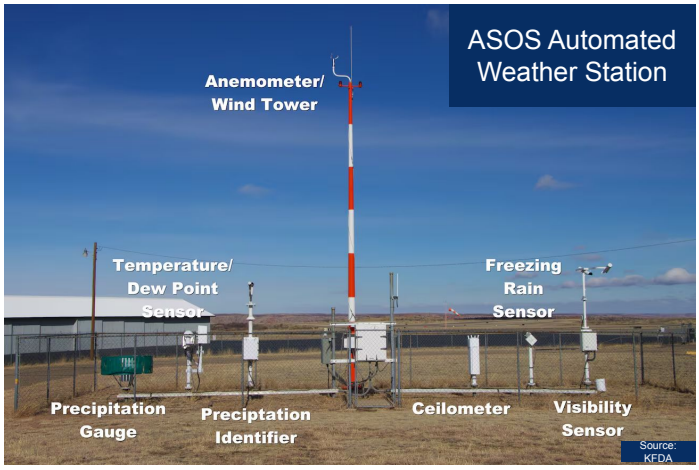
Observations

Quality observations are the backbone of producing a good forecast and maintaining a high-quality climate database.



We receive observations each day from automated weather stations at airports, temperature and precipitation data from COOP and CoCoRaHS stations, and even weather information from backyard weather station networks. We quality control these observations.

The Cooperative Observer Program (COOP) makes up the climate history of the United States. The history of this climate observation network dates back to Benjamin Franklin.

Quality-controlled local climate data (LCD) from the airports and temperature and precipitation data from COOP stations are transmitted to the National Centers for Environmental Information (NCEI) in Asheville, NC. NCEI maintains the official observation and climate data for the nation.

NCEI in Asheville, NC

NWS Factoids

On February 9th, 1870, a joint Congressional Resolution that required the Secretary of War **"to provide for taking meteorological observations at the military stations in the interior of the continent and at other points in the States and Territories…and for giving notice on the northern (Great) Lakes and on the seacoast by magnetic telegraph and marine signals, of the approach and force of storms"** was introduced and passed. President Ulysses S. Grant signed it into law, authorizing the Secretary of War to establish a national weather service within the U.S. Army Signal Service's Division of Telegrams and Reports.

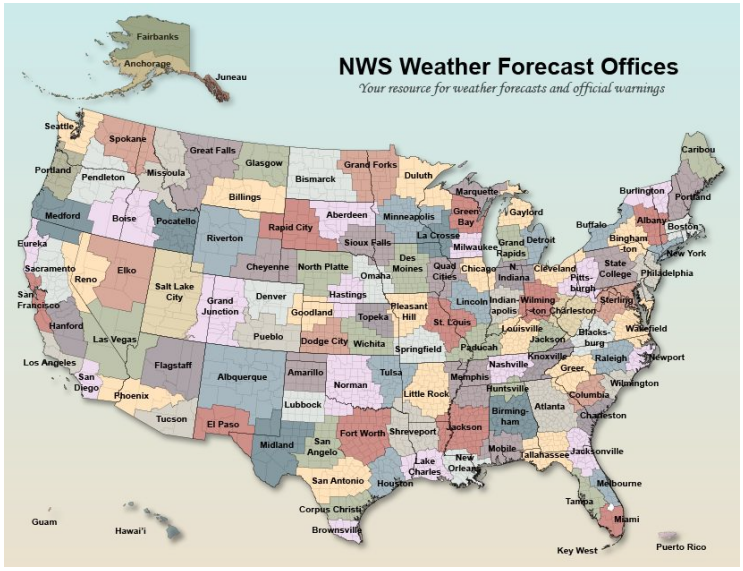

THE KNOXVILLE SENTINEL

KIOSK IS BEING INSTALLED IN KNOXVILLE BY WEATHER BUREAU

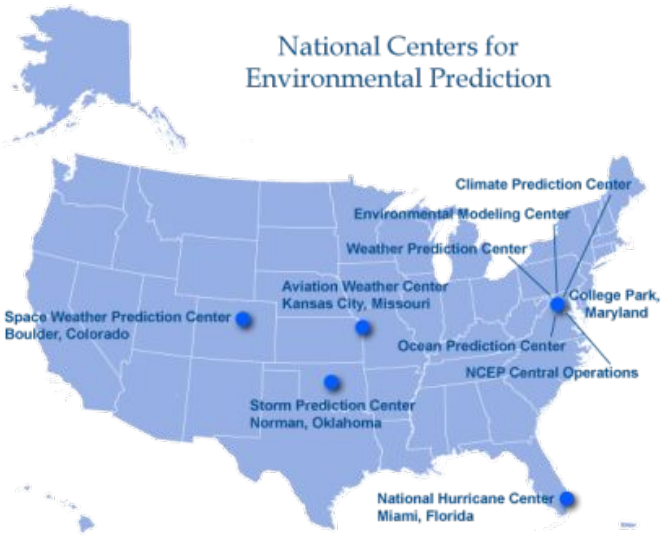
"KIOSK"

