Adaptation Planning for Climate Resilience

Selfridge Air National Guard Base

A Michigan Army National Guard Pilot Project

A demonstration project to strengthen the communities neighboring three Michigan military installations

June 2016

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Introduction

Domestic military installations play an essential role in the nation's defense, particularly in training and developing the men and women of our armed forces. But in a world of ever-evolving conditions and challenges, the modern military installation is tasked with much more than training activities. Today, there is an increasing recognition of the interdependence of installations with the communities in which they reside, particularly in the face of modern global challenges such as climate change that are not bound by political or geographical borders.

Several U.S. Federal agencies, including the Department of Defense (DoD), are leading pilot projects with local communities to identify shared climate change vulnerabilities and to develop local strategies to address those shared vulnerabilities. The Assistant Secretary of the Army (Installations, Energy and Environment) asked the National Guard Bureau (NGB) to identify a state to serve as the Army's pilot, recognizing the National Guard's ongoing efforts to increase the resilience of its installations in support of its disaster-response mission. Resilience is a measure of the sustained ability of a community to utilize available resources to respond to, withstand, and/or recover from adverse situations. NGB selected the Michigan Army National Guard (MIARNG) based on its ongoing sustainability and resiliency efforts and its participation in the Michigan Climate Coalition, a statewide partnership of universities, businesses, non-profit organizations and government agencies interested in climate science, adaptation, sustainability and related disciplines.

This report, *Adaptation Planning for Climate Resilience: A Michigan Army National Guard Pilot Project*, assesses current conditions, documents planning efforts, and makes recommendations to improve resilience in the Fort Custer Training Center (FCTC), Camp Grayling Joint Maneuver Training Center (CGJMTC), and Selfridge Air National Guard Base (SANGB) communities. The following report details an action plan developed for Selfridge Air National Guard Base aimed at responding to and preventing the adverse impacts of climate change on the installation as well as in the greater community.

Federal Framework

This project fulfills a number of federal directives to address climate change on Department of Defense installations. In 2013, the President of the United States charged the Department of Defense to prepare for the impacts of climate change, in part by increasing resiliency on military installations. Resiliency, according to this Executive Order, is "the ability to anticipate, prepare for, and adapt to changing conditions and withstand, respond to, and recover rapidly from disruptions."[1] The Department of Defense's 2014 Climate Change Adaptation Roadmap addressed some of the high-level challenges anticipated for the military's domestic activities, noting:

> "Our coastal installations are vulnerable to rising sea levels and increased flooding, while droughts, wildfires, and more extreme temperatures could threaten many

1 Executive Order 13653

> of our training activities. Our supply chains could be impacted, and we will need to ensure our critical equipment works under more extreme weather conditions. Weather has always affected military operations, and as the climate changes, the way we execute operations may be altered or constrained."

The Department of Defense issued DoD Directive 4715.21 – Climate Change Adaptation and Resilience (January 14, 2016) to formalize the roles and responsibilities laid out in DoD's 2014 Climate Change Adaptation Roadmap. The Directive tasks the DoD Components (including the Army) to assess and manage risks to built and natural infrastructure, basing, and disaster-response mission planning and operations. The Directive also tasks the DoD Components to "collaborate with internal and external stakeholders to address common climate change challenges and opportunities, including regional planning efforts."

The U.S. Army's 2015 Energy Security & Sustainability Strategy (ES2 Strategy) calls on Department of Defense installations to integrate resiliency concepts into base operations and land-use planning. "The ES2 Vision describes a strong, mobile, and flexible force that is housed, trained, and maintained on resilient installations that are able to project power, unimpeded by disruptions to domestic utilities or land use constraints."

The recommendations in this report respond to these federal mandates by increasing the resiliency, self-sufficiency, and preparedness of SANGB while protecting the Michigan Air National Guard's ability to fulfill its mission in the face of a changing climate.

Regional Climate Trends

As stated by the Intergovernmental Panel on Climate Change (IPCC), significant changes in the Earth's climate have been observed. The impacts of climate change on agriculture, infrastructure and human health can be felt across the Great Lakes region.

