

A high-angle photograph of a worker in a blue hard hat and gloves cleaning a large metal chain link with a red cloth. The worker is positioned in the upper left quadrant of the frame. The chain is composed of large, dark metal links, some of which are being cleaned. The background shows a dark, industrial floor with some yellow markings. The overall scene is industrial and focused on maintenance work.

## Appendix B Stakeholder Engagement



SFRPC Military Installation Resilience Review Site Visit & Workshop

South Florida Ocean Measurement Facility (SFOMF)

Date: July 27, 2022

Location: Naval Warfare Center, Dania Beach

On July 27<sup>th</sup>, 2022, the project team for SFRPC Military Installation Resilience Review (MIRR) conducted a site visit and workshop for the SFOMF 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. It 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 SFOMF, its mission, and its community. The objectives of the workshop for the MIRR 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 SFOMF and its community means through dialogue and continuous engagement with stakeholders

The workshop was facilitated by Jacobs Engineering and the South Florida Defense Alliance. Attendees included representatives from SFOMF, City of Dania Beach, Broward County, Florida Power & Light, and SFRPC. The agenda focused on identifying and confirming the identified hazards and threats recorded during the Kick Off Meeting, and brainstorming potential strategies and projects to alleviate them.

Information Sharing

Working Group Welcome & Introductions

Sarah Marrs welcomed the group and started with a quick round of introductions. Rick Miller kicked off the session by describing the one-of-a-kind testing offshore and analysis support SFOMF supplies, and the irreplaceable value of the work done. Funding sources for prioritized solutions discussed were REPI, FEMA BRIC, DCIP, and the state of Florida.

Mike Farrar, Site Director of SFOMF, gave a presentation on the unique services and research the installation provides and the resilience issues it faces. Priorities included the communication lines,

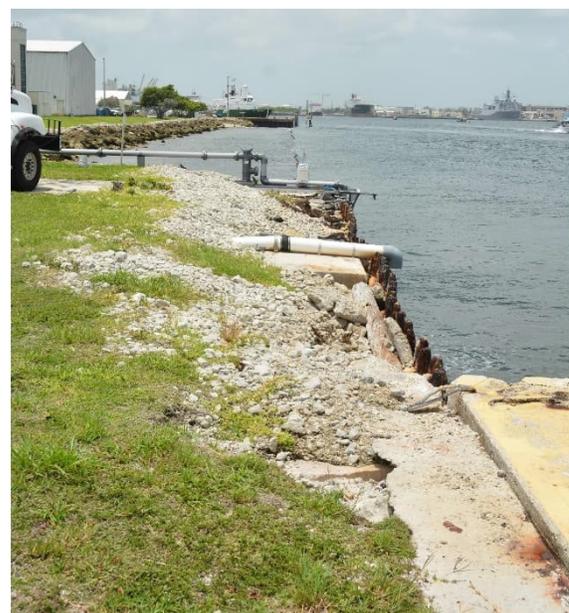


Figure 1: Shoreline Erosion

## Meeting Summary: South Florida Ocean Measurement Facility (SFOMF)

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flooding of Dania Beach Road, security risks, and shoreline erosion/degradation. The installation property is on a 45-year lease owned by the State of Florida, and concerns include the lack of maintenance by the owner of the beach and shoreline.

Afterward, Dr. Jennifer Jurado, the Chief Resilience Officer of Broward County, gave a presentation on the resilience planning and research efforts at the county.

### Data Review: Site Inventory and Analysis

Planning for 2040 and 2070 should take several factors into consideration. Post Panamax ships will likely block comms in the future, with their immense size potentially damaging the physical infrastructure on which SFOMF relies. As it is, ships dropping anchor can cause damage today to fiber optic cables, with other cables exposed and vulnerable to erosion. As bottom currents and swells change over time, there will be impacts on sensors. Testing days are likely to be reduced due to a rising frequency in storms, with customers staying longer as those severe weather days increase. Due to the critical infrastructure in the facility, Scott Davis from Florida Power & Light (FPL) noted that having two electrical feeders would be prioritized, with an auto-throw over to the facility. FPL has continued their hardening of poles, lines, and substations post-Hurricane Wilma. Currently phone lines coming into the base are exposed, causing outages whenever it floods; the relationship between incoming utilities/communications and base readiness needs to be further explored. Lisa Shortt and Mike Farrar added that they follow local emergency management procedures and can switch to remote work when needed. The facility itself must be up and running within four hours of a shock because it serves as an essential function of the mission, particularly the fiber optic cable that runs to Guantanamo Bay. A unique source of stress to the facility is damage inflicted iguanas. There are plans to expand the facility to allow more staff and warehousing space.



Figure 2: No Anchoring Signage



Figure 3: Iguana on the Jetty

Jennifer Jurado noted that the facility location falls within County Adaptation Action Area (AAA) designation for the sand bypass; therefore, considering how to package the facility for prioritized grant funding should be at the forefront.

### Walking Tour

After lunch, Lisa Shortt and William Venezia led the group on a walking tour of the facilities. The group observed the shoreline erosion, the closeness to neighbors and public that creates potential security risks, and how the extreme heat is impactful upon personnel.

## Brainstorming Workshop

### Debrief: Concept Workshop

During the last couple hours, the Jacobs team led the group through a discussion of potential pilot projects to address the resilience issues that had been documented. The group gathered around a map to plot out project ideas and agreed that the following pilots could respond to the issues.

