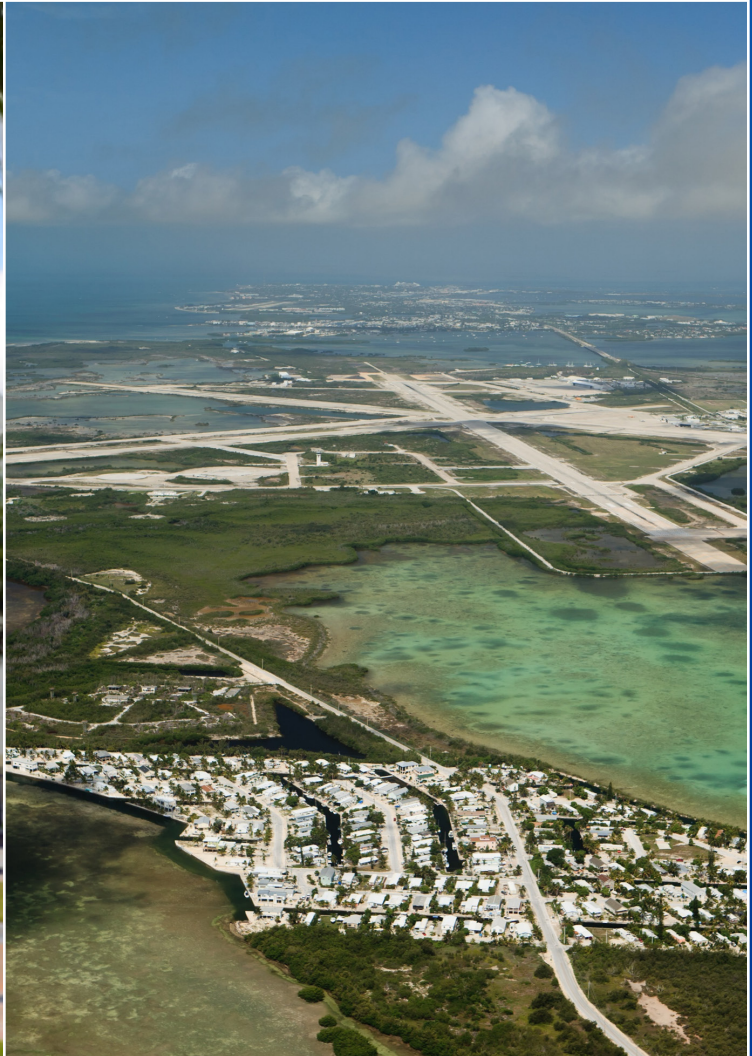


Section 1 Introduction



1. INTRODUCTION

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Section 1

Introduction

This South Florida Military Installation Resilience Review (MIRR) was 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, to assess the military resilience of the following installations and their surrounding communities (Figure 1-1):

- **South Florida Ocean Measurement Facility (SFOMF)**, in the Cities of Dania Beach and Hollywood, Broward County
- **U.S. Army Garrison (USAG) – Miami/SOUTHCOM**, in the City of Doral, Miami-Dade County
- **Homestead Air Reserve Base (HARB)**, adjacent to the City of Homestead, Miami-Dade County
- **Naval Air Station Key West (NASKW)**, in the City of Key West, Monroe County

The project grant states: *“DoD installations have not consistently assessed risks from extreme weather and climate change effects or consistently used climate projections to anticipate future climate conditions and potential impacts on community infrastructure upon which the installations depend.”*

The South Florida Regional MIRR provides a vulnerability assessment of mission critical and supportive infrastructure that has been agreed upon by the stakeholders and establishes an integrated adaptation plan to build resilience. Implementation of the plan's recommendations will deliver **mission assurance through community resilience** to the installations of South Florida.

