Executive Summary

Military Installation Resilience Review

A hazard-resilient future for Naval Station Newport within its coastal community for short-term preparedness and long-term planning

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Introduction

This Military Installation Resilience Review (MIRR) informs Naval Station (NAVSTA) Newport on Aquidneck Island, Rhode Island, and the three surrounding municipalities (City of Newport, Town of Portsmouth, and Town of Middletown) on fostering, protecting, and enhancing a resilient future against natural hazards. It considers the symbiotic nature of military operations and the larger coastal community of Aquidneck Island in the context of increasing storm intensity and rising sea levels. The MIRR provides a foundation for collaborative efforts to build present-day resilience and enhance natural hazard readiness and response, while directly addressing future conditions and supporting long-term planning and mitigation. This MIRR helps sustain and enhance the ability of NAVSTA Newport to meet its mission as a "world-class Center of Learning Excellence with the capacity to support the Navy's vision by providing warfighters with education; Research, Development, Training and Evaluation (RDT&E) and development capability to meet today's demands and exceed tomorrow's expectations." (NAVSTA Newport Mission and Vision).

Aquidneck Island has numerous plans, maps, and strategies focused on individual municipalities or NAVSTA Newport's directives. What is missing, however, is: 1) an understanding of consequences and impacts for critical infrastructure interdependencies for military resilience; 2) an integrated approach to resilience for NAVSTA Newport within its coastal community; 3) an established framework for coordination within and outside the fence; and 4) recommendations to address infrastructure resilience that links the island's jurisdictions through their co-dependencies on infrastructure, health, and safety to natural hazards, economic growth, and environmental sustainability. The MIRR addresses these gaps.

Summary of Tools and Results

The MIRR effort, undertaken from August 2020 to August 2022, used a participatory approach led by a multidisciplinary team of modelers, social scientists, landscape architects, and engagement specialists from the University of Rhode Island (URI), NAVSTA Newport, and the City of Newport. The effort was funded by the U.S. Department of Defense Office of Local Defense Community Cooperation. Tools developed through this effort are available for use in this and other initiatives.

1 “Outside the fence” refers to areas outside of the boundaries that mark the physical limits of NAVSTA Newport.
Storm Models using ADCIRC (Advanced Circulation) – The modeling scenarios developed for the NAVSTA MIRR comprise three different events: (1) calm conditions (astronomical tides only), (2) a high impact hurricane based on the 1938 Hurricane with a modified track that results in a direct landfall for Rhode Island, and (3) Superstorm Sandy (2012), a hybrid storm with hurricane and nor’easter characteristics. Each event type was simulated with the present mean sea level and three sea level rise projections of 1 ft, 3 ft, and 5 ft.

Data Collection and Methodology – The URI Project Team applied the hazard consequence threshold (HCT) data collection methodology to construct a dynamic database of geo-located assets at risk and concerns of asset managers and stakeholders. In total, subject matter experts (SMEs) representing 86 facilities identified 152 HCTs for assets, of which 66% were impacted by flooding, 19% by wind and flood, 12% by wind, and 3% were unknown.

Online Dashboard Tool – The URI Project Team created an interactive dashboard viewer that integrates ADCIRC model results and hazard consequence thresholds. Interactive dashboards summarize complex analyses and distill results into actionable information. They can help users answer such questions as: What are the threats? Which locations, assets, or sectors are vulnerable? What are the consequences of those impacts regarding the mission and operational integrity? The dashboard highlights impacted assets in red. Dashboard users click on the impacted asset to view a pop-up of information regarding its consequence and level of impact (e.g., how much the modeled storm outputs exceed the asset’s flooding and/or wind threshold). Users can also navigate to impacted assets by clicking on its name in the “Consequences Triggered” pane.

3-D Visualizations for Communicating – In addition to the dashboards, 3-D visualizations helped Tabletop Training Exercise (TTX) participants (see below) understand the extent of potential flooding resulting from the modeled scenario events. A set of 36” X 48” posters were generated by coupling virtual 3-D environments with outputs from the ADCIRC model and depicting points analyzed as part of this project.

Evacuation Models from Naval Postgraduate School (NPS) – Finally, partners at the Naval Postgraduate School (NPS) created detailed evacuation models for this project to aid evacuation decisions associated with future storms. Historically, evacuation plans for Aquidneck Island communities have been developed separately, i.e., each municipality had its own evacuation plan, while the evacuation plan for NAVSTA Newport ended at the Naval Station’s fence line. New models for island-wide impacts related to future storm scenarios provide hazard information to support integrated evacuation planning across the municipalities and NAVSTA Newport.
Tabletop Training Exercise

In December 2021, a TTX designed to elicit dialogue and feedback amongst SMEs from NAVSTA Newport and the surrounding municipalities used the dashboard viewer supplemented with static 3-D visualizations and findings from the NPS evacuation models. The objectives of the exercise were to:

- Identify priority concerns for resilience for NAVSTA Newport and surrounding communities,
- Share information about the consequences of concern to community leaders and decision makers, and
- Discuss resilience enhancement strategies and the responsible parties to implement those strategies.

The TTX generated four critical takeaways:

1. Assets for the power grid, potable water supply, and critical wastewater infrastructure are repeatedly projected to fail.

