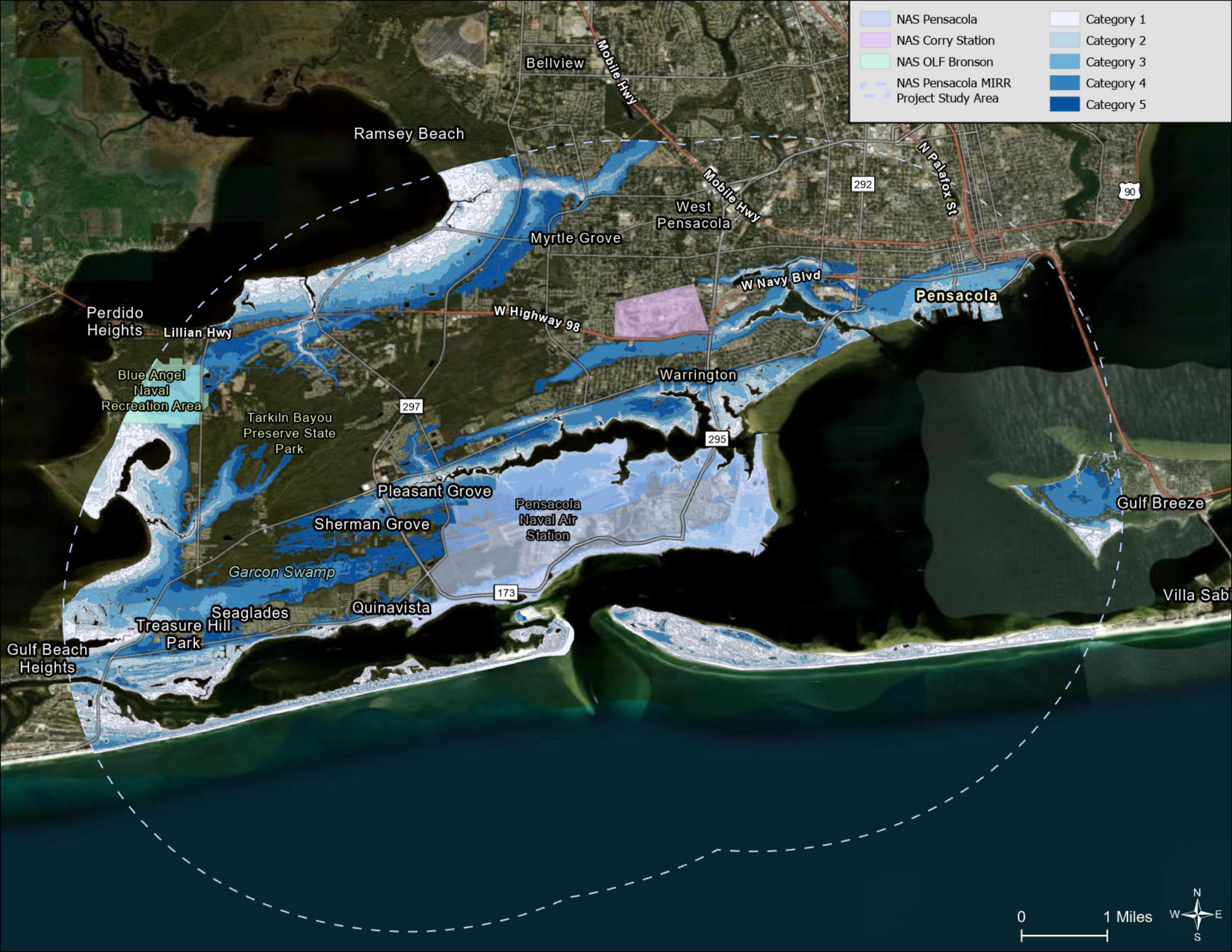
EMERALD COAST MILITARY INSTALLATION RESILIENCY REVIEW

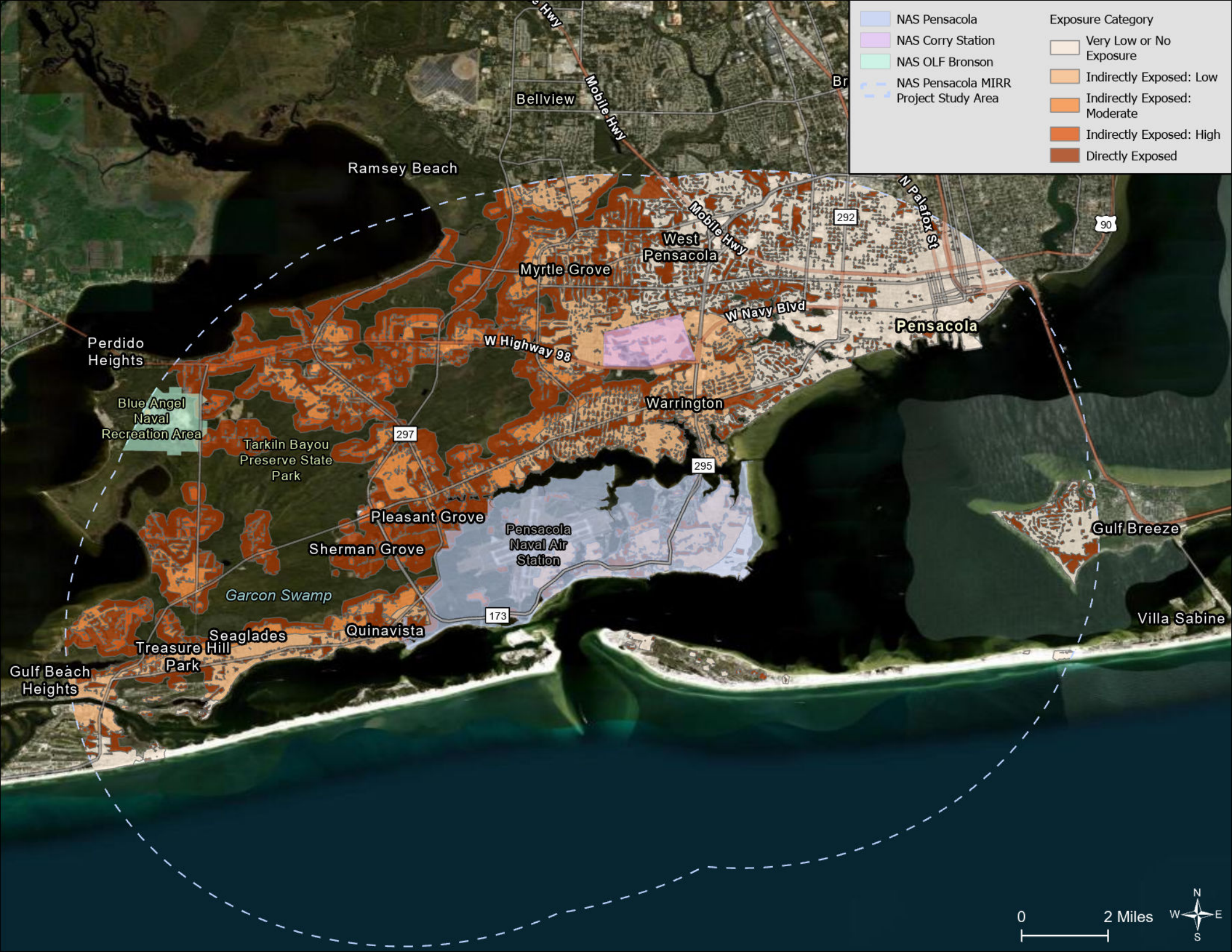
NAS Pensacola Combined Hazard Exposure

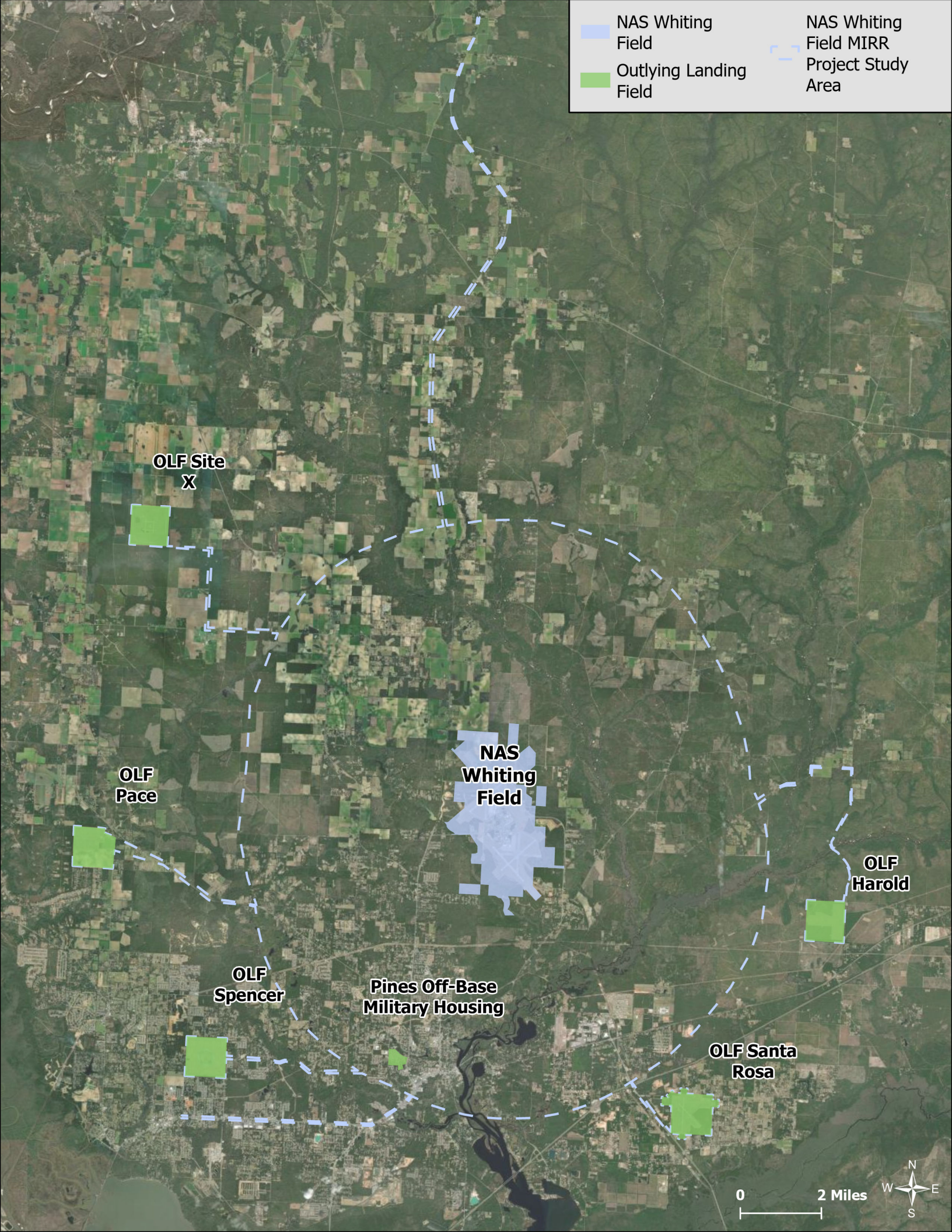
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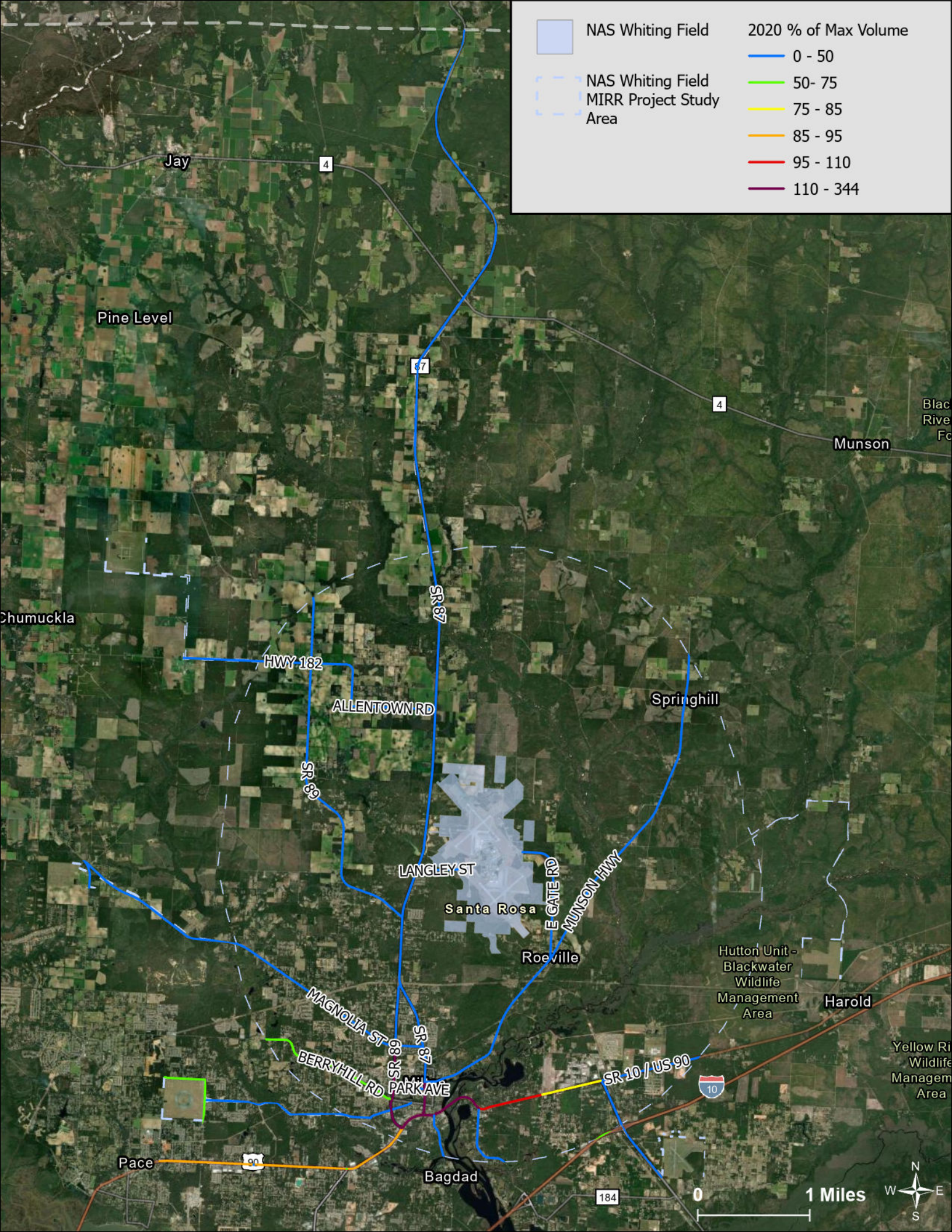

NAS Pensacola
NAS Corry Station
NAS OLF Bronson
NAS Pensacola MIRR Project Study Area
100-Year Floodplain
500-Year Floodplain
Bellview
Brent
Mobile Hwy
Ramsey Beach
N Palafox St
292
West Pensacola
Myrtle Grove
W Navy Blvd
Pensacola
90
Perdido Heights
Lillian Hwy
W Highway 98
Warrington
Blue Angel Naval Recreation Area
297
Tarkiln Bayou Preserve State Park
295
Pleasant Grove
Pensacola Naval Air Station
Gulf Breeze
Sherman Grove
Garcon Swamp
173
Villa Sabi
Seaglades
Quinavista
Treasure Hill Park
Gulf Beach Heights
0
1 Miles
N
W
E
S

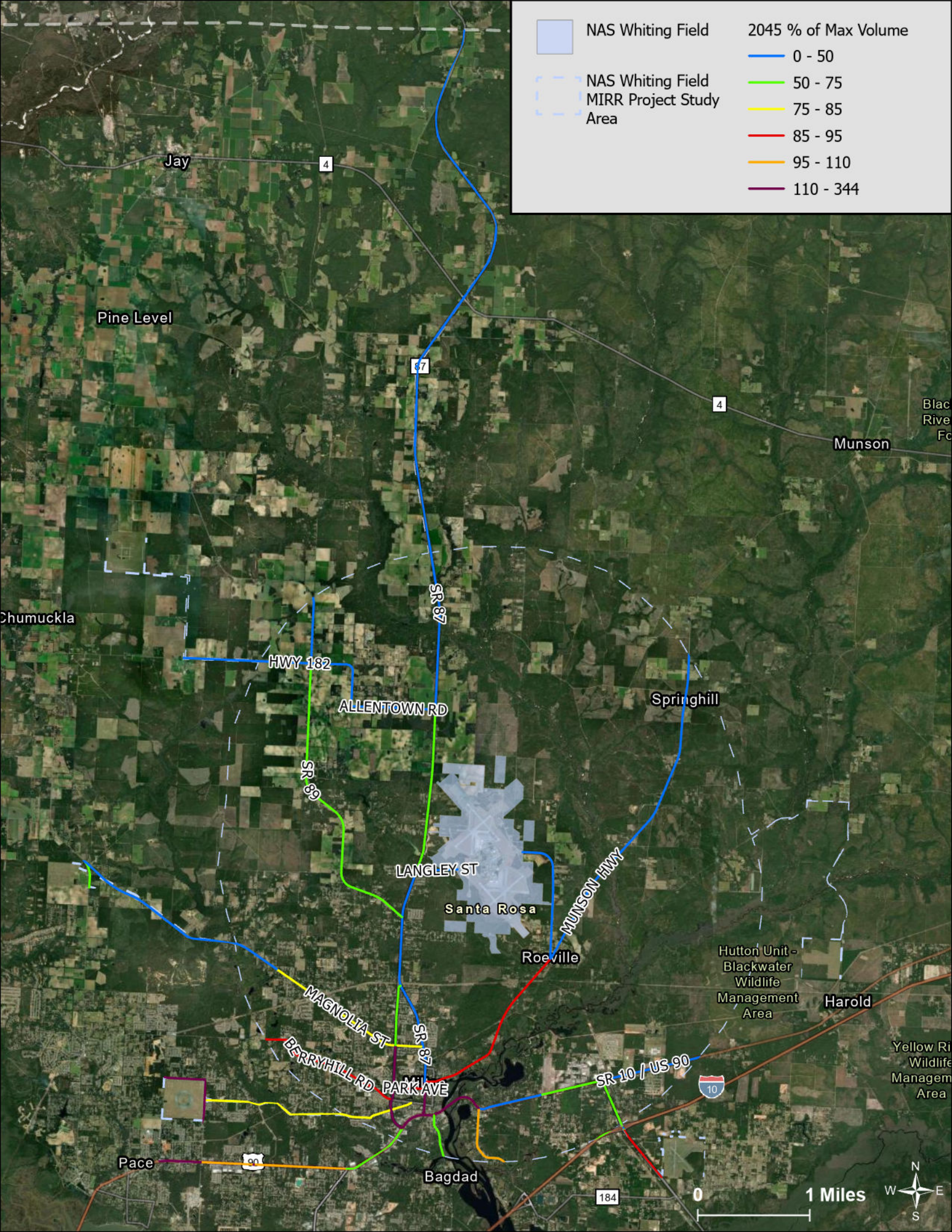

NAS Pensacola
NAS Corry Station
NAS OLF Bronson
NAS Pensacola MIRR Project Study Area
2040 Low
2040 High
2070 Low
2070 High
Bellview
Mobile Hwy
Ramsey Beach
Mobile Hwy
292
N Palafox St
90
West Pensacola
Myrtle Grove
W Navy Blvd
Pensacola
Perdido Heights
W Highway 98
Warrington
Blue Angel Naval Recreation Area
297
Tarkiln Bayou Preserve State Park
295
Pleasant Grove
Pensacola Naval Air Station
Gulf Breeze
Sherman Grove
Garcon Swamp
173
Quinavista
Villa Sal
Treasure Hill Park
Gulf Beach Heights
Key Park
0
2 Miles
N
W
E
S

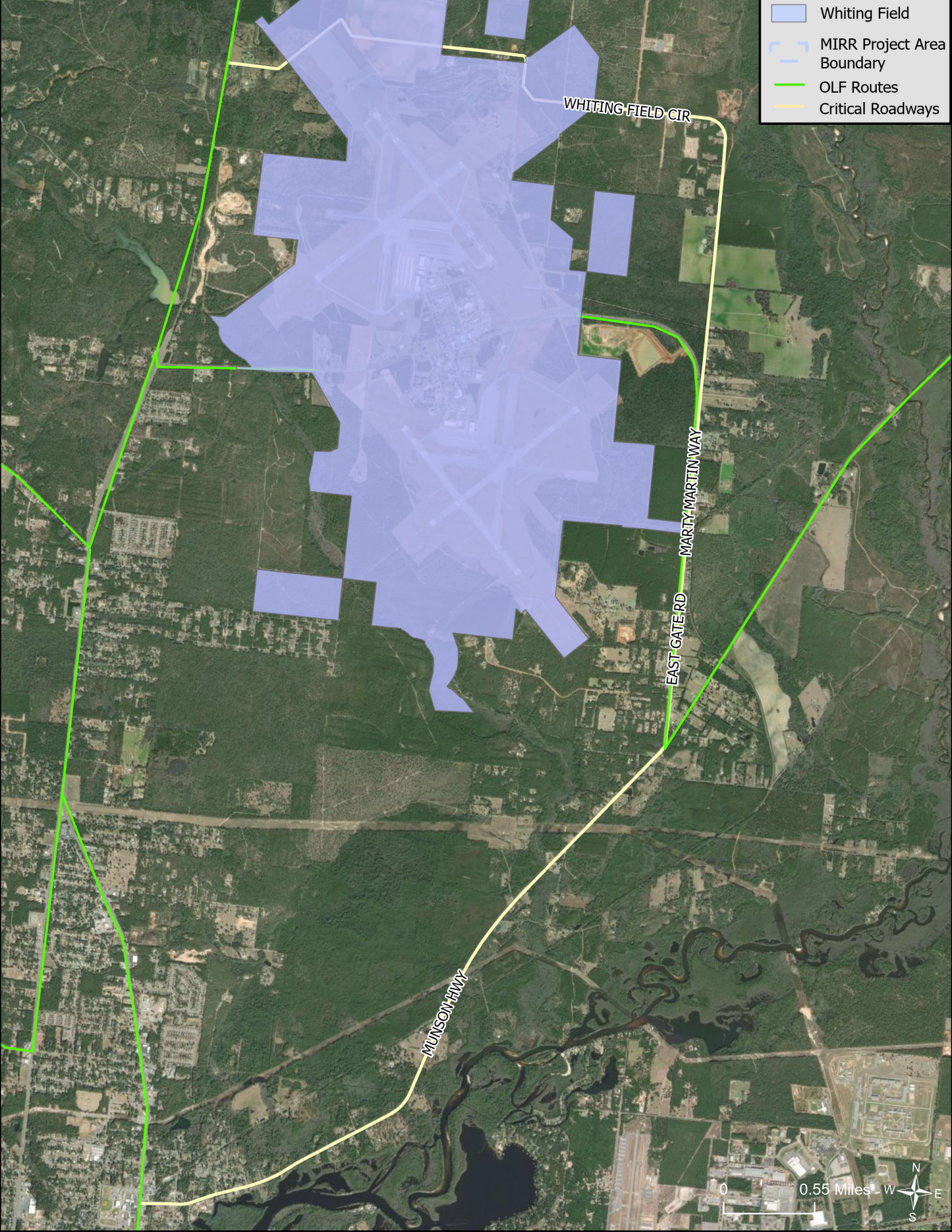

NAS Pensacola
NAS Corry Station
NAS OLF Bronson
NAS Pensacola MIRR Project Study Area
Category 1
Category 2
Category 3
Category 4
Category 5
Bellview
Mobile Hwy
Ramsey Beach
Mobile Hwy
292
N Palafox St
90
West Pensacola
Myrtle Grove
W Navy Blvd
Pensacola
Perdido Heights
Lillian Hwy
W Highway 98
Blue Angel Naval Recreation Area
Warrington
297
Tarkiln Bayou Preserve State Park
295
Pleasant Grove
Pensacola Naval Air Station
Gulf Breeze
Sherman Grove
Garcon Swamp
173
Villa Sabi
Seaglades
Quinavista
Treasure Hill Park
Gulf Beach Heights
0
1 Miles
N
W
E
S

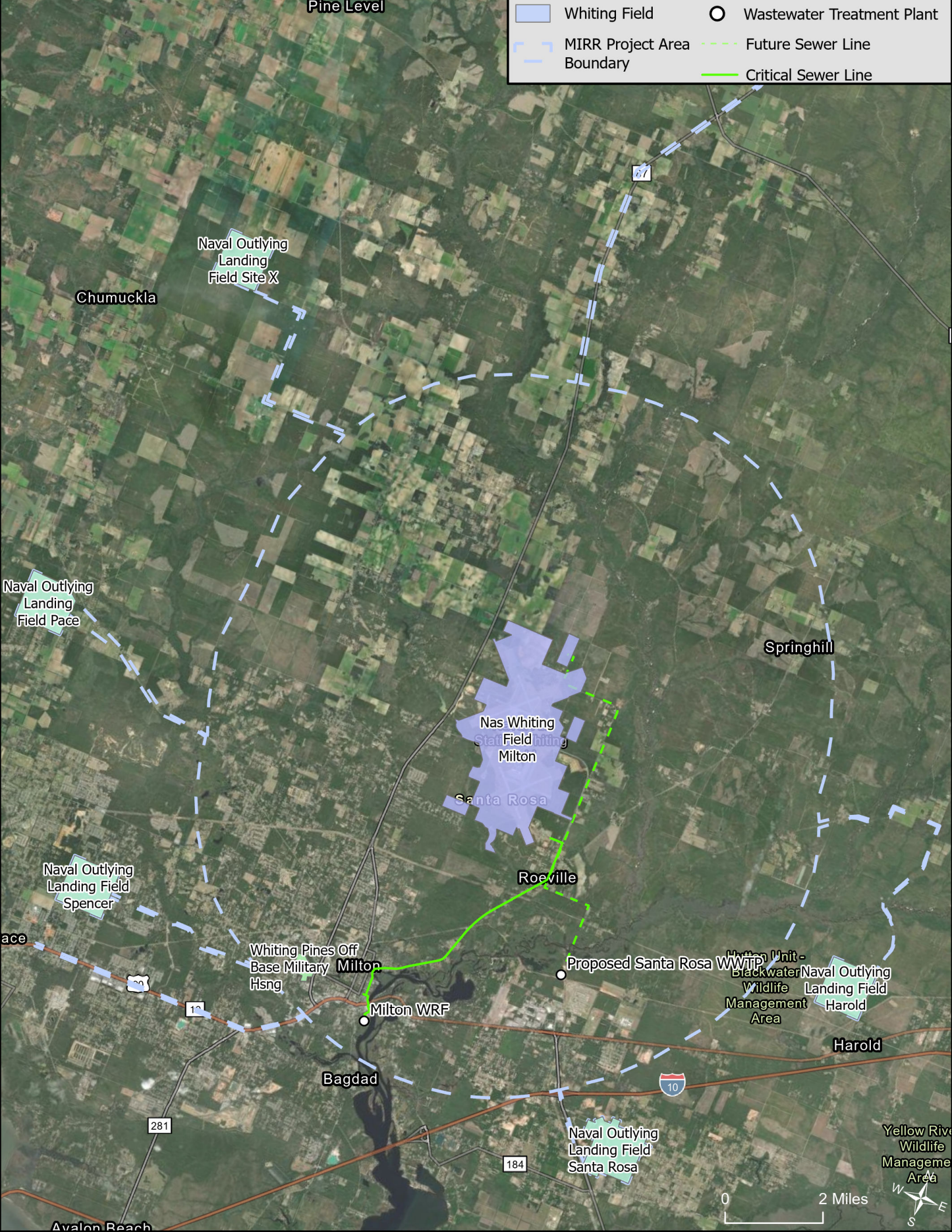

NAS Pensacola
NAS Corry Station
NAS OLF Bronson
NAS Pensacola MIRR Project Study Area
Exposure Category
Very Low or No Exposure
Indirectly Exposed: Low
Indirectly Exposed: Moderate
Indirectly Exposed: High
Directly Exposed
Bellview
Mobile Hwy
Ramsey Beach
West Pensacola
Myrtle Grove
N Palafox St
292
90
W Navy Blvd
Pensacola
W Highway 98
Perdido Heights
Blue Angel Naval Recreation Area
Tarkiln Bayou Preserve State Park
297
Warrington
295
Pleasant Grove
Sherman Grove
Pensacola Naval Air Station
Gulf Breeze
Garcon Swamp
173
Villa Sabine
Seaglades
Quinavista
Treasure Hill Park
Gulf Beach Heights
0
2 Miles
N
W
E
S


NAS Whiting Field
Outlying Landing Field
NAS Whiting Field MIRR Project Study Area
OLF Site X
OLF Pace
NAS Whiting Field
OLF Harold
OLF Spencer
Pines Off-Base Military Housing
OLF Santa Rosa
0
2 Miles
N
W
E
S

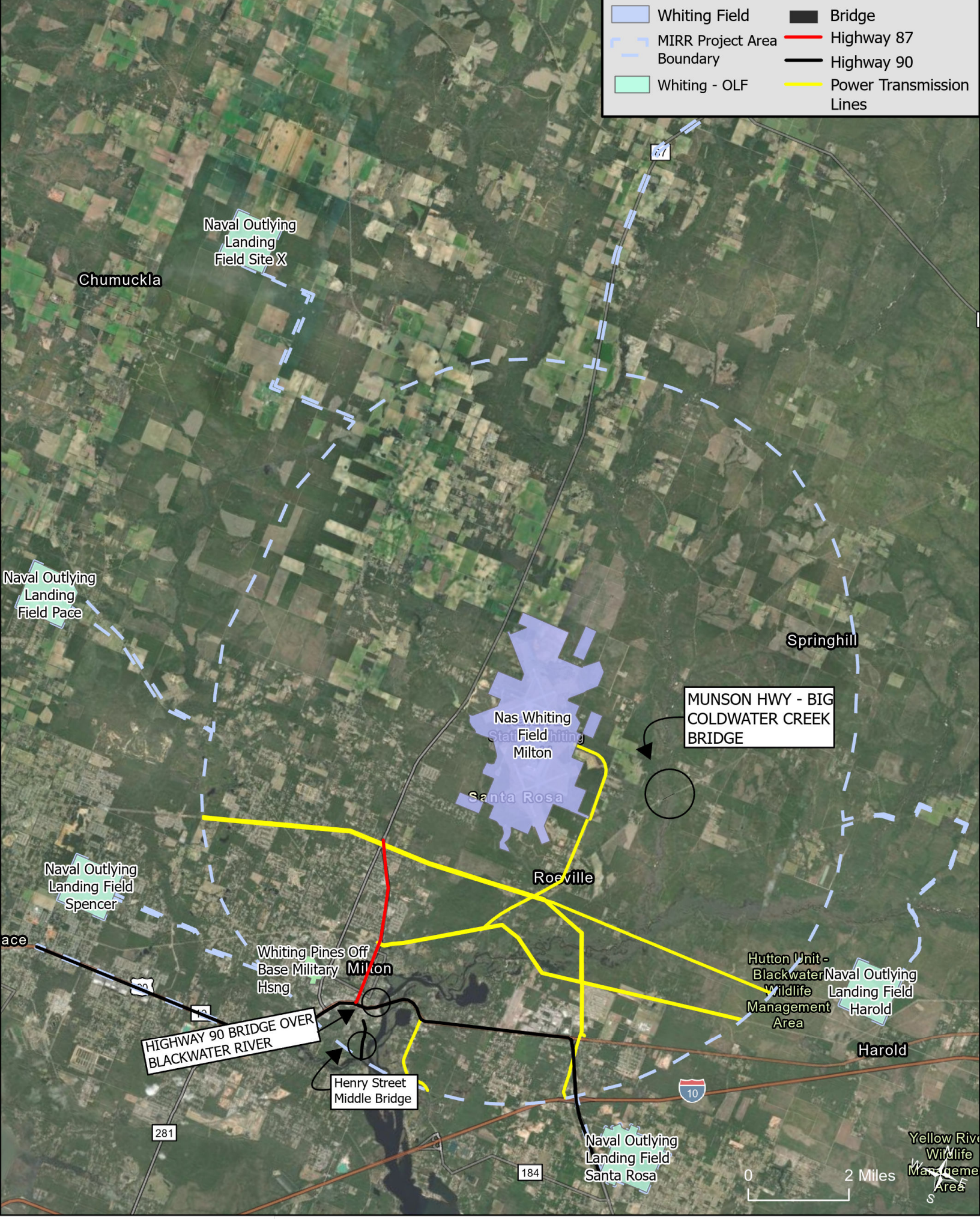

NAS Whiting Field
NAS Whiting Field MIRR Project Study Area
2020 % of Max Volume
0 - 50
50- 75
75 - 85
85 - 95
95 - 110
110 - 344
Jay
Pine Level
Munson
Springhill
Chumuckla
HWY 182
ALLENTOWN RD
SR 87
SR 89
LANGLEY ST
E GATE RD
MUNSON HWY
Santa Rosa
Roeville
Hutton Unit - Blackwater Wildlife Management Area
Harold
MAGNOLIA ST
BERRYHILL RD
PARK AVE
SR 10 / US 90
Pace
Bagdad
0
1 Miles
N
W
E
S


NAS Whiting Field
NAS Whiting Field MIRR Project Study Area
2045 % of Max Volume
0 - 50
50 - 75
75 - 85
85 - 95
95 - 110
110 - 344
Jay
Pine Level
Munson
Springhill
Santa Rosa
Roeville
Harold
Pace
Bagdad
Hutton Unit - Blackwater Wildlife Management Area
Yellow Ri Wildlife Managem Area
SR 87
HWY 182
ALLENTOWN RD
SR 89
LANGLEY ST
MUNSON HWY
MAGNOLIA ST
BERRYHILL RD
PARK AVE
SR 10 / US 90
0
1 Miles
N
W
E
S


Whiting Field
MIRR Project Area Boundary
OLF Routes
Critical Roadways
WHITING FIELD CIR
MARTY MARTIN WAY
EAST GATE RD
MUNSON HWY
0
0.55 Miles
N
W
E
S


Whiting Field
MIRR Project Area Boundary
Wastewater Treatment Plant
Future Sewer Line
Critical Sewer Line
Pine Level
Naval Outlying Landing Field Site X
Chumuckla
Naval Outlying Landing Field Pace
Springhill
Nas Whiting Field Milton
Santa Rosa
Naval Outlying Landing Field Spencer
Roeville
Whiting Pines Off Base Military Hsng
Milton
Milton WRF
Proposed Santa Rosa WWTP
Blackwater Wildlife Management Area
Naval Outlying Landing Field Harold
Harold
Bagdad
281
10
184
Naval Outlying Landing Field Santa Rosa
Yellow River Wildlife Management Area
0
2 Miles
W
E
S

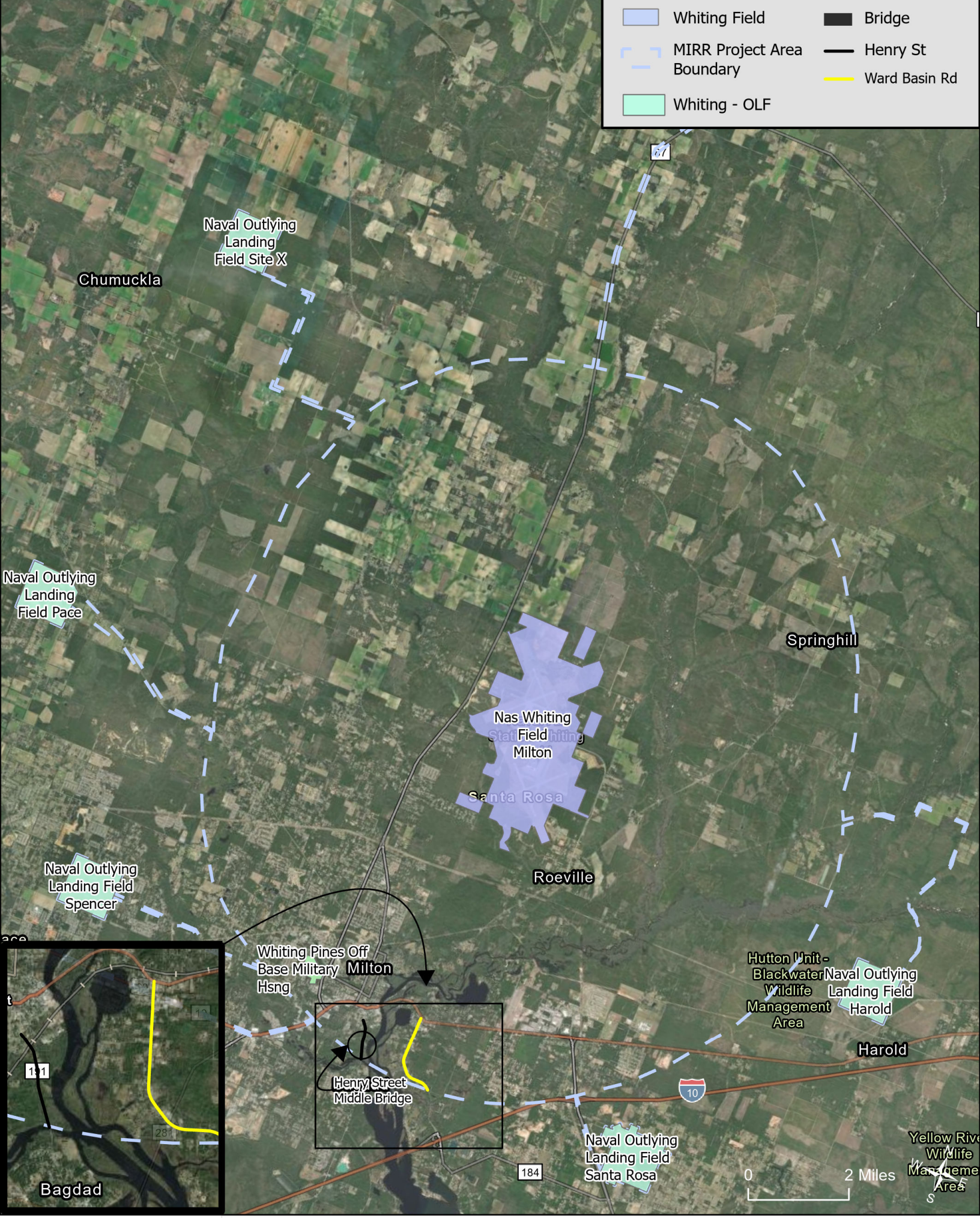

Whiting Field
MIRR Project Area Boundary
Substations
Power Transmission Lines
Naval Air Station Whiting Field Golf Course
Whiting Field Naval Air Station North
Whiting Field Naval Air Station South
Blackwater Heritage State Trail
Clear Creek
Highway 87 N
Stewart St
Dogwood Dr
Tanglewood Golf and Country Club
Roeville
Milton
Bagdad
Cooper Basin
Caroline St
Highway 90
Santa Rosa Naval Outlying Field
0
1 Miles
N
W
E
S
89
87
87A
191
8
10



EMERALD COAST MILITARY INSTALLATION RESILIENCY REVIEW

Whiting High Risk Assets

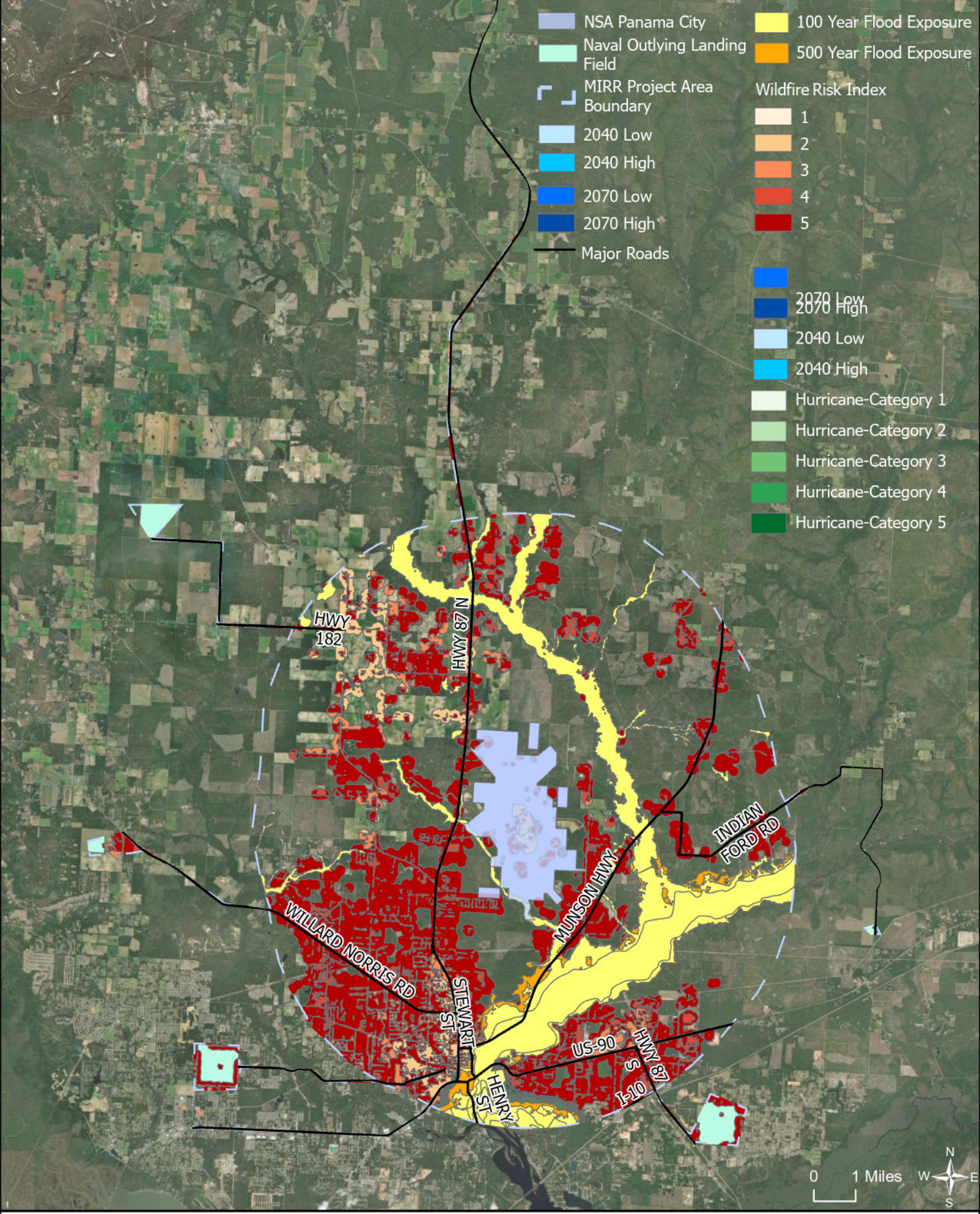
Jacobs



EMERALD COAST MILITARY INSTALLATION RESILIENCY REVIEW

Whiting High Flood Risk Assets

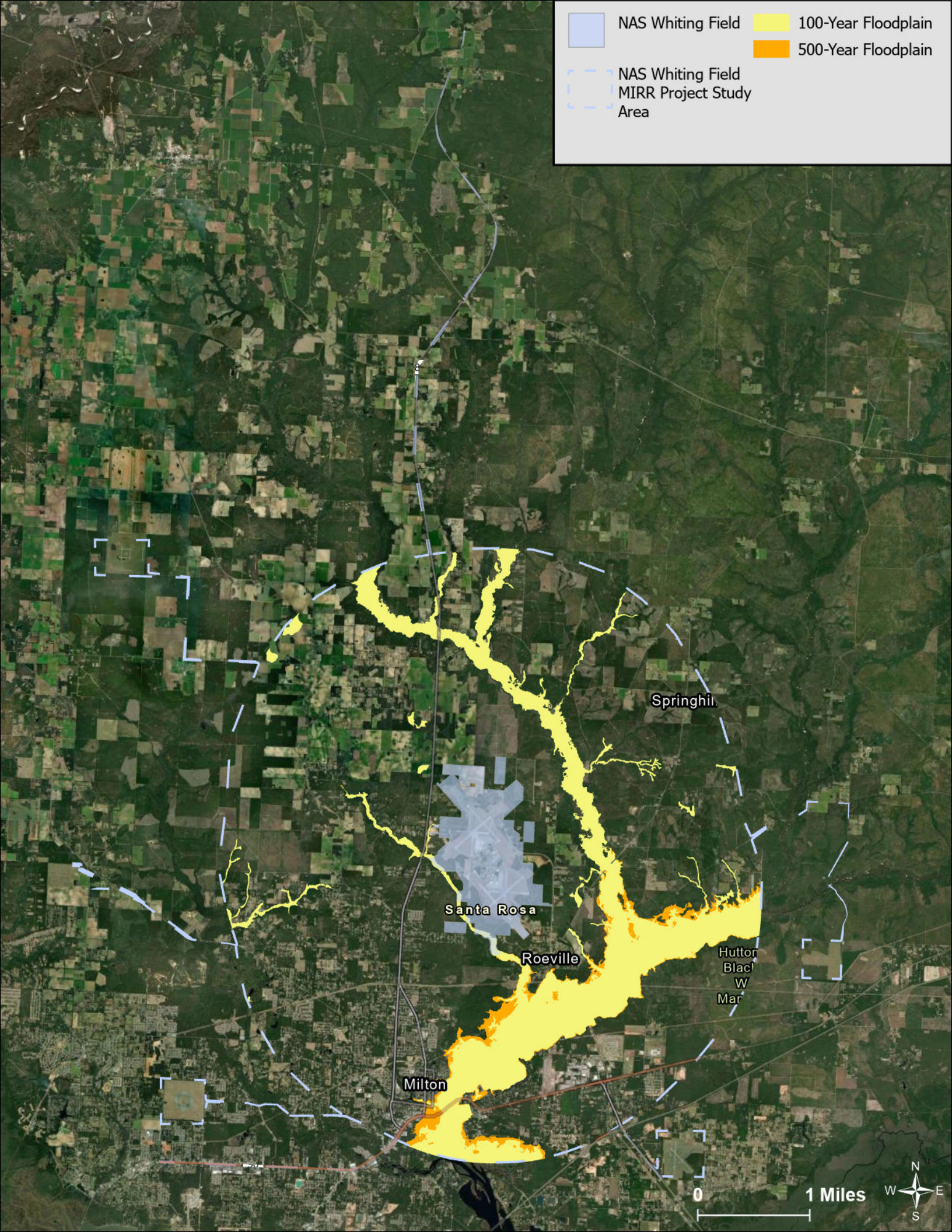
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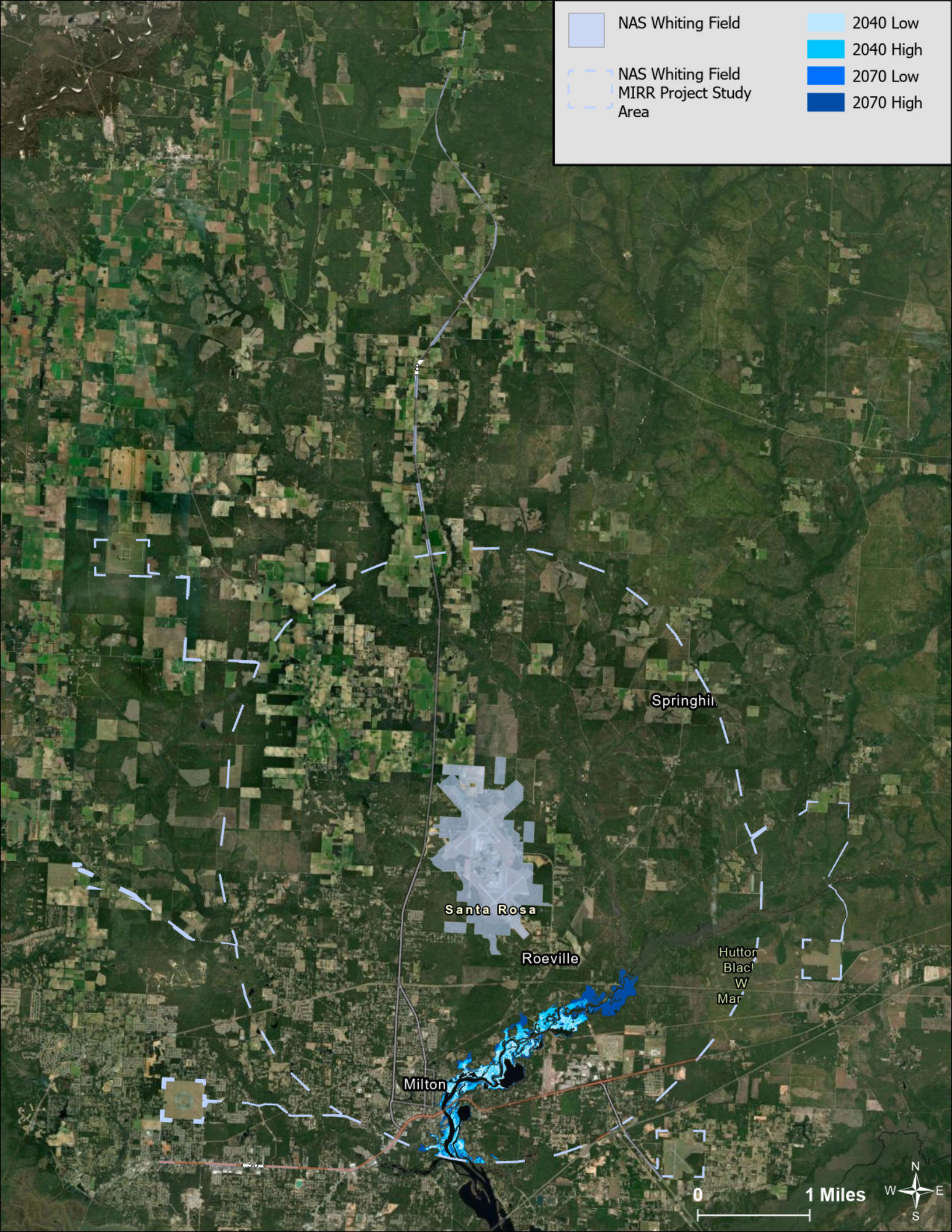