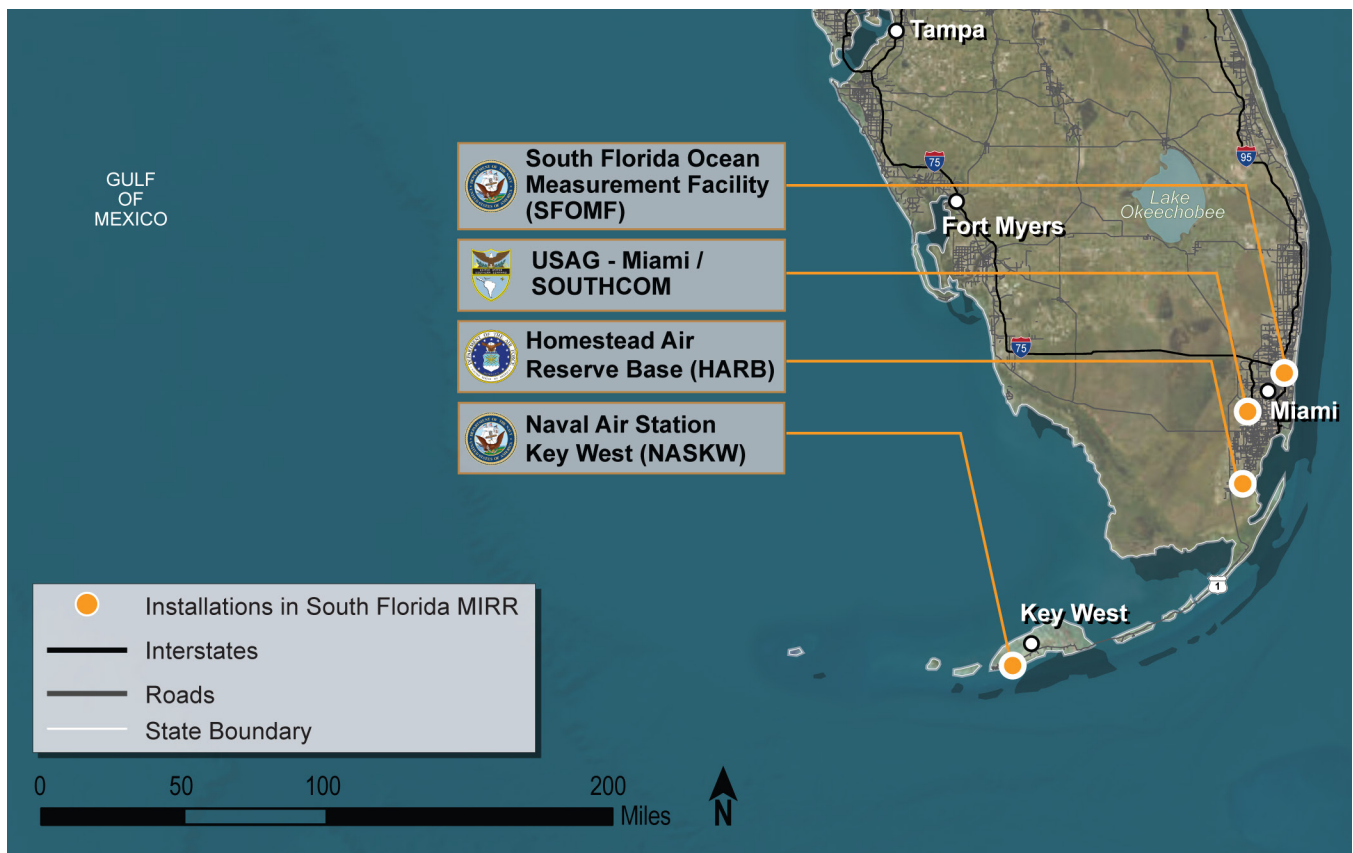


Figure 1-1. South Florida Regional MIRR Installations

1. INTRODUCTION

Importance and Impact of Installations in this Study

National Importance and Mission Interdependency

The military presence in the South Florida region has multiple interdependencies, provides critical contributions to our larger national security, and is a strong contributor to regional economic vitality. South Florida's military history dates back 200 years to when the U.S. Navy established a naval base and presence in Key West to fight piracy in the area. The legacy of the modern military footprint dates back to World War II when the area had numerous locations dedicated for military training. Throughout the Cold War, South Florida's installations were on the front lines and today, they still serve to protect the southern approaches to the United States while enabling the military to test, train, and project power around the globe.

Military commands in the South Florida region have numerous linkages with each other and the installations that support them (Figure 1-2). For example, SOUTHCOM has two key subordinate

component commands located at HARB including the Special Operations Command South (SOCSOUTH) and NASKW's Joint Interagency Task Force – South (JIATF-S). Resilience challenges at either of these two installations can have a direct impact on SOUTHCOM's mission execution. Training Operating Areas (OPAREAs) and ranges around Key West are used by aircraft based at HARB and at NASKW directly, in addition to the installations hosting aircraft and crews from around the country. Furthermore, these controlled ranges are the southern "anchor" of the entire Eglin Gulf Test and Training Range complex and extend over 500 miles to the north to include land impact areas at Eglin Air Force Base (AFB), thereby creating the largest DoD range space in the continental United States. The evolving Florida Advanced Training Range is also leveraging these South Florida assets to help develop the architecture for an advanced, multi-domain joint warfare training range that can support the 5th and next generation weapons system training and development with potentially greater than 200,000 square miles of air and sea space.

Likewise, the U.S. Coast Guard (USCG) regional presence is intricately linked to multiple operations

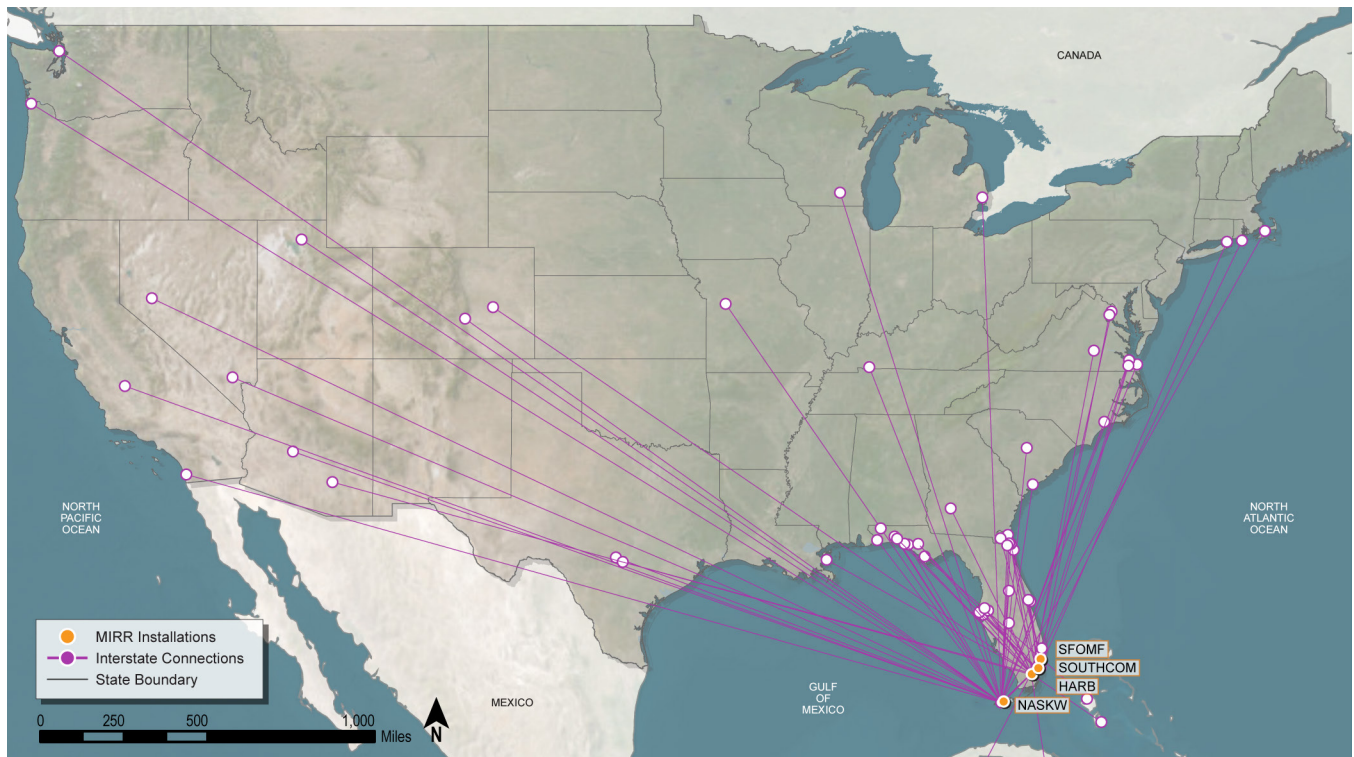


Figure 1-2. MIRR Installations' Connections

by the DoD. SOUTHCOM and JIATF-S use USCG forces controlled by the District 7 (D7) USCG Atlantic Area headquarters in Miami on a routine basis for their detection and monitoring mission defending the southern approaches to the United States. When appropriate, those forces revert to D7 tactical control to execute necessary interdiction and apprehension missions. The D7 Commander is also dual-hatted as the Commander, Homeland Security Task Force Southeast (HSTF-SE). When activated for mass-migration and Caribbean-based threats, this is frequently done in coordinated activation of dedicated Contingency Plans within SOUTHCOM. Both SOUTHCOM and HSTF-SE routinely share command and control facilities, planning staffs, and other support during both exercises and real-world contingencies. Local bases such as NASKW and HARB are also often used as logistics sites and for other support functions in these activities. The smaller SFOMF range complex provides a critical communications node for SOUTHCOM's highly sensitive national missions.