Identified opportunities to pursue during pilot analysis included:

**Partnership:** creating a “super-stakeholder” between the naval installation, the state park, and the university to advocate for mutually beneficial changes in policy and implementation. This can include getting the beach and shoreline consistent maintenance, renourishment, and habitat restoration by the state on a routine basis. While Broward County has advanced a request for the renourishment, the request could be reworked and strengthened with the support of the super-stakeholder. Additionally, the MIRR project will explore gaining priority status and improved infrastructure from comms provider AT&T in an effort to great reduce disruptions during emergencies.

**Security:** The parking lot that is utilized for the admin building at 91 North Beach Road is under threat of being acquired by the City of Dania Beach and developed as a public parking garage. This poses distinct and immediate security risks to the installation. The MIRR project would recommend advocating against the parcel acquisition in the short term and building a replacement facility adjacent to the operations in the long term.

**Access:** Because Dania Beach Road is the single point of access by land, the MIRR project could advocate for including it in the Florida Department of Transportation’s (FDOT’s) resilience study. It will also look for ways to give the road priority status for lifting and widening. Because the shoreline is the single point of access by water, the MIRR project could explore shoreline expansion projects. The ability of staff to get to the jetty with beach access, clean water, and boat access remains the most important component for mission assurance.

An overarching policy recommendation on incorporating local standards into base facility standards to address local climate issues and future conditions is paramount. While the new warehouse may address heat requirements, the stress that extreme heat creates for the workforce is not the focus of this grant.

### Outbrief: Next Steps

The workshop was concluded with Sarah Marrs detailing the next steps for the project team, when they will be in touch with the group again, and the final delivery timelines. The 1-day program was successful and well-received by the attendees, with the goals and objectives achieved for the project team.

Follow-up action items include:

- Jacobs to determine whether an interview with Naval Facilities Engineering Systems Command is required (as manager/lessor).
- Jacobs to discuss water/sewer infrastructure and sewer lift station with City of Fort Lauderdale (the water provider for the base) or City of Hollywood.
- Jacobs to request the groundwater table data available through USGS.

## Meeting Summary: South Florida Ocean Measurement Facility (SFOMF)

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- A Subject Matter Expert meeting is needed with FDOT and MPO.
- Broward County to send Priority Planning Area map to Jacobs; Jacobs will use this information alongside AAA designation to prioritize funding and apply for grants.
- Jacobs will follow up with Jennifer Jurado on a statement from the Compact about sticking to 2019 SLR projections to stay ahead of the curve for future planning.

# South Florida Military Installation Resilience Review (MIRR)

## SFOMF Site Visit Attendance List

July 27, 2022

Naval Warfare Center – Fort Lauderdale Detachment  
91 North Beach Road  
Dania Beach, FL 33004

Wednesday July 27

In-Person / Virtual	Last Name	First Name	Role	Company	Contact Email
I	Farrar	Michael	Site Director	SFOMF	michael.g.farrar@navy.mil
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I	Batista	Claudia	Planner	Dania Beach	cbatista@daniabeachfl.gov
I	Jurado	Jennifer	Chief Resilience Officer	Broward County	jjurado@broward.org
I	Davis	Scott	Client Account Representative	FPL	scott.e.davis@fpl.com
I	Berkowsky	Pamela	Facilitator	SFDA	pberkowsky@bluesapphirestrategies.com
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V	Bird	Jason	Facilitator	Jacobs	Jason.Bird@jacobs.com
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## SFRPC Military Installation Resilience Review Workshop

### USAG-Miami SOUTHCOM

**Date:** August 10, 2022  
**Location:** Meeting Room, MDR HQ Training Center  
Room 1-085, Doral

On August 10<sup>th</sup>, 2022, the project team for SFRPC Military Installation Resilience Review (MIRR) conducted a workshop for the USAG-Miami/SOUTHCOM 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. It 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 USAG-Miami/SOUTHCOM, 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 USAG-Miami/SOUTHCOM and its community means through dialogue and continuous engagement with stakeholders

The workshop was facilitated by Jacobs Engineering and the South Florida Defense Alliance. Attendees included representatives from USAG-Miami, SOUTHCOM, Miami-Dade County, SFRPC, and City of Doral. The agenda focused on identifying and confirming the identified hazards and threats recorded during the Kick Off Meeting, and brainstorming potential strategies and projects to alleviate them.

### Information Sharing

#### Working Group Welcome & Introductions

The group gathered virtually and in person at the Miami-Dade Fire & Rescue Headquarters Training Center for a quick round of introductions and overview of the day ahead. Sarah Marrs and Rick Miller gave an overview of the project, including its scope, and the goals for the workshop.



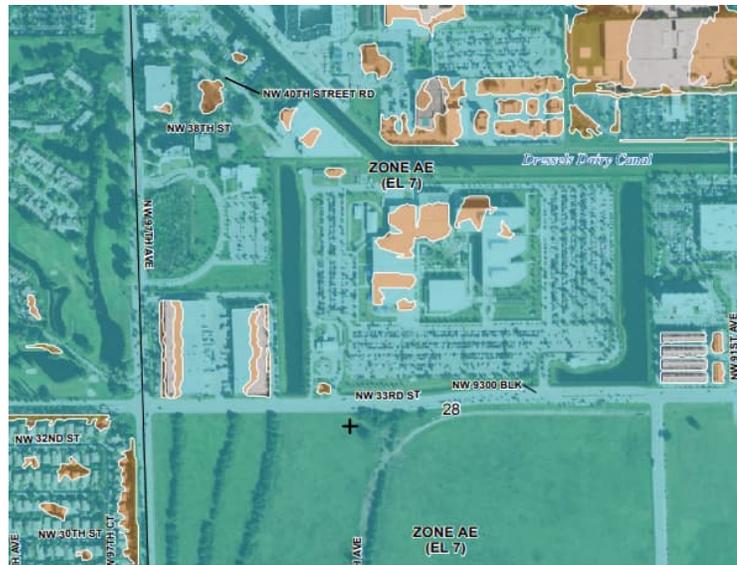
Figure 1: Participants in the Onsite Workshop

