



Mid-winter seasonal outlook report

Understand the weather impact on your business

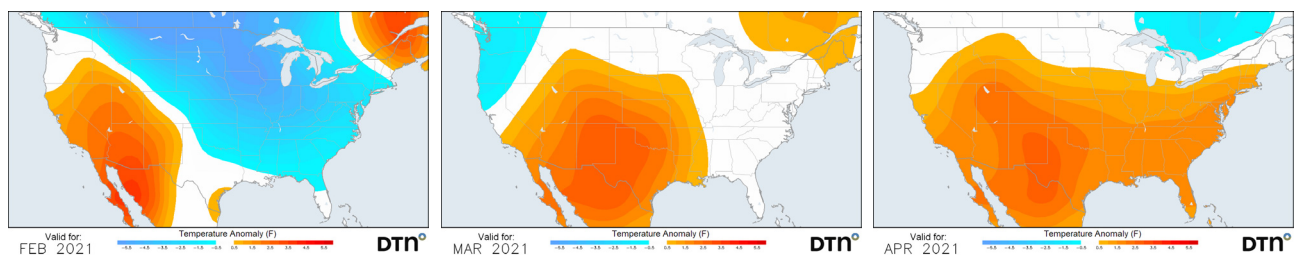
2020-2021 U.S. Mid-Winter Forecast Update

Balance of winter forecast summary

The forecast is trending cooler across the United States in February and March due to a polar vortex disturbance. This will mainly impact the northern United States. Above-normal temperatures are expected across the South.

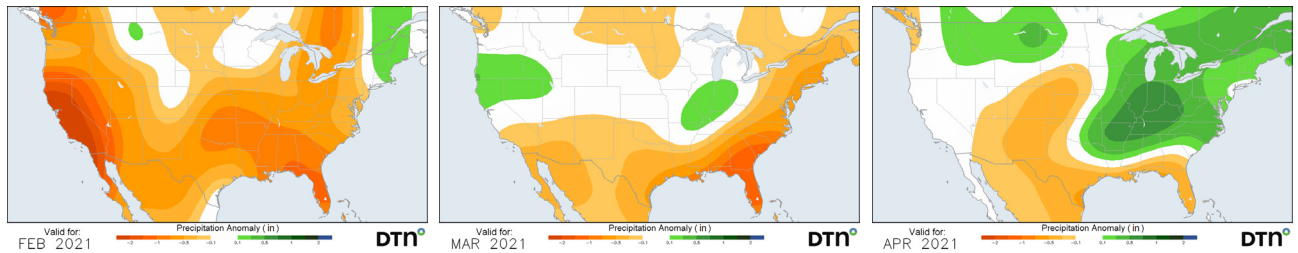
Above-normal precipitation is expected during February and March, from the Great Lakes and Ohio Valley up into the Northeast. The Northwest is expected to see wetter than normal conditions during February. The Southwest and Gulf Coast may stay drier than normal for the remainder of the winter season. Much of the northern United States could see above-normal snowfall during the balance of the winter season.

Temperature anomaly forecasts



U.S. temperature anomalies from February through April 2021.

Precipitation anomaly forecasts



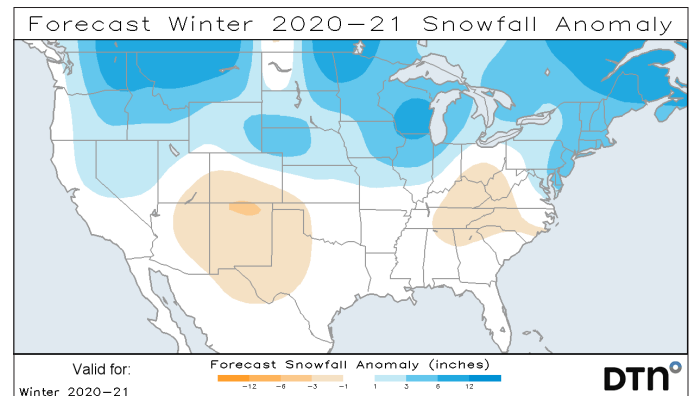
U.S. precipitation anomalies from February through April 2021.