2. Funding opportunities should be leveraged for higher-cost projects.

3. Environmental contamination is a high priority for resilience—but it remains unclear who should take the lead on projects and finding funding sources to mitigate contamination issues.

4. Inter-jurisdictional cooperation is essential in overcoming the challenges of large-scale project costs associated with shared infrastructure networks, such as water or transportation.

Observations and information gathered from the TTX helped inform the URI Project Team on key concerns cited by the SMEs. Most TTX discussion centered on cross-jurisdictional issues and resilience strategies.

Overarching Challenges and Recommendations

Leadership and collaboration among the NAVSTA Newport stakeholders, the three municipalities, and state and private sector entities are key to building resilience to support the Navy’s mission, the island economy, and the public safety of residents, tourists, and military personnel. Yet the MIRR highlights a current lack of strategic coordination and collaborative leadership between the Navy and its neighbors in resilience planning. With its focus on the role of NAVSTA Newport within its coastal community, this project confirmed there are many jurisdictional interdependencies related to assets critical to the Naval mission. Four key challenges are:

- Existing governance mechanisms prevent consistent collaborative planning and program implementation between the Department of Defense (DoD), Department of the Navy (DoN), NAVSTA Newport, and the municipalities.
- The siloed functions of DoD, DoN, NAVSTA Newport, and municipal operations for emergency management and/or long-term planning impede resilience.
- A lack of incentives and sustained leadership essential for emergency management and long-term strategic planning hinders resilience.
Inadequate resources for funding improvements and managing programs is a challenge for all jurisdictions.

The MIRR process produced five strategies (Table 1) through which NAVSTA Newport, Newport, Middletown, and Portsmouth could increase their collective capacity and effectiveness to build their resilience to storms and rising seas. These recommendations address the challenges highlighted above.

Table 1. Key recommended strategies and actions to increase collective Aquidneck Island capacity and natural hazards resilience

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<th>Key Recommendations</th>
<th>Key Actions</th>
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| 1 Establish an overarching mechanism and framework for resilience for NAVSTA, Newport and the three municipalities — and other stakeholders as appropriate | • Establish a memorandum of understanding.  
• Create a working group of cross-functional team members.  
• Create a resilience assessment process. |
| 2 Enhance emergency management collaboration.                                         | • Formalize the Aquidneck Island (AI) Disaster Response Planning Committee.  
• Develop a multi-jurisdictional hazard mitigation plan.  
• Adapt the Military Installation Resilience Review-Coastal Hazards, Analysis, Modeling & Prediction (MIRR-CHAMP) dashboard for near real-time emergency management in collaboration with the Rhode Island Emergency Management Agency. |
| 3 Enhance collaboration for resilience through infrastructure planning and execution. | • Codify an island resilience coordinator position.  
• Increase the role of state and federal political leaders in supporting these efforts and projects.  
• Combine existing Navy and municipal resilience plans and priorities. |
| 4 Develop a strategic communication plan.                                             | • Develop a strategic communication plan for sharing the Navy's resilience objectives with the surrounding communities. |
| 5 Develop partnerships to support collaborative funding and grant management that leverages DoD and municipal capacities. | • Advance partnerships between NAVSTA Newport and off-island leadership.  
• Advance partnerships between the municipalities and NAVSTA Newport.  
• Leverage DoD funds to support resilience-building projects outside the NAVSTA Newport fence line. |
Future Applications

The tools and the Military Installation Resilience Review-Coastal Hazards, Analysis, Modeling & Prediction (MIRR-CHAMP) system created in this project have a variety of applications that extend beyond the life of the NAVSTA Newport MIRR. Collecting, analyzing, and sharing information about threats facing NAVSTA Newport is directly transferable to other military installations worldwide and to the Navy's Emergency Management Hazard, Risk, and Capability Assessment process.

While the MIRR-CHAMP tool has value for planning and/or emergency response, each element of the tool also provides independent value. The data collection tool (Survey123) can assist facility managers or other SMEs as they conduct a site-specific, asset level, risk assessment of the facility under their jurisdiction. The database stores all of the valuable information collected and allows for review and updating. The dashboard allows storm surge and wind to be visualized on a map and also brings together these hazard impacts with the consequences noted through individual site visits.

State and federal programs exist for potential funding partnerships to assist in implementing resilience projects. Federal programs include the Association of Defense Communities, DoD’s Readiness and Environmental Protection Integration, Intergovernmental Support Agreements, as well as Navy-centric funding opportunities. State and regional programs include the Rhode Island Infrastructure Bank and the Southeast New England Program.

Conclusion

The MIRR process, its tools, and its recommendations provide a foundation for resilience building of NAVSTA Newport together with Newport, Middletown, and Portsmouth. From the Navy’s perspective, community engagement is considered one of the most important ways to ensure the Naval Station’s sustainment and to reduce or eliminate disruptions to mission requirements. NAVSTA leadership already engages with local, as well as state-elected officials and municipal staff in efforts to integrate Navy needs with community needs. Therefore, it is proposed that this engagement be strategically expanded to incorporate resilience issues and opportunities that will simultaneously enhance the NAVSTA Newport mission while helping achieve municipal goals and promoting community safety—all with the aim of securing long-term Aquidneck Island vitality.
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