2021 spring weather outlook report

Understand the weather impact on your business

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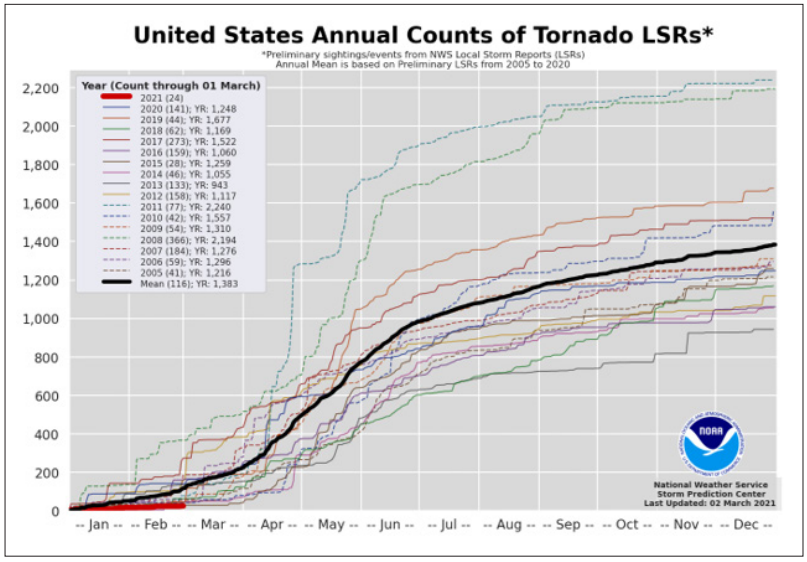
Spring forecast summary

Although the start of the spring season was somewhat uneventful, severe weather began developing in mid-March. We expect to see continued momentum into a much more active spring weather season. Emerging from the La Niña pattern, severe weather threats will continue and increase this spring — bringing an above-average number of tornadoes and severe weather events. This is consistent with past La Niña seasons, particularly 2008 and 2011.

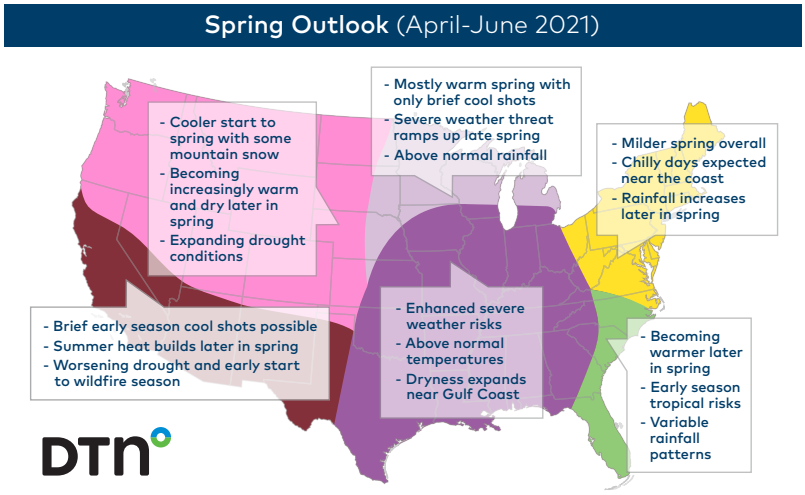


The average annual U.S. tornado counts from 2005-2020. The top pair of lines represent 2008 and 2011, which had La Niña's most similar to this year.

In addition to the severe weather probability, spring will also see expanding drought and wildfire risks in the U.S. Southwest, which will move northward as the season progresses. While there is drought in portions of the country, the eastern United States will likely see wetter conditions by late spring, and the tropical storm season will make an early appearance there.

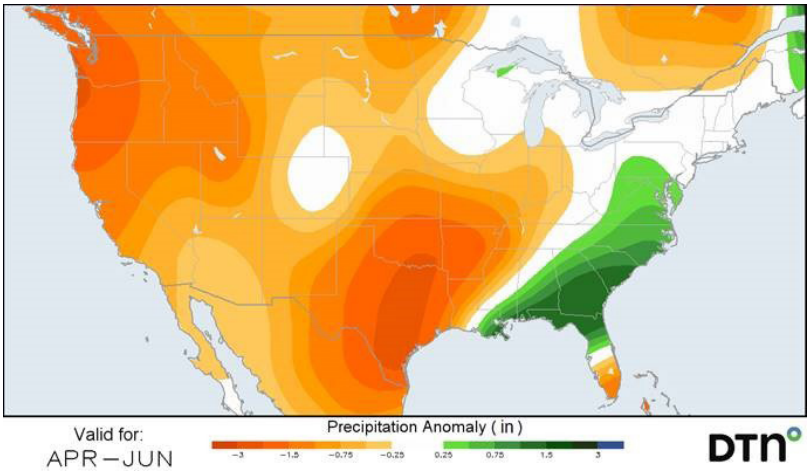
Spring severe weather & precipitation

Looking further into April, the forecast map shows most of the country drier than normal. However, the rainfall totals are possibly under-represented since the longer-range model data incorporated into the forecast is likely underestimating rainfall totals related to convective precipitation. Severe weather risks will continue to increase through April and May, and an active severe weather season is still anticipated. The focal area for severe weather risk looks to be across the middle of the country, centered over Oklahoma, after being focused on the Southeast during March. Those same areas have the best chance of seeing higher precipitation totals than currently forecast during April. Severe weather is most likely in early spring in the south-central United States with gradual expansion north and east through the season.



The DTN spring 2021 outlook map.

As far as overall precipitation, the Plains are forecast to average drier than normal, as is the Northwest. However, the East Coast could see wetter than normal conditions, in part from increased tropical risks as the season develops.



Spring 2021 seasonal rainfall map.

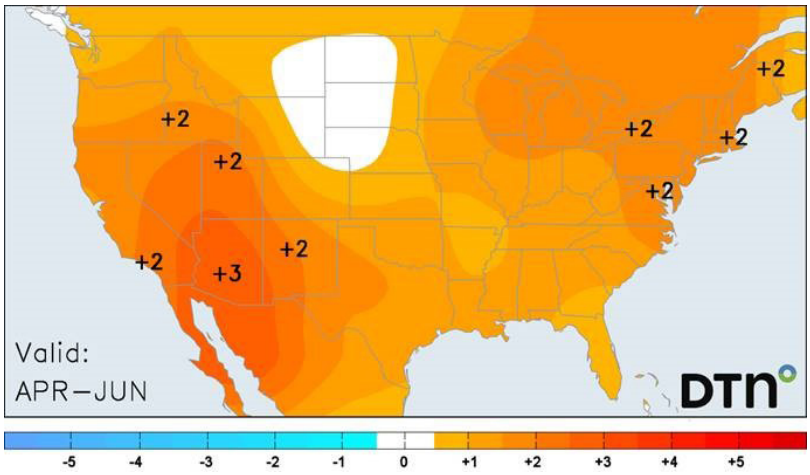
DTN

Drier than normal soil conditions remain in place across most of the western United States, although some areas have seen minor improvements. Even though recent wet conditions have resulted in above-normal soil moisture across portions of the central United States, Texas and the northern tier will remain drier than normal. Expect very little change in precipitation across the western half of the country through April; however, areas from Texas to the Northeast could see increasing soil moisture during that time.

Spring temperatures

April's forecast predicts average warmer-than-normal temperatures across much of the country — particularly the central and southwestern regions. Moving into May, those average warmer-than-normal temperatures will continue across most of the country and into the summer. Widespread, hotter than normal weather is forecast across the entire country, especially across the central and western United States.

Mostly warmer than average temperatures are expected for the balance of the spring season; mid and late April could see a couple of rounds of colder weather that should be short-lived.



Spring 2021 seasonal temperatures map.