Forecast discussion

The peak of La Niña is behind us, and it will continue to weaken later this spring into the summer, perhaps approaching neutral. However, La Niña atmospheric conditions are anticipated through the upcoming summer. The current tropical convection pattern will continue to favor the Indian Ocean to the Maritime Continent later in January and into early February. The second half of February into March may be more dominated by Indian Ocean convection with brief pushes into the Maritime Continent. This will likely produce a trough in western Canada/Northwest United States and a ridge across the Southeast.

The Stratospheric polar vortex is in the process of being stretched out and displaced across Eurasia, with a small piece extending toward eastern Canada. A closed-off upper-level ridge is in place across western Canada/Alaska. We examined past stratospheric displacement events to see if there were clues to what they might mean for North America. There are not many events, averaging roughly six per decade. If the events are separated by ones that occurred in January, the pool of events is narrowed down even further. We found two years where the polar vortex was displaced in January, similar to what is occurring this year — 2006 and 2019. These events typically take time to directly impact the weather pattern in North America, so February and March were examined. Both 2006 and 2019 showed a similar weather pattern in later February and early March. The features that stood out were the blocking ridge that occurred over Greenland, upper-level ridging across the Southeast United States, and a trough across western Canada into the

western United States. This type of pattern would support below-normal temperatures across most of the northern United States, although the Northwest through the Northern Plains would be most favored for persistent cold. Warmer than normal temperatures would be more favored across the South, with a gradient in between. This also produced a busy storm track along the gradient from the Central Plains through the Midwest and into the Northeast. Variability is possible with such a small sample size.



U.S. snowfall anomalies for winter 2020-2021

Short-term model guidance shows that the pattern will begin to change in late January. Most guidance shows below-normal temperatures invading the western and north central United States, most prevalent across the Northern Rockies and Northern Plains. All guidance shows high-latitude blocking across areas near Greenland. At the same time, above-normal temperatures are expected across the South. The Northeast should be a battle zone where some cooler air will be able to move in from the west occasionally, but it is not likely to be sustained.

The climate models are warmer than the current forecast would indicate. If the polar vortex is going to impact North America differently than the analog composite years, then warm risks will be at play across the central and eastern United States. It's important to keep in mind that extreme warmth in early January skews the January averages map.

Next, get industry-specific forecast insights by reading our forecast discussions for...

- [Aviation](#)
- [Public safety](#)
- [Transportation](#)
- [Utilities](#)

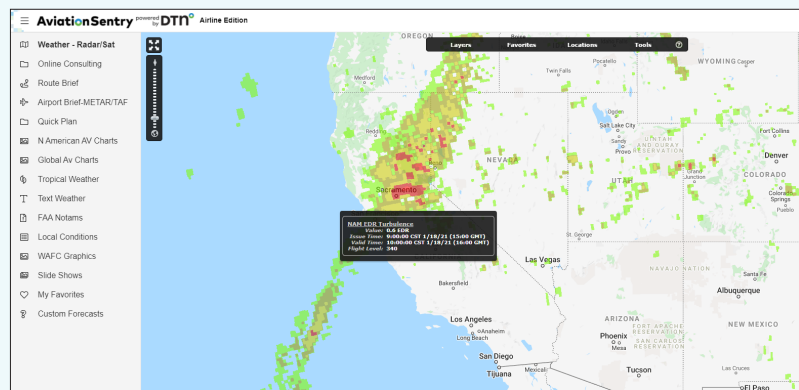
Aviation discussion

The following section translates the forecast outlook into aviation-specific weather challenges while providing proposed solutions to reduce operational risks.

Increased turbulence

With expectations for stronger than average jet stream winds over the northern half of the United States and weaker than normal winds over the far south, you can expect increased turbulence potential over the northern half of the country.