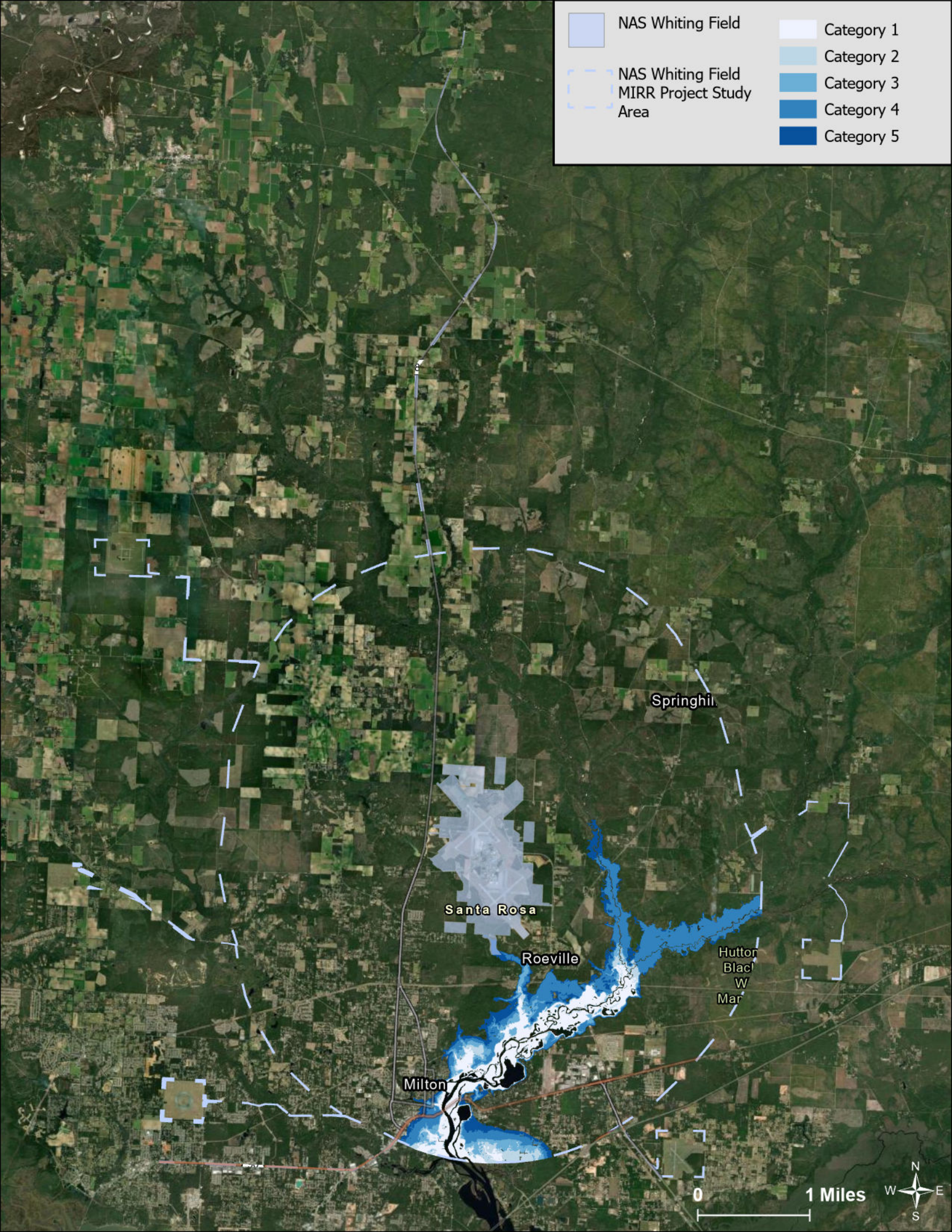
EMERALD COAST MILITARY INSTALLATION RESILIENCY REVIEW

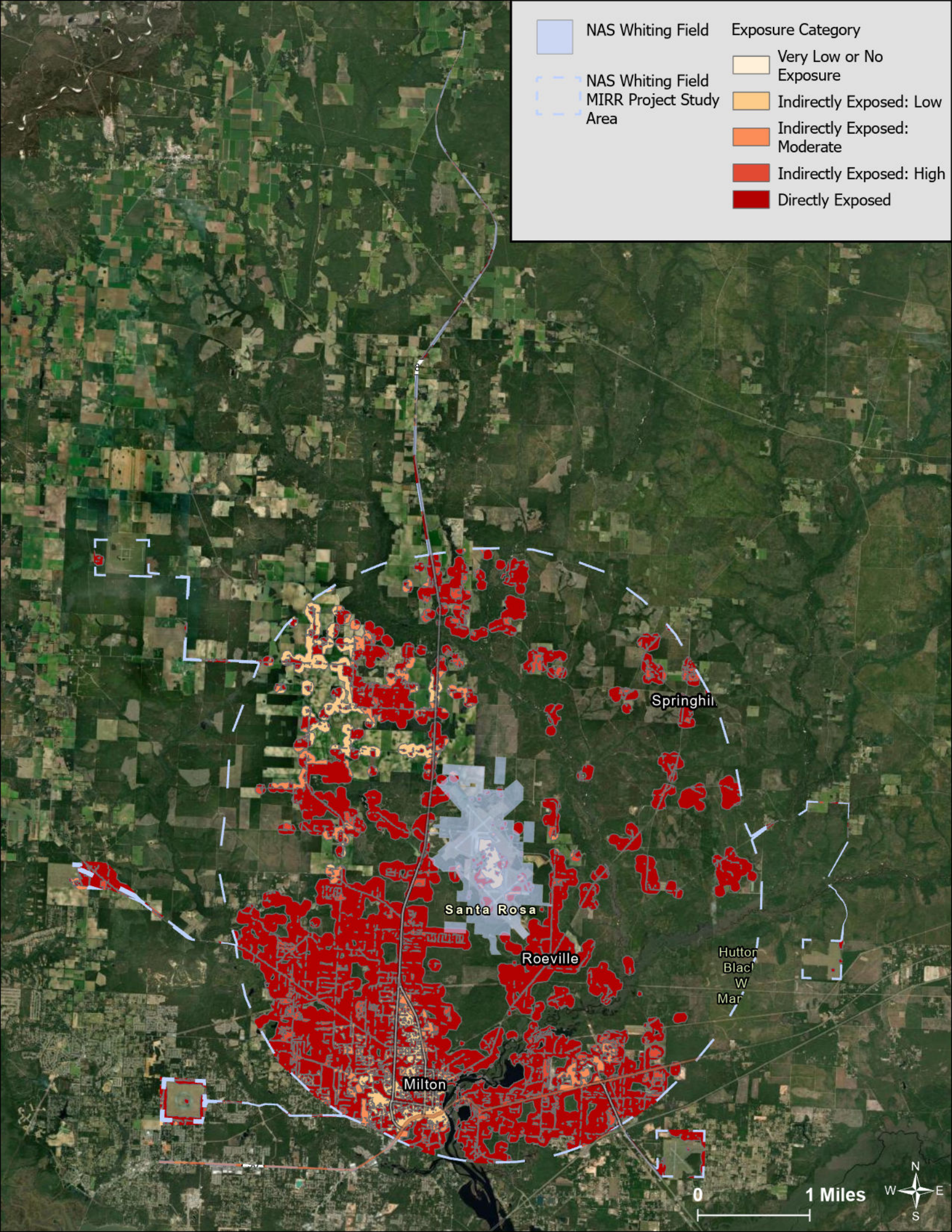
Whiting Combined Hazard Exposure

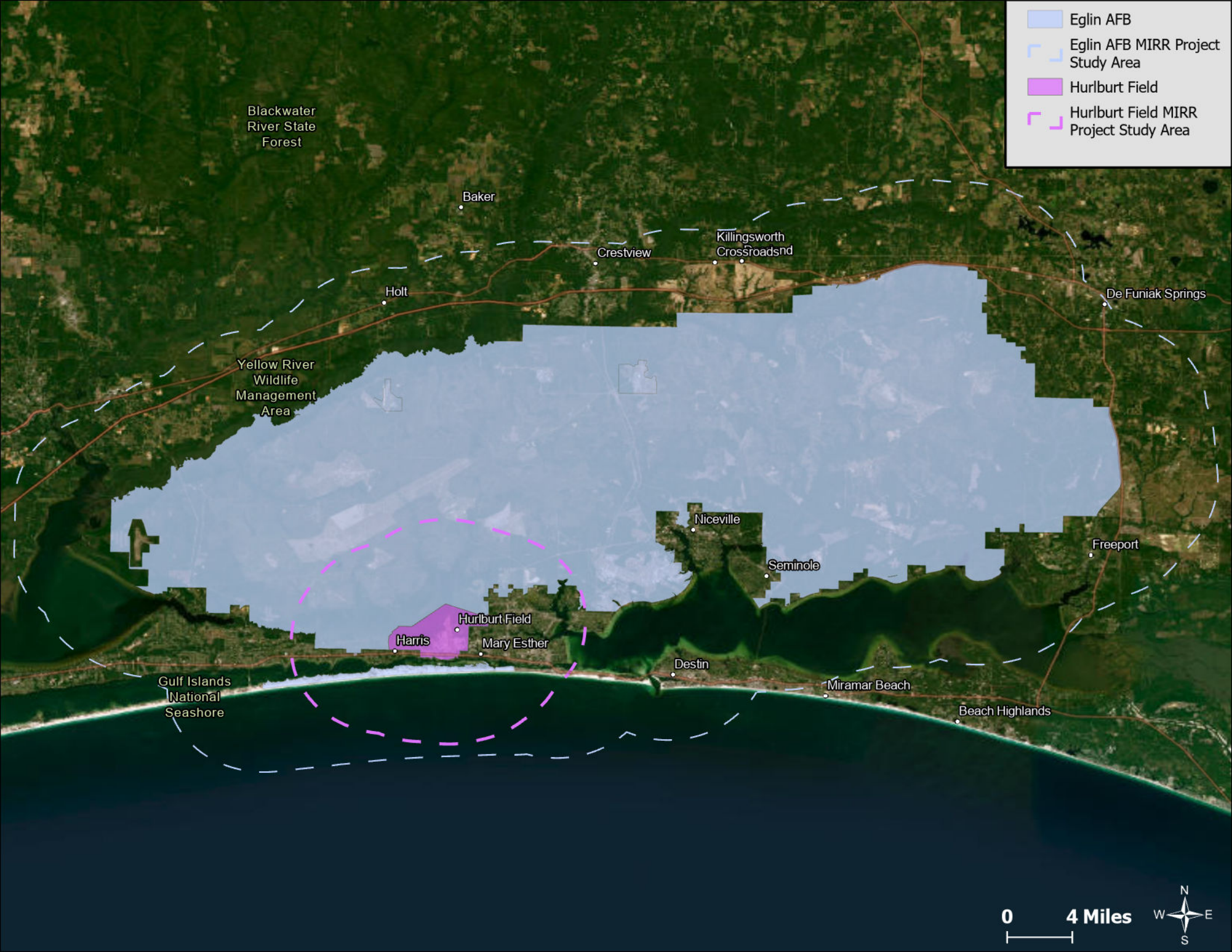
Jacobs


NAS Whiting Field
100-Year Floodplain
500-Year Floodplain
NAS Whiting Field MIRR Project Study Area
Springhill
Santa Rosa
Roeville
Milton
0
1 Miles
N
W
E
S

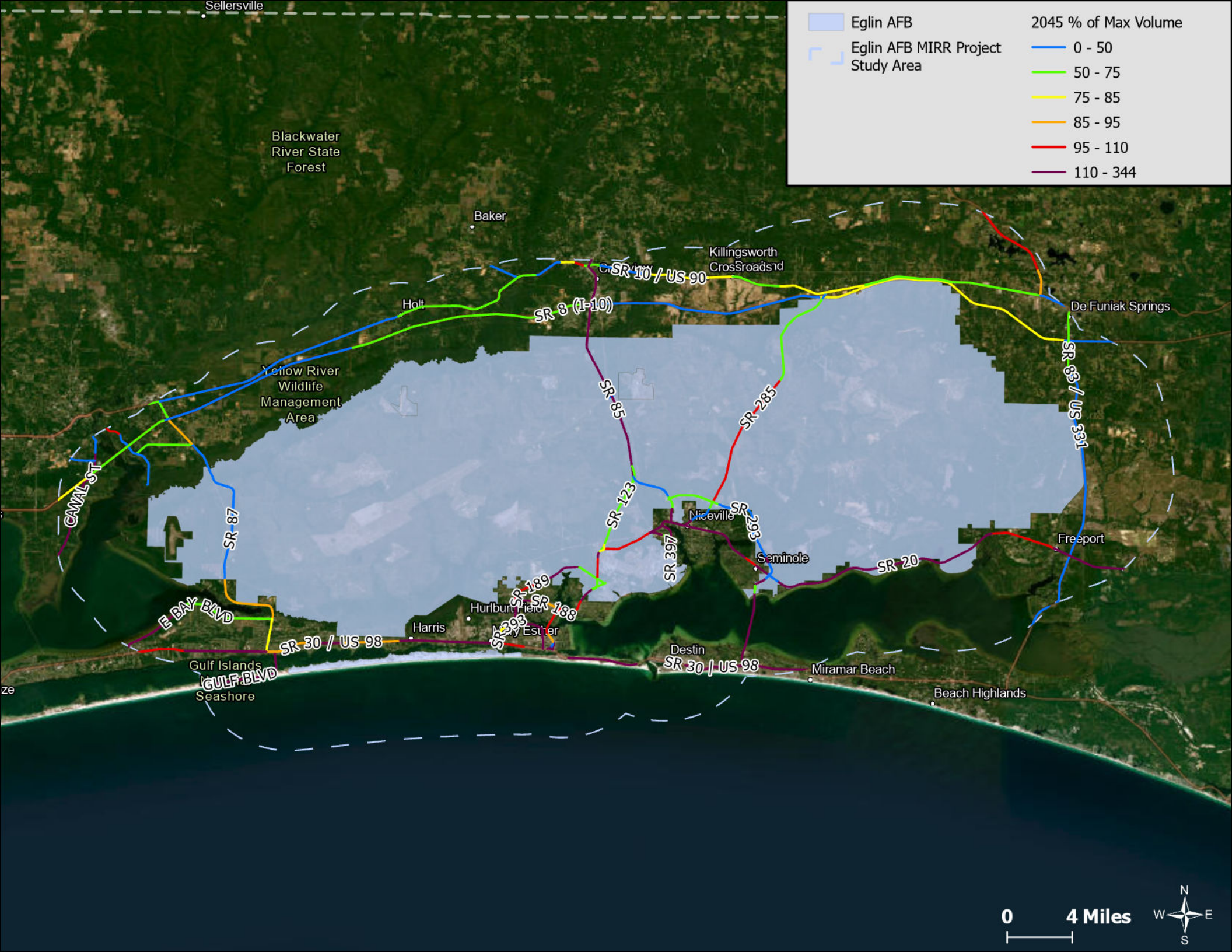

NAS Whiting Field
NAS Whiting Field MIRR Project Study Area
2040 Low
2040 High
2070 Low
2070 High
Springhil
Santa Rosa
Roeville
Hutton
Blac
W
Mar
Milton
0
1 Miles
N
W
E
S

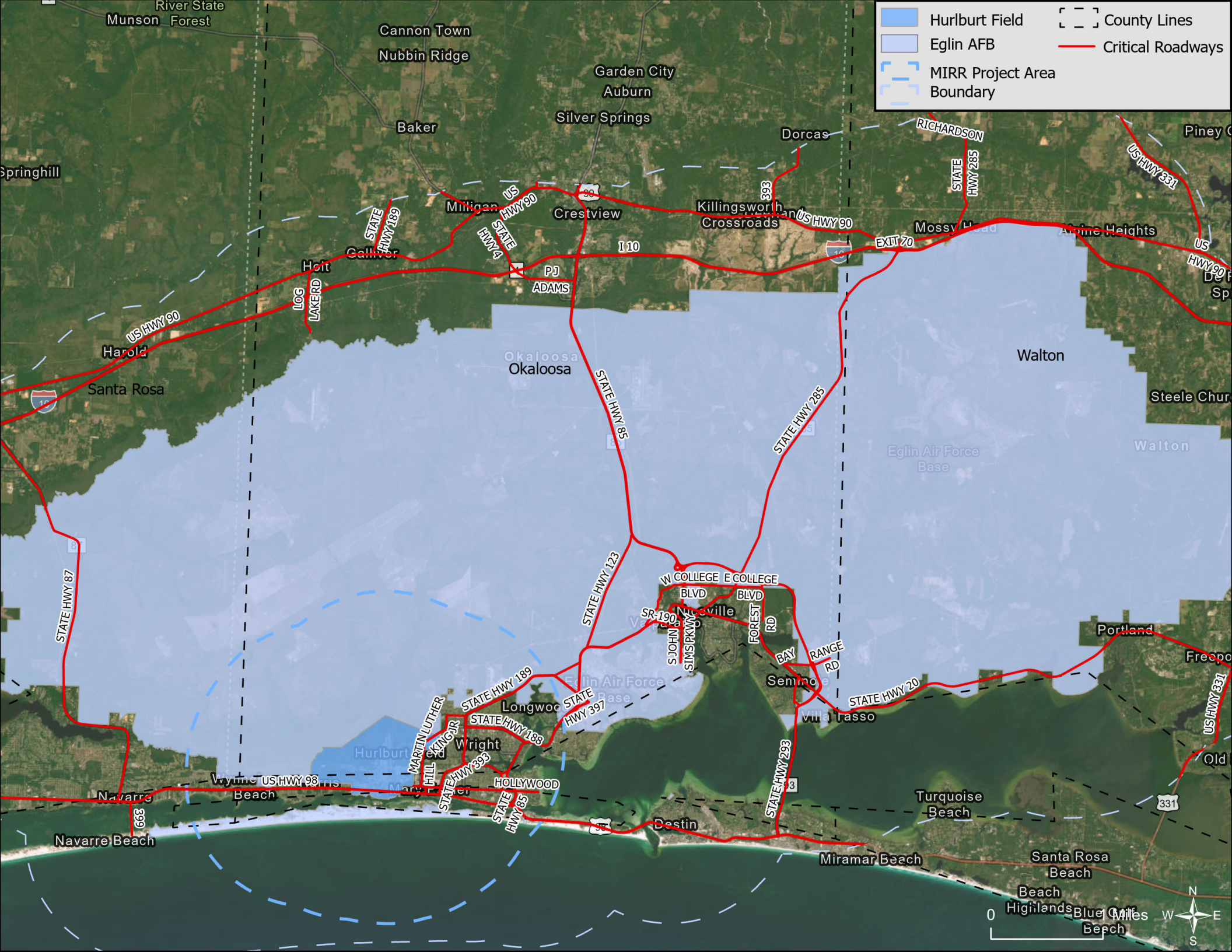

NAS Whiting Field
NAS Whiting Field MIRR Project Study Area
Category 1
Category 2
Category 3
Category 4
Category 5
Springhil
Santa Rosa
Roeville
Hutton
Blac
W
Mar
Milton
0
1 Miles
N
W
E
S


NAS Whiting Field
NAS Whiting Field MIRR Project Study Area
Exposure Category
Very Low or No Exposure
Indirectly Exposed: Low
Indirectly Exposed: Moderate
Indirectly Exposed: High
Directly Exposed
Springhil
Santa Rosa
Roeville
Milton
0
1 Miles
N
W
E
S

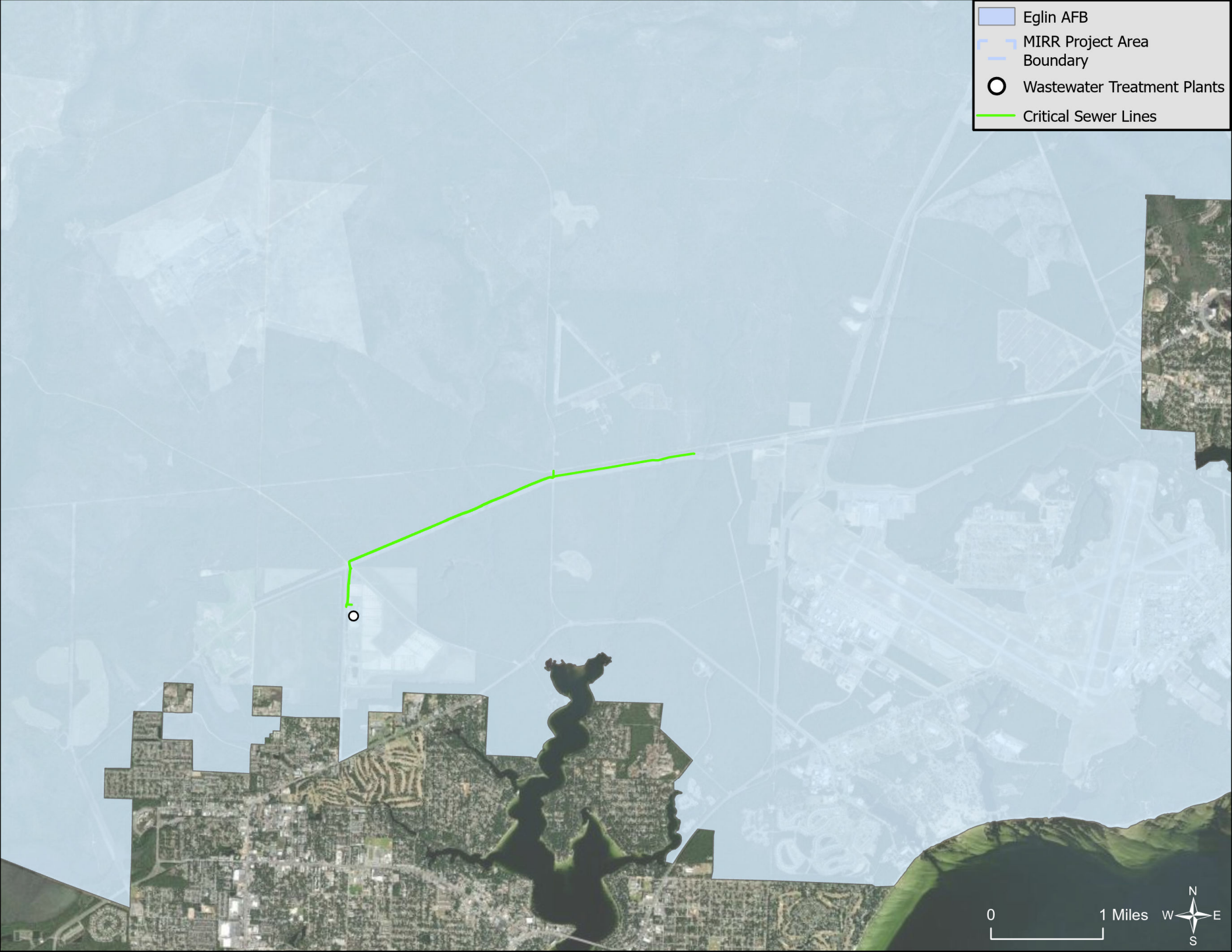

Eglin AFB
Eglin AFB MIRR Project Study Area
Hurlburt Field
Hurlburt Field MIRR Project Study Area
Blackwater River State Forest
Baker
Crestview
Killingsworth Crossroads
Holt
De Funiak Springs
Yellow River Wildlife Management Area
Niceville
Freeport
Seminole
Hurlburt Field
Harris
Mary Esther
Destin
Miramar Beach
Beach Highlands
Gulf Islands National Seashore
0
4 Miles
N
W
E
S

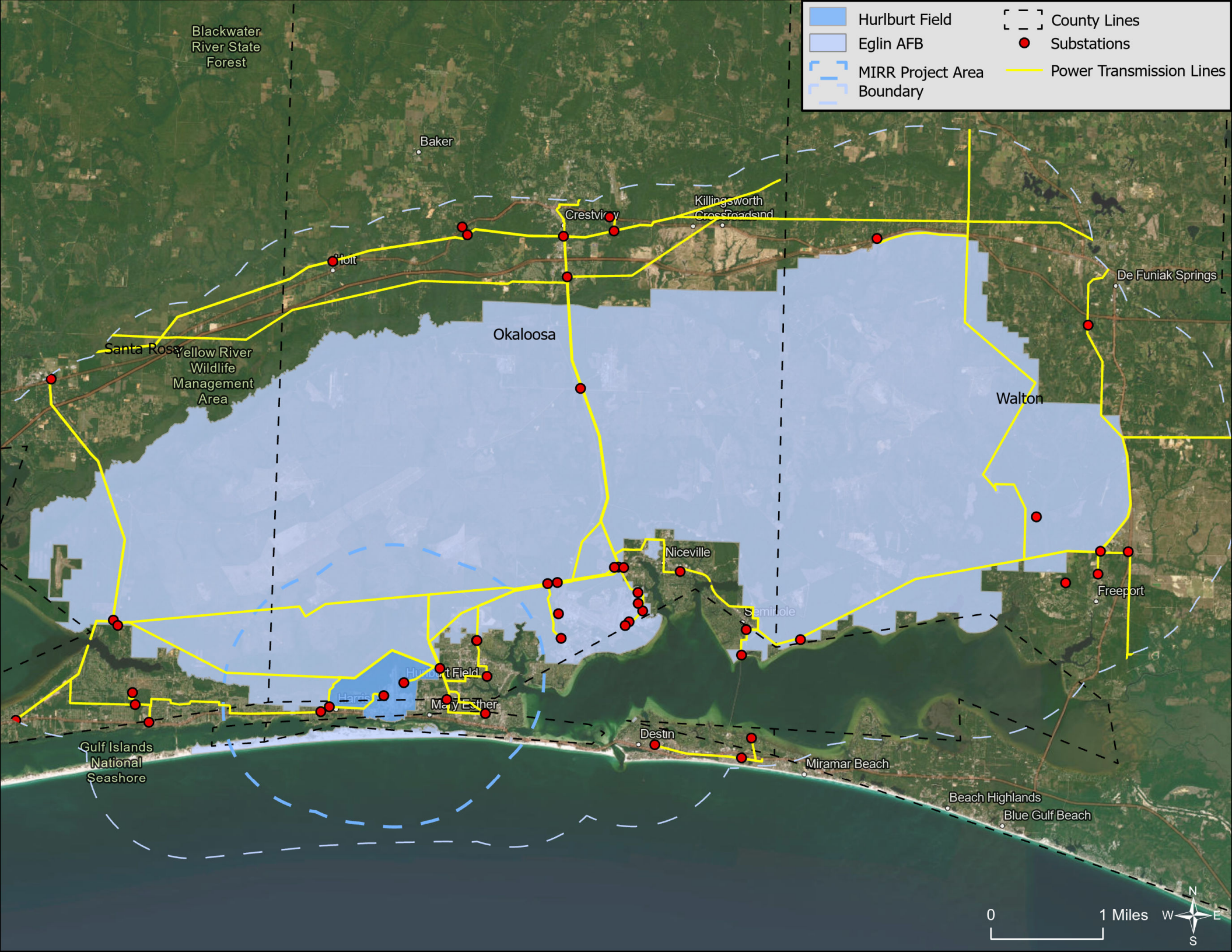

Eglin AFB
Eglin AFB MIRR Project Study Area
2020 % of Max Volume
0 - 50
50 - 75
75 - 85
85 - 95
95 - 110
110 - 344
Sellersville
Blackwater River State Forest
Baker
Killingsworth CrosSroads
SR 10 / US 90
Holt
SR 8 (I-10)
De Funiak Springs
Yellow River Wildlife Management Area
SR 210
SR 285
SR 83 / US 331
CANAL ST
SR 87
SR 123
Niceville
SR 293
SR 397
Freeport
Seminole
SR 20
SR 189
SR 188
Hurlburt Field
E BAY BLVD
Harris
SR 393
SR 85
SR 30 / US 98
Destin
Miramar Beach
Gulf Islands
GULF BLVD
Seashore
Beach Highlands
0
4 Miles
N
W
E
S

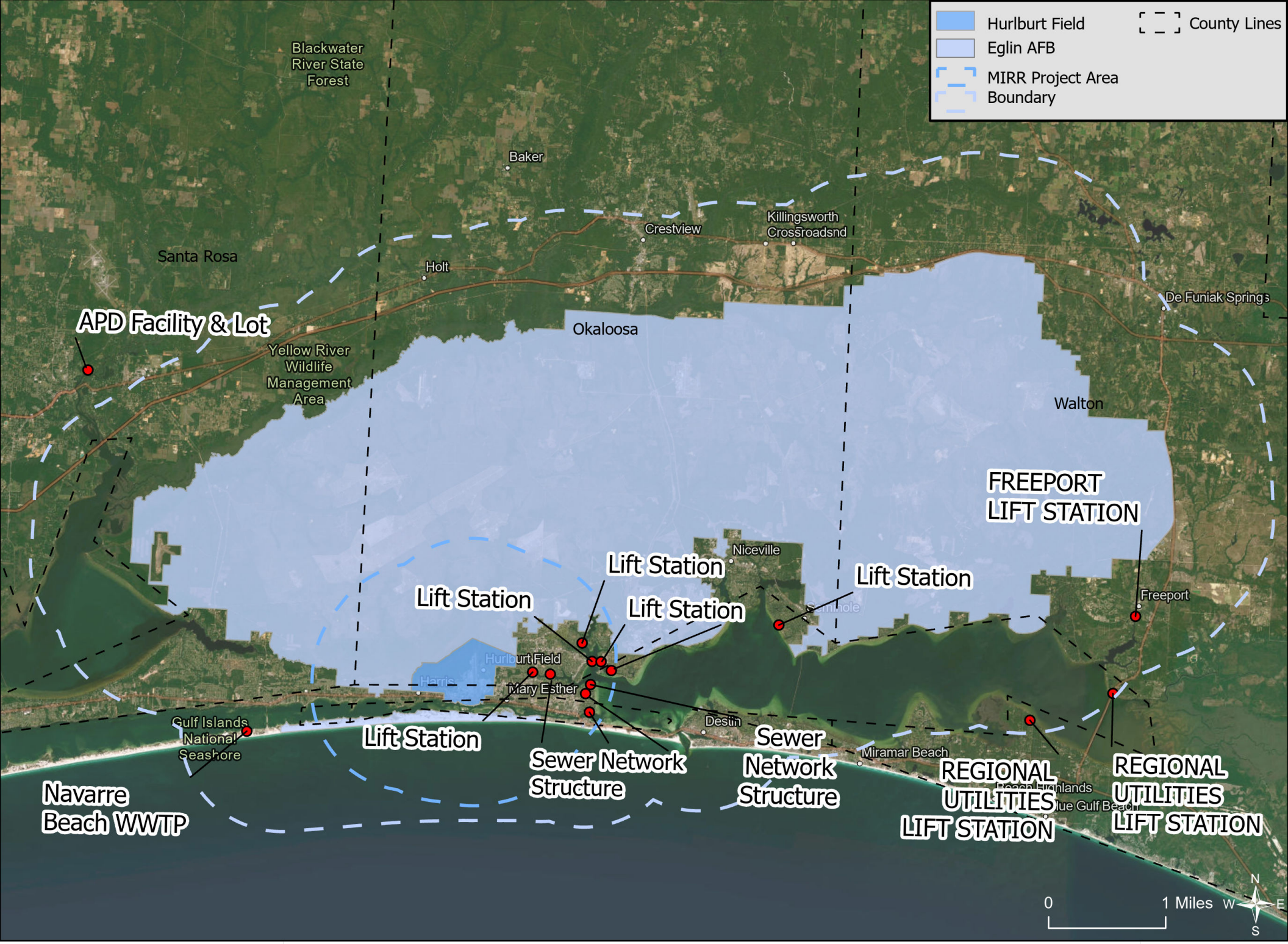

Eglin AFB
Eglin AFB MIRR Project Study Area
2045 % of Max Volume
0 - 50
50 - 75
75 - 85
85 - 95
95 - 110
110 - 344
Sellersville
Blackwater River State Forest
Baker
Killingsworth Crossroads
SR 10 / US 90
Holt
SR 8 (I-10)
De Funiak Springs
Yellow River Wildlife Management Area
SR 85
SR 285
SR 83 / US 331
CANAL ST
SR 87
SR 123
Niceville
SR 293
SR 397
Freeport
Seminole
SR 20
SR 189
SR 188
E BAY BLVD
Hurlburt Field
Harris
SR 393
Mary Esther
SR 30 / US 98
Destin
Miramar Beach
Gulf Islands
GULF BLVD
Seashore
Beach Highlands
0
4 Miles
N
W
E
S


Hurlburt Field
Eglin AFB
MIRR Project Area Boundary
County Lines
Critical Roadways
River State Forest
Munson
Cannon Town
Nubbin Ridge
Garden City
Auburn
Silver Springs
Baker
Dorcas
Springhill
Milligan
Crestview
Killingsworth Crossroads
Mossy Head
Alpine Heights
Holt
Gallivet
Harold
Santa Rosa
Okaloosa
Walton
Eglin Air Force Base
Niceville
Valparaiso
Portland
Freeport
Longwood
Wright
Hurlburt Field
Mary Esther
Wynnie
Navarre
Navarre Beach
Destin
Turquoise Beach
Miramar Beach
Santa Rosa Beach
Beach Highlands
Blue Mountain Beach
Villa Tasso
Old
US HWY 90
I 10
EXIT 70
STATE HWY 85
STATE HWY 285
STATE HWY 123
STATE HWY 87
STATE HWY 189
STATE HWY 188
STATE HWY 397
STATE HWY 393
STATE HWY 293
STATE HWY 20
US HWY 331
US HWY 98
HOLLYWOOD
W COLLEGE BLVD
E COLLEGE BLVD
SR-190
S JOHN SIMS PKWY
FOREST RD
BAY RANGE RD
MARTIN LUTHER KING JR
HILL
LOG LAKE RD
PJ ADAMS
RICHARDSON
0
Miles
N
W
E
S


Eglin AFB
MIRR Project Area Boundary
County Lines
Shorelines
Major Roadways
Santa Rosa
Okaloosa
Walton
US HWY 90
I 10
LOG LAKE RD
STATE HWY 189
STATE HWY 4
PJ ADAMS
393
LONG
HWY 331
EXIT 70
STATE HWY 85
STATE HWY 285
STATE HWY 87
STATE HWY 123
W COLLEGE BLVD
E COLLEGE BLVD
S JOHN SIMS PKWY
FOREST RD
BAY
RANGE RD
STATE HWY 20
STATE HWY 189
GREEN ACRES
STATE HWY 188
STATE HWY 85
STATE HWY 397
US HWY 98
HILL
STATE HWY 393
HOLLYWOOD
399
STATE HWY 293
US HWY 331
0
1 Miles
N
W
E
S


Eglin AFB
MIRR Project Area Boundary
Wastewater Treatment Plants
Critical Sewer Lines
0
1 Miles
N
W
E
S


Hurlburt Field
Eglin AFB
MIRR Project Area Boundary
County Lines
Substations
Power Transmission Lines
Blackwater River State Forest
Baker
Crestview
Killingsworth Crossroads
Holt
De Funiak Springs
Okaloosa
Santa Rosa
Yellow River Wildlife Management Area
Walton
Niceville
Freeport
Hurlburt Field
Mary Esther
Destin
Miramar Beach
Beach Highlands
Blue Gulf Beach
Gulf Islands National Seashore
0
1 Miles
N
W
E
S



Eglin AFB & Hurlburt Field High Risk Assets

EMERALD COAST MILITARY INSTALLATION RESILIENCY REVIEW

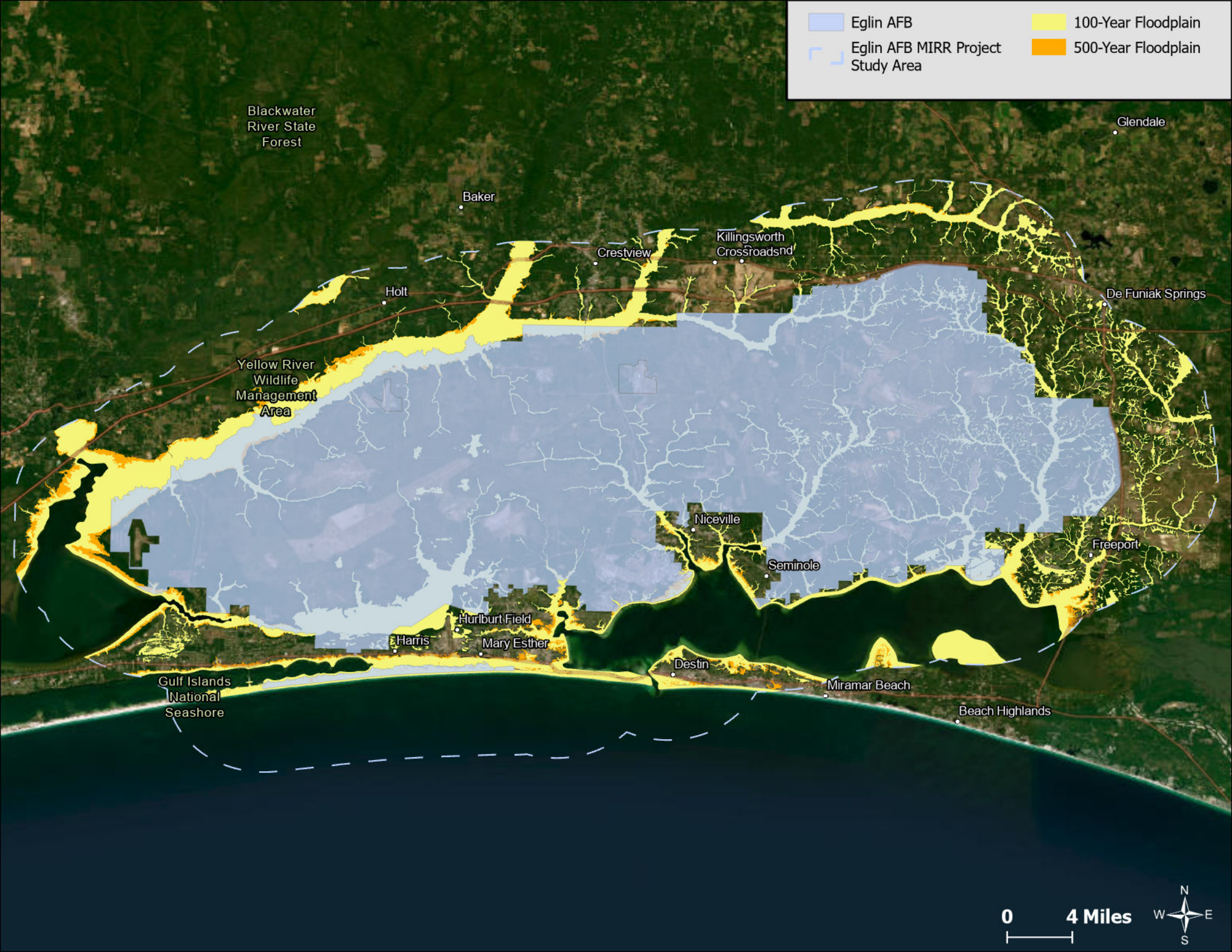
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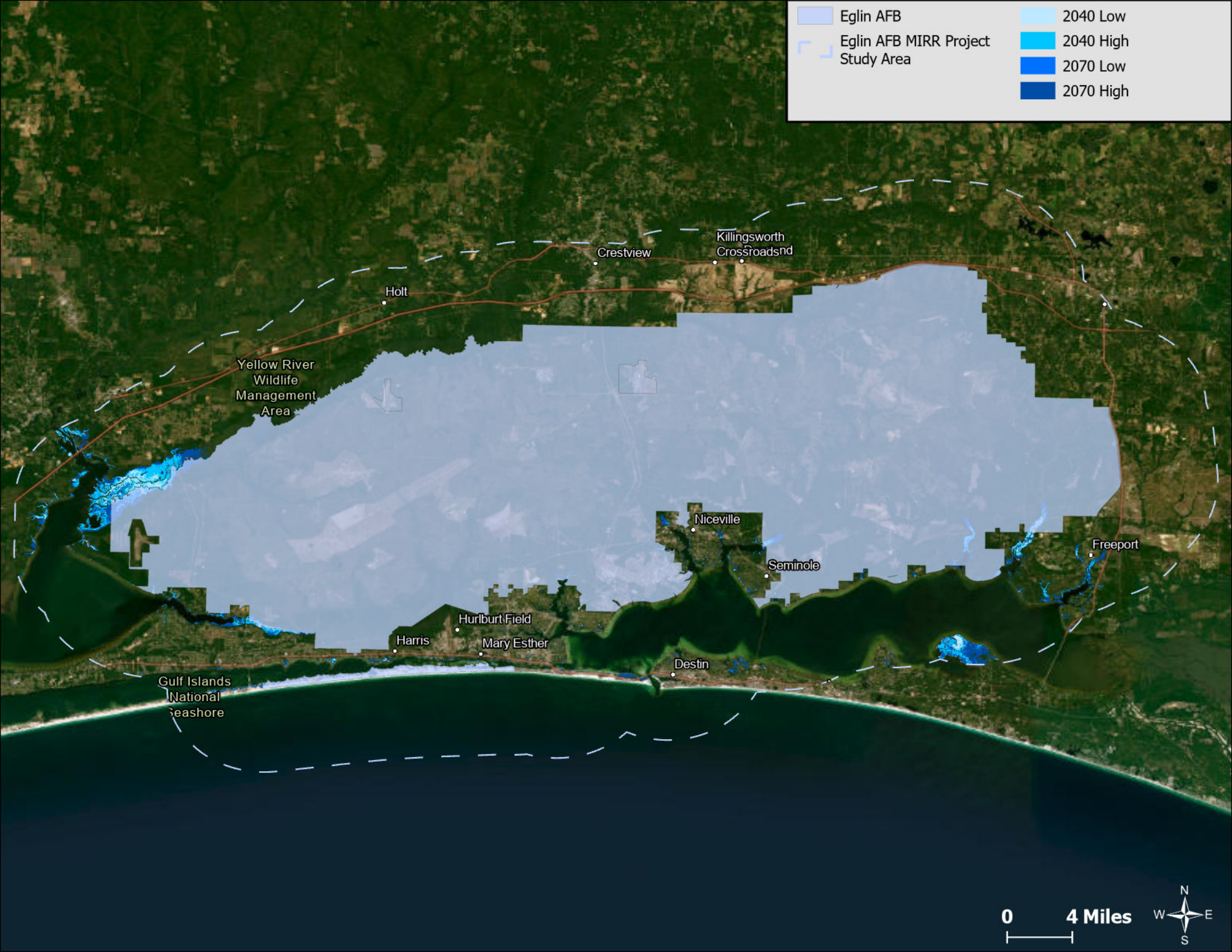


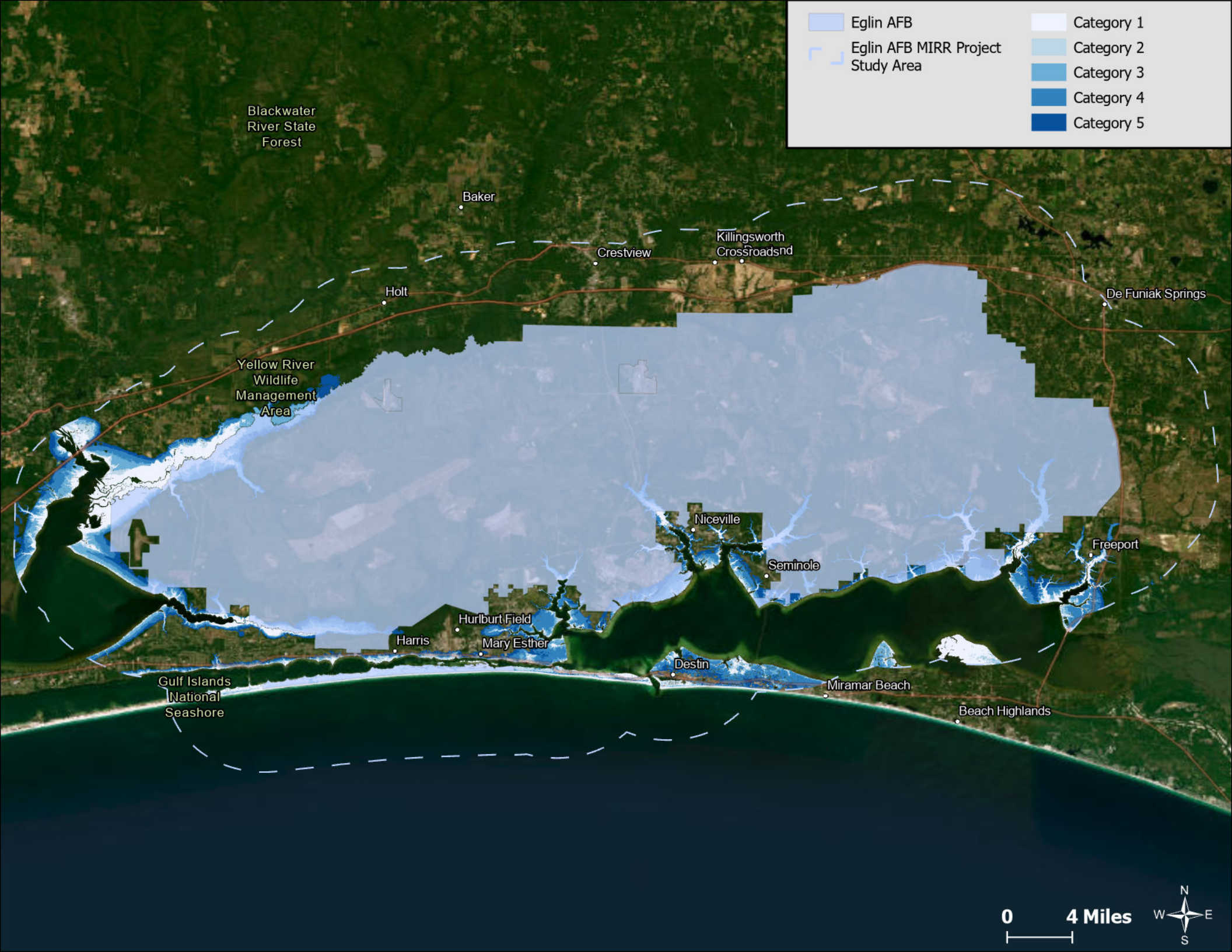
EMERALD COAST MILITARY INSTALLATION RESILIENCY REVIEW

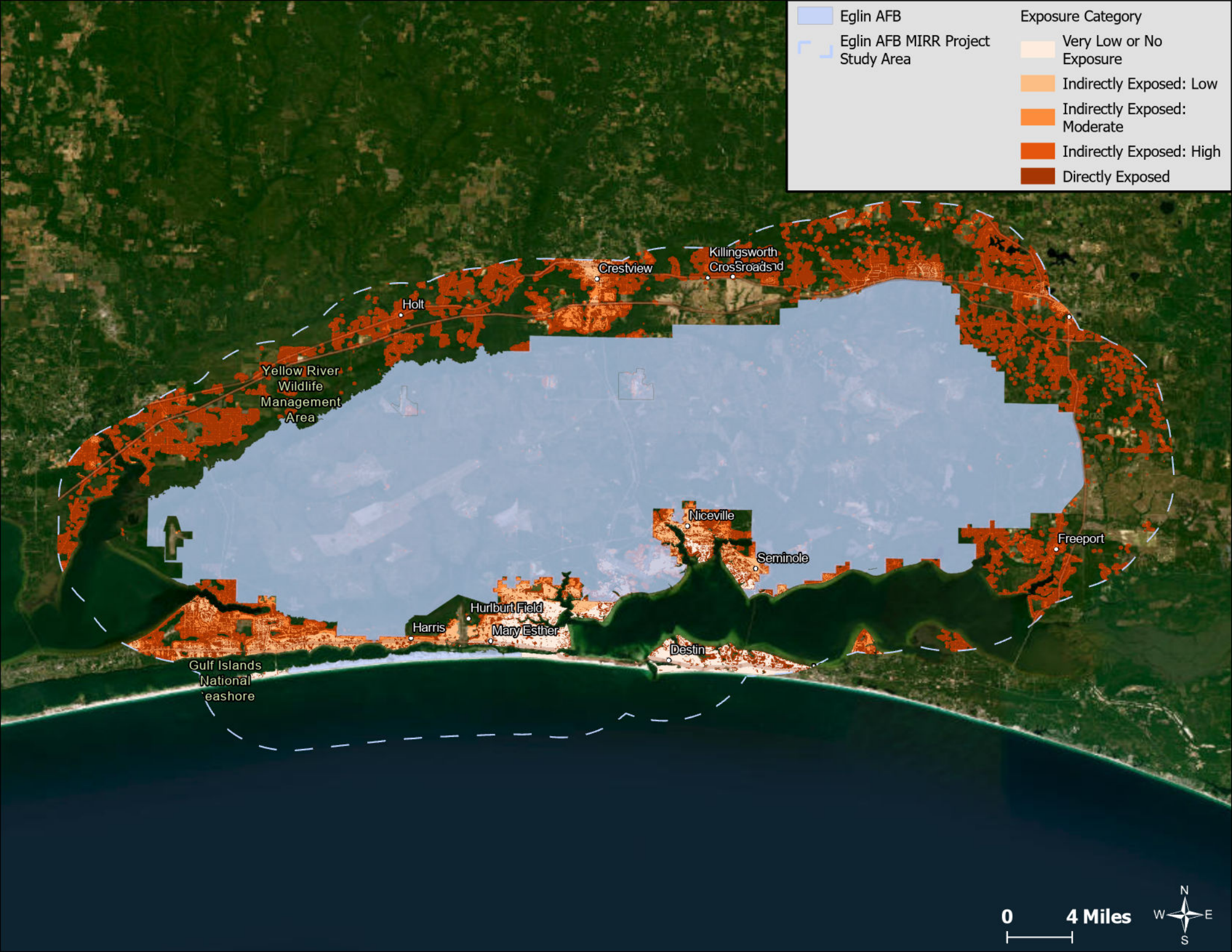
Eglin AFB & Hurlburt Field High Flood Risk Assets

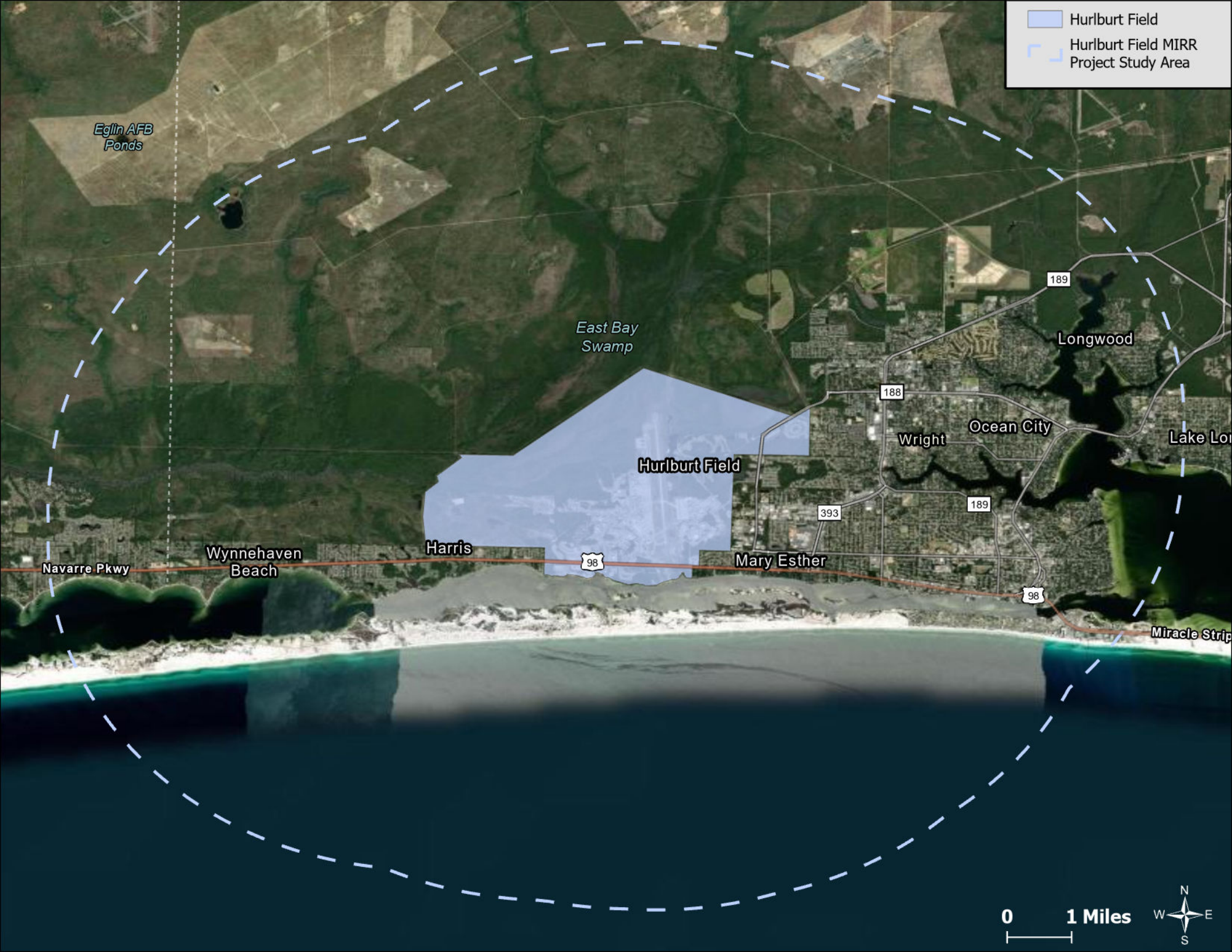
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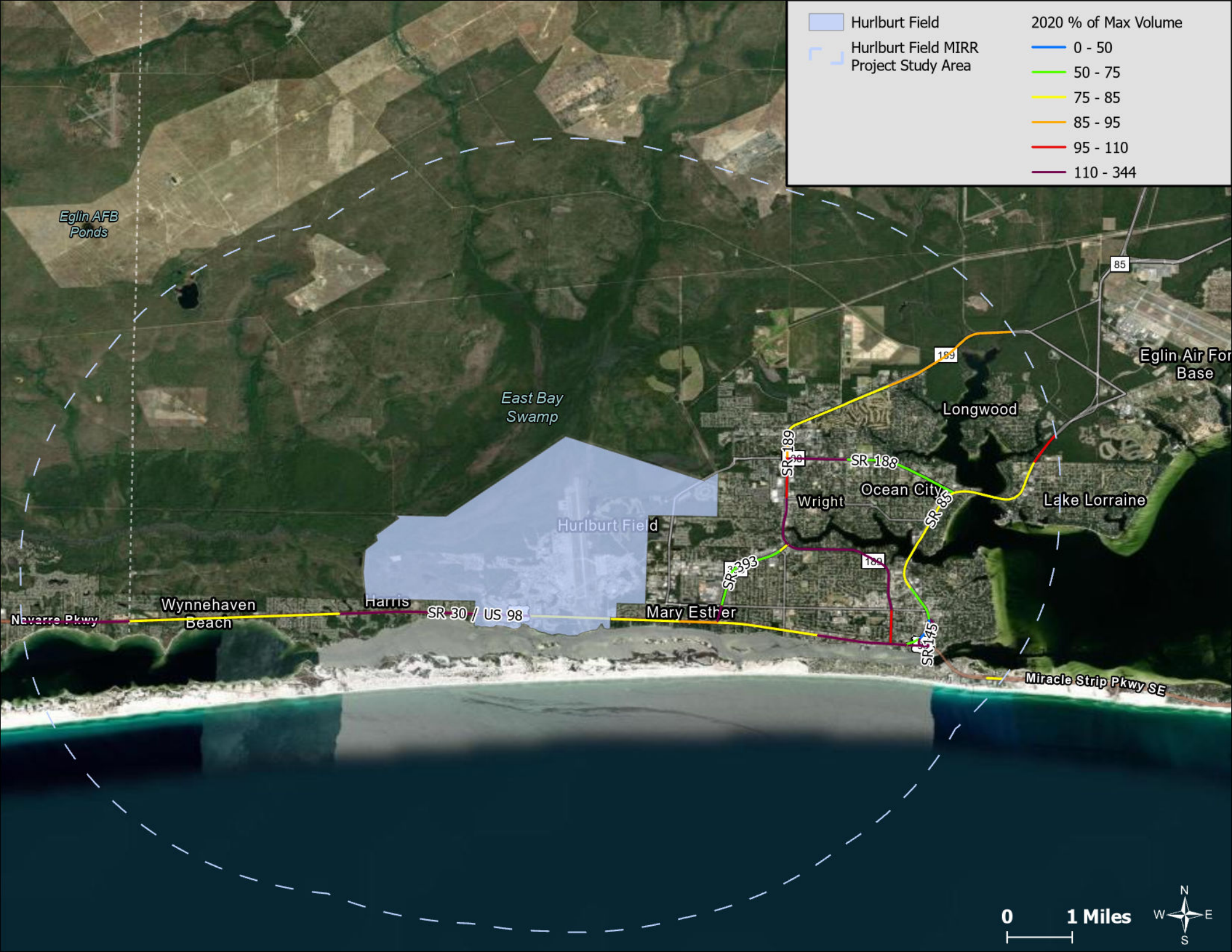

Eglin AFB
Eglin AFB MIRR Project Study Area
100-Year Floodplain
500-Year Floodplain
Blackwater River State Forest
Glendale
Baker
Crestview
Killingsworth Crossroads
Holt
De Funiak Springs
Yellow River Wildlife Management Area
Niceville
Seminole
Freeport
Hurlburt Field
Harris
Mary Esther
Destin
Miramar Beach
Beach Highlands
Gulf Islands National Seashore
0
4 Miles
N
W
E
S

