

DTN<sup>o</sup>

The logo for DTN (Data & Trade News) features the letters 'DTN' in a bold, black, sans-serif font. A small, stylized circle with a blue-to-green gradient is positioned to the upper right of the 'N'. The background of the slide includes a solid blue vertical bar on the left and a large graphic of overlapping circles in blue and green on the right.

# 2022-2023 U.S. Winter Outlook

November-March



WINTER  
FORECAST  
AGENCY



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# Winter Forecast Summary

We expect a cooler trend across the central and eastern United States, with increased early-season cold risks for December. It could be the coldest start to winter in the last decade — when the world is already dealing with reduced natural gas supplies.

In addition to below-normal temperatures, the central part of the country could see enhanced snowfalls; a late end to the winter season is also likely. In the Southwest, there will be warm and dry conditions with no drought relief. Near the East Coast, more seasonable temperatures and few coastal storms are expected, with the potential for above-normal temperatures in late winter.

The northern part of the nation — including the Rocky Mountain, Midwest, and Great Lakes regions — should have above-normal snowfalls and brief, intense cold spells throughout the season, driven by the La Niña. The pattern could even push brief-but-intense cold snaps down into the South.







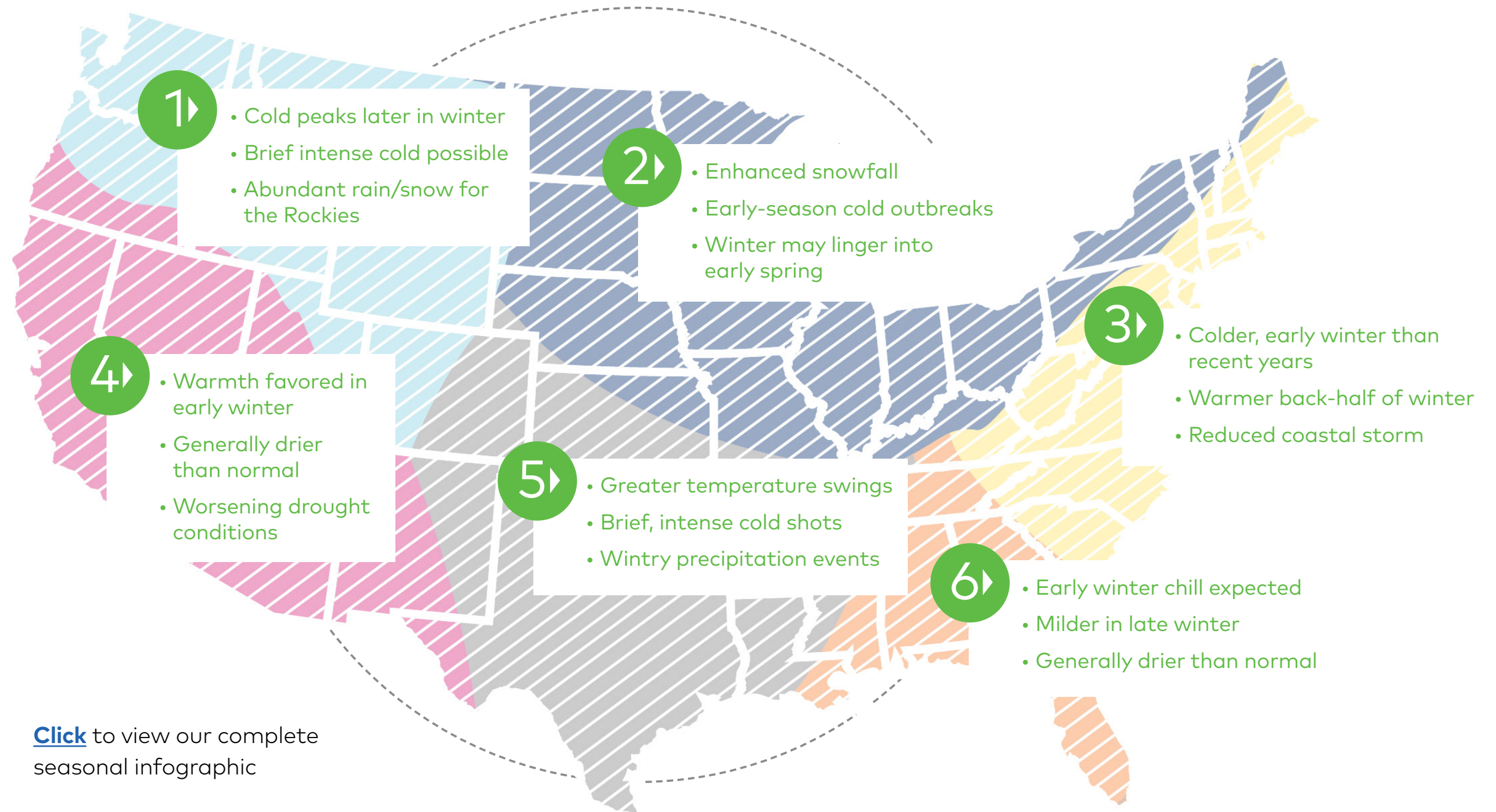
# Detailed Winter 2022-23 Forecast





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Previously, there's been a significant trend for U.S. winters to start on the warmer side. That is especially true for the southern and eastern parts of the country, where the 10-year average temperature has been 2-4 degrees Fahrenheit above normal. The last time December showed much cooler air was in 2017, mainly in the Northeast. However, this December brings an increased chance for early-season cold, particularly in the central and eastern parts of the nation, and it could be the coldest start to the season in the last decade.



