



2021 summer & tropical weather outlook report

Understand the potential impact on your business

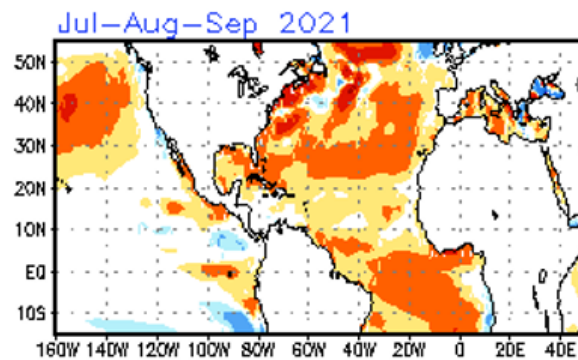
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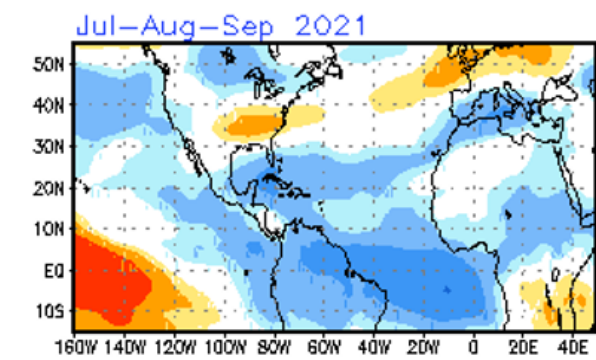
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Summer forecast summary

The hurricane season officially began on June 1, and summer is nearly here. Currently, we expect a few weather trends for the upcoming season. Most notably, conditions appear favorable for another active hurricane season in the Atlantic, particularly for the northeastern United States and Florida, and less so for the western Gulf of Mexico. While active, the season should feature fewer storms than 2020, along with reduced landfall risks.



Warmer Gulf and Atlantic water temperatures per CFS model



Lower windshear – Gulf of Mexico and southern Atlantic

Most of the United States can expect above-normal temperatures this summer. In particular, across the Southwest and the Northeast during June. We anticipate widespread, above-normal temperatures across the Central Plains and western states, with drought conditions intensifying during the season. The eastern United States will experience less-warm anomalies and more rainfall.

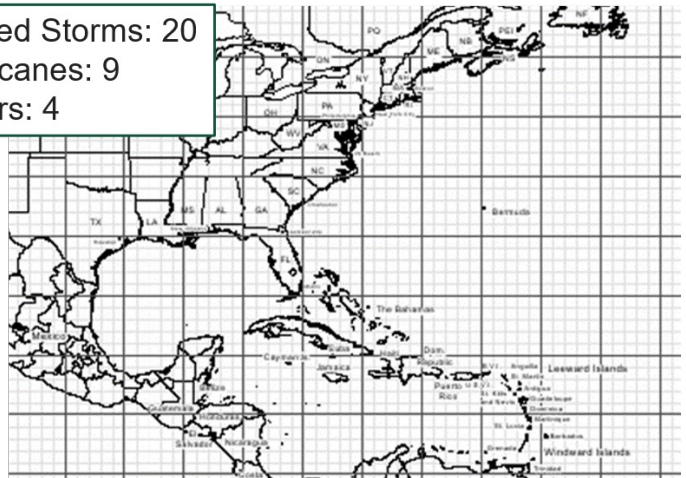
Tropical season summary

Before jumping into a detailed 2021 tropical forecast, it's worth noting some historical trends that lay the groundwork for what we expect this year. Overall, the United States has experienced fewer hurricane landfalls in the past decade than in the last 150 years. In fact, no major hurricanes made U.S. landfall between October 2005 and August 2017 — a record span — but four major hurricanes have made landfall since.

History has shown that a storm of sufficient intensity, located in exactly the wrong place, can create significant disruptions. Hurricanes Sandy and Harvey are great examples. If or when landfalls and intensities catch up with historical distributions, the costs will be much greater due to the growth in exposure, vulnerability, and wealth. Landfalls where populations and infrastructure are dense increase threats for loss of life and widespread property damage.

Keeping that history in mind, we have already seen named storms in the Pacific and Atlantic and anticipate another long, active season that will run late into fall. In addition to the above-average activity, one of the most notable observations for the season is that there will be more storms heading up the East Coast, with fewer risks for the western Gulf of Mexico.

Named Storms: 20
Hurricanes: 9
Majors: 4



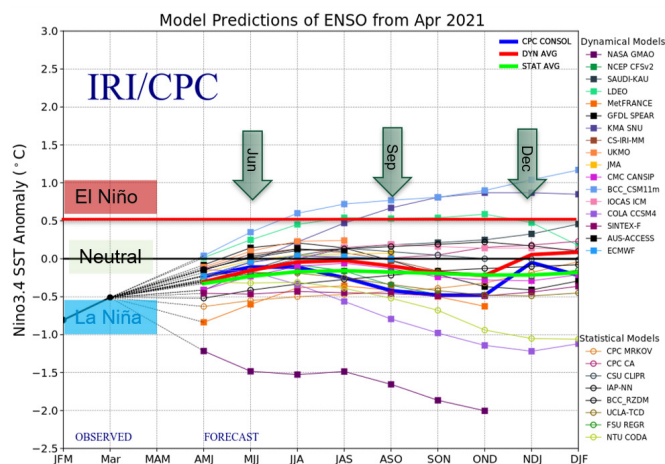
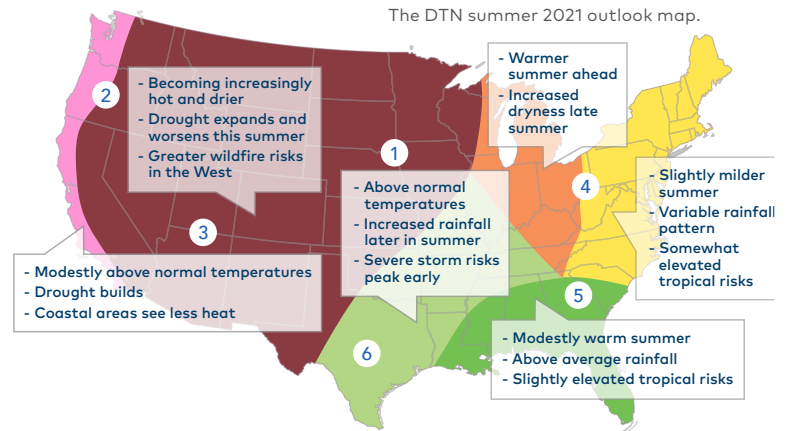
We expect El Niño-Southern Oscillation (ENSO) neutral conditions through most of the summer and fall. This is favorable for more Atlantic storms than normal, but not a record-setting year like 2020. Warm water temperatures will likely be in place again throughout the hurricane season, and storm totals will be higher than the recent 1991 to 2020 average of 14 named storms and seven hurricanes. This season, storm totals will likely be in the 20-storm range — solidly above average, though quite a bit lower than 2020's 30 named storms.

Of notable importance is where those storms will go, which connects us back to the historical information shared earlier. Current indications suggest that a weak eastern U.S. trough could be a feature of this summer, as it was for several summers before the last couple of years. For most of last year's hurricane season, a ridge was in place along the East Coast, which directed storms into the Gulf, often towards Louisiana. This year's pattern should limit the number of storms heading into the western Gulf and could send more up the East Coast. While the general pattern may be less favorable for Gulf storms this year, there will likely be some occasional periods when conditions are favorable for storms to track into the Gulf. A major Gulf storm is still possible this year, but there should be fewer storms overall than in other portions of the Atlantic basin.