Discussion included acknowledgment that while the US Army Climate Adaptation Plan has been adopted, it has not yet been

operationalized at the installation level. With a potential Base Realignment and Closure round upcoming, resilience measures will be influential for the planning horizons in 2040 and 2070. As part of this, the operational concerns at the forefront for the USAG-Miami/SOUTHCOM installation include housing, redundancy of utility services, transportation, and access to common services. Previous hazard assessments indicate that while electric generators and potable water vendors provide sufficient backup, the natural gas line has no redundancy, and transportation of supplies and staff during flooding is impacted by untraversable roads.

### Data Review: Site Inventory and Analysis

A review of the general flood exposure of the site shows that the site is exposed to 4 feet of sea level rise (SLR) via the South Florida Water Management District (SFWMD) flood management canal adjacent to the site. The current Federal Emergency Management Agency (FEMA) flood insurance rate map of this area is within flood zone AE. The garrison facilities experience some localized flooding from rainfall, have no known heat-related concerns, and a ride-out COOP team of minimum staff to support critical operations during hurricanes. Concerns include the difficulty of staffing the Child



Development Center due to access challenges, the inability for SOUTHCOM staff to work remotely, and a 24-hour turn-around time for the emergency heating, ventilation, and air conditioning system to come online.

Javier Gonzalez of the City of Doral's Planning Department gave a presentation on current and anticipated projects in the area, as the City of Doral's planning and zoning projects have implications on the connectivity to services for the installation's service members and employees. Upcoming projects include the revitalization of Doral Central Park, a possible community trail that may require the installation's approval, and a new school to be on the northeast parcel. There is little to no vacant land in the city due to purchase or current development. Rapid transit zone ordinance to set floor-area ratios along corridor is pending county approval.

Dr. Samantha Danchuk then led a discussion surrounding the data that she has currently collected to support the vulnerability analysis of this study area, and asked questions in order to find the appropriate sources for any gaps in her analysis.

### Debrief: Concept Workshop

Afterward, the Jacobs team led the group through a discussion of potential pilot projects to address the resilience issues that had been documented. The group gathered around a map to plot out project ideas and agreed that the following pilots could respond to the issues: Housing, Potable Water Wells, Transportation Safety, Multi-modal Connectivity, Green Infrastructure, and Emergency Family Assistance Center (EFAC)/Disaster Response Facility.

Identified opportunities to pursue during pilot analysis included:

**Housing:** USAG-Miami has already selected a private housing contractor in a lend-lease program to construct and operate a housing project across the street on FAA-owned parcel, with a two-phased design underway. Currently officer housing is provided for general and flag officers via private home leasing, with major consistency issues in service. The MIRR project could potentially help prioritize and advocate for the development and funding of Phase 2. Analysis will also include looking at other locations and opportunities for public/private partnerships, private developers, the U.S. Department of Defense (DoD) to build workforce housing, and partnering with the city on zoning ordinances to incentivize leasing for DoD tenants.

**Potable Water Wells:** continuing use of western stormwater as water supply for the onsite chiller plant via the pump station adjacent to the pond. The Miami-Dade Water and Sewer Department (WASD) will clarify if additional wells on and offsite could be used for backup water sources, if filtration could be achieved at these sites. This could potentially alleviate the need for trucking in potable water when roads are untraversable.

**Transportation Safety:** developing safe pedestrian infrastructure between the new housing development, USAG-Miami/SOUTHCOM, Doral Central Park, and bike trails north and south of the installation.

**Multi-modal Connectivity:** since nearby housing will not be an option for everyone at USAG-Miami/SOUTHCOM, alleviating commutes is a viable pilot. Miami-Dade County has an Urban Development Corridor project along route 836, approximately 1 mile south of USAG-Miami/SOUTHCOM. The MIRR project could potentially prioritize and advocate for a transit-oriented development (TOD) stop at 97<sup>th</sup> Avenue, and connection via shuttle and bike trail spur. Connectivity through a shuttle loop or extended service of the Doral Trolley to common services at Walmart, Sam's Club, Wawa, CVS, and the nearby hospitals will be explored.

**Green Infrastructure:** the potential to reduce stormwater flooding and heat island effect along the primary access roadways and walkways will be explored through implementing shaded greenways and infiltration planters where the rights of way can accommodate.

**EFAC/Disaster Response Facility:** a backup location for an EFAC and Disaster Response Facility could be located adjacent to Phase 2 of the housing development. This could potentially provide shelter, supplies, and Child Development Center services if current agreements for use of the off-base EFAC do not continue, or a non-charter school environment is needed.

Also discussed were future funding opportunities, which include Florida Department of Transportation and DoD access grant programs, and State Defense funding.

### Outbrief: Next Steps

The workshop was concluded with Sarah Marrs detailing the next steps for the project team, when they will be in touch with the group again, and the final delivery timelines. The 1-day program was successful and well-received by the attendees, with the goals and objectives achieved for the project team.

Follow-up action items include:

- The City of Doral's Capital Improvement Projects list, including stormwater projects and road projects, will be sent to Jacobs.

## Meeting Summary: USAG-Miami SOUTHCOM

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- Jacobs is working with WASD, FPL and the gas company for more information on the lines that feed into the base.
- Michael Laas (WASD) to clarify the possible use of abandoned wells offsite.