[Click](#) to view our complete seasonal infographic



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As in 2021, December temperatures will make or break the season's trends. There is a low probability the month could be warmer than expected, which could set up a warmer winter overall, as with last year. Currently, across much of the country, the forecast models predict an increased chance of cold for December. Even if the month is cold, we don't expect this January to be as chilly as the last, but quite a bit is riding on what happens this December.

In general, the climate models show above-normal temperatures with a fair amount of cold looming nearby across portions of Canada, which could drop south into the United States. After a chilly start, the eastern part of the nation could see mainly above-normal temperatures and the central and northwestern regions below-normal temperatures, as seen this past February. That is a familiar trend over the last few La Niña years.

In terms of precipitation, the northern United States should see above-normal snowfall this winter. The greatest chances will be across the Northern Rockies and the Midwest through the Great Lakes. Compared to recent years, lake-effect snowfalls will also increase — if the cold comes in early December.

We expect below-normal precipitation in the Southwest, across Texas, and into the Southeast. Despite this pattern, there is a risk for wintry precipitation in the South once again. There is a reduced risk for East Coast storms, but there is always the possibility of an impactful rogue storm or two.

The La Niña has come close to peaking this fall — and it should hold its current strength, likely into December. From there, the event should steadily weaken, especially later in the winter, with an [El Niño-Southern Oscillation](#) or ENSO-neutral climate pattern returning sometime next spring, potentially making this the last in the current series of La Niña events.

