U.S. Department of Defense
Climate Assessment Tool

WHAT IS THE DOD CLIMATE ASSESSMENT TOOL (DCAT)?

A CAC-accessible geospatial tool supporting climate change exposure assessments for Department of Defense sites and installations both domestic and overseas

WHAT IS THE PURPOSE OF DCAT?

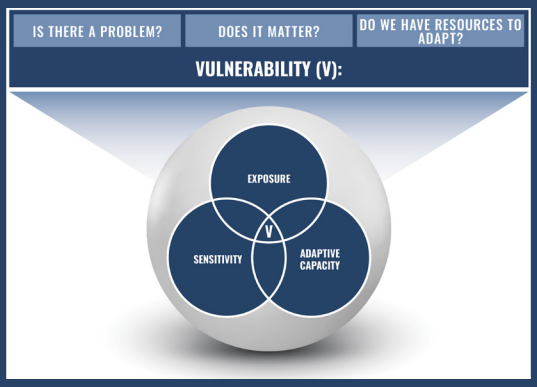
Enables integration of screening-level climate exposure assessments into military installation planning processes consistently across the Department's warfighting missions

HOW DOES THE TOOL SUPPORT ANALYSIS AND DECISION MAKING?

The tool uses data from past extreme weather events (e.g., hurricanes, tornado tracks) and the effects of future changes in sea levels, riverine flooding, drought, extreme temperature, land degradation, energy demand, and wildfires to produce hazard indicators. The data supports a screening-level assessment of installation vulnerability expressed as a combination of exposure (designated by the tool) and sensitivity. This high-level assessment is useful for long-term planning and informed decision making. The Installation-Level Flood Mapping example below illustrates the concept of sensitivity with different types of military assets (e.g., airfields, ports, training, and testing areas).

DCAT provides important information for understanding an installation's vulnerability to climate-related hazards. Other crucial vulnerability considerations include validating *climate-related impacts through additional site-specific analysis; determining potential mission impacts; and conducting detailed engineering studies to assess which adaptation strategies may be effective to reduce risk. Using DCAT as part of a comprehensive analysis will help the Department determine where best to apply resources to improve climate adaptation and resilience.

*A climate hazard is a process, phenomenon, or event related to changes in weather and climate that may cause disruption, degradation, damage, or other impacts to infrastructure, systems, people, organizations, missions, operations, or activities.



Climate vulnerability of infrastructure, systems, people, organizations, missions, operations, or activities is comprised of three components—exposure, sensitivity, and adaptive capacity:

EXPOSURE
Is there a problem?

Exposure is the geographic proximity of infrastructure, systems, people, organizations, missions, operations, or activities to a climate hazard.

SENSITIVITY
Does it matter?

Sensitivity is the degree to which a climate hazard beneficially or adversely affects the intended function of infrastructure, systems, people, organizations, missions, operations, or activities.

ADAPTIVE CAPACITY
Can we adapt?

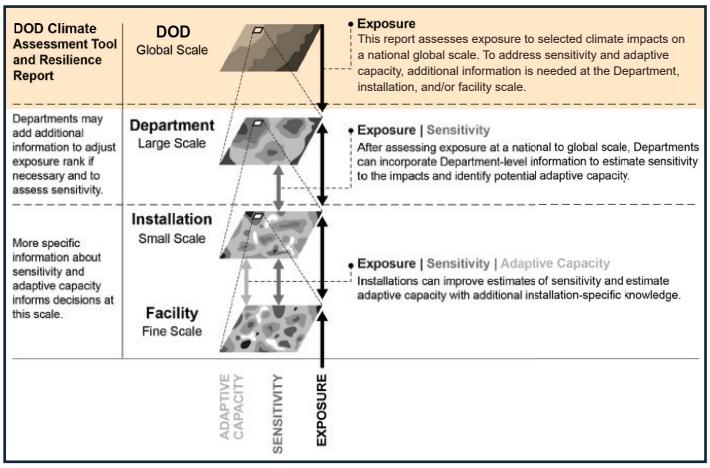
Adaptive capacity is the ability of infrastructure, systems, people, organizations, missions, operations, or activities to adjust to adverse impacts caused by a climate hazard.

DCAT USERS	IMPACTS ON DECISION MAKING
Installation-level Planners and Engineers	▪ Analyze an installation's exposure to climate and extreme weather events. ▪ Use this information to help inform planning and land use recommendations, and support resilient design, engineering, and construction. ▪ Add separate geographic information system (GIS) layers (e.g., flooding) available for Military Department-specific GIS systems used at the installation level.
Military Departments	▪ Identify regions or installations for focused attention, such as performing detailed studies to determine mission impacts and exposure adaptation strategies.
DOD Leadership	▪ Compare exposure across the Department to answer climate-related questions from Congress. ▪ Inform investment and policy decisions.

Below are examples of how the tool provides installation-specific data and mapping, as well as visualization of global trends.

