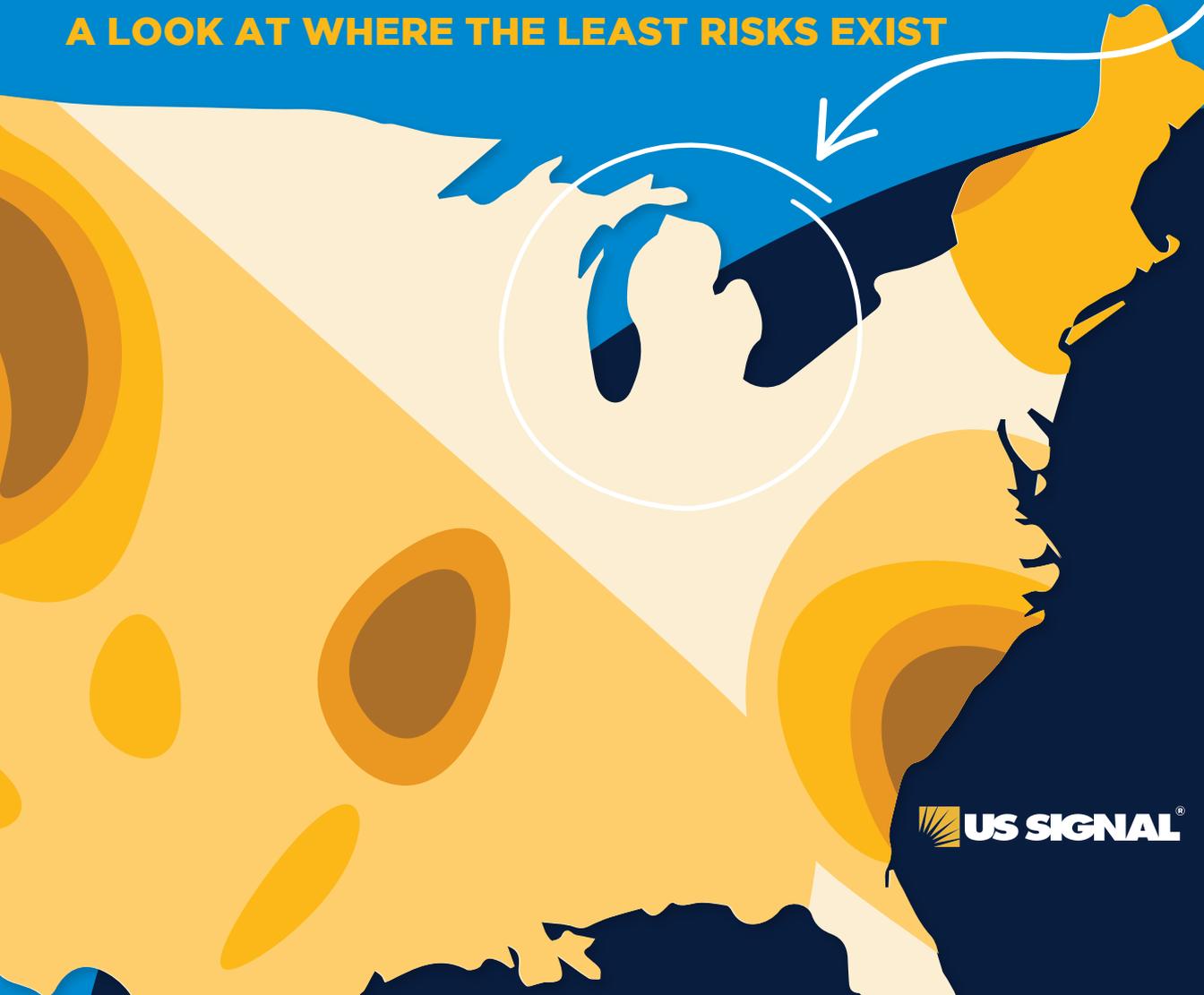


WHAT'S THE BEST LOCATION FOR A DATA CENTER?