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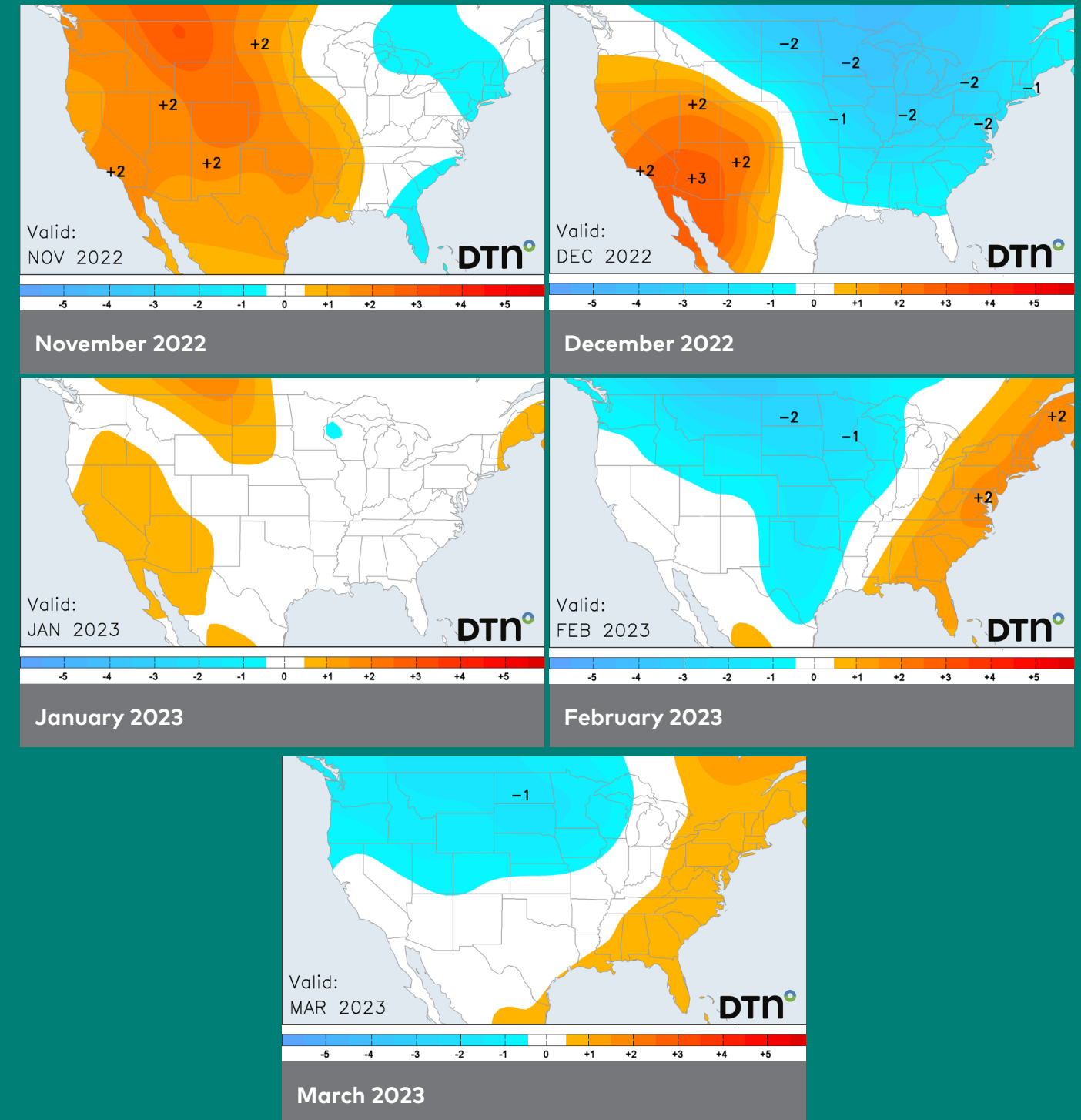
## Winter Temperatures

Let's look at this winter's expected temperatures in greater detail; overall, the cold risks marginally outweigh the warm risks. The La Niña and polar vortex behaviors will be pivotal. In the short-term, significant cold will heavily influence the rest of the winter's temperatures, much as it did in Texas during February 2021. If cold does not emerge in December, a warmer scenario will become more likely, and we could see the warmest winter in nearly 10 years.

Given that caveat, with colder-than-normal temperatures forecast for December, it gives us a high potential to see a cold weather pattern throughout the winter — likely making it our coldest since 2010. As previously mentioned, we expect cold to be most prevalent in the central and eastern parts of the country. A break in the pattern could come in January, when conditions may start to trend warmer. By February, the cold will likely return to those same regions — and linger into March, potentially delaying the start of spring. The delay largely depends on what kind of snowpack exists, which could help prolong the colder temperatures.

The East Coast looks like it will be warmer than normal in February and March, despite a cold start to the winter. The northern part of the country should be colder-than-normal through February; at the same time, it will be warmer than normal in the Southwest.