The NWS budget is around $1.4 billion which comes out to about $5.40 per adult each year in the United States. In total, we employ around 4,000 employees with over 2,000 meteorologists and meteorological technicians at over 150 locations.

The NWS has 122 forecast offices across the Contiguous United States, Alaska, Hawaii, Puerto Rico, and Guam.



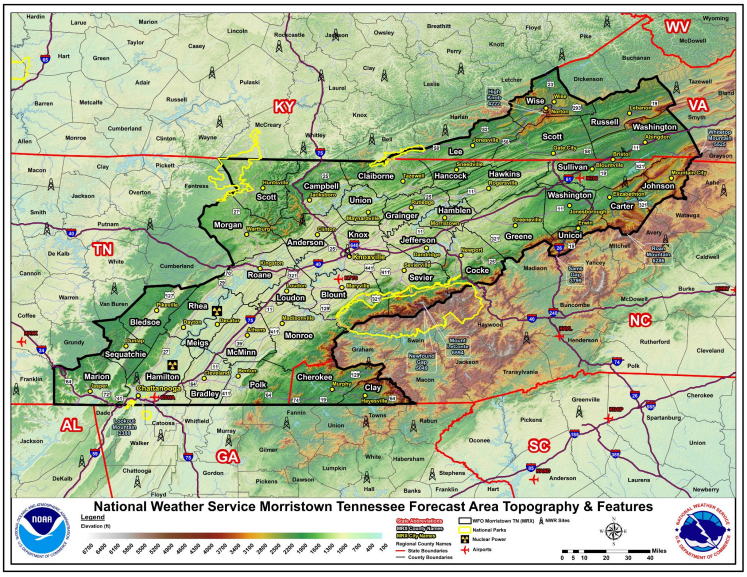
There are 9 National Centers for Environmental Prediction across the NWS that forecast general weather, climate, tropical weather, severe weather, and even space weather!



Producing a Forecast

Forecasting the weather for the Tennessee Valley and Southern Appalachians can be quite challenging! Our terrain, which varies from about 600 feet along the Tennessee River as it enters Alabama up to 6,643 feet at Clingmans Dome, plays an important role in our weather during every season of the year. The mountains result in additional precipitation and snowfall during the cooler months and additional thunderstorm formation during summer afternoons. If you're curious for more, ask our meteorologists about Northwest Flow Snowfall and mountain/valley circulations!

1) All forecasts begin with quality observations. We must QC observations and check to see how well computer models are doing based on current observed conditions.



2) We look at multiple short and long range meteorological models to understand the overall pattern and how it's expected to change over the coming week. This helps us build a conceptual model of forecast conditions.

3) We can load a model called the National Blend of Models (NBM) as a starting point in our Graphical Forecast Editor (GFE) which allows us to produce local forecasts for 2.5km grid cells. The NBM quantitatively assesses hundreds of deterministic and ensemble meteorological models to develop probabilities for temperatures, precipitation, winds, cloud cover, and many more weather elements.

4) Once we've adjusted the forecast, we can publish it. We put our technical thoughts on the forecast in an Area Forecast Discussion (AFD) that anyone can read!