Tornado probability influenced by the La Niña pattern

Currently, we are in a La Niña year, which typically means warmer than normal winter temperatures in the south and cooler than normal in the north. We found that even with these expected patterns, exceptions can exist, like when the polar vortex brought arctic temperatures and snow as far as southern Texas in mid-February. Research shows that tornadoes and hail are more frequent during La Niña springs.

La Niña conditions have rapidly faded during the last few weeks, and near-neutral El Niño-Southern Oscillation (ENSO) conditions are in place across much of the equatorial Pacific. A plume of sub-surface warmth spreading eastward across the equatorial Pacific suggests that some further surface warming will be seen during the coming months, though neutral ENSO conditions are still the most likely scenario for the upcoming summer season. A progressive Madden–Julian Oscillation (MJO) wave may provide an opportunity for a period or two of colder weather across the United States during mid-April. But, any cold is likely to be short-lived, and most of the country will average warmer than normal this spring.

In May 2008, 460 tornadoes were reported and in 2011, 362 tornadoes spun up in late April.

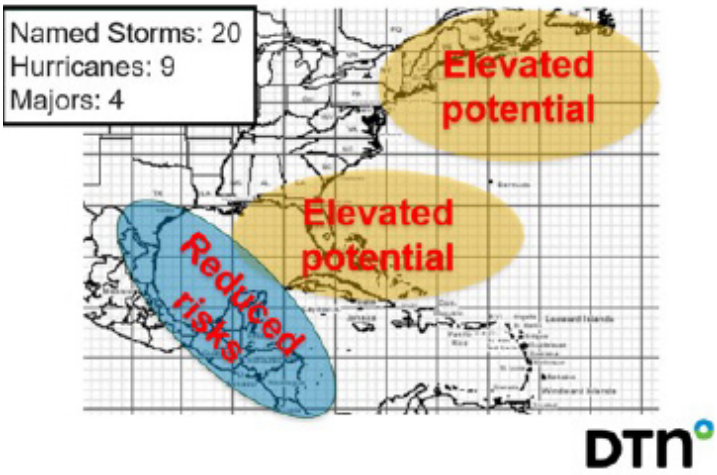
Weather history can help predict future patterns, and if you look at the past 15 years, the two most active tornado years were 2008 and 2011, during a La Niña pattern. In May 2008, 460 tornadoes were reported and in 2011, 362 tornadoes spun up in late April. Based on this historic look, this year's active spring severe weather season could see more tornado activity than normal.

Super Tuesday outbreak

The evening and night of February 5, 2008, saw a deadly tornado outbreak. It was nicknamed Super Tuesday outbreak because of the large number of presidential primaries that day. There were a total of 57 deaths in the southeast — 32 in Tennessee alone. This marked the highest number of fatalities in a single tornado outbreak since 1985.

Hurricane preview

While it's still a bit early, here are a couple of things to note about the hurricane season. Each of the past six seasons has seen a storm before its official start. It appears this year will also be early, especially as much of the Atlantic basin is warmer than normal. MJO trends also suggest the atmosphere will become more conducive for early tropical development.



The DTN 2021 tropical outlook map.

Estimated totals for the upcoming season are in the 20-storm range — solidly above average, though quite a bit lower than 2020's 30 storms. Most interesting is where storms may go. Early indications suggest there could be a limited number of storms heading into the western Gulf and more moving up the East Coast. Look for more details to come on hurricanes later this spring.

Looking ahead to summer

There's high confidence that summer will see average to hotter-than-normal temperatures across most of the country, particularly from the Plains westward. Similar analog years, climate models, soil moisture anomaly patterns, and climate trends all point towards a hotter-than-normal summer, especially across the western region. Should conditions trend back towards La Niña later this summer or drier conditions become more widespread, the summer will likely end up even hotter than forecast.

Industry thoughts on severe weather

In our Spring Severe Weather Outlook webinar on March 30, 2021, we asked our attendees if they felt severe weather has become more extreme, stayed the same, or is less extreme. We will include three sets of responses in this report. A detailed breakdown for safety and offshore are included in their forecast sections.

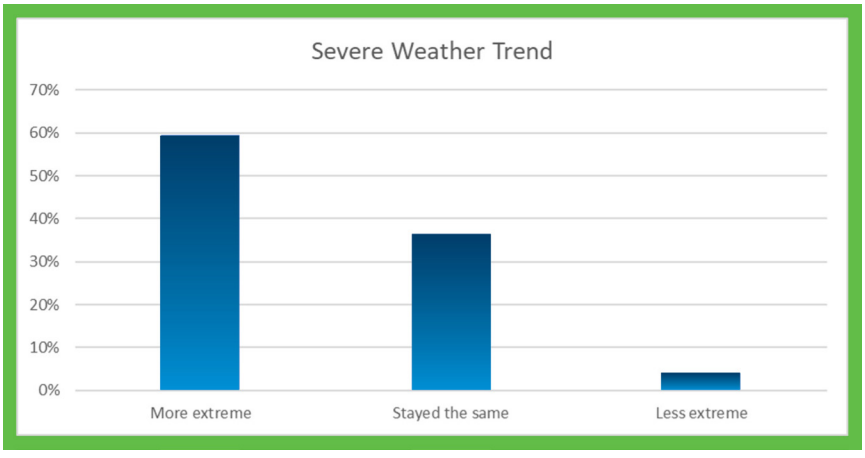
- Cross sector – (99 respondents)
- Offshore – (36 respondents)
- Safety – (26 respondents)

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

The majority of respondents (60%) felt that severe weather has been trending to be more extreme; 36% indicated they've not experienced a significant change. Only 4% replied that severe weather has become less extreme.

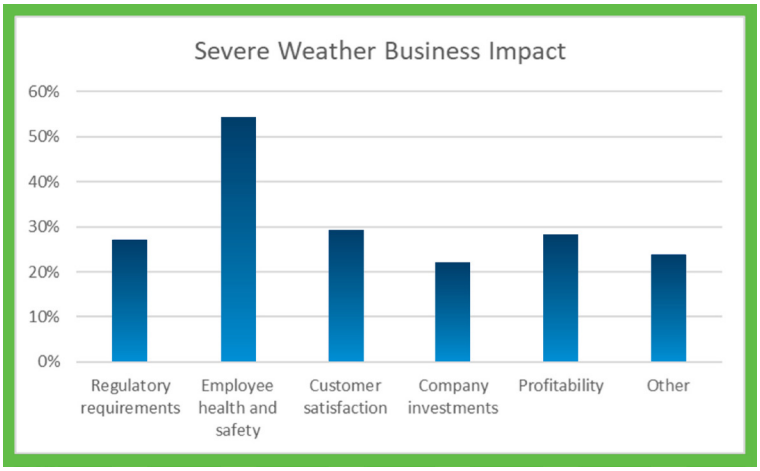
There were major differences by sector though. Especially offshore. That group felt weather has become more extreme, with 83% of respondents experiencing more extreme weather and 0% less extreme. In safety, 42% of respondents experienced more extreme weather; 46% responded that severe weather was the same and 12% said it was less extreme.

In this La Niña year, we expect respondents experiencing more extreme weather will see an increase in incidents of tornadoes, hail, high winds, and lightning. And that is what has been predicted for this upcoming spring season: an above-average number of tornadoes and occurrences of severe weather, droughts, and wildfires.