## U.S. winter temperature outlook





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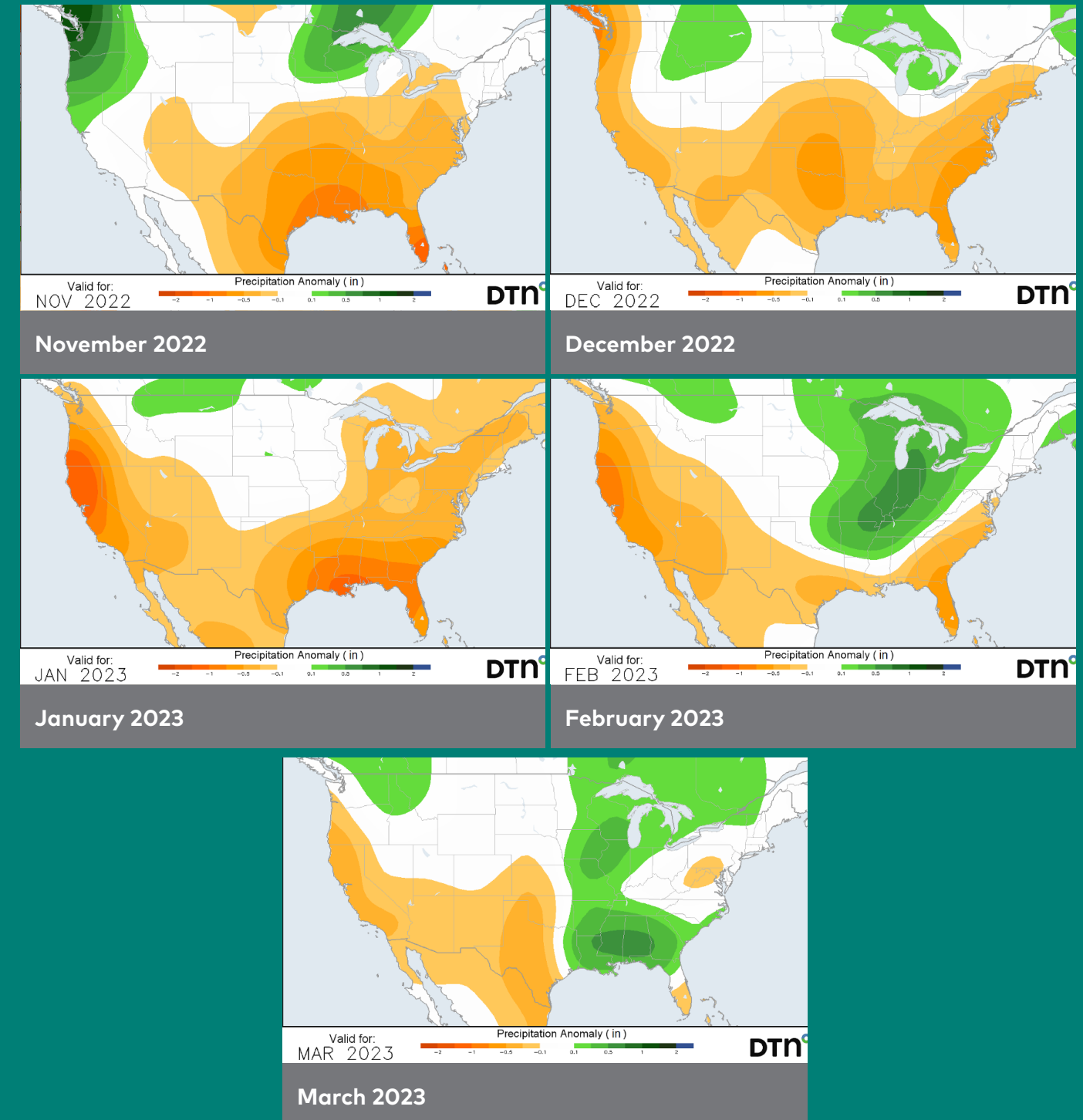
## Winter Precipitation Forecast

Much of the United States will be drier than average – particularly portions of the South and West. However, there are enhanced risks for more wintry weather than in 2021 across the northern tier. The highest potential for wetter-than-normal conditions is in the Northern Rockies to the Great Lakes. The Northwest could see wetter than normal conditions, though there will be some variability with both wetter and drier months; overall, the season should be wetter than average.

The West Coast, Gulf Coast, and Southeast can expect drier-than-average conditions. Unfortunately, this winter doesn't look to help resolve the drought faced by much of the country – particularly in these regions where it's likely to worsen throughout the season.