Aircraft operators concerned with optimizing routes, reducing fuel costs, and minimizing potential diversions should consider leveraging our state-of-the-art turbulence forecasts to support daily operations. The hourly-updating, high-resolution forecasts are found at 22 unique flight levels and output in the official ICAO turbulence intensity metric of eddy dissipation rate (EDR). This proprietary intelligence can be found across our entire [suite of powerful tools](#).



EDR turbulence insights on AviationSentry.



Winter storms

Our long-range forecasting team also expects a more active winter storm pattern across the northern half of the United States, resulting in increased winter precipitation threats and flight category restrictions.

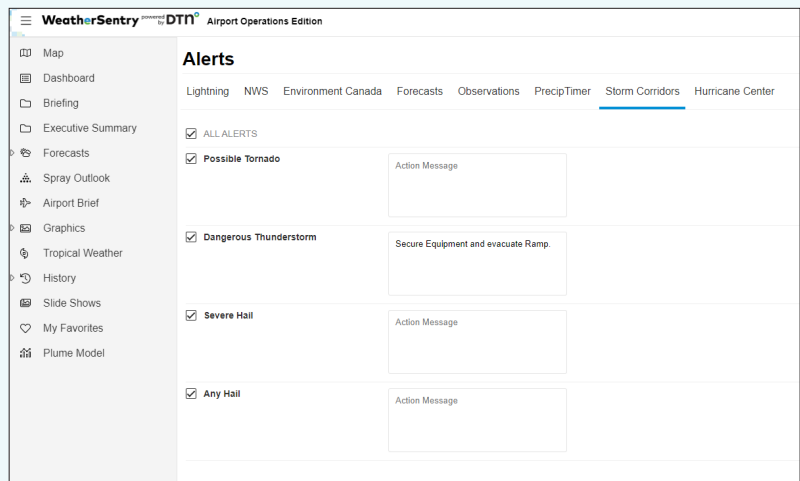
Our aviation meteorologists provide a wide range of services to help airlines and airport operators proactively plan operations, as well as foresee and minimize the profound impact of winter storms on the entire system. Have greater operational confidence by leveraging our team, 24x7, for skilled insights into visibility, ceiling height, high wind, precipitation, and other challenges. In addition, better visualize the forecast in real-time with [AviationSentry®](#), our decision support weather management solution.

Aviation discussion

Severe weather

Late in the season, our experts suggest an increased risk of severe weather throughout the mid-South. Airport ramp operations will need to revisit their standard operating procedures to ensure safety for passengers, crews, and assets. Make sure to update your protocols to include severe weather alerts from [WeatherSentry®](#).

With it, you can set custom alarms for lightning, hail, high winds, tornadoes, and other critical parameters. As conditions evolve, [WeatherSentry](#) continues to monitor the situation and automatically alerts you when your airport is in the path of an approaching storm cell.



WeatherSentry delivers customizable alerts to support safer airport ramp operations.

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.

Public safety discussion

The following section translates the forecast outlook into public safety-specific weather challenges while providing proposed solutions to reduce operational risks.

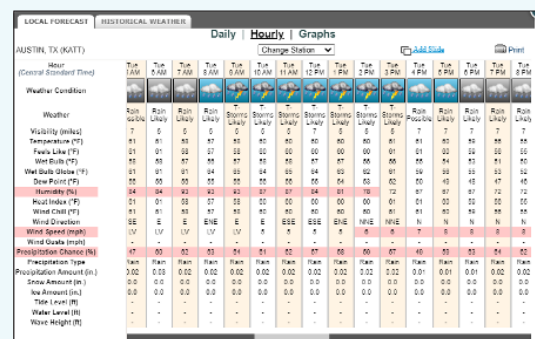
Increased snowstorms, severe weather, & lightning

There is an old saying, "If you don't like the weather, wait five minutes, and it will change." This statement applies throughout much of the United States and Canada, especially in locations that receive winter snow and severe spring thunderstorms. The long-range forecast indicates increased storms across the Northern Plains and increased lake-effect snow events. The South can also expect increased severe weather events as temperature clashes occur with this active pattern. Indications for early spring warmth — building quickly around May — and above-normal temperatures across the southern United States, combined with lingering impacts from this winter's La Niña, is expected to favor an active severe weather season. As discussed in our forecast update, spring seasons that follow La Niña winters typically see greater-than-average severe weather episodes. There is no reason to expect spring 2021 will be different.

