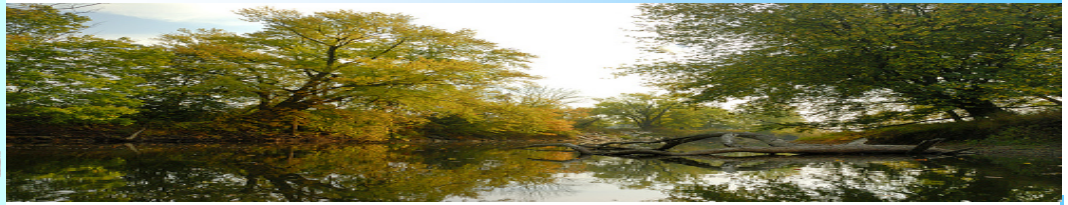




Autumn 2007



# NOAA's Northeast River Forecast Center



Source; <http://www.flickr.com/photos/billandkent/1508063206/in/photostream/>

## Inside this issue:

<i>From the Desk of the HIC</i>	1
<i>Pilot Project to Improve Temperature Forecast</i>	1
<i>Drought Conditions Prevail in Parts of Northeast</i>	2
<i>Early Winter Outlook</i>	3

*"When the well is dry, we know the worth of water."*

Benjamin Franklin, 1746.

We're on the web at:

[www.weather.gov/nerfc](http://www.weather.gov/nerfc)

NOAA's Northeast River Forecast Center

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## From the Desk of the HIC

By David Vallee  
Hydrologist-in-Charge

The fall is a time of transition, and for the Northeast River Forecast Center (NERFC), it is a time to lay the foundation for our goals and new initiatives for the coming fiscal year. I would like to take this opportunity to share with you some of the goals NERFC will be working on this coming year.

NERFC had a tremendous success story this past spring, with the implementation of the FLDWAV model to help us forecast the tidal and storm surge contribution to the river flow on the tidal Connecticut and Hudson Rivers. We hope to expand this approach to other rivers in the region, including the Merrimack, Penobscot and Kennebec. We will be continuing our modeling and calibration efforts to expand full AHPS services to the lower Merrimack Basin and across several rivers in southern New England and southwest New Hampshire.

Working with our Weather Forecast Offices, effort will be spent examining ice jam forecasting. This challenging and very complex issue will be tackled from both from a site specific ice jam scenario standpoint as well as from a more region-wide approach to forecast the potential for jam formation and break-up as part of our Winter/Spring Flood Outlook services.

In the outreach arena, NERFC will be formalizing a customer advisory board. It is envisioned that this board will help us ensure our products and services are meeting your requirements and that new services meet your expectations. Lastly, NERFC will continue to provide hydrologic expertise and assistance to several NOAA collaborative efforts including Harmful Algae Bloom research and dam removal efforts on the Penobscot River.

We look forward to another exciting and productive year as we strive to provide you with the most accurate and timely river and flood forecast information and services.

## Pilot Project to Improve Temperature Forecasts in High Elevation River Basins

By Ronald Horwood, Senior HAS Forecaster

The Northeast River Forecast Center (NERFC) is participating in a Pilot Project with the National Centers for Environmental Prediction's (NCEP) Hydro-meteorological Prediction Center to improve temperature forecasts in NERFC river basins with significant elevations above 2000 feet.

### Background

The NERFC has been in the process of updating its snow model, SNOW-17. Now, the new procedure divides river (continued page 2)

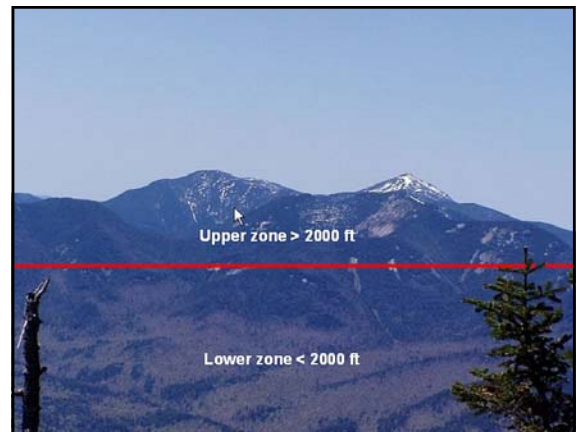


Figure 1. Portion of the E. Branch of Ausable Forks basin split into lower and upper zones.