While the snowfall forecast is higher in the northern region, at times this winter, it could sneak south into Oklahoma, Texas, and the Tennessee Valley. Snowfall events across the south can be tricky, as it often is dominated by one sizeable event, which can sway the overall snowfall average for the entire season. While the confidence level is low, there is an enhanced risk for one or two significant snow or ice events.

### U.S. winter precipitation outlook





# Costliest Winter Hazards



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## Costliest Winter Hazards

The frequency of billion-dollar weather disasters continues to grow, and we now experience about one event every **18 days**. Last winter saw two different billion-dollar disasters at the beginning of the season in December, but neither event was snow, ice, or cold related. There was a **major tornado outbreak** in the central part of the country on December 10, quickly followed by more severe storms and a **Midwest derecho** just five days later.

### 18 days

The average amount of time currently between billion-dollar weather disasters.

One of the worst on record, the December 10, 2021, tornado outbreak killed 87 people and injured dozens more across nine states in the Midwest, Ohio Valley, and Tennessee Valley. An uncommonly large event, it was even more unusual that it occurred in December. In fact, over the last 200 years, there have only been 17 tornadoes recorded during December in Middle Tennessee.

Not even a week later, another billion-dollar December weather event occurred

in the form of a **derecho** — a rarer type of windstorm, widespread and long-lasting, that is often associated with fast-moving rain cells or thunderstorms. This event broke a 70-year-old record for the most tornadoes in Iowa, with the most EF-2 or stronger tornadoes in a single day. It also set a record high for December temperatures in Iowa, with several cities recording 75 degrees Fahrenheit.

Typically, billion-dollar winter weather events happen in the eastern half of the United States, with population density and related infrastructure being key factors. When looking specifically at the frequency of blizzards, they are most frequent in the Northern and Central Plains, as these regions typically see more frequent snow and stronger winds. Nor'easters also bring a high frequency of blizzards to Maine and Massachusetts.

Lasting, freezing rain events are also prevalent in winter but present differently in different regions. For example, the Northeast has the highest annual freezing-rain hours and some of the highest frequency of freezing-rain events. New England also has a high percentage of long-duration (more than six hours) freezing rain events, but Oklahoma has the most 18-plus-hour freezing rain events.







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## Preliminary Spring 2023 Forecast

Over the last decade, winter has lingered into spring in the north-central United States. With the current forecast's increased risks for below-normal March and especially April temperatures in the region and the Northwest, the trend is likely to persist. A warmer-than-normal May will follow for most of the country. The Southwest and Southern Plains could see warm anomalies — and the Southeast as well, though there, it will likely be balanced by an early-season chill.

Across the country, the month of March tends to trend cooler, but spring 2023 could differ as we expect the La Niña will turn ENSO-neutral. This may make for an earlier turn to warmer conditions, and if that occurs, a warm scenario can't be ruled out.

Above-normal precipitation will impact the Gulf Coast through the Great Lakes in March and the Upper Midwest in April. This could mean late-season snows across the Upper Midwest and Great Lakes regions. Below-normal rainfall will expand across the

Southwest through the south-central United States in March and April. In the East, wetter conditions are possible in May. The La Niña's fade may impact the jet stream and severe weather potential this coming spring. A fast fade could lead to reduced risks. However, severe weather risks could rise if the La Niña holds on longer than anticipated.

Across most of the Rockies and Plains, spring 2023 appears windier than average, but across California and the East Coast, there could be less wind than usual. In the Plains, this could boost wind generation totals to above-average levels. In fact, the region's southern half currently appears windier than average each month, from February through June. Solar generation will be above normal across the Southwest into the south-central part of the country in spring. Clouds will be stingy in the northern areas, but there, increased solar generation isn't expected until later in the spring.







# Forecast Implications





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## Utility Forecast Implications

Extreme cold and winter weather-related outages are some of the most difficult — and dangerous — to resolve. This winter's potential for some of the coldest December temperatures in the last 10 years could lead to above-average disruptions, making resource planning a key focus.

The significant arctic air we could experience early in the season is related to overall climate change trends, especially in the southern part of the United States, where businesses and households are often unprepared for cold, snowy, or icy conditions. To help, keep an eye on the forecast two to four weeks out, allowing you to better identify and prepare for expected brief but intense cold snaps. Advance notice allows you more time to focus on winterization efforts and educate customers on intelligent electricity or natural gas use, helping lower demand curves as much as possible.