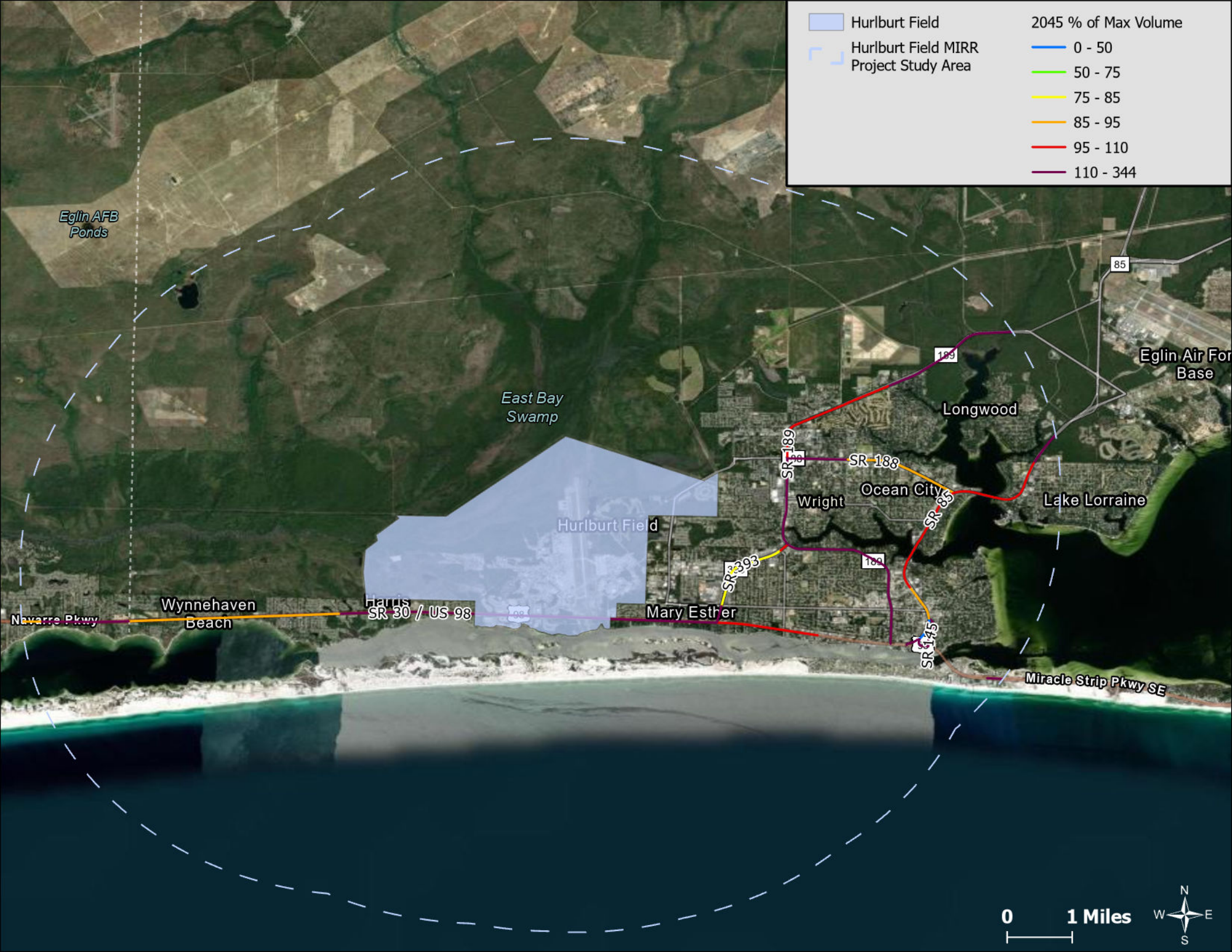

Eglin AFB
Eglin AFB MIRR Project Study Area
2040 Low
2040 High
2070 Low
2070 High
Crestview
Killingsworth Crossroads
Holt
Yellow River Wildlife Management Area
Niceville
Seminole
Freeport
Hurlburt Field
Harris
Mary Esther
Destin
Gulf Islands National Seashore
0
4 Miles
N
W
E
S

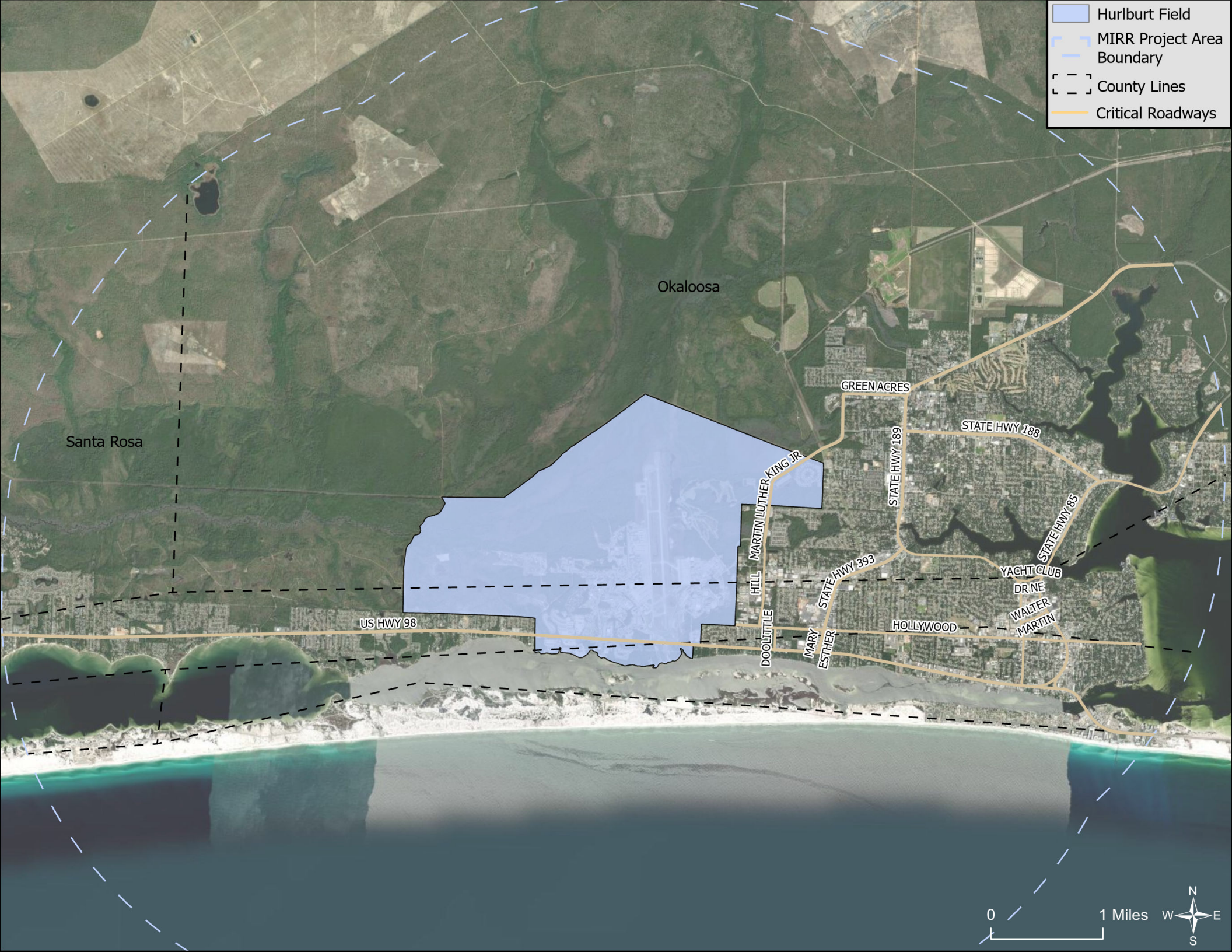

Eglin AFB
Eglin AFB MIRR Project Study Area
Category 1
Category 2
Category 3
Category 4
Category 5
Blackwater River State Forest
Baker
Crestview
Killingsworth Crossroads
Holt
De Funiak Springs
Yellow River Wildlife Management Area
Niceville
Seminole
Freeport
Hurlburt Field
Harris
Mary Esther
Destin
Miramar Beach
Beach Highlands
Gulf Islands National Seashore
0
4 Miles
N
W
E
S

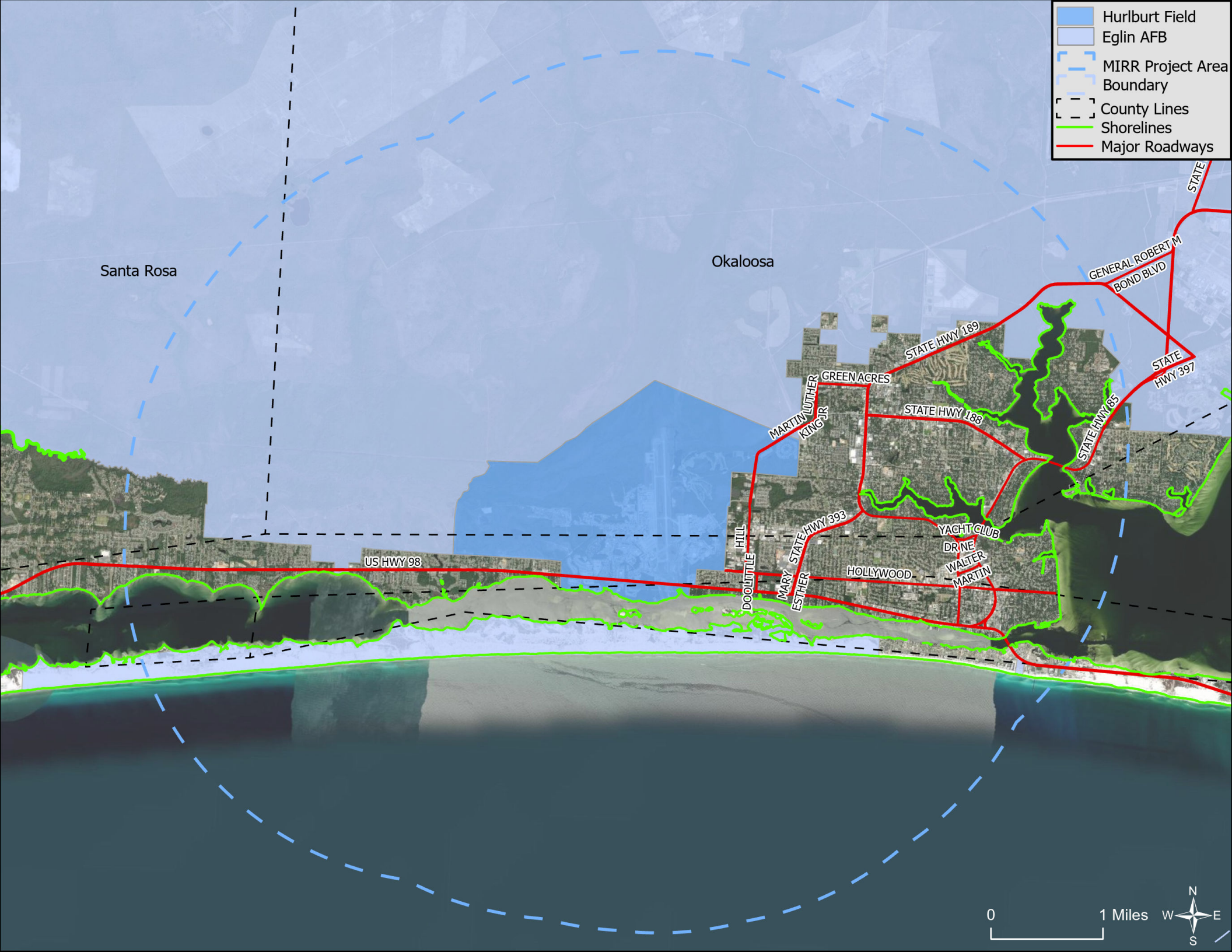

Eglin AFB
Eglin AFB MIRR Project Study Area
Exposure Category
Very Low or No Exposure
Indirectly Exposed: Low
Indirectly Exposed: Moderate
Indirectly Exposed: High
Directly Exposed
Crestview
Killingsworth Crossroads
Holt
Yellow River Wildlife Management Area
Niceville
Freeport
Seminole
Hurlburt Field
Harris
Mary Esther
Destin
Gulf Islands National Seashore
0
4 Miles
N
W
E
S

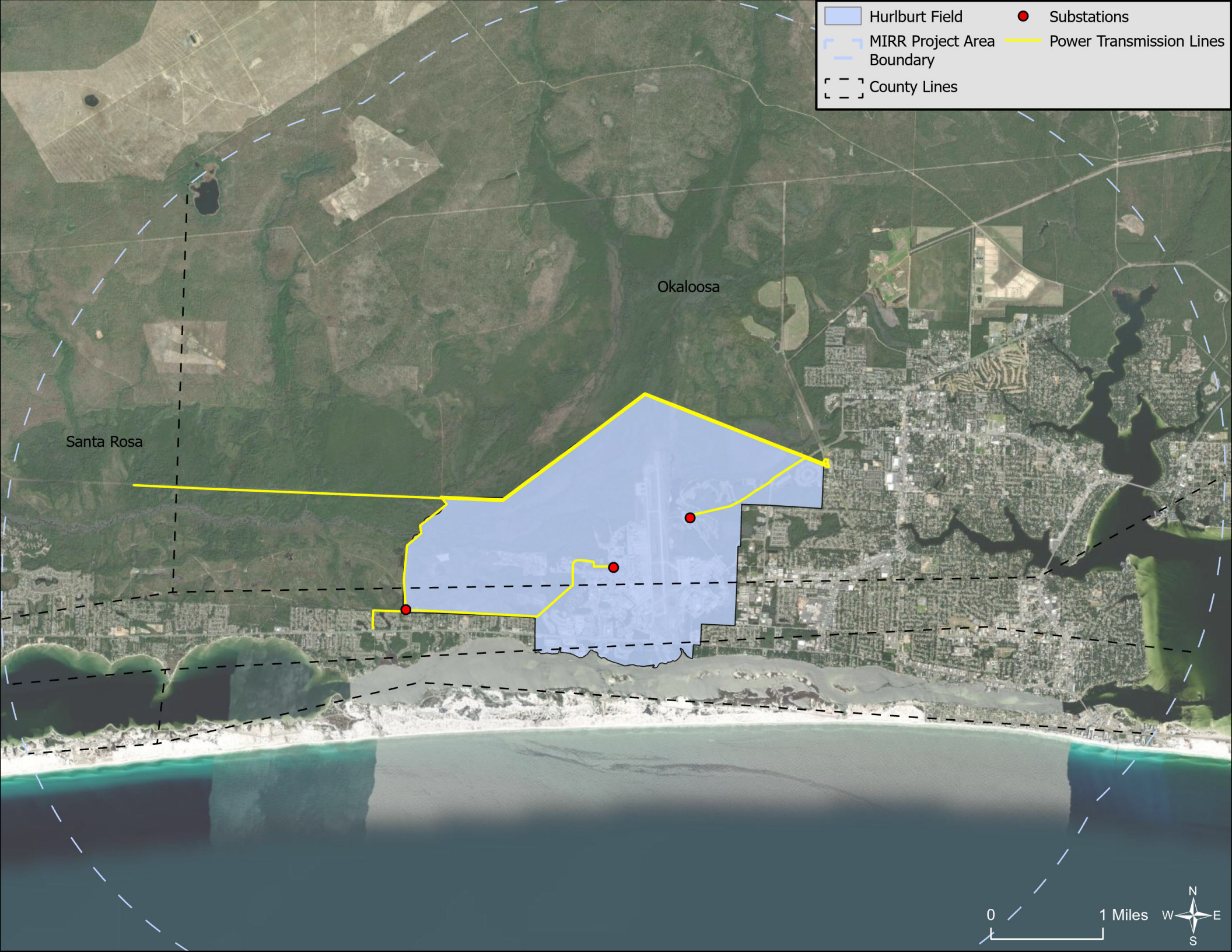

Hurlburt Field
Hurlburt Field MIRR Project Study Area
Eglin AFB Ponds
East Bay Swamp
Hurlburt Field
Longwood
Wright
Ocean City
Lake Lo
Harris
Wynnehaven Beach
Navarre Pkwy
Mary Esther
Miracle Strip
188
189
393
98
0
1 Miles
N
W
E
S

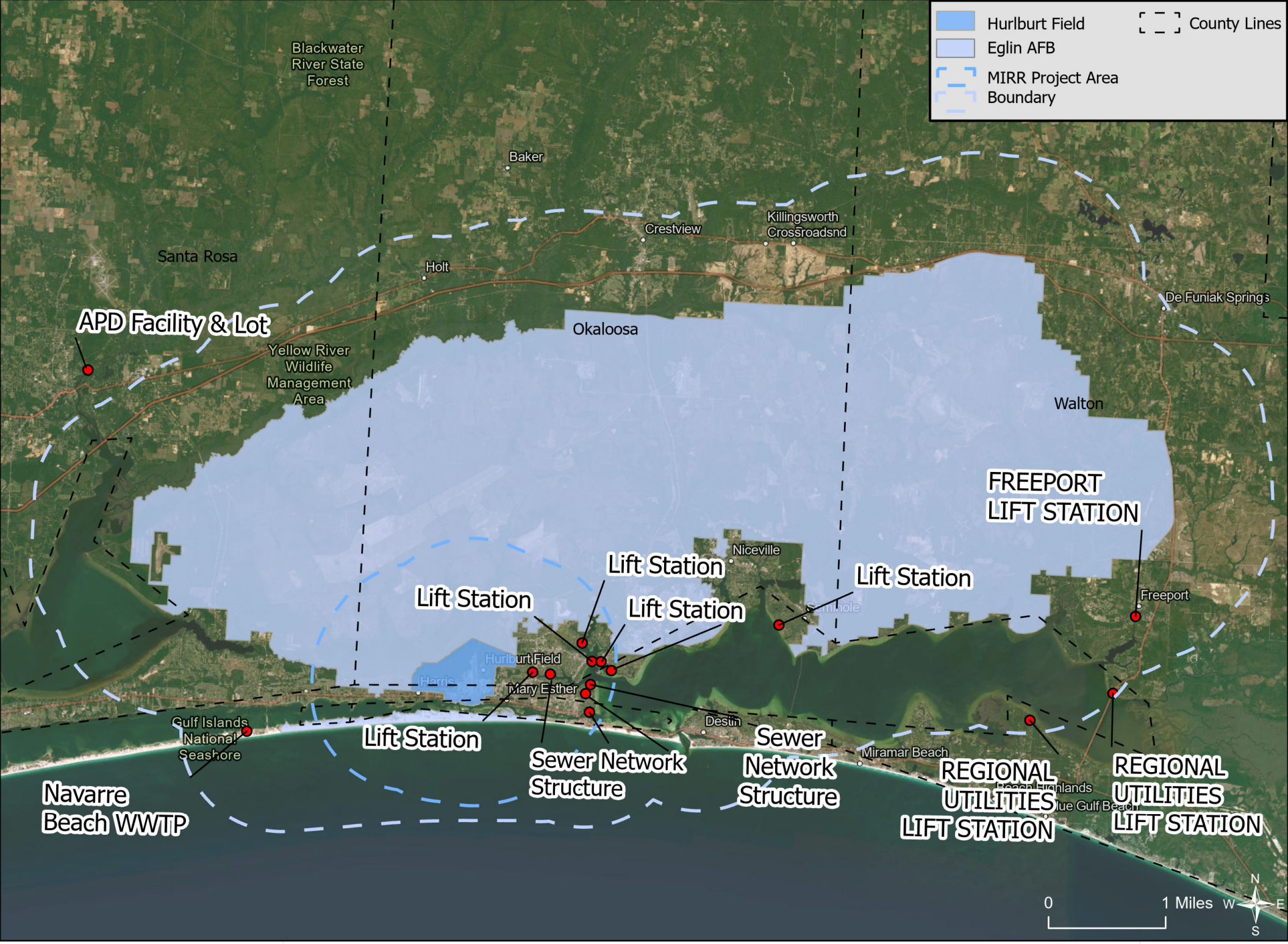

Hurlburt Field
Hurlburt Field MIRR Project Study Area
2020 % of Max Volume
0 - 50
50 - 75
75 - 85
85 - 95
95 - 110
110 - 344
Eglin AFB Ponds
East Bay Swamp
Hurlburt Field
Longwood
Eglin Air For Base
Wright
Ocean City
Lake Lorraine
Wynnehaven Beach
Harris
SR 30 / US 98
Mary Esther
Navarre Pkwy
Miracle Strip Pkwy SE
SR 189
SR 188
SR 85
SR 393
SR 145
85
0
1 Miles
N
W
E
S


Hurlburt Field
Hurlburt Field MIRR Project Study Area
2045 % of Max Volume
0 - 50
50 - 75
75 - 85
85 - 95
95 - 110
110 - 344
Eglin AFB Ponds
East Bay Swamp
Hurlburt Field
Longwood
Eglin Air For Base
Wright
Ocean City
Lake Lorraine
Wynnehaven Beach
Harris
Mary Esther
Navarre Pkwy
SR 30 / US 98
SR 189
SR 188
SR 85
SR 393
SR 145
Miracle Strip Pkwy SE
85
189
0
1 Miles
N
W
E
S


Hurlburt Field
MIRR Project Area Boundary
County Lines
Critical Roadways
Okaloosa
Santa Rosa
GREEN ACRES
STATE HWY 188
STATE HWY 189
STATE HWY 85
MARTIN LUTHER KING JR
HILL
DOOLITTLE
STATE HWY 393
YACHT CLUB
DR NE
WALTER
MARTIN
HOLLYWOOD
MARY
ESTHER
US HWY 98
0
1 Miles
N
W
E
S


Hurlburt Field
Eglin AFB
MIRR Project Area Boundary
County Lines
Shorelines
Major Roadways
Santa Rosa
Okaloosa
US HWY 98
STATE HWY 189
GREEN ACRES
MARTIN LUTHER KING JR
STATE HWY 188
STATE HWY 85
STATE HWY 397
GENERAL ROBERT M
BOND BLVD
STATE
HILL
DOOLITTLE
MARY
ESTHER
STATE HWY 393
YACHT CLUB
DR NE
WALTER
MARTIN
HOLLYWOOD
0
1 Miles
N
W
E
S


Hurlburt Field
Substations
MIRR Project Area Boundary
Power Transmission Lines
County Lines
Okaloosa
Santa Rosa
0
1 Miles
N
W
E
S



Eglin AFB & Hurlburt Field High Risk Assets

EMERALD COAST MILITARY INSTALLATION RESILIENCY REVIEW

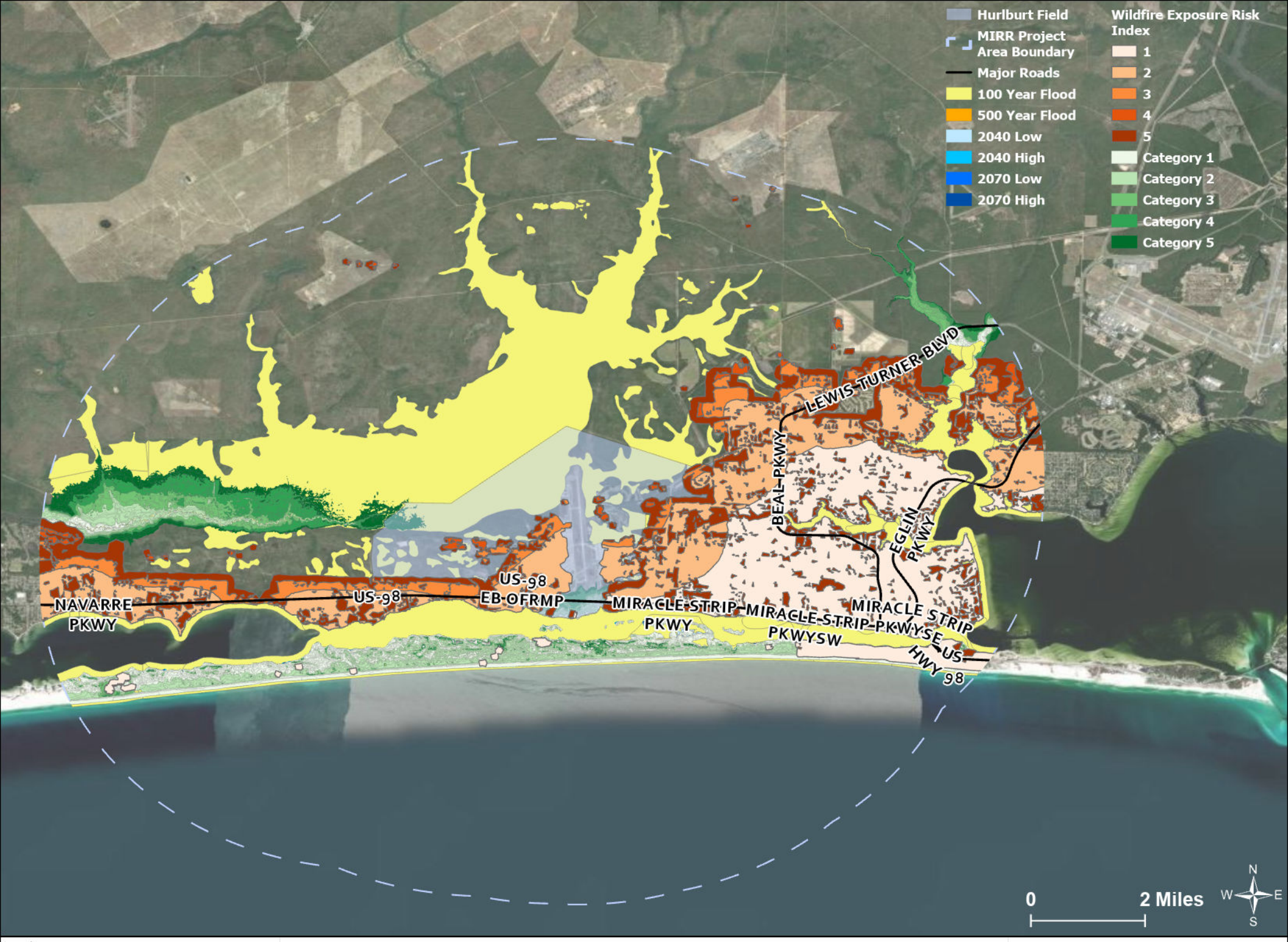
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EMERALD COAST MILITARY INSTALLATION RESILIENCY REVIEW

Eglin AFB & Hurlburt Field High Flood Risk Assets

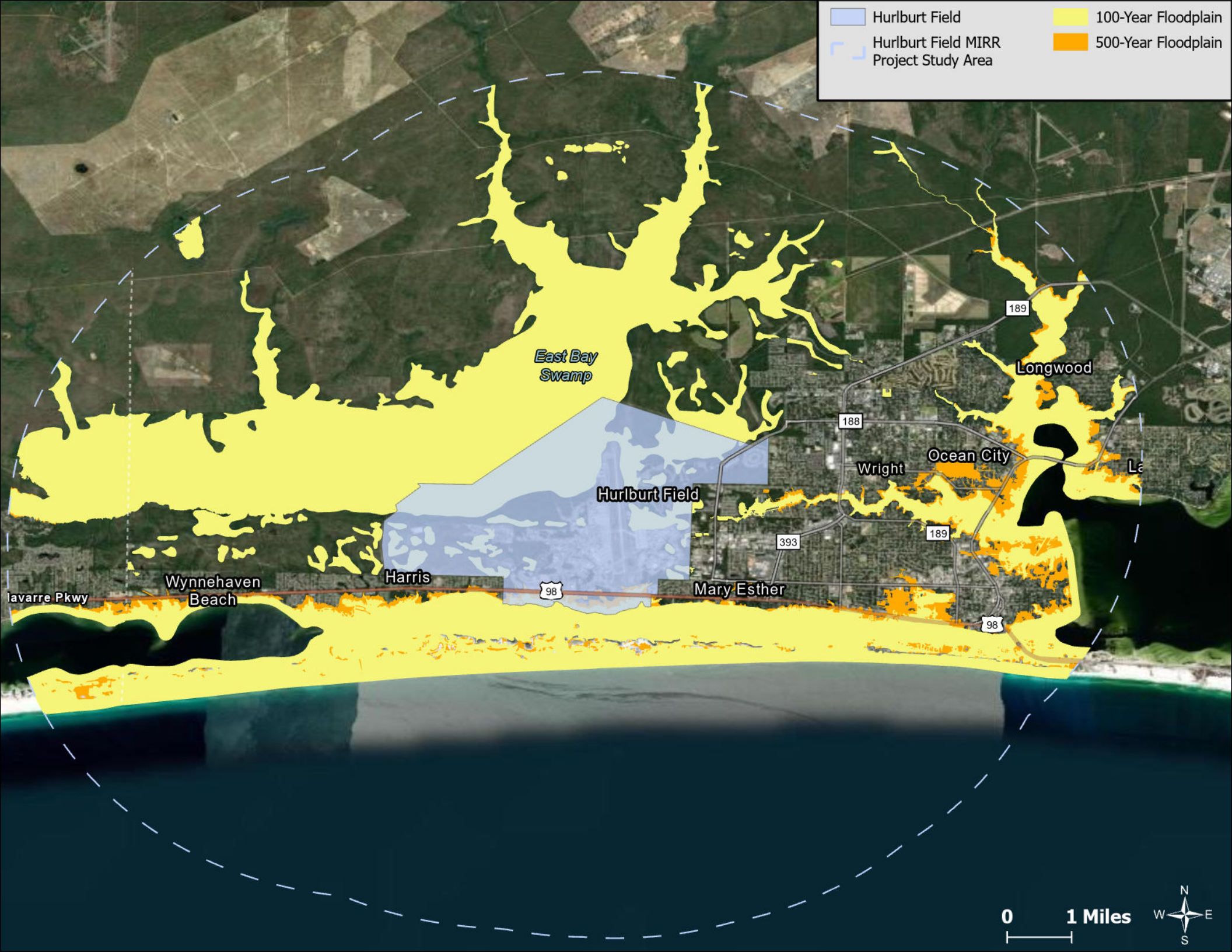
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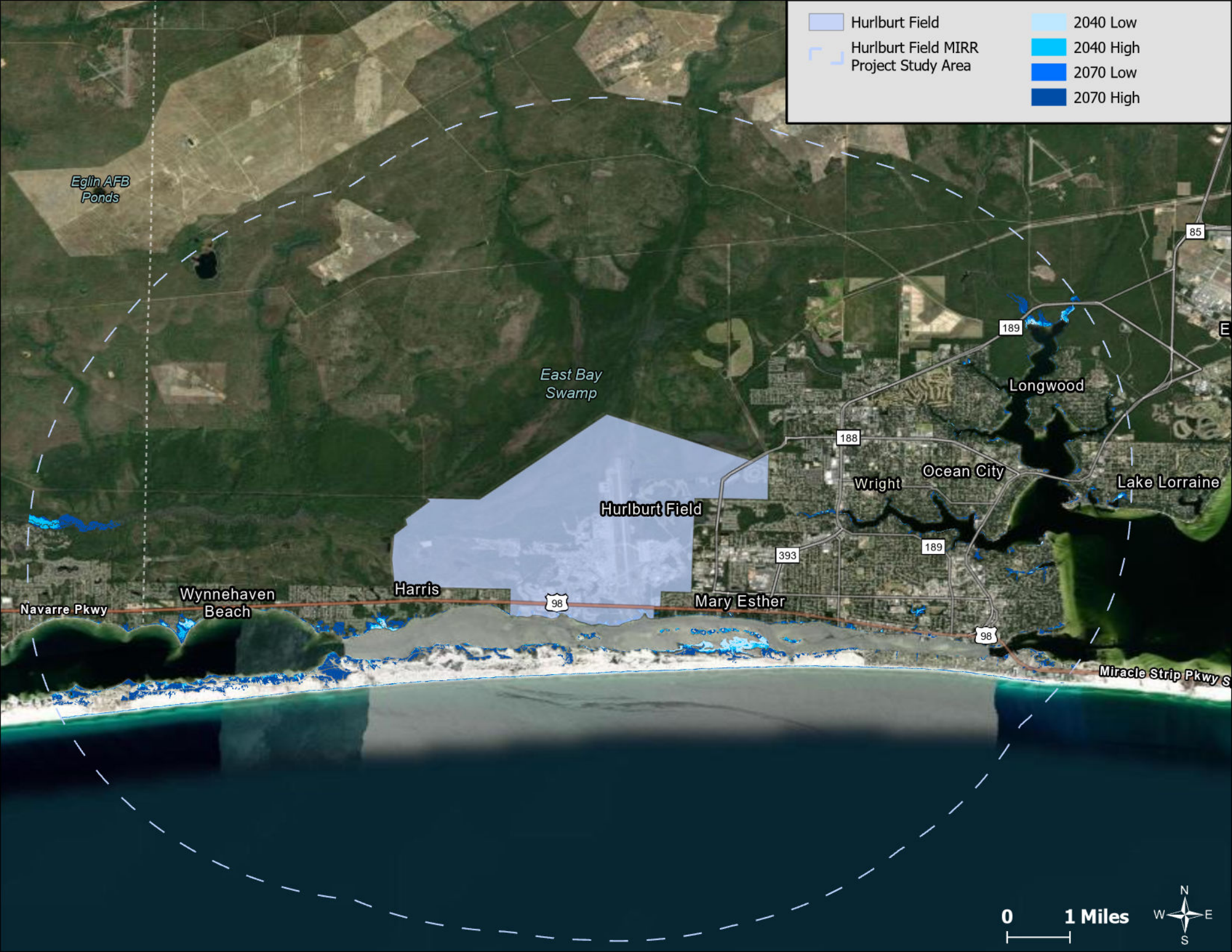


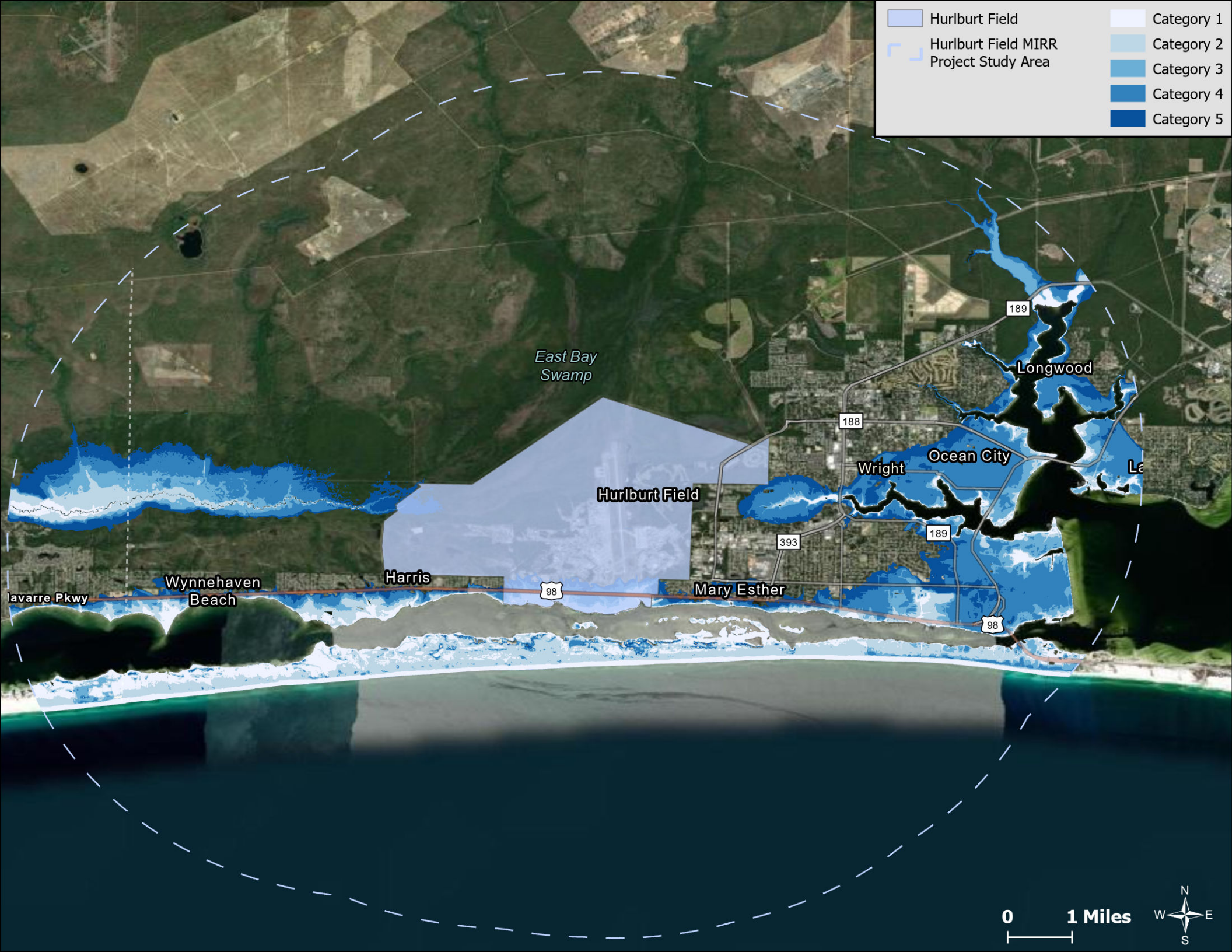
EMERALD COAST MILITARY INSTALLATION RESILIENCY REVIEW

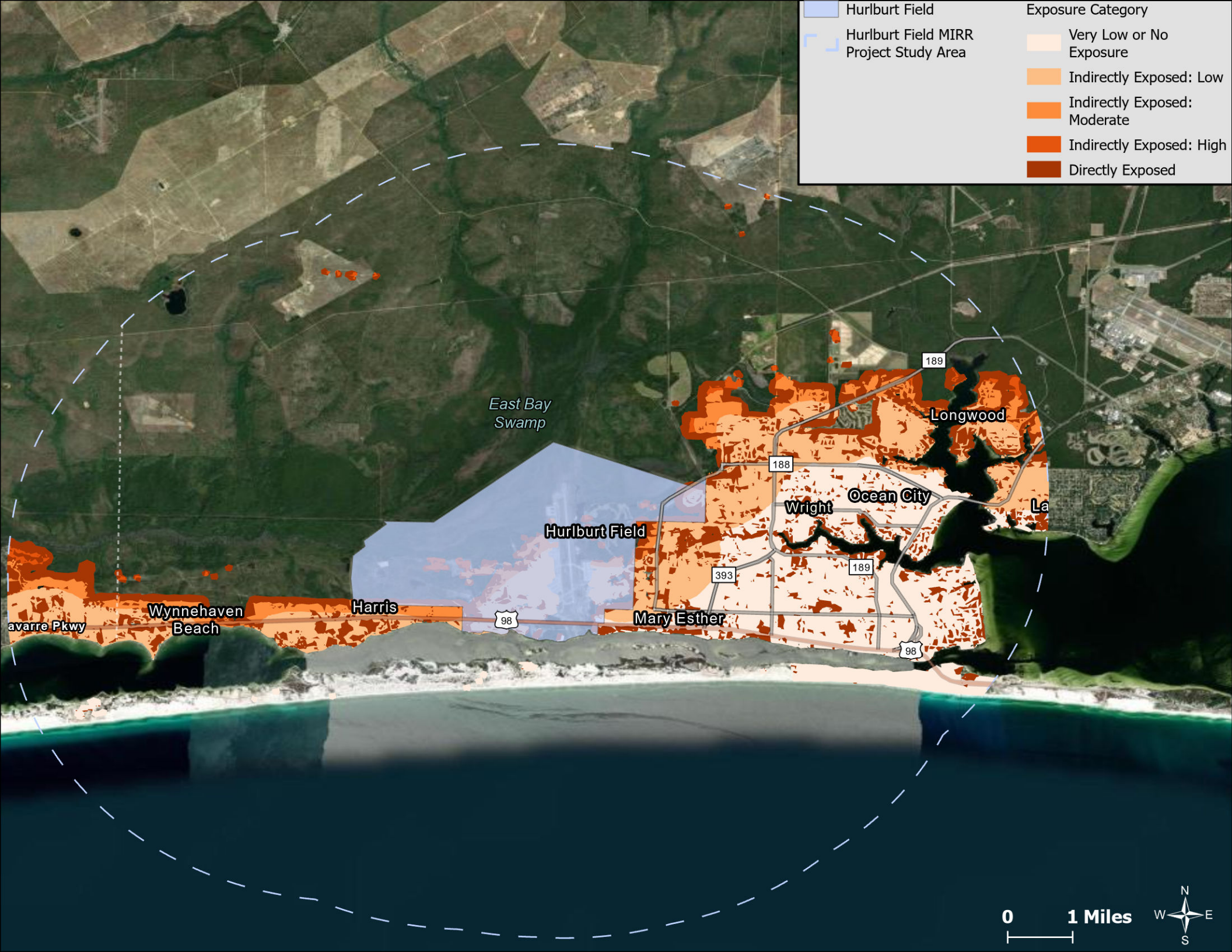
Hurlburt Field Combined Hazards Exposure

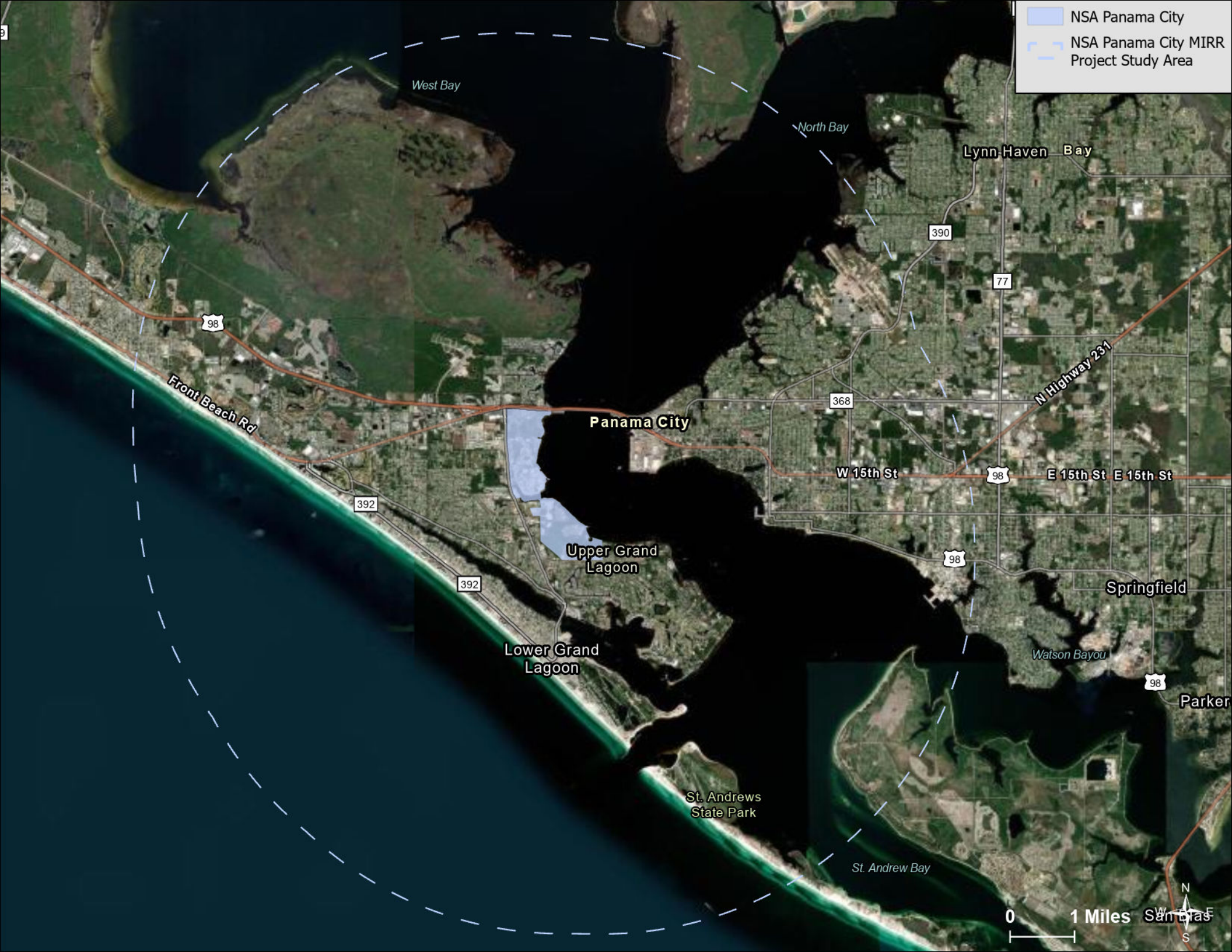
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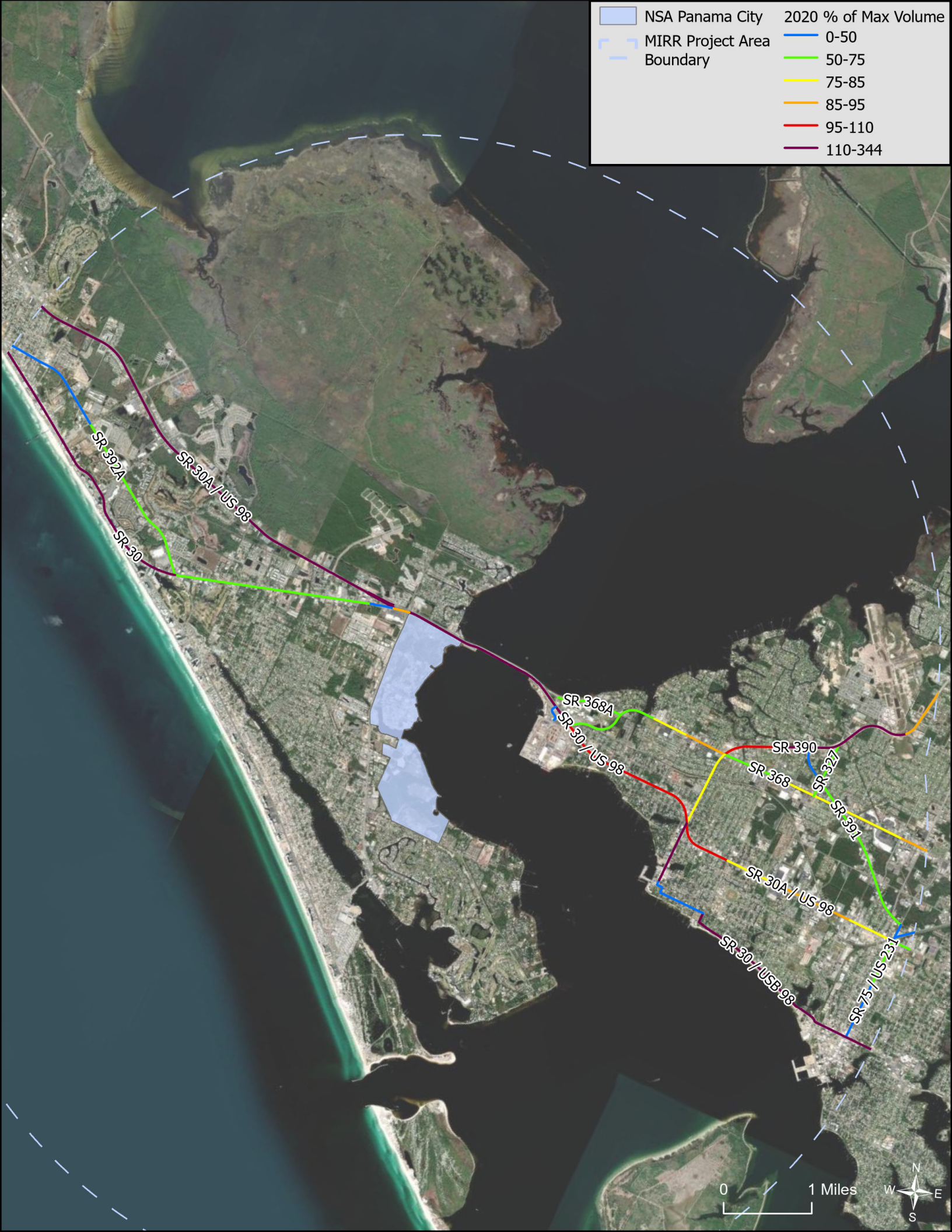

Hurlburt Field
Hurlburt Field MIRR Project Study Area
100-Year Floodplain
500-Year Floodplain
East Bay Swamp
Longwood
Ocean City
Wright
Hurlburt Field
Wynnehaven Beach
Harris
Mary Esther
avarre Pkwy
189
188
393
98
0
1 Miles
N
W
E
S


Hurlburt Field
Hurlburt Field MIRR Project Study Area
2040 Low
2040 High
2070 Low
2070 High
Eglin AFB Ponds
East Bay Swamp
Hurlburt Field
Longwood
Ocean City
Wright
Lake Lorraine
Wynnehaven Beach
Harris
Mary Esther
Navarre Pkwy
Miracle Strip Pkwy S
85
189
188
393
98
0
1 Miles
N
W
E
S


Hurlburt Field
Hurlburt Field MIRR Project Study Area
Category 1
Category 2
Category 3
Category 4
Category 5
East Bay Swamp
Hurlburt Field
Longwood
Ocean City
Wright
Wynnehaven Beach
Harris
Mary Esther
avarre Pkwy
189
188
393
98
0
1 Miles
N
W
E
S

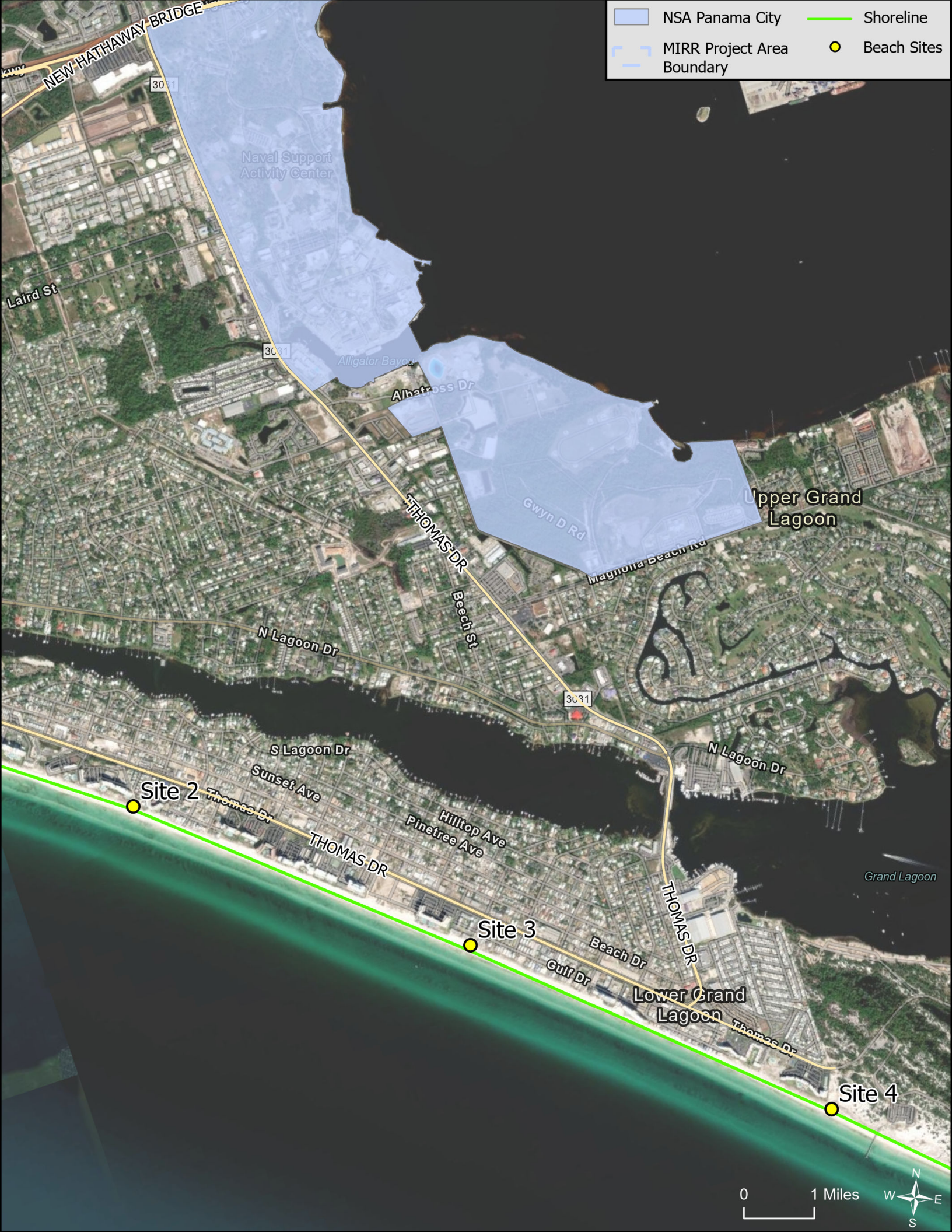

Hurlburt Field
Hurlburt Field MIRR Project Study Area
Exposure Category
Very Low or No Exposure
Indirectly Exposed: Low
Indirectly Exposed: Moderate
Indirectly Exposed: High
Directly Exposed
East Bay Swamp
Longwood
Ocean City
Wright
Hurlburt Field
Wynnehaven Beach
Harris
Mary Esther
avarre Pkwy
189
188
393
98
0
1 Miles
N
W
E
S


NSA Panama City
NSA Panama City MIRR Project Study Area
West Bay
North Bay
Lynn Haven Bay
390
77
98
Front Beach Rd
N Highway 231
368
Panama City
W 15th St
98
E 15th St
E 15th St
392
Upper Grand Lagoon
98
Springfield
392
Lower Grand Lagoon
Watson Bayou
98
Parker
St. Andrews State Park
St. Andrew Bay
0
1 Miles
San Blas
N
W
E
S


NSA Panama City
MIRR Project Area Boundary
2020 % of Max Volume
0-50
50-75
75-85
85-95
95-110
110-344
SR 392A
SR 30A / US 98
SR 30
SR 368A
SR 30 / US 98
SR 390
SR 327
SR 368
SR 391
SR 30A / US 98
SR 30 / USB 98
SR 75 / US 231
0
1 Miles
N
W
E
S


