# NOAA's National Weather Service

# Building on Successes ....for our Future

#### **Jack Hayes**

NOAA Assistant Administrator For Weather Services and National Weather Service Director

### **AMS** Annual Meeting



24th Conference on Interactive Information Processing Systems (IIPS) for Meteorology, Oceanography, and Hydrology



# Overview

- 2007 top weather, water, climate stories
- 2007 report card
- 2007 accomplishments
- Where we're headed
  - On the horizon
  - ...And beyond
- Research to applications

#### WET

Heavy takes pause widespread floogling in WA (Dec)

#### **WILDFIRES**

Numerous large fires burn in ID and MT(Jul-Sep)

#### DROUGHT

Severe drought in much of West

#### COLD

Prolonged subfreezing temperatures cause large lasses to GA agriculture (Jan)

#### WILDFIRES

Largest evacuation in California Instany (Oct)

#### WARMTH

One of 10 warmest years on record for the configuous U.S.

### SEVERE STORMS

Outbreaks produce approximately 600 tornadoes across Great Plains, and the South (Mar-May)

#### ICE

Severe ice storms from TX/OK to Midwest(Jan & Dec)

#### DROUGHT

Severe heat wave across

South and Midwest (Aug)

More than 3/4 of SE in drought - severe water shortages

Record wettest summer for TX and OK - Severe flooding in many areas (May-Aug)

### SNOW

10-day lake effect snow dumps more than 100 inches on NY's Tug Hill Plateau (Feb)

#### **NOR'EASTER**

Strong winds, heavy rains and snow affect areas from SC to ME (Apr.)

#### COLD

Record cold partnesse affects Midways Mains, Mid-Atlantip and SE (April

#### WILDFIRES

Drought related validares in GA and FLLAge March

#### WARMTH

Mome has 2nd longest figs free season (July Seg)



#### HURRICANES

fill named storms in Atlantic Basin - 1 tepical storm, & trepical degressions, and 1 herricane make landfall

#### WET

Kena Leis trings heavy rains, fleoding, and gale force winds to Maui and the Gig Island (Deci

# 2007's Top Stories: Weather, Water, & Climate Winter Weather

- February 3-12, 2007
- Northeast lake-effect winter storm
- 10 days long
- 100" of snow



# 2007's Top Stories: Weather, Water, & Climate **Tornadoes**

- March 1, 2007
- Enterprise, Ala.



# 2007's Top Stories: Weather, Water, & Climate Tornadoes

- May 4, 2007
- Greensburg, Kansas
- EF-5 tornado



The lower left corner is
Main St/Hwy 54 stop light.

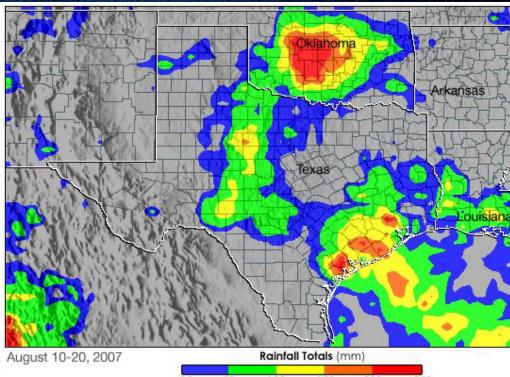
3rd Grade students of Greensburg volunteer by making new street signs for their town of Greensburg

ELM ST

# 2007's Top Stories: Weather, Water, & Climate Texas, Oklahoma Flooding

- May to August 2007
- Record wettestsummer





**Fires** 

- Late October 2007
- Calif. wildfires
- 500,000 acres burned
- 2007 nationwide: Over 9 million acres burned







**Pacific Northwest Storms** 

- Dec. 1-3 2007
- Ore. & Wash.
- Record-breaking winter storms





Dec. 2 Cape Blanco Storm Watch

Flash Floods and High Winds in Hawaii

Dec. 4-7, 2007 Kona Storm

Kula District Flooding, Maui

Waiohuli watershed debris flow. Flash flood warning lead time 4 hrs 51 mins.



Waiohuli watershed. 15 foot wall of water, mud and debris in Keokea.