# South Florida Military Installation Resilience Review (MIRR)

## USAG-Miami / SOUTHCOM Site Visit Attendance List

**August 10, 2022**

MDFR HQ Training Center Room 1-085  
9300 NW 41 Street  
Doral, FL 33178

In-Person / Virtual	Last Name	First Name	Role	Company	Contact Email
I	Dominguez	Richard	J45 Supervisor of Engineers	SOUTHCOM	richard.dominguez3.civ@mail.mil
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I	Berkowsky	Pamela	Facilitator	SFDA	pberkowsky@bluesapphirestrategies.com
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## SFRPC Military Installation Resilience Review Site Visit & Workshop

### Homestead Air Reserve Base (HARB)

**Date:** July 21-22, 2022

**Location:** Miami-Dade Public Library, Naranja

From July 21<sup>st</sup> to 22<sup>nd</sup> 2022, the project team for SFRPC Military Installation Resilience Review (MIRR) conducted a site visit and workshop for the Homestead Air Reserve 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. It 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 HARB, its mission, and its community. The objectives of the workshop for the MIRR 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 HARB and its community means through dialogue and continuous engagement with stakeholders

The workshop was facilitated by Jacobs Engineering and the South Florida Defense Alliance. Attendees included representatives from HARB, Miami-Dade County, SFRPC, WASD, DERM, and City of Homestead. The agenda focused on identifying and confirming the identified hazards and threats recorded during the Kick Off Meeting, and brainstorming potential strategies and projects to alleviate them.

### Day 1: Information Sharing

#### Working Group Welcome & Introductions

The group gathered virtually and in person at the Naranja Branch of the Miami-Dade Public Library for a round of introductions and overview of the day ahead. Rick Miller and Sarah Marrs gave an overview of the project, including its scope, and the goals for the workshop.

Larry Ventura, Mark MacGregor and Sarah Hayenga of HARB gave a presentation on the

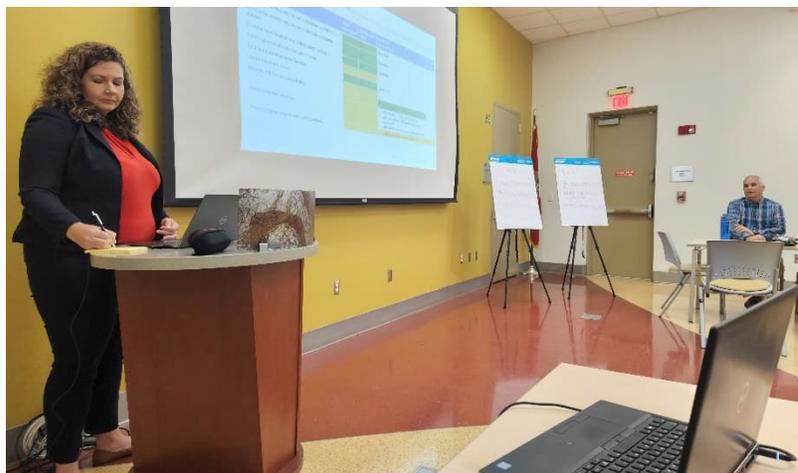


Figure 1: Participants in the Onsite Workshop

## Meeting Summary: Homestead Air Reserve Base (HARB)

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mission that the base supports, their past efforts to develop sustainable guidelines, and the ongoing issues that are of priority. Their top priorities are alleviating flooding especially on roadways and access points, hardening facilities and infrastructure to withstand climate events, lack of affordable housing, encroachment of urbanized development, and extreme heat. HARB also has multiple tenants including the US Department of Labor, US Coast Guard, SOUTHCOM special operations, Customs and Border Protection, and Florida Army National Guard. Due to Base Realignment and Closure measures after Hurricane Andrew impacted the Base in 1992, the perimeter is smaller than its historical footprint as Homestead Air Force Base (HAFB). Through discussion, the group learned that while infrastructure systems and overland drainage designed to support the larger HAFB have been turned over to Miami-Dade County and City of Homestead, there are opportunities to improve maintenance oversight and redevelopment of drainage on the parcels now outside the fence line. The representatives from HARB also acknowledged that with so many complexities around land ownership, zoning, and leasing, they are subject to complying with five different design and performance standards, which are rarely aligned with each other. There was desire expressed to align with Miami-Dade County's robust, localized standards that are developed to provide resilience measures for this specific area.

Dialogue also identified that when planning for a more resilient HARB, it is important to consider the three scenarios that the Base currently sees: Daily Operations, Training Weekends, and Evacuated Base.

Jim Murley and Kim Brown from Miami-Dade County's Department of Regulatory and Economic Resources represented the county as Chief Resilience Officer and Director of Resilience Planning. They gave a presentation on how the county defines resilience, their journey with resilience-focused planning, and the ongoing projects in the area surrounding HARB. These included planned transit improvements through bus express rapid transit (BERT) corridors and transit-oriented development (TOD) districts to define unified urban centers. The county also updates their Stormwater Master Plan with capital improvement projects to alleviate flooding.

Dialogue identified that when planning for a more resilient HARB, policy recommendations should be based on future conditions, embedded into current policies for project compliance, and customized for resilience to local vulnerabilities. Steve Taylor with the City of Homestead reiterated the city's support of HARB and its planning efforts.

### Data Review: Site Inventory and Analysis

Dr. Samantha Danchuk then led a discussion surrounding the data that she has currently collected to support the vulnerability analysis of this study area, and asked questions in order to find the appropriate sources for any gaps in her analysis.