NSA Panama City
MIRR Project Area Boundary
2045 % of Max Volume
0-50
50-75
75-85
85-95
95-110
110-344
SR 392A
SR 30A / US 98
SR 30
SR 368A
SR 30 / US 98
SR 390
SR 327
SR 368
SR 391
SR 30A / US 98
SR 30 / USB 98
SR 75 / US 231
0
1 Miles
N
W
E
S


NSA Panama City
Critical Roadways
MIRR Project Area Boundary
Warren Bayou
West Bay
Little Johnson Bayou
Harrison Bayou
BACK BCH RD
Beach Pkwy
Front Beach Rd
PC BCH PKWY
Hombre Golf Course
FRONT BEACH RD
Front Beach Rd
Signal Hills Golf Course
NEW HATHAWAY BRIDGE
Naval Support Activity Center
Thomas Dr
Panama City
US 98
W 23rd St
18TH ST
385
Pretty Bayou
Robins
Thomas Dr
N Lagoon Dr
THOMAS DR
Upper Grand Lagoon
BECK AVE
US 98 HWY
15TH ST
9TH ST
BEACH DR
Lisenby
Lower Grand Lagoon
0
1 Miles
N
W
E
S


NSA Panama City
MIRR Project Area Boundary
Shoreline
Beach Sites
NEW HATHAWAY BRIDGE
Naval Support Activity Center
Laird St
Alligator Bayou
Albatross Dr
Gwyn D Rd
Upper Grand Lagoon
THOMAS DR
Beech St
N Lagoon Dr
Magnolia Beach Rd
S Lagoon Dr
Sunset Ave
Site 2
Thomas Dr
THOMAS DR
Hilltop Ave
Pinetree Ave
Site 3
Beach Dr
Gulf Dr
Lower Grand Lagoon
Thomas Dr
Site 4
Grand Lagoon
0
1 Miles
N
W
E
S


NSA Panama City
Critical Water Lines
MIRR Project Area Boundary
0
0.5 Miles
N
W
E
S

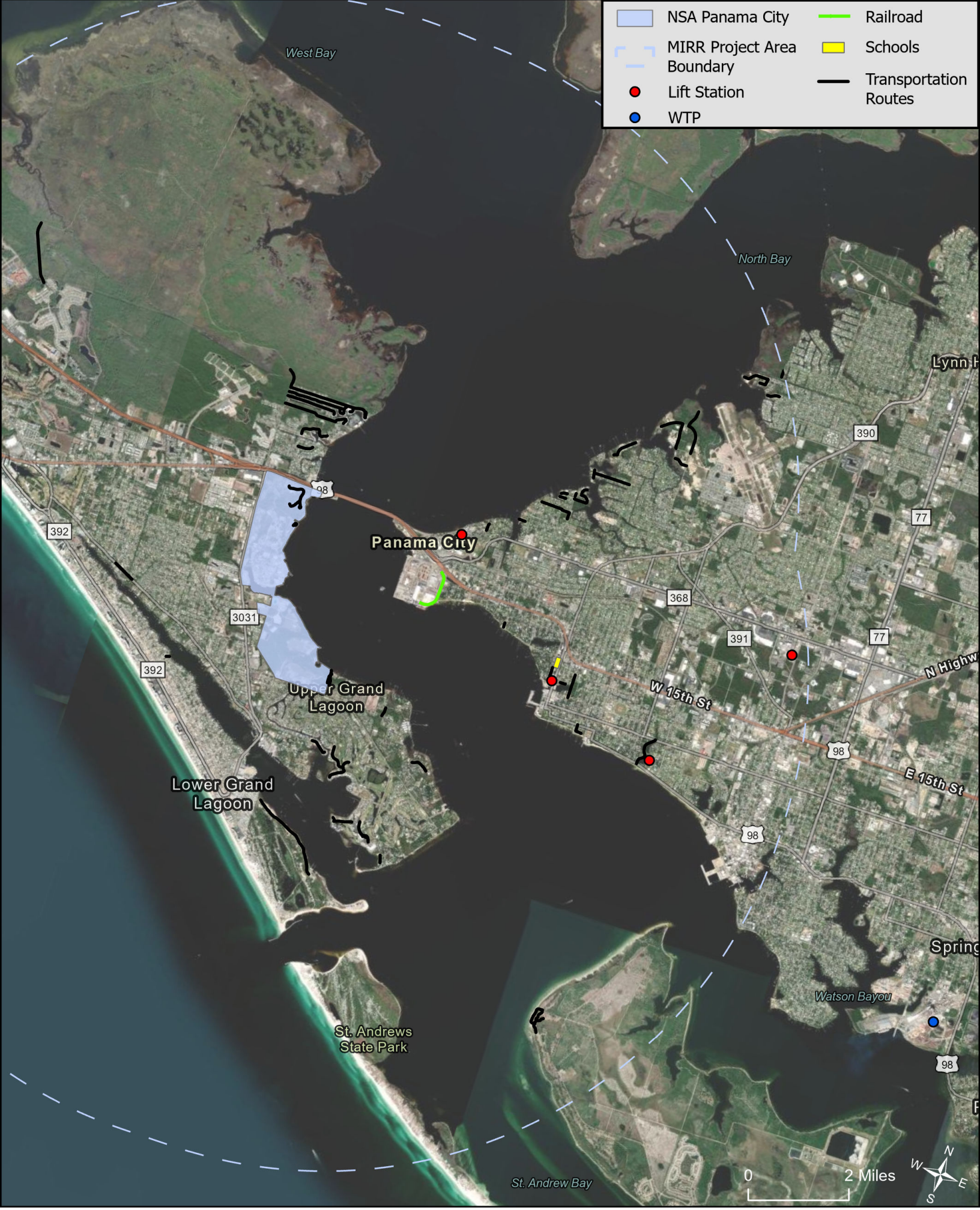

NSA Panama City
MIRR Project Area Boundary
Power Transmission Line
Substation
West Bay
Warren Bayou
Little Johnson Bayou
Harrison Bayou
Hombre Golf Course
Signal Hills Golf Course
Front Beach Rd
Thomas Dr
Naval Support Activity Center
Panama City
Pretty Bayou
Robinson Bayou
Goose Bayou
W 23rd St
98
385
Beck Ave
Airport Rd
Lisenby Ave
W 15th St
W 11th St
W Beach Dr
N Lagoon Dr
Upper Grand Lagoon
Lower Grand Lagoon
N Cove Blvd
0
0.7 Miles
N
S
E
W



EMERALD COAST MILITARY INSTALLATION RESILIENCY REVIEW

NSA Panama City High Risk Assets

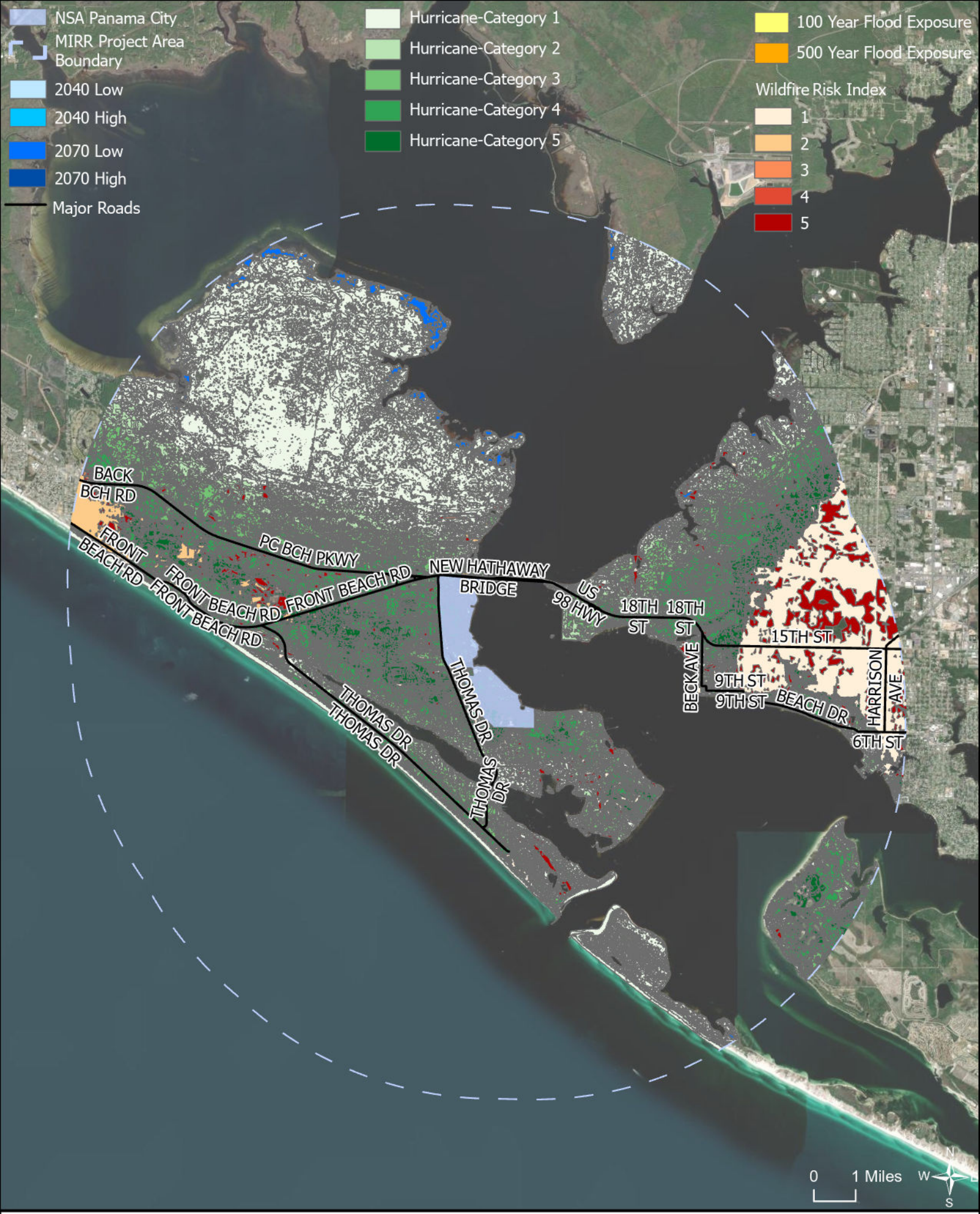
Jacobs



EMERALD COAST MILITARY INSTALLATION RESILIENCY REVIEW

NSA Panama City High Risk Flood Assets

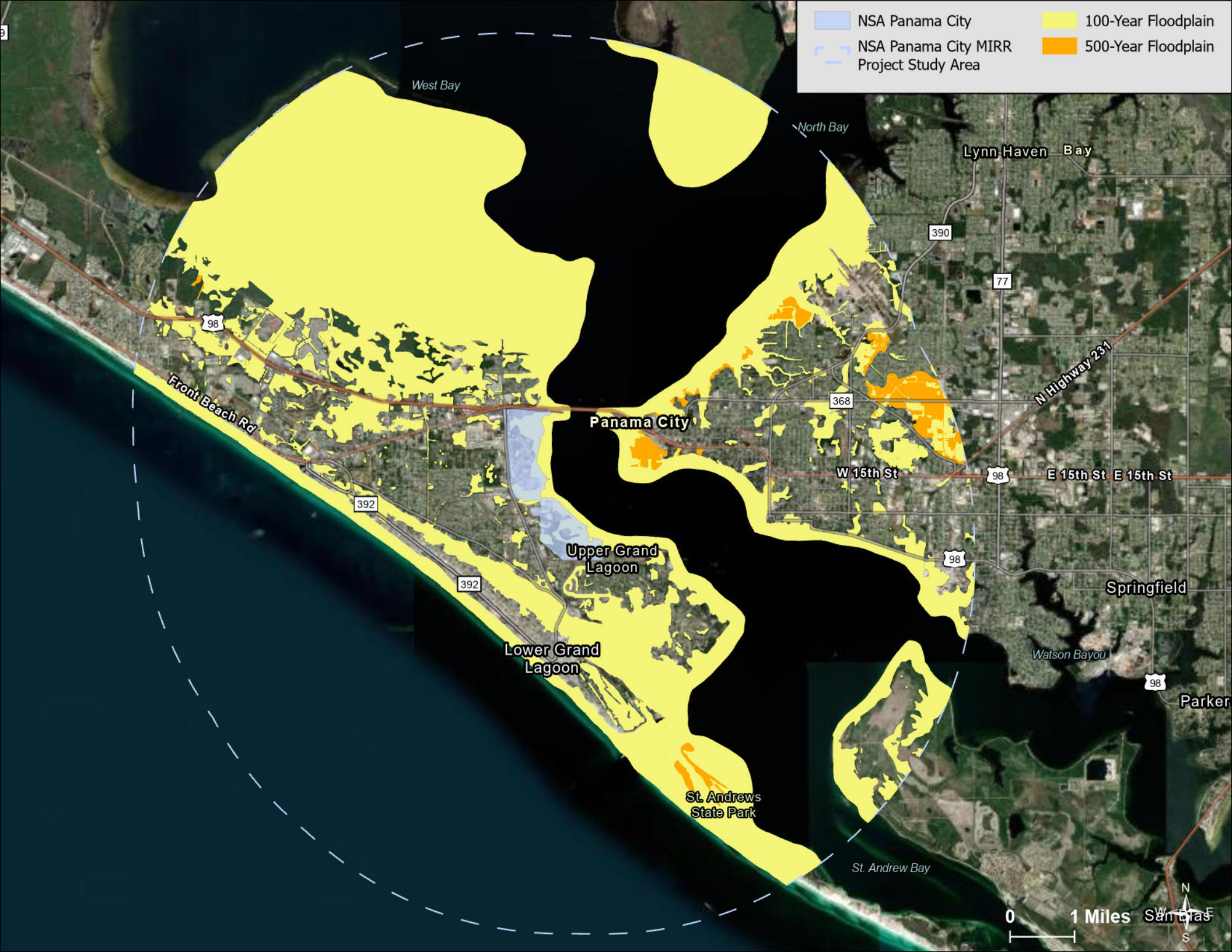
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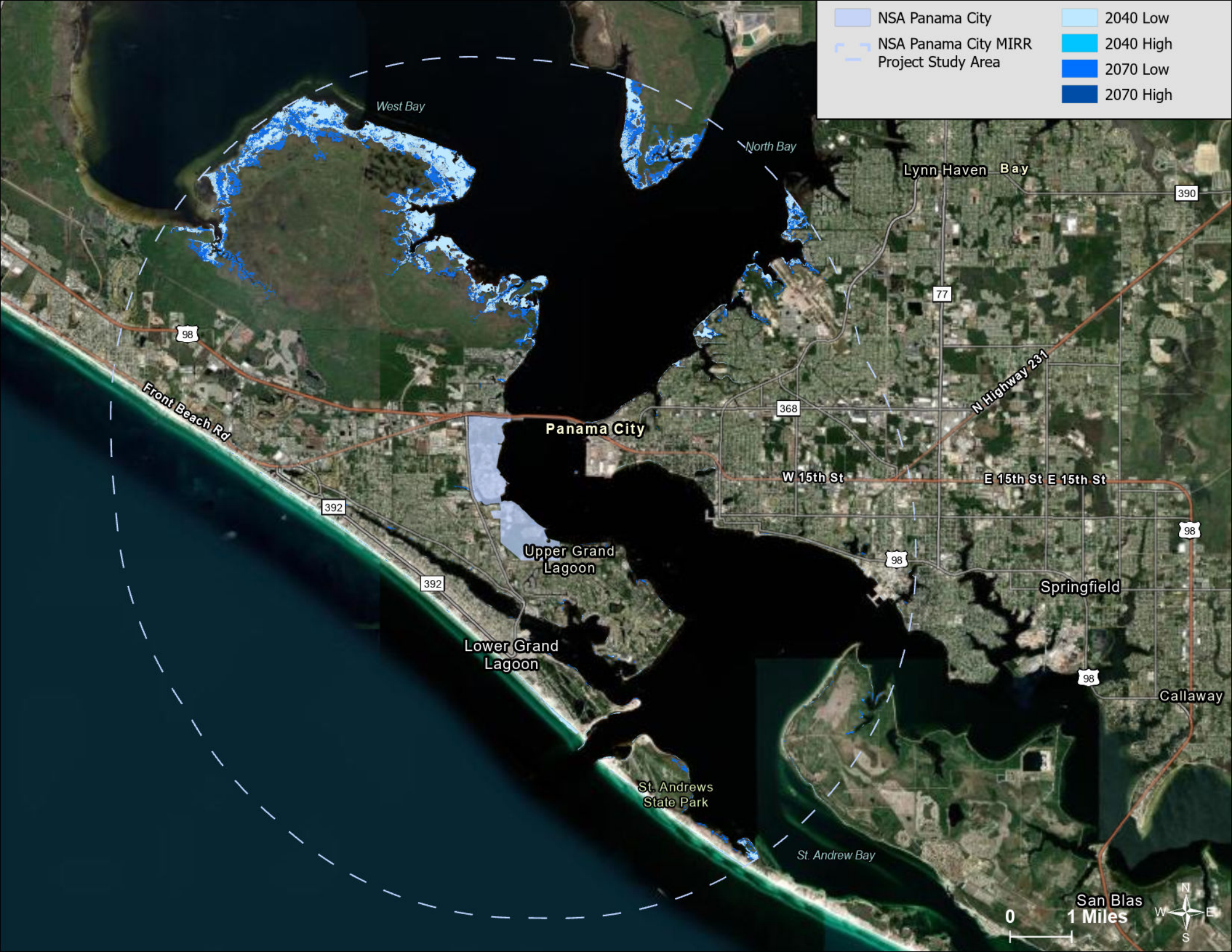


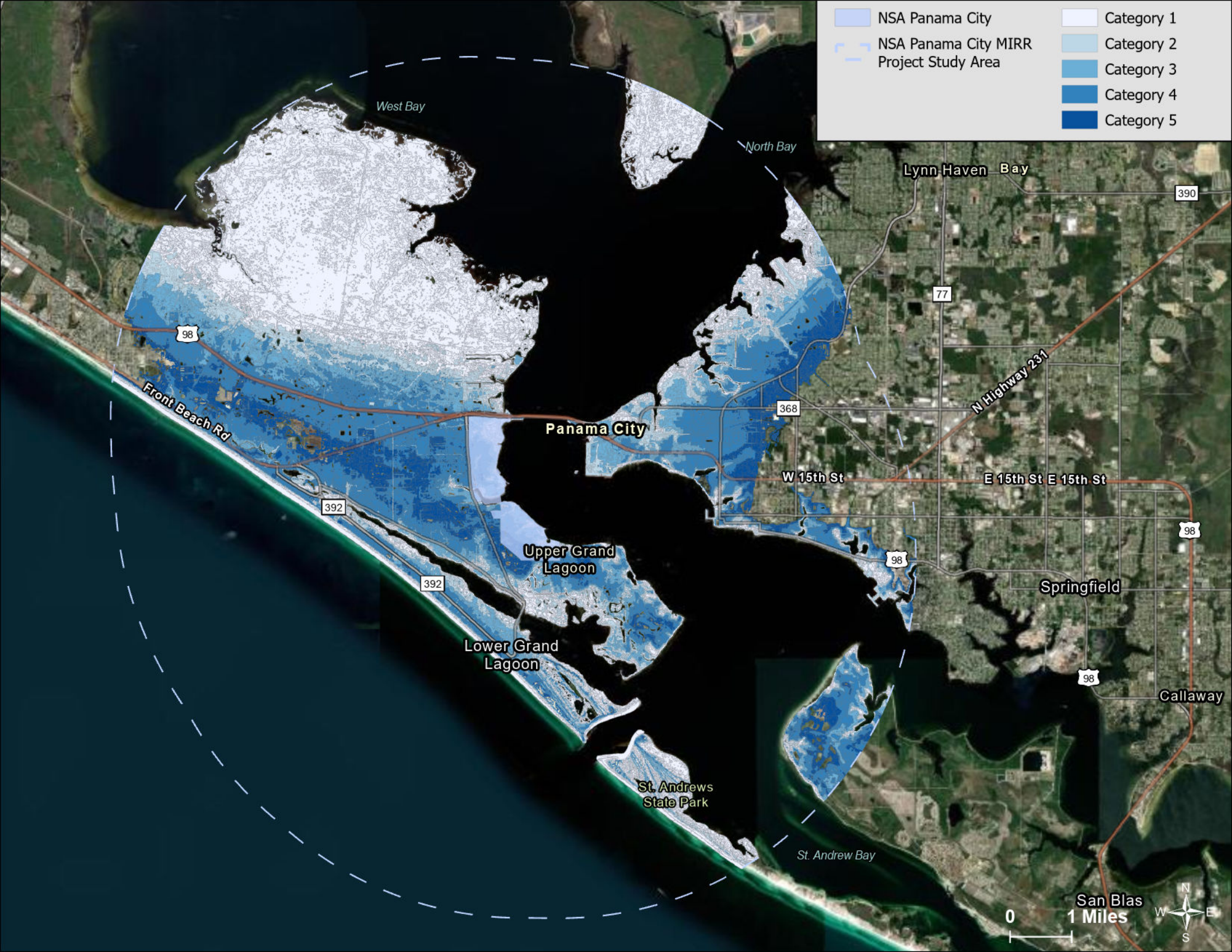
EMERALD COAST MILITARY INSTALLATION RESILIENCY REVIEW

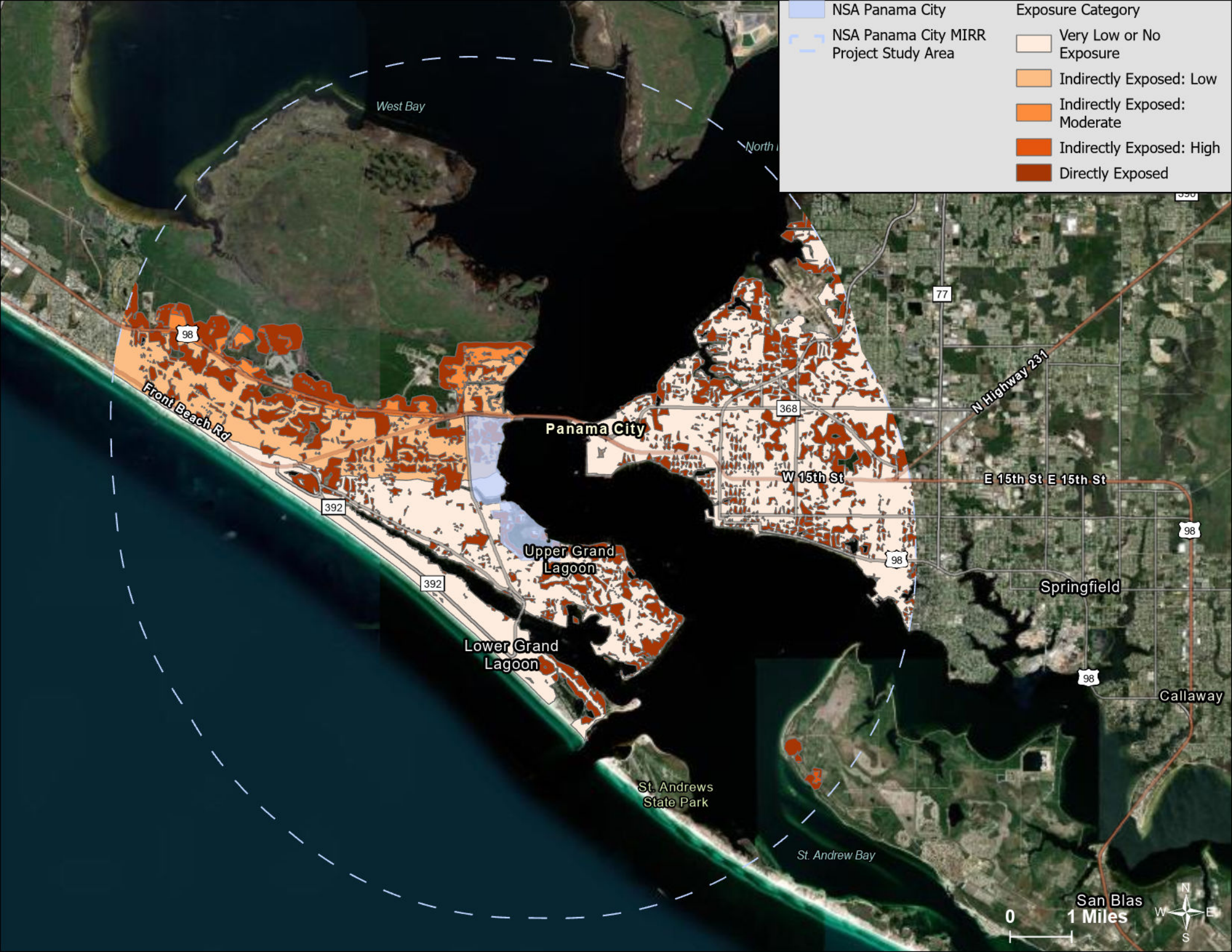
NSA Panama City Combined Hazard Exposure

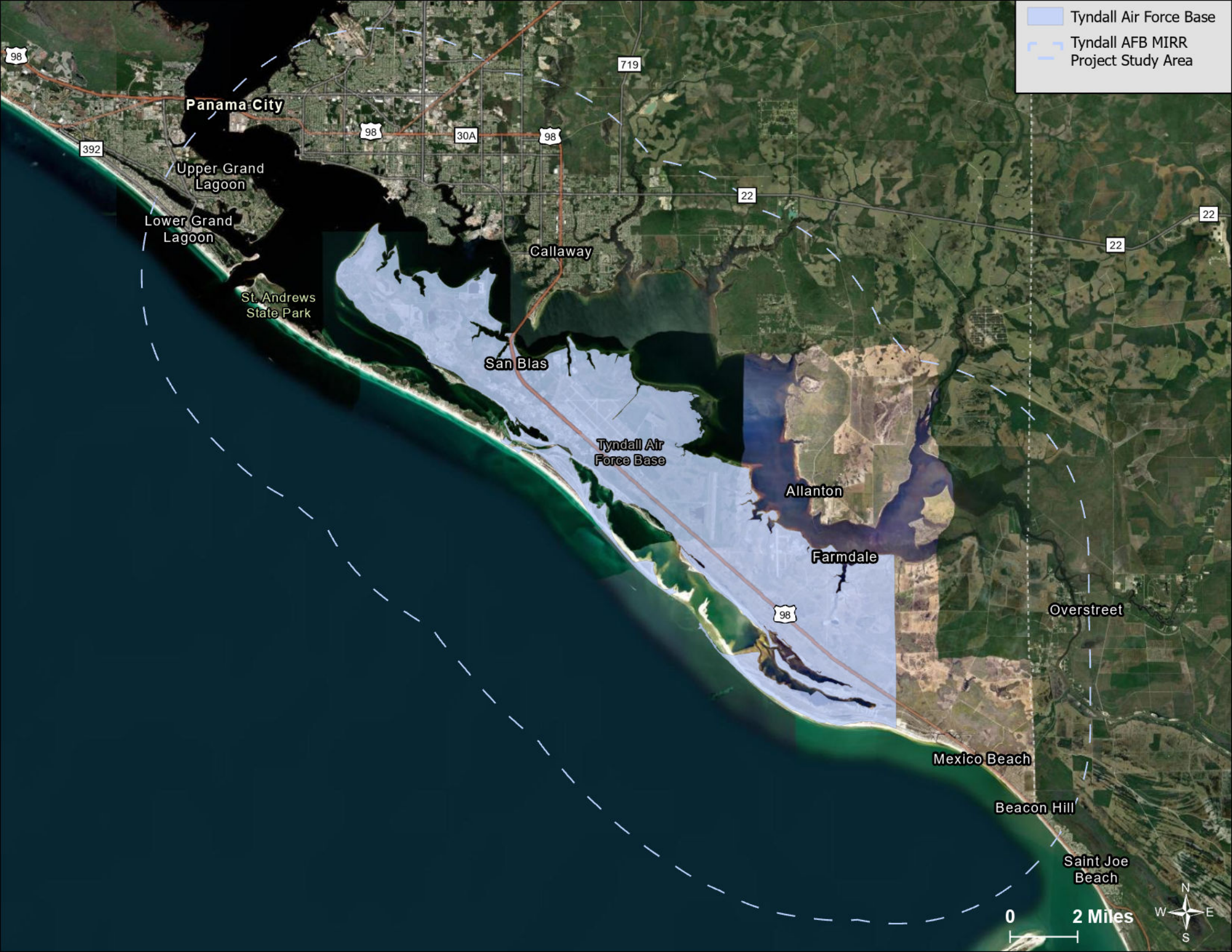
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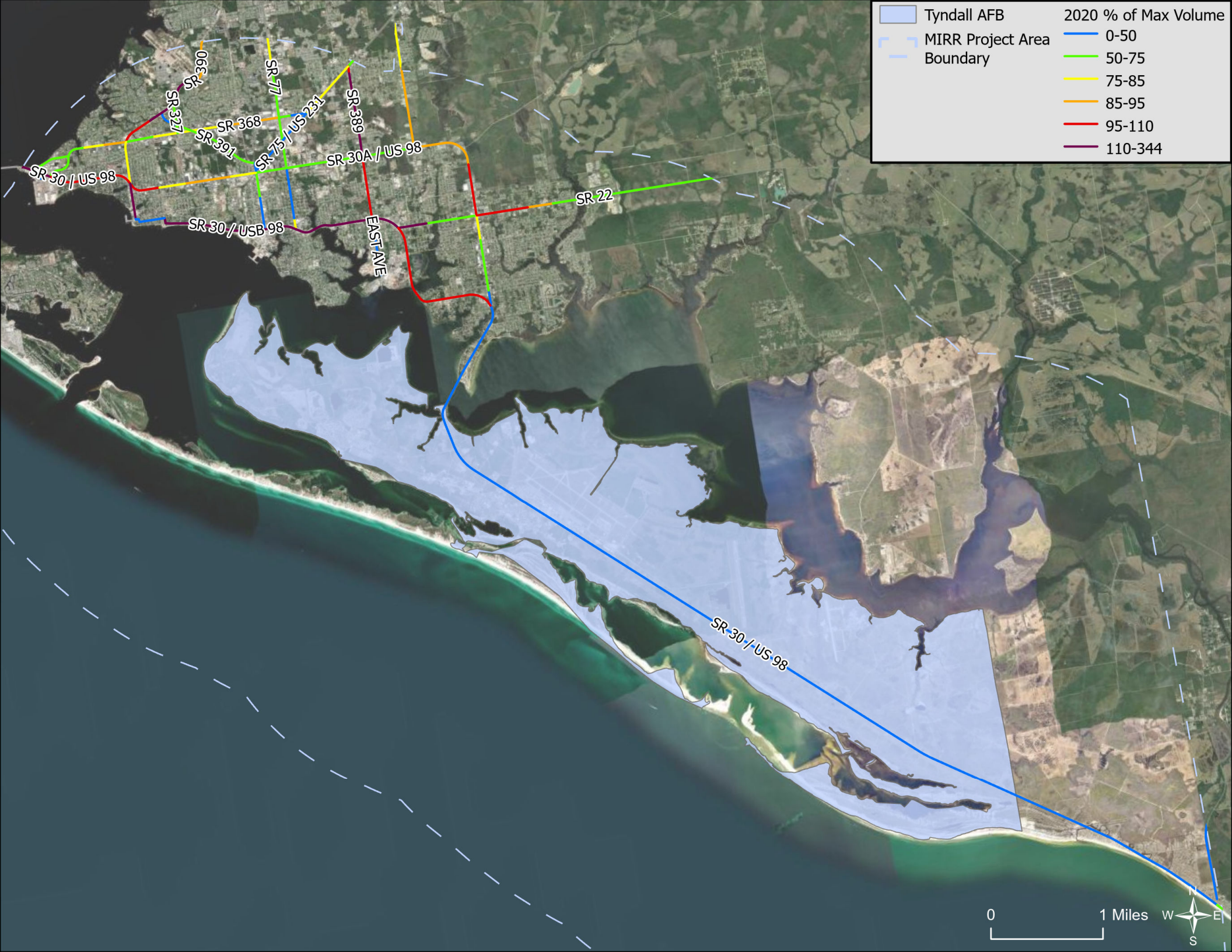

NSA Panama City
NSA Panama City MIRR Project Study Area
100-Year Floodplain
500-Year Floodplain
West Bay
North Bay
Lynn Haven
Bay
390
77
98
Front Beach Rd
368
Panama City
N Highway 231
W 15th St
E 15th St
E 15th St
392
Upper Grand Lagoon
Springfield
Lower Grand Lagoon
Watson Bayou
Parker
St. Andrews State Park
St. Andrew Bay
0
1 Miles
N
W
E
S

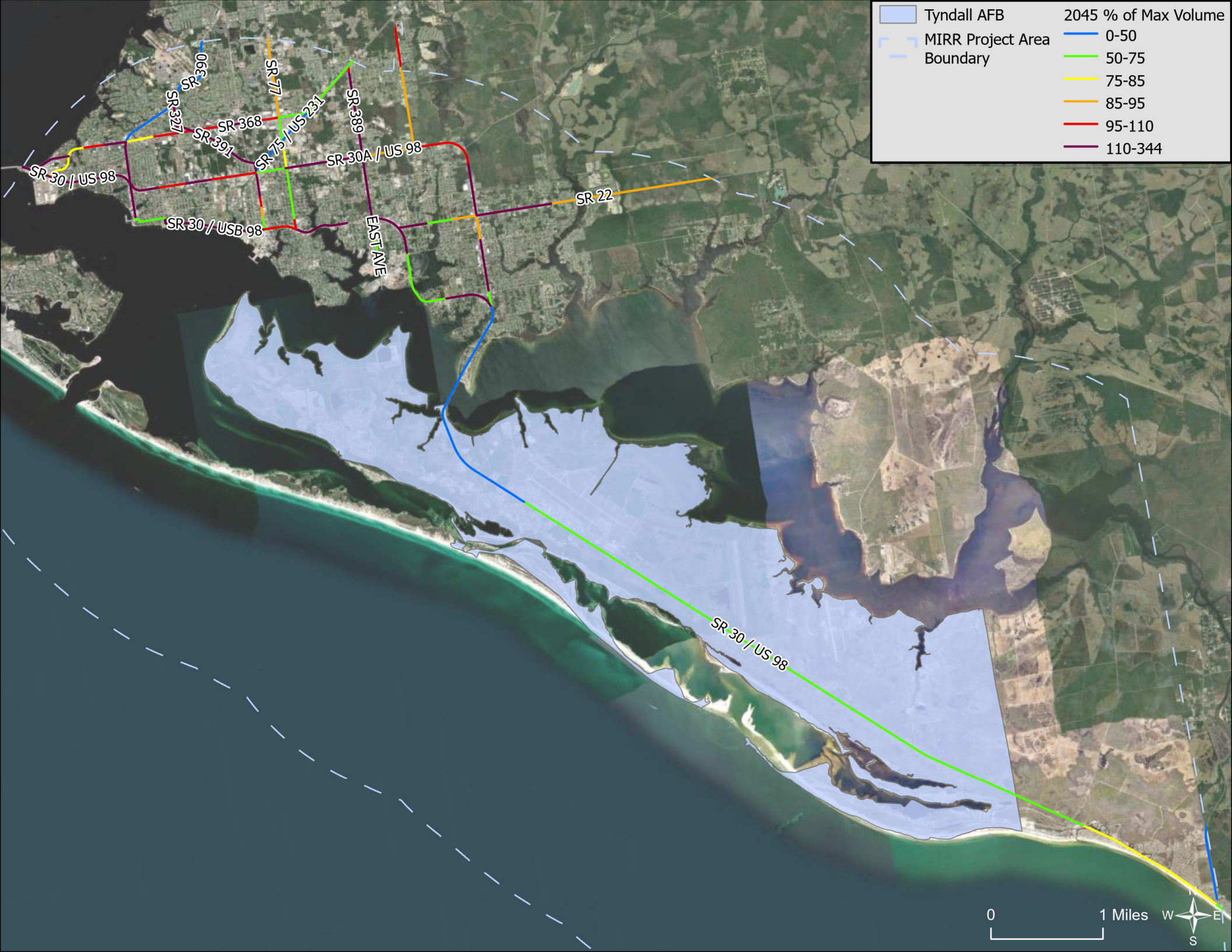

NSA Panama City
NSA Panama City MIRR Project Study Area
2040 Low
2040 High
2070 Low
2070 High
West Bay
North Bay
Lynn Haven Bay
390
77
98
Front Beach Rd
N Highway 231
368
Panama City
W 15th St
E 15th St E 15th St
392
Upper Grand Lagoon
98
Springfield
392
Lower Grand Lagoon
98
Callaway
St. Andrews State Park
St. Andrew Bay
San Blas
0
1 Miles
N
W
E
S

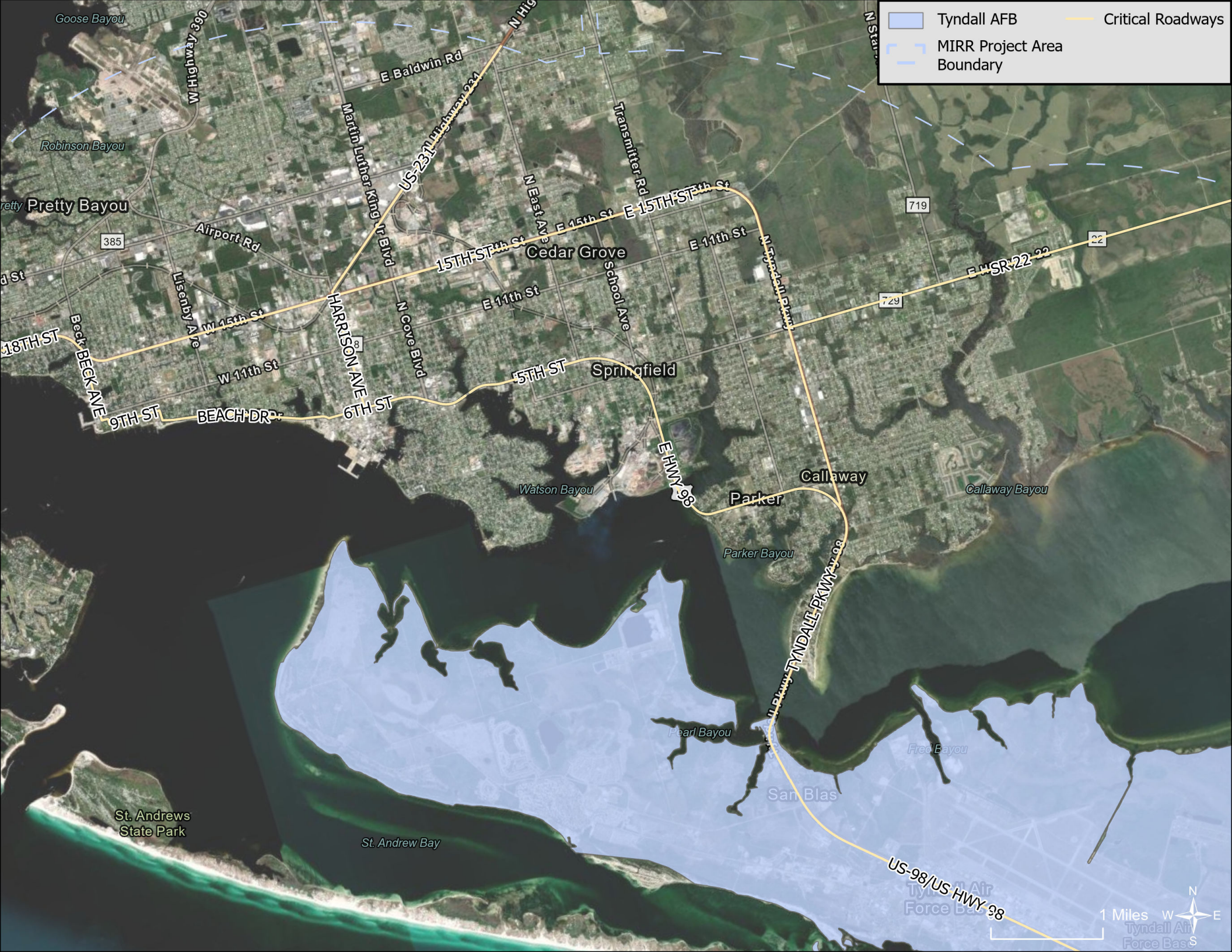

NSA Panama City
NSA Panama City MIRR Project Study Area
Category 1
Category 2
Category 3
Category 4
Category 5
West Bay
North Bay
Lynn Haven Bay
Panama City
Front Beach Rd
N Highway 231
W 15th St
E 15th St
E 15th St
Upper Grand Lagoon
Lower Grand Lagoon
Springfield
Callaway
St. Andrews State Park
St. Andrew Bay
San Blas
98
392
368
77
390
0
1 Miles
N
S
E
W

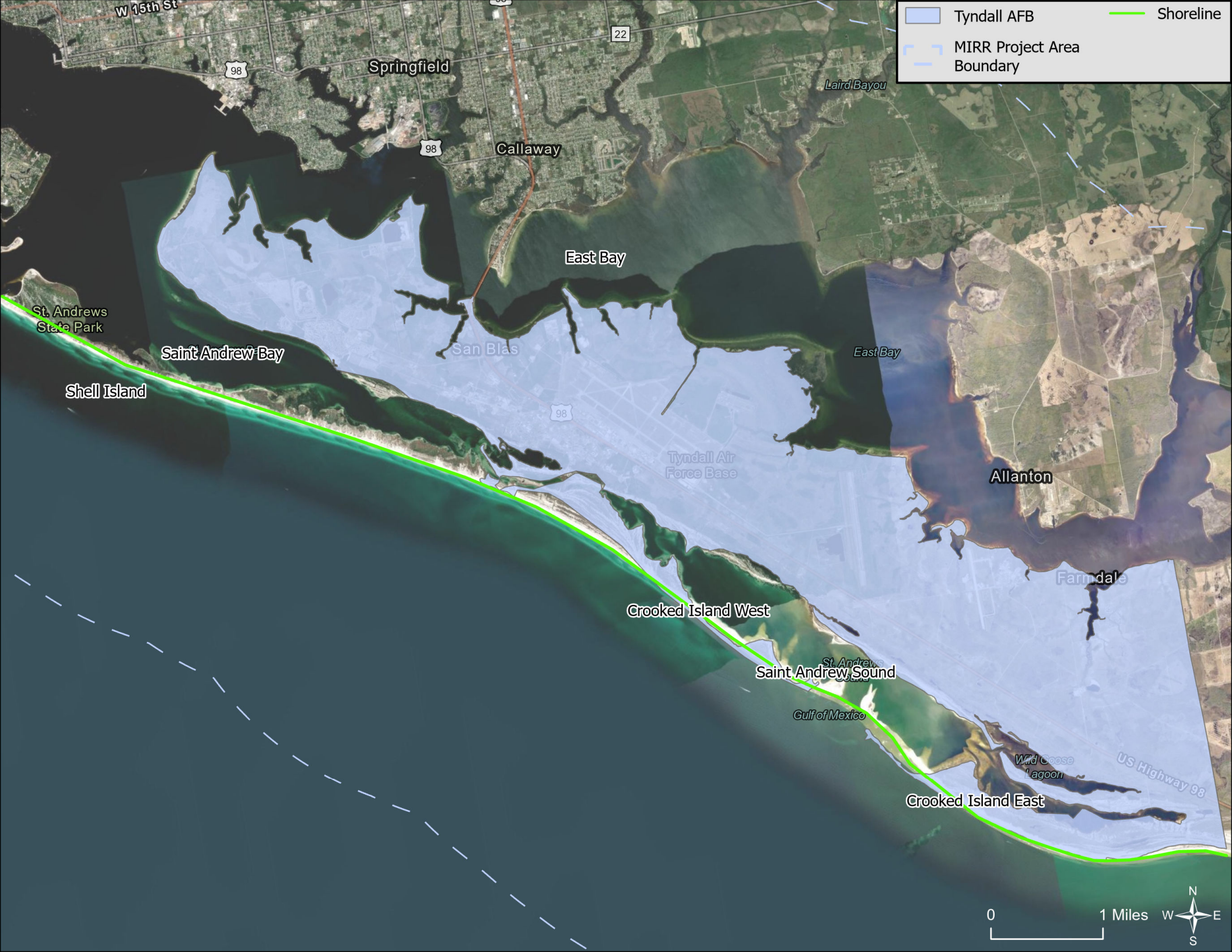

NSA Panama City
NSA Panama City MIRR Project Study Area
Exposure Category
Very Low or No Exposure
Indirectly Exposed: Low
Indirectly Exposed: Moderate
Indirectly Exposed: High
Directly Exposed
West Bay
North
Front Beach Rd
98
392
368
77
N Highway 231
Panama City
W 15th St
E 15th St
E 15th St
Upper Grand Lagoon
Lower Grand Lagoon
Springfield
Callaway
St. Andrews State Park
St. Andrew Bay
San Blas
0
1 Miles
N
S
E
W

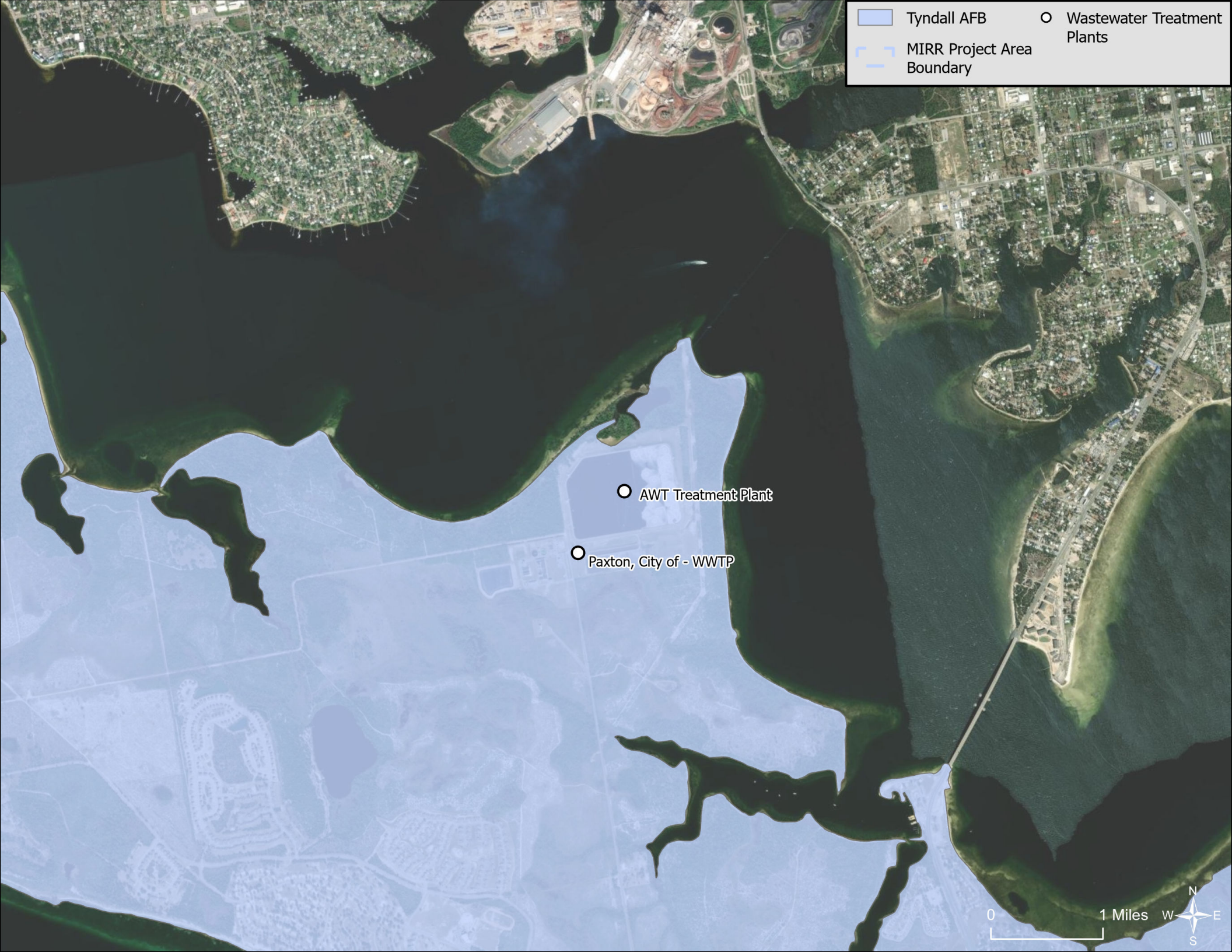

Tyndall Air Force Base
Tyndall AFB MIRR Project Study Area
Panama City
Upper Grand Lagoon
Lower Grand Lagoon
St. Andrews State Park
Callaway
San Blas
Tyndall Air Force Base
Allanton
Farmdale
Overstreet
Mexico Beach
Beacon Hill
Saint Joe Beach
98
719
30A
392
22
0
2 Miles
N
W
E
S

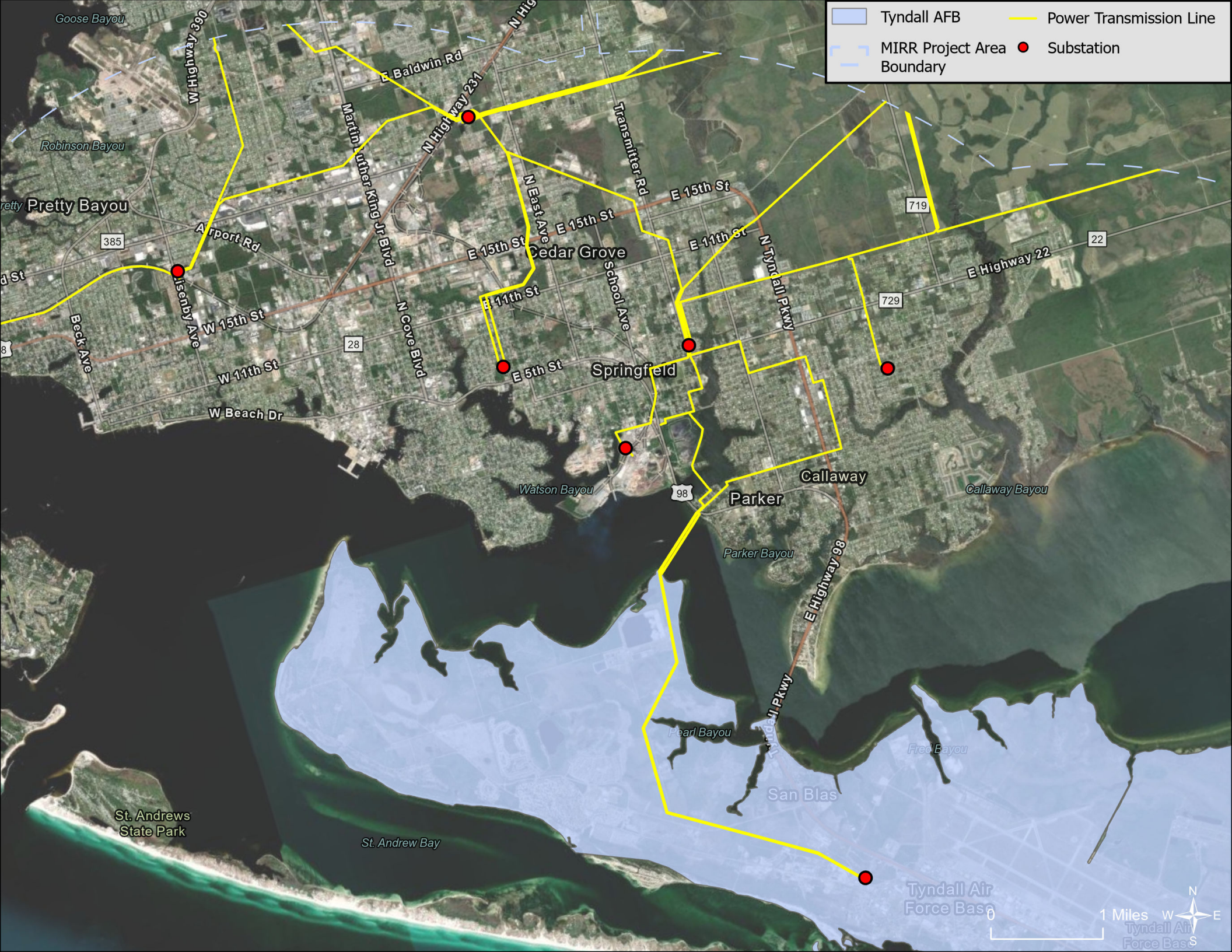

Tyndall AFB
MIRR Project Area Boundary
2020 % of Max Volume
0-50
50-75
75-85
85-95
95-110
110-344
SR 30 / US 98
SR 327
SR 368
SR 391
SR 77
SR 75 / US 231
SR 389
SR 30A / US 98
SR 22
SR 30 / USB 98
EAST AVE
SR 30 / US 98
0
1 Miles
N
W
E
S