With the more active pattern, weather awareness will be critical, regardless if the precipitation falls as rain or snow. Public safety issues will continue to grow as more activities return to normal after COVID-19 and as schools prepare to resume outdoor spring and summer sports. Whether you are a safety manager for an outdoor festival or an athletic trainer managing player and spectator safety, you face the same challenges when dealing with weather hazards. The goal is to host a safe, successful event while also limiting damage to valuable assets. There are also logistical challenges with weather hazards, such as lightning, heavy rain, high winds, heat, hail, and tornadoes. With the increased chance of severe weather this spring, any of these weather phenomena can impact outdoor events. Our vast array of decision-support solutions can help.

When lightning is near, you must quickly make critical safety decisions. Having the right information and understanding the threat is essential. Lightning and high winds are the severe weather incidents that pose the greatest threats, especially in spring and summer. Lightning strikes in the United States about 25 million times and kills an average of 20 or more people a year — and hundreds more are severely injured. In 2020, even with the drastic decrease in outdoor events due to COVID-19, there were still 17 lightning-related deaths. Having a plan in place is essential to preventing fatalities and injuries.

Detailed forecast information in our [WeatherSentry solution](#) can help you pinpoint days in advance when the greatest risk for thunderstorms will occur — keeping you ahead of potentially dangerous weather. This information also helps you manage the best times for outdoor activities, potentially adjusting start and stop times to avoid inclement weather.



WeatherSentry's detailed, hourly local weather outlook.

Public safety discussion

WeatherSentry's online consulting forum allows you to ask a meteorologist questions you may have about the forecast. They may include, but are not limited to:

- "What is your confidence level?"
- "What times are we most at risk for severe weather?"
- "How severe can we expect the potential wind gusts to be?"
- "Is there a risk of tornadoes on Saturday?"

Ask a Meteorologist/Make a Comment:
Ask a Meteorologist for guidance, 24x7. Expect a reply within 15 minutes. Please include detail on your location so we can answer your question more quickly (City, State/Province, Country).

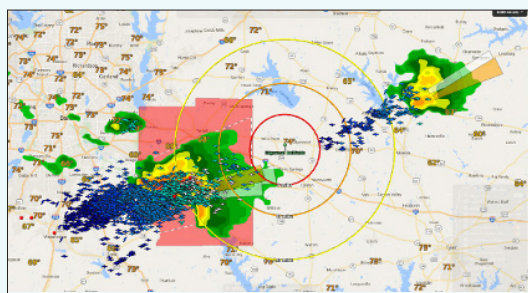
Name: Brad Nelson

Your question:
I see there are thunderstorms in the forecast for tomorrow. What is your confidence in lightning and what are the times that we will be most at risk for severe weather?

[Post question](#) ☒ Highlight this comment

Ask a meteorologist comment box.

This provides added confidence when making critical weather safety decisions for your outdoor events.



Lightning data and alerting in WeatherSentry.

We use data from the best lightning detection networks to show where lightning is occurring. Our solution also allows you to set up locations that you want to receive alerts for, sent via push notification, text, and/or email. This keeps you on top of changing conditions by showing an accurate picture of lightning risks. With it, you can set your evacuation procedures in motion well before the storm arrives and then monitor the situation so you can safely resume activities once the threat has passed.

Other weather hazards, such as heat, can impact your outdoor

events. With our forecast indicating warmer than normal temperatures for the southern two-thirds of the United States this spring — and much of the country heavily favored to see above-normal temperatures heading into the summer — heat safety will be a major focus. Aside from traditional temperature and heat index monitoring and alerting tools and forecasts, [WeatherSentry](#) also offers Wet Bulb Globe Temperatures (WBGT). In recent years, WBGT has been prioritized over the heat index as it takes temperature, relative humidity, wind, cloud cover, and sun angle into account, while also being measured in the sun. The traditional heat index is measured in the shade and only uses temperature and relative humidity.