Detailed 2021 summer forecast

During summer 2021, we expect above-normal temperatures across most of the United States, with the warmest temperatures occurring across the interior west through the Central Plains. If there will be extended episodes of heat this summer, this is where to find them. Lesser warmth is anticipated across the eastern United States, although somewhat

higher anomalies are possible across New England. The eastern region, in no coincidence, shows the greatest chances for above-normal rainfall. Heavier rainfall increases soil moisture, which tends to act as a drag on temperatures, but it also increases humidity levels. A tendency toward dry weather is expected across the north-central United States through the west, and expanding drought conditions are anticipated in these areas. Locations typically prone to wildfires should be on alert this summer as conditions will become favorable for above-normal activity. Cooler waters off the West Coast may protect the immediate coastal areas from the worst heat.



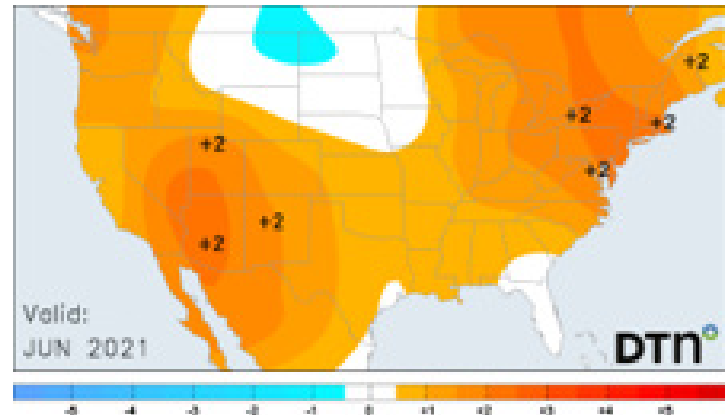
Detailed 2021 Summer Forecast 1 – ENSO

There is more uncertainty than usual regarding the progress of ENSO this summer, and it's something we'll continue to monitor throughout the season. Some models show the ENSO trending warmer than expected, so it is possible temperatures could trend cooler with a somewhat more likely increase in rainfall trends across the eastern part of the country.

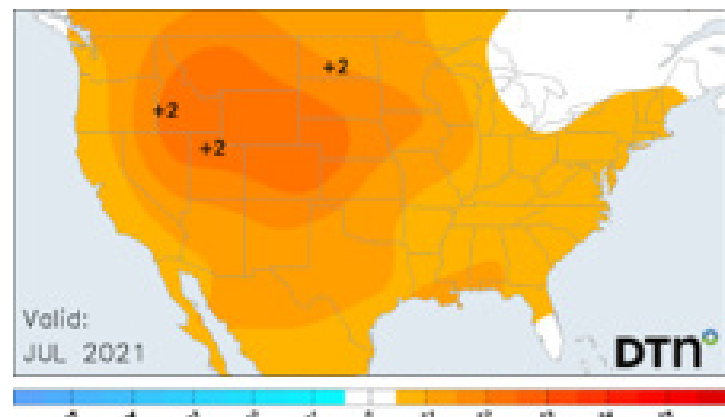
Summer temperatures

This summer's overriding theme is warmer than normal temperatures for most of the country, especially the West. The East could be more moderate but with increased humidity due to above-average rainfall. Above-normal temperatures are expected across the Southwest and Northeast during June. Cool risks remain across the north-central region for the middle of the month.

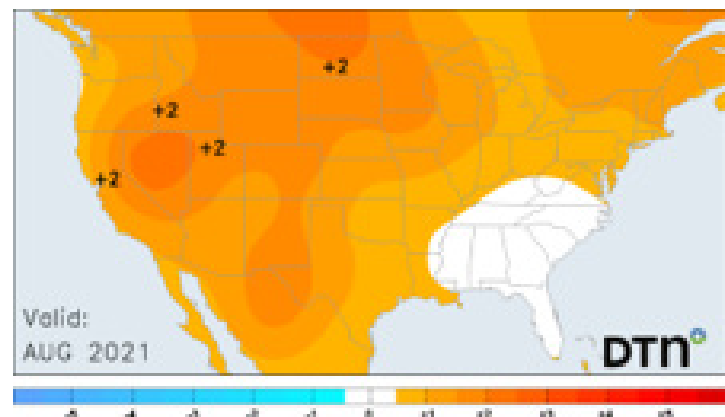
We expect widespread, above-normal temperatures across the Central Plains and West, with drought conditions intensifying for many during the summer as a whole. Lesser warm anomalies are anticipated across the East with more rainfall.



June 2021 seasonal temperatures map.



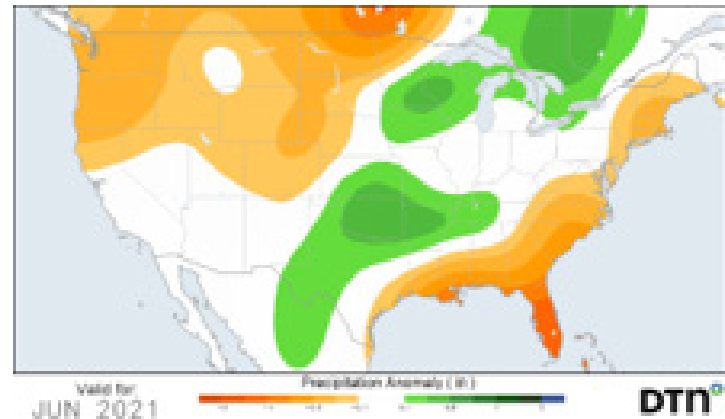
July 2021 seasonal temperatures map.



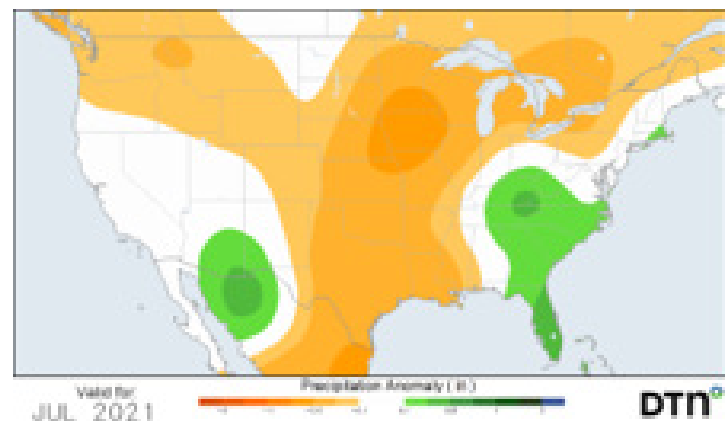
August 2021 seasonal temperatures map.

Summer precipitation

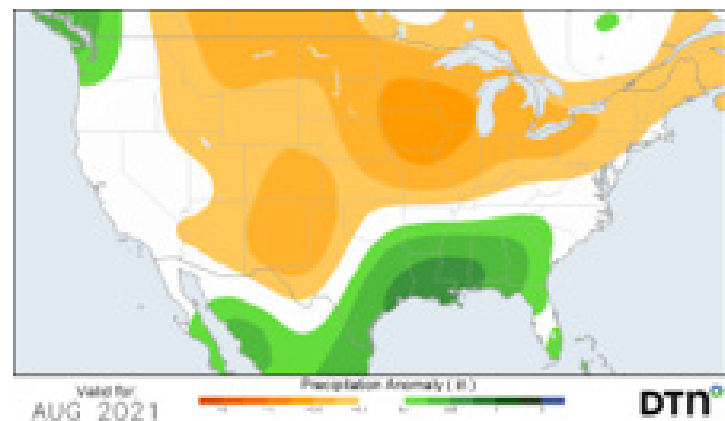
While there will be increased tropical storm activity in portions of the country, drier conditions are predicted across the West into the Central Plains by mid to late summer. While the southeast may see hurricanes and slightly wetter patterns, the western half will experience drier than normal soil moisture conditions, as will the Great Lakes and the Northeast. Given that, it's unlikely there will be an improvement in drought conditions across the western and the north-central United States this summer. In terms of severe weather, it's been quieter than average so far, although more average activity should resume in early June, so we're not out of the woods.