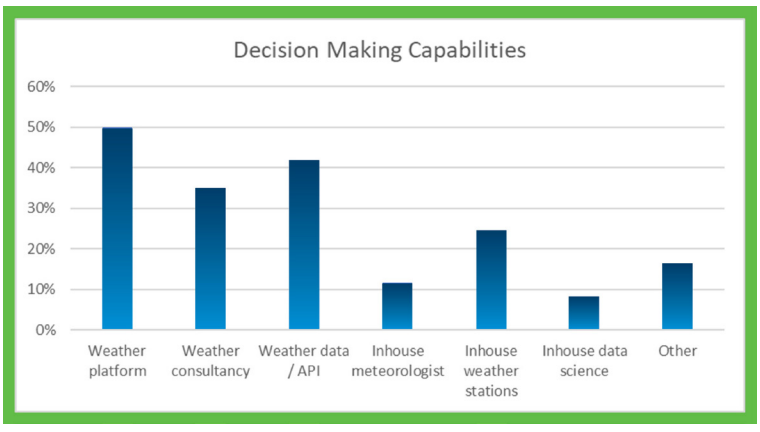
Question 2: In which areas has weather impacted your business over the past years?

Here, respondents selected all that applied from multiple answers. Across all sectors, employee health and safety was by far the largest impact, chosen by 54% of respondents. Customer satisfaction was the second largest impact with 29%, followed closely by profitability (28%) and regulatory requirements (27%). 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 selected all that applied from multiple answers. Most have some kind of external weather decision-making capability in place, like a weather platform (50%), weather data/ API (42%), or weather consultancy (35%). About one in four have in-house capabilities, like weather stations (24%), a meteorologist (12%), or data science (8%); 16% have other capabilities in place.



Aviation discussion

So, what does this forecast mean for aviation businesses? Here's a closer look at the outlook, focused on aviation-specific weather challenges, as well as a few proposed solutions to help reduce operational risks.

In recent years there has been heightened interest in being prepared to respond to extreme weather events. Even though we typically think of winter as creating adverse conditions for aviation operations, there are some warm weather situations to think about for airport, airline, and helicopter operations.

For example, this spring, the above-average severe weather threat across the central and eastern United States and its increased volatility can bring many different weather phenomena into play, including hail, lightning, winds, and even tornadoes, both in the air and at the terminal. The northern tier of the country must also be aware of the potential for stronger than average jet stream winds. There is also increased potential for wetter conditions in the Northwest, Northern Plains, and Eastern Seaboard, which creates heightened risk for low visibilities — a concern for airline and helicopter operations.

Aviation discussion

2011 airport tornado event

Spring tornado events are not something to take lightly. In 2011, a La Niña spring, similar to this year's weather pattern, brought about one of the largest tornado outbreaks in U.S. history.

On April 22, two super-cell thunderstorms produced large hail, strong winds, and five tornadoes in the St. Louis area, including one ranked EF4. The worst damage occurred when the EF4 tornado hit the St. Louis Lambert International Airport. Thankfully, there were no fatalities due to early warning, good timing, and quick thinking by airport operations staff.

The airport, working closely with its private weather partner, received the tornado warning as it was issued, before the storm hit the airport. As more specific information became available about the tornado's track, staff took appropriate action.

This tornado event is a strong reminder of the importance of having accurate, timely severe weather information to ensure the safety of pilots, crews, passengers, and terminal staff.

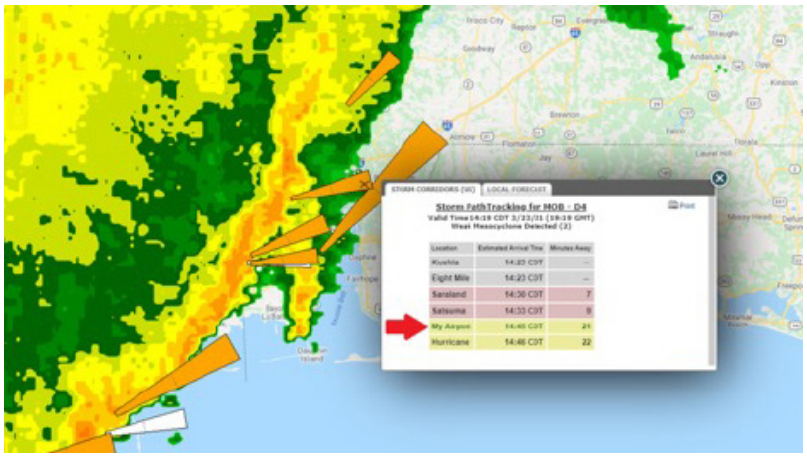
Aviation discussion

With severe weather — thunderstorms in particular — having accurate, timely weather information is key for contingency planning around ramp closures or other actions to protect employees and passengers, equipment, facilities, and aircraft.

Empower operations with storm tracking

With the forecast potential for severe weather and the pattern of increased tornadic activity following previous La Niña seasons, having a tool to accurately track a storm's momentum and strength is critical. With tracking, you can monitor the distance from a storm cell to any identified location, so you know what time it will impact your operations — supporting planning and proactive action.

It's important to also look at real-time data for lightning and issued watches and warnings for conditions like tornadoes, hail, and high winds. Implementing protocol for responses to these weather events is important — as is the flexibility for staff to adapt in real time. For example, if there is a hail warning, a customized message may tell staff to immediately move aircraft indoors.

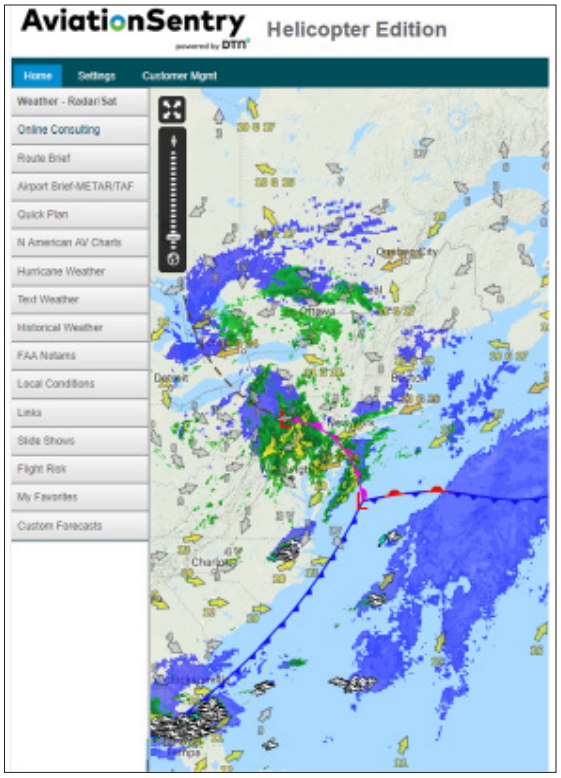


An example of storm tracking within AviationSentry®.

Aviation discussion

Efficiently avoid areas of heavy turbulence

Although we typically think of clear air-related turbulence, this spring's increasingly active jet stream pattern across the northern United States will have an impact on aircraft range, fuel burn, and performance time. When turbulence impacts operations, safety concerns for staff and passengers and increased aircraft maintenance often follow. Finding a resource that offers turbulence forecasts, particularly one with hourly updates, is imperative for safe, efficient operations.



AviationSentry provides complete weather decision support

For the most accurate and reliable forecasts, be sure to consider alternatives to government TAFs. For example, DTN has more than 120 meteorologists on staff who are available for consultations around the clock. These experts produce Real-time Atmospheric Monitoring Terminal Area Forecasts (RAMTAFs) and have provided custom terminal forecasts for more than 35 years. It's a great option to support operational flexibility, especially when government TAFs are unavailable.

Many of the features above can be found in the AviationSentry solution, which offers unmatched forecast accuracy, flight hazard forecasts, access to meteorological consultations, lightning alerts, and other features that help manage volatile spring weather.

Get actionable weather insights

For more information or to request a demo of one of our aviation solutions, please visit dtn.link/2d77gl.

Utilities discussion

The spring outlook presents a unique set of weather challenges for utilities. They include hotter-than-normal temperatures for much of the United States, drought and wildfire risks in the southwest and moving northward, and an early onset of the tropical season, where more storms are likely to head up the East Coast. Here's a more detailed look, plus solutions to help reduce operational risks.