Afterward, the group gathered around the map on the table and created existing conditions maps together to visually illustrate all the points made in the discussions.

### Vehicle Tour

The group collectively arrived at the installation and boarded the bus for a quick tour, including a



Figure 2: Participants on the Bus for the Base Tour

stop at the air traffic control tower. The view from the tower allowed the group to see the issues in context.

## Day 2: Brainstorming Workshop

### Debrief: Concept Workshop

The next morning, the Jacobs team led the group through a discussion of potential pilot projects to address the resilience issues that had been documented. The group gathered around a map to plot out project ideas.

Identified opportunities to pursue during pilot analysis included:

**Affordable Housing:** Affordable housing is lacking near HARB. The MIRR project could potentially help prioritize and advocate for affordable housing funding and development along Miami-Dade County's Urban Development Corridors. Analysis will also include looking at public/private partnerships, private developers, and partnering with the city on zoning ordinances to incentivize leasing for U.S. Department of Defense tenants.

**Resilient Utilities:** Bringing resilience to the utilities systems and infrastructure includes building in backup sources and reducing demand with policy change. The MIRR will request an automated switch be installed at the substation, analyze the potential for graywater reuse, potable water sources, energy production and storage, and fuel for the existing generator. Maintenance agreements for stormwater canals and influence on land development policy for parcels that were handed over to the county will be explored.

**Transportation Network:** Miami-Dade County is implementing a TOD corridor on US Highway 1 and a BERT corridor at the Turnpike. MIRR can advocate for Park and Ride stops and shuttles to and from these corridors and HARB. Additionally, opportunities for improving flood risk to the primary and secondary access roadways and entry points will be explored.

**Encroachment Buffer:** The areas of urban development continue to creep closer to the installation perimeter and accident potential zones (APZs) of the airfield. For areas within the



Figure 3: Stormwater Canal

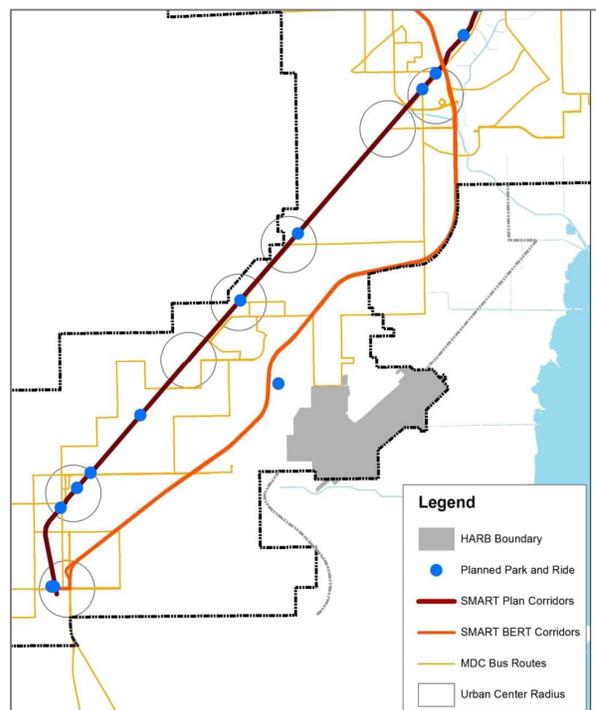


Figure 4: Miami Dade County TOD Corridors

## Meeting Summary: Homestead Air Reserve Base (HARB)

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APZs and outside the installation perimeter, easements and land use compatibility studies would be proposed to reduce risk of incompatible development. These areas will be explored for locating battery farms for alternative energy generation.

Also discussed were review of design standard memos and previous sustainability guidelines that HARB has prepared to increase the resilience of the base from inside the fence line. Additionally, the MIRR could suggest extending and increasing partnerships with other training locations. These partnerships allow for training to rotate location based on good weather seasons. This could help alleviate some of the impact of extreme heat on personnel.

### Outbrief: Next Steps

The workshop was concluded with Sarah Marrs detailing the next steps for the project team, when they will be in touch with the group again, and the final delivery timelines. The 2-day program was successful and well-received by the attendees, with the goals and objectives achieved for the project team.

Follow-up action items include:

- Jacobs to schedule follow-up meetings with stakeholders who were not present
- Jacobs to follow up with HARB representatives to ensure all data was correctly captured
- Jacobs to review HARB's design standard memos and sustainability guidelines
- Jacobs to follow up on potential for coastal resilience pilots at Biscayne Bay

# South Florida Military Installation Resilience Review (MIRR)

## HARB Site Visit Attendance List

July 21-22, 2022

Naranja Branch Library  
14850 SW 280th St  
Homestead, FL 33032

Thursday, July 21

In-Person / Virtual	Last Name	First Name	Role	Company	Contact Email
I	Hayenga	Sarah	Community Planning Liaison	HARB	sarah.hayenga.ctr@us.af.mil
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V	Mcintosh	Justin		City of Homestead	justin.macintosh.1@us.af.mil
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I	Polumbo	Robert	Facilitator	SFDA	mumbles@twoblueaces.com
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I	Foran	Casey	Facilitator	Jacobs	Casey.Foran@jacobs.com
I	Marrs	Sarah	Facilitator	Jacobs	Sarah.Marrs@jacobs.com
I	Orozco	Dorian	Resilience Intern	Jacobs (Aptim)	Dorian.Orozco@aptim.com
V	Patch	Demi	Facilitator	Jacobs	Demi.Patch@jacobs.com
I	Schmidt	Hollie	Facilitator	Jacobs	Hollie.Schmidt@jacobs.com

