

## Climate Change in Florida Poses a Threat to National Security

Florida plays an important role in U.S. national security. It is home to headquarters of three Combatant Commands: U.S. Central Command, U.S. Special Operations Command, and U.S. Southern Command. It houses over 20 bases, representing every branch of the U.S. military. It provides key access to [irreplaceable training grounds](#)<sup>1</sup> for U.S. pilots in more than 180,000 square miles of Department of Defense (DoD) controlled airspace over the Eastern Gulf of Mexico.

However, climate change poses clear risks to these security assets. As the climate changes, risks to the military installations in Florida, and U.S. national security overall, will accelerate.



Soldiers assist Florida residents after flooding from Hurricane Sally. USAF photo.

## Climate Threats to Florida Military Installations

Scientists and the Pentagon agree: climate change already threatens Florida's military installations, and the risks are expected to worsen over the coming decades. Florida's bases must adapt infrastructure and prepare personnel to maintain force readiness and protect national security.

### Risk Profile

The climate-related threats to military bases in Florida are rising sea levels, recurrent flooding, extreme weather, extreme heat, drought, and wildfires, according to a DoD [report](#)<sup>2</sup> that analyzed military bases across the U.S. for their climate vulnerability.

The military ranks eight Florida bases as among the most threatened in country by climate change. [This list](#) includes [five Air Force bases](#) – [Eglin](#), [Hurlburt Field](#), [Homestead](#), [MacDill](#), and [Tyndall](#) – [Patrick Space Force Base](#), the Navy's [Naval Air Station Key West](#) and the Marine Corps' [Blount Island](#) Support Facility.

### Examples of Installation Adaptation Efforts

Since the Bush Administration, the U.S. military has recognized that climate change affects readiness and preparedness. Consequently, the Pentagon has ordered bases to prepare. Examples of how Florida's bases have taken initial steps to adapt to a changing climate include:

- Eglin and MacDill Air Force Bases (AFBs) have experienced persistent coastal erosion resulting from higher storm surges and recurrent flooding, which threatens roadways and other key infrastructure. [These AFBs](#)<sup>3</sup> have partnered with local restaurants to fortify the coast with discarded oyster shells, which dampen wave energy and will help reduce erosion.
- [Patrick Space Force Base](#)<sup>4</sup> has imposed strict building code updates to protect mission critical infrastructure and prevent flooding-induced facility closures. Floor elevations have increased for all new construction based on updated flood plain and storm surge data.

## Threat 1: Rising Sea Levels & Recurrent Flooding

Rising sea levels [threaten](#)<sup>5</sup> Florida's coastal bases with more frequent and severe tidal flooding, land loss, and storm surges. Flooding can have a disastrous effect on military installations by damaging infrastructure, forcing evacuations, delaying training, and interrupting operations.

- In 2014, operations were disrupted at Naval Air Station Pensacola, Eglin AFB, and Hurlburt Field as torrential rains caused [historic flooding](#). Essential roads and bridges were inaccessible, damaged, or destroyed, closing the installations and disrupting operations.
- Sea level rise has exacerbated “king tides,” or higher-than-normal tides, threatening Miami with flooding on sunny days. Between 1996 and 2019, [Miami](#) saw average sea levels rise by 5.9 inches and a 320% increase in nuisance flooding. This impacts Coast Guard Base Miami Beach and U.S. Southern Command/Army Garrison-Miami.

### In the Future: Rising Seas & Recurrent Flooding

By 2050, Florida coastal bases may experience [10 times](#) the number of floods they experience today. If current trends continue, by 2100 low-lying areas of Eglin AFB and Naval Station Mayport are projected to be underwater for as much as [80% and 90%](#)<sup>6</sup> of the year, respectively, and rising sea levels may erode between [75% and 95%](#) of Naval Air Station Key West.

### Additional Action Needed

To prepare for rising seas and more recurrent flooding, Florida bases can leverage [natural and nature-based features](#),<sup>7</sup> such as mangroves and vegetated areas. These nature-based features will help protect installations from storm surge and absorb excess rainfall. Additionally, installations in Florida can utilize the [climate vulnerability toolkit](#) to plan flood mitigation activities and review ways to fund these projects.

