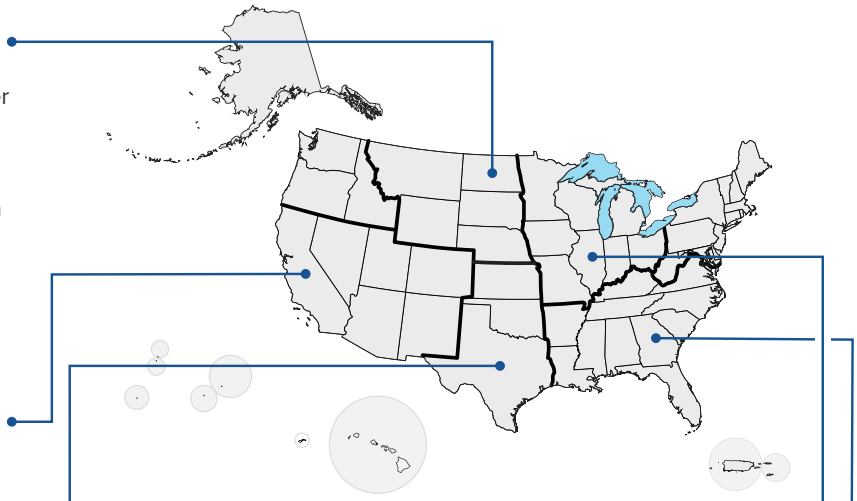
OASH | Office of Climate Change and Health Equity

Climate and Health Outlook

ISSUED APRIL 2023

The Climate and Health Outlook is an effort to inform health professionals and the public on how our health may be affected in the coming month(s) by climate events and to provide resources for proactive action. An associated webpage includes additional resources and information.



Northern Great Plains: Moderate spring flooding potential is expected to be above normal for the Red River of the North in North Dakota and the James River in South Dakota. Minor flooding is also possible in parts of Nebraska and Wyoming. Drought is favored to persist in portions of western and eastern Montana, in western North Dakota, in a small portion of northern South Dakota, and in southern Nebraska. Drought improvement and removal is favored in northern Nebraska and parts of South Dakota, Wyoming, and a small portion of southwestern Montana. Drought removal is favored in parts of North Dakota.

Southwest: Minor to moderate spring flooding potential is expected to be above normal in California across the Sierra Nevada foothills and the upper San Joaquin Valley. Minor to moderate flooding is forecast or occurring in portions of central Arizona, far eastern Nevada, and in western Nevada along eastern slopes of the Sierra Nevada. Minor flooding is also possible in much of the rest of California and Nevada as well as in northeast Utah and western Colorado. Drought is favored to persist in parts of southern California, Nevada, and Utah; in small portions of western Arizona and New Mexico; and in eastern New Mexico and Colorado. Drought improvement and removal is favored in much of Utah and in parts of northeastern Colorado, and drought removal is favored in portions of Nevada and northern California. Above normal wildland fire* potential is forecast for much of New Mexico and southeastern Arizona. Below normal wildland fire potential is forecast for much of northern Arizona and northwestern New Mexico.

Southern Great Plains: Counties in Texas (11) are projected to have 1 or more heat exceedance days** in April. Minor spring flooding potential is expected to be above normal in parts of eastern Kansas, Oklahoma, and Texas. Drought is favored to persist in much of Texas, Kansas, and Oklahoma. Drought improvement and removal is favored for eastern Texas. Above normal wildland fire potential is forecast for portions of western Texas.

Midwest: Moderate to major spring flooding potential is expected to be above normal along the mainstem of the Mississippi River from the Twin Cities, Minnesota to Keokuk, Iowa. Minor to moderate flooding is also possible along portions of the Mississippi River mainstem from Keokuk, Iowa to St. Louis, Missouri, and the Red River of the North, Souris, and Illinois River basins. Minor flooding is possible across much of the region, including in Iowa, Illinois, Indiana, Minnesota, Missouri, Ohio, and Wisconsin. Drought is favored to persist in small portions of western Missouri and Iowa. Drought removal is favored in parts of southwestern and northwestern Minnesota and a small portion of eastern Michigan. Drought removal and improvement is favored for northwestern Iowa.