# South Florida Military Installation Resilience Review (MIRR)

In-Person / Virtual	Last Name	First Name	Role	Company	Contact Email
V	Zender	Kira	Facilitator	Jacobs	KIRA.ZENDER@jacobs.com
V	Cosio Carballo	Isabel	Executive Director	SFRPC	isabelc@sfrpc.com

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**USACE Engineering With Nature® + SFRPC Military Installation Resilience Review Site Visit & Workshop**

**Naval Air Station Key West**

**Date:** August 2-5, 2022  
**Location:** Meeting Room, Building A-515, Boca Chica

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During the week of August 1, 2022, the project teams for USACE Engineering With Nature® (EWN) and SFRPC Military Installation Resilience Review (MIRR) conducted a joint site visit and workshop at Naval Air Station Key West. These events were held concurrently with the goal of creating synergy, efficiency, and awareness between the teams and stakeholders. The workshop was enhanced by the participation of the University of Miami's Reefense Team, as they were conducting research and analysis of potential sites for their prototypes.

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. It 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 Naval Air Station Key West (NASKW), its mission, and its community. The objectives of the workshop for the MIRR 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 NASKW and its community means through dialogue and continuous engagement with stakeholders

The purpose of the EWN project is to identify the vulnerabilities to the installation and mission assurance that could be mitigated through natural infrastructure solutions. These solutions can occur within or outside the fence line and are in direct alignment with the U.S. Department of Defense Climate Action Plan. The purview of the project will define a series of projects that decrease current vulnerabilities by improving the natural infrastructure system that supports NASKW and its mission. The objectives of the workshop for the EWN team included:

- Continue learning of the identified natural infrastructure (NI) projects
- Foster interactive, collaborative discussions around opportunities and challenges
- Review and discuss possible refinement of project concepts, including alignment with ERDC EWN objectives

Additionally, through working together, the meeting group decided upon an over-arching goal for both projects:

*All audiences must understand that while NASKW is vulnerable to threats and hazards, its unique location holds advantages and opportunities that cannot be duplicated elsewhere. It*

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*is critical to multiple overlapping missions, and investments to improve its adaptability are crucial for continued success.*

The site visit and workshop was hosted by Christina Gardner, Edward Barham, and Wendy Wheatley-Techmer of NAS Key West, and facilitated by Jacobs Engineering and the South Florida Defense Alliance. Attendees included representatives from NAS Key West, NAVFAC, US Navy, USACE Engineering Research Development Center (ERDC), SFRPC, and the City of Key West. The agenda focused on identifying and confirming issues and constraints on days 1 and 2, and on brainstorming potential strategies and projects on day 3.

## Day 1: Boca Chica Issues and Observations

### 8:00 a.m. Introductions

The group rallied at building 515 for a quick round of introductions and overview of the day ahead. Wendy Wheatley-Techmer gave a description of the site tour for Boca Chica.



Figure 1: Participants Touring the Boca Chica Shoreline

### 8:30-11:30 a.m. Base Shoreline Tour (Walking)

The group caravanned to the southern shoreline of Boca Chica to observe the erosion and sea level rise concerns that had been identified. During the walking tour, observations included both successful and unfinished wetland restoration, native and invasive plant communities, sea turtle habitat, boulder stabilization, and signs of frequent flooding on roadway pavement.



Figure 2: Edward Barham Sharing Information with Participants

## Meeting Summary: Naval Air Station Key West

### 12:30-1:30 p.m. Inbrief, Working Group Welcome

During lunch, Dr. Andrew Baker from the University of Miami gave a presentation of his team's research project, Reefense. Afterward, Hollie Schmidt, Rick Miller and Sarah Marrs kicked off the workshop with an inbrief of the two projects that included a review of the scopes of the grant and project timelines, followed by a recap of comments from the kickoff meeting, and goals of the site visit.



Figure 3: Participants in the Onsite Workshop

### 1:30-2:30 p.m. Summary of Observations

The group detailed their observations of risks and vulnerabilities, discussed the cost of inaction, the evolution of missions, the emergency response role of the base, and the trends in Washington.

### 2:45-5:00 p.m. Data Review: Site Inventory and Analysis

Dr. Samantha Danchuk gave a presentation on updated sea level rise projections, and how these forecasts are being used for the vulnerability assessments and analysis of the MIRR project. She then went through a review of the data she has collected to date and where some gaps still remain.

## Day 2: Trumbo Point Annex, Truman Annex, Sigsbee, and Fleming Key Issues and Observations

### 8:30-12:30 p.m. Base Tour

On Wednesday morning, the group rallied at Trumbo Point Annex and were led through Trumbo Point, Fleming Key, Truman Annex and Sigsbee by Ed, Wendy and Christina. The tour was conducted by caravan, and each vehicle used a Microsoft Teams meeting call-in to communicate. During the tour, the team observed shoreline erosion, landfills, invasive plant and animal species, impacts of flooding, critical utility infrastructure, and perimeter security vulnerabilities.