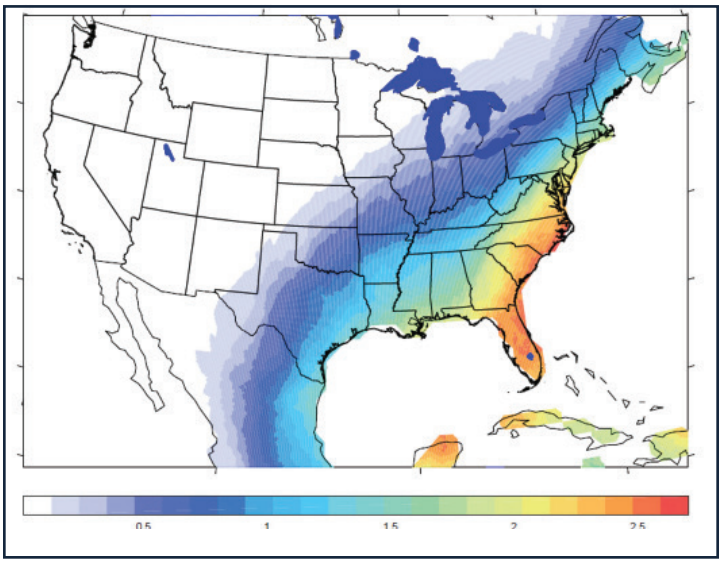
Variation Between DOD Global and Installation-Specific Assessments and Reporting

Climate exposure occurs on different scales. On a global scale, trends such as hurricanes, warming global average temperatures, and changing sea level are evident. More apparent at smaller scales are impacts on regional soil moisture, precipitation patterns, temperature, and local relative sea-level rise that can affect ecosystems and social systems important to how installations and facilities function.



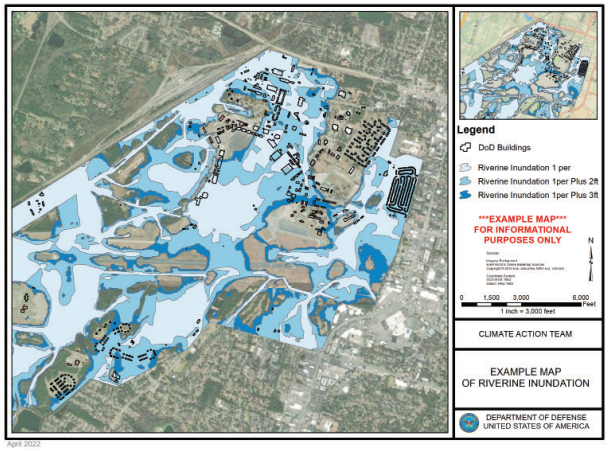
Historical Extreme Weather Events Across the United States

The tool incorporates historical data on a variety of extreme weather events. DCAT includes an indicator using the frequency of landfalling tropical cyclones between 1970-2017.



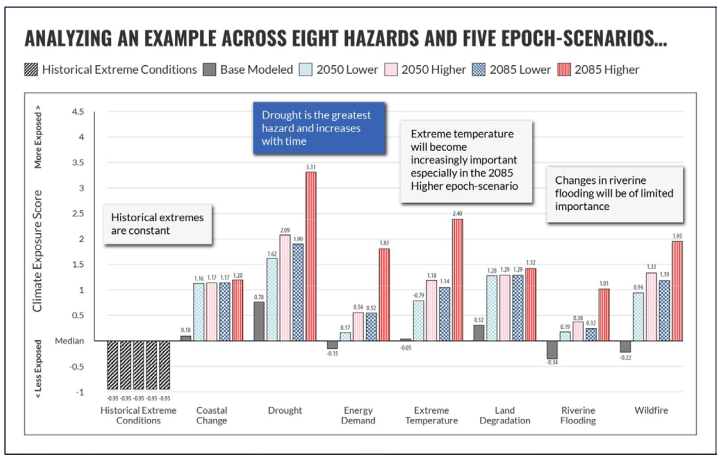
Installation-Level Flood Mapping

To depict the flooding exposure from riverine sources, the tool provides riverine flood inundation maps (at 1% Annual Exceedance Probability) using a combination of Federal Emergency Management Agency and U.S. Army Corps of Engineers data. For coastal flood inundation maps (at 1% Annual Exceedance Probability), the tool uses the DOD Regional Sea Level (DRSL) database. The DRSL database includes contributions from sea level change, tides, storm surge, and wave set-up. GIS shapefiles are available for local, installation-level mapping of coastal and riverine flooding. The maps provide planners and engineers with the percent of installation area inundated.



Actionable Climate Intelligence

Decision-makers no longer need to rely on only historical climate data to inform risk mitigation. With DCAT, users can identify which of eight climate hazards each installation may be most exposed to. Decision-makers can also see how climate exposure is projected to change in the future across a variety of indicator data sets feeding the eight hazards. For example, knowing an installation is more susceptible to extreme temperature compared to other hazards can better inform effective long-term adaptation.



DCAT supports climate-informed decision-making to increase resilience against climate hazards while preserving operational capability and protecting systems essential to the DOD's success. For more information, visit https://www.climate.mil

DOD CLIMATE ACTION TEAM
Office of the Deputy Assistant Secretary of Defense
Energy Resilience & Optimization

DEFEND THE NATION. ACT ON CLIMATE.

U.S. Department *of* Defense