These combined capabilities make the South Florida region and greater Miami Metropolitan Statistical Area critically important. Coupling those capabilities with both historical precedents and current trends raises the profile even further. Taking the global history of U.S. military interventions around the world, apart from U.S. Central Command, SOUTHCOM has the greatest number of U.S. military interventions in its Area of Responsibility (AOR) compared to all other Combatant Commands that are in a distant third place and beyond. As our pacing competitor, China continues to grow its engagement and influence throughout Latin America. Likewise, as our nation looks to diversify supply chains as part of our competition with China, Latin America is a natural market to expand for both U.S. imports and



Figure 1-3. Regional Planning Councils of Florida

exports. These competing interests will undoubtedly increase friction in the region. SOUTHCOM's ability to influence, engage, and potentially fight and win will only grow in significance in its AOR as these dynamics develop. The greater Miami area already serves as a natural "hub" of U.S. connectivity, finance, and engagement across Latin America. The South Florida community's ability to support SOUTHCOM, and myriad supporting activities at our other regional military installations, will take on increasing significance in the coming decades. The resilience of important assets in the region is vital for mission assurance and success of regional national security installations and commands.

Furthermore, from a defense economics standpoint, the Southeast Florida region ranks 4th in the state in terms of both fiscal impact on Gross Regional Product as well as job creation. Pre-pandemic, the region was consistently the fastest-growing defense economy in the state as well. Collectively, the national-security-focused economy provides approximately \$16 billion in total economic benefits and more than 150,000 jobs annually to the region. Therefore, the resilience of the associated installations and their missions is of high importance for both national security and local economic interests.

1. INTRODUCTION

Regional Military Resilience

Climate adaptation, resilience planning, and infrastructure investment are largely delivered at the local and regional level. Regional climate threats do not honor the geographic or political boundaries placed around property. Regional collaborative planning has worked well in South Florida to build community resilience.

In response to sea level rise (SLR), and flooding in particular, in 2010 the four counties of Southeast Florida—Monroe, Miami-Dade, Broward, and Palm Beach—created the first of its kind in the nation Southeast Florida Regional Climate Change Compact (the “Compact”). The counties pledged to collaborate and coordinate regionally on climate adaptation and mitigation-related activities. Each county or city develops its own climate action plan using information from the Compact. Over the years, local community officials and business leaders in the region have prioritized resilience, supporting the Compact’s leadership and efforts.

In fact, the Compact model has inspired other collaboratives within the State of Florida and around the country. Furthermore, several regional planning councils have created their own regional resilience partnerships and are at different stages of their own MIRR projects. Three additional regions (East Central Florida, Central Florida, and North Florida/Jacksonville) are developing MIRR grant applications.

“Our location and mission is unique and critical to national security. Investing in adaptation is an investment in our nation’s safe future.”

— **Michael Farrar**

Site Director, South Florida Ocean Measurement Facility

Though the four installations within the scope of this MIRR are distinct and subject to the differing resilience and/or design standards of their respective parent military services, the project team has noted numerous ways in which these installations are connected to one another—both in terms of defense missions, including significant component command and contingency plan support, and in physical assets, such as electric power, water and wastewater service, and communications infrastructure (Figure 1-4). This interconnectedness provides the critical underpinnings of South Florida MIRR’s regional approach, along with efforts to identify potential and related regional resilience synergies.



