NOAA's United States Weather Research Program (USWRP)

www.research.noaa.gov/weather/

Coordinating research for improved forecasts

What Does NOAA's U.S. Weather Research Program Do for the Nation?

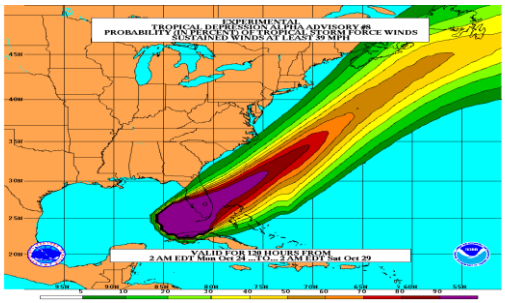
NOAA provides tools to warn the public of heavy rain events that might produce flooding. *Photo credit: NOAA*

The U.S. Weather Research Program (USWRP) has been enabling research on atmospheric phenomena and improvements to weather forecasting since the early 1990s with numerous transitions of research into NOAA's National Weather Service (NWS) operations and hundreds of peer reviewed publications attributed to the program. Managed in NOAA's Office of Weather and Air Quality in NOAA's Office of Oceanic and Atmospheric Research, it supports research needs of the NWS and U.S. Navy with research to operations projects via testbeds and external grants to academia on relevant issues. The emphasis is on projects with a path into operations within 3-5 years, thus represents the future of weather forecasting. Improvements to operational air quality, extreme precipitation, flooding, winter weather, hurricanes, and severe storm forecasting have been enabled by this program.

Research Highlights

NOAA's Joint Hurricane Testbed (JHT)
Testing improvements to hurricane forecasting at the National Hurricane Center and U.S. Navy

JHT operates an open peer-reviewed research competition every 2 years. For the 2013-14 cycle, 7 projects were chosen to support the development of new forecasting tools and improvements to hurricane models. Scientists from Colorado State and Florida State University, the Universities of Miami, Rhode Island, Wisconsin, and North Carolina, and Florida International University will join NOAA scientists in publishing their results in peer-reviewed journals and transitioning the product into National Hurricane Center/Navy operations.



The Joint Hurricane Testbed has led to improved tropical cyclone wind probability forecasts. *Image credit: NOAA*

NOAA's Hydrometeorological Testbed (HMT)
Improving flood and extreme precipitation forecasting and winter weather forecasts

In FY13-14, HMT partnered with two Colorado Cooperative Institutes, the University Corporation in Atmospheric Research in Colorado, and NWS branches for modeling, climate, and weather prediction to conduct research and analyses to improve the understanding of extreme precipitation producing atmospheric phenomena and the development of prototype tools for flood and extreme precipitation forecasting. HMT also supported winter weather forecasting improvements via development of new tools and testing them with NWS forecasters.

NOAA's Hazardous Weather Testbed (HWT)
Experimenting with new tools and observations for severe weather forecasting improvements

USWRP funded the enabling infrastructure of HWT during FY13-14 as well as contributed to the development of a new decision support tool for severe weather warnings. HWT tests and evaluates new experimental products in the NWS's forecaster computer environment by interacting directly with NWS forecasters. USWRP upgraded obsolete equipment and maintained the experimental modeling system that is tested in Spring Experiments.

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More Research Highlights

Understanding Air Chemistry
Improving understanding of atmospheric aerosols to create better forecasts of pollutants, visibility, smoke, and volcanic ash.

In FY13-14, USWRP supported 5 research projects on air quality modeling improvements that benefits operational air quality forecasting. New techniques for using air chemistry data in the models are developed and tested in collaboration with partners at NOAA's Air Resources Laboratory and Earth Systems Research Laboratory's Physical Sciences Division and Global Sciences Division. This research contributes to improving NWS smoke, dust, and volcanic ash predictions, so people can act to limit the adverse effects on human, surface transportation and aviation.

Social Sciences for a Weather Ready Nation
Making forecasts relevant to society

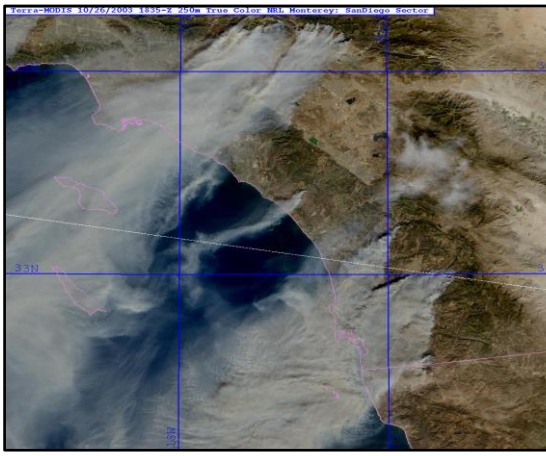
For FY13-14, USWRP competitively selected social science research that enables NOAA to test research results that improve communication during dangerous weather situations. Researchers from the Universities of Oklahoma and North Carolina, Arizona State University, East Carolina University, and a non-profit organization in Pennsylvania won the competition and have presented their findings to meteorologists in the weather enterprise. Their topics ranged from assessing NWS's flood forecasting products to understanding how the public understands tornado warning uncertainty information to improve how NWS communicates tornado warnings.

Choosing the Best Observations
Deciding which observations improve the forecasts

USWRP funded the development of an Observing System Simulation Experiment Testbed capability to determine the best suite of future observations to use in weather forecasts. The testbed provides the infrastructure to run studies to simulate observations from proposed observing systems and use in weather forecasting models to determine how much the forecast improved.

Budget Information

The Fiscal Year (FY) 2015 President's Budget Request for USWRP through NOAA's Office of Oceanic and Atmospheric Research (OAR) is $7.2M. The USWRP FY 2014 actual budget is $4.1M, the FY 2013 actual budget was $3.9M and the FY 2012 actual budget was $4.2M. USWRP sits within the Office of Weather and Air Quality, which is headquartered in Silver Spring, Maryland.



Satellite image of the November 2003 wildfires in Southern California, which killed 22 people and caused $2 billion in property damage. Improved extended range forecasting of meteorological conditions favorable for destructive fire weather events will save lives and property.
Image credit: NOAA

Did You Know?

A super cell thunderstorm.
Photo credit: NOAA

The Office of Weather and Air Quality forms a critical link to other NOAA divisions and to our external partners in socially relevant weather research, taking full advantage of opportunities to leverage research and accelerate advancements.

www.research.noaa.gov

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