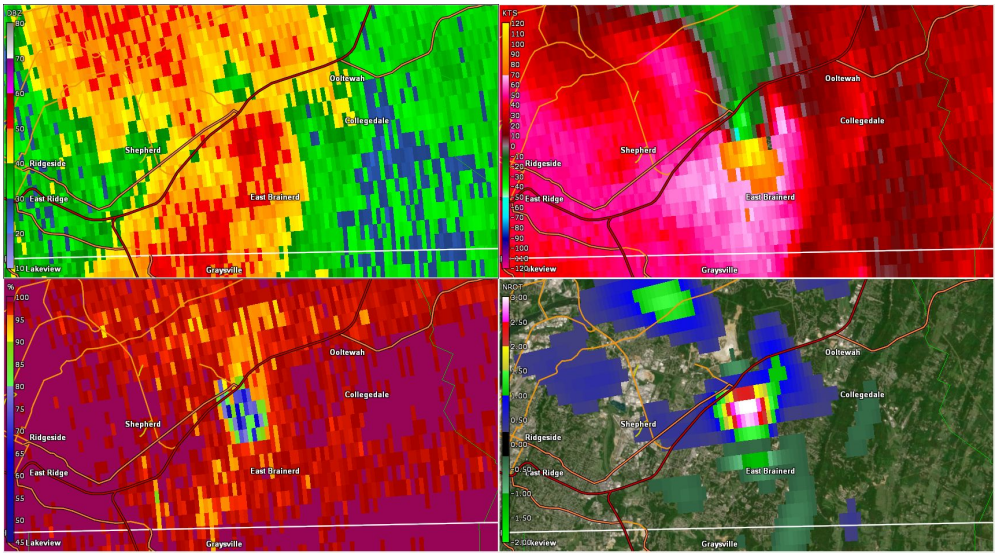
You can check the forecast we produce at **www.weather.gov**!

National Oceanic and Atmospheric Administration
U.S. Department of Commerce

National Weather Service
Morristown, TN

Radar Analysis and Warnings

Radar analysis is a complex skill! From understanding what the environment is capable of, to terrain influences, to the latest research on storm formation and hazards, radar is a place even the most experienced meteorologist has room to learn! If you're curious for more, ask our meteorologists about radar analysis and warning decision making!

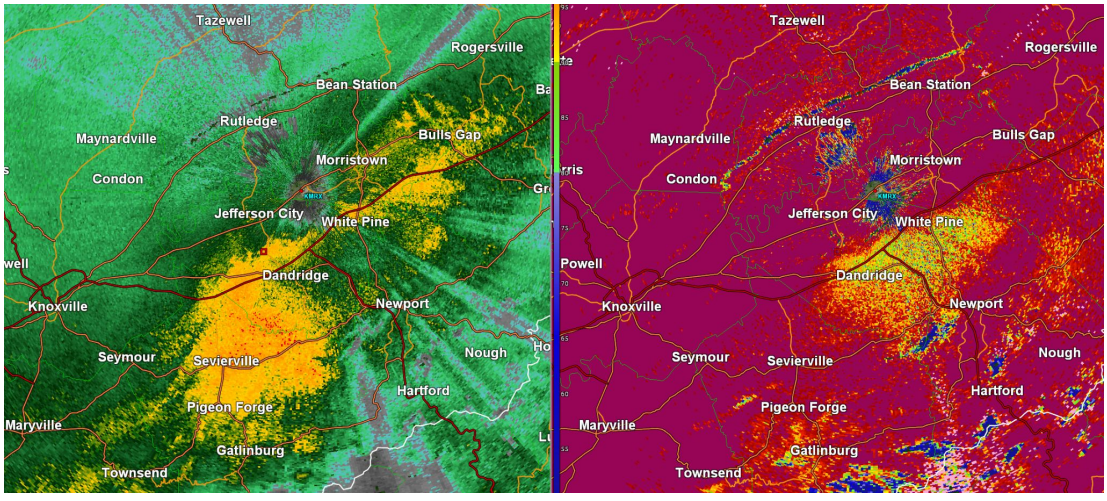


Upper Left: Reflectivity
Upper Right: Velocity
Bottom Left: Correlation Coefficient
Bottom Right: Normalized Rotation

How to identify a Tornadic Debris Signature: High values of reflectivity must be co-located (in the same location) as a strong rotational velocity, low (blue) values of CC, and ideally an NROT value > 1.

Left: Reflectivity
Right: Correlation Coefficient

Radar can detect snow melting to rain or other changeovers in precipitation. Often known as "bright banding" by higher reflectivity values, melting snow appears brighter to a radar and changes shapes to round raindrops as shown by the slightly lower CC values