Located in the southeast Lower Peninsula of Michigan, SANGB occupies 1.85 miles of the Lake St. Clair shoreline. Lake St. Clair is a shallow lake, with an average depth of about 11 feet. Because of this, small fluctuations in wind, precipitation, ice coverage and temperature cause dramatic changes to Lake St. Clair.[2] Compared to the Great Lakes, Lake St. Clair does not produce high velocity waves and generally has calmer waves. However, as the climate changes in southeast Michigan, Lake St. Clair may experience stronger storms, warmer temperatures, decreased ice coverage, and changes in lake dynamics that could threaten lake health and existing fish species.[3]

The Great Lakes Integrated Sciences and Assessments Program (GLISA) is a partnership between the University of Michigan and Michigan State University, housed in the Graham Sustainability Institute's Climate Center at the University of Michigan. As one of 10 regional centers funded by the National Oceanic and Atmospheric Administration (NOAA), GLISA builds capacity to manage risks from climate change and variability in the Great Lakes region. According to GLISA, temperatures are expected to increase in the Selfridge Community, both in terms of averages and extremes. Southeast Michigan is projected to see

2 http://projects.glc.org/habitat/lsc//documents/physical_characterization.pdf
3 http://www.resilientmichigan.org/downloads/gibbons_macomb_adaptationcasestudies.pdf

a 4.5 to 5.0°F increase in average air temperature between 2041 and 2070. An additional 30 to 40 days per year are projected to exceed 90°F. Shorter winters may accompany these temperature rises, with about 30 fewer days each year where the temperature falls below 32°F. The growing season is projected to extend by an additional 40 to 50 days each year.

Process

To develop this report, the project team conducted a two-day planning exercise in the Selfridge Community on July 29 and 30, 2015, to investigate ways that the National Guard and the surrounding communities could work together, leverage resources, and develop a common understanding of shared risks and how they could be addressed. A wide range of stakeholders, including installation leaders, state and local agencies, and the general public, were invited to participate in order to develop a clear understanding of local risks and opportunities associated with climate change. Participants worked to identify priorities and actions to reduce the risks associated with climate change. The project team conducted a series of scenario activities to identify local solutions to a range of potential climate futures. Finally, participants reviewed climate resilience ideas from around Michigan to identify which specific projects and actions could improve local readiness.

A detailed assessment of the Selfridge Community's vulnerability to the potential impacts of local climate change was also conducted. A summary of the vulnerability assessment is included in the appendices of the full project report.

Selfridge at a Glance

SANGB is 3,089 acres, comprising about one-third of Harrison Township's total land area. SANGB is an important and unique installation in the State of Michigan, acting as both the home of the 127th Wing of the Michigan Air National Guard and a Joint Military Community. The Base houses 44 tenants that together represent all branches of the U.S. Military. Key tenants of SANGB include Army, Air Force, Marines, Navy, Coast Guard, and Customs and Border Protection.

SANGB is a national model for Joint Military Communities. The Base works to develop efficiencies and cross-sharing of services between the 127th Wing of the Michigan Air National Guard and the other tenants to create a nationally-recognized model for the functionality of a Joint Military Community.

In addition to partnerships between military tenants and hosts, SANGB also works to ensure its economic and military resiliency in the future. From building structures that are usable for numerous purposes to factoring environmental and sustainable directives into planning and development, SANGB is taking steps to ensure it is flexible and resilient to future demands.

Selfridge provides significant economic and social benefits to the communities nearby. SANGB generates an estimated $825 million annually in economic activity in the local communities outside the Base. Notably, the jobs supplied by the Base and tenant

organizations are less likely to ebb and flow due to changes in the global economy. Therefore, while the Metro Detroit region recently experienced a deep economic recession due in part to a reduction in manufacturing jobs, base employment remained steady.

Selfridge also fosters competitive expertise in the defense, security and advanced manufacturing industries in Macomb County and Metro Detroit.[4] Training opportunities and job growth for industrial and defense research and development in the region have resulted in a skilled workforce, access to capital, and numerous funding and partnership opportunities for new firms. Michigan businesses have received $41 billion in defense contracts in the last decade, with more than 60 percent of that total going to businesses in Macomb County.[5]

Beyond providing educational and economic stimulus, SANGB is also a major defense asset to Macomb County, especially during emergencies. Macomb County Emergency Management and the Military Emergency Management Office on the Base collaborate when developing plans and simulating missions and exercises.

Key Issues

SANGB is a secure, operational military base. Any visitors coming onto the Base must be cleared to enter and are escorted while on Base. High security on the perimeter of the Base is necessary for Base operations, and constrains opportunities for public access to the Base during times of emergencies, for recreation along Lake St. Clair, or for other uses.

Selfridge's elevation is three feet under Lake St. Clair's average water level. Consequently, the Base relies on significant engineered infrastructure to ensure that it does not experience flooding or ponding. Pumps run constantly to drain the Base, seawalls and berms protect the near shoreline areas in times of storms and high water levels, and numerous backups and redundancies ensure that the system does not fail. Discussions surrounding opportunities to better use water resources to increase resiliency face several key constraints. First, urban flooding remains a concern throughout Macomb County, potentially flooding transportation routes leading in and out of the Base. Second, restoring the natural shoreline or native wetlands is not a viable option for Selfridge to consider because of the property's active use as an airfield.

The desire to increase land use compatibility between the Base and the surrounding community stems from two key subjects: safety and noise concerns related to aircraft, and regional efforts to increase recreational linkages.