FOR A DATA CENTER?

A LOOK AT WHERE THE LEAST RISKS EXIST



SAFE FROM THE ELEMENTS

When it comes to data centers — and even on-premise server rooms, inside temperature and humidity are key concerns for optimal operations and uptime. But what about the weather outside?

Just like most facilities, those housing essential IT equipment are designed to provide protection from the elements — rain, wind, snow, and so on. Many even go beyond by meeting or exceeding specific codes related to data center construction.

But the issue isn't solely about protecting the equipment from various weather conditions. It's also a matter of making access to the equipment and facilities available to the people that require it, regardless of the weather. Keeping those people safe is even more critical. In some parts of the country, weather- and geography-related risks can make that difficult.

That's one of the reasons why, when choosing a data center for colocation or other services, location should be a primary consideration. In this eBook, we look at where the risks are highest for various environmental risk factors that can affect data center uptime — and overall safety.

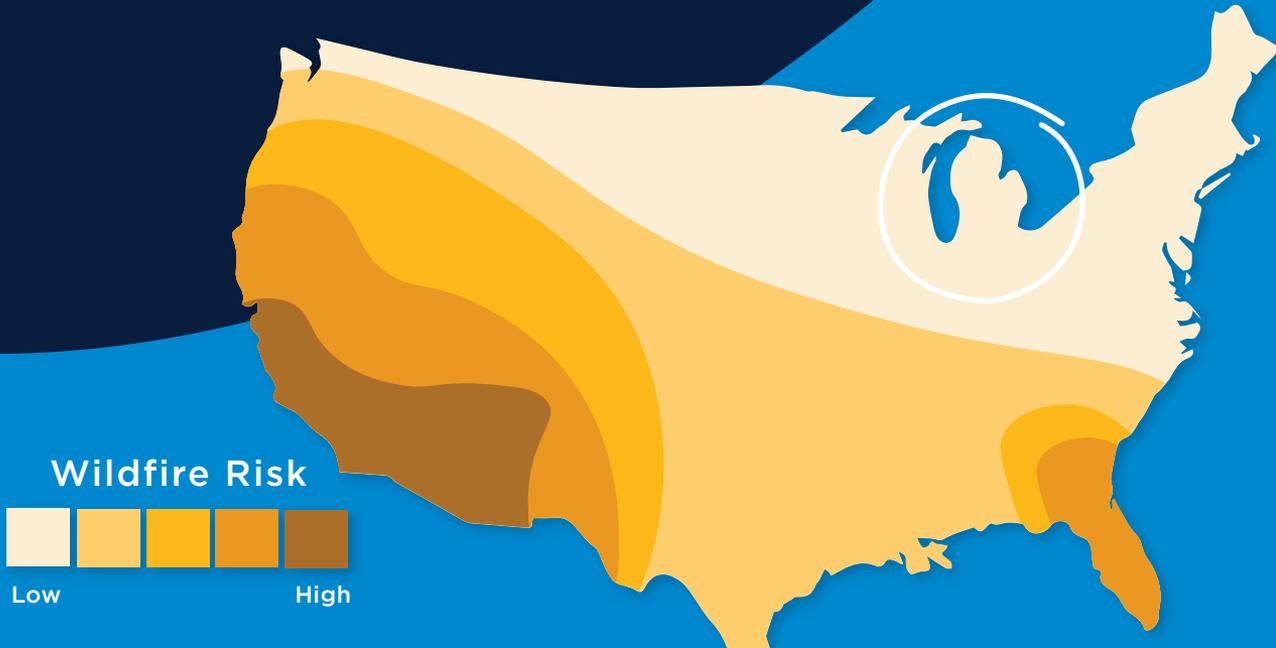
WILDFIRE RISKS HEAT UP

Climate change is causing higher temperatures and increased drought, which contribute to more frequent and damaging fires. These conditions make it easier for fires to ignite (from lightning or humans). They also cause fires to spread more rapidly and burn more intensely, making them harder to extinguish.