June 2021 seasonal precipitation temperatures map.



July 2021 seasonal precipitation temperatures map.



August 2021 seasonal precipitation temperatures map.

Preliminary 2021 fall forecast

If we look towards autumn, there is a fair amount of uncertainty due to differing model forecasts regarding ENSO and a higher-than-normal spread with everything from El Niño to La Niña. With that in mind, early indications are we'll continue to see above-normal temperatures across a good portion of the United States. The warmth will be most notable across the West but will also be in place across the Plains and the northern tier. Given the 10-year trend toward warmer conditions just about everywhere in September, warmth is more favored that month. By October and November, the models show better chances for cool risks in the southeast.

If the forecast trends toward El Niño, this will increase late-season cooling risks across the southeast. Current analog forecasts show cool risks across the southeastern third of the country, especially during the second half of the season. The model composite also shows the coolest readings relative to normal across the southeast, but not nearly to the same degree.

As mentioned in the hurricane summary, the East Coast has a higher risk of landfalling tropical systems this year, which would add to the wet risks already in place. Dry weather conditions are likely to continue across the western and north-central regions through the fall, keeping drought impacts high and wildfire risks higher than normal.

Industry thoughts on severe weather

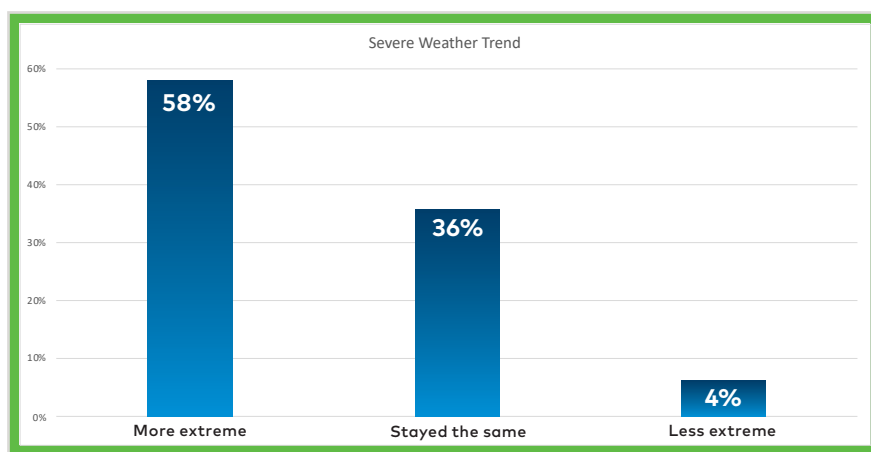
During our seasonal outlook webinars over the past few months, we asked our attendees if they felt severe weather has become more extreme, stayed the same, or is less extreme. Across all industries, 144z respondents participated. Here are their thoughts.

Question 1: How has severe weather developed in the past years?

The majority of respondents (58%) felt that severe weather has become more extreme; 36% have not experienced a significant change. Only 6% replied that severe weather has become less extreme.

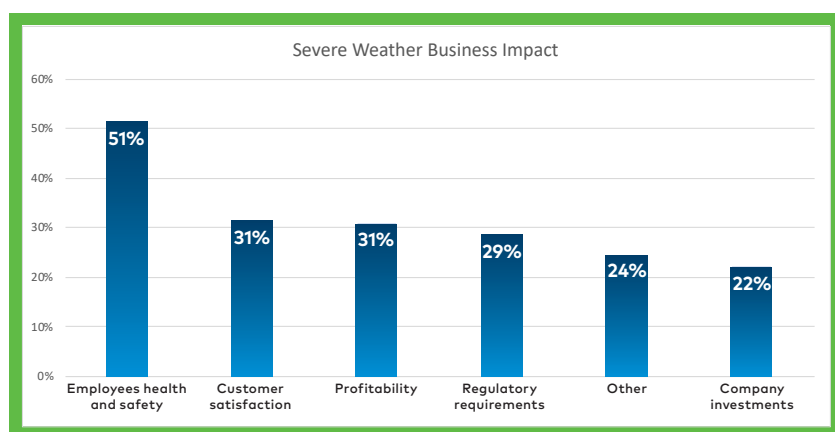
There were differences by sector, especially in sports and safety. Compared to the overall population of respondents, that group was nearly even on weather trending more extreme (43%) and staying the same (46%). In comparison to offshore (83%) and utilities (63%), however, sports and safety experience the impacts of weather to a lesser extent.

This summer, we expect respondents experiencing more extreme weather will see another more active hurricane season in the Atlantic, particularly for the northeast United States and Florida. Those in the Central Plains and western part of the country will experience widespread, above-normal temperatures with drought conditions intensifying during the summer, increasing wildfire risks.



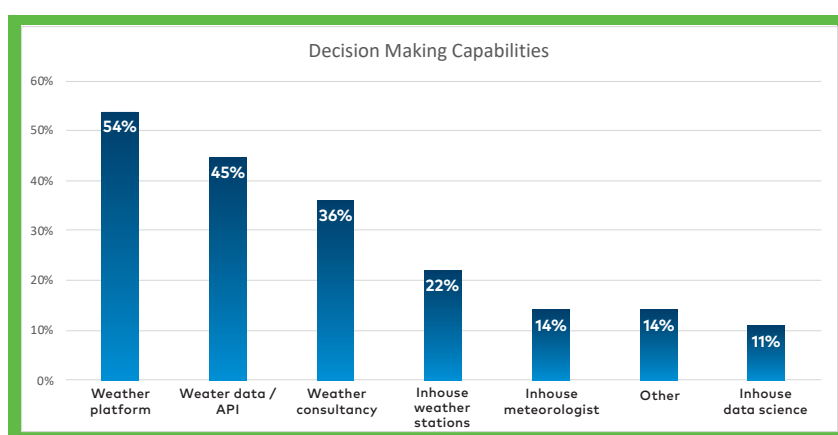
Question 2: In which areas has weather impacted your business over the past years?

Here, respondents selected all that applied from multiple answers. Across all sectors, the single largest impact, by far, was employee health and safety, chosen by 51% of respondents. Customer satisfaction and profitability were tied for the second with 31%, followed closely by regulatory requirements (29%). The least-impacted was company investments, with 22% of the responses. And 24% of the respondents experience other types of business impact.



Question 3: What capabilities does your business have in place addressing the impact of severe weather?

Once again, respondents chose all that applied from multiple answers. Most have an external weather decision-making capability in place, like a weather platform (54%), weather data/API (45%), or weather consultancy (36%). Many have in-house capabilities, like weather stations (22%), a meteorologist (14%), or data science (11%); 14% have other capabilities in place. As



we have seen, sports and safety experiences the impacts of weather to a lesser degree, reflected in their use of weather-related tools — a weather platform (24%), weather consultancy (24%), weather data/API (26%), and in-house weather stations (16%).