Southeast: Minor spring flooding potential is expected to be above normal in Alabama, Arkansas, Kentucky, Mississippi, Tennessee and much of Georgia and Louisiana. Minor flooding is also possible in Northern Florida and parts of North Carolina, South Carolina, and Virginia. Drought is favored to develop in northern and eastern Virginia and North Carolina. Drought is favored to persist in much of Florida and in small portions of southern Louisiana, southeastern and southwestern Georgia, and eastern North Carolina and Virginia. Above normal wildland fire potential is forecast for much of Florida, the North Carolina coast, and much of Virginia.

Drought Wildfire Flooding Heat

*Smoke from wildfires can impact health hundreds of miles from site of the fire.

**A "heat exceedance day" is when the daily maximum temperature is above the 95th percentile value of the historical temperature distribution in that county.

Developed with data from the Centers for Disease Control and Prevention, the National Oceanic and Atmospheric Administration, and the National Interagency Fire Center.

We want to hear from you! Please send your feedback on ways to improve the Climate and Health Outlook to ocche@hhs.gov.

Spring Flooding

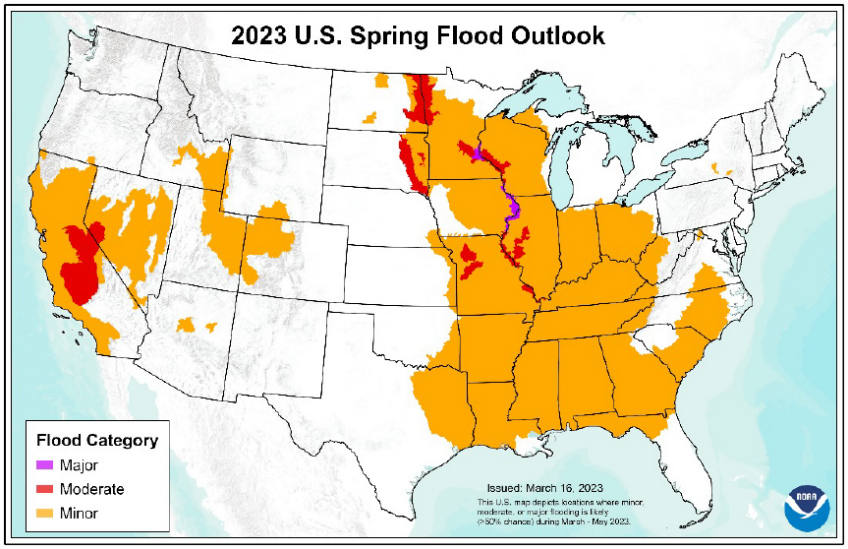


Figure. This map was developed by the National Weather Service - Office of Water Prediction and is reflective of forecast conditions on March 16, 2023. The map focuses on spring flood potential, using evaluation methods analyzed on the timescale of weeks to months, not days or hours. Heavy rainfall at any time can lead to flooding, even in areas where overall risk is considered low. For detailed hydrologic conditions and forecasts, go to water.weather.gov.

This spring season, approximately 146 million people are at risk for flooding in their communities, with nearly 6.4 million at risk for moderate flooding and 1.4 million at risk for major flooding.

An active winter with above normal snowpack has led to the potential for major flooding along portions of the Upper Mississippi River. Moderate flooding is expected along the Red River of the North in North Dakota and the James River in South Dakota. Recent heavy rains in the west, combined with near record snowpacks, have led to recent widespread flooding throughout California, including ongoing minor to moderate river flooding. Above normal snowpacks in the Sierra Nevada, Great Basin, and portions of the Central Rockies will lead to the continued potential for minor to moderate flooding for those areas.

In Alaska, spring ice breakup and snowmelt flood potential is forecasted to be normal for the majority of the state with some exceptions. The flood potential is expected to be above normal for the Upper Yukon, Upper Tanana, and portions of the Copper River basins.

Who is at high risk from spring flooding in the counties with elevated potential for moderate to major flooding?

