

The National Weather Service

Mission

The National Weather Service (NWS) provides forecasts and warnings for weather, hydrologic, and climate needs for the United States, its territories, adjacent waters and ocean areas. The mission is to **protect of life and property and enhance the national economy**. NWS data and products form a national information database and infrastructure which can be used by other governmental agencies, the private sector, the public, and the global community.

This mission is accomplished by providing warnings and forecasts of hazardous weather, including thunderstorms, flooding, hurricanes, tornadoes, winter weather, tsunamis, and climate events. The NWS is the **sole United States official voice** for issuing warnings during life-threatening weather situations.

Brief History

The National Weather Service was created as a branch of the Signal Service, later the Signal Corps of the Army, by a Joint Congressional Resolution in 1870. It provided "for taking meteorological observations at the military stations in the...United States, and for giving notice...of the approach and force of storms."



The benefits of the weather service were soon recognized by business industries, the general public, and farmers who demanded special forecasts and warnings applicable to their needs. This led to the creation of a new organization with a more scientific status. Congress transferred the weather service of the Army to the Department of Agriculture in 1891 and named it the U.S. Weather Bureau.

Before World War II, technology and communications improved slowly, but the war accelerated the need for aviation forecasts, and an increase in technology and participation by all sectors of society, including women. More employees, training and resources were poured into the war effort. Advances in satellite and radar technology soon followed. During the 1950s and 1960s organizational changes took place, including the distribution of local forecast offices across the country. In addition, numerous national centers were established to provide support for numerical weather prediction, research, climate archives, climate prediction, hydrology, aviation weather, marine weather, severe storms and hurricanes. In 1970 the Weather Bureau changed its name to the National Weather Service (NWS) and became part of the newly formed National Oceanic and Atmospheric Administration (NOAA).

Since then many more advances have taken place in computer technology, allowing for greater power in producing numerical model guidance used by meteorologists. Satellites have become more sophisticated in the weather features they can detect. In the 1990s a "Modernization and Restructuring" effort was realized. Doppler Weather Radars were installed nationwide,

representing a vast improvement over the old radars. New Advanced Weather Interactive Processing Systems (AWIPS) were installed nationwide in 1999. These workstations provide meteorological data, model guidance, satellite imagery and radar data with great flexibility in data manipulation and analysis. In 2000 a massive computer upgrade was made to allow greater speed and stability in generating numerical model guidance. In 2004 the NWS changed the forecast landscape with new digital forecasts designed to offer more spatial and temporal detail and to adapt to emerging digital technology. As the capacity of technology and understanding increases, forecasts become more accurate and extend further into the future. The NWS is the world leader for all operational weather forecasting and provides its basic infrastructure. For more history and stories, click on: www.history.noaa.gov.

The Role

The National Weather Service is part of NOAA, the National Oceanic and Atmospheric Administration, which is part of the Department of Commerce (DOC) in the U.S. Government. As noted in the mission statement, the entire weather database and infrastructure in this country (i.e. satellites, radars, weather monitoring stations, model guidance, etc.), is provided and maintained by the NWS. Private weather companies, consultants, media outlets, and research organizations all depend on this infrastructure.

It is easy to see why the NWS is part of the Department of Commerce. Numerous professions are directly impacted by the weather and countless decisions are made in response to weather forecasts. For example, anybody who works outdoors such as construction crews must monitor the forecast and make cost-saving decisions. Industries of transportation, agriculture and recreation depend heavily on weather information. Indirectly, some industries like the stock market may be impacted as entire local economies can be affected by flood, drought, freezes, or damaging weather. In fact, it is hard to find a profession not in some way affected by the weather.

The global economy is also increasingly dependent on weather forecasts. As much as one-third of the U.S. gross domestic product—three trillion dollars' worth of goods and services—is at least partially dependent on weather, according to estimates. Obvious examples include road, sea, and air transportation. Less obvious, perhaps, are power companies, which depend on temperature forecasts to anticipate consumer demand, and school systems.