## Drought Conditions Prevail in Parts of the Northeast

By Jeane Wallace, Senior Hydrologist

Below average precipitation combined with unusually warm and windy weather has led to the development of drought conditions in parts of the NERFC area since July. Originally confined to far western New York State from the Genesee Valley westward, drought conditions began to spread into eastern New York and southern New England by September.

At its height in late September, severe drought conditions were being seen from Buffalo to Watertown, NY. 90-day precipitation in these drought-stricken regions is anywhere from 4 to 8 inches below normal. According to the USGS, streamflow in western New York and southern New England ranges from below to much below normal for mid November. And when averaged over the past 28 days, streamflow in portions of Massachusetts, Rhode Island and Connecticut is near record low levels.

Groundwater is also showing signs of strain as levels are below normal throughout most of the drought-depicted area

Recent rainfall has led to improvement in drought conditions throughout the northeast. The region to the east of Lake Ontario has now been removed from drought designation and the portion of southern New England affected by drought has been significantly reduced (see figure 1). While parts of southern New England remain in "D1" (moderate drought), and western New York state in "D0" (abnormally dry), climatological forecasts point to continued improvement in drought conditions over the next 2 to 3 months.

### Pilot Project (continued from page 1)

basins into lower and upper elevation zones at approximately 2000 feet MSL. This allows SNOW-17 to independently model conditions above and below 2000 feet. This becomes important especially in the winter when differences in snow depths and water equivalent can be dramatic with an increase in elevation. Previously, SNOW-17 averaged temperature, precipitation and snow water equivalent across the entire river basin.

As the NERFC began transitioning to modeling the upper and lower elevations separately, it became apparent that during wintertime mixed precipitation events there were problems modeling the response of the watershed. This frequently occurred during events when rain was occurring in the lower elevation zone (< 2000 feet) while snow was falling across much of the upper elevation zone (> 2000 feet).

The problem is due to the fact that forecast temperatures for upper elevation zones are calculated by SNOW-17 using a constant lapse rate that only varied monthly across individual river basins. For example, during January, the forecast temperatures for the upper zone of the East Branch of the Au Sable River in upstate New York were always 4° F less than the forecast temperatures in the lower elevation zones regardless of weather. Difficulties arise during precipitation events because atmospheric temperatures often become close to isothermal (equal temperature) from the surface to as high as 5000 – 7000 feet MSL. In fact, it is not uncommon during freezing rain events for temperatures at 3000 – 5000 feet MSL to be higher than at the surface.

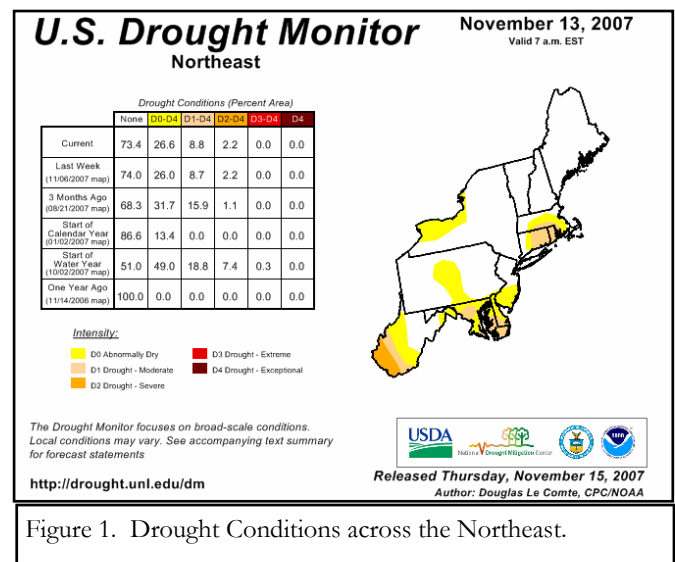


Figure 1. Drought Conditions across the Northeast.

Two operational forecast problems directly associated with assuming a constant lapse rate from the lower to upper zones in the SNOW-17 include:

- Forecasting rain in the upper zone of a basin when there is cold air aloft and rain is falling in the lower zone if temperatures in the lower zone of a basin are in the upper 30s to around 40° F. This occurs because a constant lapse rate may assume temperatures slightly above freezing, when in fact, it may be quite a bit colder. This scenario is common early in fall and spring.
- Forecasting frozen precipitation in the upper zone of a basin during freezing rain events. During freezing rain events, the upper portions of high elevation basins are warmer than the valleys and often receiving rainfall while at the surface temperatures are at or below freezing. A constant lapse rate would incorrectly forecast temperatures to decrease as you increase in elevation.