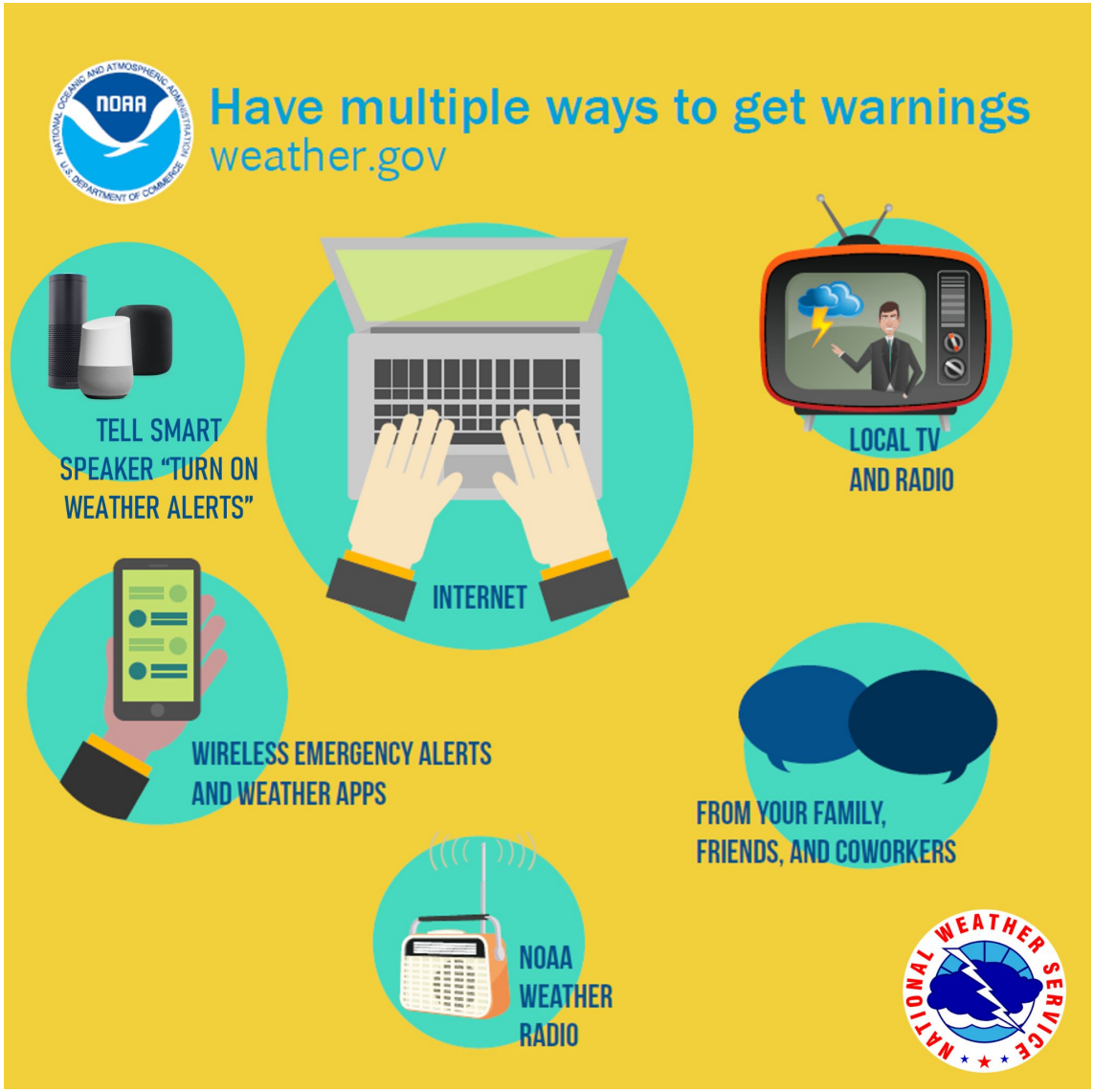


National Oceanic and Atmospheric Administration
U.S. Department of Commerce

National Weather Service
Morristown, TN

Dissemination of Weather Information

We sent out weather information, watches, advisories, and warnings! Many of the higher impact alerts activate the Emergency Alert System (EAS).



We're directly responsible for alerts making their way to NOAA Weather Radio. Significant weather warnings, such as tornado warnings, will also go to Wireless Emergency Alerts that are on all cell phones. You can also follow weather information on social media from the NWS and trusted broadcast meteorologists.