Most Americans get weather information from media sources, such as television and radio, the Internet, and newspapers. These media sources are in effect weather retailers, selling weather information to customers through advertising money or subscriptions to services. But there is yet another layer in the process. For example, let's say a local newspaper features a weather page. To prepare this page and to do it every day, the newspaper employs a private weather company. The newspaper gives the company its requirements for their weather page. The company fulfills the requirements at the appointed times and sends the bill to the newspaper. This works in a similar way for television and radio. The daily temperatures and rainfall amounts you see on the evening news were probably first collected and disseminated by the NWS, then gathered by the private weather company, then included in their weather package delivered to the paying television station. The private company may have some weather infrastructure of their own, but

largely their data and guidance are provided as public access by the NWS, namely satellite and radar data, and weather model guidance. In this way the NWS serves as a sort of giant wholesale weather warehouse, where the weather retailers can shop for free to produce their products and services specific to their customers' needs.

The Organization

The NWS is organized into headquarters, national centers, regional offices, and various field offices. See www.weather.gov/organization.php. The headquarters offices are located in Maryland (metro Washington DC) which oversee and administrate the entire agency. Nine national centers provide guidance to offices in the field scattered across the country, comprising the National Centers for Environmental Prediction (NCEP), most of which are also located in Maryland. They include:

- **Aviation Weather Center (AWC)** provides aviation warnings and forecasts of hazardous flight conditions at all levels within domestic and international air space. The center is located in Kansas City, MO. See aviationweather.gov.
- **Climate Prediction Center (CPC)** monitors and forecasts short-term climate fluctuations and provides information on the effects climate patterns can have on the nation. They provide the official monthly and seasonal outlooks. They are the official experts on climate altering mechanisms such as El Niño and La Niña. See www.cpc.ncep.noaa.gov.
- **Environmental Modeling Center (EMC)** develops and improves numerical weather, climate, hydrological and ocean prediction through a broad program in partnership with the research community. See www.emc.ncep.noaa.gov.
- **Hydrometeorological Prediction Center (HPC)** provides nationwide analysis and forecast guidance products out through seven days, including the official daily weather map analyses. They compute quantitative precipitation guidance. See www.hpc.ncep.noaa.gov.
- **NCEP Central Operations (NCO)** sustains and executes the operational suite of numerical analyses and forecast models and prepares NCEP products for dissemination as guidance essential for weather prediction by each Weather Forecast Office (WFO). See www.nco.ncep.noaa.gov.
- **Ocean Prediction Center (OPC)** issues weather warnings and forecasts out to five days for the Atlantic and Pacific Oceans north of 30 degrees North latitude. See www.opc.ncep.noaa.gov.
- **Space Environment Center (SEC)** provides space weather alerts and warnings for disturbances that can affect people and equipment working in space and on earth. The Center is located in Boulder, CO. See www.sec.noaa.gov.
- **Storm Prediction Center (SPC)** provides tornado and severe weather watches for the contiguous United States along with a suite of hazardous weather forecasts. The Center is located in Norman, OK. See www.spc.noaa.gov.
- **Tropical Prediction Center (TPC)** includes the **National Hurricane Center** and provides forecasts of the movement and strength of tropical weather systems and issues watches and warnings for the U.S. and surrounding areas. The Center is located in Miami, FL. See www.nhc.noaa.gov.

Other specialized support centers, not part of NCEP include:

- National Severe Storms Laboratory (NSSL)
- Spaceflight Meteorology Group (SMG)
- Climate Diagnostics Center (CDC)
- Hydrologic Research Laboratory (HRL)
- National Climatic Data Center (NCDC)
- Pacific Tsunami Warning Center (PTWC)
- Central Pacific Hurricane Center (CPHC)
- West Coast/Alaska Tsunami Warning Center (WC/ATWC)

For hydrologic support, there are 13 River Forecast Centers (RFCs) across the country. For aviation support, there are 22 Center Weather Service Units (CWSUs) across the country, co-located with Air Route Traffic Control Centers. The country is divided into 122 forecast areas, also known as County Warning Areas (CWAs), each serviced by the local Weather Forecast Office (WFO) (see map below).

Regional offices in the Eastern, Central, Southern, Western, Alaskan and Pacific regions oversee these field offices within their region of the country. The Western Region Headquarters directs NWS operations in the western states from its office in Salt Lake City, Utah. This includes 24 WFOs, including the office in San Diego, three RFCs, and four CWSUs.