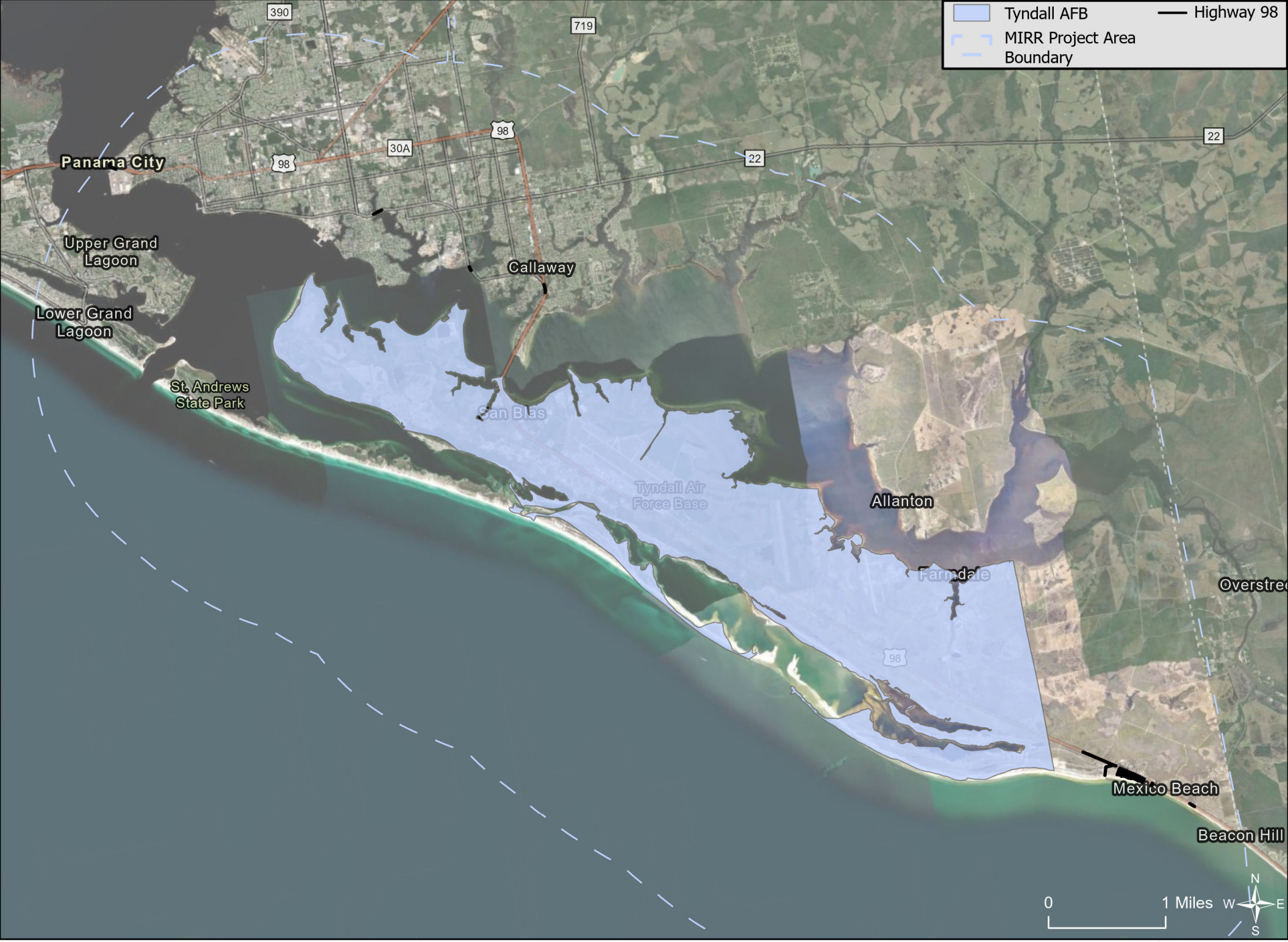

Tyndall AFB
MIRR Project Area Boundary
2045 % of Max Volume
0-50
50-75
75-85
85-95
95-110
110-344
SR 30 / US 98
SR 30 / USB 98
SR 30A / US 98
SR 22
SR 368
SR 391
SR 75 / US 231
SR 77
SR 389
SR 327
SR 390
EAST AVE
0
1 Miles
N
W
E
S


Tyndall AFB
Critical Roadways
MIRR Project Area Boundary
Goose Bayou
W Highway 390
E Baldwin Rd
N Highway 231
Martin Luther King Jr Blvd
US-231
Transmitter Rd
Robinson Bayou
Pretty Bayou
385
Airport Rd
N East Ave
E 15th St
E 15TH ST
15TH ST
Cedar Grove
E 11th St
719
N Tyndall Pkwy
SR-22
22
729
Lisenby Ave
W 15th St
HARRISON AVE
N Cove Blvd
School Ave
E 11th St
18TH ST
Beck
BECK AVE
W 11th St
9TH ST
BEACH DR
6TH ST
5TH ST
Springfield
E HWY 98
Watson Bayou
Parker
Callaway
Callaway Bayou
Parker Bayou
TYNDALL PKWY
Pearl Bayou
Fred Bayou
San Blas
St. Andrews State Park
St. Andrew Bay
US-98/US HWY 98
Tyndall Air Force Base
1 Miles
N
W
E
S


Tyndall AFB
Shoreline
MIRR Project Area Boundary
W 15th St
Springfield
22
98
Callaway
Laird Bayou
East Bay
St. Andrews State Park
Saint Andrew Bay
Shell Island
San Blas
East Bay
98
Tyndall Air Force Base
Allanton
Farmdale
Crooked Island West
St. Andrews Sound
Gulf of Mexico
Wild Goose Lagoon
US Highway 98
Crooked Island East
0
1 Miles
N
W
E
S


Tyndall AFB
MIRR Project Area Boundary
Wastewater Treatment Plants
AWT Treatment Plant
Paxton, City of - WWTP
0
1 Miles
N
W
E
S

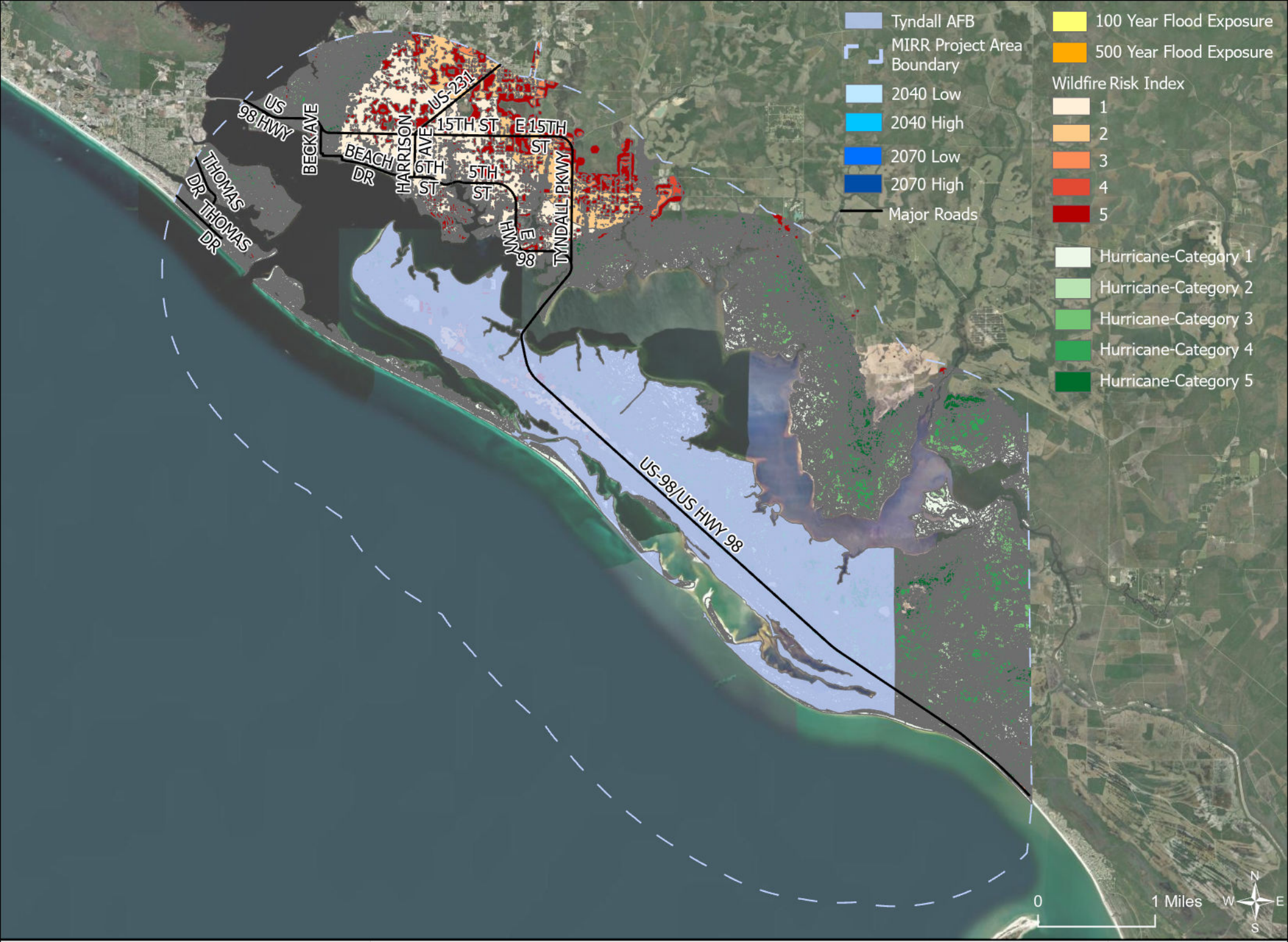

Tyndall AFB
MIRR Project Area Boundary
Power Transmission Line
Substation
Goose Bayou
W Highway 390
E Baldwin Rd
N Highway 231
Martin Luther King Jr Blvd
Transmitter Rd
Robinson Bayou
Pretty Bayou
385
Airport Rd
E 15th St
Cedar Grove
N East Ave
School Ave
E 11th St
719
22
E Highway 22
N Tyndall Pkwy
729
Beck Ave
Eisenby Ave
W 15th St
W 11th St
28
N Cove Blvd
E 5th St
Springfield
W Beach Dr
Watson Bayou
98
Parker
Callaway
Callaway Bayou
Parker Bayou
E Highway 98
Pearl Bayou
Fred Bayou
San Blas
St. Andrews State Park
St. Andrew Bay
Tyndall Air Force Base
0
1 Miles
N
W
E
S



Tyndall AFB High Risk Assets

EMERALD COAST MILITARY INSTALLATION RESILIENCY REVIEW

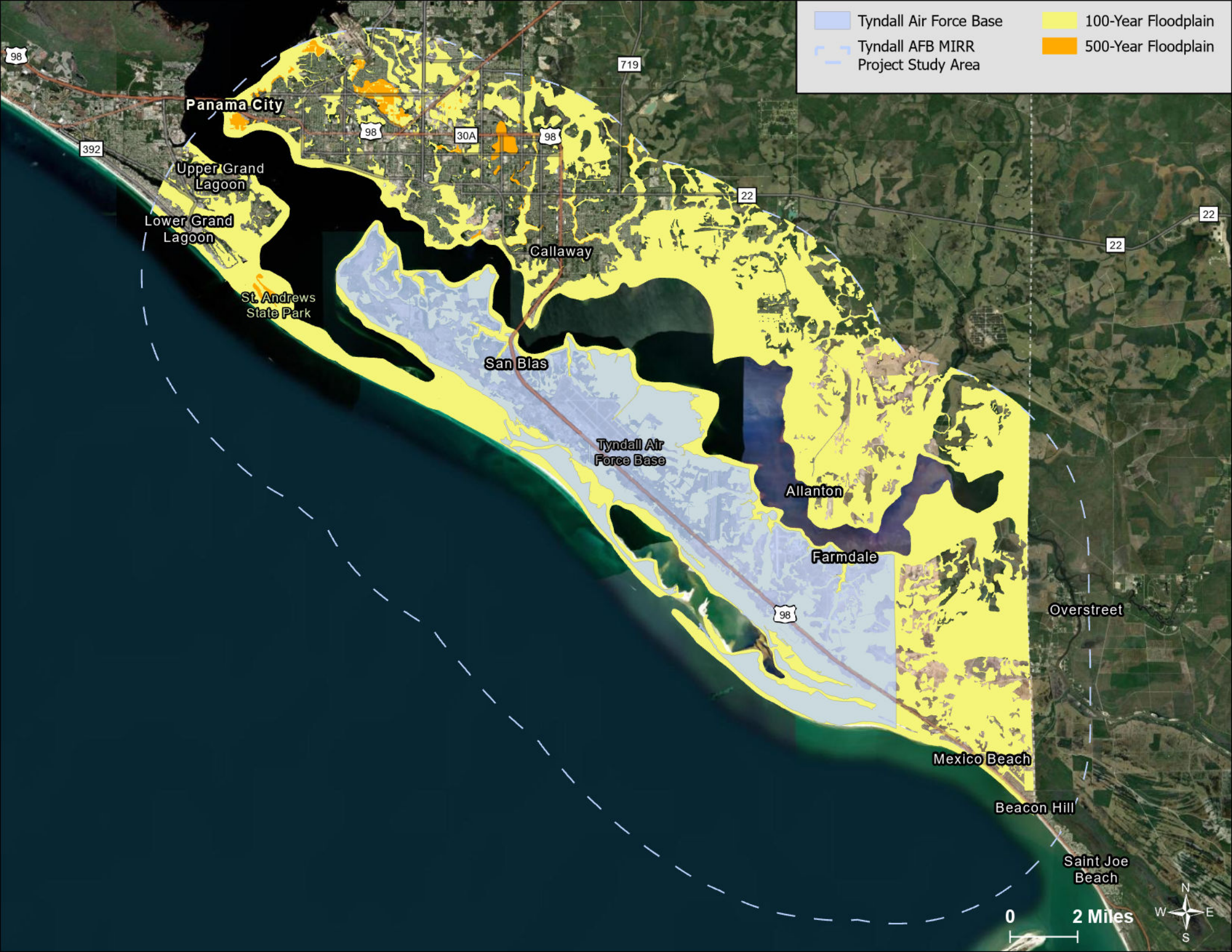
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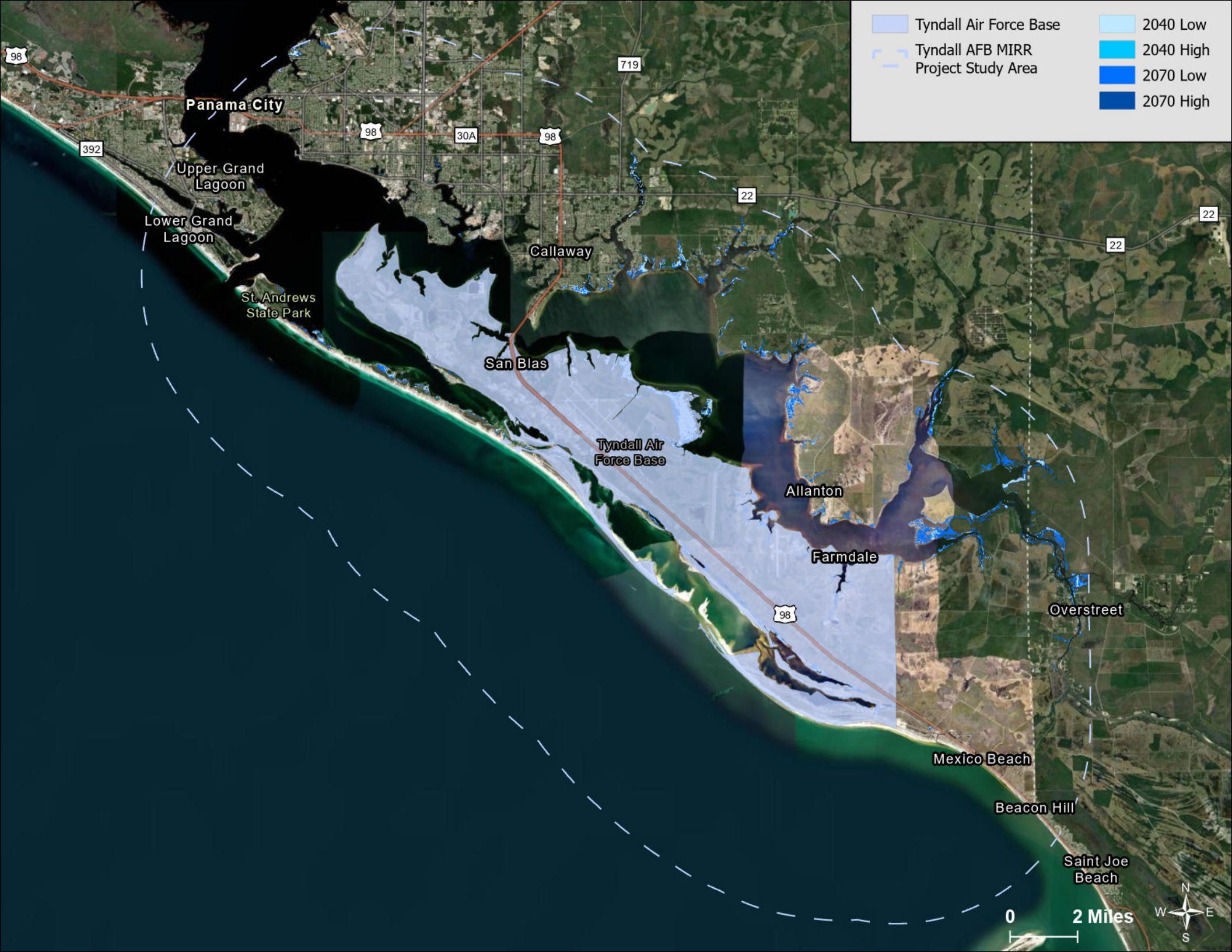


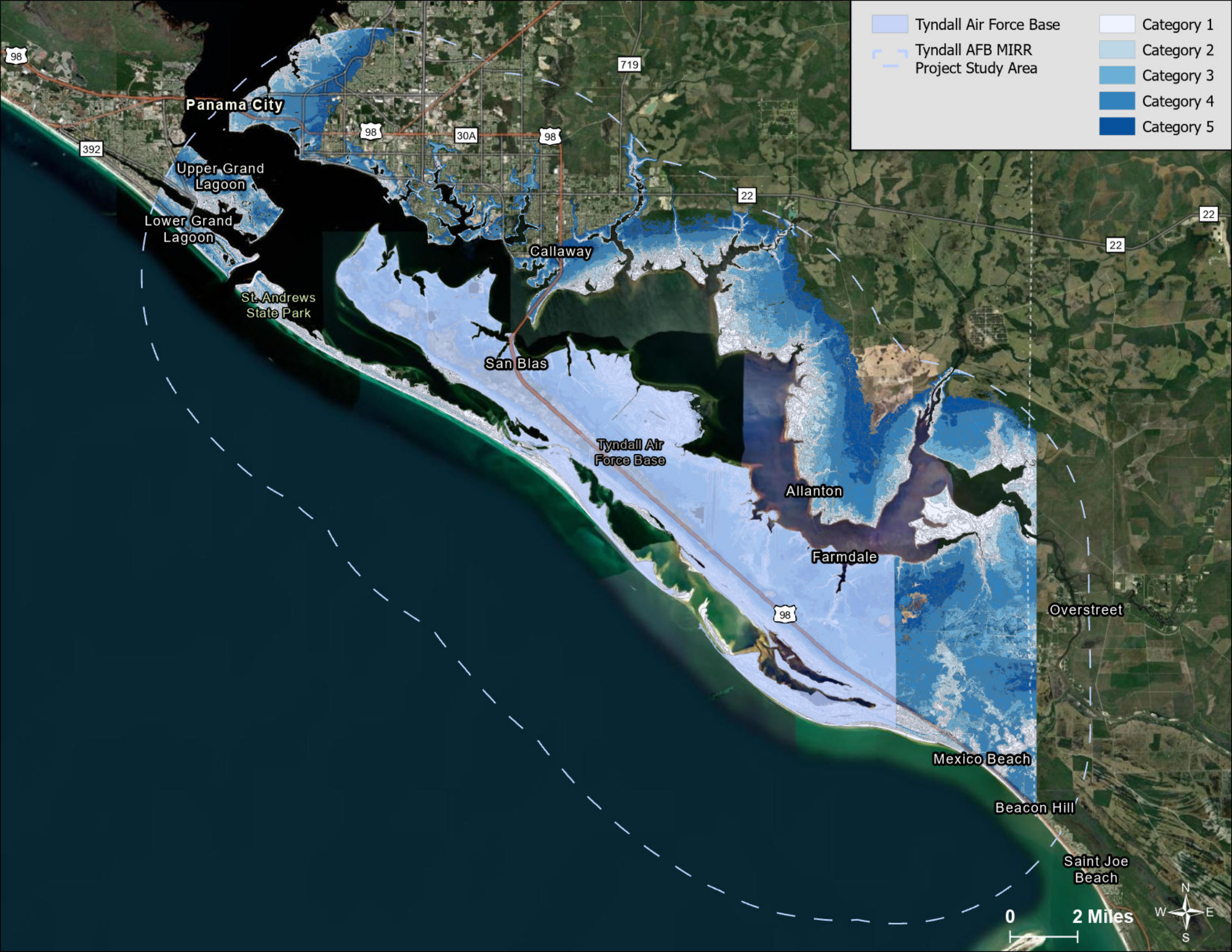
EMERALD COAST MILITARY INSTALLATION RESILIENCY REVIEW

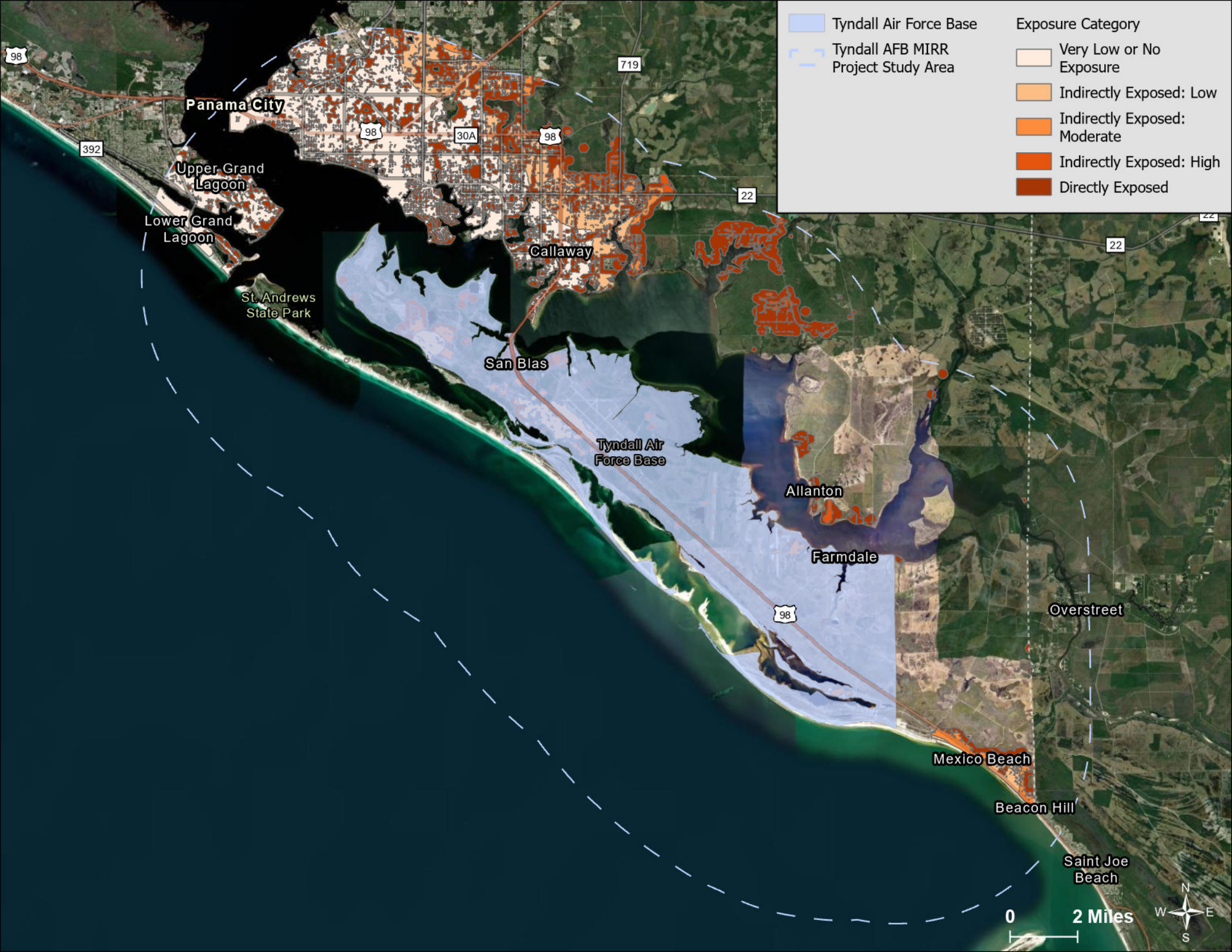
Tyndall AFB Combined Hazard Exposure

Jacobs


Tyndall Air Force Base
Tyndall AFB MIRR Project Study Area
100-Year Floodplain
500-Year Floodplain
Panama City
Upper Grand Lagoon
Lower Grand Lagoon
St. Andrews State Park
Callaway
San Blas
Tyndall Air Force Base
Allanton
Farmdale
Overstreet
Mexico Beach
Beacon Hill
Saint Joe Beach
98
719
30A
22
392
0
2 Miles
N
W
E
S


Tyndall Air Force Base
Tyndall AFB MIRR Project Study Area
2040 Low
2040 High
2070 Low
2070 High
Panama City
Upper Grand Lagoon
Lower Grand Lagoon
St. Andrews State Park
Callaway
San Blas
Tyndall Air Force Base
Allanton
Farmdale
Overstreet
Mexico Beach
Beacon Hill
Saint Joe Beach
98
719
30A
392
22
0
2 Miles
N
W
E
S


Tyndall Air Force Base
Tyndall AFB MIRR Project Study Area
Category 1
Category 2
Category 3
Category 4
Category 5
Panama City
Upper Grand Lagoon
Lower Grand Lagoon
St. Andrews State Park
Callaway
San Blas
Tyndall Air Force Base
Allanton
Farmdale
Overstreet
Mexico Beach
Beacon Hill
Saint Joe Beach
98
719
30A
392
22
0
2 Miles
N
W
E
S


Tyndall Air Force Base
Tyndall AFB MIRR Project Study Area
Exposure Category
Very Low or No Exposure
Indirectly Exposed: Low
Indirectly Exposed: Moderate
Indirectly Exposed: High
Directly Exposed
Panama City
Upper Grand Lagoon
Lower Grand Lagoon
St. Andrews State Park
Callaway
San Blas
Tyndall Air Force Base
Allanton
Farmdale
Overstreet
Mexico Beach
Beacon Hill
Saint Joe Beach
98
719
392
30A
22
0
2 Miles
N
W
E
S

APPENDIX D

Funding Options



Naval Air Station Pensacola

	Funding Program Name	Funding Agency	Description	Stakeholders and Special Consideration	Total Funding Available (millions)	Maximum Grant Award (millions)	Local Cost Share/Match Requirements	Submission Deadline	Eligible Activities			
									Planning	Env. & Final Design	Construction	Ops. & Maint.
Stormwater, Water, and Wastewater	**Clean Water and Drinking Water State Revolving Fund (SRF)**	Florida Department of Environmental Protection (FDEP)	- The Clean Water SRF provides low-interest loans to local governments to plan, design, and build or upgrade wastewater, stormwater, and nonpoint source pollution prevention projects. - The Drinking Water SRF provides low-interest loans to local governments and private utilities to plan, design, and build or upgrade drinking water systems and for source water development.	Wastewater and Drinking Water system owner would need to work with FDEP for financing	- FDEP receives $60.5 million per year in Clean Water SRF funding. - FDEP receives $70.6 million per year in Drinking Water SRF funding.		- maximum Federal share is 80% - projects benefiting a small, disadvantaged communities that serves a population less than 10,000 and whose household income is below the State of Florida average may qualify for principal forgiveness.	- Rolling application cycle - first step is to send FDEP a "Request for Inclusion"			✓	
	Building Resilient Infrastructure and Communities (BRIC)	FEMA	- Mitigation Projects: Projects designed to increase resilience and public safety; reduce injuries and loss of life; and reduce damage and destruction to property, critical services, facilities, and infrastructure. (BRIC)	Florida Division of Emergency Management (FDEM)	FY2024 not available. For reference, '$1 billion available during FY2023 national competition funding opportunity	$50 million maximum Federal share	-25% non-Federal cost share - N10Economically disadvantaged communities eligible for up to 10% non-Federal cost-share	FY2024 round likely to open Late Summer 2024. - FY2023 NOT by Aug 31, 2023 and sub applications to FDEM due on December 4, 2023.	✓	✓	✓	
	Defense Community Infrastructure Program (DCIP)	Office of Local Defense Community Cooperation (OLDCC) - Department of Defense (DoD)	- The DCIP Program is designed to address deficiencies in community infrastructure, supportive of a military installation, in order to enhance military value, installation resilience, and military family quality of life. support a military installation; - are owned by a state or local government or a not-for-profit, member-owned utility service; - that will enhance military value, military installation resilience and/or military family quality of life at the supported military installation	- Eligible community infrastructure projects are any complete and useable transportation project; community support facilities (e.g., school, hospital, police, fire, emergency response, or other community support facility); and utility infrastructure projects [e.g., water, waste-water, telecommunications, electric, gas, or other utility infrastructure (with necessary cyber safeguards)] that: - are located off of a military installation;	- $100 million is available in FY2024 funding opportunity.	- $20 million is maximum award	- at least 30% non-Federal cost-share. - Projects located in rural areas (areas with populations of less than 100,000) or projects determined to be "advantageous for reasons related to national security" with a signed statement from a Military Department Secretary are eligible to receive full Federal funding.	- FY2024 funding opportunity applications are due June 17, 2024. - FY2025 funding opportunity likely to open in Spring 2025			✓	

Naval Air Station Pensacola

	Funding Program Name	Funding Agency	Description	Stakeholders and Special Consideration	Total Funding Available (millions)	Maximum Grant Award (millions)	Local Cost Share/Match Requirements	Submission Deadline	Eligible Activities			
									Planning	Env. & Final Design	Construction	Ops. & Maint.
Airport	**FAA - Facilities and Equipment Funding**	U.S. Department of Transportation (USDOT) - FAA	• Contact FAA Regional Office to initiate ATCT reconstruction funding process								✓	
	Airport Terminals Program	U.S. Department of Transportation (USDOT) - FAA	• Funds airport terminal development projects, on-airport rail access projects, and airport-owned airport traffic control towers.	• This competitive grant program will fund airport-owned air traffic control towers.	$1 billion is available in FY2025 funding opportunity.	N/A	• 95% Federal cost-share for small hub, nonhub, and nonprimary airports. 80% Federal cost-share for large and medium hub airports.	• FY2024 funding opportunity closed October 2023. • FY2025 funding opportunity likely to open Summer 2024.				
Environmental	**Transformational Habitat Restoration and Coastal Resilience**	NOAA	- Funds habitat restoration actions that rebuild productive and sustainable fisheries, contribute to the recovery and conservation of threatened and endangered species, use natural infrastructure to reduce damage from flooding and storms, promote resilient ecosystems and communities, and yield socioeconomic benefits. (NOAA)		FY2024 Not Available. For reference, $240 million in FY2023	FY2024 Not Available. For reference,: $25 million in FY2023	No cost-share required, but encouraged	FY2024 NOFO likely to open Summer 2024. -For reference, FY2023 NOFO released on August 15, 2023 and applications due November 17, 2023.	✓	✓	✓	
	Section 103 CAP - Hurricane and Storm Damage Reduction Projects	U.S. Army Corps of Engineers (USACE)	- Funds study, design, and construction activities for small coastal storm damage reduction projects in partnership between USACE and non-Federal entities.		$500,000 is available in FY2024	$10 million	35% non-Federal cost-share	- Rolling basis, contact local USACE District				
	Section 205 CAP - Flood Damage Reduction	U.S. Army Corps of Engineers (USACE)	- Funds study, design, and construction activities for small flood control projects in partnership between USACE and non-Federal entities.		$12 million is available in FY2024	$10 million	35% non-Federal cost-share	- Rolling basis, contact local USACE District			✓	
	REPI Challenge	DoD-REPI	Funds land conservation, improvement, or management activities that limit incompatible development in the vicinity of DoD installations and ranges; enhance military installation resilience to climate change or extreme weather events; or relieve current or anticipated environmental restrictions in support of key mission capabilities of strategic importance.	Eligible entities include States, local governments Tribes, non-governmental organization, or private entities.	$30 million available for FY2025 funding opportunity.		50% non-Federal cost-share	FY2025 funding opportunity: Pre-proposals due June 10, 2024; Full proposals due August 12, 2024.				

Naval Air Station Pensacola

	Funding Program Name	Funding Agency	Description	Stakeholders and Special Consideration	Total Funding Available (millions)	Maximum Grant Award (millions)	Local Cost Share/Match Requirements	Submission Deadline	Eligible Activities			
									Planning	Env. & Final Design	Construction	Ops. & Maint.
	National Coastal Resilience Fund (NCRF)	National Fish and Wildlife Federation (NFWF)	- Restoration and Monitoring: Projects that protect and enhance resilience of natural systems and help mitigate the impacts of future storms and other natural-hazard events and threats on key local community assets (such as emergency services, infrastructure, and centers of economic activity), and drive the expected benefit to fish and wildlife.	- $15 million in DoD set-aside funding is available for coastal resilience projects that benefit military installations. In the proposal narrative, applicants will be asked to provide additional information to clearly describe the coastal hazards that threaten the military mission, the nature-based solution proposed to address those threats, and how the project will maintain and improve military resilience and directly benefit defense mission capabilities of the DoD installation or range the project is associated with. Coordinating with the local DoD installation before applying is strongly encouraged.	-$140 million in FY2024	- Up to $10 million for restoration implementation projects	- Non-Federal match is not required, but is encouraged to demonstrate broad support for the project.	- Pre-proposals due April 10, 2024. - Full Proposals due July 24, 2024. (by invitation only)			✓	
Community									✓		✓	
Transportation	**PROTECT (Formula and Competitive Discretionary programs)**	FDOT and FHWA	- Provides funding to ensure surface transportation resilience to natural hazards including climate change, sea level rise, flooding, extreme weather events, and other natural disasters through support of planning activities, resilience improvements, community resilience and evacuation routes, and at-risk coastal infrastructure. (PROTECT)	FDOT receives approximately $70 million in annual PROTECT formula funding.	FY2024 not available. For reference, '$848 million available in combined FY2022 and FY2023 funding opportunity	$500,000 minimum award size, no maximum award set.	20% non-Federal cost share	FY2024 funding opportunity likely to open Summer 2024 '- For reference, applications due August 18, 2023 for FY2023. .	✓	✓	✓	

Naval Air Station Pensacola

	Funding Program Name	Funding Agency	Description	Stakeholders and Special Consideration	Total Funding Available (millions)	Maximum Grant Award (millions)	Local Cost Share/Match Requirements	Submission Deadline	Eligible Activities			
									Planning	Env. & Final Design	Construction	Ops. & Maint.
	Defense Community Infrastructure Program (DCIP)	Office of Local Defense Community Cooperation (OLDCC) - Department of Defense (DoD)	- The DCIP Program is designed to address deficiencies in community infrastructure, supportive of a military installation, in order to enhance military value, installation resilience, and military family quality of life. support a military installation; - are owned by a state or local government or a not-for-profit, member-owned utility service; - that will enhance military value, military installation resilience and/or military family quality of life at the supported military installation	- Eligible community infrastructure projects are any complete and useable transportation project; community support facilities (e.g., school, hospital, police, fire, emergency response, or other community support facility); and utility infrastructure projects [e.g., water, waste-water, telecommunications, electric, gas, or other utility infrastructure (with necessary cyber safeguards)] that: - are located off of a military installation;	- $100 million is available in FY2024 funding opportunity.	- $20 million is maximum award	- at least 30% non-Federal cost-share. - Projects located in rural areas (areas with populations of less than 100,000) or projects determined to be "advantageous for reasons related to national security" with a signed statement from a Military Department Secretary are eligible to receive full Federal funding.	- FY2024 funding opportunity applications are due June 17, 2024. - FY2025 funding opportunity likely to open in Spring 2025			✓	
	Defense Access Roads	FHWA and Military Surface Deployment and Distribution Command [SDDC]	**Supplemental expansion and operation funds**: Provides funding to ensure highway improvements required to support highway service to defense and defense-related installations. The need for these improvements may arise in connection with the establishment, expansion, or operation of defense installations that create an unanticipated impact on the long-range requirements for the development of highways in the vicinity. The primary purpose of the funding is for highway improvements necessary for the functioning of the installation so that the defense installation does not burden the existing highway.	The local military installation identifies the access or mobility needs and brings these deficiencies to the attention of the SDDC, who reviews the requirement and makes a preliminary eligibility determination. State and local stakeholders will need to coordinate with the installations to identify the required funding to support roadway improvements and repairs	Averages $20 million a year in congressional appropriations for specific projects	SDDC and FHWA have to determine eligibility, design, and cost-estimates before requesting funding.	Local communities should connect with their installation and have the installation commander begin the process internally of requesting funding.	Rolling basis		✓	✓	
	Florida DOT Five Year Work Program	Florida DOT	• Florida DOT receives approximately $2.6 billion per year in Federal-Aid Highway Program funding from the U.S. DOT under IIJA.	• Contact FDOT Regional Office to discuss funding this priority project.								

Naval Air Station Pensacola

	Funding Program Name	Funding Agency	Description	Stakeholders and Special Consideration	Total Funding Available (millions)	Maximum Grant Award (millions)	Local Cost Share/Match Requirements	Submission Deadline	Eligible Activities			
									Planning	Env. & Final Design	Construction	Ops. & Maint.
	Safe Streets and Roads for All (SS4A) Program	U.S. Department of Transportation (USDOT)	- Funds the development of a comprehensive safety action plan to address roadway safety issues and implementation of projects identified in the Action Plan.	Local metropolitan planning organization	- $1.2 billion in FY2024 funding opportunity	- $100,000 to $10 million for planning and demonstration grants. - $2.5 million to $25 million for implementation grants	- at least 20% non-Federal cost share	- FY2024 funding opportunity applications are due May 16, 2024. - FY2025 funding opportunity likely to open in Spring 2025	✓	✓	✓	✓
	Rebuilding American Infrastructure with Sustainability and Equity (RAISE) Program	U.S. Department of Transportation (USDOT)	- Funds a wide range of critical freight and passenger transportation infrastructure projects with priority to projects that support safety, environmental sustainability, mobility and community connectivity, and quality of life.	FDOT, Eglin AFB	- $1.5 billion in FY2024 funding opportunity	- $5 million to $25 million	- at least 20% non-Federal cost share	- FY2024 funding opportunity closed February 28, 2024. - FY2025 applications due January 13, 2025	✓	✓	✓	

Naval Air Station Whiting Field

	Funding Program Name	Funding Agency	Description	Stakeholders and Special Consideration	Total Funding Available (millions)	Maximum Grant Award (millions)	Local Cost Share/Match Requirements	Submission Deadline	Eligible Activities			
									Planning	Env. & Final Design	Construction	Ops. & Maint.
Stormwater, Water, and Wastewater	**Building Resilient Infrastructure and Communities (BRIC)**	FEMA	- Mitigation Projects: Projects designed to increase resilience and public safety; reduce injuries and loss of life; and reduce damage and destruction to property, critical services, facilities, and infrastructure. (BRIC)	Florida Division of Emergency Management (FDEM)	$1 billion in FY2023 national competition funding opportunity	$50 million maximum Federal share	-25% non-Federal cost share - N10Economically disadvantaged communities eligible for up to 10% non-Federal cost-share	- FY2023 NOT by Aug 31, 2023 and sub applications to FDEM due on Dec 4, 2023. - FY2024 round likely to open Late Summer 2024.	✓	✓	✓	
	Section 205 CAP - Flood Damage Reduction	U.S. Army Corps of Engineers (USACE)	- Funds study, design, and construction activities for small flood control projects in partnership between USACE and non-Federal entities.		$12 million is available in FY2024	$10 million	35% non-Federal cost-share	- Rolling basis, contact local USACE District			✓	
	Sewer Overflow and Stormwater Reuse Municipal Grants (OSG) Program	Florida Department of Environmental Protection (FDEP)	• The OSG Program funds the planning, design, and construction of combined sewer overflows (CSOs), sanitary sewer overflows (SSOs), and stormwater management projects.	• U.S. EPA allocates funding by formula to each State for these eligible uses. At least 25% of each State grant must fund projects in financially distressed communities and/or communities with 10,000 or less in population.	• In FY2024, $41 million was made available for the OSG program and Florida received $1.16 million	• N/A	• The Federal share must be at least 55% and the non-Federal share may include in-kind services.	- Rolling application cycle - first step is to send FDEP a "Request for Inclusion"				
	Defense Community Infrastructure Program (DCIP)	Office of Local Defense Community Cooperation (OLDCC) - Department of Defense (DoD)	- The DCIP Program is designed to address deficiencies in community infrastructure, supportive of a military installation, in order to enhance military value, installation resilience, and military family quality of life. support a military installation; - are owned by a state or local government or a not-for-profit, member-owned utility service; - that will enhance military value, military installation resilience and/or military family quality of life at the supported military installation	- Eligible community infrastructure projects are any complete and useable transportation project; community support facilities (e.g., school, hospital, police, fire, emergency response, or other community support facility); and utility infrastructure projects [e.g., water, waste-water, telecommunications, electric, gas, or other utility infrastructure (with necessary cyber safeguards)] that: - are located off of a military installation;	- $100 million is available in FY2024 funding opportunity.	- $20 million is maximum award	- at least 30% non-Federal cost-share. - Projects located in rural areas (areas with populations of less than 100,000) or projects determined to be "advantageous for reasons related to national security" with a signed statement	- FY2024 funding opportunity d applications are due June 17, 2024. - FY2025 funding opportunity likely to open in Spring 20245			✓	
	Clean Water and Drinking Water State Revolving Fund (SRF)	Florida Department of Environmental Protection (FDEP)	- The Clean Water SRF provides low-interest loans to local governments to plan, design, and build or upgrade wastewater, stormwater, and nonpoint source pollution prevention projects. - The Drinking Water SRF provides low-interest loans to local governments and private utilities to plan, design, and build or upgrade drinking water systems and for source water development.	Wastewater and Drinking Water system owner would need to work with FDEP for financing	- FDEP receives $60.5 million per year in Clean Water SRF funding. - FDEP receives $70.6 million per year in Drinking Water SRF funding.		- maximum Federal share is 80% - projects benefiting a small, disadvantaged communities that serves a population less than 10,000 and whose household income is below the State of Florida average may qualify for principal forgiveness.	- Rolling application cycle - first step is to send FDEP a "Request for Inclusion"			✓	

Naval Air Station Whiting Field

	Funding Program Name	Funding Agency	Description	Stakeholders and Special Consideration	Total Funding Available (millions)	Maximum Grant Award (millions)	Local Cost Share/Match Requirements	Submission Deadline	Eligible Activities			
									Planning	Env. & Final Design	Construction	Ops. & Maint.
Energy	**Building Resilient Infrastructure and Communities (BRIC)**	FEMA	- Mitigation Projects: Projects designed to increase resilience and public safety; reduce injuries and loss of life; and reduce damage and destruction to property, critical services, facilities, and infrastructure. (BRIC)	Florida Division of Emergency Management (FDEM)	FY2024 not available. For reference, '$1 billion available during FY2023 national competition funding opportunity	$50 million maximum Federal share	-25% non-Federal cost share - N10Economically disadvantaged communities eligible for up to 10% non-Federal cost-share	FY2024 round likely to open Late Summer 2024. - FY2023 NOT by Aug 31, 2023 and sub applications to FDEM due on December 4, 2023.	✓	✓	✓	
	Defense Community Infrastructure Program (DCIP)	Office of Local Defense Community Cooperation (OLDCC) - Department of Defense (DoD)	- The DCIP Program is designed to address deficiencies in community infrastructure, supportive of a military installation, in order to enhance military value, installation resilience, and military family quality of life. support a military installation; - are owned by a state or local government or a not-for-profit, member-owned utility service; - that will enhance military value, military installation resilience and/or military family quality of life at the supported military installation	- Eligible community infrastructure projects are any complete and useable transportation project; community support facilities (e.g., school, hospital, police, fire, emergency response, or other community support facility); and utility infrastructure projects [e.g., water, waste-water, telecommunications, electric, gas, or other utility infrastructure (with necessary cyber safeguards)] that: - are located off of a military installation;	- $100 million is available in FY2024 funding opportunity.	- $20 million is maximum award	- at least 30% non-Federal cost-share. - Projects located in rural areas (areas with populations of less than 100,000) or projects determined to be "advantageous for reasons related to national security" with a signed statement from a Military Department Secretary are eligible to receive full Federal funding.	- FY2024 funding opportunity d applications are due June 17, 2024. - FY2025 funding opportunity likely to open in Spring 2025			✓	
	Grid Resilience State Formula Grants	Department of Energy (DOE)	- The Grid Resilience program is designed to strengthen and modernize America's power grid against wildfires, extreme weather, and other natural disasters and will provide funding over five years based on a formula to States, territories and Tribes. - States can use grant funding to issue subawards to electric grid operators, electricity storage operators, transmission owners and operators, and distribution providers.	- State of Florida and electric grid operators are recipients of funding	- Florida receives approximately $15 million per year	- N/A	- The eligible entity that receives a subaward is required to match 100% of the amount of the subaward.	- Grant awards are made on a rolling basis as applications are received	✓	✓	✓	
	Grid Resilience and Innovation Partnerships (GRIP) Program	Department of Energy (DOE)	- The GRIP program funds projects across 3 separate programs to enhance grid flexibility and improve the resilience of the power system against extreme weather threats. - The Grid Resilience Utility and Industry Grants support activities that will modernize the electric grid to reduce impacts due to extreme weather and natural disasters.	- Eligible entities include electric grid operators, electricity storage operators, transmission owners and operators, and distribution providers, etc.	- $3.9 billion for FY2024 and 2025	- Funding is capped at the amount the eligible entity has spent in the previous three years on hardening efforts. - There is a small utility set-aside for entities selling no more than 4 million MWh of electricity per year.	- 100% cost-match	- FY2024 concept papers were due January 12, 2024 and full applications due April 17, 2024.	✓	✓	✓	

Naval Air Station Whiting Field

	Funding Program Name	Funding Agency	Description	Stakeholders and Special Consideration	Total Funding Available (millions)	Maximum Grant Award (millions)	Local Cost Share/Match Requirements	Submission Deadline	Eligible Activities			
									Planning	Env. & Final Design	Construction	Ops. & Maint.
Environmental	**Building Resilient Infrastructure and Communities (BRIC)**	FEMA	- Mitigation Projects: Projects designed to increase resilience and public safety; reduce injuries and loss of life; and reduce damage and destruction to property, critical services, facilities, and infrastructure. (BRIC)	Florida Division of Emergency Management (FDEM)	FY2024 not available. For reference, '$1 billion available during FY2023 national competition funding opportunity	$50 million maximum Federal share	-25% non-Federal cost share - N10Economically disadvantaged communities eligible for up to 10% non-Federal cost-share	FY2024 round likely to open Late Summer 2024. - FY2023 NOT by Aug 31, 2023 and sub applications to FDEM due on December 4, 2023.	✓	✓	✓	
	Fire Management Assistance Grants (FMAG)	FEMA	• Funds State, local and Tribal governments for the mitigation, management, and control of fires on publicly or privately-owned forests or grasslands	• The Fire Management Assistance declaration process is initiated when a State submits a request for assistance to the FEMA Regional Director at the time a "threat of major disaster exists."	The State must demonstrate the total eligible costs for the declared fire	• 75% maximum Federal cost-share		Rolling basis, a State must submit a request for assistance if there is a threat of major disaster exists				
	Hazard Mitigation Grant Program	FEMA	• Funds State, local and Tribal governments for to develop hazard mitigation plans and rebuild in a way that reduces, or mitigates, future disaster losses in their communities.	• Funding is available after a Presidentially declared disaster. States and local governments must develop and adopt hazard mitigation plans to received funding under the HMGP. The Florida Department of Emergency Management will submit applications on behalf of sub applicants for HMGP funding.	Funding is based the aggregate cost of disaster assistance in the eligible State.	• 75% maximum Federal cost-share		Rolling basis, after a Presidentially declared disaster	✓	✓	✓	
Transportation	**PROTECT (Formula and Competitive Discretionary programs)**	FDOT and FHWA	- Provides funding to ensure surface transportation resilience to natural hazards including climate change, sea level rise, flooding, extreme weather events, and other natural disasters through support of planning activities, resilience improvements, community resilience and evacuation routes, and at-risk coastal infrastructure. (PROTECT)	FDOT receives approximately $70 million in annual PROTECT formula funding.	FY2024 not available. For reference, '$848 million available in combined FY2022 and FY2023 funding opportunity	$500,000 minimum award size, no maximum award set.	20% non-Federal cost share	FY2024 funding opportunity likely to open Summer 2024 '- For reference, applications due August 18, 2023 for FY2023. .	✓	✓	✓	
	Building Resilient Infrastructure and Communities (BRIC)	FEMA	- Mitigation Projects: Projects designed to increase resilience and public safety; reduce injuries and loss of life; and reduce damage and destruction to property, critical services, facilities, and infrastructure. (BRIC)	Florida Division of Emergency Management (FDEM)	FY2024 not available. For reference, '$1 billion available during FY2023 national competition funding opportunity	$50 million maximum Federal share	-25% non-Federal cost share - N10Economically disadvantaged communities eligible for up to 10% non-Federal cost-share	FY2024 round likely to open Late Summer 2024. - FY2023 NOT by Aug 31, 2023 and sub applications to FDEM due on December 4, 2023.	✓	✓	✓	

Naval Air Station Whiting Field

	Funding Program Name	Funding Agency	Description	Stakeholders and Special Consideration	Total Funding Available (millions)	Maximum Grant Award (millions)	Local Cost Share/Match Requirements	Submission Deadline	Eligible Activities			
									Planning	Env. & Final Design	Construction	Ops. & Maint.
	Defense Community Infrastructure Program (DCIP)	Office of Local Defense Community Cooperation (OLDCC) - Department of Defense (DoD)	- The DCIP Program is designed to address deficiencies in community infrastructure, supportive of a military installation, in order to enhance military value, installation resilience, and military family quality of life. support a military installation; - are owned by a state or local government or a not-for-profit, member-owned utility service; - that will enhance military value, military installation resilience and/or military family quality of life at the supported military installation	- Eligible community infrastructure projects are any complete and useable transportation project; community support facilities (e.g., school, hospital, police, fire, emergency response, or other community support facility); and utility infrastructure projects [e.g., water, waste-water, telecommunications, electric, gas, or other utility infrastructure (with necessary cyber safeguards)] that: - are located off of a military installation;	- $100 million is available in FY2024 funding opportunity.	- $20 million is maximum award	- at least 30% non-Federal cost-share. - Projects located in rural areas (areas with populations of less than 100,000) or projects determined to be "advantageous for reasons related to national security" with a signed statement from a Military Department Secretary are eligible to receive full Federal funding.	- FY2024 funding opportunity applications are due June 17, 2024. - FY2025 funding opportunity likely to open in Spring 2025			✓	
	Florida DOT Five Year Work Program	Florida DOT	• Florida DOT receives approximately $2.6 billion per year in Federal-Aid Highway Program funding from the U.S. DOT under IIJA.	• Contact FDOT Regional Office to discuss funding this priority project.								
	Defense Access Roads	FHWA and Military Surface Deployment and Distribution Command [SDDC]	**Supplemental expansion and operation funds**: Provides funding to ensure highway improvements required to support highway service to defense and defense-related installations. The need for these improvements may arise in connection with the establishment, expansion, or operation of defense installations that create an unanticipated impact on the long-range requirements for the development of highways in the vicinity. The primary purpose of the funding is for highway improvements necessary for the functioning of the installation so that the defense installation does not burden the existing highway.	The local military installation identifies the access or mobility needs and brings these deficiencies to the attention of the SDDC, who reviews the requirement and makes a preliminary eligibility determination. State and local stakeholders will need to coordinate with the installations to identify the required funding to support roadway improvements and repairs	Averages $20 million a year in congressional appropriations for specific projects	SDDC and FHWA have to determine eligibility, design, and cost-estimates before requesting funding.	Local communities should connect with their installation and have the installation commander begin the process internally of requesting funding.	Rolling basis		✓	✓	
	Safe Streets and Roads for All (SS4A) Program	U.S. Department of Transportation (USDOT)	- Funds the development of a comprehensive safety action plan to address roadway safety issues and implementation of projects identified in the Action Plan.	Local metropolitan planning organization	- $1.2 billion in FY2024 funding opportunity	- $100,000 to $10 million for planning and demonstration grants. - $2.5 million to $25 million for implementation grants	- at least 20% non-Federal cost share	- FY2024 funding opportunity applications are due May 16, 2024. - FY2025 funding opportunity likely to open in Spring 2025	✓	✓	✓	✓

Naval Air Station Whiting Field

	Funding Program Name	Funding Agency	Description	Stakeholders and Special Consideration	Total Funding Available (millions)	Maximum Grant Award (millions)	Local Cost Share/Match Requirements	Submission Deadline	Eligible Activities			
									Planning	Env. & Final Design	Construction	Ops. & Maint.
	Rebuilding American Infrastructure with Sustainability and Equity (RAISE) Program	U.S. Department of Transportation (USDOT)	- Funds a wide range of critical freight and passenger transportation infrastructure projects with priority to projects that support safety, environmental sustainability, mobility and community connectivity, and quality of life.	FDOT, Eglin AFB	- $1.5 billion in FY2024 funding opportunity	- $5 million to $25 million	- at least 20% non-Federal cost share	- FY2024 funding opportunity closed February 28, 2024. - FY2025 applications due January 13, 2025	✓	✓	✓	

Naval Air Stations Whiting Field and Pensacola

	Funding Program Name	Funding Agency	Description	Stakeholders and Special Consideration	Total Funding Available (millions)	Maximum Grant Award (millions)	Local Cost Share/Match Requirements	Submission Deadline	Eligible Activities			
									Planning	Env. & Final Design	Construction	Ops. & Maint.
Housing	**Community Development Block Grant (CDBG) Entitlement Program**	Department of Housing and Urban Affairs (HUD)	- Provides annual grants on a formula basis to entitled cities and counties to develop viable urban communities by providing decent housing and a suitable living environment, and by expanding economic opportunities, principally for low- and moderate-income persons. - CDBG funds may be used for activities which include, but are not limited to: - Acquisition of real property - Relocation and demolition - Rehabilitation of residential and non-residential	Monroe County is the local CDBG grantee.		- Dependent on the grantee	- Dependent on the grantee	- CDBG Grantees generally submit annual plans to HUD that list the projects to be funded each fiscal year.	✓		✓	
									✓	✓	✓	