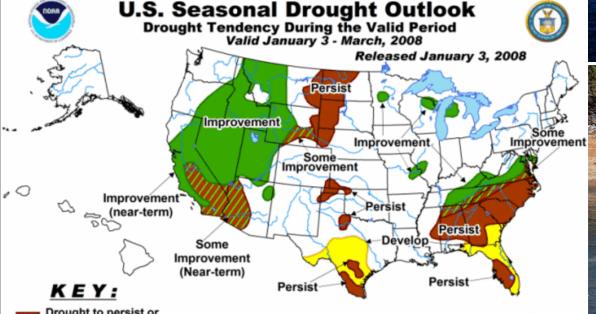


1 Keokea home swept off its foundation.

Drought

Exceptional drought in S.E.

- 2007 Drought
- N.C. driest year
- Ga. 4<sup>th</sup> driest



- Drought to persist or intensify
- Drought ongoing, some improvement
- Drought likely to improve, impacts ease
- Drought development likely

Depicts large-scale trends based on subjectively derived probabilities guided by short- and long-range statistical and dynamical forecasts. Short-term events — such as individual storms — cannot be accurately forecast more than a few days in advance. Use caution for applications — such as crops — that can be affected by such events. "Ongoing" drought areas are approximated from the Drought Monitor (D1 to D4 intensity). For weekly drought updates, see the latest U.S. Drought Monitor. NOTE: the green improvement areas imply at least a 1-category improvement in the Drought Monitor intensity levels, but do not necessarily imply drought elimination.

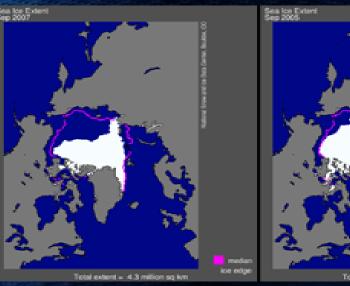


Lake Lanier in Buford, Ga. (John Bazemore, AP)

Alaska Events

- Southeast Record Annual Snowfall
- Record Arctic Sea Ice Minimal Extent
  - Juneau Airport recorded 197.8 inches for the season
  - 220% of average, old record 194.1 inches in 1964-65





- More than 4 times greater than previous record (Sept 2005)
- NW Passage completely open, first in recorded history

# 2007 Performance Report Cards

#### **Hurricane Season Report Card**

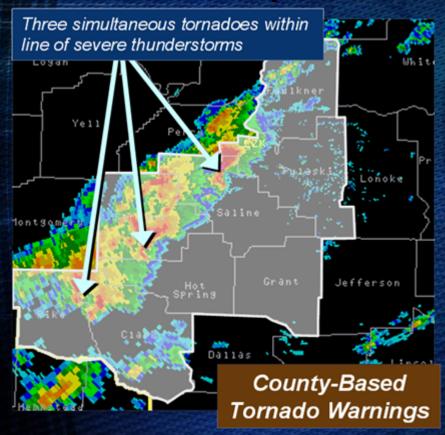
	Goal CY 2006	Actual CY 2006	Goal CY 2007	Actual CY 2007
Hurricane Track Forecasts (48-Hour Forecast Error, nm)	111	97	110	86 est.
Hurricane Intensity Error at 48 Hours (kts)	_	15.3 kts	_	18.5 kts

#### Severe Weather, Water Report Card

	Goal FY 2006	Actual FY 2006	Goal FY 2007	Actual FY 2007
Tornado Warnings - Lead Time (min)	13	13	13	13
Flash Flood Warnings - Lead Time (min)	48	49	48	60
Winter Storm Warnings - Accuracy (%)	90	89	90	92
Winter Storm Warnings - Lead Time (hours)	15	17	15	18

More specific warning information for severe weather

#### **Previously**



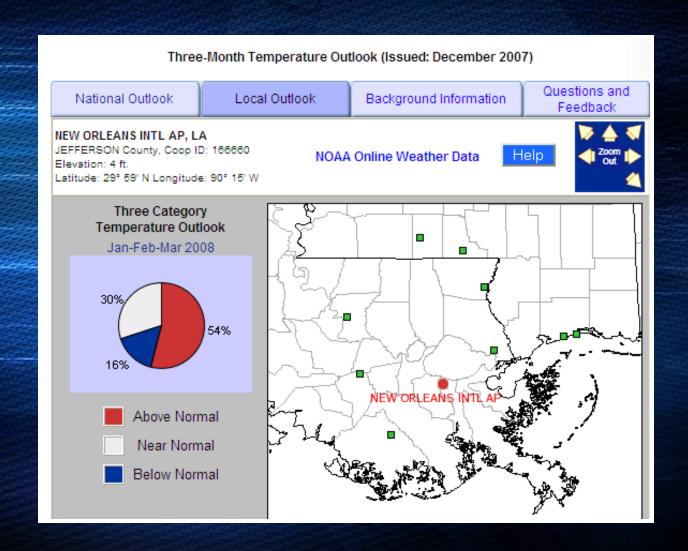
8 Counties under warning almost 1 million people warned