NERFC meteorologists decided a possible solution to the problems associated with assuming constant lapse rates from lower to upper elevation zones could be overcome by using forecasts of temperature from numerical weather models at 925 mb. 925 mb is approximately 3000 feet MSL which is close to the median elevation of many upper zones for which the NERFC forecasts.

HPC will send the NERFC 48 hours of 925 mb forecast temperatures 4 times a day (00, 06, 12 and 18 GMT) from the 40 km NAM-WRF numerical weather prediction model. These temperatures are processed through software at the NERFC and gridded basin average 925 mb temperatures are input into SNOW-17 model for use in operational forecasts. The NERFC runs this project from October 1 through April 30 when snow frequently occurs in the higher terrain of New England and New York State. The project became a part of routine NERFC forecast operations during March 2007 and initial results appear to be encouraging.

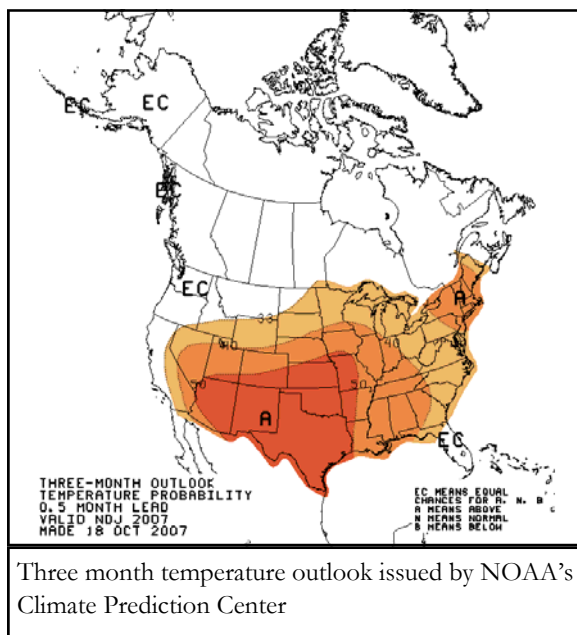
## Early Winter Hydrometeorologic Outlook

By Steven Nogueira, HAS Forecaster

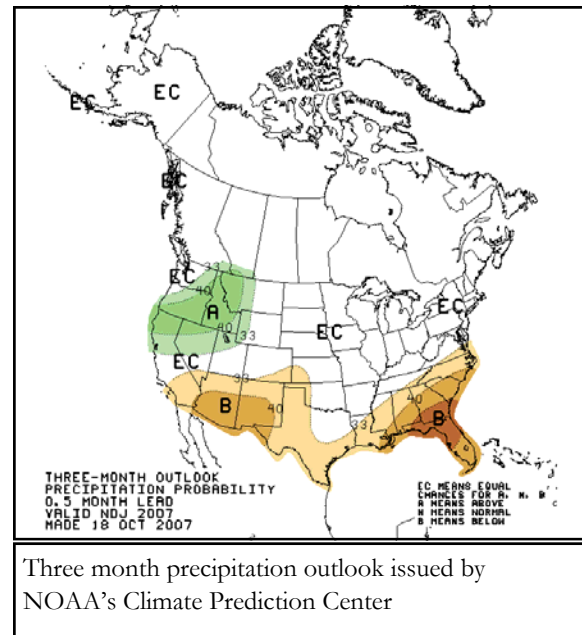
Very dry weather persisted across the northeast through the summer, although there were some indications that the pattern was at least temporarily becoming wetter during late summer and early autumn. Across western and central New York where the driest weather was noted during summer, rainfall had finally begun to increase and ease the drought conditions. Across the rest of the northeast, rainfall was lighter toward the end of summer and early autumn, and now portions of Southern New England are in drought.

The seasonal outlook from the Climate Prediction Center that covers November through January indicates that temperatures have a good chance of being above normal for the period. The outlook for precipitation during this period gives the northeast equal chances for above normal or below normal amounts.

The Climate Prediction Center is forecasting below normal soil moisture during the same period, which is indicative of only a slight chance of flooding.



Three month temperature outlook issued by NOAA's Climate Prediction Center



Three month precipitation outlook issued by NOAA's Climate Prediction Center

We're on the web at:

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The NERFC Nor'easter is a quarterly publication of the Northeast River Forecast Center which is part of NOAA's National Weather Service. Your comments are welcome.