The DoD must urgently conduct a detailed [analysis](#) of sea level rise, and Congress should provide the resources for individual installations to mitigate risk. Actions include supporting the development of high-resolution hurricane and coastal flooding models; increasing funding for data monitoring systems; and allocating human, financial, and data resources to support detailed mapping and planning efforts.

## Threat 2: Hurricanes & Extreme Storms

The threat from hurricanes comes in two forms—extreme rainfall and high winds. Hurricanes derive energy from warm ocean water, and sea temperatures are rising approximately [0.13°F](#) per decade. [Warmer air](#) holds more moisture, leading to more rain, more flooding, and more damage.

- Hurricane Irma [damaged](#) 40 percent of facilities and 97 percent of housing at Patrick Space Force Base and two launches from Kennedy Space Center were postponed, in 2017.
- In 2018, Hurricane Michael severely damaged [95 percent](#) of the infrastructure at Tyndall AFB, and critical training and maintenance were disrupted for [almost a month](#). Seventeen of the 55 F-22s housed at Tyndall were also damaged, at an estimated repair cost of [\\$2 billion](#).

## In the Future: Hurricanes & Extreme Storms

There is scientific evidence that climate change could be weakening the atmospheric currents that move weather systems along, which means 150+ mph winds, storm surges, and [rain will stall in one place](#). As such, the storms hitting Florida could move slower and take [twice as long to break apart](#), increasing the potential and scope of wind and flood damage to military infrastructure and assets.

### Additional Action Needed

Following a 2019 Government Accountability Office (GAO) [report](#) that was critical of the lack of action, the DoD has updated the [Unified Facilities Criteria](#) (UFCs), the DoD's building codes, to incorporate climate change-related risks into installation master planning. Each branch has subsequently [updated](#) or developed relevant policies and directives to address the new UFCs, like the Naval Facilities Engineering Command Planning Handbook. While the updates are a step in the right direction, what is needed now are metrics that are objective, clear, and quantifiable, as recommended in a [2020 GAO report](#).

Military bases can also execute authority granted by Congress to address military installation resilience as a key element of the [Readiness and Environmental Protection Initiative](#) (REPI).

## Threat 3: Extreme Heat & Drought

Extreme heat puts military personnel at greater risk of heat stroke and causes significant delays in training. According to [DoD statistics](#), rates of heat stroke among military personnel in the U.S. nearly doubled between 2014 and 2018. In 2019, 507 active service members suffered heat stroke, while 2,174 suffered heat exhaustion. In 2018, an Army National Guard soldier [died](#) of heat stroke at Florida's Camp Blanding during land navigation training on a 107-degree day.

Higher temperatures coupled with drought increase the risk of wildfires, which [raged](#) across the Florida panhandle in 2020.

Wildfires can destroy military [infrastructure](#),<sup>8</sup> cause power outages, and make [ordinance storage](#) more dangerous. These issues delay training and operations critical to national security, like [rocket launches](#).<sup>9</sup>

### In the Future: Extreme Heat

Florida bases are on track to suffer a [four-fold increase](#) in dangerously hot days by 2050. If heat-trapping emissions are not reduced, Florida's three major AFBs — MacDill, Homestead, and Tyndall — [would experience an increase](#) of between 76 and 116 days per year with a heat index above 100 degrees. That is an increase of between 68 and 96 days per year above historical averages, potentially delaying training and operations.



Scattered remnants of Tyndall Air Force Base aircraft hangers. U.S. Army photo.



Damaged structures along Florida's coastline. DoD photo.