Safety is a top concern for both homeowners and utility crews. For homeowners, finding relief from bitter cold temperatures indoors can be difficult. Whereas in the summer, people can head to pools or beaches or





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use fans, there's not a similar solution in the winter. New [research](#) has found carbon monoxide poisoning is a dangerous consequence of outages as people look for alternative options to warm homes with items like grills and propane heaters. An outage prediction solution can help you understand potential risks related to wet snow events, ice accretion, or extreme wind. An outage prediction solution based on weather intelligence can improve your understanding of potential risks, allowing you to prepare and mobilize crews in advance, minimizing and shortening outages to keep customers safer and happier.

For utility work crews, the safety issues are a bit different. Understanding the severity of the cold allows for precautions during outdoor restoration work, including providing proper outerwear and adapting work hours — when possible — to avoid the potential for frostbite. But of all the hazards

crews are likely to encounter during the colder months, wintry roads are perhaps the most dangerous. Snow and ice don't only make reaching access points more difficult; they contribute to nearly [40% of all weather-related traffic accidents](#). These accidents can have deadly consequences; according to the U.S. Bureau of Labor Statistics, in 2019, [39% of occupational fatalities were traffic related](#).

Finally, winterizing electricity generator assets is a priority. More and more utilities are committing considerable time and effort to this, particularly after [Texas's February 2021 cold event](#). Winterizing assets, like exposed pipes transporting water and steam at power generation plants with heat tracing and insulation — before extreme cold hits — is critical to keeping the power on. Enhancing your awareness of potential risks early in the season allows for better mitigation and preparation decisions, ensuring safety and business continuity.

Our WeatherSentry® solution includes several tools that tailor weather risk information to specific events to improve your preparation and response, including the new Storm Risk Analytics. It uses machine learning to provide a set of quantitative predictions that support a better-prepared response to potential outages. The system uses regionally trained outage prediction models that include historic electric customers-out data, updated every six hours.

With it, you can track multiple events up to seven days out. It also includes hourly electric customers-out forecasts, maps, tables, and trends. Together, these insights provide clear guidance on the incident command escalation level needed for individual operations centers and aids decision-making ahead of an event for crew and materials reallocation or sourcing strategies.

Explore our [storm risk solutions](#) today to see how we can support your unique operations.





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## Coldest December in Texas: 1989

While the cold snap of February 2021 is top-of-mind for many in terms of damage, Texas has also seen devastating cold in previous Decembers, most notably in 1989. That year, frigid arctic air infiltrated many portions of the United States, including Texas, beginning around mid-month, and lasting until Christmas. This outbreak was historic, with many Texas cities

seeing record lows and sub-freezing temperatures. It caused considerable damage to citrus crops, and Dallas experienced more than \$25 million in damage from frozen water pipes, resulting in significant business losses from the plumbing failures. Houston also recorded its coldest December on record back to the 1880s, with six of the record-low temperatures still standing

today. Between crop losses and other damages, the losses were at nearly \$500 million in southeast and coastal Texas. The winter freeze greatly strained the ability of the state's electric utilities to provide reliable power to customers. While demand increased, weather-related equipment malfunctions caused generating units to trip offline.





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## Airport Forecast Implications

As with utilities, resource planning is vital for airport operations in extreme cold. With the airline industry expecting a strong holiday season to surpass 2019 levels, you must prepare. Canceled flights, extreme weather, and pilot shortages filled the summer, but the cold weather will bring more challenges, particularly around resource allocation. While your preparations are likely already in motion, managing budgets and access to deicing solutions and winter equipment will be a priority. Securing extra crews and on-call contractors for snow clearing and deicing efforts will be critical in December.

Your airport's location has a significant impact on winter planning activities. If your winters are typically cold and dry, like in the southern half of the country, your primary concern is probably not snow removal. However, given this season's forecast, you should consider your enhanced frost, deicing, and cold exposure risks. If you're in the northern half of the United States, prepare for this season's more variable snow events. For all operations, proper, timely assessments of approaching weather events will allow your team to take appropriate action to support ramp and airport safety and efficiencies.