We offer a number of different ways to monitor and be alerted to heat dangers. Besides mobile alerts for WBGT conditions that will exceed your heat safety thresholds, you can view WBGT information in our app. This will help you plan for days when heat conditions are expected to be unsafe.

We offer a wide array of tools available to help you confidently make the best safety decisions for your events.

	TEMP °F	FEELS LIKE °F	WBGT °F	DEW POINT °F
Mon Jan 18	82 61	83 61	76 64	60
Tue Jan 19	89 67	91 67	88 69	61
Wed Jan 20	88 62	90 62	85 64	64
Thu Jan 21	85 62	88 62	83 63	64
Fri Jan 22	92 61	95 61	87 62	63
Sat Jan 23	91 62	94 62	87 64	64
Sun Jan 24	89 62	92 62	87 64	64
Mon Jan 25	91 62	93 62	88 64	63
Tue Jan 26	90 61	92 61	86 63	63

Wet Bulb Globe Temperature forecasts in the WeatherSentry Mobile® app.

Get actionable weather insights

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



Transportation discussion

The following section translates the forecast outlook into transportation-specific weather challenges while providing proposed solutions to reduce operational risks.

Increased snow & potential blow ice

Snowier conditions are expected across much of the northern part of the United States, along with an increase in lake-effect snow events. This will likely mean your winter maintenance crews will be busy the next three months, ensuring safer roads and working to reduce travel times as much as possible. Chemical usage will also likely increase in these areas. As the calendar moves into late February and March, many maintenance efforts will occur near or just below 32 degrees Fahrenheit. The sun's angle is beginning to increase, as is the amount of radiation impacting the pavement. This means, even during the coldest air temperature days, pavement temperatures will absorb the sun's radiation and will soar well above the air temperatures. As pavement temperatures rise into the upper 20s, so will compacted snow on roadways. This situation will force crews to use more deicers as mechanical means, such as plowing, become less effective.

In the Northern Plains and western Canada, blow ice conditions can become more common in late February and March. While current snow accumulation is much less than the previous years, if additional snow is received over the next 30 to 45 days, this danger can increase. Open terrain along roadways with near 100% snow capacity in the ditches and surrounding areas are most prone to the phenomena. Weather conditions include blowable snow, strong winds with a wind direction blowing across the road, generally clear skies that allow pavement temperatures to warm near or above 32 degrees Fahrenheit, and air temperatures colder than the mid-20 degrees Fahrenheit. In these situations, snow begins to blow over the road and as the pavement temperature rises, it catches the snow. On the pavement, the snow melts and quickly refreezes due to the cold air. As more and more snow blows across the road, it continues to melt and quickly refreeze. This process is known as blow ice and can result in very icy conditions. This is a challenging situation because conventional wisdom advises against chemical applications in blowing snow situations. However, in most cases, blow ice stops when the sun goes down, and thus, in certain situations, applying chemicals can help break up the ice when conditions improve near sunset.



Our [suite of winter maintenance software applications](#) can help. During winter snow events, there are many weather variables you must consider when making decisions. Given the potential for increased winter events for the remainder of the season, it is important to have clear insights into factors, such as precipitation start and end times, duration, accumulation, pavement temperatures, and more.

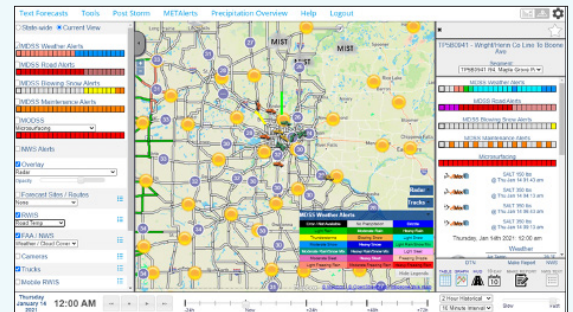
Transportation discussion

Precipitation start time is especially critical. It impacts crew scheduling, material and equipment allocation, and when considered in relationship with pavement temperatures, chemical application decisions. The following image shows a route-based forecast within our [ClearPath Weather/MDSS product](#) that shows when precipitation is expected to start on a specific roadway.