The SFOMF North Site at Port Everglades Inlet

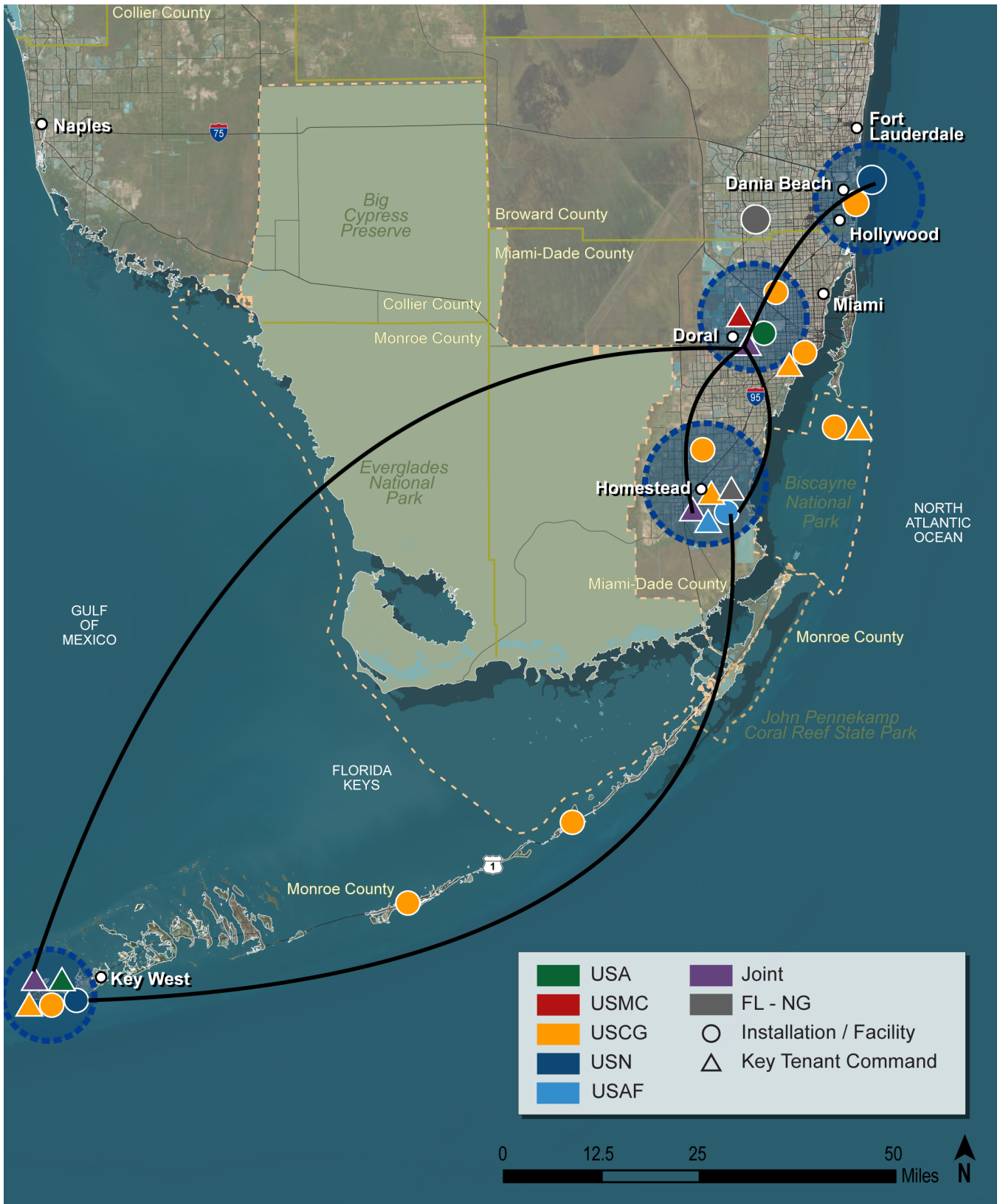


Figure 1-4. Regional Interdependencies

1. INTRODUCTION

Resilience in South Florida

There are compelling reasons why a regional approach is needed in the MIRR. South Florida indisputably leads the nation in resilience assessment and planning out of necessity and due to its low-lying elevations, porous limestone that allows water to rise from below, hurricanes and other storm events, and growing problems with heavy rainfall and sunny day flooding. In response, local community officials and business leaders in the region have prioritized resilience, joined the Compact, developed a uniform SLR projection for the region, as well as regional benchmarks and standards, and have been active collaborators in multiple climate resilience initiatives and best practices such as the Rockefeller Foundation's 100 Resilient Cities. The region also benefits from numerous local university research capabilities involving climate-driven challenges and resilience issues including, among others, the Florida Atlantic University (FAU) Center for Environmental Studies, Florida International University Sea Level Solutions Center, and the University of Miami SUSTAIN Laboratory.

Adaptation and mitigation work often requires collaboration and cooperation among different entities to enhance resilience across the region. The Compact strengthens stakeholders' ability to implement adaptation strategies across multiple jurisdictions with similar local contexts.

The regional approach has provided multiple benefits to communities 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 has resulted in better communication and greater understanding 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 goals.

Many hurricanes have impacted the region, but none more than Hurricane Andrew in 1992. In response to the devastation Hurricane Andrew caused, Miami-Dade County strengthened the South Florida Building Code with more robust design standards for wind and more local construction oversight. That model code was subsequently adopted by the State of Florida, and the Florida Building Code was born.



Adaptation Guidance Resources Consulted

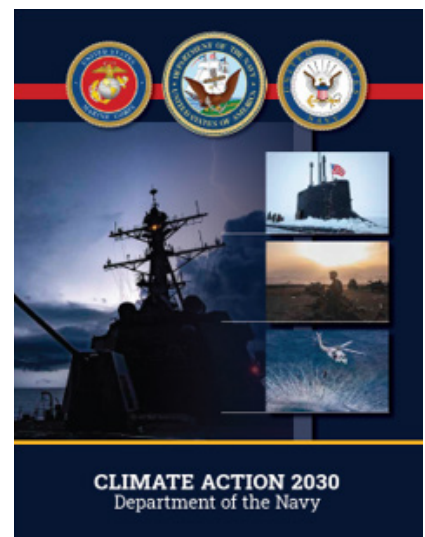
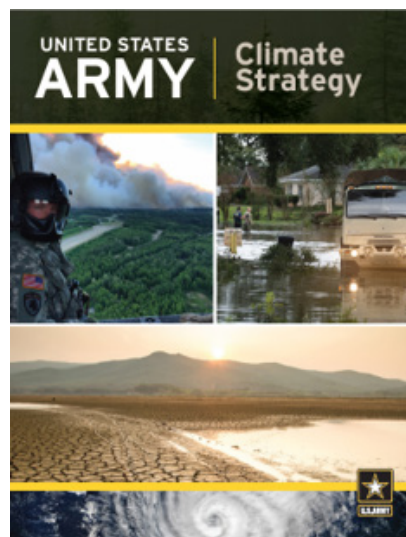
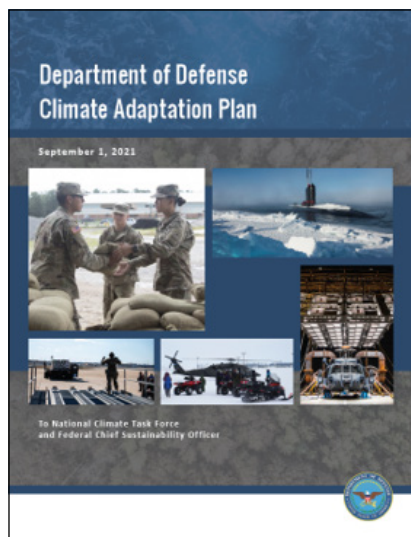
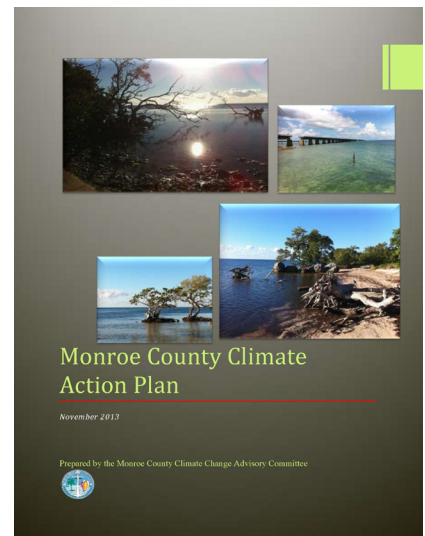
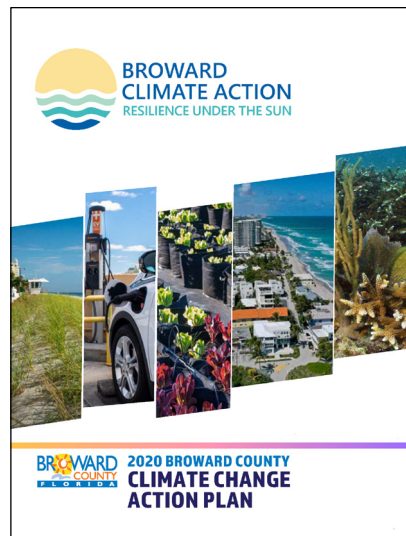


As a representation of the significant amount of ongoing resilience planning and mitigation projects within the region, the DoD, and the Federal government more broadly, resources that were acknowledged during stakeholder workshops are listed in Appendix A.

Building on Current and Ongoing Resilience Efforts

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 [BFE]), 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 Unified Facilities Criteria (UFC). The DoD should strongly consider developing 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.

Specific efforts by the counties that are underway and provide positive benefit to the MIRR installations are noted in the following subsections.