First, the number of flights taking off from and arriving to SANGB has increased in recent years, prompting an updated Air Installation Compatible Use Zone study for the Base. This report studied the zoning ordinances and development patterns in areas within the noise contour and safety zones of the airfield, and found that many existing land uses and zones in neighboring communities are not compatible with the airfield. As neighboring jurisdictions

4 http://www.127wg.ang.af.mil/shared/media/document/AFD-120919-017.pdf
5 Ibid.

are experiencing population growth, this issue requires information exchanges and collaboration to address.

Second, regional efforts are underway to increase awareness of recreational opportunities and connect them in the region. Several of these efforts have included preliminary discussions with Base leaders to connect trails through the Base along the shoreline. Trail plans — including water trails for kayakers and paddlers in Lake St. Clair and walking/biking trails in neighboring communities — would benefit from increased collaboration with the Base.

Action Plan

The following goals and actions are a result of a series of in-depth stakeholder interviews, public input from a two-day planning charrette focused on SANGB, a Vulnerability Assessment conducted for the Selfridge Community, and recommendations made by installation leaders and the project steering committee, the Michigan Climate Coalition (MCC). Not all recommendations and actions are the MIARNG's responsibility, as several are community-wide recommendations that would be best led by local governments, watershed groups, or other NGOs.

Natural Resources

Goal: *Protect existing wetlands and restore wetlands that have been degraded to increase their resiliency in response to climate change.*

- *Action:* Work with the Clinton River Watershed Council (CRWC) to identify strategic areas for wetlands restoration and preservation within the watershed.
- *Action:* Partner with research universities to study methods to restore wetlands that provide water control benefits without attracting wildlife that is dangerous to planes.

Goal: *Address flooding issues on Base and in the areas surrounding the Base, especially in areas where flooding may be acerbated by climate change.*

- *Action:* Explore opportunities on Base to create cisterns or other stormwater retention methods, acting as an overflow for the region near the Base.
- *Action:* Update FEMA mapping to incorporate urban flooding.
- *Action:* Locate critical facilities like shelters and health facilities outside of high flood risk areas in surrounding communities.
- *Action:* Consider the use of drought-resistant trees to restore the urban tree canopy where trees have died off to enhance canopy and retain stormwater.
- *Action:* Promote the use of green infrastructure such as rain gardens, green roofs, and permeable surfaces.

Goal: *Restore coastal habitat and consider ways to reduce hardening along the Lake St. Clair shoreline to increase its resilience to climate change.*

- *Action:* Explore methods of subsurface fish habitat restoration, keeping in mind base security and wildlife threats.
- *Action:* Prioritize native plantings along the coastline and work with private property owners to educate them on the benefits of native plants.

Infrastructure

Goal: *Increase availability of backup energy and water supplies throughout the community to increase resiliency.*

- *Action:* Explore the use of solar generators, including on personal property.
- *Action:* Evaluate options to establish a regional backup water supply, since the entire region relies on the City of Detroit.

Goal: *Work to position Selfridge and the surrounding communities as a leader in clean energy and energy efficiency and to increase SANGB's energy security posture.*

- *Action:* Invest in airport greening efforts, such as repaving the airstrip with warm-mix asphalt and exploring solar energy.
- *Action:* Work with DTE Energy to explore new opportunities to invest in renewable assets on Base or off Base.
- *Action:* Leverage Harrison Township's commitment to clean energy and identify ways to collaborate in the development of wind, solar, and ground-source heating and cooling.
- *Action:* Explore methane, geothermal, solar energy sources, and installation of microgrids for part of a net-zero solution.

Emergency Response and Climate Resiliency

Goal: *Institute resiliency at every level of internal and external operations.*

- *Action:* Introduce climate change and resiliency topics to the Joint Base Council to implement recommendations and build awareness and capacity for change.
- *Action:* Promote and publicize the reverse 911 system.
- *Action:* Evaluate the potential to use the Base as a backup emergency shelter in the event of a climate-related emergency.
- *Action:* Evaluate any potential change in frequency, duration, and type of severe weather events to determine potential impacts on emergency response capabilities.
- *Action:* Continuity of Operations (COOP) or Continuity of Government Plans should be revalidated and synchronized at the local, state, and federal levels to ensure all efforts harmonize.

Land Use

Goal: *Promote climate-informed smart growth and development that is resilient to climate change and is consistent with installation operations in surrounding communities.*

- *Action:* Work to ensure land-use compatibility in Chesterfield Township and integrate consideration of Clear Zones and Potential Clear Zones in its zoning ordinance.

Next Steps

MIARNG will continue to engage in ongoing state and local planning efforts both in Michigan and in the greater Selfridge area. SANGB leaders plan to continue to monitor the most up-to-date and emerging climate trends and regional projections, and share the information with state/local planning entities.