This spring will see above-average temperatures but fewer cooling degree days than in recent years. That heat, and the related increased demand for gas and air conditioning, will be most prevalent in the southern and western regions of the United States. There will be a great disparity in precipitation across the country — most notably, growing drought conditions in the West that will bring elevated wildfire risks to northern California. While on the East Coast, a weak trough may send more tropical storms in that direction. The eastern Gulf states are also at an elevated risk for potential tropical activity. For those in the renewables industry, a recovery in winds in Texas and continued above-average irradiance in the Southwest to facilitate solar generation are expected.

Utilities discussion

The growth and historical patterns of power shutoffs for public safety

In the first two months of this year, California already experienced nearly four times the number of wildfires as the same time in 2020. Warm winter weather, strong winds, and dry vegetation are to blame for the recent outbreak, and those weather conditions will continue into the summer. Wildfires are increasing in frequency, intensity, and length of their season. What was once a four-month, high-alert season from July to October is now a year-round risk.

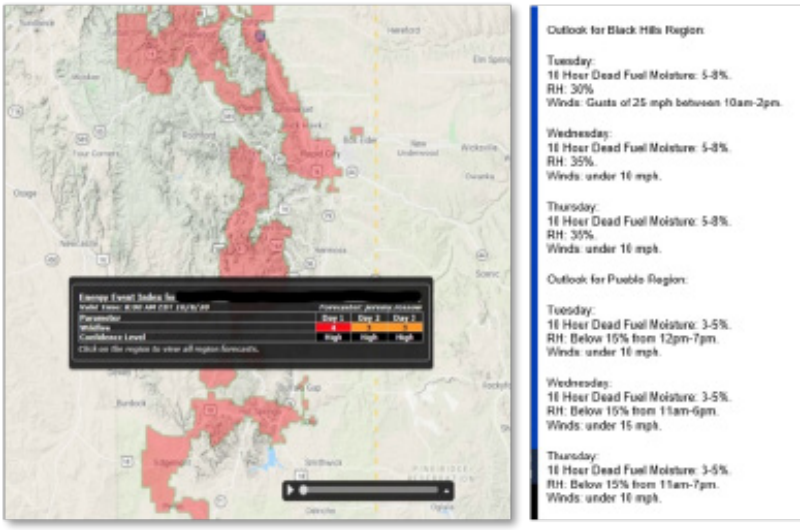
Not only do wildfires threaten public safety, houses, and infrastructure, but they also create additional risks for utility companies. Wildfires can be ignited by utility infrastructures, such as power lines or nearby aerial communication facilities, as was the case for the 2018 California Camp Fire (Read our ebook about the event). Or, it can cause utility companies to shut off power to millions of customers to prevent fueling existing fires. Earlier this year, the Santa Cruz fires required local utilities to perform public safety shutoffs for thousands of customers. Wildfire risk mitigation has become integral to operations management. Fire risk forecasts and advanced technology are critical for confident risk mitigation decisions.

Utilities discussion

Weather-related wildfire risk insights

Wildfire risks can't be ignored this season, especially in California. There are growing concerns for electric utilities all across the western United States to build wildfire risk mitigation plans. A private weather partner can help with that by offering accurate weather forecasts, providing risk criteria for operational wildfire mitigation plan escalation, and access to skilled meteorologists who have fire-weather expertise.

The right weather resource allows utilities to define their operating region and the related weather phenomena and thresholds for each. With accurate, hyper-local forecasts, connections can be made to potential operational impacts. Operational thresholds can be set to help visualize weather and wildfire risk in a specific service region.

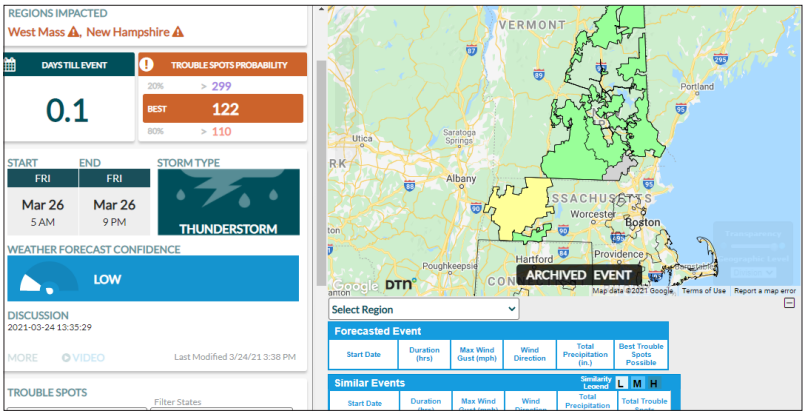


The DTN Energy Event Index showing fire risks for the Black Hills of South Dakota.

Utilities discussion

Outage prediction & management

Another key implication of the spring forecast is the early onset of the tropical season with the elevated potential for storms to be concentrated on the East Coast — resulting in the need to grow power outage management efficiencies.



Storm Impact Analytics provides weather event-specific outage forecasts for your operating geographies, powered by machine learning models.

It's about improving understanding of outage predictions ahead of major weather events and planning mutual assistance use. This complicated process includes accurate weather forecasts, anticipating the types of incident tasks, declaring incident command events through specific forecast criteria, and making decisions to mobilize restoration resources to fulfill estimated restoration times. All of this must be done while maintaining high levels of customer satisfaction and appeasing public utility commissions.

Machine learning is a growing technology that supports outage prediction and informed crew deployment decisions. A machine learning program combines electric utility data, outage management system weather data, and above-ground infrastructure asset data. When paired with current weather forecast data, the machine learning model supports high-fidelity outage prediction.

Awareness of weather hazards can help you formulate plans and enable actions that offset associated business and operational risks.

Learn more by downloading the white paper.

Get actionable weather insights

For more information or to request a demo of one of our utilities solutions, please visit dtn.link/mrei29.

Transportation discussion

As longer days and warmer temperatures are upon us, transportation weather impacts and mitigation change more drastically than in most other industries. There are some very transportation-specific spring weather challenges and proposed solutions to help reduce operational risks.

Those responsible for summer maintenance and operations understand the logistical challenges that severe weather can create for transportation management. Most notably in this year's spring forecast is the increasingly active, above-average severe weather threat across the central and eastern United States. It can bring many unpredictable conditions, including strong winds, sudden heavy rains, hail, lightning, and tornadoes. Each has significant impacts on roads, infrastructure, maintenance crews, and the public at large.

Flash flooding & road safety

While tropical storms can quickly bring rain in amounts that cause flash flooding, it's more common for severe storms to produce intense rainfall, as with the Louisville flash floods of 2006.

This storm system brought severe weather and localized flooding to much of the southeastern United States; however, it struck the Louisville area particularly hard. Historical radar and personal accounts of the event showed more than 6 inches of rainfall in many parts of the city. One person reported recording more than 2.5 inches of rain in a single hour.

The localized floods killed six people — in most cases, as their vehicles were overcome by rising water. Interstate 64 closed due to standing water. It was the area's single deadliest weather event in nearly 10 years. The storm also caused more than a million dollars in damage and forced hundreds of people from their homes due to the quickly rising waters.

Transportation discussion

Daily weather planning tools

Offering all employees — from maintenance crews to those working in public safety — a daily outlook and regular communication about changing weather conditions is key to safe, efficient operations.

An example of a daily weather planner included in the WeatherSentry® solution from DTN.

With a daily planner, everyone knows what will happen weather-wise, not only now but also in the short term, supporting the most efficient resource planning. Giving crews access to single-site radar data is also critical on job sites, not only for personal safety but also project timing. Crew safety can be further supported by tying that data to real-time weather alerts. By customizing alerts to specific locations, crews can receive real-time watches and warnings by text or email.