1. INTRODUCTION

Broward County

Compound Flooding

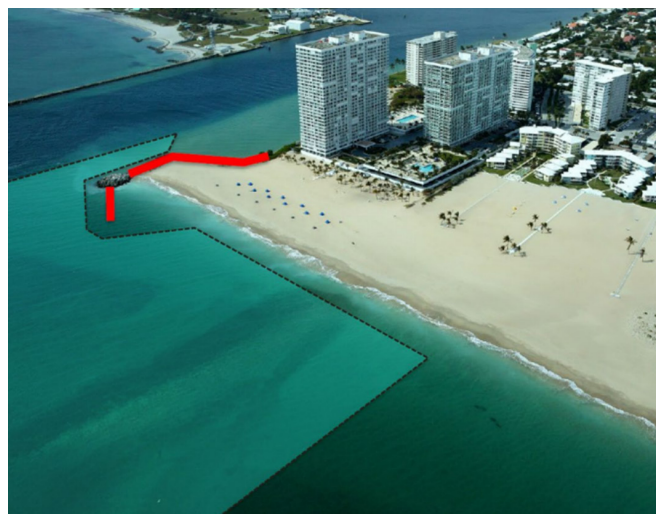
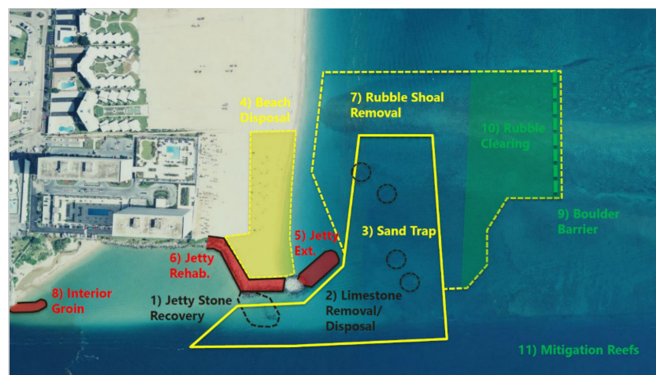
In South Florida, compound flooding may occur when high tides, storm surge, intense rainfall, or high groundwater table elevations occur simultaneously. Compound flooding impairs built drainage systems and natural drainage processes and results in greater flood depths than if only one or two hazards occur. SLR has contributed and will continue to contribute to higher elevations of the tides, surges, and groundwater table. Broward County and local partners have highlighted the roads and infrastructure connecting and supporting access and services to the SFOMF as vulnerable to compound flooding as sea level rises. Resilience studies, initiatives, planning, grant coordination, and project implementation focused on Dania Beach Boulevard and Florida State Road A1A in Hollywood have been initiated to identify and address urgent needs and prepare a longer-term adaptation strategy. During the MIRR, the need to comprehensively address compound flooding risk of connected infrastructure in Dania Beach and the Dr. Von D. Mizell-Eula Johnson State Park was identified.

Port Everglades Sand Bypass

Broward County has obtained permits for the Port Everglades Sand Bypass Project to mitigate erosion from the shoreline adjacent to the SFOMF, located near the north end of the Segment III Federal Shoreline Protection Project. Implementation of the Sand Bypass Project would support the long-term strategy for resilience in the region by addressing the need for economical, local sand for beach renourishment along a critically eroded shoreline and mitigating storm surge risk to the adjacent critical infrastructure and natural areas including the SFOMF, the USCG Station, port facilities, Dr. Von D. Mizell-Eula Johnson State Park, and sea turtle and seabird nesting habitat. The sustainability of regular renourishment of the Segment III shoreline depends on the successful implementation of the Port Everglades Sand Bypass Project, the beneficial use of material dredged from Port Everglades maintenance, the reauthorization of the Federal Shore Protection Project, dedicated funding, and government and industry capacity to support the projects.



Rain Bomb in Broward County April 2023



Views of the SFOMF North Site and Adjacent Beach Renourishment Sand Fill Area Along Segment III Port Everglades Sand Bypass Project

(Broward County Resilient Environment Department 2020)

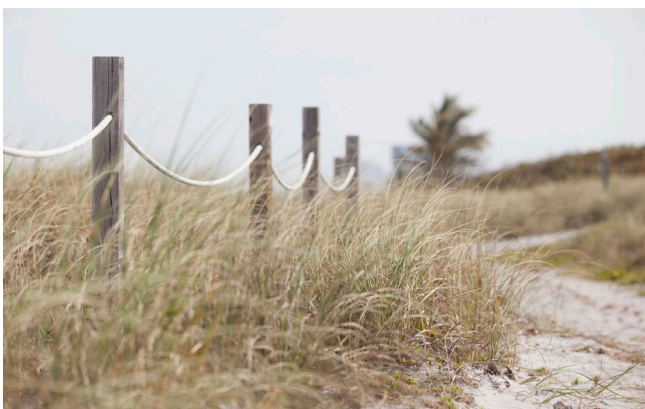
Benefits

Implementation of the proposed Sand Bypass Project will:

- Increase the resilience of critical natural resources and existing infrastructure protecting and supporting the missions served by the SFOMF
- Reduce the impacts of Port Everglades to the shorelines south of the inlet
- Provide a sustainable beach compatible sand source for the highly erosional shorelines south of the inlet – Segment III of the Broward County Federal Shore Protection Project
- Fortify and sustain storm protection for critical infrastructure and valuable property including the USCG Station, port facilities, and more than \$345 million in property
- Reduce shoaling in the Federal navigation channel
- Preserve habitat and nesting areas for three endangered and four threatened species in one of the most highly developed urban areas in the state
- Maintain opportunity for public outdoor recreation at Dr. Von D. Mizell-Eula Johnson State Park, serving more than half a million residents and visitors annually
- Provide the most environmentally sensitive approach to beach management in an area of rich coastal and nearshore reef resources

Status

Procurement and construction are anticipated to begin by end of the year 2023 (Broward County n.d.).



Stable, Maintained Beach

Miami-Dade County

Attainable and Resilient Housing

South Florida is experiencing an attainable housing crisis, much like other urban centers around the country. The counties and cities have prioritized this issue in policies and plans. This not only affects the communities' working class, but also affects the military families stationed at South Florida facilities. Attainable housing is an added stressor in terms of military resilience when families live too far from work, affecting commute time to installations. Also, attracting the military talent needed can be more challenging if attainable housing for the military family is limited. As this could affect mission assurance and readiness, it should be a community resilience issue to tackle together.

As task forces are stood up and policies and projects updated, military families should be prioritized and be part of the equation in the same manner as local police, fire, and teachers. With rising costs and limited space, creative and innovative paths must be taken, potentially changing traditional zoning and development patterns.

Update to Water Management Strategy

The Miami-Dade County Water and Sewer Department and the South Florida Water Management District (SFWMD) are adapting their systems to increase their resilience to current and projected hazards. These adaptation interventions positively impact mission assurance at HARB both directly and indirectly.