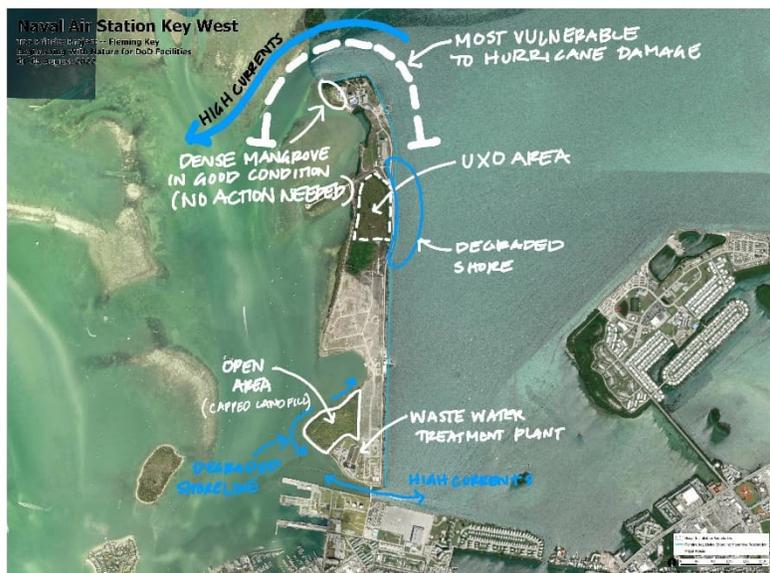


Figure 4: Observations from Base Tour

### 1:30-4:30 p.m. Summary of Observations and Site Inventory

After lunch, the project teams and stakeholders broke into smaller groups to discuss observations and prioritize the key areas with the most important issues. This included topics of fuel pipeline location, cost of living / lack of affordable housing, the mandate for Electric Vehicle Fleets, iguanas, and more. Stakeholders identified what stressors are felt across all locations, versus stressors that are specific to one or two within the installation. After this in-depth look at specific issues, the group identified the following as the key priority items that must be resilient for mission assurance:



Figure 5: Priorities Identified by the Group

- Boca Chica Airfield
- Housing for civil servants and enlisted servicemembers
- Utilities
- Sigsbee Causeway
- Unique Ops & JIATF-S

### Day 3: Concept Adaptation Workshops (All Sites)

#### 8:30-9:30 a.m. Morning Session

The group reconvened in the meeting room of building 980 for the last day of workshop. The morning kicked off with Dr. Andrew Baker giving an update on his team's observations and work from the day before, as well as the next steps of his project. Afterward, Hollie Schmidt gave a recap of the progress of the EWN project, and Sarah Marrs gave a recap of the MIRR project.



Figure 6: Workshop Breakout Session

## Meeting Summary: Naval Air Station Key West

### 9:30-12:30 p.m. Adaptation Breakout Groups

The two project teams broke into small groups and worked through ideas and concepts that could become strategies and pilot projects. These discussions successfully identified potential projects that could benefit both the community and the base, that became the steppingstones for the project teams to develop. The groups also identified ongoing city projects that can be aligned with, provided support, and accelerated for the benefit of all stakeholders.



Figure 7: Workshop Breakout Session

### 1:30-3:00 p.m. MIRR + EWN Together; Next Steps

After lunch, the teams came back together to review the concepts and ideas, acting as a sounding board for each, and finding synergies in how the projects can support each other moving forward. This included discussion of shoreline stabilization strategies, renewable energy feasibility studies, and enhanced use lease strategies.

The workshop was concluded with Hollie Schmidt and Sarah Marrs detailing what the next steps are for both projects, when they will be in touch with the group again, and the final delivery timelines. The 3-day program was successful and well-received by the attendees, with the goals and objectives achieved for both project teams.