Offshore discussion

Over the last six years

We've seen an interesting situation where tropical storms begin in late April or May. Continuing with that trend, Tropical Storm Ana formed in the central Atlantic on May 22. While this system was weak and short-lived, it doesn't mean businesses can relax. An above-average storm season is once again predicted, with a higher risk of tropical storms impacting the Eastern Seaboard.

Despite this, the atmosphere is not quite as favorable for storm development as last year; however, climate model guidance still favors lower-than-average wind shear. Warm water temperatures will likely be in place again throughout the hurricane season, so storm totals should come in higher than even the recent 1995-2020 average. This season, totals will likely be in the 20-storm range, solidly above average, though quite a bit lower than 2020's 30 named storms.

Of greater importance is where the storms will go. Early indications suggest that a weak eastern U.S. trough could be a feature of this summer's pattern, as it was for several summers before the last couple of years. A ridge was in place along the East Coast during most of last year's hurricane season, which directed storms into the Gulf, often towards Louisiana. This year's pattern should limit the number of storms heading into the western Gulf and could send more from the eastern Gulf up the East Coast. While the general pattern may be less favorable for western Gulf storms this year, there will likely be some occasional periods when conditions are favorable for storms to track into the Gulf. A major Gulf storm is still possible this year, but there should be fewer storms in the western Gulf overall than in other portions of the Atlantic basin.

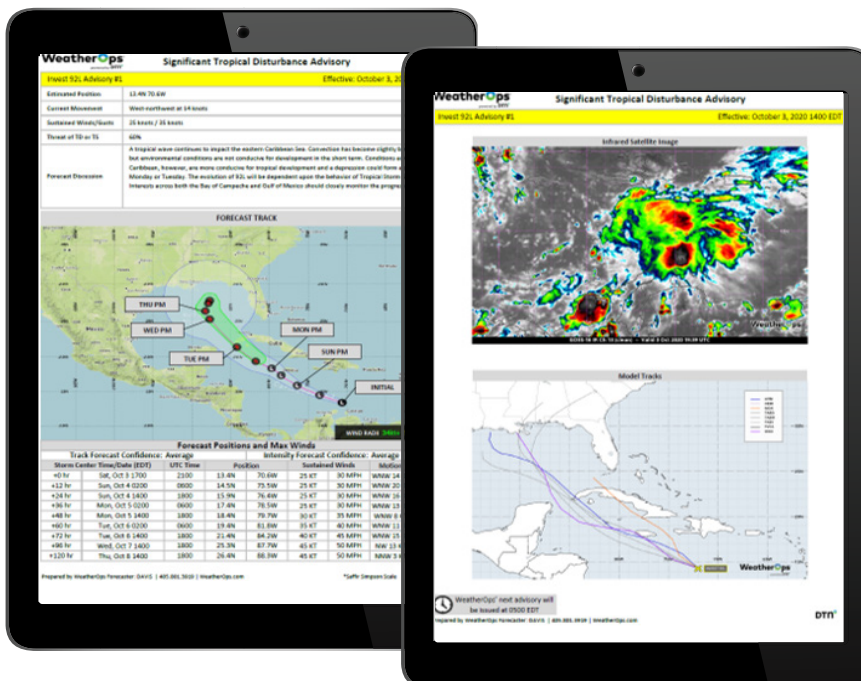
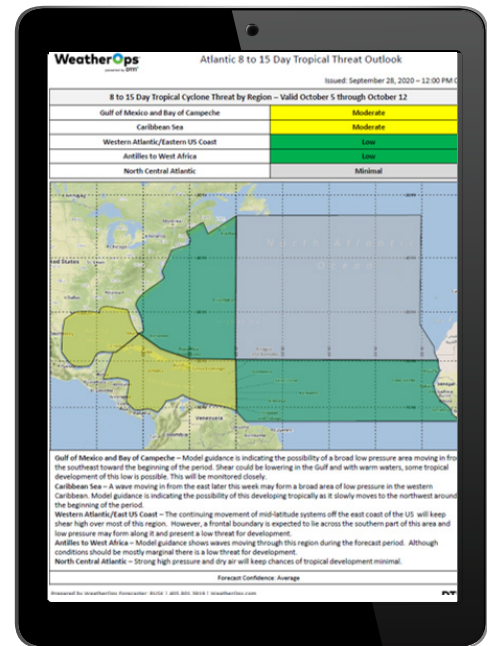
The best defense for another busy tropical storm season is a strong offense. Being prepared with a comprehensive, step-by-step, staged solution will help drive confident, informed decision-making that supports risk mitigation.

Offshore discussion

Tropical storm-focused forecasts

The first solution for storm monitoring in our tropical weather suite is our long-range report — an extended, two-week outlook, updated twice a week. Next is the seven-day outlook, updated twice a day. They provide general awareness of current conditions and what could potentially head towards vulnerable crews and assets.

Once there is the potential for a storm to form and reach a minimum, pre-determined threshold, our team issues a significant tropical disturbance advisory. These are typically issued before National Hurricane Center advisories since our thresholds are focused on business-specific, decision-making needs — in addition to general safety guidance. Once the storm is named, active storm advisories are issued, including a seven-day forecast track and site-specific guidance for a business' specific needs, whether for offshore or coastal locations. These reports, essential for Gulf offshore platform operations, may be especially helpful for East Coast ports and terminals this season to support planning and decision-making.



Offshore discussion

A real-life example

Here's an example of how a comprehensive weather tool worked during an actual event: 2020's Hurricane Delta. As a quick overview, Hurricane Delta was officially classified as a tropical depression on October 4 and dissipated nine days later. It made landfall twice in Puerto Morelos, Yucatan, and Creole, Louisiana, causing more than \$4 billion in damage. The storm reached peak winds of 140 mph, and its lowest pressure was 953 mb.

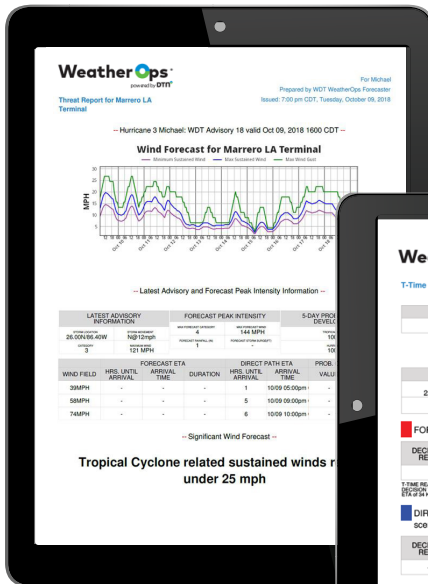


Keep in mind the October 4 classification date. On September 28, our forecast team first identified activity indicating enhanced probability for storm formation in the Caribbean in an extended outlook report. A few days later, the team started issuing special guidance on this potential low in our daily tropical planner. This occurred about five days before the official storm formation. Then, we issued specific briefings on its tropical wave development and potential.

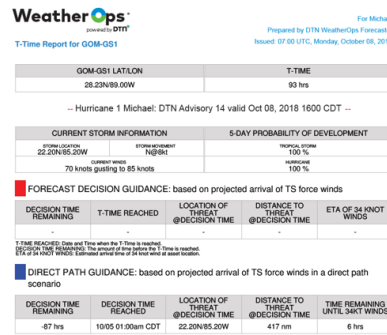
On October 3, there was a clear indication that this tropical wave had the potential to form into a cyclone. Our team issued a significant tropical disturbance advisory — 26 hours before the National Hurricane Center issued its first potential tropical cyclone advisory. This provided our valued customers an additional day to plan for the impending storm.

Our reports provided a full five-day storm track forecast, including the initial spaghetti plots from the various models, giving valuable insight into forecast track uncertainty. Once the storm was officially classified, the bulletin was upgraded to an active storm advisory, breaking down the storm's motion, category, and other details.

