Environmental & Energy Study Institute

The National Security – Climate Adaptation Nexus: Mission Assurance Through Community Resilience

April 2, 2024
Mission Assurance Through Community Resilience Topics

1. The Why?
2. Vulnerability & risk examples
3. Adaptation approach
4. Partners
   - Florida Defense Alliance (FDA)
   - Office of Local Defense Community Cooperation (OLDCC) Military Installation Resilience Reviews (MIRR)s
5. MIRR objectives
6. How to determine risk?
7. Adaptation tools
8. Final thoughts
### WHY? South Florida vulnerability assessment highlights

#### AGING INFRASTRUCTURE

<table>
<thead>
<tr>
<th>History/Likelihood of Occurrence/Frequency</th>
<th>Relevance &amp; Extent of Potential Impact</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>100%</strong></td>
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</tr>
<tr>
<td>Needs maintenance and replacement prior to life cycle end</td>
<td>Reliance on supporting infrastructure</td>
</tr>
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</table>

- **Installations and communities are reliant on infrastructure systems that are supplied and maintained by county, city, and private third-party providers.**

- **Infrastructure systems continue to expand as the capacity increases, creating both the need for continued maintenance of existing and new assets, and the replacement of components prior to the end of their life cycle.**

#### EXTREME HEAT

<table>
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<tbody>
<tr>
<td><strong>2-12</strong> Days Temperature exceeds 100 Degrees</td>
<td><strong>100%</strong> Probability of High Demand on Infrastructure</td>
</tr>
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</table>

- **Climate change is projected to increase the number of days above 95°F by 20 to 30 days over the next 50 years.**

- **Extreme heat can cause health risks and fatalities for personnel exercising and working outdoors. Extreme heat above 120 °F may cause damage to roads or power cables and degrade military equipment, operations and training. Extreme heat can lead to higher energy demands which increases potential for power brownouts or disruption.**
WHY? South Florida vulnerability assessment highlights

HOUSING & STAFF RETENTION

History/Likelihood of Occurrence/Frequency
100%
Study areas experiencing a housing crisis

Relevance & Extent of Potential Impact
TOP CAUSE
Of lack of continuity of staff

Lack of affordable housing was listed as a top priority for installations, counties, and cities in South Florida. Exacerbated by rising cost of living, staff are being priced out of the area, creating unmanageable commutes or moving away completely.

HURRICANES

History/Likelihood of Occurrence/Frequency
200+
Since 1851
Across Florida Peninsula

Relevance & Extent of Potential Impact
VARIABLE
Damage potential at 4 installations

A hurricane is a tropical cyclone with sustained winds exceeding 74 mph. Hurricane season extends from June 1 to November 30 annually.

Cat 1: Generally results in coastal flooding and tree damage.
Cat 2: Winds may result in roof damage.
Cat 3: Winds may cause damage to small buildings and may cause inland flooding.
Cat 4: Can result in wall and roof failures in housing, major beach erosions and inland flooding.
Cat 5: Can result in complete roof and small building failures, flooding of structures along the coast.
WHY? South Florida vulnerability assessment highlights

**LAND MANAGEMENT**

<table>
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<tr>
<td><strong>100%</strong></td>
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<tr>
<td>Probability of development applications</td>
<td>Impact on Flood Management</td>
</tr>
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Development applications, even within natural areas providing valuable flood management, are expected to continue to South Florida.

Land management is the balance of maintaining and conserving natural infrastructure and compatible use development. Near installations, buffer zones should be established to prevent encroachment and security concerns at the perimeter. Once natural areas are developed, flood management and habitat is lost.

**LIGHTNING**

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<th>History/ Likelihood of Occurrence/ Frequency</th>
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<tr>
<td><strong>28</strong></td>
<td><strong>LOCALIZED</strong></td>
</tr>
<tr>
<td>Per square mile</td>
<td>Damage potential</td>
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Lightning can result in injuries to personnel, fires, and damage to power infrastructure, equipment and vessels.

In 2019, Florida had 228 lightning events per square mile. Monroe County experiences 12 to 28 lightning strikes per square mile per year and has a 26% annual probability of lightning strikes that cause damage.
WHY? South Florida vulnerability assessment highlights

SEA LEVEL RISE, TIDAL FLOODING AND COMPOUND FLOODING

- History/Likelihood of Occurrence/Frequency: <9 Days per season
- Relevance & Extent of Potential Impact: NUISIBLE
  Flooding potential for 3 out of 4 installations

Sea level rise leads to compound flooding when rainfall, tidal flooding and surge flooding occur simultaneously.

Tidal flooding occurs today in coastal areas with elevations lower than 1.6 feet NAVD. Sea level rise also contributes to groundwater rise, seepage through the ground surface, degrading transportation assets and reducing capacity of stormwater systems. Sea level rise will eventually overtop and inundate coastal infrastructure if adaptation does not occur. Sea level rise also causes saltwater intrusion of inland freshwater/potable water supplies.

SEVERE THUNDERSTORMS & FUTURE PRECIPITATION

- History/Likelihood of Occurrence/Frequency: 40+ Days per year
- Relevance & Extent of Potential Impact: IMPACTFUL
  Flooding potential at 4 installations

With climate change, severe thunderstorms are projected to increase in rainfall intensity and volume.