As indicated in the map to the left, **142** counties across **11** states are projected to have above-normal moderate to major flooding risk this spring. Of these counties:

42 (30%) have a high number* of people aged 65 or over, living alone.

5 (4%) have a high number of people without health insurance.

18 (13%) have a high number of uninsured children.

11 (8%) have a high number of adults with coronary heart disease.

37 (26%) have a high number of people living in rural areas.

12 (8%) have a high number of Black or African American people.

12 (8%) have a high number of people with frequent mental distress.

13 (9%) have a high number of people living in poverty.

44 (31%) have a high number of people spending a large proportion of their income on home energy.

20 (14%) have a high number of people with severe housing cost burden.

24 (17%) have a high number of people with electricity-dependent medical equipment and enrolled in the HHS emPOWER program.

11 (8%) have a high number of people with one or more disabilities.

13 (9%) are identified as highly vulnerable by CDC's Social Vulnerability Index.

*"A high number" indicates that these counties are in the top quartile for this indicator compared to other counties.

Climate Change and Spring Flooding

Climate change can impact the size and frequency of river and stream flooding events. Large floods have become more frequent across the Northeast, Pacific Northwest, and northern Great Plains. Flood frequency has decreased in some other parts of the country, especially the Southwest and the Rockies. Warmer temperatures can cause more water to evaporate from the land and oceans, changing the amount and frequency of heavy precipitation (for example, rain and snow). In addition to precipitation, changes in river and stream size, the timing of snowmelt, and the amount of snowpack that accumulates in the winter can also affect flood patterns.

Floods Affect Health in Many Ways

Floods increase the risk for a diverse range of health outcomes. For example:

- Floodwaters pose **drowning risks** for everyone, including those driving in floodwaters.
- Objects in floodwaters can cause injuries such as **broken bones**, **cuts**, and **electrocution**.
- Exposure to floodwater contaminated with chemicals, sewage, animal waste, and other pathogens can cause **burns**, **rashes**, **skin and eye infections**, and **gastrointestinal and respiratory illnesses**.
- Post-flooding mold can present risks for people with **asthma** and **allergies**.
- Power failure during floods can **harm patients** who critically depend on electricity-dependent medical equipment, both at home and at health care facilities.
- Using generators and indoor heaters improperly can cause carbon monoxide (CO) exposure, which can lead to **loss of consciousness** and **death**. More than 400 people die each year from accidental CO poisoning.

Resources to Stay Safe During and After Floods

The Centers for Disease Control and Prevention's (CDC's) Floods site provides resources to help individuals prepare for floods, protect themselves from floodwaters, and safely return home after a flood. The CDC's Protect Yourself From Chemicals Released During a Natural Disaster site provides information on protecting yourself and your home from chemicals and other contaminants during disasters such as floods and how to properly dispose of waste after disasters.

The Ready.gov Floods site includes information on preparing for a flood and staying safe during and after a flood. The Ready Business site also includes an inland flooding toolkit for business preparedness.

The U.S. Food and Drug Administration's Floods: Key Tips for Consumers About Food and Water Safety site provides information on how to prepare for floods and how to keep water and food safe after flooding occurs. The U.S. Department of Agriculture's Disaster Supplemental Nutrition Assistance Program (D-SNAP) provides food assistance to low-income households with food loss or damage caused by a natural disaster.

The CDC has information about What You Need to Know When the Power Goes Out Unexpectedly. To prevent CO poisoning, use generators, pressure washers, grills, and similar items outdoors only. Generators should be used at least 20 feet away from your home.

Image source: https://www.cdc.gov/co/pdfs/Flyer_Danger.pdf - PDF

If you do not have health insurance and are in a federally-identified disaster, the Emergency Prescription Assistance Program can help you get the prescription drugs, vaccinations, medical supplies, and equipment you need.

Mental Health

It is normal for floods and other extreme weather events to cause people to experience emotional distress. Feelings such as overwhelming anxiety, constant worrying, trouble sleeping, and other depression-like symptoms are common responses to flooding events. The Substance Abuse and Mental Health Services Administration Helpline and Text Service is available 24/7, free, and staffed by trained crisis counselors. Call or text 1-800-985-5990 to get help and support for any distress that you or someone you care about may be feeling related to any disaster.