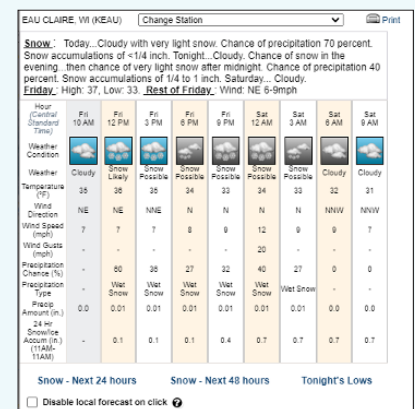
Detailed information about start time and amounts can also be captured for an individual route or forecast location.

Precipitation accumulation helps you better understand the magnitude of a storm and adjust as necessary. With [WeatherSentry's](#) 72-hour precipitation outlooks and accumulation maps, you can better visualize the spatial distribution of precipitation and its potential impact on your roads.

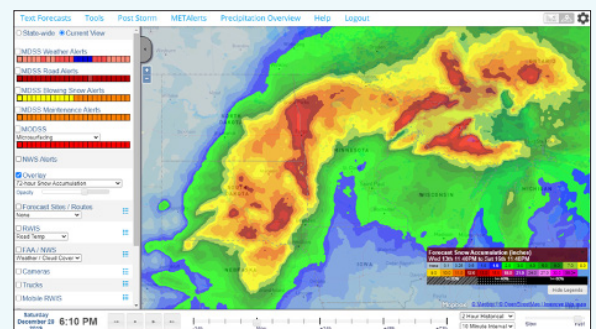
[WeatherSentry](#) also provides a fully-integrated alerting system. For many locations across the Northern Plains, this winter has been both warmer and drier than average. However, as indicated by the long-range forecast, this will change. The number of storm paths will increase, requiring you to stay on top of changing conditions. We understand that staffing your team to monitor winter weather around the clock is expensive. Our dedicated team of transportation meteorologists will monitor these situations for you. Our automated alerting system takes our highly accurate local forecasts and messages you, 24/7, when conditions will require your winter maintenance efforts.



Route-specific MDSS weather alerts and visualization.



WeatherSentry's detailed, hourly local weather outlook.



Forecast snow accumulation data.

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.



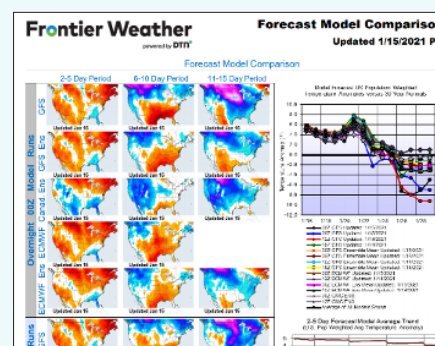
Utilities discussion

The following section translates the forecast outlook into utilities-specific weather challenges while providing proposed solutions to reduce operational risks.

Polar vortex, severe weather, & increased fire risks

There are four key concerns for utilities during the remainder of winter into early spring.

- The polar vortex will bring cold temperatures and accentuated precipitation to the Pacific Northwest and Northern Plains. Overall, heating and gas demand will remain below-normal across the rest of the country.
- Northern Arizona and southern Utah will experience continued drought with windy conditions that will raise fire risks.
- Sunny, relatively dry conditions in California, southern Texas, and Florida will support ideal solar energy generation.
- Although weakening, the La Niña is expected to support an active severe weather pattern in the Southern Plains in early spring.



Forecast model comparison.