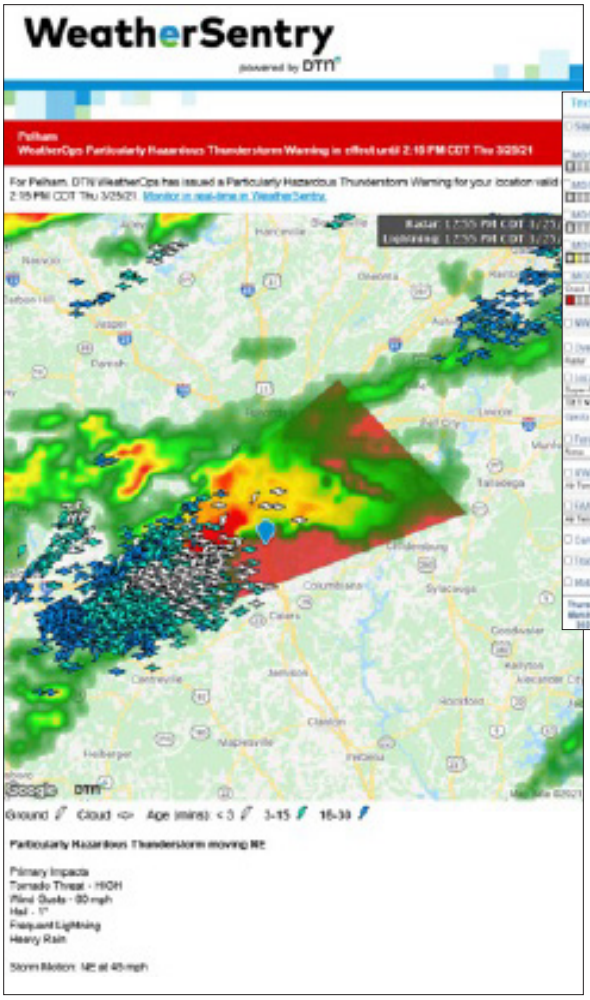
Local radar data

The local radar and additional weather layers in WeatherSentry.

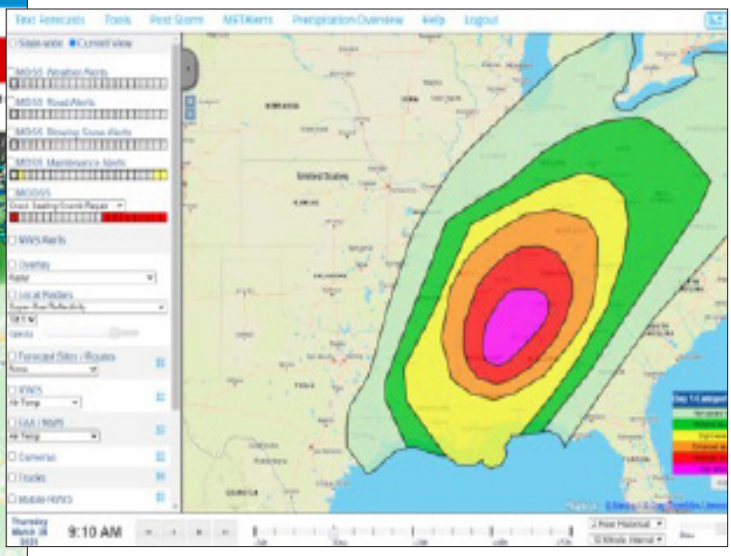
Local-radar data helps pinpoint when and where severe weather may move. Hyper-local insights can alert specific crews if they need to move or pause a project before a storm arrives. Real-time weather data also helps them prepare for flash flooding or other events and enables them to better support utility crews with road closures and post-storm clean-up.

Transportation discussion

A platform, like the one offered by DTN, supports complete integration of severe storm outlooks. This can help managers protect crew safety and project efficiency with details about specific weather threats. Severe weather potential, such as high winds and tornadoes, can also be easily monitored.



Severe weather alerts shown on WeatherSentry.



Severe weather radar shown on WeatherSentry.

Prepare for volatile weather, like flooding and extreme temperatures, with an action plan that incorporates accurate weather insights and management tools.

Learn more by downloading the white paper.

Get actionable weather insights

For more information or to request a demo of one of our transportation solutions, please visit dtn.link/y5mlbb.

Public safety & sports discussion

Although the number of major events declined over the last year, planned festivals, fairs, and concerts will likely begin to resume as a growing number of Americas are vaccinated. Participation in recreational sports and activities has also increased.

In addition to health concerns, there will need to be heightened weather and safety awareness with the expected above-average occurrences of severe weather and the potential for above-average heat this spring and summer. The following is a look at the spring outlook as it relates to public safety-specific weather challenges, as well as some solutions to help minimize weather impacts and support safer events.

Event safety changes from 2011

Because 2011 also featured an active severe weather season influenced by a La Niña pattern, it's worth looking at how one of its events changed event safety management.

The Indiana State Fair stage collapse occurred during an outdoor concert by the country band Sugarland. Extremely gusty winds from a severe thunderstorm hit the stage's temporary roof structure, causing it to crash down onto the crowd, killing seven people and injuring dozens more. It was the third weather-related outdoor roof collapse in North America in just three weeks. Others happened in Tulsa and Ottawa.

The number of people impacted by the event was devastating and event planning leaders across the industry took notice. As a result, many began working together and formed the Event Safety Alliance, a group dedicated to promoting "life safety first" during all phases of event planning and execution. The group has become a leader in promoting public safety at events throughout North America.

Public safety & sports discussion

This spring, the main message is severe weather is trending — particularly in the central United States. There will also be above-normal heat and humidity heading into summer. Coming out of the La Niña influence, there's a high probability of tornadoes, hail, and other volatile weather. It's been 10 years since we've seen such a major influence from La Niña and the devastating results it can bring.

In terms of severe weather potential, the population density at most risk will be the Central Plains — from Houston, up to Nashville and Memphis, and over to Kansas City. We'll also likely see active storm activity from the Southern Plains to the Tennessee Valley. With severe weather comes the risk of lightning, winds, hail, tornadoes, and flash flooding, so public safety officials must be prepared. On top of COVID-19 protocols, they must implement severe weather safety plans and the necessary logistics.

So far, this year's La Niña pattern influence has spun up 207 tornadoes. This volatility is anticipated to continue through spring. While the number of tornadoes is currently on track with the median for this time of year, the storms came as an intense burst in March and such a risk should be monitored as the season moves along.

In addition to the severe weather threat, the potential for above-average heat across the entire country is a cause for concern; heat impact is a major event safety hazard. In fact, heat is actually the number one weather-related fatality event among high school students, so understanding not only high temperatures, but the heat index and wet bulb globe temperatures are important for those in charge of public safety.

Many factors come into play when considering the spring outlook's weather impacts on public safety. For most events, safety and evacuation concerns will typically be the main focus. But there are other event aspects to consider, such as the disruption of play, participant comfort, venue safety during heavy rain, and more. The bottom line is that there are many logistics to think through in terms of event safety and execution.

Mitigate safety risks with accurate, real-time weather insights and management tools that support a comprehensive safety plan.

Learn more by downloading the white paper.

Public safety & sports discussion

The importance of forecast accuracy

Since access to accurate weather forecasts is imperative, having a trusted weather tool may be the most important resource for public safety leaders. Detailed forecasts, local radar data, lightning alerts, National Weather Service watches and warnings, and professional meteorological consultations are critical to confident, timely decision-making, especially when safety is on the line.

While that may seem like a significant amount of data, the right system can make the tools and information easy to manage. With apps, texts, and emails, they are also accessible remotely to ensure fast information, regardless of location.

Real-time alerting solutions

Lightning, an above-average number of tornadoes, hail, and severe storms are all predicted for this spring. One of the best ways to keep players, staff, spectators, and attendees safe is with real-time alerts and an on-site, multi-directional siren with a beacon. Real-time alerts for impending weather events help share critical information with those who need to seek shelter, whether it's warnings for tornadoes, high winds, hail, lightning, or more. This information can help guide fast decisions around when to move people to safety and how to best manage resources.