Learn more about floods and mental health at SAMHSA's Floods site. SAMHSA also has other disaster behavioral health resources, including newsletters and tip sheets. The Office of the Assistant Secretary for Preparedness and Response Technical Resources, Assistance Center, and Information Exchange's (ASPR TRACIE's) Disaster Behavioral Health Resources includes information about services for at-risk populations following a disaster.

Check out SAMHSA's Climate Change and Health Equity site for more information on the behavioral health impacts of climate change, preparing for a disaster, and resources for disaster planning and climate change education.

Where are extremely hot days expected in April?

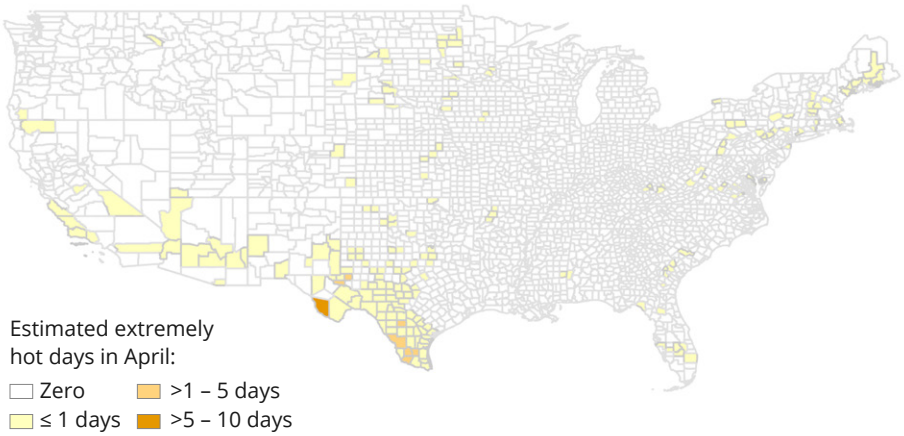


Figure: This map shows the expected number of extremely hot days in April in each county in the contiguous United States. The forecast is based on the NOAA Climate Prediction Center's probabilistic outlook of temperatures being above, below, or near normal in June. A county's 'normal' temperature is based on the 30-year average from 1991–2020. An 'extremely hot day' is when the daily maximum temperature is above the 95th percentile value of the historical temperature distribution in that county. For more information on your county, please refer to the Centers for Disease Control and Prevention (CDC) Heat and Health Tracker.

In April, **11 counties** in **Texas** are expected to have one or more extremely hot days. Extreme summer heat is increasing in the United States. Climate projections indicate that extreme heat events will be more frequent and intense in coming decades. In the U.S., an average of 702 heat-related deaths occur each year.

Heat Affects Health in Many Ways

Warmer temperatures increase the risk for a diverse range of health risks. For example:

- An increased risk of **hospitalization for heart disease**.
- **Heat exhaustion**, which can lead to **heat stroke** if not treated, can cause critical illness, brain injury, and even death.
- Worsening **asthma** and **chronic obstructive pulmonary disease (COPD)** as heat increases the production of ground-level ozone.
- Dehydration, which can lead to **kidney injury** and blood pressure problems. Some kidney damage can become irreversible with repeated or untreated injury.
- **Violence**, **crime**, and **suicide** may increase with temperature, adding to the rates of depression and anxiety already associated with climate change.

The Danger of Early Season Heat Waves

Although early season extreme heat events are less common than those that occur later in the summer, they may be more deadly. As the summer progresses, our bodies get used to the higher temperatures and become more efficient at cooling, by increasing sweating rates, for example. When temperatures are very high early in the season, before our bodies have a chance to adjust, the risks of heat stress and heat stroke may be higher.

One study of heat waves in 43 U.S. cities found that the first heat wave in a community generally had greater impacts on mortality than heat waves that were not the first in the season. Heat-related mortality risk early in the heat season is even greater for those who are more vulnerable to the impacts of heat, such as young children, older adults, pregnant people, or those with chronic medical conditions that make them more susceptible to heat-related illness.

