

SCIPP RESEARCH BRIEF - U.S. MILITARY INSTALLATIONS AND EXTREME WEATHER: AN OKLAHOMA CASE STUDY ON PREPARATION

Dolly Na-Yemeh, Mark Shafer, and Cassandra Shivers-Williams
University of Oklahoma

OVERVIEW

U.S. military installations have become increasingly threatened by weather extremes, which negatively impact their ability to protect national security. Understanding how these installations prepare for and respond to these weather extremes is crucial in the development of improved plans. Oklahoma is home to five major military installations and some of the world's most extreme weather, making it a prime location for such a study.

METHODS AND RESULTS

Personnel from Fort Sill Fires Center of Excellence and Tinker Air Force Base participated in a series of interviews and focus groups. Through coding the responses, four major themes emerged: information sources, weather events and decision-making, preparedness, and impacts.

Information Sources:

- Air Force Products
- National Hurricane Center
- Other sources used as needed

Most Impactful Weather Events:

- Winter Weather and Lightning (Tinker AFB)
- Flooding (Fort Sill)

Decision Making:

- Varies by unit, task, arrival, and threat

Planning:

- Short- and long- term preparedness considered at both installations
 - Plans vary based on job, location, and available personnel

Impacts:

- Installation Closures
 - Broader community impacts

QUICK INFO

STUDY LOCATIONS

- Tinker Air Force Base
- Fort Sill Fires Center of Excellence

OBJECTIVES

- Determine what/how information is being used by decision-making authorities at military installations
- Examine planning process and the influence of climate change on preparations

Table 3. Types of weather events, lead times, and generalised decisions

Installation	Types of events	Generalised weather-based decisions	Lead Time Required for Decision-Making
Fort Sill Fires Center of Excellence (S-FCOE)	<ul style="list-style-type: none">- Winter weather (Ice storms, Snowstorms)- Floods- Fire weather	<ul style="list-style-type: none">- 0-5 heat cap for rest- Adjusting aim points- Fire solution calculation- Precautionary measures for lightning- Closing installation- Curtailing services	<ul style="list-style-type: none">- It depends on units in the field- Regulations provide timeframes for the installation from AFW (e.g. usually a 15 min plus lead time for tornadoes. For winter storms-the potential 12 to 24 hour timeframe)
Tinker Air Force Base (T-AFB)	<ul style="list-style-type: none">- Winter weather (Freezing rain, hail)- Severe thunderstorms- Tornadoes- General Thunderstorms- Excessive heat- Lightning	<ul style="list-style-type: none">- Preparation to get materials (salt and sand) for roads- Take extra delivery of resources- Get people off or on Base- Coordinating with agencies- Operational preparations for missions to continue as normal as possible	<ul style="list-style-type: none">- Multiple Watches, Warnings, and Advisories (WWA) are sent out depending on the event- Usually, there is a one-hour lead time for most WWAs (e.g. once a WWA for severe thunderstorms, snow is issued, there is enough time to enact plans set out to mitigate the effects on aircraft)

Table 1. Weather events experienced, decisions made, and lead time required at S-FCOE and T-AFB. (Na-Yemeh et al., 2024)

IMPLICATIONS

1. Climate adaptation planning

Climate change and extreme weather events are anticipated to produce billions of dollars in damage. The Department of Defense's Climate Adaptation Plan established three avenues through which the military (and installations) can plan for climate change impacts: climate informed workforce and decision-making, supply chain resilience, and energy use.

2. How are military installations preparing for climate change?

The military installations interviewed in this study did not make any direct references to the DoD's Climate Adaptation Plan, but revealed some degree of integration of the first two avenues (i.e. decision-making and supply chain resilience). The exact manner through which these initiatives are implemented varies by the installation's tasks and needs. At both installations, increasing infrastructure resilience is encouraged as a method for reducing costs from individual events.

3. Looking forward

Moving forward, installations are encouraged to collaborate with research institutions in an attempt to further explore avenues to increase resiliency. The results within this study are specific to the installations interviewed and should not be generalized. Further research in other regions is encouraged for a more complete understanding.

Access the full report: Na-Yemeh, D.Y, M.A. Shafer, and C.A. Shivers-Williams, 2024: U.S. military installations and extreme weather: an Oklahoma case study on preparation. *Environmental Hazards*: **1-26**, <https://doi.org/10.1080/17477891.2024.2343389>.

For additional information about how this project was developed and funded, see our news story [here](#).