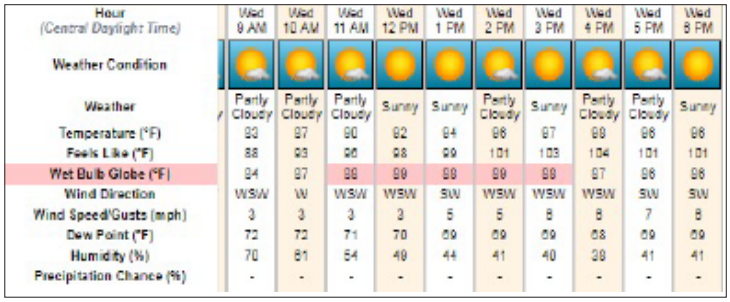
The OnGuard siren system with beacon.

Alerts can be sent by text or email, ensuring they are quickly seen. DTN offers an on-site alerting system that is ideal for schools and outdoor events. The OnGuard Siren alerting system integrates with the other DTN weather solutions, so it can activate lights and sounds to alert people in the area to specific types of weather dangers, such as lightning, high winds, or tornadoes.

Public safety & sports discussion

Wet bulb globe temperatures

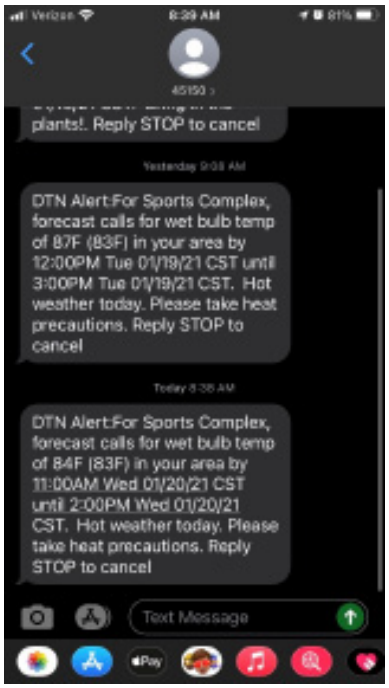
With above-normal temperatures expected through much of the country this spring, there will likely be consistently above-normal temperatures to contend with through summer. This high heat potential is particularly important when planning and managing events, practices, games, or outdoor work.



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)	93	97	99	92	94	96	97	99	98	96
Feels Like (°F)	88	93	96	98	99	101	103	104	101	101
Wet Bulb Globe (°F)	94	97	99	99	99	99	99	97	96	96
Wind Direction	WSW	W	WSW	WSW	SW	WSW	WSW	WSW	SW	SW
Wind Speed/Gusts (mph)	3	3	3	3	5	5	8	8	7	8
Dew Point (°F)	72	72	71	70	69	69	69	68	69	69
Humidity (%)	70	61	54	49	44	41	40	39	41	41
Precipitation Chance (%)	-	-	-	-	-	-	-	-	-	-

The WBGT forecast within WeatherSentry.

Yes, extra water, cold towels, cooling fans, and scheduling considerations are essential for protecting athletes and others in the heat, but so are proper tools for monitoring the heat index. WeatherSentry offers forecast conditions, observations, and 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 humidity but in shady areas. While not as commonly referenced as the heat index, WBGT is vital for addressing how prolonged exposure to heat pushes the human body beyond its limits. When extreme heat combines with high humidity, it can become a potentially lethal situation.



An example of a location-specific WBGT alert.

Public safety & sports discussion

Local radar data

The local radar and additional weather layers in WeatherSentry.

An active severe weather season is predicted at the same time spring sports, events, and outdoor activities are increasing. One of the most critical weather tools for tracking severe storms is local radar. A single-site local radar provides information on a storm's current location and where it's headed. It can be customized with different layers to show additional information, like wind, rain, hail, and more. Velocity data is also available to provide greater visibility into tornado activity for public safety teams and others who may require that level of insight.

Get actionable weather insights

For more information or to request a demo of one of our public safety solutions, please visit dtn.link/i9nx3e.

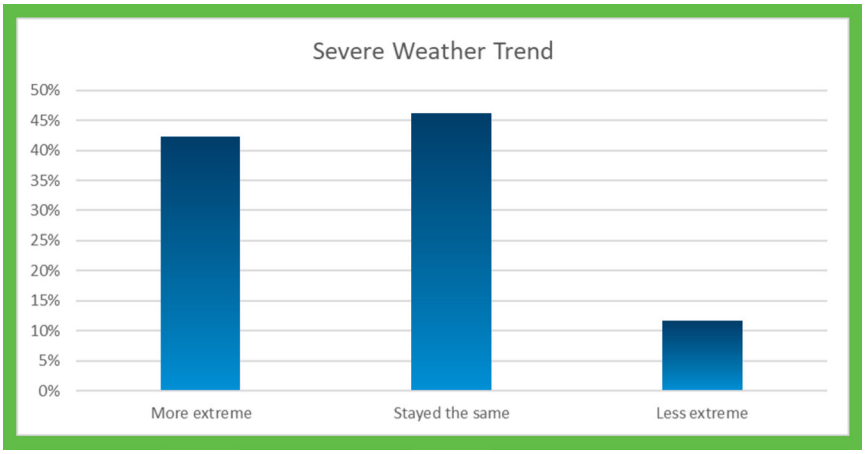
Public safety & sports discussion

Industry thoughts on severe weather

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

In the poll, 88% of respondents experienced weather has become more extreme (42%) or stayed the same (46%); only 12% experiencing less extreme weather. Even though it seems like a high percentage, it is only half compared to the offshore industry, where 83% of respondents said they experienced an increase in severe weather. Last year's active hurricane season is contributing to this — which usually has a bigger impact on the coast and offshore, less inland.

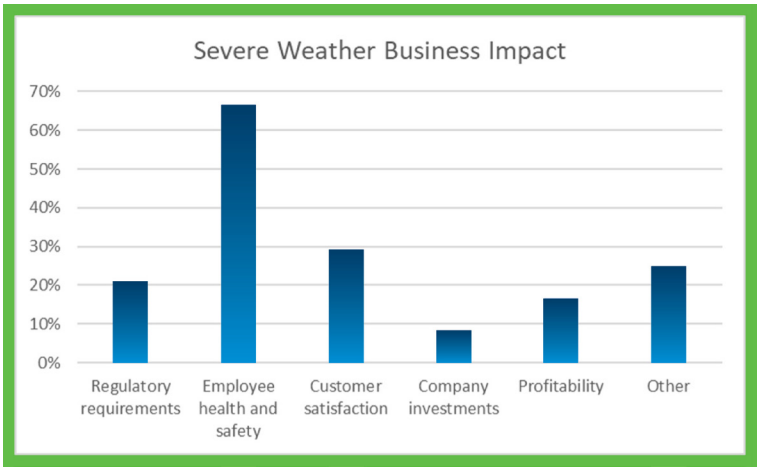
It is clear that as we move further into spring and summer, sports, events, and outdoor activities will begin resuming, and planning for the potential impacts of a more active severe weather season is essential. La Niña will, as it has before, influence the probability of extreme weather, such as tornadoes, hail, and thunderstorms. Also, extreme heat has been and will continue to be an issue.