Natural gas demand for heating is expected to be greater than in 2020 for the remainder of winter, but it will likely see a 5-10% drop compared to historic normals. Increased snow in the Pacific Northwest will set up significant melt and run-off later in the spring, providing healthy reservoir levels for hydropower. Electricity and natural gas generators, as well as electricity traders, can better monitor the evolving trends with our [Frontier Weather forecasts](#), which deliver timely insights on regional temperatures, precipitation, wind, and solar predictions that can cause major power market fluctuations.

Parameter	Region	Day 1	Day 2	Day 3
Wind Speed	Cheyenne Region	1	1	1
	Pueblo CO Region	1	1	1
	Black Hills Region	1	1	1
Wind Gust	Cheyenne Region	1	1	1
	Pueblo CO Region	1	1	1
	Black Hills Region	1	1	1
Wildfire	Cheyenne Region	1	1	1
	Pueblo CO Region	1	1	1
	Black Hills Region	1	1	1
Snow	Cheyenne Region	1	1	1
	Pueblo CO Region	1	1	1
	Black Hills Region	1	1	1
Ice	Cheyenne Region	1	1	1
	Pueblo CO Region	1	1	1
	Black Hills Region	1	1	1
Confidence Level	Cheyenne Region	High	High	High
	Pueblo CO Region	High	High	High
	Black Hills Region	High	High	High

Energy Event Index Definition	Wind Speed	Precipitation	Temp. Dev.	Snow	Ice
1	< 20 mph	< 0.50 in	Low Risk	< 5 in	< 0.10 in
2	< 25 mph	< 0.50 in	Low Risk with Dry Thunderstorms	< 5 in	< 0.10 in
3	< 30 mph	< 0.50 in	Moderate Risk	< 5 in	< 0.10 in
4	< 35 mph	< 0.50 in	High Risk	< 5 in	< 0.10 in

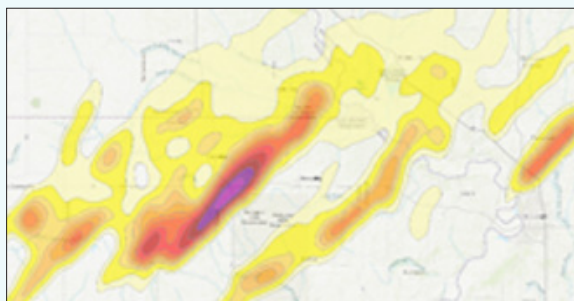
Forecast weather risk scores in the Energy Event Index.

Exceptional drought conditions persist across most of the four corners region of Arizona, New Mexico, Utah, and Colorado. The spring wind anomaly forecast indicates a high probability of windier than normal conditions, fueling dangerous wildfire risks. Colorado is still recovering after the three largest wildfires in its history, which burned more than 625,000 acres in 2020. Our new [Energy Event Index](#) wildfire risk management forecasts can provide electric utilities with actionable forecasts to establish wildfire mitigation plan procedures that minimize liability risks in fire starts. Weather risk forecasts can also deliver insights for a wide variety of hazards, including wind speed, wind gust, snow, and ice.

Utilities discussion

The leading solar regions will have above average sunshine given the northerly storm tracks this spring. Solar farm operators and off-takers in California, Texas, and Florida can benefit from our Content Services API with its accurate temperature and solar radiation data. Stakeholders across the renewable energy supply chain can use this information to validate solar generation performance, better meet expectations, and identify under performance where photovoltaic module cleaning can improve efficiency.

The ongoing La Niña, characterized by above-normal sea surface temperatures in the Pacific Ocean, will facilitate an active severe weather pattern in the Southern Plains. Previous La Niña springs in 2008 and 2011 had more than double the number of tornadoes compared to an average year. Better prepare for these expected severe weather hazards by subscribing to our [ArcGIS data services](#), which integrate Hailswath and TornadoTrax radar-derived storm paths into your enterprise software platforms to help identify at-risk assets.



An example of Hailswath data.

Get actionable weather insights

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