## Additional Action Needed

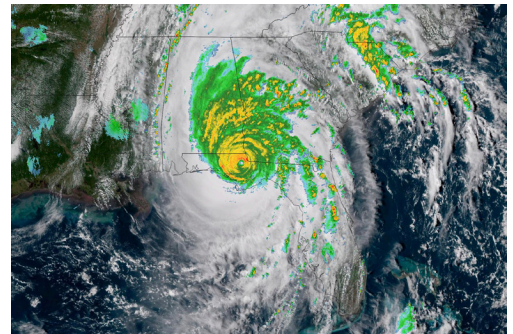
The DoD must begin tracking training days lost to heat. Commands and services should update training programs and [rest and work schedules](#) to maintain operational readiness and improve [awareness of and response](#) to heat illness. An example is the “[Heat Center](#)” initiative at Fort Benning, Georgia, which is intended to build awareness on behalf of military installations worldwide.

The DoD must mitigate the potential [effects](#) of wildfires using [techniques](#) developed by the Florida Forest Service, like reducing the amount or height of vegetative fuels. This will reduce the likelihood that wildfires delay training and operations.

## Additional Adaptation Recommendations

To address the adaptation measures listed in this report, Congress should continue to authorize and appropriate additional funding for the following programs:

- [Defense Community Infrastructure Pilot Program](#) (DCIP) – empowers communities that surround military installations to strengthen operational readiness by building or strengthening vital community infrastructure (roads, schools, etc.);
- [Military Installation Sustainability](#) (MIS) program – used to enhance or fortify infrastructure within a military installation;
- [Hazard Mitigation Grant Program](#) (HMGP) – provides funding to rebuild in a way that reduces, or mitigates, future community disaster losses;
- [Flood Mitigation Assistance](#) (FMA) program – provides funding to be used for projects that reduce or eliminate the risk of repetitive flood damage to buildings insured by the [National Flood Insurance Program](#);
- [Building Resilient Infrastructure and Communities](#) (BRIC) – supports communities through capability- and capacity-building to encourage and enable innovation, promote partnerships, and enable large projects; and
- [Defense Access Road Program](#) (DAR) – empowers communities to mitigate risks to infrastructure posed by recurrent flooding and sea level fluctuation when determined continued access to a military installation has been impacted.



A satellite image of Hurricane Michael over Florida panhandle. NOAA image.

## Achieving Resilience

Climate change is a threat to national security, and the DoD has taken [measures](#) to address [rising seas](#), [recurrent flooding](#), [extreme weather](#), [extreme heat](#), [wildfires](#), and [drought](#). This is an issue that has historically garnered bipartisan support, and it should continue to do so. Congress must take seriously the threat posed by climate change to U.S. military installations, specifically in Florida given the importance of the infrastructure and resources. Inaction, or action taken too slowly, will be costly, not just in terms of dollars but also our national security.

## Endnotes

1. Department of Defense. “Preserving Military Readiness in the Eastern Gulf of Mexico”. 05/18. <https://media.defense.gov/2019/Jan/29/2002084200/-1/-1/1/CLIMATE-CHANGE-REPORT-2019.PDF> p.1. 03/11/21.
2. Department of Defense. “Report on Effects of a Changing Climate to the Department of Defense”. 01/10/19. <https://media.defense.gov/2019/Jan/29/2002084200/-1/-1/1/CLIMATE-CHANGE-REPORT-2019.PDF> pp. 4-10. 03/11/21.
3. Ibid, p. 12.
4. Ibid, p. 11.
5. UCUSA. “The US Military on the Front Lines of Rising Seas”. 07/27/2016. [https://www.ucsusa.org/sites/default/files/attach/2016/07/us-military-on-front-lines-of-rising-seas\\_all-materials.pdf](https://www.ucsusa.org/sites/default/files/attach/2016/07/us-military-on-front-lines-of-rising-seas_all-materials.pdf) p. 4. 03/11/21.
6. Ibid, p. 2-3.
7. UCUSA. “The Value of Coastal Wetlands for Flood Damage Reduction in the Northeastern USA.” 08/31/17. <https://www.nature.com/articles/s41598-017-09269-z> p. 1. 03/11/21
8. Department of Defense. “Report on Effects of a Changing Climate to the Department of Defense”. 01/10/19. <https://media.defense.gov/2019/Jan/29/2002084200/-1/-1/1/CLIMATE-CHANGE-REPORT-2019.PDF> p. 7. 03/11/21.
9. Ibid.