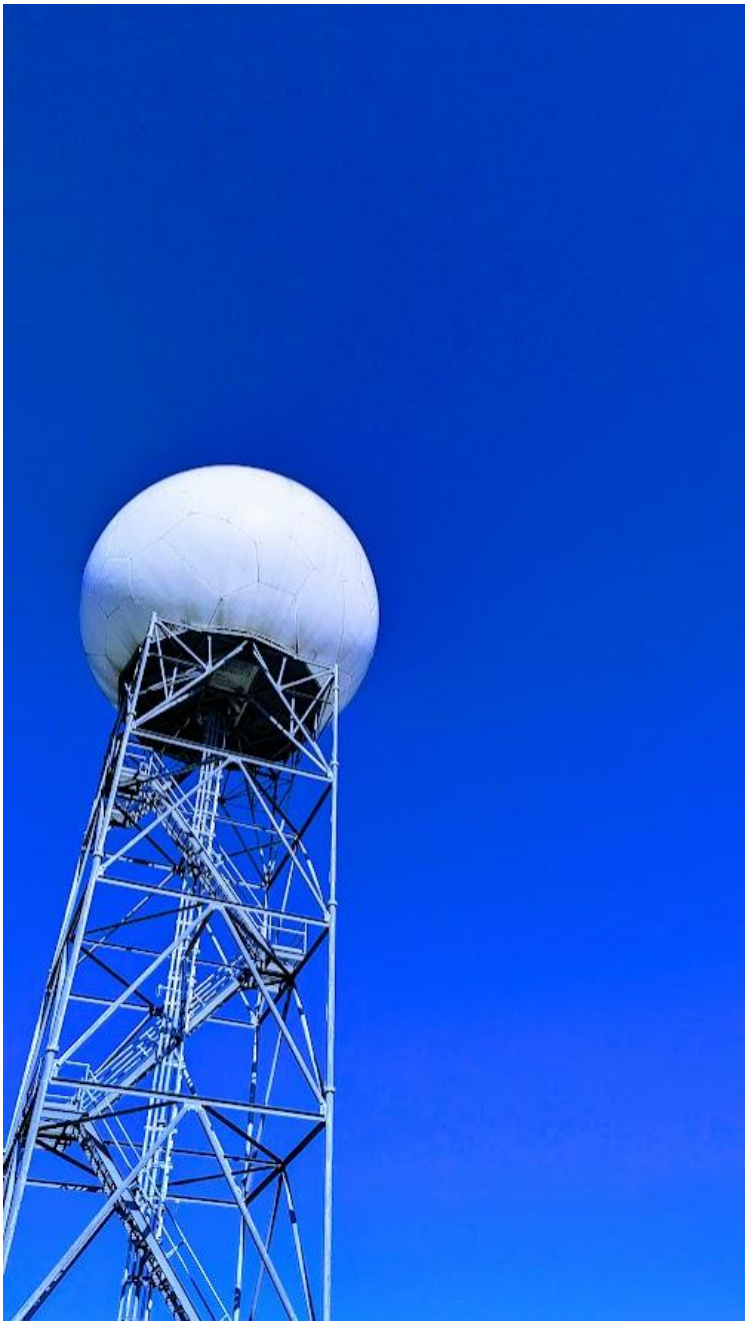
Always make sure that you have multiple ways to receive weather alerts!

All Hazards NOAA Weather Radio
NOAA's National Weather Service

Radar Facts

WSR-88D Radar: Key Facts

Weather Surveillance Radar - 1988 Doppler



Specifications

- Power:
  - Transmit Power: 750 kW
  - Peak Power: 1 MW
- Range:
  - Max Range: Up to 248 nautical miles (approximately 285 miles)
- Cost:
  - Approximate Cost per Unit: $3 million to $5 million (installation and maintenance included)

Operational Facts

- First Deployed: 1992
- Number of Units: Over 160 in the U.S.
- Data Collection: Updates every 5-10 min.

Capabilities

- Doppler Technology: Measures both precipitation intensity and wind speed.
- Dual-Polarity: Can transmit and receive in both horizontal and vertical orientations, improving precipitation type detection.
- Severe Weather Detection: Identifies severe storms, tornadoes, and hail.