#### **Currently**



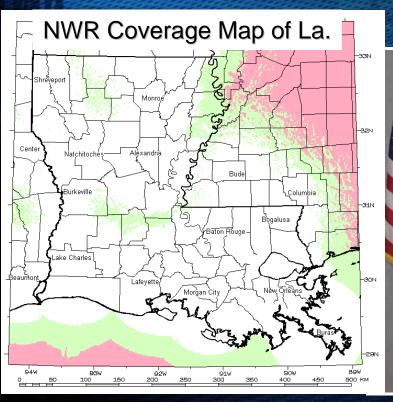
70% less area covered ~600,000 fewer people warned

New 3-month Local Temperature Outlook product



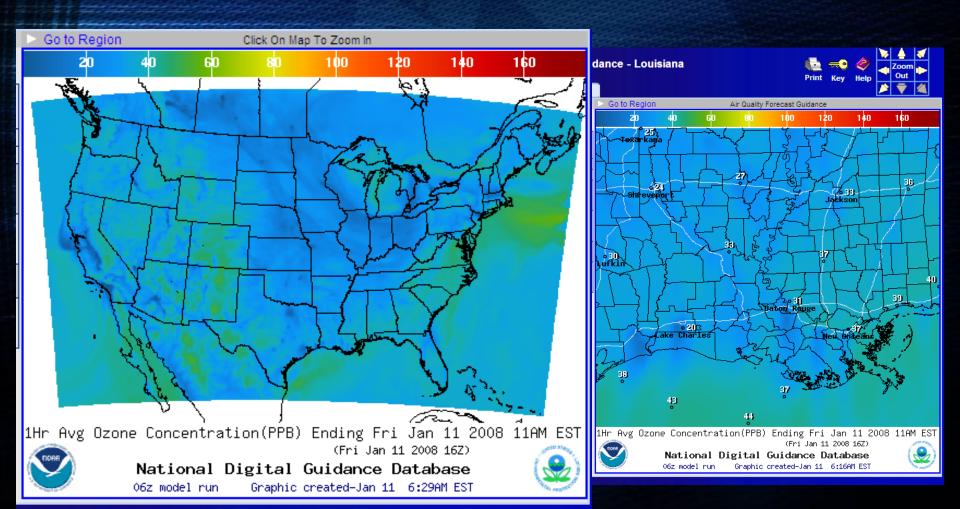
Increased NOAA Weather Radio All Hazards coverage to 100% of high risk areas