- Miami-Dade County Water and Sewer Department
 - Emergency Operations Center for Central District Wastewater Treatment Plant
 - Emergency Operations Center for South District Wastewater Treatment Plant
 - Hardening of South District Wastewater Treatment Plant for SLR and flooding
- South Florida Water Management District
 - Improvements in Primary Canals C-103 and C-103N, including upgrades to the canal banks to prevent overtopping

1. INTRODUCTION

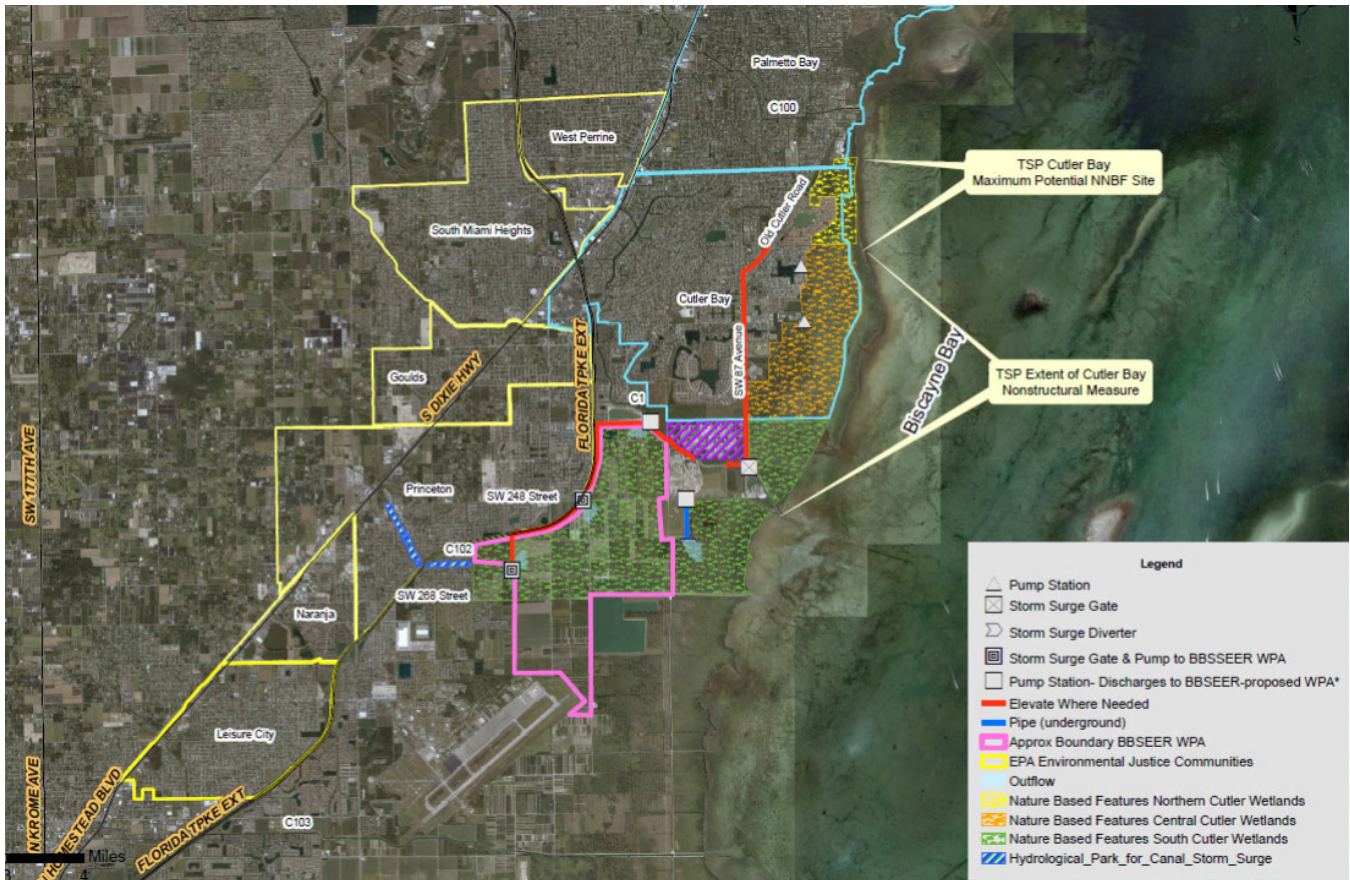
- Upgrades of Coastal Structures S-20F and S-20G (SFWMD 2023)
- Installation of control structures at Levee L31E
- Improved elevation of all levees at the eastern boundary of the C-103 watershed
- Installation of backflow prevention devices in the C-103 watershed

Biscayne Bay Southeastern Everglades Ecosystem: Restart of Biscayne Bay Feasibility Study

Miami-Dade Office of Resilience is partnering with the United States Army Corps of Engineers (USACE) on multiple projects to protect and adapt to current and future conditions impacted by climate change. The Miami-Dade County Department of Environmental Resources Management is coordinating the Biscayne Bay Southeastern

Everglades Ecosystem Review (BBSEER) that is studying nature-based solutions for SLR. The solutions that result from this study will protect HARB and the communities in South Dade.

The proposed draft alternatives for the project include a non-structural alternative and a coastline alternative, with potential natural and nature-based features (NNBFs) such as spoil island reinforcement, living shorelines, mangrove planting, and dune enhancement identified for enhancing resilience. However, further refinement, including considerations of footprint and optimal locations, is necessary to assess the feasibility, long-term sustainability, and economic justification of these features. Careful coordination, analysis of costs and benefits, and consideration of the specific requirements of each NNBF will help ensure that the chosen alternatives and NNBFs are both effective and economically justified.



Biscayne Bay Southeastern Everglades Ecosystem Review Project Includes Looking at Nature-based Solutions to Combat SLR

Image source: United States Army Corps of Engineers, Jacksonville District

Coordinate and Deconflict Interests

Miami-Dade County and HARB continue to work together on efforts to conserve and protect the natural lands and habitat east of the installation. In addition to the BBSEER project with USACE, the county and base have submitted multiple applications to the Environmentally Endangered Lands (EEL) program. Through that program, these natural lands can provide ecosystem restoration that protects the installation from both storm surge and development encroachment. However, the management of these lands needs to be consistent with HARB's Bird Air Strike Hazard (BASH) policy. This MIRR study recommends that HARB and Miami-Dade County coordinate to create a natural conservation buffer that will protect HARB's airfield from encroachment without interfering with flight operations.

MIRR Program

The MIRR grant program is managed by OLDCC, which was established to provide state and local governments with the financial and technical assistance needed to implement community adaptation measures in areas where risk to natural and climate-related hazards will impair the operations of an installation. OLDCC understands that installations cannot operate as islands and are inherently dependent upon the communities in which they are located. The MIRR program, which brings together local civil and military leaders in a particular jurisdiction in a "one community" approach, supports the development of actions necessary to enhance the sustainability of the installations and their operational missions. The South Florida Regional Planning Council (SFRPC) MIRR represents the first regional effort funded by OLDCC.

"More than twenty years ago, HARB committed itself to rebuilding [after Hurricane Andrew], using what was then termed "Sustainable Operations". Today, HARB continues down that same path. Sustainable land management and resource conservation is vital to the aviation and mission partner operations at HARB as well as to the natural resources of our precious national parks. Working together with our community partners we can achieve both beneficial outcomes, while enhancing the resilience of our installation and surrounding community."