Impact on Meteorology

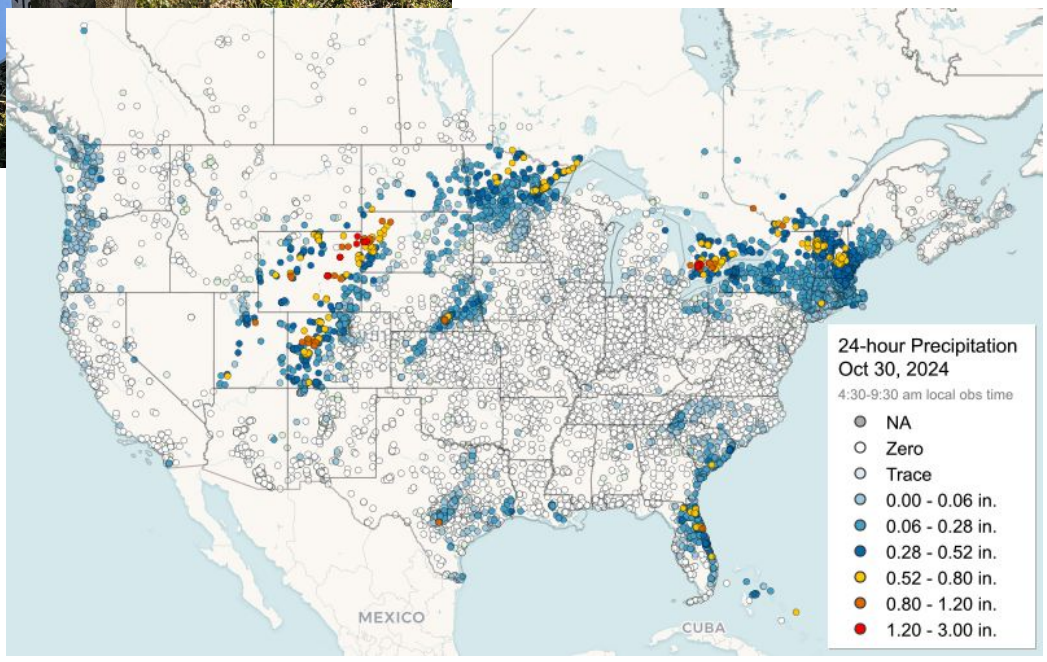
- Real-Time Monitoring: Enables real-time weather monitoring and forecasting.
- Public Safety: Vital for issuing timely warnings for severe weather events.
- Research Tool: Used in meteorological research and training.
- Accessibility: Data is made available to the public via various platforms, enhancing community preparedness.

Sign Up - CoCoRaHS

CoCoRaHS

Community Collaborative Rain, Hail, & Snow Network

cocorahs.org



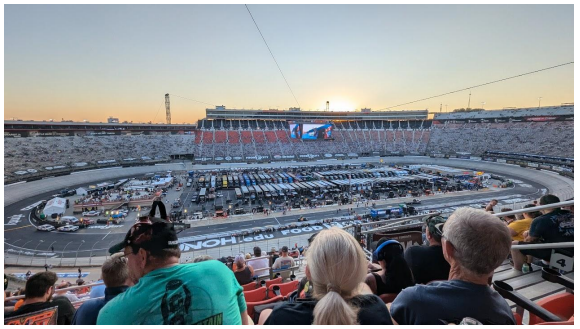
Decision Support (DSS)

What is DSS?

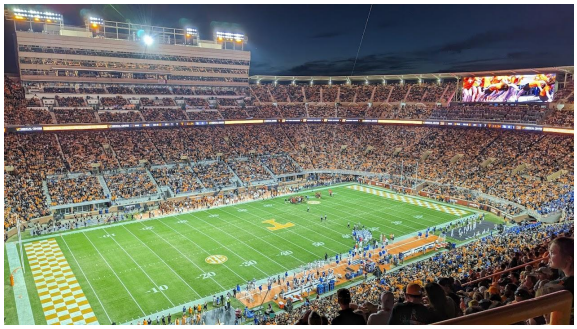
NWS Decision Support Services (DSS) provide weather, water, and climate information to help decision-makers protect lives and property. Services include specialized forecasts for emergency management that are usually site-specific and for a public safety purpose.

DSS services include:

- Forecast advice
- Interpretive services
- Training and exercises
- Assistance with NWS data and products
- Severe weather preparedness and education
- Coordination activities
- Direct, interactive support



These can be specialized forecasts, and often on-site support, to enhance public safety at large outdoor gatherings like UT football games and races at Bristol Motor Speedway where over 100,000 are routinely in attendance (we're not actually in a location to watch the event 😞). We can even use atmospheric data and radar to help predict lightning before it strikes!



A core function of DSS is also preparation, education, and ensuring that a forecast is properly messaged to local, state, and federal emergency management partners. This way, emergency management officials can take appropriate action based on scientific forecast data.

Online Resources

All of our handouts are available online!

All infographics and presentations at the Open House are available online at **www.weather.gov/mrx/openhouse** or at the **QR code below**.

weather.gov/mrx/openhouse