Offshore discussion



Tropical decisions guidance issued every 12 hours



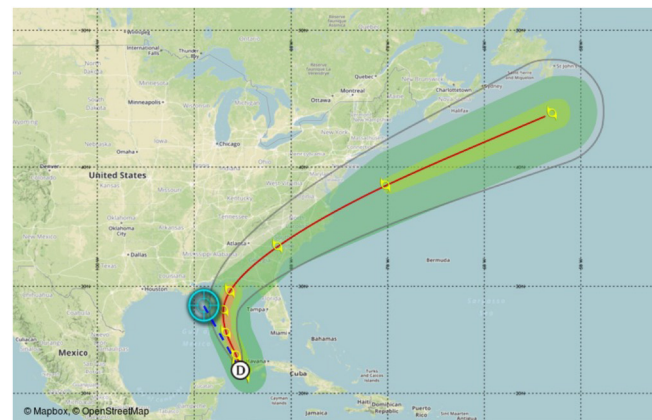
Even more important is the commentary our team provides each customer. It shares specific insights into what the forecast means for the customer's circumstances and operational considerations,

onshore or off. Storm impacts are broken into marine weather or onshore, with a general forecast discussion, including track, intensity, and other details.

Once the significant tropical disturbance advisories begin, initial tracks and site-

specific decision guidance are issued. We offer three different reports, including the T-time report used for offshore assets. It breaks down the decision time remaining for both a forecast track and also a direct path. In addition to a single location report, multi-location reports are available. Whether an operation has 10 or 100 locations, everything can be provided in one report for easy reference during operational meetings.

The second type of report is the tropical threat report, which focuses more on wind and storm surge for a coastal, onshore, or inland location. It breaks down a 10-day wind forecast, a forecast track, and a direct track path, providing calculations for estimated times of arrival for certain wind speed thresholds based on the tracks. The report also includes storm surge impact information. Like the T-time report, a multiple-location option is available.



Offshore discussion

Finally, there's a risk and response report. For organizations with staged emergency response procedures, the forecast shows storm specifics as they apply to an individual plan. Triggers are available for forecast wind and gusts, worst case wind, and the probability exceedance of wind thresholds, which is helpful for businesses with stringent procedures.

PHASE	THRESHOLD	REACHED?	EST. HRS REMAINING & TIME
2	Receive Report < 119 hours and Forecast Wind Speed 34.00kt < 119 hours and Probability of 34 Knot Winds > 50.00% < 119 hours	NO	-
3	Receive Report < 95 hours and Forecast Wind Speed 34.00kt < 95 hours and Probability of 34 Knot Winds > 50.00% < 95 hours	NO	-
4	Receive Report < 71 hours and Forecast Wind Speed 34.00kt < 71 hours and Direct Path Wind Speed 34.00kt < 71 hours and Probability of 34 Knot Winds > 50.00% < 71 hours and Forecast Wind Gust 34.00kt < 71 hours	NO	-
5	Receive Report	YES	REACHED 4pm CDT Mon 09/03

Accurate weather insights and analysis can help reduce uncertainties and risks for personnel and assets while also improving operational efficiencies. Learn more by [downloading our white paper](#).

Get actionable weather insights

For more information or to request a demo of one of our offshore solutions, please visit www.dtn.com/weather/marine-offshore/

Transportation discussion

This summer, transportation managers must remain aware of significant weather risks to effectively schedule crews and road maintenance work and prepare for potential emergency responses. There are three key weather threats this summer that may threaten infrastructure integrity and public safety.

The predicted above-average hurricane season poses particular challenges for non-traditional storm areas and the potential impact on population-dense centers. However, the hurricanes themselves aren't the only threat to roads and bridges. The extreme rainfall that often accompanies slow-moving tropical storms can cause flash flooding in the eastern United States, having a significant impact on public safety and supply chain operations.

Conversely, the third weather threat is the hot, dry weather predicted for the central and western portions of the country. These conditions could lead to emergency road closures and infrastructure repair, particularly with concern to wildfire management.

An elevated risk of tropical weather

Major U.S. population centers are at greater risk this season as the hurricane forecast focuses on the Eastern Seaboard. Transportation teams up and down the coast must be aware of the potential for elevated tropical storm activity. While there is still some threat in the Gulf, the focus will likely be on Florida and the East Coast.

Preparing for before, during, and post-storm activities will be paramount this season. In particular, post-storm activity relies on efficient, effective crew scheduling and reallocation to open roads and partner with utilities and other crews assigned to help restore infrastructure as quickly and safely as possible — particularly in high-density areas. Tropical storms create a different scenario than thunderstorms, as there is typically more time to plan and coordinate as the storm develops and moves up the coast. Having the right resources in place can support crew scheduling and reallocation

Transportation discussion

to quickly manage road closures due to debris, coordinate with other agencies when needed, and prepare for potential flash floods. Access to meteorological consultations can ensure more efficient, targeted efforts. A meteorologist can provide real-time information and offer counsel on expected storm impacts, which can be invaluable when making decisions.

Those consultations and more are available with [WeatherSentry® Transportation](#) Edition. It integrates National Hurricane Center projected storm paths and can identify transportation-related impacts, both along the coast and inland. Flooding, wind, and severe weather potential can be identified and integrated into one platform for team use.

The daily planner tool is also helpful for multiday events, like tropical storms. A daily planner can be customized and used by multiple people in an organization. It is pushed out, providing daily overviews and hourly details through multiple display capabilities. With a daily planner, everyone knows what will happen weather-wise, now and in the short term, supporting the most efficient resource planning.

The screenshot shows the WeatherSentry website interface. At the top, there's a 'Choose a region' dropdown set to 'Northeast' and a US map icon. Below this is the 'Northeast Highlights' section featuring a profile for Jim Meikle, Senior Energy Team Meteorologist. The main article is titled 'Sandy Continues To Be Major Threat' and discusses the storm's impact on the Northeast. To the right, there's a 'Blogs/Community' section with a 'Telvent Extended Weather PRELIMINARY OUTLOOK FOR WINTER 2012/13' and a 'WeatherSentry Ideas & Input' link. Below the article is a 'Comments (19)' section with a sample comment about the storm's intensity. On the far right, there's a '34 HOUR PRECIPITATION' radar map showing precipitation over the Northeast and surrounding areas.

WeatherSentry powered by DTT							
Daily Planner							
Position: 33.563889, -86.752306 Birmingham							
Issued: Mar 23, 2011 11:30:00 AM (CDT)							
Daily Summary							
Weather Threats	Tue Mar 23	Wed Mar 24	Thu Mar 25	Fri Mar 26	Sat Mar 27	Sun Mar 28	Mon Mar 29
Daily Weather Condition							
Daily Evapotranspiration (inches/day)	0.15	0.11	0.14	0.15	0.12	0.16	0.16
Maximum Temperature (F)	69	73	77	77	78	72	69
Minimum Temperature (F)	61	58	61	56	54	57	43
Maximum Feels Like Temperature (F)	69	73	77	77	78	72	69
Minimum Feels Like Temperature (F)	61	58	61	56	54	57	43
Maximum Wet Bulb Globe Temperature (F)	65	70	71	70	74	70	62
Minimum Wet Bulb Globe Temperature (F)	60	58	61	59	57	52	44
Daily Average Dew Point (F)	51	56	60	54	56	50	35
Daily Average Relative Humidity (%)	62	71	74	53	67	56	38
Daily Average Wind Speed (mph)	11	7	14	4	6	9	5
Daily Probability of Precipitation (%)	80	80	80	80	80	80	0
Daily Precipitation Amount (in.)	0.06	0.25	0.95	0.11	0.47	0.52	0.0
Daily Precipitation Type	Rain	Rain	Rain	Rain	Rain	Rain	-

Transportation discussion

Wetter than normal

It's important to recognize secondary, severe storm potential as tropical storms weaken and move inland. In addition to the heavy rain and wind, these storms can create quick-forming, spin-up tornadoes. With these events causing potentially wetter situations across the eastern United States, conditions may be ideal for flash flooding and road closures due to water and debris. Post-tropical storm weather events can threaten transportation infrastructure and the ability to move people and goods. Local-radar data helps identify specifically where and when severe weather may be moving in. Hyperlocal weather information and alerts can help specific crews know if they need to move, or if a project needs to be paused as weather moves through. Real-time weather data allows crews to prepare for flash flooding and severe storms, as well as support utility crews with road closures and clean-up efforts.

