NWS Hydrologic Products and Services: Now and Future

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DRBC Flood Warning Users Forum

David Nicosia
Warning Coordination Meteorologist
NOAA’s National Weather Service
Binghamton, NY Forecast Office

607-770-9531 x223
david.nicosia@noaa.gov

NOAA’s National Weather Service
National Weather Service Mission

“To provide weather, water, and climate forecasts and warnings for the protection of life and property and the enhancement of the national economy.”

River Forecast Centers
National Weather Service Forecast Office
Areas of Responsibility - Northeast

Personnel
- Senior Forecasters: 5
- General Forecasters: 6
- Hydrometeorological Technicians: 3
- Electronic Technicians: 2
- Hydrologist: 1
- Management: 5
- IT position: 1
- Administrative support: 1
- Total Personnel: 24
The Present...

Flood Warnings

You may not have enough time to prepare once a flood warning is issued...
NWS Suite of Products and Services

NWS Suite of Official Forecasts

- Seasonal
  - Monthly Maps/Text
  - 8-14 Days
    - T Maps/P Maps/Text
  - 6-10 Days
    - T Maps/P Maps/Text
  - 3-7 Days
  - 0-48 Hours

Seasonal Forecasts

U.S. Seasonal Drought Outlook

Seasonal Drought Outlook

Key:
- Drought has ended or is increasing.
- Drought has ended, some improvement.
- Drought is likely to improve, some improvement.
- Drought development likely.

Map showing drought conditions across the U.S. with color-coded regions indicating different levels of drought severity.

Legend:
- Red: Severe to Exceptional Drought
- Brown: Moderate Drought
- Yellow: Abnormally Drought
- Green: Below Normal
- Blue: Normal

Maps showing drought conditions and outlook for different regions of the U.S.
What about Deep Snow Cover?

Hazards Assessment for Precipitation
3 to 14 day forecast
5 day rainfall total forecast

What if a hurricane or tropical storm is the threat?
National Weather Service Binghamton
Heavy Rain Potential
Briefing #1

Latest as of Monday 9/27/10 2 pm
For latest forecasts:
See http://www.weather.gov/bgm
Flood Watches

National Weather Service Forecast Office
Blacksburg, VA

Flood Warnings

National Weather Service Weather Forecast Office
Twin Cities, MN
Getting the Word Out

NOAA Weather Radio
The Future…

Near Term – Inundation mapping

Neuse River at Kinston, NC (KNN7)

Graphical representation of flood inundation for NWS Flood categories are based on steady state hydrologic modeling water surface elevations for incremental discharges. Map shows approximate inundation areas for given water surface elevations and should not be used for navigation or permitting or other legal purposes, but should only as a planning reference tool.
Dual-polarization Radar

Benefits

- Better able to distinguish between rain, hail, sleet, and snow.
- Improved data quality.
- Significant improvements in precipitation estimates.

Deployment 2011-2012
The Longer Term: Climate Change

Global average temperature 1850-2009
Based on Brohan et al. 2006

Global combined land-surface air temperature and SST anomalies (°C) (red) for 1850 to 2009 relative to the long-term mean, along with 5 to 95% error bar ranges, from HadCRUT3 (The smooth blue curves show decadal variations).
Muir Glacier, Ak: August, 1941 (photo by William Field) August, 2004 (photo by Bruce Molnia)

Average Monthly Arctic Sea Ice Extent
September 1979 to 2009

Source: National Snow & Ice Data Center  http://nsidc.org
http://nsidc.org/images/arcticseacenews/20091005_Figure3.png
It will be a warmer & wetter world

Figure 6. Trends in the 99th percentile of daily accumulations per decade from 1948-2007. Increasing trends are shown in red, decreasing in blue. Trends were calculated from ten 51-year window time series. Statistically significant trends are indicated by black diamonds.

CHANGE IN PRECIPITATION BY END OF 21st CENTURY
inches of liquid water per year

as projected by NOAA/GFDL CM2.1
Warmer world since 1998...
More Floods???

Major Floods Each Year 2002-2007

May 2002

Ivan 2004

April 2005

June 2006

July 2003

June 2007
**Enhanced Climate Services**

Enhance climate services to help communities, businesses, and governments understand and adapt to climate-related risks.

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**Where We’re Headed**

**Climate Services**

- Climate information demands increasing
  - High quality observations
  - Improved seasonal to inter-annual prediction
  - Downscaled products and services to regional and local levels

- Entire Weather and Climate Enterprise must work together to meet these challenges
  - NWS committed to doing our part

- Improve Preparation for and Response to Heat Waves, Drought, Coastal Inundation, and Other Phenomena

- Relevant and Reliable Climate Data Will Stimulate Private Development of Technologies and Applications
• But now, it’s not just good enough to make a better weather forecasts.
• Insure appropriate level of information is getting to decision makers.
• Better insight into how people react and respond to warnings.
• Focus on user-defined impact based-warnings.

NWS Decision Support Services-
Painting a Complete Picture Quickly

New Decision Tools created by a team of Social Scientists with Emergency Managers
• Visualizations of inundation “impact” for various flooding scenarios
• Visualization of uncertainty model inputs for more clear understanding predictions
• Allow for local knowledge to be incorporated into impacts (inundation and costs)
• Fusion/organization of information for clear understanding of relationship to one another and enhanced orientation.
NWS Strategic Plan for 2020

Integrated Water Services
Deliver a broad suite of improved water services to support management of Nation’s water supply

Where We’re Headed

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
Questions?