Because of the ways climate change increases temperature and temperature variability, these early season extreme heat events may become more common. This underscores the importance of taking precautions to protect yourself and those around you whenever temperatures are high and particularly during extreme heat events in the early heat season.

Some medications increase the risk of heat-related illness. These include diuretic medicines (sometimes called "water pills"), antihistamine medicines (including many allergy medicines), and many antipsychotic medicines used to treat a variety of psychiatric and neurologic illnesses. Check out SAMHSA's Tips for People Who Take Medication: Coping with Hot Weather for more information.

How hot will it be, and where, over the next 3 months?

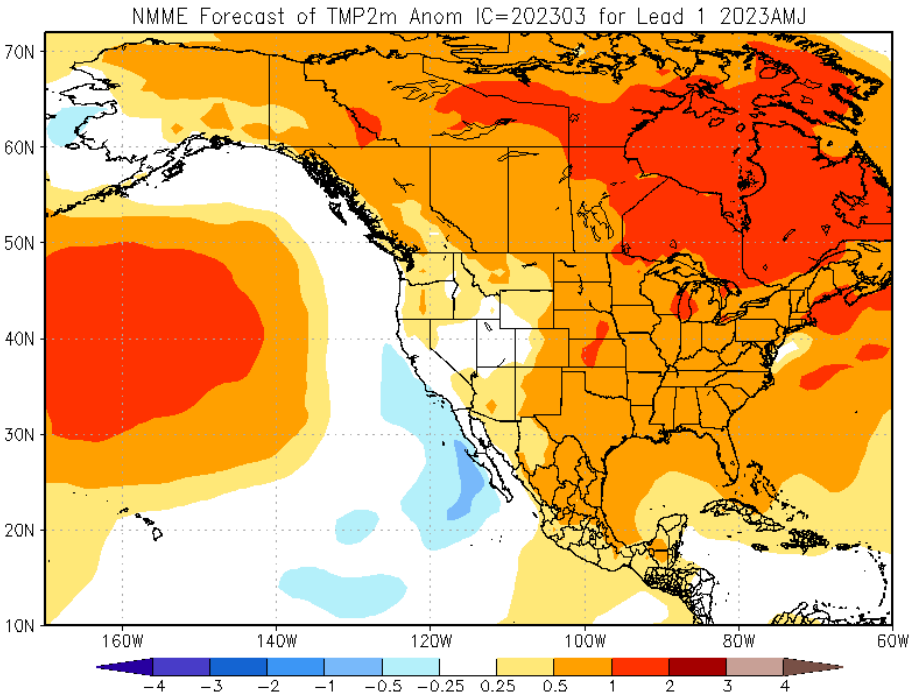


Figure: The North American Multi-Model Ensemble (NMME) predicts that average temperature over the next 3 months (April–June) will be 0.9–1.8°F (0.5–1°C) hotter than average across much of the contiguous United States. For more information about this model or prediction, please refer to the NMME website.

For April–June, the North American Multi-Model Ensemble (NMME) predicts that the average temperature will be 0.9–1.8°F (0.5 to 1°C) above normal for most of the continental United States. However, portions of the Midwest, Northeast, and the Great Plains regions may experience a higher 90-day average that is 1.8–3.6°F (1 to 2°C) above the normal average temperature for this period. The NMME integrates multiple forecasts of the next 90 days to build the best estimate of temperatures and precipitation over that time frame. Note that although many regions may expect a warmer 90-day average temperature, this is not the same as your local weather forecast, in which large fluctuations in temperature may be predicted from day to day.

Resources for People at High Risk of Heat-Related Health Problems

Certain populations with limited resources may have restricted access to information on heat-related illness prevention, cool indoor environments, and government programs that provide critical support. Find more resources on heat-related illness prevention from Heat.gov and CDC websites.