Eglin Air Force Base

	Funding Program Name	Funding Agency	Description	Stakeholders and Special Consideration	Total Funding Available (millions)	Maximum Grant Award (millions)	Local Cost Share/Match Requirements	Submission Deadline	Eligible Activities			
									Planning	Env. & Final Design	Construction	Ops. & Maint.
Environmental	**Transformational Habitat Restoration and Coastal Resilience**	NOAA	- Funds habitat restoration actions that rebuild productive and sustainable fisheries, contribute to the recovery and conservation of threatened and endangered species, use natural infrastructure to reduce damage from flooding and storms, promote resilient ecosystems and communities, and yield socioeconomic benefits. (NOAA)	The Nature Conservancy, Eglin AFB, FDOT, Choctawhatchee Bay Estuary Program, Choctawhatchee Basin Alliance	FY2024 Not Available. For reference,: $240 million in FY2023	FY2024 Not Available. For reference,: $25 million in FY2023	No cost-share required, but encouraged	FY2024 NOFO likely to open Summer 2024. -For reference, FY2023 NOFO released on August 15, 2023 and applications due November 17, 2023.	✓	✓	✓	
	Section 103 CAP - Beach Erosion and Hurricane and Storm Damage Reduction	U.S. Army Corps of Engineers (USACE)	- Funds projects to project public and private properties and facilities against damages caused by storm-driven waves and currents through the construction of revetments, groins, and jetties. (USACE)			$10 million	35% non-Federal cost-share	- Rolling basis			✓	
	REPI Challenge	DOD-REPI	Funds land conservation, improvement, or management activities that limit incompatible development in the vicinity of DOD installations and ranges; enhance military installation resilience to climate change or extreme weather events; or relieve current or anticipated environmental restrictions in support of key mission capabilities of strategic importance.	Eligible entities include States, local governments Tribes, non-governmental organization, or private entitie.	$30 million available for FY2025 funding opportunity.		50% non-Federal cost-share	FY2025 funding opportunity: Pre-proposals due June 10, 2024; Full proposals due August 12, 2024.				
	National Coastal Resilience Fund (NCRF)	National Fish and Wildlife Federation (NFWF)	- Restoration and Monitoring: Projects that protect and enhance resilience of natural systems and help mitigate the impacts of future storms and other natural-hazard events and threats on key local community assets (such as emergency services, infrastructure, and centers of economic activity), and drive the expected benefit to fish and wildlife.	- $15 million in DOD set-aside funding is available for coastal resilience projects that benefit military installations. In the proposal narrative, applicants will be asked to provide additional information to clearly describe the coastal hazards that threaten the military mission, the nature-based solution proposed to address those threats, and how the project will maintain and improve military resilience and directly benefit defense mission capabilities of the DOD installation or range the project is associated with. Coordinating with the local DOD installation before applying is strongly encouraged.	-$140 million in FY2024	- Up to $10 million for restoration implementation projects	- Non-Federal match is not required, but is encouraged to demonstrate broad support for the project.	- Pre-proposals due April 10, 2024. - Full Proposals due July 24, 2024. (by invitation only)			✓	

Eglin Air Force Base

	Funding Program Name	Funding Agency	Description	Stakeholders and Special Consideration	Total Funding Available (millions)	Maximum Grant Award (millions)	Local Cost Share/Match Requirements	Submission Deadline	Eligible Activities			
									Planning	Env. & Final Design	Construction	Ops. & Maint.
Transportation	**PROTECT (Formula and Competitive Discretionary programs)**	FDOT and FHWA	- Provides funding to ensure surface transportation resilience to natural hazards including climate change, sea level rise, flooding, extreme weather events, and other natural disasters through support of planning activities, resilience improvements, community resilience and evacuation routes, and at-risk coastal infrastructure. (PROTECT)	FDOT receives approximately $70 million in annual PROTECT formula funding. U.S. DOT makes available approximately $300 million per year in discretionary grant funding.	FY2024 funding opportunity is not open yet. For reference, $848 million available in combined FY2022 and FY2023 funding opportunity.	$500,000 minimum award size, no maximum award set.	20% non-Federal cost share	FY2024 funding opportunity likely to open Summer 2024 '- For reference, applications due August 18, 2023 for FY2023. .	✓	✓	✓	
	Building Resilient Infrastructure and Communities (BRIC)	FEMA	- Mitigation Projects: Projects designed to increase resilience and public safety; reduce injuries and loss of life; and reduce damage and destruction to property, critical services, facilities, and infrastructure. (BRIC)	Florida Division of Emergency Management (FDEM)	FY2024 not available. For reference, '$1 billion available during FY2023 national competition funding opportunity	$50 million maximum Federal share	-25% non-Federal cost share - N10Economically disadvantaged communities eligible for up to 10% non-Federal cost-share	FY2024 round likely to open Late Summer 2024. - FY2023 NOT by Aug 31, 2023 and subapplications to FDEM due on December 4, 2023	✓	✓	✓	
	Defense Community Infrastructure Program (DCIP)	Office of Local Defense Community Cooperation (OLDCC) - Department of Defense (DOD)	- The DCIP Program is designed to address deficiencies in community infrastructure, supportive of a military installation, in order to enhance military value, installation resilience, and military family quality of life. support a military installation; - are owned by a state or local government or a not-for-profit, member-owned utility service; - that will enhance military value, military installation resilience and/or military family quality of life at the supported military installation	- Eligible community infrastructure projects are any complete and useable transportation project; community support facilities (e.g., school, hospital, police, fire, emergency response, or other community support facility); and utility infrastructure projects [e.g., water, waste-water, telecommunications, electric, gas, or other utility infrastructure (with necessary cyber safeguards)] that: - are located off of a military installation;	- $100 million is available in FY2024 funding opportunity.	- $20 million is maximum award	- at least 30% non-Federal cost-share. - Projects located in rural areas (areas with populations of less than 100,000) or projects determined to be "advantageous for reasons related to national security" with a signed statement from a Military Department Secretary are eligible to receive full Federal funding.	- FY2024 funding opportunity applications are due June 17, 2024. - FY2025 funding opportunity likely to open in Spring 2025			✓	
	Defense Access Roads	FHWA and Military Surface Deployment and Distribution Command [SDDC]	**Supplemental expansion and operation funds**: Provides funding to ensure highway improvements required to support highway service to defense and defense-related installations. The need for these improvements may arise in connection with the establishment, expansion, or operation of defense installations that create an unanticipated impact on the long-range requirements for the development of highways in the vicinity. The primary purpose of the funding is for highway improvements necessary for the functioning of the installation so that the defense installation does not burden the existing highway.	The local military installation identifies the access or mobility needs and brings these deficiencies to the attention of the SDDC, who reviews the requirement and makes a preliminary eligibility determination. State and local stakeholders will need to coordinate with the installations to identify the required funding to support roadway improvements and repairs	Averages $20 million a year in congressional appropriations for specific projects	SDDC and FHWA have to determine eligibility, design, and cost-estimates before requesting funding.	Local communities should connect with their installation and have the installation commander begin the process internally of requesting funding.	Rolling basis		✓	✓	

Eglin Air Force Base

	Funding Program Name	Funding Agency	Description	Stakeholders and Special Consideration	Total Funding Available (millions)	Maximum Grant Award (millions)	Local Cost Share/Match Requirements	Submission Deadline	Eligible Activities			
									Planning	Env. & Final Design	Construction	Ops. & Maint.
	Safe Streets and Roads for All (SS4A) Program	U.S. Department of Transportation (USDOT)	- Funds the development of a comprehensive safety action plan to address roadway safety issues and implementation of projects identified in the Action Plan.	Local metropolitan planning organization	- $1.2 billion in FY2024 funding opportunity	- $100,000 to $10 million for planning and demonstration grants. - $2.5 million to $25 million for implementation grants	- at least 20% non-Federal cost share	- FY2024 funding opportunity applications are due May 16, 2024. - FY2025 funding opportunity likely to open in Spring 2025	✓	✓	✓	✓
	Active Transportation Infrastructure Investment Program	U.S. Department of Transportation (USDOT)	Funds to construct safe and connected active transportation facilities in an active transportation network, and to develop plans for active transportation networks.	Funding for FY2024 and beyond is subject to the availability of Federal appropriations.	$45 million was available in FY23. No funding is available in FY24	• $100,000 - $2 million for planning/design. • $7.5M to $15M for construction.	• at least 20% non-Federal cost-share	• No funding available for FY24				
	Bridge Investment Program	U.S. Department of Transportation (USDOT)	Funds planning and construction work to improve bridge condition and the safety, efficiency, and reliability of the movement of people and freight over bridges.	Planning grants and project construction grants are available. FHWA has released a combined funding opportunity for FY2023-2026 with separate application deadlines.	Approximately $2.4B is available each year (FY24, FY25, FY26) and only $20M is available each year for planning grants.	• No minimum/maximum award size for planning grants, however cost of the ulimate bridge construction must be greater than $3.125M. • For bridge construction grants, the project must be over $2.5M and the maximum award may not be more than 80% of total project costs.	• at least 20% non-Federal cost-share	FY25 applications due October 1, 2024 (planning) and November 1, 2024 (bridge construction). FY26 applications due October 1, 2025 (planning) and November 1, 2025 (bridge construction)				
	Rebuilding American Infrastructure with Sustainability and Equity (RAISE) Program	U.S. Department of Transportation (USDOT)	- Funds a wide range of critical freight and passenger transportation infrastructure projects with priority to projects that support safety, environmental sustainability, mobility and community connectivity, and quality of life.	FDOT, Eglin AFB	- $1.5 billion in FY2024 funding opportunity	- $5 million to $25 million	- at least 20% non-Federal cost share	- FY2024 funding opportunity closed February 28, 2024. - FY2025 applications due January 13, 2025	✓	✓	✓	
Community	**Community Development Block Grant (CDBG) Program**	**U.S. Department of Housing and Urban Development**	Funds a wide range of community projects, including projects that support affordable housing, suitable living environments, and economic opportunities. CDBG funds may be used for the acquisition of real property, construction and rehabilitation of residential and non-residential structures, public services, and a variety of other activities.	The City of Fort Walton Beach, FL is a CDBG entitlement grantee. The City of Fort Walton Beach receives an annual allocation of approximately $140,000 for CDBG program activities.	$140,000 is allocated to the City of Fort Walton Beach, FL annually	• No minimum or maximum award sizes	• No cost-share	Rolling application cycle, check with the City of Fort Walton Beach, FL				

Hurlburt Field

	Funding Program Name	Funding Agency	Description	Stakeholders and Special Consideration	Total Funding Available (millions)	Maximum Grant Award (millions)	Local Cost Share/Match Requirements	Submission Deadline	Eligible Activities			
									Planning	Env. & Final Design	Construction	Ops. & Maint.
Stormwater, Water, and Wastewater	**Clean Water and Drinking Water State Revolving Fund (SRF)**	Florida Department of Environmental Protection (FDEP)	- The Clean Water SRF provides low-interest loans to local governments to plan, design, and build or upgrade wastewater, stormwater, and nonpoint source pollution prevention projects. - The Drinking Water SRF provides low-interest loans to local governments and private utilities to plan, design, and build or upgrade drinking water systems and for source water development.	Wastewater and Drinking Water system owner would need to work with FDEP for financing	- FDEP receives $60.5 million per year in Clean Water SRF funding. - FDEP receives $70.6 million per year in Drinking Water SRF funding.		- maximum Federal share is 80% - projects benefiting a small, disadvantaged communities that serves a population less than 10,000 and whose household income is below the State of Florida average may qualify for principal forgiveness.	- Rolling application cycle - first step is to send FDEP a "Request for Inclusion"			✓	
	Building Resilient Infrastructure and Communities (BRIC)	FEMA	- Mitigation Projects: Projects designed to increase resilience and public safety; reduce injuries and loss of life; and reduce damage and destruction to property, critical services, facilities, and infrastructure. (BRIC)	Florida Division of Emergency Management (FDEM)	FY2024 not available. For reference, '$1 billion available during FY2023 national competition funding opportunity	$50 million maximum Federal share	-25% non-Federal cost share - N10Economically disadvantaged communities eligible for up to 10% non-Federal cost-share	FY2024 round likely to open Late Summer 2024. - FY2023 NOT by Aug 31, 2023 and sub applications to FDEM due on December 4, 2023.	✓	✓	✓	
	Defense Community Infrastructure Program (DCIP)	Office of Local Defense Community Cooperation (OLDCC) - Department of Defense (DoD)	- The DCIP Program is designed to address deficiencies in community infrastructure, supportive of a military installation, in order to enhance military value, installation resilience, and military family quality of life. support a military installation; - are owned by a state or local government or a not-for-profit, member-owned utility service; - that will enhance military value, military installation resilience and/or military family quality of life at the supported military installation	- Eligible community infrastructure projects are any complete and useable transportation project; community support facilities (e.g., school, hospital, police, fire, emergency response, or other community support facility); and utility infrastructure projects [e.g., water, waste-water, telecommunications, electric, gas, or other utility infrastructure (with necessary cyber safeguards)] that: - are located off of a military installation;	- $100 million is available in FY2024 funding opportunity.	- $20 million is maximum award	- at least 30% non-Federal cost-share. - Projects located in rural areas (areas with populations of less than 100,000) or projects determined to be "advantageous for reasons related to national security" with a signed statement from a Military Department Secretary are eligible to receive full Federal funding.	- FY2024 funding opportunity applications are due June 17, 2024. - FY2025 funding opportunity likely to open in Spring 2025			✓	
	Sewer Overflow and Stormwater Reuse Municipal Grants (OSG) Program	Florida Department of Environmental Protection (FDEP)	• The OSG Program funds the planning, design, and construction of combined sewer overflows (CSOs), sanitary sewer overflows (SSOs), and stormwater management projects.	• U.S. EPA allocates funding by formula to each State for these eligible uses. At least 25% of each State grant must fund projects in financially distressed communities and/or communities with 10,000 or less in population.	• In FY2024, $41 million was made available for the OSG program and Florida received $1.16 million	• N/A	• The Federal share must be at least 55% and the non-Federal share may include in-kind services.	- Rolling application cycle - first step is to send FDEP a "Request for Inclusion"				
	PROTECT (Formula and Competitive Discretionary programs)	FDOT and FHWA	- Provides funding to ensure surface transportation resilience to natural hazards including climate change, sea level rise, flooding, extreme weather events, and other natural disasters through support of planning activities, resilience improvements, community resilience and evacuation routes, and at-risk coastal infrastructure. (PROTECT)	FDOT receives approximately $70 million in annual PROTECT formula funding.	FY2024 not available. For reference, '$848 million available in combined FY2022 and FY2023 funding opportunity	$500,000 minimum award size, no maximum award set.	20% non-Federal cost share	FY2024 funding opportunity likely to open Summer 2024 '- For reference, applications due August 18, 2023 for FY2023. .	✓	✓	✓	

Hurlburt Field

	Funding Program Name	Funding Agency	Description	Stakeholders and Special Consideration	Total Funding Available (millions)	Maximum Grant Award (millions)	Local Cost Share/Match Requirements	Submission Deadline	Eligible Activities			
									Planning	Env. & Final Design	Construction	Ops. & Maint.
Transportation	**PROTECT (Formula and Competitive Discretionary programs)**	FDOT and FHWA	- Provides funding to ensure surface transportation resilience to natural hazards including climate change, sea level rise, flooding, extreme weather events, and other natural disasters through support of planning activities, resilience improvements, community resilience and evacuation routes, and at-risk coastal infrastructure. (PROTECT)	FDOT receives approximately $70 million in annual PROTECT formula funding.	FY2024 not available. For reference, '$848 million available in combined FY2022 and FY2023 funding opportunity	$500,000 minimum award size, no maximum award set.	20% non-Federal cost share	FY2024 funding opportunity likely to open Summer 2024 '- For reference, applications due August 18, 2023 for FY2023. .	✓	✓	✓	
	Building Resilient Infrastructure and Communities (BRIC)	FEMA	- Mitigation Projects: Projects designed to increase resilience and public safety; reduce injuries and loss of life; and reduce damage and destruction to property, critical services, facilities, and infrastructure. (BRIC)	Florida Division of Emergency Management (FDEM)	FY2024 not available. For reference, '$1 billion available during FY2023 national competition funding opportunity	$50 million maximum Federal share	-25% non-Federal cost share - N10Economically disadvantaged communities eligible for up to 10% non-Federal cost-share	FY2024 round likely to open Late Summer 2024. - FY2023 NOT by Aug 31, 2023 and sub applications to FDEM due on December 4, 2023.	✓	✓	✓	
	Defense Community Infrastructure Program (DCIP)	Office of Local Defense Community Cooperation (OLDCC) - Department of Defense (DoD)	- The DCIP Program is designed to address deficiencies in community infrastructure, supportive of a military installation, in order to enhance military value, installation resilience, and military family quality of life. support a military installation; - are owned by a state or local government or a not-for-profit, member-owned utility service; - that will enhance military value, military installation resilience and/or military family quality of life at the supported military installation	- Eligible community infrastructure projects are any complete and useable transportation project; community support facilities (e.g., school, hospital, police, fire, emergency response, or other community support facility); and utility infrastructure projects [e.g., water, waste-water, telecommunications, electric, gas, or other utility infrastructure (with necessary cyber safeguards)] that: - are located off of a military installation;	- $100 million is available in FY2024 funding opportunity.	- $20 million is maximum award	- at least 30% non-Federal cost-share. - Projects located in rural areas (areas with populations of less than 100,000) or projects determined to be "advantageous for reasons related to national security" with a signed statement from a Military Department Secretary are eligible to receive full Federal funding.	- FY2024 funding opportunity applications are due June 17, 2024. - FY2025 funding opportunity likely to open in Spring 2025			✓	
	Florida DOT Five Year Work Program	Florida DOT	• Florida DOT receives approximately $2.6 billion per year in Federal-Aid Highway Program funding from the U.S. DOT under IIJA.	• Contact FDOT Regional Office to discuss funding this priority project.								
	Nationally Significant Multimodal Freight & Highway Projects (INFRA)	U.S. Department of Transportation (USDOT)	• Funds highway and bridge projects on the National Highway Freight Network or National Highway system of national or regional significance.	• US DOT has combined the INFRA program with Mega and Rural to created the "Multimodal Project Discretionary Grant (MPDG)" opportunity as a way to streamline application requirements across the three programs.	• $2.7 billion from available in the FY2025-FY2026 funding opportunity			• The FY2025-FY2026 funding opportunity deadline was May 6, 2024. No more funding for the INFRA program is available from the IIJA and is subject to future Congressional appropriations.				

Hurlburt Field

	Funding Program Name	Funding Agency	Description	Stakeholders and Special Consideration	Total Funding Available (millions)	Maximum Grant Award (millions)	Local Cost Share/Match Requirements	Submission Deadline	Eligible Activities			
									Planning	Env. & Final Design	Construction	Ops. & Maint.
	Defense Access Roads	FHWA and Military Surface Deployment and Distribution Command [SDDC]	**Supplemental expansion and operation funds**: Provides funding to ensure highway improvements required to support highway service to defense and defense-related installations. The need for these improvements may arise in connection with the establishment, expansion, or operation of defense installations that create an unanticipated impact on the long-range requirements for the development of highways in the vicinity. The primary purpose of the funding is for highway improvements necessary for the functioning of the installation so that the defense installation does not burden the existing highway.	The local military installation identifies the access or mobility needs and brings these deficiencies to the attention of the SDDC, who reviews the requirement and makes a preliminary eligibility determination. State and local stakeholders will need to coordinate with the installations to identify the required funding to support roadway improvements and repairs	Averages $20 million a year in congressional appropriations for specific projects	SDDC and FHWA have to determine eligibility, design, and cost-estimates before requesting funding.	Local communities should connect with their installation and have the installation commander begin the process internally of requesting funding.	Rolling basis		✓	✓	
	Safe Streets and Roads for All (SS4A) Program	U.S. Department of Transportation (USDOT)	- Funds the development of a comprehensive safety action plan to address roadway safety issues and implementation of projects identified in the Action Plan.	Local metropolitan planning organization	- $1.2 billion in FY2024 funding opportunity	- $100,000 to $10 million for planning and demonstration grants. - $2.5 million to $25 million for implementation grants	- at least 20% non-Federal cost share	- FY2024 funding opportunity applications are due May 16, 2024. - FY2025 funding opportunity likely to open in Spring 2025	✓	✓	✓	✓
	Rebuilding American Infrastructure with Sustainability and Equity (RAISE) Program	U.S. Department of Transportation (USDOT)	- Funds a wide range of critical freight and passenger transportation infrastructure projects with priority to projects that support safety, environmental sustainability, mobility and community connectivity, and quality of life.	FDOT, Eglin AFB	- $1.5 billion in FY2024 funding opportunity	- $5 million to $25 million	- at least 20% non-Federal cost share	- FY2024 funding opportunity closed February 28, 2024. - FY2025 applications due January 13, 2025	✓	✓	✓	

Eglin Air Force Base and Hurlburt Field

	Funding Program Name	Funding Agency	Description	Stakeholders and Special Consideration	Total Funding Available (millions)	Maximum Grant Award (millions)	Local Cost Share/Match Requirements	Submission Deadline	Eligible Activities			
									Planning	Env. & Final Design	Construction	Ops. & Maint.
Environmental	**Transformational Habitat Restoration and Coastal Resilience**	NOAA	- Funds habitat restoration actions that rebuild productive and sustainable fisheries, contribute to the recovery and conservation of threatened and endangered species, use natural infrastructure to reduce damage from flooding and storms, promote resilient ecosystems and communities, and yield socioeconomic benefits. (NOAA)		FY2024 Not Available. For reference,: $240 million in FY2023	FY2024 Not Available. For reference,: $25 million in FY2023	No cost-share required, but encouraged	FY2024 NOFO likely to open Summer 2024. -For reference, FY2023 NOFO released on August 15, 2023 and applications due November 17, 2023.	✓	✓	✓	
	Section 103 CAP - Beach Erosion and Hurricane and Storm Damage Reduction	U.S. Army Corps of Engineers (USACE)	- Funds projects to project public and private properties and facilities against damages caused by storm-driven waves and currents through the construction of revetments, groins, and jetties. (USACE)			$10 million	35% non-Federal cost-share	- Rolling basis			✓	
	National Coastal Resilience Fund (NCRF)	National Fish and Wildlife Federation (NFWF)	- Restoration and Monitoring: Projects that protect and enhance resilience of natural systems and help mitigate the impacts of future storms and other natural-hazard events and threats on key local community assets (such as emergency services, infrastructure, and centers of economic activity), and drive the expected benefit to fish and wildlife.	- $15 million in DoD set-aside funding is available for coastal resilience projects that benefit military installations. In the proposal narrative, applicants will be asked to provide additional information to clearly describe the coastal hazards that threaten the military mission, the nature-based solution proposed to address those threats, and how the project will maintain and improve military resilience and directly benefit defense mission capabilities9 of the DoD installation or range the project is associated with. Coordinating with the local DoD installation before applying is strongly encouraged.	-$140 million in FY2024	- Up to $10 million for restoration implementation projects	- Non-Federal match is not required, but is encouraged to demonstrate broad support for the project.	- Pre-proposals due April 10, 2024. - Full Proposals due July 24, 2024. (by invitation only)			✓	
Water and Wastewater	**Clean Water and Drinking Water State Revolving Fund (SRF)**	Florida Department of Environmental Protection (FDEP)	- The Clean Water SRF provides low-interest loans to local governments to plan, design, and build or upgrade wastewater, stormwater, and nonpoint source pollution prevention projects. - The Drinking Water SRF provides low-interest loans to local governments and private utilities to plan, design, and build or upgrade drinking water systems and for source water development.	Wastewater and Drinking Water system owner would need to work with FDEP for financing	- FDEP receives $60.5 million per year in Clean Water SRF funding. - FDEP receives $70.6 million per year in Drinking Water SRF funding.		- maximum Federal share is 80% - projects benefiting a small, disadvantaged communities that serves a population less than 10,000 and whose household income is below the State of Florida average may qualify for principal forgiveness.	- Rolling application cycle - first step is to send FDEP a "Request for Inclusion"			✓	

Eglin Air Force Base and Hurlburt Field

	Funding Program Name	Funding Agency	Description	Stakeholders and Special Consideration	Total Funding Available (millions)	Maximum Grant Award (millions)	Local Cost Share/Match Requirements	Submission Deadline	Eligible Activities			
									Planning	Env. & Final Design	Construction	Ops. & Maint.
	Building Resilient Infrastructure and Communities (BRIC)	FEMA	- Mitigation Projects: Projects designed to increase resilience and public safety; reduce injuries and loss of life; and reduce damage and destruction to property, critical services, facilities, and infrastructure. (BRIC)	Florida Division of Emergency Management (FDEM)	FY2024 not available. For reference, '$1 billion available during FY2023 national competition funding opportunity	$50 million maximum Federal share	-25% non-Federal cost share - N10Economically disadvantaged communities eligible for up to 10% non-Federal cost-share	FY2024 round likely to open Late Summer 2024. - FY2023 NOT by Aug 31, 2023 and sub applications to FDEM due on December 4, 2023.	✓	✓	✓	
	Defense Community Infrastructure Program (DCIP)	Office of Local Defense Community Cooperation (OLDCC) - Department of Defense (DoD)	- The DCIP Program is designed to address deficiencies in community infrastructure, supportive of a military installation, in order to enhance military value, installation resilience, and military family quality of life. support a military installation; - are owned by a state or local government or a not-for-profit, member-owned utility service; - that will enhance military value, military installation resilience and/or military family quality of life at the supported military installation	- Eligible community infrastructure projects are any complete and useable transportation project; community support facilities (e.g., school, hospital, police, fire, emergency response, or other community support facility); and utility infrastructure projects [e.g., water, waste-water, telecommunications, electric, gas, or other utility infrastructure (with necessary cyber safeguards)] that: - are located off of a military installation;	- $100 million is available in FY2024 funding opportunity.	- $20 million is maximum award	- at least 30% non-Federal cost-share. - Projects located in rural areas (areas with populations of less than 100,000) or projects determined to be "advantageous for reasons related to national security" with a signed statement from a Military Department Secretary are eligible to receive full Federal funding.	- FY2024 funding opportunity applications are due June 17, 2024. - FY2025 funding opportunity likely to open in Spring 2025			✓	
Energy	**Building Resilient Infrastructure and Communities (BRIC)**	FEMA	- Mitigation Projects: Projects designed to increase resilience and public safety; reduce injuries and loss of life; and reduce damage and destruction to property, critical services, facilities, and infrastructure. (BRIC)	Florida Division of Emergency Management (FDEM)	FY2024 not available. For reference, '$1 billion available during FY2023 national competition funding opportunity	$50 million maximum Federal share	-25% non-Federal cost share - N10Economically disadvantaged communities eligible for up to 10% non-Federal cost-share	FY2024 round likely to open Late Summer 2024. - FY2023 NOT by Aug 31, 2023 and sub applications to FDEM due on December 4, 2023.	✓	✓	✓	
	Defense Community Infrastructure Program (DCIP)	Office of Local Defense Community Cooperation (OLDCC) - Department of Defense (DoD)	- The DCIP Program is designed to address deficiencies in community infrastructure, supportive of a military installation, in order to enhance military value, installation resilience, and military family quality of life. support a military installation; - are owned by a state or local government or a not-for-profit, member-owned utility service; - that will enhance military value, military installation resilience and/or military family quality of life at the supported military installation	- Eligible community infrastructure projects are any complete and useable transportation project; community support facilities (e.g., school, hospital, police, fire, emergency response, or other community support facility); and utility infrastructure projects [e.g., water, waste-water, telecommunications, electric, gas, or other utility infrastructure (with necessary cyber safeguards)] that: - are located off of a military installation;	- $100 million is available in FY2024 funding opportunity.	- $20 million is maximum award	- at least 30% non-Federal cost-share. - Projects located in rural areas (areas with populations of less than 100,000) or projects determined to be "advantageous for reasons related to national security" with a signed statement from a Military Department Secretary are eligible to receive full Federal funding.	- FY2024 funding opportunity d applications are due June 17, 2024. - FY2025 funding opportunity likely to open in Spring 2025			✓	

Eglin Air Force Base and Hurlburt Field

	Funding Program Name	Funding Agency	Description	Stakeholders and Special Consideration	Total Funding Available (millions)	Maximum Grant Award (millions)	Local Cost Share/Match Requirements	Submission Deadline	Eligible Activities			
									Planning	Env. & Final Design	Construction	Ops. & Maint.
	Grid Resilience State Formula Grants	Department of Energy (DOE)	- The Grid Resilience program is designed to strengthen and modernize America's power grid against wildfires, extreme weather, and other natural disasters and will provide funding over five years based on a formula to States, territories and Tribes. - States can use grant funding to issue subawards to electric grid operators, electricity storage operators, transmission owners and operators, and distribution providers.	- State of Florida and electric grid operators are recipients of funding	- Florida receives approximately $15 million per year	- N/A	- The eligible entity that receives a subaward is required to match 100% of the amount of the subaward.	- Grant awards are made on a rolling basis as applications are received	✓	✓	✓	
	Grid Resilience and Innovation Partnerships (GRIP) Program	Department of Energy (DOE)	- The GRIP program funds projects across 3 separate programs to enhance grid flexibility and improve the resilience of the power system against extreme weather threats. - The Grid Resilience Utility and Industry Grants support activities that will modernize the electric grid to reduce impacts due to extreme weather and natural disasters.	- Eligible entities include electric grid operators, electricity storage operators, transmission owners and operators, and distribution providers, etc.	- $3.9 billion for FY2024 and 2025	- Funding is capped at the amount the eligible entity has spent in the previous three years on hardening efforts. - There is a small utility set-aside for entities selling no more than 4 million MWh of electricity per year.	- 100% cost-match	- FY2024 concept papers were due January 12, 2024 and full applications due April 17, 2024.	✓	✓	✓	
Transportation	**Safe Streets and Roads for All (SS4A) Program**	U.S. Department of Transportation (USDOT)	- Funds the development of a comprehensive safety action plan to address roadway safety issues and implementation of projects identified in the Action Plan.	Local metropolitan planning organization	- $1.2 billion in FY2024 funding opportunity	- $100,000 to $10 million for planning and demonstration grants. - $2.5 million to $25 million for implementation grants	- at least 20% non-Federal cost share	- FY2024 funding opportunity closed February 28, 2024. - FY2025 applications due January 13, 2025	✓	✓	✓	
	Rebuilding American Infrastructure with Sustainability and Equity (RAISE) Program	U.S. Department of Transportation (USDOT)	- Funds a wide range of critical freight and passenger transportation infrastructure projects with priority to projects that support safety, environmental sustainability, mobility and community connectivity, and quality of life.	FDOT, Eglin AFB	- $1.5 billion in FY2024 funding opportunity	- $5 million to $25 million	- at least 20% non-Federal cost share	- FY2024 funding opportunity applications are due June 17, 2024. - FY2025 funding opportunity likely to open in Spring 2025			✓	
	Advanced Transportation Technology and Innovation (ATTAIN)	U.S. Department of Transportation (USDOT)	Funds projects to deploy, install, and operate advanced transportation technologies to improve safety, mobility, efficiency, system performance, intermodal connectivity, and infrastructure return on investment.	The program requires eligible applicants (States and localities) to partner with the private sector or public agencies as part of the grant application.	$60M is available each year	• Maximum award size is $12M	• at least 20% non-Federal cost-share	FY23-24 applications were due February 2024. FY25 applications likely to open Fall 2024				
	Florida DOT Five Year Work Program	Florida DOT	• Florida DOT receives approximately $2.6 billion per year in Federal-Aid Highway Program funding from the U.S. DOT under IIJA.	• Contact FDOT Regional Office to discuss funding this priority project.								

Eglin Air Force Base and Hurlburt Field

	Funding Program Name	Funding Agency	Description	Stakeholders and Special Consideration	Total Funding Available (millions)	Maximum Grant Award (millions)	Local Cost Share/Match Requirements	Submission Deadline	Eligible Activities			
									Planning	Env. & Final Design	Construction	Ops. & Maint.
	Nationally Significant Multimodal Freight & Highway Projects (INFRA)	U.S. Department of Transportation (USDOT)	• Funds highway and bridge projects on the National Highway Freight Network or National Highway system of national or regional significance.	• US DOT has combined the INFRA program with Mega and Rural to created the "Multimodal Project Discretionary Grant (MPDG)" opportunity as a way to streamline application requirements across the three programs.	• $2.7 billion from available in the FY2025-FY2026 funding opportunity			• The FY2025-FY2026 funding opportunity deadline was May 6, 2024. No more funding for the INFRA program is available from the IIJA and is subject to future Congressional appropriations.				
	Defense Community Infrastructure Program (DCIP)	Office of Local Defense Community Cooperation (OLDCC) - Department of Defense (DoD)	- The DCIP Program is designed to address deficiencies in community infrastructure, supportive of a military installation, in order to enhance military value, installation resilience, and military family quality of life. support a military installation; - are owned by a state or local government or a not-for-profit, member-owned utility service; - that will enhance military value, military installation resilience and/or military family quality of life at the supported military installation	- Eligible community infrastructure projects are any complete and useable transportation project; community support facilities (e.g., school, hospital, police, fire, emergency response, or other community support facility); and utility infrastructure projects [e.g., water, waste-water, telecommunications, electric, gas, or other utility infrastructure (with necessary cyber safeguards)] that: - are located off of a military installation;	- $100 million is available in FY2024 funding opportunity.	- $20 million is maximum award	- at least 30% non-Federal cost-share. - Projects located in rural areas (areas with populations of less than 100,000) or projects determined to be "advantageous for reasons related to national security" with a signed statement from a Military Department Secretary are eligible to receive full Federal funding.				✓	
Communications	**Defense Community Infrastructure Program (DCIP)**	Office of Local Defense Community Cooperation (OLDCC) - Department of Defense (DoD)	- The DCIP Program is designed to address deficiencies in community infrastructure, supportive of a military installation, in order to enhance military value, installation resilience, and military family quality of life. support a military installation; - are owned by a state or local government or a not-for-profit, member-owned utility service; - that will enhance military value, military installation resilience and/or military family quality of life at the supported military installation	- Eligible community infrastructure projects are any complete and useable transportation project; community support facilities (e.g., school, hospital, police, fire, emergency response, or other community support facility); and utility infrastructure projects [e.g., water, waste-water, telecommunications, electric, gas, or other utility infrastructure (with necessary cyber safeguards)] that: - are located off of a military installation;	- $100 million is available in FY2024 funding opportunity.	- $20 million is maximum award	- at least 30% non-Federal cost-share. - Projects located in rural areas (areas with populations of less than 100,000) or projects determined to be "advantageous for reasons related to national security" with a signed statement from a Military Department Secretary are eligible to receive full Federal funding.					

Eglin Air Force Base and Hurlburt Field

	Funding Program Name	Funding Agency	Description	Stakeholders and Special Consideration	Total Funding Available (millions)	Maximum Grant Award (millions)	Local Cost Share/Match Requirements	Submission Deadline	Eligible Activities			
									Planning	Env. & Final Design	Construction	Ops. & Maint.
	Building Resilient Infrastructure and Communities (BRIC)	FEMA	- Mitigation Projects: Projects designed to increase resilience and public safety; reduce injuries and loss of life; and reduce damage and destruction to property, critical services, facilities, and infrastructure. (BRIC)	Florida Division of Emergency Management (FDEM)	FY2024 not available. For reference, '$1 billion available during FY2023 national competition funding opportunity	$50 million maximum Federal share	-25% non-Federal cost share - N10Economically disadvantaged communities eligible for up to 10% non-Federal cost-share	FY2024 round likely to open Late Summer 2024. - FY2023 NOT by Aug 31, 2023 and sub applications to FDEM due on December 4, 2023.	✓	✓	✓	

Naval Support Activity Panama City

	Funding Program Name	Funding Agency	Description	Stakeholders and Special Consideration	Total Funding Available (millions)	Maximum Grant Award (millions)	Local Cost Share/Match Requirements	Submission Deadline	Eligible Activities			
									Planning	Env. & Final Design	Construction	Ops. & Maint.
Environmental	**Transformational Habitat Restoration and Coastal Resilience**	NOAA	- Funds habitat restoration actions that rebuild productive and sustainable fisheries, contribute to the recovery and conservation of threatened and endangered species, use natural infrastructure to reduce damage from flooding and storms, promote resilient ecosystems and communities, and yield socioeconomic benefits. (NOAA)		FY2024 Not Available. For reference,: $240 million in FY2023	FY2024 Not Available. For reference,: $25 million in FY2023	No cost-share required, but encouraged	FY2024 NOFO likely to open Summer 2024. -For reference, FY2023 NOFO released on August 15, 2023 and applications due November 17, 2023.	✓	✓	✓	
	Section 205 CAP - Flood Damage Reduction	U.S. Army Corps of Engineers (USACE)	- Funds study, design, and construction activities for small flood control projects in partnership between USACE and non-Federal entities.		$12 million is available in FY2024	$10 million	35% non-Federal cost-share	- Rolling basis, contact local USACE District			✓	
	Section 103 CAP - Beach Erosion and Hurricane and Storm Damage Reduction	U.S. Army Corps of Engineers (USACE)	- Funds study, design, and construction activities for small coastal storm damage reduction projects in partnership between USACE and non-Federal entities.		$500,000 is available in FY2024	$10 million	35% non-Federal cost-share	- Rolling basis, contact local USACE District			✓	
	Section 107 CAP - Small Navigation Projects	U.S. Army Corps of Engineers (USACE)	Funds study, design, and construction of navigation improvement projects, including dredging of channels, anchorage areas, and turning basins and construction of breakwaters, jetties and groins.		$1.5 million is available in FY2024	$10 million	35% non-Federal cost-share	- Rolling basis, contact local USACE District				
	…	U.S. Army Corps of Engineers (USACE)	Request study authorization and Congressional funding for new study for eligible water resources activities (navigation, riverine and coastal flooding risk reduction, ecosystem restoration)									
	REPI Challenge	DoD-REPI	Funds land conservation, improvement, or management activities that limit incompatible development in the vicinity of DoD installations and ranges; enhance military installation resilience to climate change or extreme weather events; or relieve current or anticipated environmental restrictions in support of key mission capabilities of strategic importance.	Eligible entities include States, local governments Tribes, non-governmental organization, or private entities.	$30 million available for FY2025 funding opportunity.		50% non-Federal cost-share	FY2025 funding opportunity: Pre-proposals due June 10, 2024; Full proposals due August 12, 2024.				

Naval Support Activity Panama City

	Funding Program Name	Funding Agency	Description	Stakeholders and Special Consideration	Total Funding Available (millions)	Maximum Grant Award (millions)	Local Cost Share/Match Requirements	Submission Deadline	Eligible Activities			
									Planning	Env. & Final Design	Construction	Ops. & Maint.
	National Coastal Resilience Fund (NCRF)	National Fish and Wildlife Federation (NFWF)	- Restoration and Monitoring: Projects that protect and enhance resilience of natural systems and help mitigate the impacts of future storms and other natural-hazard events and threats on key local community assets (such as emergency services, infrastructure, and centers of economic activity), and drive the expected benefit to fish and wildlife.	- $15 million in DoD set-aside funding is available for coastal resilience projects that benefit military installations. In the proposal narrative, applicants will be asked to provide additional information to clearly describe the coastal hazards that threaten the military mission, the nature-based solution proposed to address those threats, and how the project will maintain and improve military resilience and directly benefit defense mission capabilities of the DoD installation or range the project is associated with. Coordinating with the local DoD installation before applying is strongly encouraged.	-$140 million in FY2024	- Up to $10 million for restoration implementation projects	- Non-Federal match is not required, but is encouraged to demonstrate broad support for the project.	FY2024 Funding Opportunity: Pre-proposals due April 10, 2024; Full Proposals due July 24, 2024. (by invitation only)			✓	
Transportation	**PROTECT (Formula and Competitive Discretionary programs)**	FDOT and FHWA	- Provides funding to ensure surface transportation resilience to natural hazards including climate change, sea level rise, flooding, extreme weather events, and other natural disasters through support of planning activities, resilience improvements, community resilience and evacuation routes, and at-risk coastal infrastructure. (PROTECT)	FDOT receives approximately $70 million in annual PROTECT formula funding.	NOFO expect in Summer of FY24. For reference, '$848 million available in combined FY2022 and FY2023 funding opportunity	$500,000 minimum award size, no maximum award set.	20% non-Federal cost share	FY2024 funding opportunity likely to open Summer 2024 '- For reference, applications due August 18, 2023 for FY2023. .	✓	✓	✓	
	Building Resilient Infrastructure and Communities (BRIC)	FEMA	- Mitigation Projects: Projects designed to increase resilience and public safety; reduce injuries and loss of life; and reduce damage and destruction to property, critical services, facilities, and infrastructure. (BRIC)	Florida Division of Emergency Management (FDEM)	NOFO expect in Summer of FY24. For reference, '$1 billion available during FY2023 national competition funding opportunity	$50 million maximum Federal share	-25% non-Federal cost share - N10Economically disadvantaged communities eligible for up to 10% non-Federal cost-share	FY2024 round likely to open Late Summer 2024. - FY2023 NOT by Aug 31, 2023 and sub applications to FDEM due on December 4, 2023.	✓	✓	✓	

Naval Support Activity Panama City

	Funding Program Name	Funding Agency	Description	Stakeholders and Special Consideration	Total Funding Available (millions)	Maximum Grant Award (millions)	Local Cost Share/Match Requirements	Submission Deadline	Eligible Activities			
									Planning	Env. & Final Design	Construction	Ops. & Maint.
	Defense Community Infrastructure Program (DCIP)	Office of Local Defense Community Cooperation (OLDCC) - Department of Defense (DoD)	- The DCIP Program is designed to address deficiencies in community infrastructure, supportive of a military installation, in order to enhance military value, installation resilience, and military family quality of life. support a military installation; - are owned by a state or local government or a not-for-profit, member-owned utility service; - that will enhance military value, military installation resilience and/or military family quality of life at the supported military installation	- Eligible community infrastructure projects are any complete and useable transportation project; community support facilities (e.g., school, hospital, police, fire, emergency response, or other community support facility); and utility infrastructure projects [e.g., water, waste-water, telecommunications, electric, gas, or other utility infrastructure (with necessary cyber safeguards)] that: - are located off of a military installation;	- $100 million is available in FY2024 funding opportunity.	- $20 million is maximum award	- at least 30% non-Federal cost-share. - Projects located in rural areas (areas with populations of less than 100,000) or projects determined to be "advantageous for reasons related to national security" with a signed statement from a Military Department Secretary are eligible to receive full Federal funding.	- FY2024 funding opportunity applications are due June 17, 2024. - FY2025 funding opportunity likely to open in Spring 2025			✓	
	Florida DOT Five Year Work Program	Florida DOT	• Florida DOT receives approximately $2.6 billion per year in Federal-Aid Highway Program funding from the U.S. DOT under IIJA.	• Contact FDOT Regional Office to discuss funding this priority project.						✓		
	Defense Access Roads	FHWA and Military Surface Deployment and Distribution Command [SDDC]	**Supplemental expansion and operation funds**: Provides funding to ensure highway improvements required to support highway service to defense and defense-related installations. The need for these improvements may arise in connection with the establishment, expansion, or operation of defense installations that create an unanticipated impact on the long-range requirements for the development of highways in the vicinity. The primary purpose of the funding is for highway improvements necessary for the functioning of the installation so that the defense installation does not burden the existing highway.	The local military installation identifies the access or mobility needs and brings these deficiencies to the attention of the SDDC, who reviews the requirement and makes a preliminary eligibility determination. State and local stakeholders will need to coordinate with the installations to identify the required funding to support roadway improvements and repairs	Averages $20 million a year in congressional appropriations for specific projects	SDDC and FHWA have to determine eligibility, design, and cost-estimates before requesting funding.	Local communities should connect with their installation and have the installation commander begin the process internally of requesting funding.	Rolling basis		✓	✓	

Naval Support Activity Panama City

	Funding Program Name	Funding Agency	Description	Stakeholders and Special Consideration	Total Funding Available (millions)	Maximum Grant Award (millions)	Local Cost Share/Match Requirements	Submission Deadline	Eligible Activities			
									Planning	Env. & Final Design	Construction	Ops. & Maint.
	Safe Streets and Roads for All (SS4A) Program	U.S. Department of Transportation (USDOT)	- Funds the development of a comprehensive safety action plan to address roadway safety issues and implementation of projects identified in the Action Plan.	Local metropolitan planning organization	- $1.2 billion in FY2024 funding opportunity	- $100,000 to $10 million for planning and demonstration grants. - $2.5 million to $25 million for implementation grants	- at least 20% non-Federal cost share	- FY2024 funding opportunity applications are due May 16, 2024. - FY2025 funding opportunity likely to open in Spring 2025	✓	✓	✓	✓
	Rebuilding American Infrastructure with Sustainability and Equity (RAISE) Program	U.S. Department of Transportation (USDOT)	- Funds a wide range of critical freight and passenger transportation infrastructure projects with priority to projects that support safety, environmental sustainability, mobility and community connectivity, and quality of life.	FDOT, Eglin AFB	- $1.5 billion in FY2024 funding opportunity	- $5 million to $25 million	- at least 20% non-Federal cost share	- FY2024 funding opportunity closed February 28, 2024. - FY2025 applications due January 13, 2025	✓	✓	✓	
Water and Wastewater	**Clean Water and Drinking Water State Revolving Fund (SRF)**	Florida Department of Environmental Protection (FDEP)	- The Clean Water SRF provides low-interest loans to local governments to plan, design, and build or upgrade wastewater, stormwater, and nonpoint source pollution prevention projects. - The Drinking Water SRF provides low-interest loans to local governments and private utilities to plan, design, and build or upgrade drinking water systems and for source water development.	Wastewater and Drinking Water system owner would need to work with FDEP for financing	- FDEP receives $60.5 million per year in Clean Water SRF funding. - FDEP receives $70.6 million per year in Drinking Water SRF funding.		- maximum Federal share is 80% - projects benefiting a small, disadvantaged communities that serves a population less than 10,000 and whose household income is below the State of Florida average may qualify for principal forgiveness.	- Rolling application cycle - first step is to send FDEP a "Request for Inclusion"			✓	
	Building Resilient Infrastructure and Communities (BRIC)	FEMA	- Mitigation Projects: Projects designed to increase resilience and public safety; reduce injuries and loss of life; and reduce damage and destruction to property, critical services, facilities, and infrastructure. (BRIC)	Florida Division of Emergency Management (FDEM)	FY2024 not available. For reference, '$1 billion available during FY2023 national competition funding opportunity	$50 million maximum Federal share	-25% non-Federal cost share - N10Economically disadvantaged communities eligible for up to 10% non-Federal cost-share	FY2024 round likely to open Late Summer 2024. - FY2023 NOT by Aug 31, 2023 and sub applications to FDEM due on December 4, 2023.	✓	✓	✓	

Naval Support Activity Panama City

	Funding Program Name	Funding Agency	Description	Stakeholders and Special Consideration	Total Funding Available (millions)	Maximum Grant Award (millions)	Local Cost Share/Match Requirements	Submission Deadline	Eligible Activities			
									Planning	Env. & Final Design	Construction	Ops. & Maint.
	Defense Community Infrastructure Program (DCIP)	Office of Local Defense Community Cooperation (OLDCC) - Department of Defense (DoD)	- The DCIP Program is designed to address deficiencies in community infrastructure, supportive of a military installation, in order to enhance military value, installation resilience, and military family quality of life. support a military installation; - are owned by a state or local government or a not-for-profit, member-owned utility service; - that will enhance military value, military installation resilience and/or military family quality of life at the supported military installation	- Eligible community infrastructure projects are any complete and useable transportation project; community support facilities (e.g., school, hospital, police, fire, emergency response, or other community support facility); and utility infrastructure projects [e.g., water, waste-water, telecommunications, electric, gas, or other utility infrastructure (with necessary cyber safeguards)] that: - are located off of a military installation;	- $100 million is available in FY2024 funding opportunity.	- $20 million is maximum award	- at least 30% non-Federal cost-share. - Projects located in rural areas (areas with populations of less than 100,000) or projects determined to be "advantageous for reasons related to national security" with a signed statement from a Military Department Secretary are eligible to receive full Federal funding.	- FY2024 funding opportunity applications are due June 17, 2024. - FY2025 funding opportunity likely to open in Spring 2025			✓	
Energy	**Building Resilient Infrastructure and Communities (BRIC)**	FEMA	- Mitigation Projects: Projects designed to increase resilience and public safety; reduce injuries and loss of life; and reduce damage and destruction to property, critical services, facilities, and infrastructure. (BRIC)	Florida Division of Emergency Management (FDEM)	FY2024 not available. For reference, '$1 billion available during FY2023 national competition funding opportunity	$50 million maximum Federal share	-25% non-Federal cost share - N10Economically disadvantaged communities eligible for up to 10% non-Federal cost-share	FY2024 round likely to open Late Summer 2024. - FY2023 NOT by Aug 31, 2023 and sub applications to FDEM due on December 4, 2023.	✓	✓	✓	
	Defense Community Infrastructure Program (DCIP)	Office of Local Defense Community Cooperation (OLDCC) - Department of Defense (DoD)	- The DCIP Program is designed to address deficiencies in community infrastructure, supportive of a military installation, in order to enhance military value, installation resilience, and military family quality of life. support a military installation; - are owned by a state or local government or a not-for-profit, member-owned utility service; - that will enhance military value, military installation resilience and/or military family quality of life at the supported military installation	- Eligible community infrastructure projects are any complete and useable transportation project; community support facilities (e.g., school, hospital, police, fire, emergency response, or other community support facility); and utility infrastructure projects [e.g., water, waste-water, telecommunications, electric, gas, or other utility infrastructure (with necessary cyber safeguards)] that: - are located off of a military installation;	- $100 million is available in FY2024 funding opportunity.	- $20 million is maximum award	- at least 30% non-Federal cost-share. - Projects located in rural areas (areas with populations of less than 100,000) or projects determined to be "advantageous for reasons related to national security" with a signed statement from a Military Department Secretary are eligible to receive full Federal funding.	- FY2024 funding opportunity d applications are due June 17, 2024. - FY2025 funding opportunity likely to open in Spring 2025			✓	

Naval Support Activity Panama City

	Funding Program Name	Funding Agency	Description	Stakeholders and Special Consideration	Total Funding Available (millions)	Maximum Grant Award (millions)	Local Cost Share/Match Requirements	Submission Deadline	Eligible Activities			
									Planning	Env. & Final Design	Construction	Ops. & Maint.
	Grid Resilience State Formula Grants	Department of Energy (DOE)	- The Grid Resilience program is designed to strengthen and modernize America's power grid against wildfires, extreme weather, and other natural disasters and will provide funding over five years based on a formula to States, territories and Tribes. - States can use grant funding to issue subawards to electric grid operators, electricity storage operators, transmission owners and operators, and distribution providers.	- State of Florida and electric grid operators are recipients of funding	- Florida receives approximately $15 million per year	- N/A	- The eligible entity that receives a subaward is required to match 100% of the amount of the subaward.	- Grant awards are made on a rolling basis as applications are received	✓	✓	✓	
	Grid Resilience and Innovation Partnerships (GRIP) Program	Department of Energy (DOE)	- The GRIP program funds projects across 3 separate programs to enhance grid flexibility and improve the resilience of the power system against extreme weather threats. - The Grid Resilience Utility and Industry Grants support activities that will modernize the electric grid to reduce impacts due to extreme weather and natural disasters.	- Eligible entities include electric grid operators, electricity storage operators, transmission owners and operators, and distribution providers, etc.	- $3.9 billion for FY2024 and 2025	- Funding is capped at the amount the eligible entity has spent in the previous three years on hardening efforts. - There is a small utility set-aside for entities selling no more than 4 million MWh of electricity per year.	- 100% cost-match	- FY2024 concept papers were due January 12, 2024 and full applications due April 17, 2024.	✓	✓	✓	