— Colonel Joshua Padgett
Commander
482nd Fighter Wing



Soldier Observes the Developed and Conserved Lands Below

1. INTRODUCTION

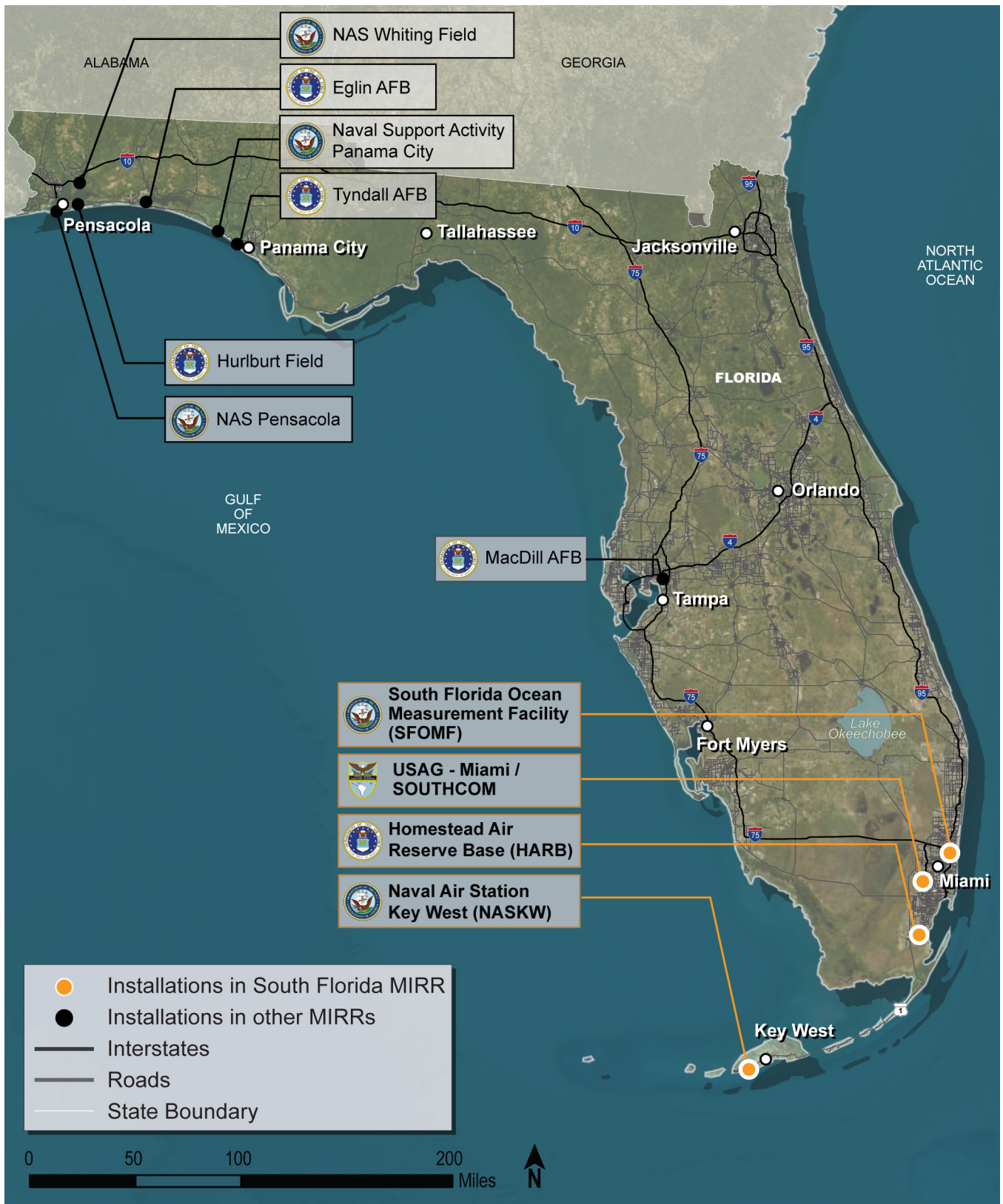


Figure 1-5. Florida Installations in MIRR Program

Florida Installations in MIRR Programs

Florida installations in concurrent MIRR programs are shown in Figure 1-5 and include:

- Tampa Bay Regional Planning Council MIRR
 - MacDill AFB
- Emerald Coast Regional Planning Council MIRR
 - Naval Air Station (NAS) Pensacola
 - Hurlburt Field
 - NAS Whiting Field
 - Eglin AFB
 - Tyndall AFB
 - Naval Support Activity Panama City

Programs on the horizon include:

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

South Florida MIRR Grant

South Florida and its key DoD commands and installations are vulnerable to the compounding hazards and threats posed by SLR, increasing frequency and magnitude of tropical systems, flooding, storm surge, and recent increases in extreme rainfall and heat. The Atlantic Ocean is the eastern boundary of the region. The Everglades and wetlands are the western boundary of Miami-Dade and Broward counties. Monroe County's western boundary is the Gulf of Mexico. Built on a limestone geology, concerns over SLR, flooding, storm surge, and other related effects are vulnerabilities that need to be addressed even if the facilities are not directly located on the coast.

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 South Florida are concentrated primarily in three counties: Broward, Miami-Dade, and Monroe, which also comprise

the SFRPC planning area. Municipalities that are adjacent/proximate to the installations in this study include the cities of Fort Lauderdale, Dania Beach, Hollywood, Doral, Miami, Homestead, Cutler Bay, and Key West. 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.

Objectives, Goals, and Methodology

The three objectives of the South Florida 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 Resilience 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 (Figure 1-6) is described in detail in Sections 3 through 7.

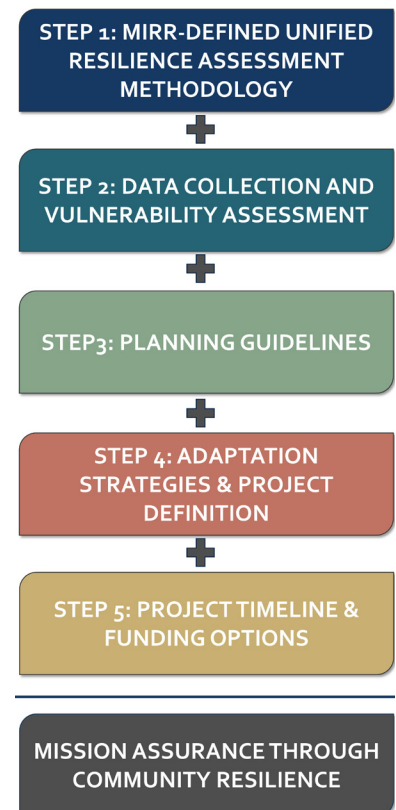


Figure 1-6. MIRR Methodology

1. INTRODUCTION

Planning Process and Stakeholder Engagement

The South Florida MIRR planning process was officially kicked off in May 2022. U.S. Southern Command hosted the Study Advisory Committee (SAC), comprised of leadership from the four installations, the counties and their Chief Resilience Officers, affected municipal governments, as well as other invited elected and appointed officials from the congressional delegations, the State of Florida, and local governments. In all, 63 people attended. This was the first step in the project team’s six-step process (Figure 1-7).