NWRs distributed to all public schools

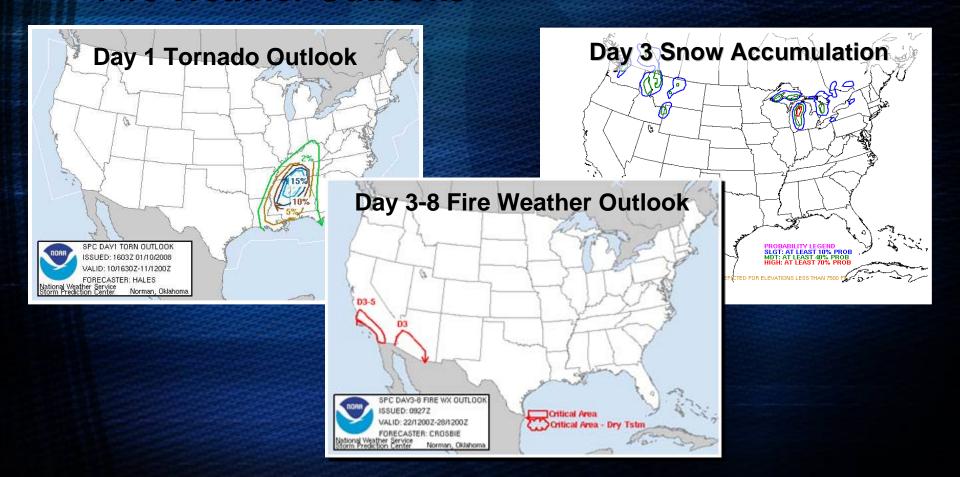




 NOAA hourly Air Quality Ozone and Smoke Forecasts now available coast-to-coast

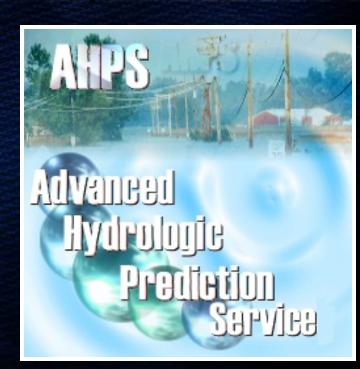


- New Probabilistic Forecast Products (Convective Outlooks, Probabilistic Winter Weather)
- Fire Weather Outlooks



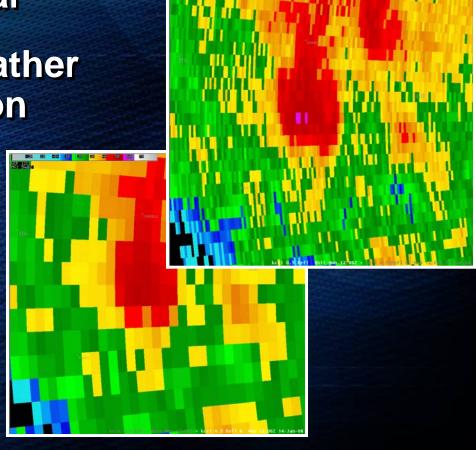
# Where We're Headed On the Horizon... Products and Services

- Common Alerting Protocol (CAP)
- AHPS Static Flood Inundation Map libraries
- Improved aviation services
- More products in GIS format
- More probabilistic products



# Where We're Headed On the Horizon... Enhanced Capabilities

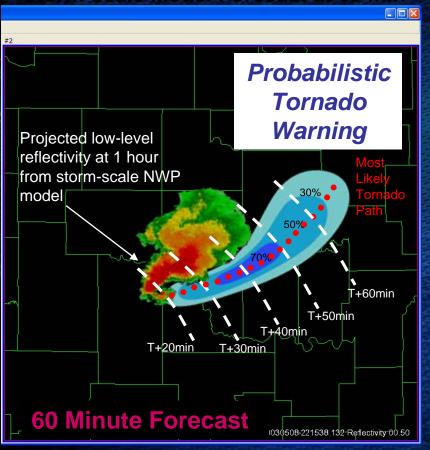
- Super resolution radar
- NOAA Center for Weather and Climate Prediction
- Wind profilers
- Water vapor sensors



## Where We're Headed

...And Beyond

Storm-scale Model Forecast at 60 min



## **Severe Weather**

- Warn-On Forecasts: Tornado warning lead time increases from an average of 13 minutes today to as much as 1 hour
- Severe Thunderstorm Warning lead time increases from an average of 18 minutes to as much as 2 hours

- Enables Emergency Managers to energize community response
- Lives saved and millions in savings

## Where We're Headed

...And Beyond

## **Tropical Cyclone Services**

- Warning lead time for landfall increases from less than24 hours to 3 days
- 50% reduction in 48 hr intensity error (~8 kts)
- 50% reduction in 48 hr track error (~50 nm)



- Saves lives/enhances public safety
- Improves response capability of emergency managers
- Mitigates property loss
- Economic impact increasingly complex (coastal development....)