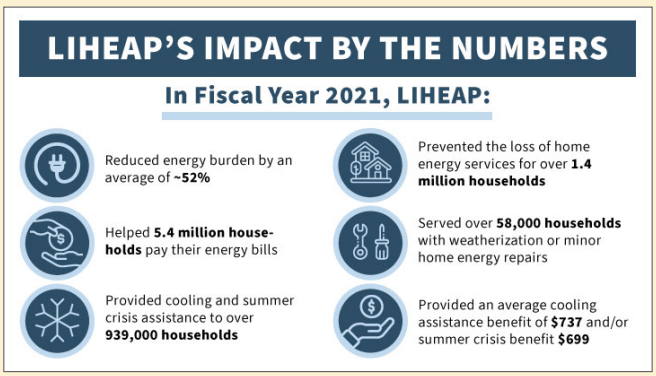
Worker Health

Occupations that require strenuous work outdoors pose a high risk for heat-related illness. These include construction workers, farmers, agricultural workers, delivery workers, athletes, landscapers, and others. Learn more about the dangers of working in heat. Employer responsibilities and resources for safety are also available through the Occupational Safety and Health Administration (OSHA) Heat Illness Prevention campaign.

The Heat Safety Tool provides real-time heat index and hourly forecasts, specific to your location, as well as occupational safety and health recommendations from OSHA and the National Institute for Occupational Safety and Health (NIOSH).

The National Institute of Environmental Health Sciences (NIEHS) Worker Training Program has heat safety and health training for at-risk workers.

The Health Resource Services Administration (HRSA) funds National Training and Technical Assistance Partners—Farmworker Justice and Migrant Clinicians Network that helps clinicians prevent and treat heat-related illness among agricultural workers.



Staying Safe Indoors

The Low Income Home Energy Assistance Program (LIHEAP) and the Weatherization Assistance Program (WAP) help keep families safe and healthy through initiatives that assist families with energy costs. To inquire about LIHEAP assistance, call the National Energy Assistance Referral (NEAR) hotline at 1-866-674-6327.

Spring Pollen Season

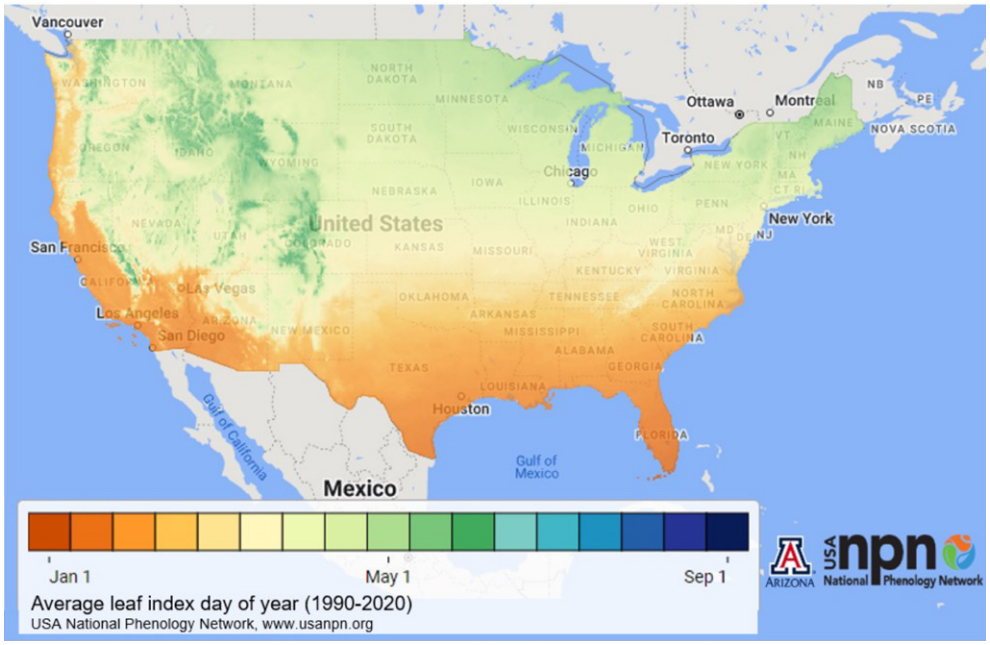


Figure: This map from the USA National Phenology Network (USA-NPN) shows when springtime activity in plants typically began over the last 30 years. The start of spring occurs on the date when enough heat has accumulated to initiate growth (leafing and flowering) in temperature-sensitive plants. On average, the start of spring has occurred earlier in the contiguous United States since 1984. The United States Global Change Research Program uses data from the USA-NPN as an indicator for the start of the spring season.