A platform like [ours](#) can help monitor for severe rainfall events. Completely integrated into the system, our data shows exactly where threats will occur and can help project managers keep crews safe and projects moving along as efficiently as possible.

Hot and dry weather

The hot and dry weather expected in the West and Central Plains creates the perfect setup for fires. Transportation agencies play a significant role in wildfire management and must be prepared to support firefighting efforts, whether it's managing road closures, repairing roads and bridges, or assisting other groups who are trying to move resources and keep people safe.



Transportation discussion

Having access to real-time information and weather data can help crews understand where there are heightened risks for fire-related damage. [WeatherSentry](#) offers accurate information about relative humidity and wind speed, two conditions that contribute to fire weather. The platform integrates with other available data regarding fire weather to help increase understanding of wind speed and direction.

Hurricane Sally causes devastating road damage in 2020

Hurricanes can be difficult for transportation teams to navigate as there are many risks, both during and after the storm. Last year, Hurricane Sally was the second of two hurricanes to hit the Gulf Coast in a three-week period. Sally moved slower, producing higher-than-average rainfall. Very powerful and destructive, the hurricane wreaked havoc with roadways and bridges.

[Sally created challenges](#) for Florida DOT and city and county agencies with its widespread flooding, closing roads across the Panhandle. There were so many closures that officials ran out of barricades and worked hard to get the word out about avoiding area roadways. Even though Sally diminished to a tropical storm as it slowly moved inland, it produced strong winds and rain that resulted in flooding. Most notably, it caused a construction crane to crash into the new Three Mile Bridge over Pensacola Bay, collapsing a section of the bridge.

Get actionable weather insights

For more information or to request a demo of one of our transportation solutions, please visit www.dtn.com/weather/transportation/city-and-county-roadways/

Aviation discussion

As flight operations climb back to pre-COVID levels, it is increasingly important to manage efficiencies and ensure smooth operations, both in the air and on the ramp. This summer, there will be three key weather events where actionable insights can help drive decisions that will contribute to safer, more efficient operations.

As in most summers, thunderstorms and severe weather can impact timeliness and safety. Such events can quickly bring lightning, hail, strong winds, heavy rain, or any combination of these conditions. This summer, thunderstorm activity is expected to be heightened across parts of the Southeast and Mid-Atlantic. In the Central and Southern Plains, where conditions are expected to be very warm and dry, personal safety is a concern, as is increased turbulence potential.

Thunderstorm activity

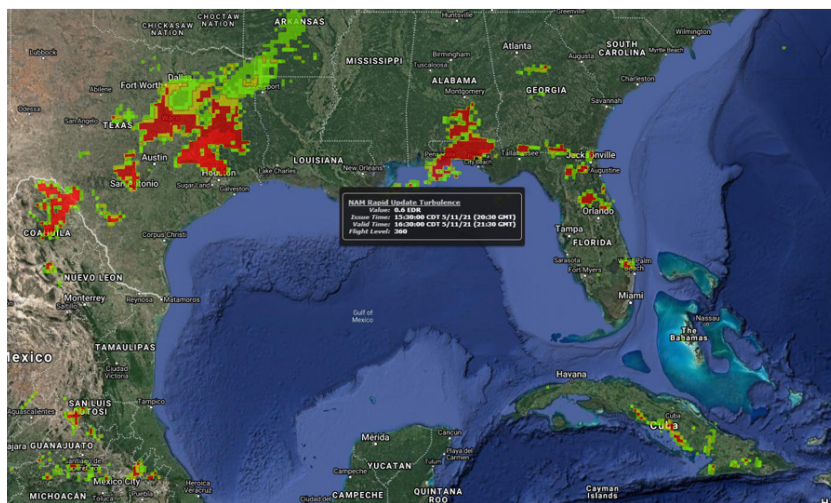
When we think about the impact of thunderstorms on some of the busiest aviation hubs, contingency planning around ramp closures and other actions is critical to protecting employees and passengers, equipment, facilities, and aircraft. Access to accurate, real-time weather insights can help drive informed decisions.

With the potential for a more active thunderstorm season across much of the country, it is critical to have a tool that can accurately track a storm's momentum and strength. This allows an operations team to monitor the distance from a thunderstorm cell to any identified location, so it's clear what time it will impact critical assets — supporting proactive decisions and actions. Real-time lightning data and watches and warnings for tornadoes, hail, and high winds are essential. Implementing protocols for these events contributes to operational efficiencies — allowing staff to flexibly adapt in real time. For example, a customized hail warning message can notify staff to immediately move aircraft indoors.

Aviation discussion

Increased turbulence

The predicted thunderstorm activity will lead to increased convectively-induced turbulence. Although we typically think of clear air-related turbulence in colder months, flying over summertime thunderstorms presents a similar risk. This seasonal turbulence develops close to thunderstorms, and is related to gravity waves breaking



above the storm, impacting aircraft range, fuel burn, and performance time. When turbulence impacts operations, safety concerns also exist for passengers and crew along with an increased need for aircraft maintenance. Finding a resource that offers turbulence forecasts, particularly with hourly updates, is imperative for safe, efficient operations. The Rapid Update Turbulence Forecast helps mitigate convectively-induced turbulence risks. It provides real-time, calculated turbulence intelligence for thunderstorm-induced turbulence conditions.

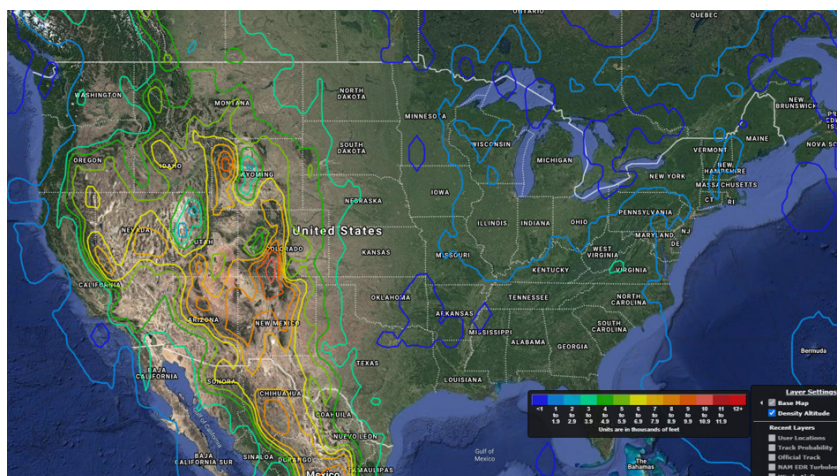
Learn more about convectively-induced turbulence in our [white paper](#) on reducing risks and improving the bottom line.