# Where We're Headed ... And Beyond

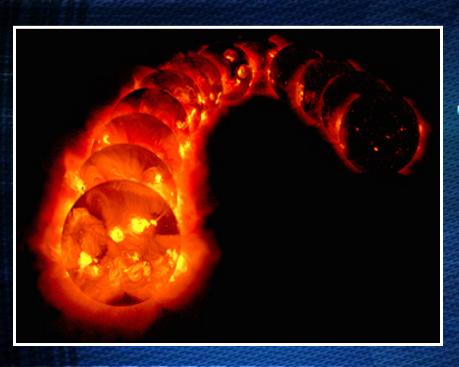


## **Aviation Weather Services**

- Aviation forecasts to exceed 80% accuracy
- New metric with FAA to determine weather impact on operations
- Weather support for Next Generation Air Transportation System
  - 4D weather cube

- FAA REDAC report indicates 2/3 of NAS weather delays
   Preventable—10% reduction translates to savings of \$600M/year
- Reduce general aviation weather-related fatalities by 25%

# Where We're Headed .... And Beyond



## **Space Weather Services**

- Seamless integration of space weather into our suite of products and services
  - Meeting new space weather service needs of fast-growing customer base

- Building hazard-resilient communities is NOAA-wide priority
- High-tech communities should be hazard resilient as well

# Where We're Headed ... And Beyond

### Winter Weather Services

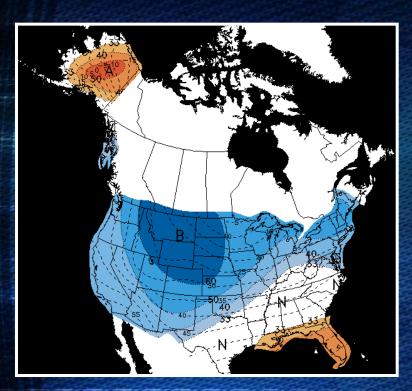
Warning lead time increases from an average of 18 hours to days

 Better forecast accuracy of storm onset and duration



- Reduce \$Billions in losses and improve safety for Air and Surface Transportation Ind.
- Better decisions by public prior to arrival of inclement Wx

# Where We're Headed ... And Beyond



## **Climate Services**

- Enhance products and services with climate change information
- Local outlooks for temperature, precipitation, El Niño/La Niña
- Seamless Climate, Water, and Weather products and services

- Reduce losses from wildfires
- Save lives and reduce property damages caused by major climate anomalies including drought
- Meet new needs with end-to-end suite of climate products and services

## Where We're Headed

...And Beyond

## **Water Resource Services**

- Provide high-resolution water quantity, quality, and soil moisture forecasts
  - Emergency and resource managers mitigate losses for conditions ranging from droughts to floods



- Enables NOAA to meet our Nation's growing needs for water forecasts
- Provides forecasts for consumption resources
- Provides important resource protection capabilities

# Where We're Headed ... And Beyond



# **Ecosystem Impact Information**

- Provide forecasts of weather, water, and climate impacts for management decisions
  - Management decisions reflect relationships among humans, nonhuman species, and the environments in which they live

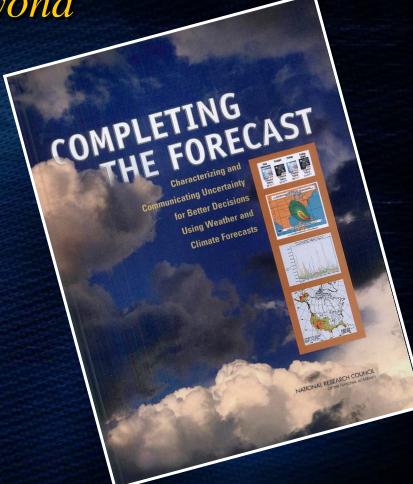
 Benefits through innovative approaches to spill preparedness, response, damage assessments and restoration, NOAA contributes approximately \$75 million annual to the U.S. economy.

# Where We're Headed

...And Beyond

Forecast Uncertainty Information

- Integral and essential part of all forecasts
- Enterprise-wide partnership to generate and communicate forecast uncertainty to decision makers and public
- Expressed in terms of probabilities



- Users decide whether to take action and appropriate level of response
- Thresholds unique to decision maker based on mission risk

# Research to Applications Needed Advances

- Observations
  - Improved spatial, temporal, spectral resolution (National Mesonet,...)
  - Integrated surface, upper, ocean obs. (Next generation satellites,...)
- Modeling
  - Fine scale, earth system, ensemble (HWRF,...)
- Forecast generation
  - IT systems & applications (AWIPS II, 4D,...)
- Service delivery
  - Decision support assistance (IMETs,...)
  - Product dissemination (CAP, GIS,...)
- Training and customer education
  - Weather Enterprise and public



# Working Together ....for our Future