Road closures and evacuations in the path of a fire can pose risks to staffing levels. Employees may not be able to get to the site or may need to deal with their own emergency situations. Wildfires can also burn transmission lines, interrupting the flow of power to the facility. Post-fire erosion can cause landslides that take out fiber cable. Sometimes, fires can occur in multiple areas, thwarting redundancies.

Data centers are often sited near hydroelectric power sources to ensure access to clean, inexpensive electricity. That generally means locations near mountains and forests — areas increasingly at risk of wildfire in an age of climate change. More wildfires occur in the East and Midwest. But those in the West — including Alaska, Arizona, California, Colorado, Idaho, Montana, New Mexico, Nevada, Oregon, Utah, Washington, and Wyoming — are larger and burn more acreage.

Data center operators have plans in place for dealing with wildfires, including evacuation plans. But if choice of location is an option, go with an area with low wildfire risk.



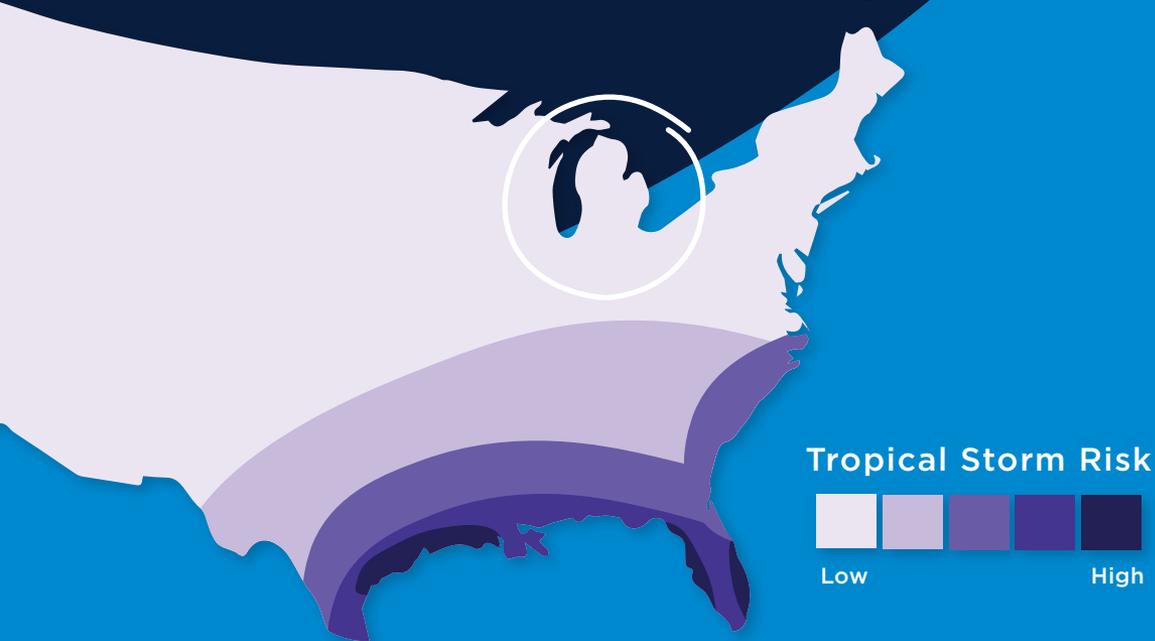
WHERE THE TROPICAL STORMS ARE

Every coastline along the North Atlantic is vulnerable to tropical storms, with southern US coastal locations at the highest risk. While these storms are rare along the west coast of the US, it's not impossible for one to impact Southern California.

Data centers built in areas prone to tropical storms are usually designed to withstand hurricane-force winds and water ingress. Nonetheless, those high winds can take down power lines and cause structural or other damage that can affect data center operations, put data center employees at risk, and make travel treacherous. Storm surges and flooding can also create dangerous conditions. In addition, tropical storms can spawn tornadoes.

Data center employees aren't the only ones to be concerned about when tropical storms hit. There are also vendors, utilities workers and others whose services data centers count on.