Heat impact on operations

With excessive heat expected across the United States this summer, airplane performance could be a concern, especially during take-off; ramp crew safety is also a potential issue. The predicted extreme heat won't be limited to just one part of the country, as most areas will see above-average temperatures. The Northeast will also experience higher humidity with its wetter conditions.

Aviation discussion

One way to combat heat-related aircraft performance issues is knowing the density altitude for any given location. AviationSentry® offers specific tools that present a snapshot of real-time density altitude, providing insights into potential performance implications and allowing valuable time for risk mitigation.



WeatherSentry Airport Operations edition includes a feature that may not be well known for aviation use — Wet Bulb Globe Temperature (WBGT). Used by hundreds of athletic teams and event planners across the country, WBGT measures heat stress in direct sunlight by estimating the effect of temperature, humidity, wind speed, and solar radiation on the human body. With its location-specific information, ramp worker safety can be ensured during this summer's expected above-average temperatures.

Excessive heat has multiple points of impact for air travel

Excessive heat can threaten health and safety, contribute to droughts, and fuel fire weather. In 2017, excessive heat impacted the aviation industry. Worker safety is always paramount, particularly for ramp workers who are exposed to prolonged heat and sun. In June 2017, airlines had to pay special attention; some set up cooling stations for employees at airports. It was critical at Phoenix International Airport, where the daytime air temperatures reached 120 degrees that summer. Extreme heat also impacted flight operations, grounding more than 40 flights in Phoenix during the same period as smaller jets couldn't generate enough lift to take off in the extreme temperatures. Its ripple effect impacted flight schedules across the country.

Get actionable weather insights

For more information or to request a demo of one of our aviation solutions, please visit www.dtn.com/weather/airlines/



Utilities discussion

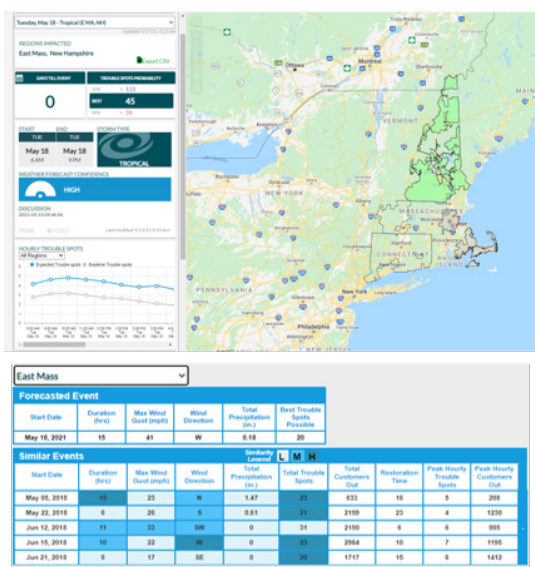
According to the U.S. Department of Energy, severe weather has caused nearly 60% of all major power outages over the last 20 years. Knowing that, with any potential severe weather threats, utilities must improve their understanding of outage predictions ahead of significant weather events so they can plan mutual assistance to help minimize related outages.

While day-to-day power supply maintenance operations usually only require a handful of crews, the weather typically remains the largest variable for utilities. This summer's weather outlook presents a unique set of weather challenges that require consideration and action. The forecast predicts an above-average tropical storm season with an elevated risk for the East Coast. The West Coast will see another season of fire weather with warm temperatures and drought fueling wildfire risks. Finally, an active thunderstorm season is anticipated across the eastern United States, with easterly and southerly wind flows — coupled with warm Atlantic temperatures that fuel thunderstorms.

Hurricane landfall events

With an above-average tropical storm season on deck, utilities need to continue growing power outage management efficiencies. Successful outage planning is complicated. It requires accurately forecasting weather events, anticipating likely types of incident tasks, declaring incident command events through specific forecast criteria, and mobilizing resources to fulfill estimated restoration times. All of this must be completed while maintaining a high level of customer satisfaction and appeasing the public utility commissions. By improving the understanding of potential outages ahead of major weather events, those insights can support critical planning around the use of mutual assistance groups.

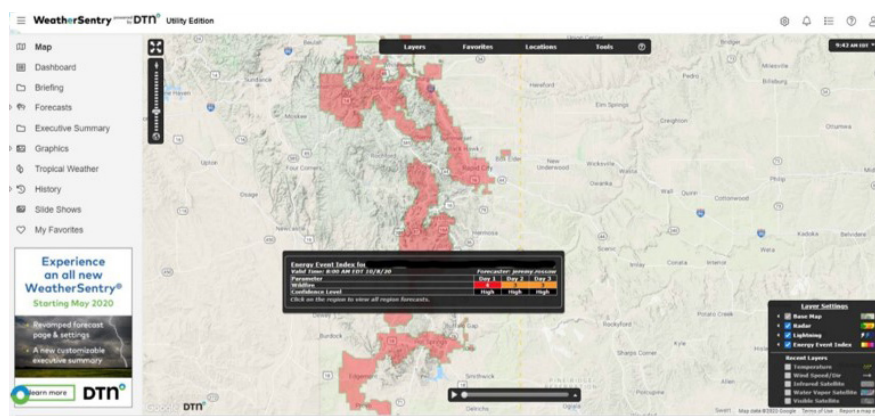
Utilities discussion



[Machine learning](#) is a growing technology that helps predict outages and supports informed crew deployment decisions. A machine learning program combines electric utility, outage management system weather, and above-ground infrastructure asset data. When combined with current weather forecasts, it also supports high-fidelity outage prediction. There are also tropical storm monitoring tools in [WeatherSentry® Utility Edition](#). The biggest need is to accurately forecast the track, intensity, and time of arrival to coordinate emergency preparedness efforts. Our tropical storm threat reports can be customized across any service region with estimated times of arrival, wind thresholds, and other data that supports preparation plans.

Western region fire weather

Wildfire risks can't be ignored this season, especially in California. There are growing concerns for electric utilities across the western United States to build wildfire risk mitigation plans. [insert: fire weather risk] Those plans should include accurate weather insights and objective risk criteria for operational wildfire mitigation plan escalation. Access to skilled meteorologists who have fire-weather expertise is also vital for informed decision-making.

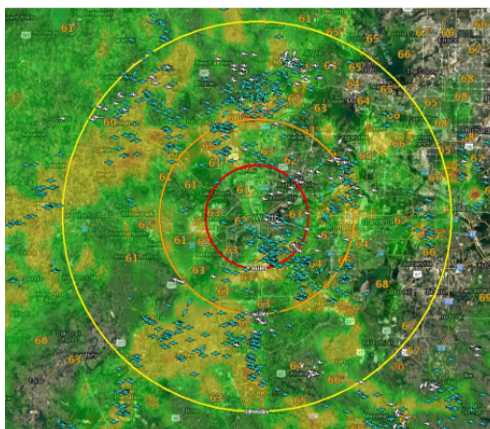


Utilities discussion

Our Energy Event Index, an add-on to WeatherSentry, provides a daily wildfire risk score matrix, which acts as a red flag warning for designated service areas. The right weather resource allows utilities to define an operating region and related weather phenomena and thresholds for each. Accurate, hyper-local forecasts can help create connections to potential operational impacts. Custom operational thresholds can help staff visualize weather and wildfire risk in a specific service region.

Thunderstorm risks

With thunderstorm risk, it's about better understanding the timing and coverage area of impending storms. Operations teams should be able to track lightning activity and determine its type and threat potential. Access to data for hail, flash flooding, and more, plus automated alerts and all-clear notifications can also help.