Climate change may lead to both higher pollen concentrations and earlier and longer pollen seasons, potentially causing more people with asthma and allergies to suffer adverse health effects. One study found that nationwide, total pollen amounts increased up to 21% between 1990 and 2018, with the greatest increases recorded in Texas and the Midwest.

The American Academy of Allergy, Asthma & Immunology National Allergy Bureau certifies pollen monitoring stations and has a network that spans different parts of the country. However, those stations are sparsely distributed (especially in rural areas) and pollen monitoring is not always done consistently throughout the year, so there may or may not be active monitoring near you.

Start of Spring Across the United States as of April 3, 2023

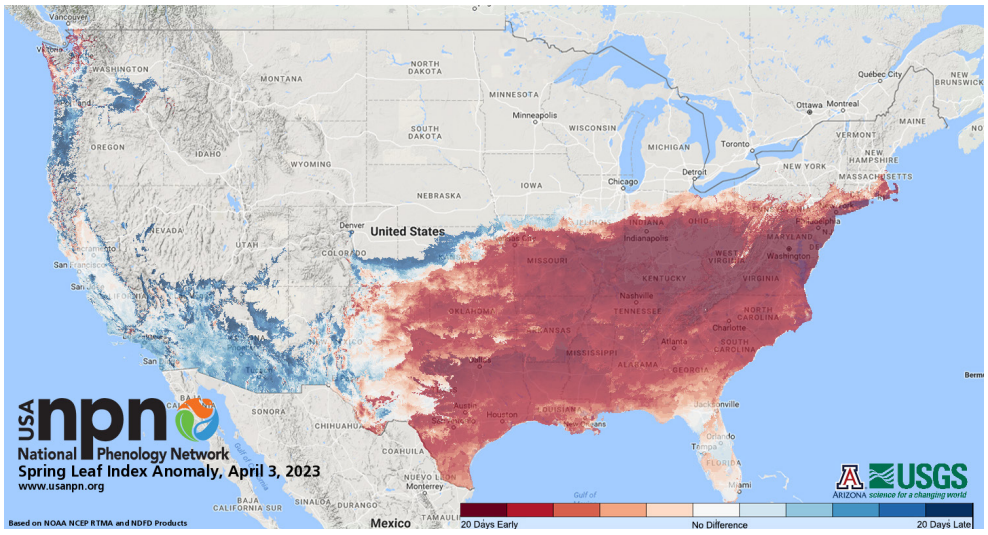


Figure: This map depicts where springtime biological activity has begun earlier than average (in red tones) and later than average (blue tones) so far this year. We can expect an earlier start to the pollen season in regions experiencing an earlier than normal start to spring. For more information, visit the USA-NPN Status of Spring page.

So far in 2023, the start of springtime activity has been up to three weeks ahead of schedule in the southeastern states and over four weeks ahead of schedule in the mid-Atlantic and Northeast. The start of springtime activity is arriving later than normal in the Southwest and parts of Kansas. Springtime pollen release is heavily shaped by winter and spring temperatures. Plants must be exposed to sufficient warmth to emerge from dormancy, open their flowers, and release pollen. On average, plants release pollen about two weeks after showing signs of springtime activity.

The start of spring has appeared the earliest in 40 years in parts of Texas, Arkansas, Ohio, Kentucky, Maryland, New Jersey, and New York.

THANK YOU to the partners who provide invaluable information, expertise, and data for the Climate and Health Outlook series:

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EPA United States Environmental Protection Agency

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PREDICTIVE SERVICES

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AAAAI American Academy of Allergy Asthma & Immunology
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USA npn National Phenology Network