Tyndall Air Force Base

	Funding Program Name	Funding Agency	Description	Stakeholders and Special Consideration	Total Funding Available (millions)	Maximum Grant Award (millions)	Local Cost Share/Match Requirements	Submission Deadline	Eligible Activities			
									Planning	Env. & Final Design	Construction	Ops. & Maint.
Water and Wastewater	**Clean Water and Drinking Water State Revolving Fund (SRF)**	Florida Department of Environmental Protection (FDEP)	- The Clean Water SRF provides low-interest loans to local governments to plan, design, and build or upgrade wastewater, stormwater, and nonpoint source pollution prevention projects. - The Drinking Water SRF provides low-interest loans to local governments and private utilities to plan, design, and build or upgrade drinking water systems and for source water development.	Wastewater and Drinking Water system owner would need to work with FDEP for financing	- FDEP receives $60.5 million per year in Clean Water SRF funding. - FDEP receives $70.6 million per year in Drinking Water SRF funding.		- maximum Federal share is 80% - projects benefiting a small, disadvantaged communities that serves a population less than 10,000 and whose household income is	- Rolling application cycle - first step is to send FDEP a "Request for Inclusion"	✓	✓	✓	
	Building Resilient Infrastructure and Communities (BRIC)	FEMA	- Mitigation Projects: Projects designed to increase resilience and public safety; reduce injuries and loss of life; and reduce damage and destruction to property, critical services, facilities, and infrastructure. (BRIC)	Florida Division of Emergency Management (FDEM)	FY2024 not available. For reference, '$1 billion available during FY2023 national competition funding opportunity	$50 million maximum Federal share	-25% non-Federal cost share - N10Economically disadvantaged communities eligible for up to 10% non-Federal cost-share	FY2024 round likely to open Late Summer 2024. - FY2023 NOT by Aug 31, 2023 and sub applications to FDEM due on December 4, 2023.	✓	✓	✓	
	Defense Community Infrastructure Program (DCIP)	Office of Local Defense Community Cooperation (OLDCC) - Department of Defense (DoD)	- The DCIP Program is designed to address deficiencies in community infrastructure, supportive of a military installation, in order to enhance military value, installation resilience, and military family quality of life. support a military installation; - are owned by a state or local government or a not-for-profit, member-owned utility service; - that will enhance military value, military installation resilience and/or military family quality of life at the supported military installation	- Eligible community infrastructure projects are any complete and useable transportation project; community support facilities (e.g., school, hospital, police, fire, emergency response, or other community support facility); and utility infrastructure projects [e.g., water, waste-water, telecommunications, electric, gas, or other utility infrastructure (with necessary cyber safeguards)] that: - are located off of a military installation;	- $100 million is available in FY2024 funding opportunity.	- $20 million is maximum award	- at least 30% non-Federal cost-share. - Projects located in rural areas (areas with populations of less than 100,000) or projects determined to be "advantageous for reasons related to national security" with a signed statement from a Military Department Secretary are eligible to receive full Federal funding.	- FY2024 funding opportunity applications are due June 17, 2024. - FY2025 funding opportunity likely to open in Spring 2025			✓	
Environmental	**Transformational Habitat Restoration and Coastal Resilience**	NOAA	- Funds habitat restoration actions that rebuild productive and sustainable fisheries, contribute to the recovery and conservation of threatened and endangered species, use natural infrastructure to reduce damage from flooding and storms, promote resilient ecosystems and communities, and yield socioeconomic benefits. (NOAA)		FY2024 Not Available. For reference,: $240 million in FY2023	FY2024 Not Available. For reference,: $25 million in FY2023	No cost-share required, but encouraged	FY2024 NOFO likely to open Summer 2024. -For reference, FY2023 NOFO released on August 15, 2023 and applications due November 17, 2023.	✓	✓	✓	

Tyndall Air Force Base

	Funding Program Name	Funding Agency	Description	Stakeholders and Special Consideration	Total Funding Available (millions)	Maximum Grant Award (millions)	Local Cost Share/Match Requirements	Submission Deadline	Eligible Activities			
									Planning	Env. & Final Design	Construction	Ops. & Maint.
	Section 103 CAP - Beach Erosion and Hurricane and Storm Damage Reduction	U.S. Army Corps of Engineers (USACE)	- Funds projects to project public and private properties and facilities against damages caused by storm-driven waves and currents through the construction of revetments, groins, and jetties. (USACE)			$10 million	35% non-Federal cost-share	- Rolling basis			✓	
	National Coastal Resilience Fund (NCRF)	National Fish and Wildlife Federation (NFWF)	- Restoration and Monitoring: Projects that protect and enhance resilience of natural systems and help mitigate the impacts of future storms and other natural-hazard events and threats on key local community assets (such as emergency services, infrastructure, and centers of economic activity), and drive the expected benefit to fish and wildlife.	- $15 million in DoD set-aside funding is available for coastal resilience projects that benefit military installations. In the proposal narrative, applicants will be asked to provide additional information to clearly describe the coastal hazards that threaten the military mission, the nature-based solution proposed to address those threats, and how the project will maintain and improve military resilience and directly benefit defense mission capabilities of the DoD installation or range the project is associated with. Coordinating with the local DoD installation before applying is strongly encouraged.	-$140 million in	- Up to $10 million for restoration implementation projects	- Non-Federal match is not required, but is encouraged to demonstrate broad support for the project.	- Pre-proposals due April 10, 2024. - Full Proposals due July 24, 2024. (by invitation only)	✓	✓	✓	
Transportation	**PROTECT (Formula and Competitive Discretionary programs)**	FDOT and FHWA	- Provides funding to ensure surface transportation resilience to natural hazards including climate change, sea level rise, flooding, extreme weather events, and other natural disasters through support of planning activities, resilience improvements, community resilience and evacuation routes, and at-risk coastal infrastructure. (PROTECT)	FDOT receives approximately $70 million in annual PROTECT formula funding.	FY2024 not available. For reference, '$848 million available in combined FY2022 and FY2023 funding opportunity	$500,000 minimum award size, no maximum award set.	20% non-Federal cost share	FY2024 funding opportunity likely to open Summer 2024 '- For reference, applications due August 18, 2023 for FY2023. .	✓	✓	✓	
	Building Resilient Infrastructure and Communities (BRIC)	FEMA	- Mitigation Projects: Projects designed to increase resilience and public safety; reduce injuries and loss of life; and reduce damage and destruction to property, critical services, facilities, and infrastructure. (BRIC)	Florida Division of Emergency Management (FDEM)	FY2024 not available. For reference, '$1 billion available during FY2023 national competition funding opportunity	$50 million maximum Federal share	-25% non-Federal cost share - N10Economically disadvantaged communities eligible for up to 10% non-Federal cost-share	FY2024 round likely to open Late Summer 2024. - FY2023 NOT by Aug 31, 2023 and sub applications to FDEM due on	✓	✓	✓	

Tyndall Air Force Base

	Funding Program Name	Funding Agency	Description	Stakeholders and Special Consideration	Total Funding Available (millions)	Maximum Grant Award (millions)	Local Cost Share/Match Requirements	Submission Deadline	Eligible Activities			
									Planning	Env. & Final Design	Construction	Ops. & Maint.
	Defense Community Infrastructure Program (DCIP)	Office of Local Defense Community Cooperation (OLDCC) - Department of Defense (DoD)	- The DCIP Program is designed to address deficiencies in community infrastructure, supportive of a military installation, in order to enhance military value, installation resilience, and military family quality of life. support a military installation; - are owned by a state or local government or a not-for-profit, member-owned utility service; - that will enhance military value, military installation resilience and/or military family quality of life at the supported military installation	- Eligible community infrastructure projects are any complete and useable transportation project; community support facilities (e.g., school, hospital, police, fire, emergency response, or other community support facility); and utility infrastructure projects [e.g., water, waste-water, telecommunications, electric, gas, or other utility infrastructure (with necessary cyber safeguards)] that: - are located off of a military installation;	- $100 million is available in FY2024 funding opportunity.	- $20 million is maximum award	- at least 30% non-Federal cost-share. - Projects located in rural areas (areas with populations of less than 100,000) or projects determined to be "advantageous for reasons related to national security" with a signed statement from a Military Department Secretary are eligible to receive full Federal funding.	- FY2024 funding opportunity applications are due June 17, 2024. - FY2025 funding opportunity likely to open in Spring 2025			✓	
	Florida DOT Five Year Work Program	Florida DOT	• Florida DOT receives approximately $2.6 billion per year in Federal-Aid Highway Program funding from the U.S. DOT under IIJA.	• Contact FDOT Regional Office to discuss funding this priority project.								
	Bridge Investment Program	U.S. Department of Transportation (USDOT)	Funds planning and construction work to improve bridge condition and the safety, efficiency, and reliability of the movement of people and freight over bridges.	Planning grants and project construction grants are available. FHWA has released a combined funding opportunity for FY2023-2026 with separate application deadlines.	Approximately $2.4B is available each year (FY24, FY25, FY26) and only $20M is available each year for planning grants.	• No minimum/maximum award size for planning grants, however cost of the ultimate bridge construction must be greater than $3.125M. • For bridge construction grants, the project must be over $2.5M and the maximum award may not be more than 80% of total	• at least 20% non-Federal cost-share	FY25 applications due October 1, 2024 (planning) and November 1, 2024 (bridge construction). FY26 applications due October 1, 2025 (planning) and November 1, 2025 (bridge construction)				

Tyndall Air Force Base

	Funding Program Name	Funding Agency	Description	Stakeholders and Special Consideration	Total Funding Available (millions)	Maximum Grant Award (millions)	Local Cost Share/Match Requirements	Submission Deadline	Eligible Activities			
									Planning	Env. & Final Design	Construction	Ops. & Maint.
	Defense Access Roads	FHWA and Military Surface Deployment and Distribution Command [SDDC]	**Supplemental expansion and operation funds**: Provides funding to ensure highway improvements required to support highway service to defense and defense-related installations. The need for these improvements may arise in connection with the establishment, expansion, or operation of defense installations that create an unanticipated impact on the long-range requirements for the development of highways in the vicinity. The primary purpose of the funding is for highway improvements necessary for the functioning of the installation so that the defense installation does not burden the existing highway.	The local military installation identifies the access or mobility needs and brings these deficiencies to the attention of the SDDC, who reviews the requirement and makes a preliminary eligibility determination. State and local stakeholders will need to coordinate with the installations to identify the required funding to support roadway improvements and repairs	Averages $20 million a year in congressional appropriations for specific projects	SDDC and FHWA have to determine eligibility, design, and cost-estimates before requesting funding.	Local communities should connect with their installation and have the installation commander begin the process internally of requesting funding.	Rolling basis		✓	✓	
	Safe Streets and Roads for All (SS4A) Program	U.S. Department of Transportation (USDOT)	- Funds the development of a comprehensive safety action plan to address roadway safety issues and implementation of projects identified in the Action Plan.	Local metropolitan planning organization	- $1.2 billion in FY2024 funding opportunity	- $100,000 to $10 million for planning and demonstration grants. - $2.5 million to $25 million for implementation grants	- at least 20% non-Federal cost share	- FY2024 funding opportunity applications are due May 16, 2024. - FY2025 funding opportunity likely to open in Spring 2025	✓	✓	✓	✓
	Rebuilding American Infrastructure with Sustainability and Equity (RAISE) Program	U.S. Department of Transportation (USDOT)	- Funds a wide range of critical freight and passenger transportation infrastructure projects with priority to projects that support safety, environmental sustainability, mobility and community connectivity, and quality of life.	FDOT, Eglin AFB	- $1.5 billion in FY2024 funding opportunity	- $5 million to $25 million	- at least 20% non-Federal cost share	- FY2024 funding opportunity closed February 28, 2024. - FY2025 applications due	✓	✓	✓	

Tyndall Air Force Base and Naval Support Activity Panama City

	Funding Program Name	Funding Agency	Description	Stakeholders and Special Consideration	Total Funding Available (millions)	Maximum Grant Award (millions)	Local Cost Share/Match Requirements	Submission Deadline	Eligible Activities			
									Planning	Env. & Final Design	Construction	Ops. & Maint.
Housing	**Community Development Block Grant (CDBG) Entitlement Program**	Department of Housing and Urban Affairs (HUD)	- Provides annual grants on a formula basis to entitled cities and counties to develop viable urban communities by providing decent housing and a suitable living environment, and by expanding economic opportunities, principally for low- and moderate-income persons. - CDBG funds may be used for activities which include, but are not limited to: - Acquisition of real property - Relocation and demolition - Rehabilitation of residential and non-residential structures -Construction of public facilities and improvements, such as water and sewer facilities, streets, neighborhood centers, and the conversion of school buildings for eligible purposes	Monroe County is the local CDBG grantee.		- Dependent on the grantee	- Dependent on the grantee	- CDBG Grantees generally submit annual plans to HUD that list the projects to be funded each fiscal year.	✓		✓	
Water and Wastewater	**Clean Water and Drinking Water State Revolving Fund (SRF)**	Florida Department of Environmental Protection (FDEP)	- The Clean Water SRF provides low-interest loans to local governments to plan, design, and build or upgrade wastewater, stormwater, and nonpoint source pollution prevention projects. - The Drinking Water SRF provides low-interest loans to local governments and private utilities to plan, design, and build or upgrade drinking water systems and for source water development.	Wastewater and Drinking Water system owner would need to work with FDEP for financing	- FDEP receives $60.5 million per year in Clean Water SRF funding. - FDEP receives $70.6 million per year in Drinking Water SRF funding.		- maximum Federal share is 80% - projects benefiting a small, disadvantaged communities that serves a population less than 10,000 and whose household income is below the State of Florida average may qualify for principal forgiveness.	- Rolling application cycle - first step is to send FDEP a "Request for Inclusion"	✓	✓	✓	
	Building Resilient Infrastructure and Communities (BRIC)	FEMA	- Mitigation Projects: Projects designed to increase resilience and public safety; reduce injuries and loss of life; and reduce damage and destruction to property, critical services, facilities, and infrastructure. (BRIC)	Florida Division of Emergency Management (FDEM)	FY2024 not available. For reference, '$1 billion available during FY2023 national competition funding opportunity	$50 million maximum Federal share	-25% non-Federal cost share - N10Economically disadvantaged communities eligible for up to 10% non-Federal cost-share	FY2024 round likely to open Late Summer 2024. - FY2023 NOT by Aug 31, 2023 and sub applications to FDEM due on December 4, 2023.	✓	✓	✓	

	Defense Community Infrastructure Program (DCIP)	Office of Local Defense Community Cooperation (OLDCC) - Department of Defense (DoD)	- The DCIP Program is designed to address deficiencies in community infrastructure, supportive of a military installation, in order to enhance military value, installation resilience, and military family quality of life. support a military installation; - are owned by a state or local government or a not-for-profit, member-owned utility service; - that will enhance military value, military installation resilience and/or military family quality of life at the supported military installation	- Eligible community infrastructure projects are any complete and useable transportation project; community support facilities (e.g., school, hospital, police, fire, emergency response, or other community support facility); and utility infrastructure projects [e.g., water, waste-water, telecommunications, electric, gas, or other utility infrastructure (with necessary cyber safeguards)] that: - are located off of a military installation;	- $100 million is available in FY2024 funding opportunity.	- $20 million is maximum award	- at least 30% non-Federal cost-share. - Projects located in rural areas (areas with populations of less than 100,000) or projects determined to be "advantageous for reasons related to national security" with a signed statement from a Military Department Secretary are eligible to receive full Federal funding.	- FY2024 funding opportunity applications are due June 17, 2024. - FY2025 funding opportunity likely to open in Spring 2025			✓	

All Regional Bases

	Funding Program Name	Funding Agency	Description	Stakeholders and Special Consideration	Total Funding Available (millions)	Maximum Grant Award (millions)	Local Cost Share/Match Requirements	Submission Deadline	Eligible Activities			
									Planning	Env. & Final Design	Construction	Ops. & Maint.
Housing	**Community Development Block Grant (CDBG) Entitlement Program**	Department of Housing and Urban Affairs (HUD)	- Provides annual grants on a formula basis to entitled cities and counties to develop viable urban communities by providing decent housing and a suitable living environment, and by expanding economic opportunities, principally for low- and moderate-income persons. - CDBG funds may be used for activities which include, but are not limited to: - Acquisition of real property - Relocation and demolition - Rehabilitation of residential and non-residential structures -Construction of public facilities and improvements, such as water and sewer facilities, streets, neighborhood centers, and the conversion of school buildings for eligible purposes	Monroe County is the local CDBG grantee.		- Dependent on the grantee	- Dependent on the grantee	- CDBG Grantees generally submit annual plans to HUD that list the projects to be funded each fiscal year.	✓		✓	

APPENDIX E

Mutual Support Agreements



Emerald Coast Military Installation Resiliency Review

Florida State University

Department of Urban and Regional Planning

June 11, 2024

Project manager: Eren Ozguven, PhD

Prepared by: Tyler Tucci, Dennis Smith and Billie Ventimiglia

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Executive Summary

The Emerald Coast Florida Military Installation Resiliency Review (MIRR) is an initiative of the Emerald Coast Regional Council. Funded through the US Department of Defense, Local Office of Defense, Community Cooperation's Installation Resilience program, the intent of the initiative is to build resilience with and between communities and miliary installations in the Emerald Coast region. Jacobs, the full spectrum global consulting services firm, with offices throughout Florida and in the Panhandle, is the ECRC's lead contractor for the overall MIRR initiative. The Resilient Infrastructure & Disaster Response (RIDER) Center at the FAMU-FSU College of Engineering, and its affiliate, the Mark & Marianne Barnebey Planning and Development Lab in the FSU Department of Urban and Regional Planning (Barnebey Lab) are providing subcontractor support to Jacobs related to project Task 5, the development of an Opportunity Assessment Report.

The RIDER team is developing a cost benefit analysis of site-specific scenarios to improve regional coordination and sustainability as part of the project. For project Task 5, The Barnebey Lab led a process to identify opportunities for aligning Continuity of Operations Plan (COOP) missions and tasks across installations while also identifying other opportunities for enhancing regional coordination. This report document that process, research findings, and provides preliminary recommendations to enhance coordination in support of regional resilience.

To understand existing conditions and opportunities for enhancing regional coordination, the Barnebey Lab employed a three-step research process, which included plan reviews, an expert survey, and follow-up interviews with stakeholders. The plan review focused on five categories: emergency operations, disaster recovery, infrastructure planning and maintenance, shared services, and housing. The survey was distributed to relevant emergency management, planning, utility, and military officials. It asked for further information in each of these areas. The findings of the plan review and survey results were supplemented by interviews with area stakeholders representing both the military and civilian governments.

Broader, regionally relevant findings of this research include:

A history of good coordination: High levels of coordination currently exist between civilian governments and the military throughout the region. Some of the coordination is formal, such as through participation in regional planning frameworks (i.e., Transit Planning Organizations (TPO), Metropolitan Planning Organizations (MPO), Local Emergency Planning Committees (LEPC)) and some are more informal, including participation in ad hoc task forces.

More coordination happens than is recorded: Many of the coordination activities identified through the survey results and interviews were not well documented in the reviewed planning documents. When possible, plans should be updated to formalize existing coordination activities.

Opportunities for improvement: The results of the survey and the follow-up interviews suggested that stakeholders do not believe there are any critical gaps in coordination that would imperil the region's sustainability. However, most respondents provided input for improving coordination in each of the five research areas, suggesting that there are always opportunities for making marginal enhancements to exiting plans, procedures, and processes.

Varying levels of coordination: The consensus was that coordination is more robust in some areas, including emergency operations, disaster recovery and infrastructure planning and maintenance, while it is less evident in shared services. Housing was identified as an area where there was little to no cross-entity coordination.

Regional considerations: Several concerns dominated the follow-up interviews with both military and government leaders. The first was the acknowledgement that region and its residents are very vulnerable to natural hazard impacts, from coastal storms to wildfires. Also noted were the interconnected concerns about the availability of affordable housing and regional traffic congestion.

Introduction

The Military Installation Resiliency Review (MIRR), funded by the Department of Defense (DOD), Office of Local Defense Community Cooperation (OLDCC), is a process that analyzes and implements actions to improve the sustainability of military installations and communities. The MIRR focuses on resiliency risks, such as wildfires, drought, wind, and flooding, and resiliency impacts, such as wastewater, transportation, installation energy, storm water, and water availability. The goal of the MIRR is to develop strategies and an implementation plan to protect resources that enhance military installation resilience and community resilience.

The Emerald Coast Regional Council (ECRC), through the MIRR funding, is creating a comprehensive strategy in collaboration with area military installations to address and mitigate risks at the installation level and in the surrounding communities that may impair the operational utility of military missions, impact available resources, or create barriers to military-civilian government coordination. The ECRC region includes 7 counties in total. This project includes partners at the region's six military installations and five counties that host military bases within the region, as well as the 25 incorporated municipalities located therein. **Table 1** lists the five study area counties and the incorporated municipalities within their boundaries.

Table 1. Partner Counties and Municipalities for the MIRR

County	Municipalities
Escambia	The City of Pensacola and the Town of Century
Santa Rosa	The Cities of Gulf Breeze and Milton and the Town of Jay
Okaloosa	The Cities of Crestview, Destin, Fort Walton Beach, Laurel Hill, Mary Esther, Niceville, and Valparaiso, and the Towns of Cinco Bayou and Shalimar
Walton	The Cities of DeFuniak Springs and Freeport and the Town of Paxton
Bay	The Cities of Callaway, Lynn Haven, Mexico Beach, Panama City, Panama City Beach, Parker, and Springfield

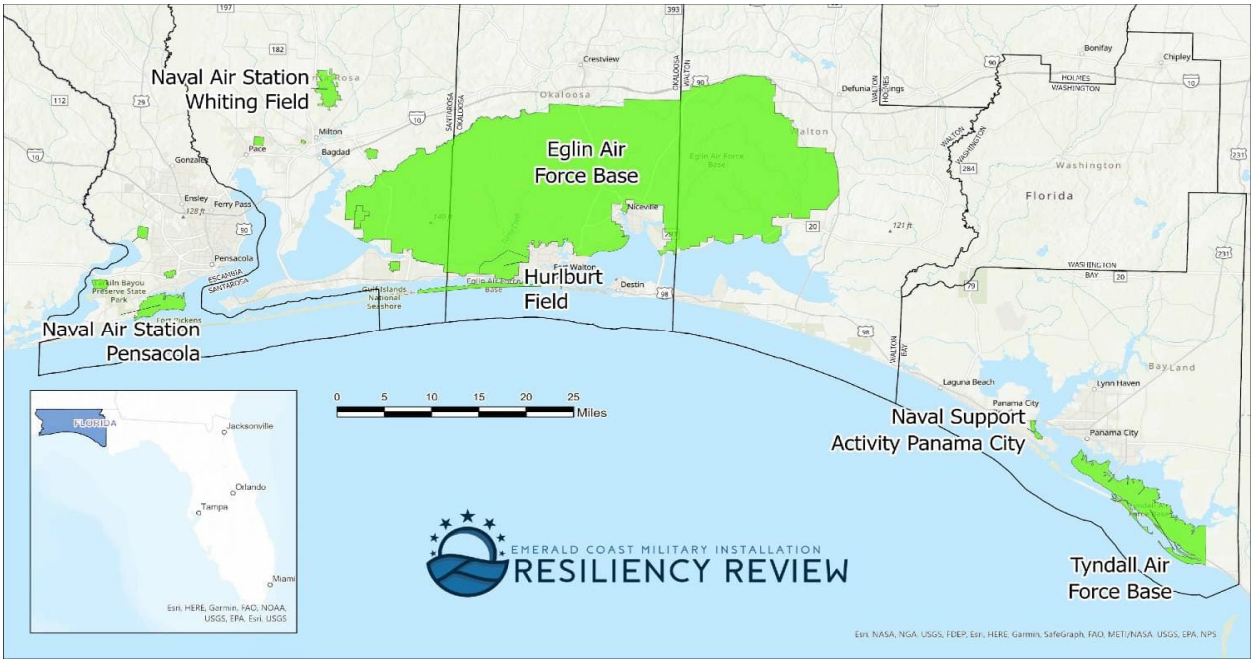
Table 2 lists each of the military installations and county or counties in which they are located.

Table 2. Partner Military Installations and Host Counties for the MIRR

Military Installations	Host County or Counties
Eglin Air Force Base	Santa Rosa, Okaloosa, Walton
Hurlburt Field	Okaloosa
Naval Air Station Pensacola	Escambia
Naval Air Station Whiting Field	Santa Rosa
Naval Support Activity Panama City	Bay
Tyndall Air Force Base	Bay

Additionally, **Figure 1** provides an overview of the project area from the ECRC. The six military installations are shaded in green over the five counties.

Figure 1. MIRR Project Area



Source: ECRC

The objective of the ECRC'S MIRR is to strengthen and preserve military readiness, capabilities, and operability for our region's military installations. This will be accomplished through four main activities, including:

1. A threat assessment
2. Identification of vulnerabilities
3. Prioritization of mitigation programs and projects
4. Plan implementation.

To support this project, the ECRC contracted with Jacobs, a full-service firm with a local presence in the region that specializes in planning, architecture, engineering, project and construction management, and data management. Jacobs partnered with the Resilient Infrastructure & Disaster Response Center (RIDER), a multi-disciplinary applied research function of the FAMU-FSU College of Engineering, to work on Task 5 of the project. The goal of Task 5 is to evaluate the feasibility of mutual support agreements among DOD installations and local governments. Task 5 is focused on the potential for agreements for mutual aid in short term disaster response or for long-term cooperation in mitigation and recovery.

Upon completion, Task 5 will provide a better understanding of existing planning gaps and opportunities for coordination between and within area government and military installations. Table 3 provides a breakdown of the six subtasks in Task 5.

Table 3. Task 5 Subtasks and Descriptions

Subtask	Description
5.1: Data Collection and Review	Collect and review previous studies, CIP, policies, and other relevant information for the study area.
5.2: Identify Synergies/Gaps for Resilience Support, Collaborations, and Potential Solutions Across the Region	Identify gaps and determine synergies for resilience support, collaborations, and potential solutions and will include a summary of these findings.
5.3: Identify Continuity of Operations Plan Missions	Identify mission/task alignment opportunities across and with regional partners.
5.4: Develop Cost-Benefit Analysis	Conduct a cost-benefit analysis of the mission/task opportunities and tie this to the justification of preliminary policy recommendations.
5.5: Preliminary Policy Recommendations	Provide a draft list of Preliminary Policy Recommendations across installations.
5.6: Site-Specific Solutions	Develop site-specific solutions to identify resiliency needs and appropriate implementation strategies.

The FSU, Department of Urban and Regional Planning (DURP), Mark and Marianne Barnebey Planning and Development Lab, a RIDER affiliate, addressed items 5.1, 5.2, and 5.3. This report documents the research and outreach process used to gather data, findings, and coordination specific recommendations. It is intended that this report will form the basis for a larger, complete Task 5 deliverable, however it can also serve as a standalone document.

Identification of Resilience Factors and Hazards

Initial meetings with the ECRC and Jacobs Engineering helped determine the best course of action for finding gaps in resiliency efforts between Northwest Florida counties and nearby military installations. To start this process, a plan review matrix to support content analysis for the purpose of identifying exiting coordination activities was developed. Plans from Bay County, Walton County, Santa Rosa County, Okaloosa County, and Escambia County were compiled by the Jacobs team for further review by the FSU Mark & Marianne Barnebey Development Lab. The plans consisted of multiple levels including base specific, local government, county, and regional plans. Examples of plans include Energy Resilience Readiness Exercises at the base level, comprehensive plans at the local government level, Comprehensive Emergency Management Plans at the county level, and vulnerability assessments at the regional level.

The FSU team then identified five key resilience categories:

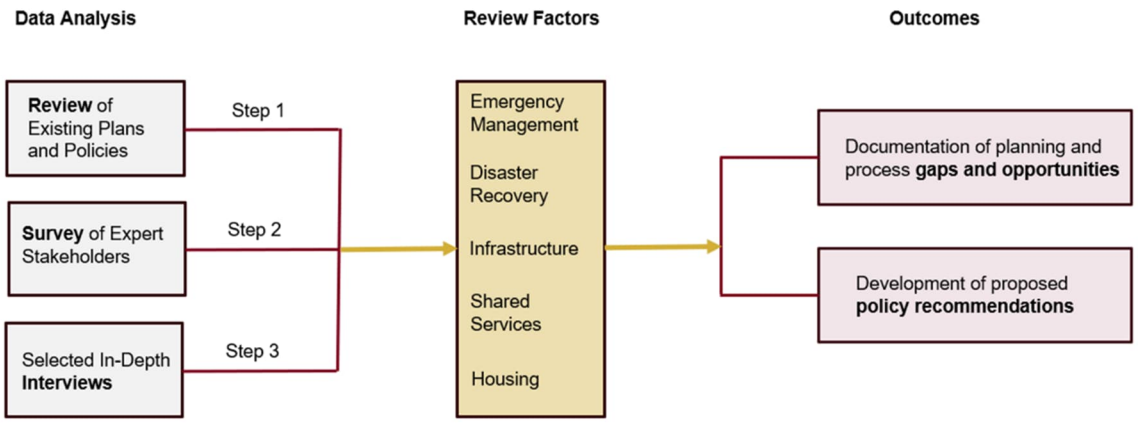
1. Emergency operations
2. Disaster recovery
3. Infrastructure
4. Shared services
5. Housing

These categories were chosen due to their relevance to emergency management and the goals of the MIRR. These categories also helped provide a framework for recording existing coordination activities, identifiable gaps, and opportunities for enhancement. The five topics structure was employed at each level of inquiry, from the plan review, through the expert survey, and the follow-up interview, in order to provide consistency of analysis.

Methodology and Data Analysis

The Barnebey Lab research team employed a three-step process to identify existing conditions, potential gaps in coordination, and opportunities for enhancing existing inter-governmental and cross military-civilian efforts related to regional resilience. The first step involved a review of existing plans and polies, document using a plan review matrix structured around five resilience factors, emergency management, disaster recovery, infrastructure, shared services, and housing. The second step incorporated the five resilience factors into a Qualtrics survey of government and military administrators, inquiring about existing coordination and areas for improvement. The data recorded from these first two steps was augmented in step three through in-depth follow-up interviews with key stakeholders from both the military and civilian government entities. **Figure 2**, below, details this stepwise research process.

Figure 2. Research Process



1. Plan Review

The plan review began in October 2023 and was completed by the Barnebey Lab in January 2024. It consisted of a spreadsheet of 49 plans and five tabs, one for each of the above resiliency categories. All categories were examined for shared resources and staffing as well as a statement of coordination. A copy of the plan review can be found in **Appendix A.** Plans were examined to determine if coordination / resiliency efforts pertaining to each category were mentioned. Each category had a separate list of questions:

- **Emergency Operations**
    - Is there any mention of base-specific military and civilian coordination?
    - Are there specific categories of emergencies cited?

- **Disaster Recovery**
    - Is there mention of coordinating mission assignments on and off base?
    - Is there any statement regarding the coordination of recovery planning (i.e., plan has been shared and reviewed by)?
    - Are there specific categories for debris removal and emergency protective measures?

- **Infrastructure**
    - Is there anything specific to mobility and power?
    - Is there any discussion of waste and water facilities?

- **Shared Services**
    - Is there anything referring to law enforcement or right-of-way maintenance?
    - Is there anything referring to school buses or transit?

- **Housing**
    - Are there any special programs for service personnel?
    - Are there considerations regarding disaster vulnerability special programs?

Of the 49 plans analyzed, 36 were from city and county governments, 7 were from regional agencies (i.e., the ECRC or Northwest Florida Water Management), and 6 were from military bases. The team observed more references to coordination related to emergency operations, disaster recovery, and infrastructure planning and maintenance, fewer references to shared services, and even less for housing. Additionally, the team saw few instances of explicitly stated coordination between bases and local jurisdictions, especially regarding specific functions such as right-of-way maintenance, debris collection, law enforcement, and transit. Finally, we observed that documents produced off-base rarely mentioned the bases within their jurisdiction.

Our plan review suggests that coordination between bases and local governments is well documented for the three categories of emergency operations, disaster recovery, and infrastructure planning and maintenance. The plan review also suggests that more instances of coordination exist, in the other categories, though they are not well documented. Additionally, there are more instances of coordination that exist outside of what was observed in our plan review.

These results encouraged us to posit that coordination between bases and local governments exists, in a de facto sense, but not all coordination is included in official plans, or in a de jure sense. In short, the plan review suggests that there are gaps in the documentation of coordination, specifically for shared services and housing.

2. Stakeholder Survey

Using information derived from the plan review a digital survey was created. The Stakeholder Survey was opened in December 2023 and closed in February 2024. It was shared with Jacobs and the ECRC before being sent out to advisors and officials from regional city and county governments, regional agencies, and military bases. Different versions of the survey were given based on whether respondents selected whether they were military personnel or from a city, county, or regional agency. Survey questions and answers can be found in **Appendix B**. The stakeholder survey was directed towards emergency managers, planners, administrators, and other staff from the region's cities, counties and military installations. It was intended to provide depth to the research team's understanding of current and potential opportunities for intergovernmental coordination. The survey had ten questions, mirroring the five review factors of the plan review process. By the time of the initial survey end date 23 responses were received. The survey was pushed several times to allow for a larger sample size. The final day for responses was February 11, 2024. In total, the survey received 73 responses.

Figures 3 and **4** illustrate the frequency of respondent agencies and roles.

Figure 3. Frequency of Respondent Agencies

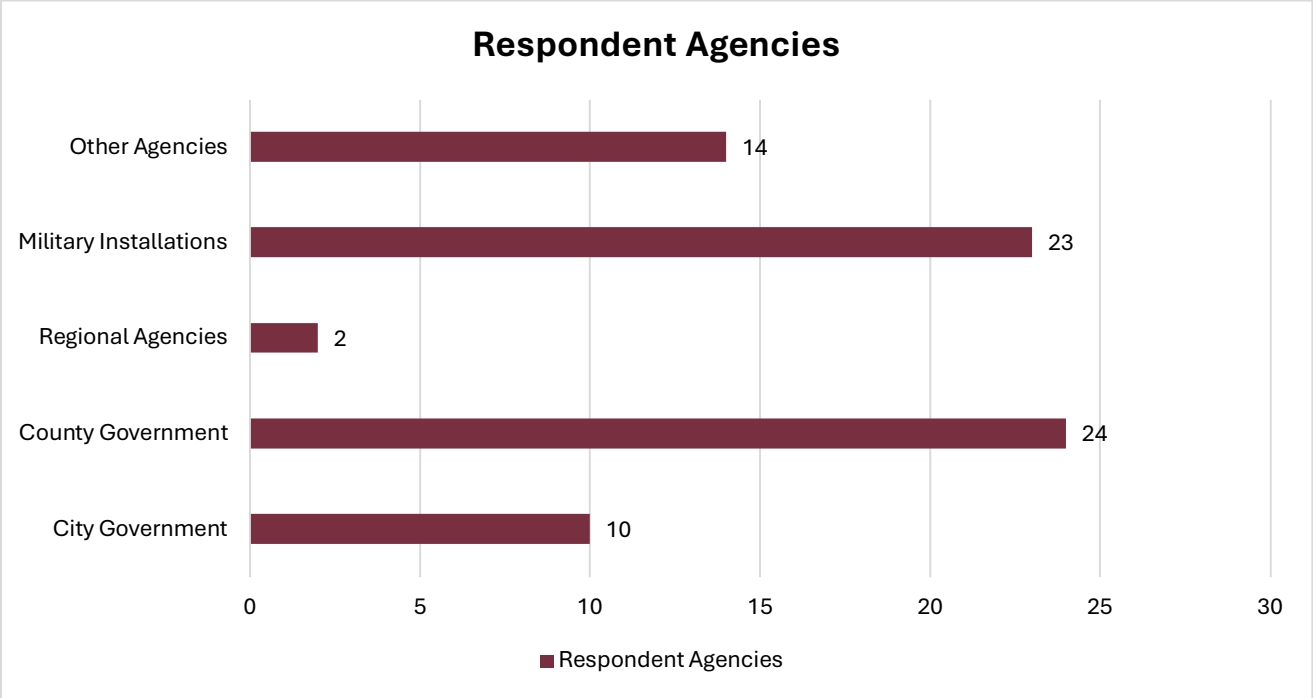
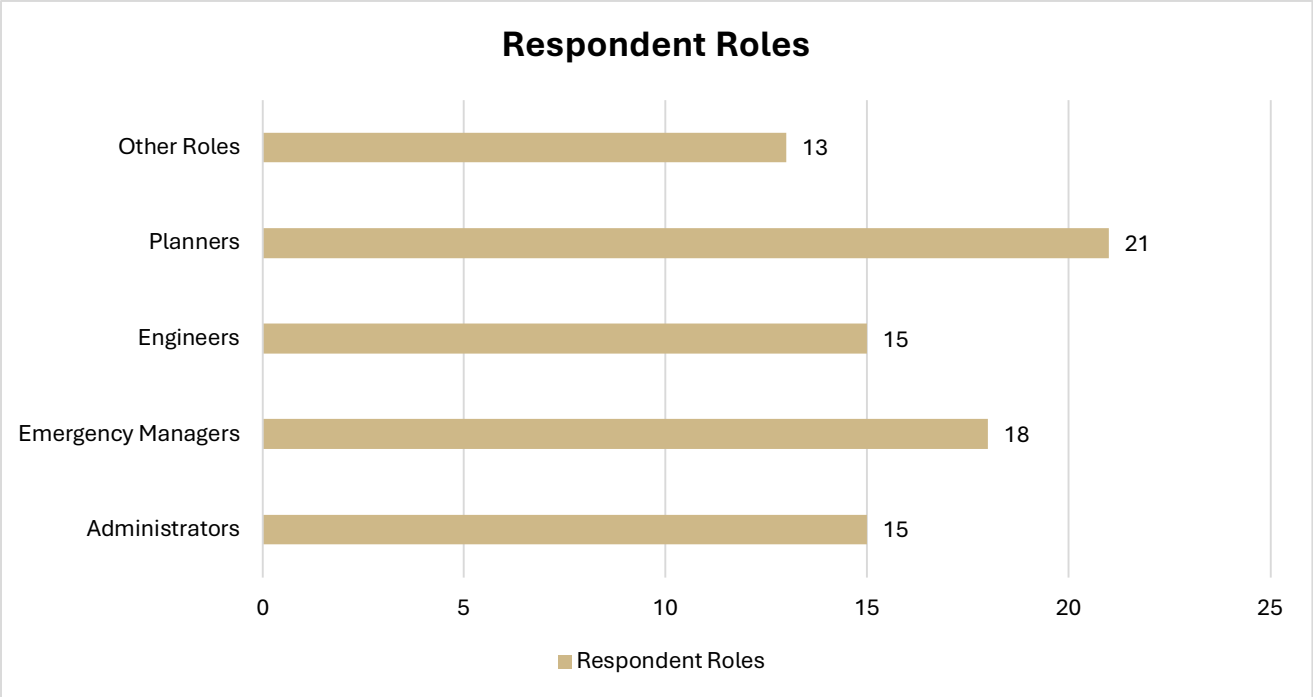


Figure 4. Frequency of Respondent Roles



In total, 72 responses were received including 17 emergency managers, 20 planners, 15 engineers, 14 administrators, and 14 individuals who identified with other roles. 10 worked with city government, 24 with county government, 2 with regional agencies, 23 with military installations, and 21 identified as working with other agencies. A few respondents stated that they worked with other agencies or in other roles, apart from those provided. Other agencies and roles included utility companies, housing coalitions, GIS professionals, housing managers, grant managers, and environmental resource managers.

As intended, the stakeholder survey supplemented the team's understanding of existing coordination between bases and local governments in Northwest Florida. Respondents cited local emergency services, infrastructure, education, utilities, and community planning as current coordination activities. Commonly cited gaps in coordination included debris clean up, power restoration, and traffic management during disasters. Each review factor had a question asking respondents whether there were any related activities that they did not currently coordinate with a local jurisdictions on but could identify as beneficial. For each of the five review factors over 50% of the respondents replied that there were not any such activities.

3. Expert Interviews

Survey respondents were given the opportunity for a follow-up interview. Of the 72 respondents, 27 agreed to a follow-up interview. A list of these respondents can be found in **Appendix C**. Respondents were given the choice between short, 15 question phone interviews or self-guided written interviews. A copy of the written interview document can be found in **Appendix C**. Respondents were contacted by phone, then later by email, to set up their interviews.

Follow-up interviews were conducted between February 2024 and April 2024. They were intended to clarify and expand upon information received from the plan review and survey. In the end nine follow-up interviews were completed. Three were conducted over the phone and six were delivered as emails. 16 individuals were interviewed over the course of nine separate interviews. Specifically, there were 8 individual interviews and one group interview with 8 interviewees. Attendance for the group interview held on April 3rd, 2024, is available in **Appendix C.**

Interviewees from Hurlburt Field shared that they have an on-base hurricane team and a task force for disaster response. They suggested that there is a coordination gap in terms of labor. Specifically, they commented that internally they are prepared, but externally they are focused on life-saving measures and preventing property damage. Other officials shared that they struggle with communication gaps. One interviewee from Eglin disclosed that they had recently lost access to the state's Web Emergency Operations Center (WebEOC). The same interviewee stated that this has made the process of sharing and monitoring data even more difficult, especially with regards to future opportunities for coordination. On the other hand, other interviewees felt as though communication between on and off base EOCs is well coordinated and effective. Officials from several bases also shared their housing efforts. This included working with local governments to supply utilities to on base housing, advocating for affordable housing for members of the military and the public, and collaborating with grant funding agencies like the Florida Housing Coalition to build multifamily developments near military bases.

Similarly to the survey, most interviewees felt that there were little to no critical gaps in their coordination for any of the five key review factors, but that there are always opportunities for improvements around the edges. Respondents shared that there is a strong, long-standing, positive foundation formally, through participation in regional planning entities (MPO/TPOs, LEPCs), and informally, through task forces and working groups, for military base – civilian government coordination on a range of planning issues. The most cited opportunities for collaboration were also like those stated in the survey: road infrastructure planning, traffic management, affordable housing, and wastewater management.

Recommendations for Joint Resilience Efforts

As has been noted throughout this report, there is more coordination happening among and between military installations and local governments than what is formally recorded in plans, policies, and procedures. Much of this coordination is de facto, relying on the goodwill of the partners, rather than de jure, proscribed based on plan or legal requirements. Overall, we recommend that these historically strong and positive interactions and examples of coordination that happen on the ground should be reflected in both military installation and civilian government plans. Our specific recommendations for each of the five resiliency topics are as follows:

Emergency Management:

Existing Conditions

There was a high level of coordination reported between the military and civilian governments as it relates to emergency management. Several survey respondents and interviewees affirmed the fact that there is positive coordination, established processes, and combined training and exercise opportunities between military installations and local governments in Northwest Florida.

Considerations

While the military reported having good access to civilian government during disasters (EOC's, briefings, etc.), some respondents noted that there are limits to civilian access to military base EOCs. Another concern was interoperability regarding computer systems and communication platforms. Finally, while mechanisms exist for coordination, some planning groups or task forces are better in terms of participation than others.

Recommendations

- Explore opportunities for enhancing data sharing between military installations and their local jurisdictions during disaster events.

- Examine the feasibility of re-establishing the military's connection to the state's WebEOC.

- Ensure military staff members consistently attend Local Emergency Planning Committee meetings.

Disaster Recovery:

Existing Conditions

The military has a primary duty to address recovery on base and the civilian authority for areas off base. Some very welcome support has been provided by the military post disaster (debris push, traffic management), but in a time limited manner (such as during the first 72 hours of a declared event).

Considerations

There was a desire expressed by some civilian authorities that the military provide more post-disaster assistance. The military does not have the authority to do this outside of the mission tasking through the state EOC. Additionally, to support regional economic recovery, it is important to allow pre-event contracts to be activated and engage the private sector in regional recovery when feasible.

Another significant consideration identified by the expert interview panel was base re-entry for off-base personnel, including service members and civilians, is a major concern. The general vulnerability of the on-base (and off-base) workforce, coupled with concerns regarding individual recovery needs, is worsened by unplanned and potentially inefficient base re-entry protocols.

Recommendations

- Formalize the understanding of what the military can and cannot do in support of civilian-led, off-base recovery efforts, including mission requests through the State Emergency Response Team (SERT). Document these limitations and opportunities and the process for requesting aid in the County Comprehensive Emergency Management Plans (CEMP).

- Initiate future collaborative efforts between military installations and local jurisdictions that focus on streamlining base re-entry. This should include regional disaster exercises, training, and revisions to County CEMPs as needed.

Infrastructure Planning and Maintenance:

Existing Conditions

The status of transportation infrastructure and the efficiency of the regional transportation network is important to military installations, local governments, and the regional economy under blue skies, as these conditions will directly impact disaster response and immediate recovery operations, as well as long-term economic recovery and resilience of the region. The military reports meaningful engagement with area MPOs/ TPOs and other planning entities LEPC with regards to infrastructure planning and maintenance.

Considerations

Because of the constraints in the local housing market, commute distances, travel times, and congestion for both the military and civilian populations are an area of concern. Some enlisted and civilian employees noted they need to drive over an hour to get to their base. Likewise, many local governments report longer commute times for their employees.

Recommendations

- Continue miliary personnel inclusion and engagement in local, county, and regional planning organizations that address transportation assets, including the region's TPOs/MPOs, the Local Mitigation Strategy (LMS) working groups, and ad hoc and emerging planning opportunities, like the MIRR Technical Advisory Committee (TAC) Meeting.

- Conduct benefit cost analysis of improvements to understand the value of ensuring consistent and efficient integration of military installations into the regional transportation network and to assist in the prioritization of maintenance (Resurfacing, Restoration, and Rehabilitation), disaster loss-reduction / hazard mitigation, and the development of new facilities.

Shared Services:

Existing Conditions

The provision of services on-base and off base is not well integrated, with little evidence of cooperative agreements. Most basic services, including water/wastewater, energy, and solid waste management, are handled independently. Some examples exist where a miliary installation and a local government are exploring cost sharing / shared use in the expansion of a water utility system.

Considerations

Improving shared services has the potential to be both a cost saving measure for the military and civilian governments, and, through making the provision of these services more efficient, an opportunity to enhance regional resilience. The stakeholder survey and follow-up interviews identified this as an area where both the military and civilian respondents felt there were opportunities for improvement.

Recommendations

- Continue the intergovernmental / military - civilian dialogue on areas for sharing services, with a goal of identifying and prioritizing these opportunities. Because solid waste collection was identified as a potential point for future collaboration, and it does not involve construction activities, this may be an area to explore first.

- Identify potential military and civilian government funding sources that could be used to expand, improve the redundancy of, or build new water / wastewater systems or other critical service infrastructure.

Housing:

Existing Conditions

The region, like the nation, is experiencing a crisis in the availability and affordability of housing. While all local governments must maintain a comprehensive growth management plan that includes a housing element, pursuant to Chapter 163, F.S., there was no mention of coordination between the military and local governments in these plans or any of the other plans that were reviewed. Regarding supporting residents and employees, unlike the local governments, as new personnel arrive at a military installation, they are provided with a housing packet that can help direct them to affordable housing and encourage them to obtain flood insurance. Some state-level entities, including the Florida Housing Finance Corporation, were cited as being helpful resources in identifying affordable, multi-family housing projects near military bases.

Considerations

Housing costs and policies affect where people live and work, as well as their ability to move or change jobs. Greater access to affordable housing can lead to increased tax generation, job creation, and economic development opportunities. Adequate housing can also facilitate labor mobility within an economy and help economies adjust to adverse shocks, making it a critical area of resilience. While this problem is bigger than the communities and the military installation in the region, even marginal improvements in coordination may help improve regional resilience.

Recommendations

- Continue working with entities like the Florida Housing Finance Corporation to provide resources on locating affordable housing.

- Identify potential military and civilian government funding sources that could be used to expand access to affordable housing in the region, from vouchers to new construction.