Lightning Manager ⊞ Add Slic

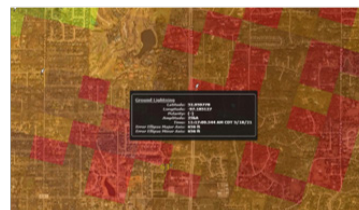
Strike counts in the last 15 minutes:

86	Warning strikes within 8 miles.
182	Caution strikes from 8 - 15 miles.
533	Advisory strikes from 15 - 30 miles.

■ Warning

Minutes	Potential All Clear within
13	8 miles (Warning All Clear)
14	15 miles (Caution All Clear)
15	30 miles (Advisory All Clear)

[change settings](#)



WeatherSentry Utility Edition monitors conditions, like lightning, for specific locations across a service area. Further, proactive alerts can be created to support safe, efficient operational decisions. The solution's dashboard offers many layers of weather intelligence, including lightning, hail, and wind data. The RadarScope single-site radar offers real-time data and insights into when and where rainfall is happening and then overlays global precision real-time lightning data for alerting, recording, and archiving purposes. Specific to your overhead assets, it enables efficient post-storm lightning inspection reports so you can prioritize repairs and crew utilization.

Improve planning and operations to offset weather-related business and operational risks through greater awareness of weather hazards. Learn more by [downloading the white paper](#).

Utilities discussion

Noteworthy, early-season tropical events impacting East Coast utilities

In July 1996, [Hurricane Bertha](#) made landfall along North Carolina's Atlantic coast. The storm brought an 8 to 10-foot surge and tracked along the Eastern Seaboard, bringing significant rainfall and wind gusts of up to 63 mph to Maryland and New Jersey. Power outages left more than 250,000 customers without power in the Carolinas, Virginia, Maryland, and Delaware. The utilities brought in repair crews from as far away as Georgia and Florida to quickly bring customers back online.

The first storm of 2013, [Tropical Storm Andrea](#), made landfall along the Gulf Coast of Florida and was the only tropical storm to directly impact the contiguous United States that season. It brought extreme flooding of up to 7.7 inches to Williamsburg, Virginia, and 6.6 inches to Gales Ferry, Connecticut. Utilities from Florida to Massachusetts managed scattered power outages over the extensive area.

Get actionable weather insights

For more information or to request a demo of one of our utility solutions, please visit www.dtn.com/weather/utilities/

Public safety & sports discussion

With COVID restrictions easing, more and more people are organizing, attending, and participating in outdoor events — and there are high expectations that they are well-run, safe, and orderly. From COVID safety protocols to weather contingency plans, preparation is essential, and the forecast must be considered. Notably, the ENSO neutral pattern presents an elevated risk of tropical storms in the Atlantic, especially for the Mid-Atlantic and Northeast with the favorable storm track. Staff at events held in these areas must be aware of potential tropical storm activity. Wetter than normal conditions across the Eastern United States and increased storms will require extra precautions, as heavy rainfall events could impact public safety and outdoor event logistics. In the Northern Plains and the West, warm and dry conditions will pose heat safety concerns.

Tropical weather considerations

With the heightened potential for tropical storms along the Eastern Seaboard and its dense population centers, event organizers must consider the potential impacts, including flooding and severe weather. In addition, saturated soil conditions can impact set-up activities, facilities, and parking, as well as public safety. Since access to accurate weather forecasts is imperative, a trusted weather tool may be the most critical resource for public safety leaders and event organizers. Detailed forecasts, local radar data, lightning alerts, National Weather Service watches and warnings, and professional meteorological consultations are crucial to confident, timely decision-making, especially when safety is on the line. WeatherSentry® also integrates tropical weather data, so event organizers don't need to search for that information from other sources. Users can access the official storm track, wind potential, tropical rainfall, wave height, and storm surge. Even more detailed tropical storm advisory support available. A tropical daily planner resource can be established for specific storms and issues a twice-daily planner for comprehensive storm insights, related warning advisories, and decision guidance.

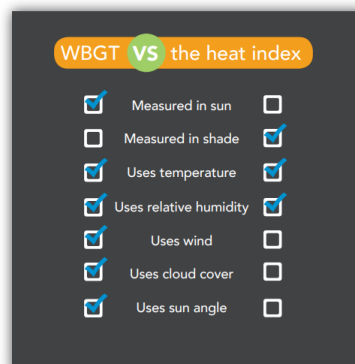
Public safety & sports discussion

Hot weather

Most of the country is expected to have above-normal temperatures this summer, and with the elevated heat, safety risks and concerns also rise. Heat plays a role in weather-related fatalities each year and is the leading cause of weather-related deaths among U.S. high school athletes. Having accurate information and observations to monitor extreme heat and

humidity is imperative this season.

WeatherSentry offers forecast conditions, current conditions, and custom, location-based alerts for temperatures, the heat index, and Wet Bulb Globe Temperature (WBGT). WBGT measures heat stress in direct sunlight. It differs from the heat index, which also looks at temperature and



Hour (Central Daylight Time)	Wed 9 AM	Wed 10 AM	Wed 11 AM	Wed 12 PM	Wed 1 PM	Wed 2 PM	Wed 3 PM	Wed 4 PM	Wed 5 PM	Wed 6 PM
Weather Condition										
Weather	Partly Cloudy	Partly Cloudy	Partly Cloudy	Sunny	Sunny	Partly Cloudy	Sunny	Partly Cloudy	Partly Cloudy	Sunny
Temperature (°F)	83	87	90	92	94	96	97	98	96	96
Feels Like (°F)	88	93	96	98	99	101	103	104	101	101
Wet Bulb Globe (°F)	84	87	88	89	88	89	88	87	86	86
Wind Direction	WSW	W	WSW	WSW	SW	WSW	WSW	WSW	SW	SW
Wind Speed/Gusts (mph)	3	3	3	3	5	5	6	6	7	6
Dew Point (°F)	72	72	71	70	69	69	69	68	69	69
Humidity (%)	70	61	54	49	44	41	40	38	41	41
Precipitation Chance (%)	-	-	-	-	-	-	-	-	-	-

humidity — but in the shade. While not as commonly referenced as the heat index, WBGT is vital for addressing how prolonged heat exposure pushes the human body beyond its limits. When extreme heat combines with high humidity, it can become lethal.

Severe weather

Severe weather can challenge the best-laid event plans. High winds can uproot trees, hail can break windows and cause other damage, lightning strikes can be deadly, and dangerous tornadoes can develop with little or no advance warning. Real-time alerts are essential for monitoring fast-changing severe weather conditions. With lightning, hail, and severe storms expected throughout much of the United States this summer, one of the best ways to keep

Public safety & sports discussion



The OnGuard siren system with beacon.

people safe is real-time alerts and on-site, multi-directional sirens with beacons. Real-time alerts to approaching weather support those who need to seek shelter fast. This information can help guide timely decisions that improve safety and resource management.

If you are responsible for people playing, practicing, working, or enjoying the outdoors when inclement weather strikes, you must be fully aware of potential hazards and have an evacuation plan ready. Download our [e-book](#) for important information on weather monitoring and alert systems.

The 2015 heatwave

An [early-season heatwave](#) consumed the United States during June 2015, impacting events throughout the country. Notably, the Pacific Northwest and West Coast experienced near-record temperatures, with 16 different states seeing above-average temperatures. Many cities set new, all-time June temperature records — even Boise, Idaho, hit temperatures near 110 degrees Fahrenheit (F).

Seattle saw its [hottest summer on record](#), with an average high of 80.2 degrees F, impacting events all summer long. In Oregon's Willamette Valley and the Portland metropolitan area, at least four deaths were blamed on the heat, according to NOAA.

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