If circumstances require you to use a data center in an area at risk of tropical storms, make sure to go with one that has components in place to help ensure uptime. That includes redundant core equipment, such as N+1 generators, N+1 Uninterruptible Power Supply (UPS) systems, on-site fuel, and first-priority contracts with reliable providers in the area. Equally important, have a disaster recovery (DR) plan in place that includes a secondary site located at least 200 miles away from the primary site.



ON SHAKY GROUND WITH EARTHQUAKES

Earthquake damage can severely damage data centers. Beyond the health and safety of staff, the damage to the servers and equipment can be beyond repair; critical data can be lost. The resulting downtime and data loss can paralyze a business.

There are also the byproducts of earthquakes to consider such as fire. Warm winds in areas like Southern California can quickly spread fires, where over-stressed fire departments and broken water lines make fighting them a challenge.

Seismic design, building codes and various technologies have been developed to prevent and mitigate earthquake damage. However, nothing is guaranteed. And as is the case with other types of

natural disasters, road closures, structural damage and other issues resulting from earthquakes can still wreak havoc on data center operations and access.

It's important to keep in mind that while the West Coast has the highest earthquake potential, seismic events can happen throughout most of the US. Fortunately, the vast majority of them are magnitude 2.5 or less. Great earthquakes — magnitude 8.0 or higher — only happen about once every 5 to 10 years and occur along the plate boundaries, not in the eastern and midwestern U.S.

The areas with the least earthquake risks include portions of the northern and central Midwest, including Michigan and Wisconsin.



Earthquake Risk



Low

High

TORNADO ALLEY AND BEYOND

Hurricanes are typically more destructive than tornadoes, but tornadoes are much more frequent. There were 21 named storms during the 2021 Atlantic hurricane season; 1,376 tornadoes hit the US that same year.

Hurricanes tend to be larger, with an average size of about 300 miles, while the average tornado is about 500 feet across and may make landfall for about five miles before dying out. However, tornadoes have higher wind speeds on average than hurricanes and can do just as much, if not more, damage.

No place is entirely free of tornadoes, but they occur more frequently in the US's so-called Tornado Alley. Tornado Alley refers to the area encompassed by Texas, Louisiana, Oklahoma, Kansas, South Dakota,

Iowa and Nebraska. However, Minnesota, Wisconsin, Ohio, Arkansas, North Dakota, and Montana are often included, as are the easternmost portions of Colorado and New Mexico.

As is the case in areas at risk of tropical storms, data centers that could be affected by tornadoes often are built to withstand the high winds. But also like in hurricane-prone areas, building construction doesn't stop flooding, downed powerlines or other damage that could affect operations and uptime, as well as employee safety.

If circumstances allow, opt for a data center in a location that's at low risk of tornados. If not, core equipment redundancies are a must for data centers located in tornado-prone areas, as are DR plans.