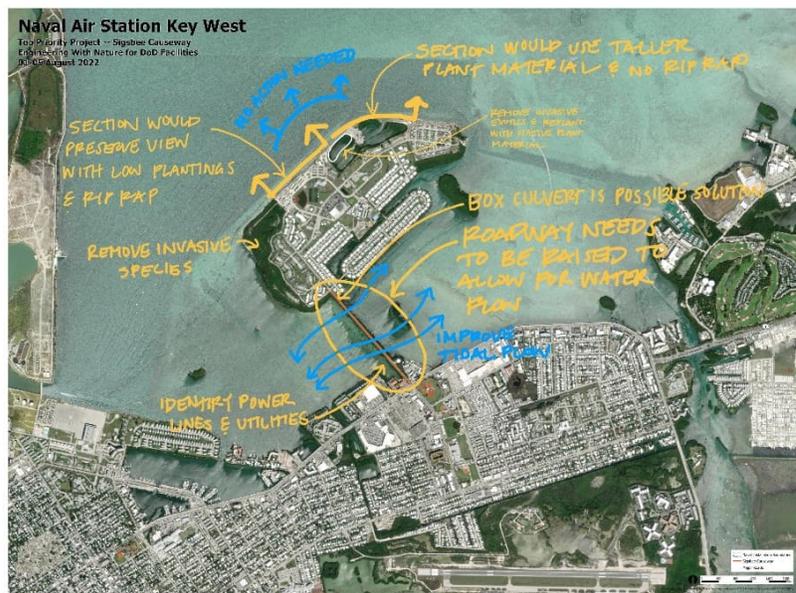


Figure 8: Potential Project Ideas

# South Florida Military Installation Resilience Review (MIRR)

## NASKW Site Visit Attendance List

August 2-4, 2022

Building 515  
NASKW  
Boca Chica, FL

In-Person / Virtual	Tuesday	Wednesday	Thursday	Last Name	First Name	Role	Company	Contact Email
I	X	X	X	Gardner	Christina	Community Planning Officer	NASKW	<a href="mailto:Christina.a.gardner2.civ@us.navy.mil">Christina.a.gardner2.civ@us.navy.mil</a>
I	X	X	X	Barham	Edward	Environmental Director	NASKW	<a href="mailto:edward.m.bardham.civ@us.navy.mil">edward.m.bardham.civ@us.navy.mil</a>
I	X	X	X	Wheatley-Techmer	Wendy	Natural Resources Manager	NASKW	<a href="mailto:wendy.wheatley-techmer.civ@us.navy.mil">wendy.wheatley-techmer.civ@us.navy.mil</a>
I			X	Flowers	Roland	Utilities Head	NASKW	
I			X	Cottom	Ray	Utilities Deputy	NASKW	
I	X			Halloran	Katie	Planning Director	City of Key West	<a href="mailto:khalloran@cityofkeywest-fl.gov">khalloran@cityofkeywest-fl.gov</a>
I	X	X		Wilman	Karen	Senior Construction Manager	City of Key West	<a href="mailto:karen.wilman@cityofkeywest-fl.gov">karen.wilman@cityofkeywest-fl.gov</a>
V	X			Higgins	Alison	Chief Resilience Officer	City of Key West	<a href="mailto:ahiggins@cityofkeywest-fl.gov">ahiggins@cityofkeywest-fl.gov</a>
I			X	Volenec	Gary	City Engineer	City of Key West	<a href="mailto:gary.volenec@cityofkeywest-fl.gov">gary.volenec@cityofkeywest-fl.gov</a>
I		X	X	Frazier	Kimberley	Utilities	City of Key West	<a href="mailto:kimberley.frazier@cityofkeywest-fl.gov">kimberley.frazier@cityofkeywest-fl.gov</a>
I			X	Strom	Valerie	Public Works	City of Key West	
I	X	X	X	Oelke Farley	Jennifer	Environmental Programs Director	NAVFAC	<a href="mailto:jennifer.l.oelkefarley.civ@us.navy.mil">jennifer.l.oelkefarley.civ@us.navy.mil</a>
I	X	X	X	Ross	Jesse	Natural Resources Specialist	US Navy	<a href="mailto:jesse.j.ross15.ctr@us.navy.mil">jesse.j.ross15.ctr@us.navy.mil</a>

# South Florida Military Installation Resilience Review (MIRR)

In-Person / Virtual	Tuesday	Wednesday	Thursday	Last Name	First Name	Role	Company	Contact Email
I	X	X	X	Altman	Safra	Coastal Ecology Lead	USACE ERDC	<a href="mailto:safra.altman@usace.army.mil">safra.altman@usace.army.mil</a>
I	X	X	X	Savercool	Dan	Senior Scientist	EA Engineering	<a href="mailto:dsavercool@eaest.com">dsavercool@eaest.com</a>
I	X	X	X	Smith	Robbie	Biologist	US Navy	<a href="mailto:robert.j.smith1384.civ@us.navy.mil">robert.j.smith1384.civ@us.navy.mil</a>
I	X	X	X	Miskis	Christina	Principal Planner	SFRPC	<a href="mailto:cmiskis@sfrpc.com">cmiskis@sfrpc.com</a>
I	X	X	X	Miller	Rick	Facilitator	SFDA	<a href="mailto:rmiller@pharosmissioncritical.com">rmiller@pharosmissioncritical.com</a>
I	X	X	X	Berkowsky	Pamela	Facilitator	SFDA	<a href="mailto:pberkowsky@bluesapphirestrategies.com">pberkowsky@bluesapphirestrategies.com</a>
I	X	X	X	Torriente	Susy	Facilitator	Jacobs	<a href="mailto:susy.torriente@jacobs.com">susy.torriente@jacobs.com</a>
I	X	X	X	Marrs	Sarah	Facilitator	Jacobs	<a href="mailto:sarah.marrs@jacobs.com">sarah.marrs@jacobs.com</a>
I	X	X	X	Hicks	Kale	Planner	Jacobs	<a href="mailto:kale.hicks@jacobs.com">kale.hicks@jacobs.com</a>
I	X	X	X	Danchuk	Sam	Engineer	Jacobs (Aptim)	<a href="mailto:Samantha.Danchuk@aptim.com">Samantha.Danchuk@aptim.com</a>
I	X	X	X	Schmidt	Hollie	Facilitator	Jacobs	<a href="mailto:hollie.schmidt@jacobs.com">hollie.schmidt@jacobs.com</a>
I	X	X	X	Gorsira	Rick	Scientist	Jacobs	<a href="mailto:rick.gorsira@jacobs.com">rick.gorsira@jacobs.com</a>
I	X	X	X	Griffin	Mitch	Engineer	Jacobs	<a href="mailto:Mitch.Griffin@jacobs.com">Mitch.Griffin@jacobs.com</a>
I	X		X	Baker	Andrew	Marine Biology / Reefense	University of Miami	<a href="mailto:abaker@rsmas.miami.edu">abaker@rsmas.miami.edu</a>
I	X			Lirman	Diego	Marine Biology / Reefense	University of Miami	<a href="mailto:dlirman@rsmas.miami.edu">dlirman@rsmas.miami.edu</a>
I	X		X	Cherney	Laura	Reefense	AECOM	<a href="mailto:Laura.Cherney@aecom.com">Laura.Cherney@aecom.com</a>
I			X	Swan	Lauren	Reefense	AECOM	<a href="mailto:Lauren.Swan@aecom.com">Lauren.Swan@aecom.com</a>
V	X	X	X	Zender	Kira	Liaison	Jacobs	<a href="mailto:Kira.Zender@jacobs.com">Kira.Zender@jacobs.com</a>
V	X			Bernagros	Jason	Support	Jacobs	<a href="mailto:Jason.Bernagros@jacobs.com">Jason.Bernagros@jacobs.com</a>
V	X			Yang	Tia	Support	Jacobs	<a href="mailto:Tianya.Yang@jacobs.com">Tianya.Yang@jacobs.com</a>

**B. STAKEHOLDER ENGAGEMENT**

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