Public safety & sports discussion

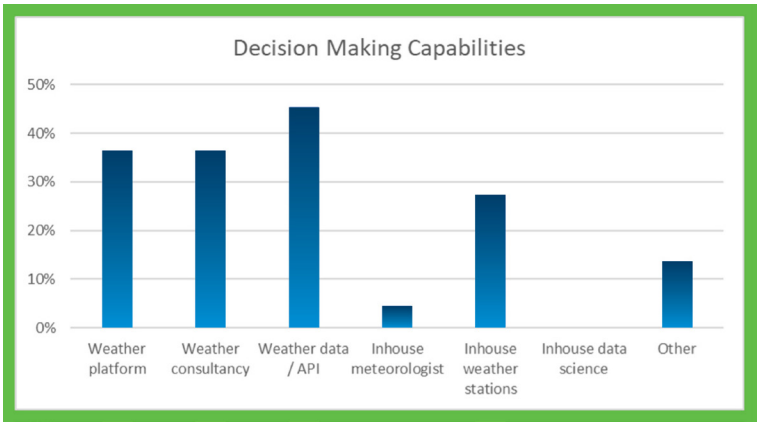
Question 2: In which areas has weather impacted your business over the past years?

Here, respondents selected all that applied from multiple answers. Like in other sectors, employee health and safety was the biggest impact (67%). This is the highest response across all sectors with offshore at 58% and others at 42%. In second place was customer satisfaction (29%), followed by regulatory requirements (21%), profitability (17%), and company investments (8%).



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

Once again, respondents selected all that applied from multiple answers. Most have external weather decision support, like weather data/API (45%), a weather platform (36%), or weather consultancy (36%). Some have in-house capabilities, like weather stations (27%) or a meteorologist (5%). None have data science capabilities; 14% have other capabilities in place.



Offshore discussion

As businesses begin their tropical storm preparedness planning, an early indication of what the season may hold can be helpful. In short, it looks like we are in for another long, active season that will start before June 1 and run well into October or November. There will also be more storms heading up the East Coast.

Full details on the hurricane season will be available soon, but each of the past six hurricane seasons has seen a storm before its official start date — and this season appears it will be early as well. With much of the Atlantic basin warmer than normal and MJO trends suggesting that the atmosphere will become more conducive for tropical development during the second half of April, a pre-season storm or two is possible this year, starting in mid-April. The atmosphere is not quite as favorable for storm development as it was 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, storm totals will likely be in the 20-storm range, solidly above average, though quite a bit lower than 2020's 30 named storms.

Offshore discussion

Strong storm surge in historic 2003 East Coast hurricane

An early and active hurricane season is expected again this year, particularly along the eastern seaboard. East Coast hurricanes can be devastating, and Hurricane Isabel in 2003 was no exception. Isabel made landfall as a Category 2 storm near Cape Hatteras, North Carolina — approximately 100 miles south of Norfolk, Virginia, where significant storm surge damage had occurred. Isabel is most remembered for the storm surges that created record high water levels — and the highest seen in nearly one hundred years.

The storm was responsible for 17 deaths and more than $500 million in damage, including the Chesapeake Bay port and the U.S. Navy's fleet and academy complex. The U.S. Navy moved 40 ships and submarines and dozens of aircraft from sites near Norfolk. The storm cost the U.S. Navy $130 million in damages, not only at the navel sites, but the academy suffered extensive flooding and wind damage throughout the campus.

Offshore discussion

Of greater importance is where those 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 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. So, a major Gulf storm is still possible this year, but there should be fewer storms overall in the Gulf than other portions of the Atlantic basin.

So how do businesses prepare for yet another busy tropical storm season? It comes down to finding a comprehensive, step-by-step staged product or service that provides information from the initial stage through to an active storm system.

Tropical storm-focused forecasts

The first solution for monitoring storms in the DTN tropical weather suite is its long-range report — an extended, two-week outlook, updated twice a week. Next is the seven-day outlook, which is updated twice a day. It provides a 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, the DTN team issues a significant tropical disturbance advisory. These are typically issued before National Hurricane Center advisories since DTN 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 an offshore or a coastal location.

These reports, often essential for Gulf offshore platform operations, may be especially helpful for East Coast ports and terminals this season in supporting planning and decision-making.

Accurate weather insights and analysis can help reduce uncertainties and risks for personnel and assets while also improving operational efficiencies.

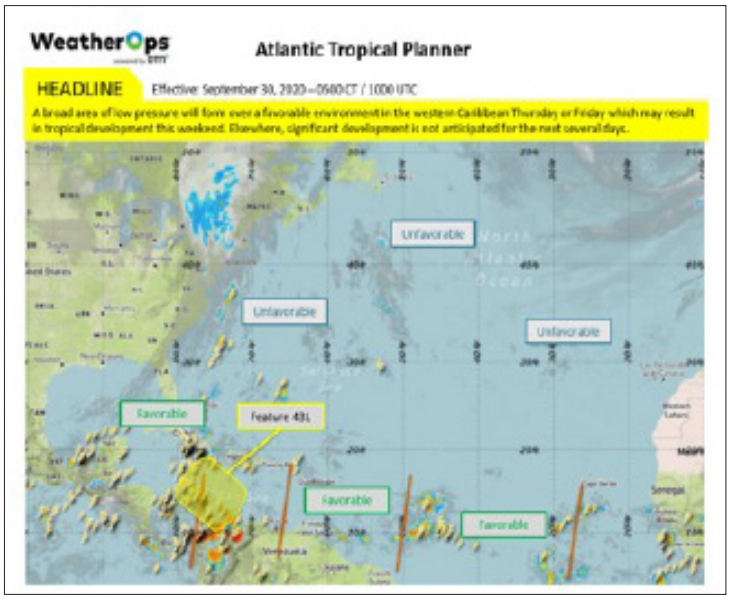
Learn more by downloading our white paper.

DTN

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.



The tropical planner.

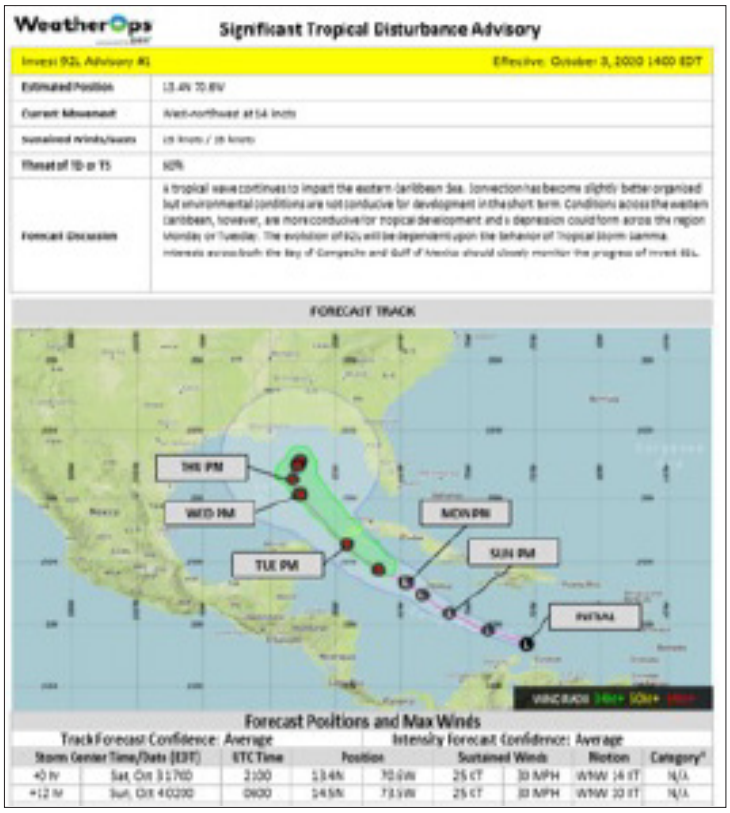
Keep in mind the October 4 classification date when reviewing these reports. On September 28, the DTN forecast team first identified activity indicating enhanced probability for storm formation in the Caribbean Sea in an extended outlook report. A few days later, the team started issuing special guidance on this potential low in its daily tropical planner. This occurred about five days before the official storm formation. Then, the team 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. The DTN forecast team issued a significant tropical disturbance advisory — 26 hours before the National Hurricane Center issued its first potential tropical cyclone advisory. This provided DTN customers with an additional day to plan for the impending storm.