Tornado Risk



Low

High

WEATHER-RELATED FLOOD FACTORS

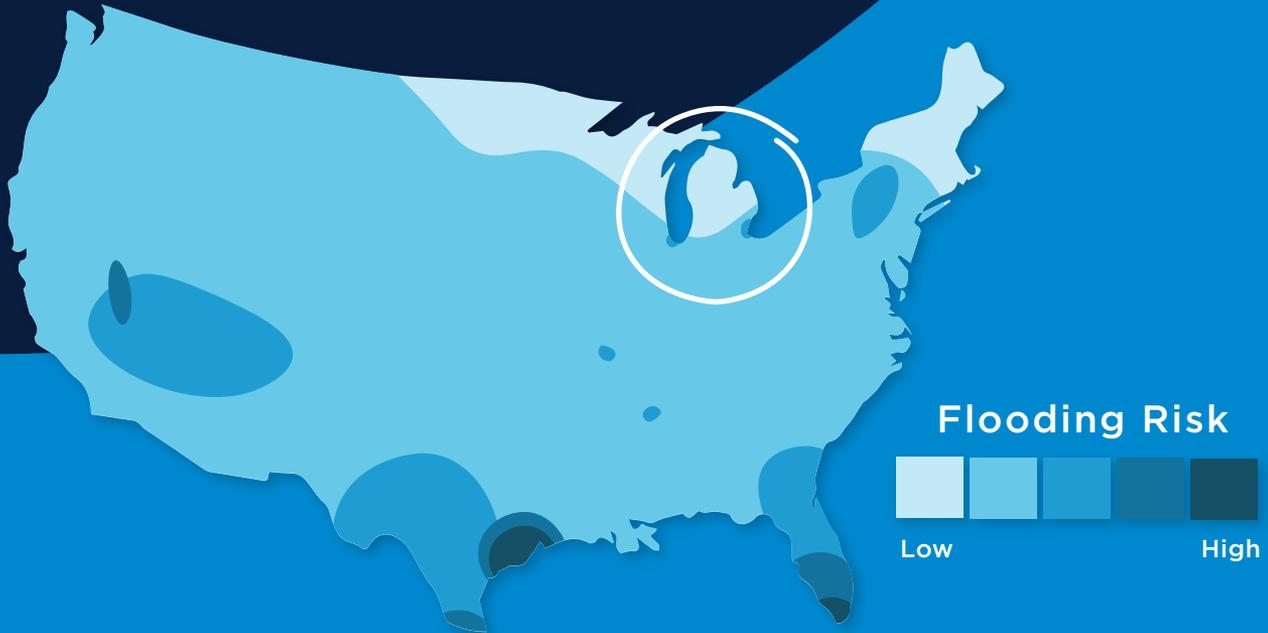
Who can forget when flooding caused by Hurricane Sandy took down several data centers in lower Manhattan in 2012. Basements and generator rooms had to be pumped out and damaged switchgear replaced before the facilities could get back online.

However, flooding isn't just a side effect of tropical storms. It can happen due to heavy rains, when ocean waves come on shore, when snow melts quickly, or when dams or levees break. Flash floods are particularly dangerous because they combine the destructive power of a flood with incredible speed.

Location is the best defense against most weather-related flood risks, and various industry

organizations provide guidance. For example, TIA 942 notes that Tier IV data centers should be more than 300 feet from the 100-year flood plain and more than half a mile from coastal or inland waterways. Flood-prone areas can also be identified from historical data available from agencies such as FEMA, USGS, and NOAA.

The data centers safest from weather-related flooding are located away from coastal areas, upstream dams, and rivers and streams — particularly the ones with levees or that could be affected by snowmelt. Avoid densely populated areas too, as the construction of highways and other infrastructure increases runoff that can lead to flash flooding.