Workshop Preparation at NASKW



Figure 1-7. Planning Process

Stakeholder Engagement Supported the Project from Day One of Data Collection, Throughout Work Group, SAC Meetings, Follow-up Calls, and Final Edits.



Site Tour at HARB



SAC Meeting Hosted by HARB



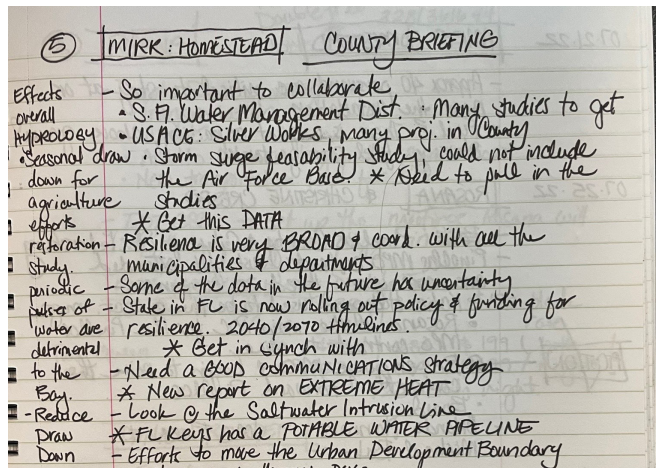
Site Tour at the SFOMF



Workshop Notes



Working Group Workshop at HARB



Workshop Notes

1. INTRODUCTION

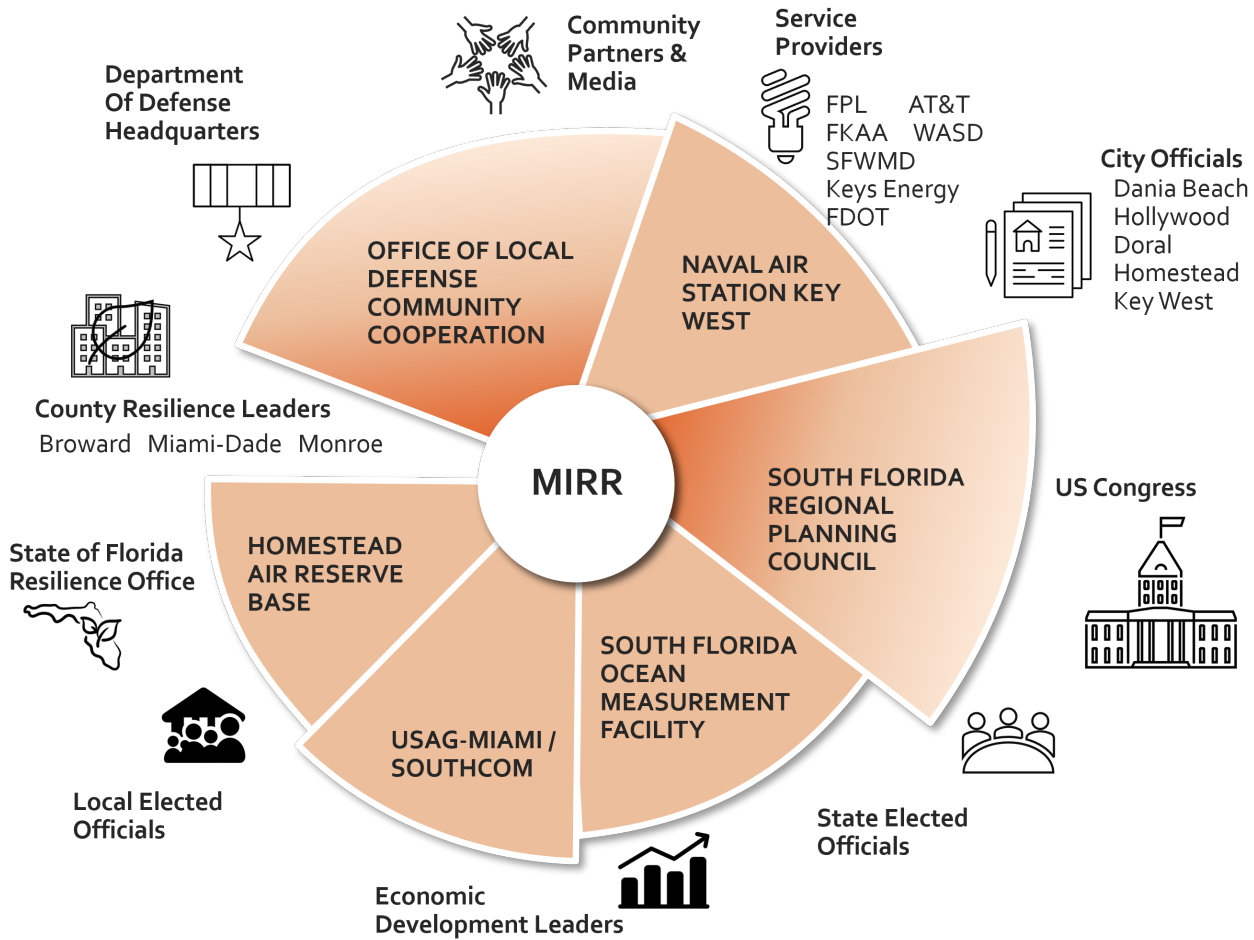


Figure 1-8. Study Advisory Committee

Data collection and four site visits took place in the summer of 2022 for a deeper dive into the shocks and stresses that affect mission assurance at the bases. Robust dialogue informed the data collection process and brainstorming led to the foundation of strategies and intervention ideas to reduce risk.

The vulnerability assessment phase was undertaken throughout the fall of 2022 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 SAC and Work Group members 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.

Stakeholders were mapped into groups including the SAC, Friends of the SAC, and Working Groups for communication and engagement purposes. The SAC consists of installation leaders, municipal leaders (city and county), and Chief Resilience Officers (Figure 1-8). These advisors met five times for project awareness, updates, and were asked for input and guidance. The Friends of the SAC included state and DoD representatives, media, and local business councils that were convened at the beginning and toward the end of the project for awareness and updates. The Working Groups were centered around each installation and included representatives from Mission Sustainment, Continuity of Operations, Facilities, Public Works, Infrastructure, Preparedness Response (including Emergency Managers), and Community Relations. These participants spent days with the project team providing the details of the vulnerabilities and current/proposed adaptation actions.

“Naval Air Station Key West’s unique island setting within the Florida Keys National Marine Sanctuary makes our installation, the City of Key West, and Monroe County interconnected and interdependent partners in the resilience journey. Our ongoing partnerships enable our national defense mission of world-class training, joint operations, research and testing facilitated from the base’s ideal geography.”

— Captain Elizabeth Regoli
Commander
Naval Air Station Key West



Working Group Workshop at USAG-Miami/SOUTHCOM



Workshop Notes



Site Tour at NASKW

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