Because we expect significant cold weather for the end of the year, airports nationwide need to stay aware of potential extreme temperatures. A crucial component to protecting people and assets is having a plan ready and knowing when to put it in motion. Keep a close eye on the forecast to help minimize your potential safety and resource allocation risk in December and beyond.

See how we can help you protect passengers and equipment and ensure smoother ramp operations.





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## A Case Study in Winter Operations

Gerald R. Ford International Airport in Grand Rapids, Michigan, deals with particularly extreme winter weather. With Lake Michigan just 50 miles away, the airport often experiences a wide range of extreme conditions, including lake-effect snow, cold temperatures, and ice. Proper resource planning and allocation help the airport's operations team effectively mitigate potential risks.

Starting in late fall, the team monitors Lake Michigan's water temperatures through the winter months, as the temperature impacts each snow and ice storm differently. The crew includes nearly 30 full-time and seasonal team members who also monitor current forecasts and review the previous season's snow events to identify opportunities for improvement

— including investments in new equipment, adjusting staffing levels, and offering further staff training. By monitoring past events and modifying practices for future events, the airport's operations team has reduced the time spent clearing a runway by more than 30% through new equipment and staff training.





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## Transportation Forecast Implications

For transportation, weather impacts and mitigation change more drastically in winter than in most industries, and the current forecast has several transportation-specific implications. Safety is top of mind for crews clearing roads or those traveling the roadways to deliver goods; for both groups, accurate weather forecasts and real-time insights are critical to ensuring safe, efficient operations.

Keeping roads safe during early-season cold events is a challenge for transportation agencies — and is even more challenging when juggling resource management, such as salt supplies or staffing. Across the country, staffing shortages are plaguing many transportation departments, and from Maine to Missouri, driver staff is down 30%. The expected early cold creates added pressure to fill open driver positions fast. Salt supplies are vital, as most agencies typically order their supplies well before the season, so it's critical to best manage and allocate that valuable resource by monitoring weather forecasts.

Icy road conditions can happen quickly, impacting specific stretches of roads but not others — especially in the early-season cold. Monitoring subsoil temperatures across roadways with accurate weather insights can help you best prepare for icy conditions. Often in December, subsurface temperatures will keep pavement temperatures warm. With an early-season snow event, the air and surface temperatures may be cold, but a warming effect from subsurface pavement temperatures can lead to icy pavement. Using hyperlocal weather forecasts to drive decision-making gives you more time to prepare your team and resources.

Our trusted solutions support more effective processes with best-in-class weather forecasts and expert recommendations. Specifically, our WeatherSentry solution can help your team create a plan ahead of approaching cold, snow, or ice. These accurate insights can help with resource allocation, route management, and other operational decisions, improving overall safety and mobility.

Take a closer look at our solutions with a personalized trial. [Request one today.](#)





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## Minnesota's December Weather Whiplash

In terms of weather events, in December 2021, Minnesota had it all. Parts of the state experienced upwards of 20 inches of snow mid-month. Then, just five days later, severe storms hit, followed by icy roads a few hours later. This weather whiplash was especially challenging for transportation crews.

Soon after the mid-December snowstorm, warm temperatures melted the snowpack, leading to widespread, dense fog. Strong gradient winds and gusts exceeding 50 miles per hour developed, and the state experienced its first-ever December tornado. After the burst of warm air and severe weather, temperatures quickly dropped below

freezing across the state, changing rain to a wintry mix of freezing drizzle and snow. Snow accumulations of 1-4 inches and strong wind gusts led to low visibility and travel hazards. Over 1,100 automobile crashes resulted, killing one person and injuring 27 more. Such events highlight the importance of resource planning.







## About DTN

At DTN, our mission is to empower you with intelligent and actionable weather insights that make sense of the data to help you and your business prosper. We are your trusted partner, an independent source of information that helps you feed, fuel, and protect the world.

Our customers' complex supply chains challenge even the best leaders. Our deep expertise in operations empowers our customers to make smart decisions for their bottom line, customers, and employees. We are committed to bringing you the most advanced analytics and machine learning solutions to make your tough decisions easier.

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