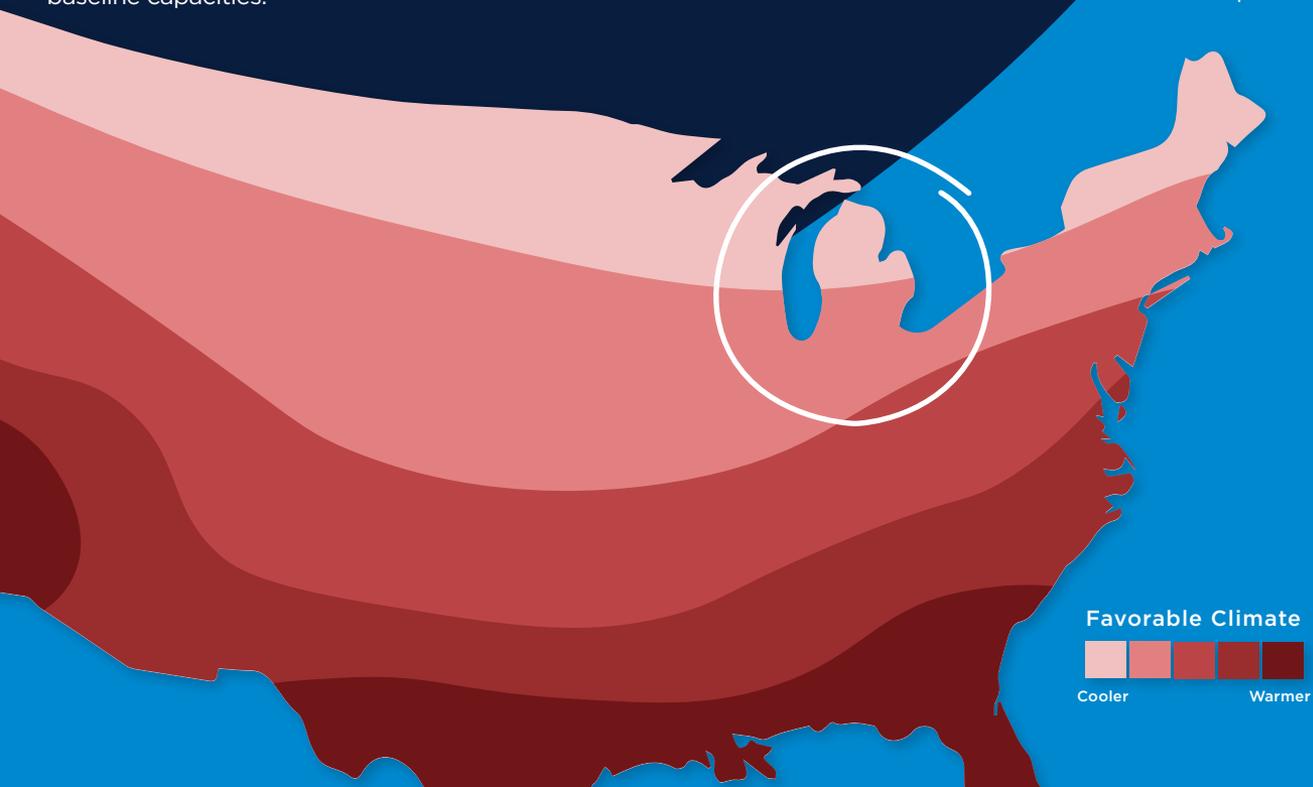
THE BEST CLIMATE FOR DATA CENTERS

Is there such a thing as the most favorable climate for a data center? In terms of energy efficiency, the answer is yes.

Data centers require high levels of energy to supply power to hundreds of server racks, light the buildings, and more. Much of a data center's energy consumption and operational expenditure goes for cooling. Not surprisingly, data centers in warm climates use a lot of resources to keep servers from overheating and to increase airflow just to run at baseline capacities.

However, data centers located in cooler climates are often able to diminish or even eliminate reliance on conventional, energy-intensive cooling systems. For example, some data centers can run the naturally available cold air or chilled water into their facilities, lowering temperatures without excessive energy usage.

Even data centers that rely on traditional cooling systems tend to use less resources if they're located in cooler climates. That translates into lower costs and a smaller environmental footprint.



SAFE WITH US SIGNAL

US Signal's SSAE 18 audited data centers are strategically located in business-friendly, mid-sized cities throughout America's heartland — considered one of the safest geographical areas in the U.S. Cooler climates prevail throughout much of the region, and the risk of weather-related disasters, ranging from earthquakes to hurricanes, is low.

Most of the data centers are at least 200 miles apart and all are on separate power grids to minimize the effects of natural disasters. Situated in areas protected from weather-related events, they are nonetheless easily accessible from main transportation routes.

Connected to US Signal's wholly owned, robust, secure network, US Signal's data centers benefit from over 9,500 miles of privately owned lit fiber and metro rings in strategic tier-one, tier-two and tier-three markets. It's what ensures US Signal data customers of reliable colocation and cloud services, maximum bandwidth utilization, reduced downtime and worry-free, secure connectivity — and helps them connected from coast to coast and around the world.

Source - National Centers for Environmental Information, National Oceanic and Atmospheric Administration. Disaster and Risk Mapping, Risk and Vulnerability.
<https://www.ncei.noaa.gov/access/billions/mapping>