Appendix A: Plan Review

A-1. Emergency Management Plan Review

Plan Name	Is there any mention of base specific military and civilian coordination?	Are there specific categories of emergency cited? List all.	Statement of Coordination	Shared Staffing	Shared Resources	Shared Planning
St. Andrews Bay SWIM Plan	Yes (B11-B12, G1)	No	No	No	Shared land (B12)	No
Panama City Comprehensive Plan	Yes (pg. 15, 16, 53, 57)	No	Yes (pg. 15-16)	No	No	No
Bay County Strategic Plan 2022-2026	No	Not in relation to the bases	Yes (pg. 15, PZ task 3.1.1)	No	No	No
Bay County LMS Master Plan 2020	Yes (pg. 9, 14)	Hurricane damage (pg. 6)	No	No	Land, airspace	No
City of Lynn Haven Comprehensive Plan	No	No	No	No	No	No
Projects Considered by the Bay County Commissioner	No	No	No	No	No	No

Plan Name	Is there any mention of base specific military and civilian coordination?	Are there specific categories of emergency cited? List all.	Statement of Coordination	Shared Staffing	Shared Resources	Shared Planning
Eglin Air Force Base JLUS	Coordination in terms of meetings with city officials to address issues, specifically development along the Eglin AFB Boundary, lighting, noise, etc.	No	"Enhance land use compatibility within Santa Rosa, Okaloosa, and Walton Counties and its municipalities by coordinating, forming partnerships, and management initiatives to ensure long term viability of Eglin AFB's role" (28)	No	No	No
Florida-Alabama Transportation Planning Organization 2045 Long Range Plan	Yes, several projects are in the works related to evacuation routes and military access during emergencies. (127)	Focus is placed on areas in coastal high hazard areas. Public health emergencies, adverse effects of climate change (heavy rain, rising sea levels, intense hurricanes, heat waves, other extreme weather events. (128)	No	No	No	No
Pensacola Bay System Service Water Improvement and Management Plan	Yes, base is managed for habitat conservation and endangered species protection (B-11)	No	Six Rivers Cooperative Invasive Species Management Areas (B-11)	No	Legacy Program (B-11)	No
Pensacola and Perdido Bays Estuary System	Eglin Air Force Base Natural Resources Team (54) & Sentinel Landscape (80)	Watershed clean up	No	No	Sentinel Landscape	No
Pensacola Bay Living Shoreline Project Basis of Design Report	Defense Infrastructure Program (7)	Risk areas listed (pg. 11-12)	No	No	Yes, (Appendix C, pg. 57)	Yes, (Appendix C, pg. 57)
Escambia County Comprehensive Plan 2030	Yes, (CP2:2)	No, just references to their emergency management plan	Yes (CP7:11-CP7:12)	Yes, (CP2:1 & CP8:11)	Airfields (CP8:10)	Yes, (CP2:1 & CP8:11)

Plan Name	Is there any mention of base specific military and civilian coordination?	Are there specific categories of emergency cited? List all.	Statement of Coordination	Shared Staffing	Shared Resources	Shared Planning
Escambia County LMS	Yes (pg. 107, task 5)	Fires (pg. 47), aircrafts (pg. 68), terrorism (pg. 75)	No	No	No	No
City of Gulf Breeze 5 Year Strategic Plan	No	No	No	No	Land (pg. 35)	No
Response to Public Input for Pensacola Bay Living Shoreline	No	No	No	No	No	No
NASP East Enclave Overview Report	No	No	No	No	No	No
Coastal Vulnerability Assessment: Escambia County, Florida	No	No	No	No	No	No
Hurlburt Field ERRE SAME Brief May 2023	Yes, for a potential regional ERRE. They cite multiple bases, county governments, city governments, utilities, and businesses (19). Also mention the need "to understand impact to off-base residents" (20).	Heat waves, hurricanes, windstorms, and lightning. There are also mentions of preparation against criminal attacks, cyber-attacks, and protection against adversaries. (4)	Only a statement regarding future coordination.	No	Specifically mentions the ECRC MIRR as a resource. Only one to do so thus far.	No
Joint Land Use Studies for Military Installations	Yes. They list a technical advisory committee review, policy review, focus on public awareness through meetings, flyers, and websites. No focus on emergency or preparedness.	No	No	No	No	No

Plan Name	Is there any mention of base specific military and civilian coordination?	Are there specific categories of emergency cited? List all.	Statement of Coordination	Shared Staffing	Shared Resources	Shared Planning
NAS Pensacola Compatible Use Study	Section 7.4 contains a Communications and Coordination section that details several projects, both completed and in progress, between military and civil actors. Several deals with emergency mitigation and resiliency including the continued implementation of the Pensacola Bay Living Shoreline.	Storm surges, drought, heat waves, hurricanes, tropical storms, flooding, and emergency plane landings.	Yes (P. 232-261)	Yes	"land, water, airspace, and infrastructure such as transportation networks" (22)	Yes
Air Installations Compatible Use Study	No	No	NOLF Saufley has been used in coordination with FEMA for past hurricane response efforts, including having been used as a temporary Logistical Staging Area (23) (31)	No	No	No
Perdido River and Bay SWIM Plan	No	Hurricanes, major storm systems, floods, oil spills	Gulf Coastal Plain Ecosystem Partnership (88)	No	No	No
Okaloosa-Walton Long Range Transportation Plan	Several projects relating to improvements to Eglin Parkway, nothing outside of that.	No	No	No	No	No
Okaloosa County Comprehensive Emergency Management Plan	Yes (about environmental protections, pages 6, 69, 242)	Not in relation to the bases	Yes (pg. 65, objective 1.3.B & pg. 310 section 9.3.1)	No	Yes, shared airspace (pg. 83)	No
Water and Sewer Enterprise Fund/Engineering (PBB FY2023)	No	No	No	No	Yes (land, pg3)	No

Plan Name	Is there any mention of base specific military and civilian coordination?	Are there specific categories of emergency cited? List all.	Statement of Coordination	Shared Staffing	Shared Resources	Shared Planning
Okaloosa Surtax Needs List	Yes (pg. 32, 42, 44)	Oil spills (pg. 54), terrorism (pg. 58), aircraft accidents (pg. 44)	No	No	Mutual aid (pg. 32), aircrafts (pg. 44)	No
Okaloosa Couty LMS Ranked Project Listing	No	Yes, these projects aim to mitigate a variety of emergencies. These include storm surge, flood, severe storms, tropical storms, hurricanes, heat wave, drought, wildfires, dam safety, and beach erosion.	No	No	No	No
2021 LMS Project List for Okaloosa	No	Hurricane, tropical storm, flood, storm surge	No	No	No	No
CH-2.13 Capital Improv with Adopted 5-Year Schedule	No	No	No	No	No	No
Airport Budget Packet	No	No	No	No	No	No
City of Valparaiso JLUS	No	No	No	No	No	No
2019 Region II Regional Water Management Plan - Northwest Florida Water Management District	Yes (pg. 80 & 169, section ESF13)	No	No	No	Yes (pg. 101)	No
Santa Rosa County Comprehensive Emergency Management Plan 2022	Mention of protecting military bases (B-2), endangered species on Eglin base (B-12)	Emergency Watershed Protection Program (60)	No	Yes (B1-B2)	Yes (B1-B2)	Yes (B1-B2)

Plan Name	Is there any mention of base specific military and civilian coordination?	Are there specific categories of emergency cited? List all.	Statement of Coordination	Shared Staffing	Shared Resources	Shared Planning
Santa Rosa County Comprehensive Plan Through 2040	No	No	No	No	Yes (pg. 2)	No
Land Acquisition Study for the Santa Rosa Board of County Commissioners	Program is meant to evaluate existing and future land uses as they relate to military operations (11)	No	No	No	No	No
Florida Community Resiliency Initiative Pilot Project	No	No	No	No	No	No
Choctawhatchee River and Bay Surface Water Improvement and Management Plan	No	No	No	No	No	No
Walton County Emergency Management Plan 2020	According to ESF 13, Eglin Air Force Base and USAF Site C6 will serve as support agencies during or after disasters.	Yes, ESF 13	Yes. ESF 13 Military Support addresses the coordination of military resources during or after a disaster. (43)	No	Yes, ESF 13	ESF 13 names Florida National Guard, USAF Site C6, and Eglin Air Force Base
Walton County Local Mitigation Strategy	No	Yes, 3.3.1 detail federal disaster declarations, the emergency and disaster declarations for Walton since 1975. (20)	No	No	No	No
Walton County Comprehensive Plan (Infrastructure Element)	No	No	No	Water conservation (pg. 3)	No	No
Walton County Comprehensive Plan (Future Land Use Element)	No	There is only a mention of wildfire hazards. (28)	No	No	No	No

Plan Name	Is there any mention of base specific military and civilian coordination?	Are there specific categories of emergency cited? List all.	Statement of Coordination	Shared Staffing	Shared Resources	Shared Planning
Walton County Comprehensive Plan (Capital Improvements Element)	No	Only examples of planned funding for various emergencies including tropical storms and hurricanes.	No	No	No	No
Walton County Comprehensive Plan (Transportation Element)	No	No	No	No	No	No
Walton County Comprehensive Plan (Recreation Element)	No	No	No	No	No	No
Walton County Comprehensive Plan (Property Rights Element)	No	No	No	No	No	No
Walton County Comprehensive Plan (Intergovernmental Coordination Element)	No	No	No	No	No	No
Walton County Comprehensive Plan (Housing Element)	No	No	No	No	No	No
Walton County Comprehensive Plan (Conservation Element)	No	No	No	No	No	No
Walton County Comprehensive Plan (Coastal Management Element)	No	No	No	No	No	No

A-2. Disaster Recovery Plan Review

Plan Name	Is there any mention of coordinating mission assignments on and off base?	Is there any statement regarding the coordination of recovery planning (i.e., plan has been shared and reviewed by)?	Are there specific categories for debris removal and emergency protective measures?	Statement of Coordination	Shared Staffing	Shared Resources	Shared Planning
2019 Region II Regional Water Management Plan - Northwest Florida Water Management District	No	pg. 11	No	The District has supported cooperative efforts to evaluate alternatives, funding options, and site plans with Okaloosa County and project partners that have included Eglin AFB and the U.S. Army Corps of Engineers (11)	pg. 11	pg. 11	pg. 11
2021 LMS Project List for Okaloosa	No	No	No	No	No	No	No
Air Installations Compatible Use Study	No	No	No	No	No	No	No
Airport Budget Packet	No	No	No	No	No	No	No
Bay County LMS Master Plan 2020	No	No	Some mention of natural disasters carrying debris from bases into county	No	No	Land, airspace	No
Bay County Strategic Plan 2022-2026	Coordinate proposed new developments with area bases to support compatible growth that sustains military mission capability (pg. 15)	No	No	Yes (pg. 15, PZ task 3.1.1)	No	No	No

Plan Name	Is there any mention of coordinating mission assignments on and off base?	Is there any statement regarding the coordination of recovery planning (i.e., plan has been shared and reviewed by)?	Are there specific categories for debris removal and emergency protective measures?	Statement of Coordination	Shared Staffing	Shared Resources	Shared Planning
CH-2.13 Capital Improv with Adopted 5-Year Schedule	No	No	Nothing specific to emergencies, though there are improvements to sewers, road surfaces, storm water management that could be considered emergency protective measures.	No	No	No	No
Choctawhatchee River and Bay Surface Water Improvement and Management Plan	No	No	Emergency Watershed Protection Program to remove debris from streams and other water sources (69).	Natural Resource Management on Department of Defense Lands. (92)	No	No	No
City of Gulf Breeze 5 Year Strategic Plan	No	No	Yes, but not in relation to base	No	No	Land (pg. 35)	No
City of Lynn Haven Comprehensive Plan	No	No	No	No	No	No	No
City of Valparaiso JLUS	No	No	No	No	No	No	No
Coastal Vulnerability Assessment: Escambia County, Florida	No	No	Yes, but not in relation to base	No	No	No	No
Eglin Air Force Base JLUS	Same as previous sheet	No	No	No	No	No	No
Escambia County Comprehensive Plan 2030	Military rep. is on the planning board (pg. CP2:1) and supports their missions (CP7:11)		Yes, but not in relation to base	Yes (CP7:11-CP7:12)	No	Airfields (CP8:10)	Yes, (CP8:11)

Plan Name	Is there any mention of coordinating mission assignments on and off base?	Is there any statement regarding the coordination of recovery planning (i.e., plan has been shared and reviewed by)?	Are there specific categories for debris removal and emergency protective measures?	Statement of Coordination	Shared Staffing	Shared Resources	Shared Planning
Escambia County LMS	Annually meet with representatives of local military bases to explore potential mitigation opportunities (107)		Yes, but not in relation to base	No	No	No	No
Florida Community Resiliency Initiative Pilot Project	No	No	No	No	No	No	No
Florida-Alabama Transportation Planning Organization 2045 Long Range Plan	Not specific to disaster recovery.	Federal expectations include consultation of agencies responsible for natural disaster risk reduction (32) Also the ability to recover from natural disasters is detailing 6.4.9 Natural Disaster Risk Reduction and Resiliency (126)	No	Objective A.3 ensures a regional transportation system that can support recovery efforts. (41)	No	No	No
Hurlburt Field ERRE SAME Brief May 2023	Recommendation for future regional efforts.	No	No	No	No	No	No
Joint Land Use Studies for Military Installations	JLUS was conducted to address encroachment of the base, not coordination regarding disasters/emergencies	No	No	No	No	No	No
Land Acquisition Study for the	No	No	No	No	No	No	No

Plan Name	Is there any mention of coordinating mission assignments on and off base?	Is there any statement regarding the coordination of recovery planning (i.e., plan has been shared and reviewed by)?	Are there specific categories for debris removal and emergency protective measures?	Statement of Coordination	Shared Staffing	Shared Resources	Shared Planning
Santa Rosa Board of County Commissioners							
NAS Pensacola Compatible Use Study	Purpose of the CUS is to identify opportunities for coordination	Mention of the importance of the Port of Pensacola when it comes to disaster recovery efforts. (167)	No	Yes	Yes	Yes	Yes
NASP East Enclave Overview Report	No	No	No	No	No	No	No
Okaloosa County Comprehensive Emergency Management Plan	No	Military may request aid from the county & vice versa (32)	Military retains control in emergencies (29), also discusses susceptibility to flooding, terrorism, and oil spills	Pg 29 & 32	Pg 29 & 32	Pg 29 & 32	Pg 29 & 32
Okaloosa Couty LMS Ranked Project Listing	No	No	No	No	No	No	No
Okaloosa Surtax Needs List	No	No	No	No	No	No	No
Okaloosa-Walton Long Range Transportation Plan	No	No	No	No	No	No	No
Panama City Comprehensive Plan	Yes (pg. 16, objective 1.15)	Ex-officio member is allowed on planning board (pg. 53)	Yes, but not in relation to base	Yes (pg. 15-16)	No	No	No
Pensacola and Perdido Bays Estuary System	Eglin Air Force Base Natural Resources Team (54)	No	Yes, but not in relation to base	No (discussion of conservation but no true statement)	No	Yes (54)	Yes (54)
Pensacola Bay Living Shoreline Project Basis of Design Report	Defense Infrastructure Program (7), goals of project PowerPoint slide states that county aims to protect	No	Risk areas listed (pg. 11-12)	No	No	Yes, (Appendix C, pg. 57)	Yes, (Appendix C, pg. 57)

Plan Name	Is there any mention of coordinating mission assignments on and off base?	Is there any statement regarding the coordination of recovery planning (i.e., plan has been shared and reviewed by)?	Are there specific categories for debris removal and emergency protective measures?	Statement of Coordination	Shared Staffing	Shared Resources	Shared Planning
	military missions						
Pensacola Bay System Service Water Improvement and Management Plan	Six Rivers Cooperative Invasive Species Management Areas (B-11)	No	Debris removal in streams (not related to base)	Six Rivers Cooperative Invasive Species Management Areas (B-11)	No	Legacy Program	Legacy Program
Perdido River and Bay SWIM Plan	No	No	No	No	No	No	No
Projects Considered by the Bay County Commissioner	No	No	No	No	No	No	No
Response to Public Input for Pensacola Bay Living Shoreline	No	No	No	No	No	No	No
Santa Rosa County Comprehensive Emergency Management Plan 2022	No	Federal govt. assists bases (45), ESF13 Plan (80, 169)	Yes, but not in relation to base	The purpose of ESF 13 is to provide military support coordination during disasters in Santa Rosa County (80, 169)	No	Pg 80, 101	Pg 80
Santa Rosa County Comprehensive Plan Through 2040	No	Base preservation (14, 64, 65)	No	Foster meaningful intergovernmental coordination between the County, the military and the Federal Aviation Administration to ensure that land use decisions are not in conflict with military operations or federal aviation standards, and that such decisions promote the health and safety of the	The Local Planning Board will include, as ex-officio members, appropriate local Department of Defense representatives (65)	(64-65)	(64-64)

Plan Name	Is there any mention of coordinating mission assignments on and off base?	Is there any statement regarding the coordination of recovery planning (i.e., plan has been shared and reviewed by)?	Are there specific categories for debris removal and emergency protective measures?	Statement of Coordination	Shared Staffing	Shared Resources	Shared Planning
				County's public (65)			
St. Andrews Bay SWIM Plan	No	No	Yes, but not in relation to base	No	No	Shared land (B12)	No
Walton County Comprehensive Plan (Capital Improvements Element)	No	No	No	No	No	No	No
Walton County Comprehensive Plan (Coastal Management Element)	No	No, closest would-be Policy CM-2.4.2 which details short term recovery efforts but does not mention coordination. 11	Policy CM-2.4.4 specifies windborne debris.12	No	No	No	No
Walton County Comprehensive Plan (Conservation Element)	No	No	No	No	No	No	No
Walton County Comprehensive Plan (Future Land Use Element)	No	No	No	No	No	No	No
Walton County Comprehensive Plan (Housing Element)	No	No	No	No	No	No	No
Walton County Comprehensive Plan (Infrastructure Element)	No	No	No	No	Water conservation (pg. 3)	No	No
Walton County Comprehensive Plan (Intergovernmental Coordination Element)	No	No	No	No	No	No	No
Walton County Comprehensive	No	No	No	No	No	No	No

Plan Name	Is there any mention of coordinating mission assignments on and off base?	Is there any statement regarding the coordination of recovery planning (i.e., plan has been shared and reviewed by)?	Are there specific categories for debris removal and emergency protective measures?	Statement of Coordination	Shared Staffing	Shared Resources	Shared Planning
Plan (Property Rights Element)							
Walton County Comprehensive Plan (Recreation Element)	No	No	No	No	No	No	No
Walton County Comprehensive Plan (Transportation Element)	No	No	No	No	No	No	No
Walton County Emergency Management Plan 2020	No	Coordination of recovery activities will be handled by all municipalities and the county (73)	Yes. ESF 3 covers the coordination of debris removal, including on private property. It provides steps for the prioritization of debris removal in all municipalities in Walton County. (83)	Coordination, staffing, resources, and planning between county and municipalities only.	No	No	No
Walton County Local Mitigation Strategy	Only off base and not in coordination with the base.	No	No	No	No	No	No

A-3. Infrastructure Planning and Maintenance Plan Review

Plan Name	Is there anything specific to mobility or power?	Is there anything specific to water/waste?	Statement of Coordination	Shared Staffing	Shared Resources	Shared Planning
2019 Region II Regional Water Management Plan - Northwest Florida Water Management District	No	Entire document (but not really in relation to base)	The District has supported cooperative efforts to evaluate alternatives, funding options, and site plans with Okaloosa County and project partners that have included Eglin AFB and the U.S. Army Corps of Engineers (11)	pg. 11	pg. 11	pg. 11
2021 LMS Project List for Okaloosa	Past plans included emergency generators, as well as generators for wastewater treatment plants, lift stations, wells, and booster stations.	Past plans focused on mitigating stormwater runoff and flooding, stormwater swales and retention areas, etc.	No	No	No	No
Air Installations Compatible Use Study	No	No	No	No	No	No
Airport Budget Packet	No	No	No	No	No	No
Bay County LMS Master Plan 2020	No	Not in relation to base	No	No	No	No
Bay County Strategic Plan 2022-2026	No	Not in relation to base	No	No	No	No
CH-2.13 Capital Improv with Adopted 5-Year Schedule	Several transportation projects from OCWS. These range from roadbed installation to lane improvements. Nothing specific to bases.	Yes, OCWS projects through 2027. Starting on p. 7 these projects range from small sewer system upgrades to reclaiming water main to Niceville/Eglin. Also, the only mention of a base.	No	No	No	No
Choctawhatchee River and Bay Surface Water Improvement and Management Plan	No	Yes, starting on p. 43 section 4.1.3 details wastewater management and improvements. Specifically, there are projects relating to stormwater management and improvement (43), septic tank abatement (44), and advanced onsite treatment plans (45). This document has the most information for Walton's wastewater facilities and current and past projects.	No	No	No	No
City of Gulf Breeze 5 Year Strategic Plan	No	Eglin leased land to the county to connect wastewater systems (35)	No	No	No	No

Plan Name	Is there anything specific to mobility or power?	Is there anything specific to water/waste?	Statement of Coordination	Shared Staffing	Shared Resources	Shared Planning
City of Lynn Haven Comprehensive Plan	Not in relation to base	Not in relation to base	No	No	No	No
City of Valparaiso JLUS	No	No	No	No	No	No
Coastal Vulnerability Assessment: Escambia County, Florida	No	Figure 37 (pg. 49)	No	No	No	No
Eglin Air Force Base JLUS	Mentions in power with respect to the base's usage and existing impediments and nuisances for residents, nothing related to emergencies.	No	No	No	No	No
Escambia County Comprehensive Plan 2030	No	Not in relation to base	Military rep. is on the planning board (pg. CP2:1) and supports their missions (CP7:11)	No	No	No
Escambia County LMS	Outages related to natural disasters	Waste material spills	No	No	No	No
Florida Community Resiliency Initiative Pilot Project	No	Project to constructed a reclaimed water main to Niceville/Eglin	No	No	No	No
Florida-Alabama Transportation Planning Organization 2045 Long Range Plan	Yes, one of the necessary evaluations for 2045 includes Goal A, Safety and Security. Among its objectives is Intermodal access for the military. (43)	23 CF 450.306(b)(9): "Improve the resiliency and reliability of the transportation system and reduce or mitigate stormwater impacts of surface transportation", not specific to the military though. (29)	Statement regarding coordination if a planning area includes Federal Lands: "Military representatives were also actively involved in the Steering Committee to make recommendations on project affecting the several area military bases" (205)	No	No	No

Plan Name	Is there anything specific to mobility or power?	Is there anything specific to water/waste?	Statement of Coordination	Shared Staffing	Shared Resources	Shared Planning
Hurlburt Field ERRE SAME Brief May 2023	Major focus on on-base power and capability of back up systems. "Testing the ability of the backup systems to start, transfer the load, and carry the load until commercial power is restored" (3). Generators were said to have a small problem with water in fuel (18).	Yes, water systems will still be pressurized but they warn against generating wastewater during power outages/disasters (14). Wastewater was also cited as a gap in Hurlburt's infrastructure (18).	No	No	No	No
Joint Land Use Studies for Military Installations	No	No	No	No	No	No
Land Acquisition Study for the Santa Rosa Board of County Commissioners	No	No	Coordination regarding land acquisition between County Attorney's Office, property owner, and the Navy (19)	No	No	No
NAS Pensacola Compatible Use Study	There is a section dedicated to roadway capacity (202) and several mentions of utility services throughout the paper.	Comprehensive Environmental Response, Compensation, and Liability Act supports the cleanup of sites with hazardous waste (123), the DCIP addresses waste and wastewater management, and there are several sections dedicated to water and water quality.	"The Defense Community Infrastructure Pilot (DCIP) Program is designed to address deficiencies in community infrastructure supportive of a military installation to enhance military value, installation resilience, and military family quality of life. (126)	Yes	"Pensacola also provides services in natural resource extraction, utilities, and professional, scientific, and technical services." (81)	Yes
NASP East Enclave Overview Report	No	No	No	No	No	No
Okaloosa County Comprehensive Emergency Management Plan	Not in relation to base	No	Pg 29 & 32	Pg 29 & 33	Pg 29 & 34	Pg 29 & 35

Plan Name	Is there anything specific to mobility or power?	Is there anything specific to water/waste?	Statement of Coordination	Shared Staffing	Shared Resources	Shared Planning
Okaloosa Couty LMS Ranked Project Listing	Yes. Several projects installed generators including 3d, 3f, 11d, 12a, 13a, and 14a. 14a provides "a post-storm power source for traffic signals to move traffic and free up emergency personnel for other efforts". Others focus simply on providing emergency power sources.	Yes, 3d stipulates generators for wastewater treatment facilities. Also 2 refers to a Master Drainage Plan.	No	No	No	No
Okaloosa Surtax Needs List	No	Stormwater improvements	No	No	No	No
Okaloosa-Walton Long Range Transportation Plan	The goal of this plan is "to provide a high quality, safe, efficient, reliable, and cost-effective multimodal transportation system that enhances economic vitality, military missions, and quality of life while protecting the environment and promoting efficient system management and operation". (3)	No	No	No	No	No
Panama City Comprehensive Plan	Not in relation to base	NSA Panama City Land Use/Water Interface Military Influence Area (15)	Ex-officio member is allowed on planning board (pg. 53) & statement of coordination on pg. 15, but not necessarily related to waste/water/power	No	No	No
Pensacola and Perdido Bays Estuary System	No	Not in relation to base	No	No	No	No
Pensacola Bay Living Shoreline Project Basis of Design Report	No	Not in relation to base	Defense Infrastructure Program (7)	No	Appendix C (pg. 57) discusses cooperation regarding airfields (related to power)	
Pensacola Bay System Service Water Improvement and Management Plan	No	Six Rivers Cooperative Invasive Species Management Areas & Legacy Program (B-11)	No	No	No	No

Plan Name	Is there anything specific to mobility or power?	Is there anything specific to water/waste?	Statement of Coordination	Shared Staffing	Shared Resources	Shared Planning
Perdido River and Bay SWIM Plan	No	4.1.3 details wastewater management and treatment improvements. (38) Additionally, there are objectives for water quality improvements that include upgrades to infrastructure and constriction best management practices (42)	No	No	No	No
Projects Considered by the Bay County Commissioner	No	No	No	No	No	No
Response to Public Input for Pensacola Bay Living Shoreline	No	No	No	No	No	No
Santa Rosa County Comprehensive Emergency Management Plan 2022	ESF 12 (pg. 79)	Yes, but not in relation to base	The purpose of ESF 13 is to provide military support coordination during disasters in Santa Rosa County (80, 169)	No	Pg 80, 101	Pg 80
Santa Rosa County Comprehensive Plan Through 2040	Yes, but not in relation to base	Not much in relation to military but there is a flood vulnerability map on pg. 211	Foster meaningful intergovernmental coordination between the County, the military and the Federal Aviation Administration to ensure that land use decisions are not in conflict with military operations or federal aviation standards, and that such decisions promote the health and safety of the County's public (65)	The Local Planning Board will include, as ex-officio members, appropriate local Department of Defense representatives (65)	(64-65)	(64-64)
St. Andrews Bay SWIM Plan	No	Reduce discharge through military facility (35),	Natural resource management program (B-8 & B-11)	No	Legacy Program	No

Plan Name	Is there anything specific to mobility or power?	Is there anything specific to water/waste?	Statement of Coordination	Shared Staffing	Shared Resources	Shared Planning
Walton County Comprehensive Plan (Capital Improvements Element)	No	Policy CI-1.3.3 dictates a minimum level of service for wastewater and potable water services. (1)	No	No	No	No
Walton County Comprehensive Plan (Coastal Management Element)	No	No	No	No	No	No
Walton County Comprehensive Plan (Conservation Element)	No	No	No	No	No	No
Walton County Comprehensive Plan (Future Land Use Element)	Mobility is mentioned in Policy BW-1.5.5 though not in a recovery context. (51)	OBJECTIVE L-1.4 is the closest mention of water/waste in a disaster context. The county will not allow new developments in floodplains or other vulnerable areas.	No	No	No	No
Walton County Comprehensive Plan (Housing Element)	No	No	No	No	No	No
Walton County Comprehensive Plan (Infrastructure Element)	No	Entire document (but not really in relation to base)	No	Water conservation (pg. 3)	No	No
Walton County Comprehensive Plan (Intergovernmental Coordination Element)	No	No	Yes, coordination and shared resources between Walton and Eglin regarding land uses. (6)	No	No	No
Walton County Comprehensive Plan (Property Rights Element)	No	No	No	No	No	No

Plan Name	Is there anything specific to mobility or power?	Is there anything specific to water/waste?	Statement of Coordination	Shared Staffing	Shared Resources	Shared Planning
Walton County Comprehensive Plan (Recreation Element)						
Walton County Comprehensive Plan (Transportation Element)	Goal T-2 provides multi modal transit to improve access to car alternatives as well as quality of life. Nothing related to mobility or power in a recovery sense. (5)	Policy T-2.3.1 to reduce water runoff in certain areas. Nothing related to recovery.	No	No	No	No
Walton County Emergency Management Plan 2020	ESF 3 prioritizes the removal of debris for roadways, but nothing else for mobility. In terms of power, ESF 12 monitors/reports on/assesses power restoration.	ESF 12 also monitors the restoration of wastewater treatment and sewage.	Public works and municipalities for restoration of potable water supply. (65)	No	No	No
Walton County Local Mitigation Strategy	As of 2020, Walton had a pending mobility plan. It is shown in Appendix A. Policy BW-1.5.5 entails improvements to access and mobility. (314, 317) Section 3.5.13 details utility outages. Specifically, there is a vulnerability and impact assessment. (148-152)	3.4.2 lists the wastewater facility as a critical facility. (23) Attention is also given to the possibility of a dam failure. Lastly, 77% of respondents to question 17 of their survey said they would like to see improvements to the damage resistance of existing utilities. (514)	No	No	No	No
Water and Sewer Enterprise Fund/Engineering (PBB FY2023)	No	Entire document (but not really in relation to base)	No	No	No	No

A-4. Shared Services Plan Review

Plan Name	Is there anything referring to law enforcement or right-of-way maintenance?	Is there anything referring to school buses or transit?	Statement of Coordination	Shared Staffing	Shared Resources	Shared Planning
Walton County Emergency Management Plan 2020	Nothing for right of way maintenance outside of debris removal for disaster recovery. ESF 16 refers to Law Enforcement. (53)	ESF 1 coordinates emergency transportation in response to / recovery from disaster. (50)	ESF 1 lists Walton County School District, Walton County Fire Rescue, South Walton Fire Rescue, and Tri-County Community Council.	ESF dictates that law enforcement agencies will work with the EOC/ Are Command Incident Action Plan and the Emergency Services Branch Director and Operations Section Chief. These law enforcement agencies include Walton County's Sheriff's Office, City of DeFuniak Springs Police Department, Florida Highway Patrol (FHP), Florida Fish and Wildlife Commission, and Florida National Guard.	No	No
Walton County Local Mitigation Strategy	No	Policy BW-1.1.4 D aims to provide an enhanced transportation network for Walton County. (312) Policy BW-1.6.5 seeks to provide pedestrian and bicycle facilities to supplement car travel. (313) Nothing on school buses.	Not with the base, for transit there is coordination between Bay Town Trolley, Walton County, and Okaloosa County Transit. (313)	No	No	No
Walton County Comprehensive Plan (Transportation Element)	Policy T-1.6.4-8 refers to right of ways, though not in a recovery sense. Policy T-1.6.4 and Policy T-1.6.5 cover right of way protections, though there is no mention of law enforcement or recovery.	Again, related to Goal T-2. Nothing for recovery or relating specifically to school buses.	No	No	No	No

Plan Name	Is there anything referring to law enforcement or right-of-way maintenance?	Is there anything referring to school buses or transit?	Statement of Coordination	Shared Staffing	Shared Resources	Shared Planning
Walton County Comprehensive Plan (Recreation Element)	No	Policy C-1.6.2 states that the county will promote multi modal transport, no reference to transit in a recovery context. (7)	No	No	No	No
Okaloosa-Walton Long Range Transportation Plan	One planned right of way acquisition, not on base for A-026. (8)	No	No	No	No	No
Santa Rosa County Comprehensive Emergency Management Plan 2022	No	There are 52 transit projects planned till 2045. (4) There is also some speculation regarding future demand for public transit and shared-use vehicles. (8)	No	No	No	No
Santa Rosa County Comprehensive Plan Through 2040	104 & 193 (not related to base)	Public transit services in Santa Rosa County are limited to the following: door to door transit services and an express bus route from downtown Pensacola to Pensacola Beach along US98 with several stops in the City of Gulf Breeze (34, 80, 98)	Foster meaningful intergovernmental coordination between the County, the military and the Federal Aviation Administration to ensure that land use decisions are not in conflict with military operations or federal aviation standards, and that such decisions promote the health and safety of the County's public (65)	The Local Planning Board will include, as ex-officio members, appropriate local Department of Defense representatives (65)	(64-65)	(64-65)
Okaloosa County Comprehensive Emergency Management Plan	34 (not related to base)	Public Safety Department may request school buses and drivers from the Okaloosa School Board (102)	No	No	No	No

Plan Name	Is there anything referring to law enforcement or right-of-way maintenance?	Is there anything referring to school buses or transit?	Statement of Coordination	Shared Staffing	Shared Resources	Shared Planning
Okaloosa Couty LMS Ranked Project Listing	There are two projects concerned with right of way erosion on specific corridors. These are projects 13i and 13j.	No	No	No	No	No
Hurlburt Field ERRE SAME Brief May 2023	No	Cites potential impacts to transportation including loss of traffic control devices, loss of the ability to refuel (for EVs and gas) (20).	No	No	No	No
CH-2.13 Capital Improv with Adopted 5-Year Schedule	No law enforcement but there are suggested improvements for various roads starting on p. 9.	No	No	No	No	No
Escambia County Comprehensive Plan 2030	States to refer to LMS (CP11:7), right-of-way mentioned (CP8:5)	Transit goals mentioned several times starting on CP8:5	Yes (CP7:11-CP7:12)	No	No	No
Escambia County LMS	Very briefly mentioned (80, 104)	No	No	No	No	No
City of Gulf Breeze 5 Year Strategic Plan	No	Multi-modal pathway created (37)	No	No	No	No
Florida-Alabama Transportation Planning Organization 2045 Long Range Plan	Nothing specific aside from Goal A.	Yes, included in the 2045 Adopted Needs Planned Transit Projects are two Express Buses for enhanced military buses. These include buses to NAS Transit and Eglin/Hurlburt. (85)	Objective E.3: "Implement projects that will support the military's ability to carry out its missions at the region's installations" (43)	No aside from the Steering Committee.	Plans include GIS layers of relevant military bases for environmental cost analysis, needs assessments, and project maintenance. (63)	Steering Committee allowed relevant bases to be involved in the planning process alongside other necessary organizations/ the public.

Plan Name	Is there anything referring to law enforcement or right-of-way maintenance?	Is there anything referring to school buses or transit?	Statement of Coordination	Shared Staffing	Shared Resources	Shared Planning
Panama City Comprehensive Plan	Right-of-way plans mentioned (7, 11, 19, 51)	Focus on density in relation to transit modes	Pg 15-16	No	No	No
City of Lynn Haven Comprehensive Plan	Right-of-way improvements (22, 24)	Goal to promote walking, biking, and public transit along with right-of-way	No	No	No	No
Bay County Strategic Plan 2022-2026	Law enforcement works with EM services in disasters	TD Action 3.5 (and entirety of pg. 11)	No	No	No	No
Bay County LMS Master Plan 2020	No	Pg 35 discusses transit	No	No	No	No
NAS Pensacola Compatible Use Study	Mention of law enforcement support through Memoranda of Understanding (MOU) (131-132). There are mentions of right-of-way takings to enhance specific highways but not for the explicit purpose of emergency management or resiliency.	PS-3A "Seek partnerships or developers to improve the area, remove unsafe areas, and address blight" (243)	Table 5-2 provides goals and policies related to military coordination from the Escambia County Comprehensive Plan (137)	Yes	Yes	Yes
Walton County Comprehensive Plan (Property Rights Element)	No	No	No	No	No	No
Walton County Comprehensive Plan (Intergovernmental Coordination Element)	No	No	No	No	No	No
Walton County Comprehensive Plan (Infrastructure Element)	Not in relation to base	No	No	No	No	No
Walton County Comprehensive Plan (Housing Element)	No	No	No	No	No	No
Walton County Comprehensive	No	No	No	No	No	No

Plan Name	Is there anything referring to law enforcement or right-of-way maintenance?	Is there anything referring to school buses or transit?	Statement of Coordination	Shared Staffing	Shared Resources	Shared Planning
Plan (Future Land Use Element)						
Walton County Comprehensive Plan (Conservation Element)	No	No	No	No	No	No
Walton County Comprehensive Plan (Coastal Management Element)	No	No	No	No	No	No
Walton County Comprehensive Plan (Capital Improvements Element)	No	No	No	No	No	No
Choctawhatchee River and Bay Surface Water Improvement and Management Plan	No	No	No	No	No	No
2019 Region II Regional Water Management Plan - Northwest Florida Water Management District	No	No	No	No	No	No
Water and Sewer Enterprise Fund/Engineering (PBB FY2023)	No	No	No	No	No	No
Okaloosa Surtax Needs List	No	No	No	No	No	No
Airport Budget Packet	No	No	No	No	No	No
2021 LMS Project List for Okaloosa	No	No	No	No	No	No
Perdido River and Bay SWIM Plan	No	No	No	No	No	No
Response to Public Input for Pensacola Bay Living Shoreline	No	No	No	No	No	No
Pensacola Bay System Service Water Improvement and Management Plan	No	No	No	No	No	No
Pensacola and Perdido Bays Estuary System	No	No	No	No	No	No

Plan Name	Is there anything referring to law enforcement or right-of-way maintenance?	Is there anything referring to school buses or transit?	Statement of Coordination	Shared Staffing	Shared Resources	Shared Planning
Pensacola Bay Living Shoreline Project Basis of Design Report	No	No	No	No	No	No
NASP East Enclave Overview Report	No	No	No	No	No	No
Coastal Vulnerability Assessment: Escambia County, Florida	No	No	No	No	No	No
Florida Community Resiliency Initiative Pilot Project	No	No	No	No	No	No
St. Andrews Bay SWIM Plan	No	No	No	No	No	No
Projects Considered by the Bay County Commissioner	No	No	No	No	No	No
City of Valparaiso JLUS	No	No	No	No	No	No
Air Installations Compatible Use Study	No	No	No	No	No	No
Joint Land Use Studies for Military Installations	No	No	No	No	No	No
Land Acquisition Study for the Santa Rosa Board of County Commissioners	No	No	No	No	No	No
Eglin Air Force Base JLUS	No	No	No	No	No	No

A-5. Housing Plan Review

Plan Name	Are there any special programs for service personnel?	Are there considerations regarding disaster vulnerability special programs?	Statement of Coordination	Shared Staffing	Shared Resources	Shared Planning
St. Andrews Bay SWIM Plan	No	No	No	No	No	No
Panama City Comprehensive Plan	Several housing programs but nonspecific to service personnel	No	No	No	No	No
City of Lynn Haven Comprehensive Plan	Several housing programs but nonspecific to service personnel	No	No	No	No	No
Projects Considered by the Bay County Commissioner	No	No	No	No	No	No
Eglin Air Force Base JLUS	No	No	No	No	No	No
Florida-Alabama Transportation Planning Organization 2045 Long Range Plan	No	No	No	No	No	No
Response to Public Input for Pensacola Bay Living Shoreline	No	No	No	No	No	No
Pensacola and Perdido Bays Estuary System	No	No	No	No	No	No
NASP East Enclave Overview Report	No	No	No	No	No	No
Escambia County Comprehensive Plan 2030	Several housing programs but nonspecific to service personnel (CP9:1 and on)	No	No	No	No	No
Escambia County LMS	A few housing programs mentioned but nonspecific to service personnel	No	No	No	No	No
Coastal Vulnerability Assessment: Escambia County, Florida	No	No	No	No	No	No
City of Gulf Breeze 5 Year Strategic Plan	No	No	No	No	No	No
Joint Land Use Studies for Military Installations	No	No	No	No	No	No
Okaloosa-Walton Long Range Transportation Plan	No	No	No	No	No	No
Okaloosa County Comprehensive Emergency Management Plan	Housing options mentioned but nothing specific to service personnel	No	No	No	No	No
Water and Sewer Enterprise						

Plan Name	Are there any special programs for service personnel?	Are there considerations regarding disaster vulnerability special programs?	Statement of Coordination	Shared Staffing	Shared Resources	Shared Planning
Fund/Engineering (PBB FY2023)						
Okaloosa Surtax Needs List	No	No	No	No	No	No
Okaloosa Couty LMS Ranked Project Listing	No	No	No	No	No	No
Airport Budget Packet	No	No	No	No	No	No
2021 LMS Project List for Okaloosa	No	No	No	No	No	No
City of Valparaiso JLUS	No	No	No	No	No	No
2019 Region II Regional Water Management Plan - Northwest Florida Water Management District	No	No	No	No	No	No
Santa Rosa County Comprehensive Plan Through 2040	Housing options mentioned but nothing specific to service personnel	No	No	No	No	No
Land Acquisition Study for the Santa Rosa Board of County Commissioners	No	No	No	No	No	No
Florida Community Resiliency Initiative Pilot Project	No	No	No	No	No	No
Walton County Comprehensive Plan (Transportation Element)	No	No	No	No	No	No
Walton County Comprehensive Plan (Recreation Element)	No	No	No	No	No	No
Walton County Comprehensive Plan (Property Rights Element)	No	No	No	No	No	No
Walton County Comprehensive Plan (Infrastructure Element)	No	No	No	No	No	No

Plan Name	Are there any special programs for service personnel?	Are there considerations regarding disaster vulnerability special programs?	Statement of Coordination	Shared Staffing	Shared Resources	Shared Planning
Walton County Comprehensive Plan (Housing Element)	No	No	No	No	No	No
Walton County Comprehensive Plan (Future Land Use Element)	No	No	No	No	No	No
Walton County Comprehensive Plan (Conservation Element)	No	No	No	No	No	No
Walton County Comprehensive Plan (Coastal Management Element)	No	No	No	No	No	No
Walton County Comprehensive Plan (Capital Improvements Element)	No	No	No	No	No	No
Bay County Strategic Plan 2022-2026	Veterans' services (12)	No	No	No	No	No
Bay County LMS Master Plan 2020	Not a special program but Mexico Beach anticipates potential expansion to the west end of the city to meet local housing demand, including Tyndall Air Force Base (12), there is also a veteran's home in the county	No	No	No	No	No
Pensacola Bay System Service Water Improvement and Management Plan	Navy Commissary and Exchange and Housing (G-3)	No	No	No	No	No
Pensacola Bay Living Shoreline Project Basis of Design Report	Infrastructure projects to be funded under the Defense Infrastructure Grant Agreement include housing (7)	No	No	No	No	No
Hurlburt Field ERRE SAME Brief May 2023	This entire document relates to service personnel.	No, but there are considerations towards on and off base housing. This document refers to the impact of on base power outages, either in times of disaster or no, and outlines plans for on and off base personnel.	No	No	No	No

Plan Name	Are there any special programs for service personnel?	Are there considerations regarding disaster vulnerability special programs?	Statement of Coordination	Shared Staffing	Shared Resources	Shared Planning
NAS Pensacola Compatible Use Study	There are Basic Allowances for Housing (BAHs) which account for increased rent prices off base.	FEMA's Building Resilient Infrastructure and Communities program is mentioned on p.126 as well as the DCIP.	Coordination between bases and communities to provide housing	No	Yes	Yes
Air Installations Compatible Use Study	No	No	In the section "Responsibility for Compatible Land Uses" they state that one of their goals is to "develop properties in a manner that appropriately protects the health, safety, and welfare of the civilian population" (20)	NAS Pensacola staffs 23,000 military and civilian personnel (50)	No	No
Perdido River and Bay SWIM Plan	No	Project from NOAA Costal Resilience Grant funding to reduce vulnerability of coastal communities to "extreme weather events and climate-related hazards" (67)	No	No	No	No
CH-2.13 Capital Improv with Adopted 5-Year Schedule	No	No	No	No	No	No
Santa Rosa County Comprehensive Emergency Management Plan 2022	Housing discussed on 167 but not technically in relation to base	No	No	No	No	No
Choctawhatchee River and Bay Surface Water Improvement and Management Plan	No	Habitat restoration to decrease vulnerability of coastal communities. (67)	No	No	No	No
Walton County Emergency Management Plan 2020	No	Cites LMS as responsible for addressing vulnerabilities.	No	No	No	No

Plan Name	Are there any special programs for service personnel?	Are there considerations regarding disaster vulnerability special programs?	Statement of Coordination	Shared Staffing	Shared Resources	Shared Planning
Walton County Local Mitigation Strategy	No	Not for service personnel. Vulnerability and impact assessment refers to individuals with medical needs and complications from loss of power.	No	No	No	No
Walton County Comprehensive Plan (Intergovernmental Coordination Element)	No	Consideration towards historical flood plains but no specific programs. See Policy IC 1.4.5. (3)	No	No	No	No

Appendix B: Survey Questionnaire

B-1. Military Personnel Question Set

Survey responses have been lightly edited for consistency.

Question 1: As an administrator, planner, operations leader, emergency manager, or other staff, are you aware of coordination activities between your installation and a local jurisdiction on shared service operations/response?

Shared service operations/ response activities	Jurisdictions coordinated with
Emergency Response, Infrastructure, Quality of Life and Education	Transportation Planning Organizations, Tri-County Partnership/ Community Partnership Programs, and Florida Defense Task Force
Any Tyndall asset that impacts the local community (i.e., aircraft crash)	Eglin Air Force Base, Hulburt and Duke Field
All incidents (manufactured or natural) that may impact the County and Tyndall AFB.	Eglin Air Force Base, Hurlburt Field, Naval Support Activity Panama City, MacDill, Patrick, Naval Air Station Pensacola, and Naval Air Station Jacksonville.
MOU/MOA with local Fire and Police	Naval Support Activity Panama City
Destin/Ft Walton Beach Airport, Arbennie Pritchett Water Reclamation Facility, Okaloosa County School District (Eglin Elementary), Solid Waste Collection at Eglin AFB Beach	Eglin Air Force Base
Community Planning & Liaising	Community-Military Partnering Collaboratives, IGSAs, Encroachment Partnering and Mutual Aide Agreements

Question 2: Are there shared service operations/response activities that you do not currently coordinate with a local jurisdiction on, but can identify as beneficial?

Shared service operations/response activities	Jurisdictions you would benefit from coordinating with
Public transportation	ECAT
Public transportation	Escambia County
Street light maintenance	Escambia county
Storm Water Drainage Improvement Projects to enhance flooding mitigations/responses.	Santa Rosa County

Question 3: As an administrator, planner, operations leader, emergency manager, or other staff, are you aware of coordination activities between your installation and a local jurisdiction on infrastructure operations?

Infrastructure operations/response activities	Jurisdictions coordinated with
Increase traffic capacity, safety through highway improvements and look at flooding issues near the base.	Okaloosa and Santa Rosa Planning teams, Transportation Planning Organization, FDOT and Elected officials.
Review of Emergency Operations Plan	Bay County Emergency Operations Center
Water, Sewer, and Power	Bay County
Living Shoreline	Escambia County, FDEP, Pensacola City
5G, Transportation Corridors, Wastewater	Santa Rosa County

Question 4: Are there infrastructure operations/response activities that you do not currently coordinate with a local jurisdiction on, but can identify as beneficial?

Infrastructure operations/response activities	Jurisdictions you would benefit from coordinating with
Road maintenance, storm water conveyance, fence maintenance	Escambia County
Road maintenance	Escambia County

Question 5: As an administrator, planner, operations leader, emergency manager, or other staff, are you aware of coordination activities between your installation and a local jurisdiction on emergency management operations/response?

Emergency management operations/response activities	Jurisdictions coordinated with
Exercises, real-world response, and review of emergency operations plans	Bay County Emergency Operations Center
Fire and police mutual aid	Escambia County
Police and fire mutual aid	Escambia County
Bay County Emergency Operations Center	Emergency Operations Center (EOC)
Funeral escorting	Local Sherriff
Use of Bay County EOC for Naval Support Activity Panama City COOP location	Bay County
Mutual Aide Responses (Fire & Emergency)	Santa Rosa County

Question 6: Are there emergency management operations/response activities that you do not currently coordinate with a local jurisdiction on, but can identify as beneficial?

Emergency management operations/response activities	Jurisdictions you would benefit from coordinating with
Not directly sure	Escambia/Pensacola

Question 7: As an administrator, planner, operations leader, emergency manager, or other staff, are you aware of coordination activities between your installation and a local jurisdiction on disaster recovery operations/response?

Disaster recovery operations/response activities	Jurisdictions coordinated with
Disaster Recovery Operations	Bay County Emergency Operations Center
All activities that impact Tyndall.	Emergency Operations Center
Emergency response	Pensacola emergency response entities
Stage and Resourcing of Power and Light Recovery teams; EOC stakeholder engagement	Santa Rosa County

Question 8: Are there disaster recovery operations/response activities that you do not currently coordinate with a local jurisdiction on, but can identify as beneficial?

Disaster recovery operations/response activities	Jurisdictions to coordinate with
Debris clearing	Escambia County
Debris clearing	Escambia County
N/A	Emergency Operations Center

Question 9: As an administrator, planner, operations leader, emergency manager, or other staff, are you aware of coordination activities between your installation and a local jurisdiction on post-disaster housing operations/response?

Post-disaster housing operations/response activities	Jurisdictions coordinated with
Pre-storm sheltering and post-storm housing	Bay County Emergency Operations Center
Off-base housing during emergencies	Emergency Operations Center
Use of shelters after disastrous event	Bay County
Post-disaster staging	Chelco

Question 10: Are there post-disaster housing operations/response activities that you do not currently coordinate with a local jurisdiction on, but can identify as beneficial?

Post-disaster housing operations/response activities	Jurisdictions to coordinate with
N/A	Emergency Operations Center

B-2. City, County, and Regional Governments Question Set

Question 1: As an administrator, planner, operations leader, emergency manager, or other staff, are you aware of coordination activities between your jurisdiction and a military base on shared service operations/response?

Shared service operations/response activities	Bases coordinated with
Right of way management	Eglin Air Force Base
EMS, Fire, Airport and many other MOUs, MOAS, and Mutual Aid agreements. As well as a DSCA process.	Eglin Air Force Base, Hurlburt Field, Duke Field, 7th group
Air Traffic and Land use	Eglin Air Force Base
County departments and divisions work directly with the military bases in Bay County.	Tyndall Air Force Base
Traffic Signal Maintenance, Utilities, coordination of base adjacent efforts.	Eglin Air Force Base including Hurlburt and Duke Fields
N/A	Naval Air Station Pensacola
Power supply and maintenance	Eglin Air Force Base, Hurlburt, Cape San Blas, Duke Fields
N/A	Eglin Air Force Base
Traffic Signal maintenance, occasional acquisition of goods.	Eglin Air Force Base /Hurlburt Field/Duke Field
Mutual Air, NAFD, Loner ARFF Vehicle	Naval Air Station Pensacola
Provide electricity to area base.	Eglin Air Force Base
Electric Utility Outage Response prior to, during and after storm or other events.	Eglin Air Force Base
power restoration	Eglin Air Force Base
Environmental Project Planning	Naval Air Station Pensacola
Mutual aid agreements and Command Staff positions on EOC team	Tyndall Air Force Base and Naval Support Activity Panama City

Question 2: Are there shared service operations/response activities that you do not currently coordinate with a military partner on, but can identify as beneficial?

Shared service operations/response activities	Bases you would benefit from coordinating with
Disaster recovery	Eglin Air Force Base
N/A	Tyndall Air Force Base
N/A	Naval Air Station Pensacola
Procurement	Naval Air Station Pensacola, Naval Air Station Whiting Field
Joint training exercises	Any
Coordination of resources (personnel, equipment, and other resources).	Tyndall Air Force Base

Question 3: As an administrator, planner, operations leader, emergency manager, or other staff, are you aware of coordination activities between your jurisdiction and a military base on infrastructure operations/response?

Infrastructure operations/response activities	Bases coordinated with
Road closures	Eglin Air Force Base
Bay County Public Works can identify these activities.	Tyndall Air Force Base
Constant communication regarding traffic on state arterial roadways, base access, and response times.	Eglin including Hurlburt Field and Duke Field
N/A	Naval Air Station Pensacola
Water/Sewer	Naval Air Station Whiting Field
Power Restoration, Utility equipment storage	Eglin Air Force Base
Anything to do with roadways that cross the base and are around the base.	Eglin Air Force Base / Hurlburt Field / Duke Field
Provide electricity on base.	Eglin Air Force Base
CHELCO supplies Eglin AFB and is the Utilities Privatization System Owner for the electrical distribution system at Eglin AFB. Likewise, Gulf Coast Electric Cooperative is the System Owner at Tyndall AFB. CHELCO supported GCEC at Tyndall AFB during restoration activities associated with hurricane Michael. CHELCO responds to electrical system concerns as required, also.	Tyndall Air Force Base, Naval Support Activity Panama City

Infrastructure operations/response activities	Bases coordinated with
Power delivery	Eglin Air Force Base
Road improvements	Tyndall Air Force Base
Water/Sewer services, Joint Land Use Planning, Fire services, Law Enforcement, E911 system	Tyndall Air Force Base and Naval Support Activity Panama City

Question 4: Are there infrastructure operations/response activities that you do not currently coordinate with a military partner on, but can identify as beneficial?

Infrastructure operations/response activities	Bases you would benefit from coordinating with
I assume there are mutual benefits to be discovered	Naval Air Station Pensacola
Metering	Eglin Air Force Base
Procurement	Naval Air Station Pensacola, Naval Air Station Whiting Field

Question 5: As an administrator, planner, operations leader, emergency manager, or other staff, are you aware of coordination activities between your jurisdiction and a military base on emergency management operations/response?

Emergency management operations/response activities	Bases coordinated with
Storm water management	Hurlburt Field
Cross communication regarding needs	Eglin Air Force Base, Hurlburt Field
Bay County Emergency Operations can identify these activities.	Tyndall Air Force Base
Power restoration	Eglin Air Force Base, Hurlburt Field, Cape San Blas, Duke Field
Coordination during weather/emergency events	Eglin Air Force Base / Hurlburt Field / Duke Field
Live Emergency Drill	Naval Air Station Pensacola
Electrical system restoration planning and reporting. CHELCO personnel interact with various entities on base (Leadership, EOC, Base Civil Engineering) to disseminate information, respond to requests and support the base as required during events.	Electrical system restoration planning and reporting. CHELCO personnel interact with various entities on base (Leadership, EOC, Base Civil Engineering) to disseminate information, respond to requests and support the base as required during events.
Power delivery/restoration	Eglin Air Force Base

EOC Operations, alternate EOC	Tyndall Air Force Base and Naval Support Activity Panama City

Question 6: Are there emergency management operations/response activities that you do not currently coordinate with a military partner on, but can identify as beneficial?

Emergency management operations/response activities	Bases you would benefit from coordinating with
Hurricane/Natural Disaster Response	Naval Air Station Whiting Field
Live Emergency Drill	Coast Guard
Shared mutual air recourses in the event of a large-scale incident.	Naval Air Station Pensacola

Question 7: As an administrator, planner, operations leader, emergency manager, or other staff, are you aware of coordination activities between your jurisdiction and a military base on disaster recovery operations/response?

Disaster recovery operations/response activities	Bases coordinated with
Cross communication, space for staging, representation in EOC	Eglin Air Force Base
Bay County Emergency Operations can identify these activities.	Tyndall Air Force Base
Coordination in evacuation and response efforts through the EOC.	Eglin Air Force Base, including Hurlburt Field and Duke Field.
N/A	Naval Air Station Pensacola
Power restoration	Eglin Air Force Base, Hurlburt, Cape San Blas, Duke
Coordination during recovery of roads accessing the base.	Eglin Air Force Base / Hurlburt Field / Duke Field
Electrical system restoration and public safety surrounding downed power lines or other electrical system equipment.	Eglin Air Force Base
Power Restoration, staging areas	Eglin Air Force Base
Post disaster temporary housing, community recovery	Tyndall Air Force Base and Naval Support Activity Panama City

Question 8: Are there disaster recovery operations/response activities that you do not currently coordinate with a military partner on, but can identify as beneficial?

Disaster recovery operations/response activities	Bases you would benefit from coordinating with
Reentry procedures, area control	Eglin Air Force Base and Hurlburt Field
I assume there are mutual benefits to be discovered	Naval Air Station Pensacola
Flood/Hurricane response	Naval Air Station Whiting Field
Hurricane Response	Naval Air Station Pensacola

Question 9: As an administrator, planner, operations leader, emergency manager, or other staff, are you aware of coordination activities between your jurisdiction and a military base on post-disaster housing operations/response?

Post-disaster housing operations/response activities	Bases coordinated with
Bay County Housing coordinates with officials at all the cities, Tyndall and local realtors for planning and data collection, such as Tom Neubauer with the Bay Defense Alliance, Inc., and Kathy Ferguson with the Roosevelt Group.	Tyndall Air Force Base
Temporary housing	Tyndall Air Force Base and Naval Support Activity Panama City

Question 10: Are there post-disaster housing operations/response activities that you do not currently coordinate with a military partner on, but can identify as beneficial?

Post-disaster housing operations/response activities	Bases you would benefit from coordinating with
Special services for veterans	Eglin Air Force Base and Hurlburt Field
Mass Sheltering.	Naval Air Station Pensacola
FL state programs	Any
Temporary crew housing and support services	Eglin Air Force Base
Yes	Traffic and transportation

B-3. Both Groups: End of Survey Question Set

Question 1: Are there any types of coordination activities or collaboration not listed above that you feel would be beneficial?

Yes, but all based on existing DSCA policies and Flow via appropriate channels thru state to federal
I believe so, but they have not been discovered yet
Military Housing, Economic Development, Utility Services Annexations to bring the City Boundary closer to the base for economic development/planning/utility services purposes

Question 2: Is there anything else you would like to share with us?

The federal process can often make great ideas too difficult to execute.
We are interested in further coordination with our Military partners.
I have routine meetings with Base staff on how to coordinate ongoing infrastructure efforts. This communication enables both parties to be as efficient as possible with our limited resources.

Appendix C: Interview Respondents and Questions

C-1. Interviewee Contact List

Name	Address	City/State	Postal Code	Email
Scott Davidson	BLDG 90053 Independence Rd	Hurlburt / FL	32544	scott.davidson.8@us.af.mil
Ryan Prince	90 College Blvd E	Niceville/ Fl	32578	Rprince@myokaloosa.com
Steve O'Connor	4100 Indian Bayou Trail	Destin, FL	32541	soconnor@cityofdestin.com
Randy McDaniel	Building 670, Iverness Road	Eglin AFB, FL	32542	randy.mcdaniel@us.af.mil
Tammy Harris	Bay County Housing Services	Panama City	32401	tharris@baycountyfl.gov
Conor Grace	310 John Towers Rd	Pensacola, FL	32508	N/A
Jason Autrey	1759 S Ferdon Blvd	Crestview, FL	32536	jautrey@myokaloosa.com
Doug Hirsch	11000 University Parkway Bldg. 90, Room 109	Pensacola	32526	dhirsch@uwf.edu
Jacob Hullett	6738 Dixon St	Milton	32570	jhullett@miltonfl.org
Amy Honish	655 US-331	DeFuniak Springs	32433	ahonish@chelco.com
Trish Bond	201 DeLeon Rd	Eglin AFB	32542	tbond@chelco.com
Jared Cobb	195 Christobal Road, North	Mary Esther	32569	jcobb@cityofmaryesther.com
Roy Remington	2430 Airport Blvd	Pensacola	32504	rremington@cityofpensacola.com
Justin Hoard	5430 Airport Blvd	Pensacola/FL	32504	jhoard@cityofpensacola.com
Susan Wilkinson	P O Box 512	DeFuniak Springs, FL	32435	swilkinson@chelco.com
Marty Spikes	335 Suwannee Ave	Tyndall AFB, FL	32403	maurice.spikes@us.af.mil
Rocky Hudson	102 DeLeon Rd	EGLIN AFB	32542	rhudson@chelco.com

Name	Address	City/State	Postal Code	Email
Robert C Smith	101 Vernon Ave Bldg. 308	Panama City/FL	32407	robert.c.smith251.civ@us.navy.mil
Matt Rushing	655 US-331 North	DeFuniak Springs/Fl	32435	mrushing@chelco.com
Karen Taporco	501 DeLeon St	Eglin AFB, FL	32542	karen.taporco@us.af.mil
Ryan Kirby	223 Palafox Pl	Pensacola, FL	32502	rhkirby@myescambia.com
Bob Majka	840 W 11th St	Panama City, FL	32401	bmajka@baycountyfl.gov
Randy Roy	7550 USS ESSEX St	Milton, Florida	32570	randy.r.roy.civ@us.navy.mil

*Gold highlighting designates survey respondents who completed follow-up interviews.

C-2. Attendees of April 3rd, 2024, Meeting with Hurlburt Field's 1st Special Operations Wing, 1st Special Operations Engineering Squadron (SOCES)

Name	Position
Chief Master Sergeant Skipper Valentincruzado	Chief Enlisted
Matt Vera	Engineering Flight Chief
Veronica Brieno Rankin	Housing and Environmental Flight Chief
Randy Frederick	Readiness & Emergency Management Fight Chief
Kieth Cutshaw	Engineer, Space Utilization Manager
Alexis Throckmorton	Environmental and Real Property Chief
Lieutenant Ryan Adolacion	Deputy Engineering Flight Chief
Scott Davidson	Community Planner for Hurlburt Field.