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

Offshore discussion

Even more important is the commentary the forecast team provides each customer. It shares added, specific insights into what the forecast means for the business' circumstances and operational considerations, whether onshore or off. Storm impacts are broken into marine weather or onshore, with a general forecast discussion including track, intensity, and other details.

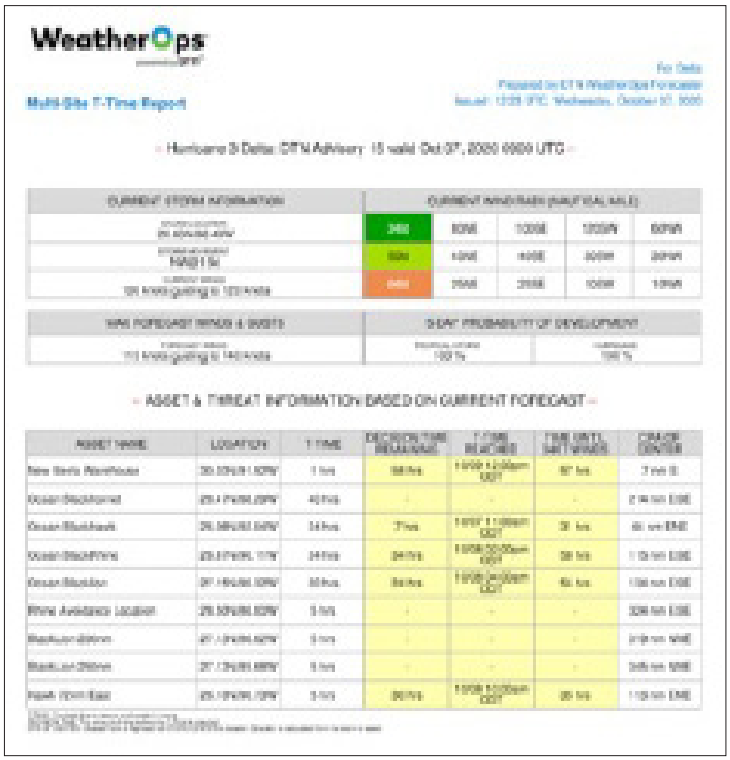


The significant tropical disturbance advisory.

Once the significant tropical disturbance advisories begin, initial tracks and site-specific decision guidance are issued. DTN has 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 can be generated. Whether an operation has 10 or 100 locations, all of the information can easily be incorporated into one report for easy reference in operational meetings.

Offshore discussion

A second report that is issued is the tropical threat report, which focuses more on wind and storm surge and is geared 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, it can be produced in a multi-site format.



A T-time report.

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

Get actionable weather insights

For more information or to request a demo of one of our offshore solutions, please visit dtn.link/hjecb4.

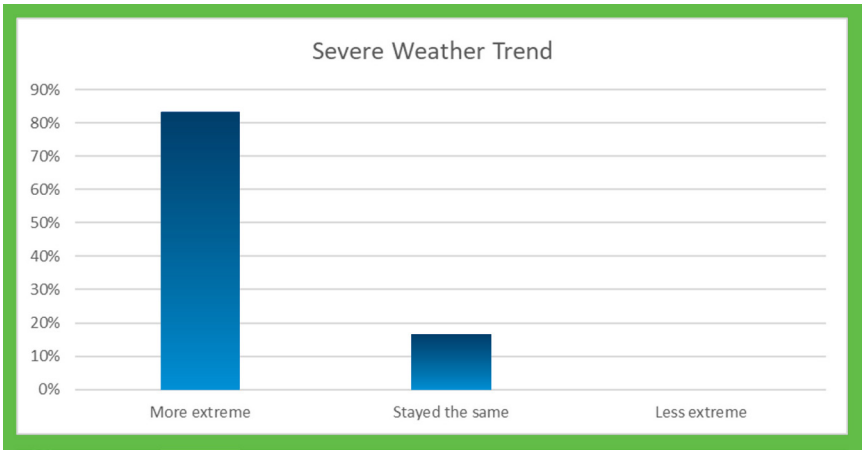
Offshore discussion

Industry thoughts on severe weather

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

Especially for offshore, the weather has become more extreme; 83% of respondents have experienced more extreme weather. This is almost double compared to safety, where only 42% experienced an increase in severe weather. Most interesting is that 0% of offshore respondents have experienced less extreme weather.

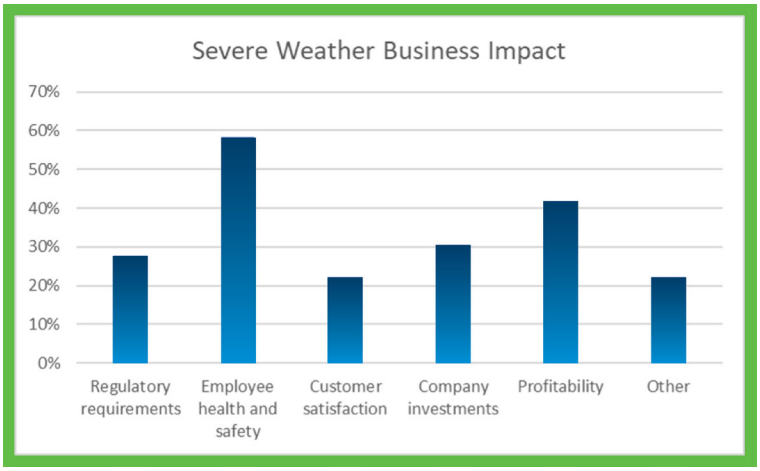
Last year's active hurricane season definitely contributed to this. In keeping with the past six years, the upcoming tropical season will likely begin before its official start date and will be active with a predicted 20 named storms. There is an increased chance that most of the storms will head up the East Coast rather than across the Gulf. While that is good news for Gulf shore platform operations, it is worrisome for East Coast ports and terminals.



Offshore discussion

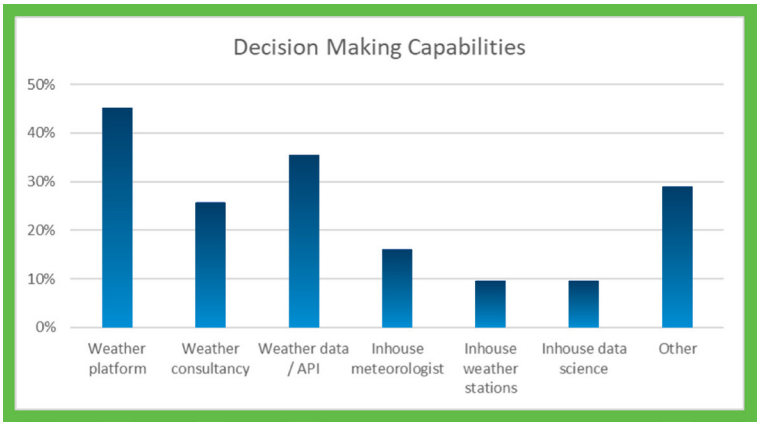
Question 2: In which areas has weather impacted your business over the past years?

Like in other sectors, the largest impact was employee health and safety, cited by 58% of offshore respondents. Profitability (42%) was the second-largest impact, followed by company investments (31%) and regulatory requirements (28%). Customer satisfaction was the least impacted with 22%; an additional 22% of respondents experienced other impacts.



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

Again, respondents selected all that applied from multiple answers. Most have external weather decision support, like a weather platform (45%), weather data/API (35%), or weather consultancy (26%). A smaller amount have in-house weather capabilities, like a meteorologist (16%), weather stations (10%), or data science (10%); 29% of respondents have other capabilities in place.



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