

NATIONAL HURRICANE CENTER

The National Hurricane Center (NHC) is responsible for preparing and issuing official forecasts, watches, and warnings for storms affecting the tropical and subtropical regions of the North Atlantic Ocean, Caribbean Sea, and Gulf of Mexico (collectively known as the Atlantic basin), as well as the eastern Pacific Ocean. The NHC operates as one of three branches of the Tropical Prediction Center (TPC), one of the National Weather Service's (NWS) nine National Centers for Environmental Prediction (NCEP), and is co-located with the NWS Miami Forecast Office on the campus of Florida International University. The other branches of the TPC, the Tropical Analysis and Forecast Branch (TAFB) and the Technical Support Branch (TSB), provide support to the NHC during hurricane season, which officially begins on May 15 in the eastern Pacific and on June 1 in the Atlantic basin and lasts through November 30 for both areas.

The NHC developed from the long-standing need of the U.S. government to coordinate monitoring, forecasting, and warning of tropical storms and hurricanes. In 1898, during the Spanish-American War, President William McKinley called for the creation of a national hurricane warning network. McKinley reportedly said that he feared a hurricane more than the entire Spanish navy. A series of observing stations was established throughout the central and eastern Caribbean, but hurricane warnings for the continental United States were issued from Washington, D.C.

A 1935 reorganization of the hurricane warning system ultimately created new hurricane forecasts centers in Jacksonville, Florida; New Orleans, Louisiana; San Juan, Puerto Rico; and

Boston, Massachusetts. In 1943, the forecast center in Jacksonville was relocated to Miami, under the direction of Grady Norton. The Miami office was officially designated as the NHC in 1955, with Gordon Dunn as its first director. (Although he was never officially designated as such, Dunn and others considered Norton the first director of the NHC.) Further reorganization in 1965 granted the NHC sole responsibility for issuing track and intensity forecasts and warnings for tropical storms and hurricanes in the Atlantic Basin.

This period of growth for the NHC also saw the addition of new staff, heightened public awareness of the threat of hurricanes, and increased international cooperation, including assisting with the training and upgrading of meteorological services throughout the Caribbean. Following the 1967 hurricane season, Dunn was succeeded as NHC director by Robert Simpson, whose tenure saw increased research efforts and applications of satellite imagery and statistical and dynamical models to hurricane forecasting. Since Simpson, the directors of NHC have been Neil Frank (1973–1987), Robert Sheets (1988–1995), Robert Burpee (1996–1997), Jerry Jarrell (1998–2000), Max Mayfield (2000–2007), Bill Proenza (2007–), and Ed Rappaport (Acting Director as of autumn 2007).

Forecasters at the NHC monitor conditions of tropical systems as they develop from tropical waves into tropical depressions, which have maximum sustained surface wind speeds of 38 mph (62 kph) or less. Once wind speeds have increased to between 39 mph (63 kph) and 73 mph (118 kph), a system is reclassified as a tropical storm. At this point, it is assigned a name, based on alphabetical lists of alternating female and male names that rotate every six years and are approved by the United Nations World Meteorological Organization (WMO).

Saffir-Simpson Hurricane Scale

Hurricane Category	Pressure mb	Wind Speed		Storm Surge		
		kph	mph	m	ft	
1	≥980	119–153	74–95	1–2	4–5	Minimal
2	965–979	154–177	96–110	2–3	6–8	Moderate
3	945–964	178–209	111–130	3–4	9–12	Extensive
4	920–944	210–250	131–155	4–6	13–18	Extreme
5	<920	>250	>155	>6	>18	Catastrophic

If the maximum sustained wind speed of a tropical storm reaches 74 mph (119 kph), it becomes a hurricane and its intensity is designated by a 1–5 category ranking. This ranking is based on the Saffir-Simpson scale, named for structural engineer Herbert Saffir and Robert Simpson, the former NHC director.

Various products issued by the NHC inform forecasters, emergency managers, and the public of general conditions in tropical and subtropical areas, as well as the location, movement, and potential hazards of active storms. The NHC issues a Tropical Weather Outlook four times a day during hurricane season, regardless of whether any active storms are occurring. The Tropical Weather Outlook describes the general state of weather in the tropics and includes a discussion of any areas of expected development over the next forty-eight hours.

When a tropical cyclone is active, the NHC issues a suite of forecast products every six hours. These include a general Public Advisory, a more technical Forecast/Advisory, a detailed Discussion (intended primarily for other forecasters), and Strike Probability Forecasts, which indicate the chance that a storm's center will pass within 65 nautical miles (75 statute miles) of various locations within seventy-two hours. These products also include any tropical storm and hurricane watches and warnings that have been issued by the NHC. Watches are issued when tropical storm or hurricane conditions pose a possible threat to coastal areas within thirty-six hours, while warnings indicate that tropical storm or hurricane conditions are expected along coastal areas within twenty-four hours or less. Other products, such as Hurricane Local Statements and Tropical Cyclone Updates, are issued on an as-needed basis.

Although its most visible role comes during hurricane season, the NHC assumes a year-round operation. It conducts public outreach and training of state and local emergency managers and officials from foreign countries affected by tropical cyclones.

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Sources

National Hurricane Center. <http://www.nhc.noaa.gov>.
Sheets, Bob, and Jack Williams. *Hurricane Watch: Forecasting the Deadliest Storms on Earth*. New York: Vintage Books, 2001.

NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION

The National Oceanic and Atmospheric Administration (NOAA) is a U.S. government agency, the goal of which is to understand, predict, and conserve Earth's atmosphere and oceans to sustain the social, economic, and environmental needs of the United States.

The agency was established in the U.S. Department of Commerce on October 3, 1970, by President Richard M. Nixon. Along with the Environmental Protection Agency (EPA), NOAA was formed to strengthen and centralize the already existing bureaus that provided the government with knowledge on the monitoring of ocean, atmosphere, and space exploration. NOAA combined some of the oldest federal agencies, among them the Coast and Geodetic Survey (established 1807), the Weather Bureau (established 1870), and the Bureau of Commercial Fisheries (established 1871).

Today, NOAA is divided into seven lines in order to manage all of the major federal services under its jurisdiction: Oceanic and Atmospheric Research (OAR), National Environmental Satellite, Data, and Information Service (NESDIS), National Ocean Service (NOS), National Weather Service (NWS), Program Planning and Integration (PPI), National Marine Fisheries Service (NMFS), and NOAA Marine and Aviation Operations (NMAO).

Oceanic and Atmospheric Research is the driving force of scientific research in NOAA's study of Earth's oceans and atmosphere. It strives to provide a better understanding of the environment and relationships between the atmosphere and ocean in hopes of predicting threatening conditions and problems. OAR is a broad network of twelve internal research laboratories providing cooperative research with thirty Sea Grant university research programs, additional research grant programs through academic institutions, and six underwater research centers. Climates are a major focus of OAR, which has done significant work on El Niño, an occurrence of increasing water temperatures that takes place in the equatorial Pacific Ocean. OAR works to study, predict, and