SFOMF and NASKW are entirely within the 100-year floodplain. The areas surrounding SOUTHCOM and HARB are partially within the 100-year floodplain. Poses risk to drainage systems and roads.
WHY? South Florida vulnerability assessment highlights

**STORM SURGE**

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<th>History/Likelihood of Occurrence/Frequency</th>
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<td>35 Days in past 5 years</td>
<td>IMPACTFUL</td>
</tr>
<tr>
<td></td>
<td>Potential flooding at 3 of 4 installations</td>
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As hurricane magnitude increases, surge depths can reach over 9 feet in the project area. Storm surge can propagate inland through canals and cause inland flooding. According to the National Hurricane Center storm surge is produced by water being pushed toward the shore by the force of winds moving cyclonically around the storm. It is often the greatest threat to life and property from a hurricane event.

**TORNADOES & EXTREME WIND**

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<td>2 Per year per county</td>
<td>100% Probability of Damage</td>
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The high wind speeds and transport of debris turned projectiles within tornados causes property damage and loss of life. Strong winds can cause damage to trees, vehicles, and roofs. Most damage from thunderstorms results from straight-line winds which can gust at 100 miles per hour and damage as much infrastructure as a tornado.

Future wind speeds are anticipated to increase by 2-11%.
Resilience = Risk Reduction

ADAPTATION: LAYERED APPROACH TO RESILIENCE

Understand risks today & tomorrow
Assess vulnerabilities & document
Develop adaptation strategy
Identify policies and programs to reduce risk
Develop funding strategy
Secure Funding
Implement and Invest
Multiple avenues are targeted to find complementary interventions that, when bundled together, can provide adaptation to vulnerabilities over time.
ADAPTATION: LEVERAGING LOCAL EFFORTS

Identify & Align Projects to Optimize Funding

- Capital Improvement Plans
- Comprehensive Development Master Plans
- Long Range Transportation Plans
- Local Mitigation Strategies
- Adaptation Studies
- Resilience Strategies & Plans
PARTNERS: OLDCC and FDA

The Florida Defense Alliance is a grassroots consortium of representatives of defense-related organizations including government, defense industry, economic development organizations and other interested parties who come together in order to protect, promote and enhance the military value of Florida’s installations and missions.

The U.S. Department of Defense Office of Local Defense Community Cooperation assists states and local governments to maximize support of the military mission. It provides technical and financial assistance to states, territories and communities that are invested in the defense mission.

Office of Local Defense Community Cooperation assistance supports the readiness and resilience of both defense installations and defense communities, a priority for the country’s National Defense Strategy.
Florida MIRRs Case Studies Highlights
Support Mission Assurance. Protect and preserve military readiness and defense capabilities through funded interventions.

Promote Resilience Communities. Improve the 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.
DETERMINING VULNERABILITY & RISK

Asset EXPOSURE to Natural and Operational Threats based on Proximity

Asset SENSITIVITY based on Affects from Exposure

Asset ADAPTIVE CAPACITY (Ease of asset modification to accommodate future anticipated threats, high-medium-low. Qualitative, for consideration)

Asset VULNERABILITY (Exposure to assets may result in Impacts and service Interruptions)

Once vulnerable assets are identified, a risk score is calculated for those vulnerable assets.

Hazardous Event LIKELIHOOD (What is the probability that a hazardous event will occur?)

CONSEQUENCE of Hazardous Event Occurring and its Impacts (What are the effects associated with asset impact, loss of service?)

Cumulative Asset Score: RISK TO MISSION
Once vulnerable assets are identified, a risk score is calculated for high-vulnerability assets.

- **Asset EXPOSURE** to Natural and Operational Threats based on Proximity
- **Asset SENSITIVITY** based on Effects from Exposure

**Asset VULNERABILITY** (Exposure to assets may result in Impacts and service Interruptions)

**Cumulative Asset Score: RISK TO MISSION**

- LIKELIHOOD of Hazard Occurring
- CONSEQUENCE of Hazard Event Occurring
- IMPACT ON MISSION

**HOW WE BUILT IT: Emerald Coast, FL**
Once vulnerabilities are identified, a risk score is calculated for all critical assets.

Adaptive capacity of assets is also considered qualitatively during evaluation process.
ADAPTATION TOOLS

Unified Resilience Assessment Methodology
Planning Guidelines
Decision-Making Framework for Investment
Grant Funding Strategy
Rough Order Magnitude Costs
Policy Recommendations
1. Climate change is a national security threat.

2. Climate vulnerabilities do not stay within geographic and/or political borders; therefore, working beyond borders is key.

3. Planning for future conditions and investing in a system’s adaptative capacity reduces risk to military installations and the communities they call home.

4. The OLDCC MIRR program is an excellent vehicle to bring together community and military planners to assess risk and vulnerability and prepare adaptation strategies for investing in resilience. The program should be expanded beyond the Department of Defense to include other federal agencies, like DHS.

5. DoD should allow individual installations to follow local building and design codes when these have been strengthened to address local future climate conditions.
Thank you!

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