Photo by Mike Cempa

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The Coastal Front

Fall 2012

Volume III-3

New Spotters Trained

By Mike Cempa, Skywarn Coordinator

The National Weather Service in Gray would like to welcome 180 new Skywarn Spotters. These individuals have attended one of seven Skywarn Spotter training classes hosted across the area this spring and summer. Once trained, these volunteers are assigned a spotter ID and provide valuable information to the National Weather Service during significant weather events. These are your neighbors helping the NWS provide better forecasts and warnings to you!

Spotter training sessions were held in South Portland, Belfast, Gorham, and Auburn in Western Maine. There were also sessions held in North Conway, Concord, and at WMUR studios in Manchester, NH. If you are interested in having a Skywarn Spotter training session in your area, email mike.cempa@noaa.gov or call the NWS Gray at 207-688-3216.

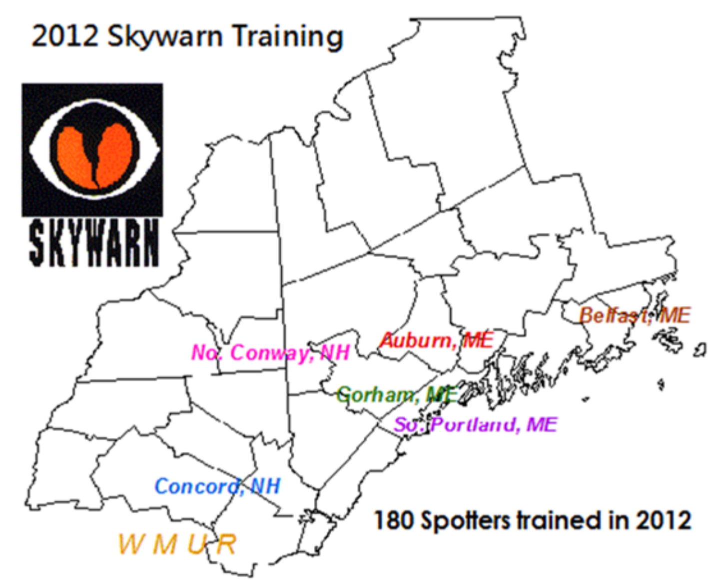

Figure 1: Map of Skywarn Spotter training sessions in 2012.

Waterspouts in New England

By Chris Kimble, Journeyman Forecaster

This summer there have been several reports of waterspouts across New England. The area's two largest lakes, Lake Winnipesaukee in New Hampshire and Sebago Lake in Maine, both have had waterspouts this summer, as well as Newfound Lake in New Hampshire. The many reports of waterspouts have prompted some to ask, "What's the difference between a waterspout and a tornado?" While the traditional definition indicates that a waterspout is simply a tornado which occurs over water, over the last few decades scientists have begun to understand that the processes involved in generating a waterspout are often quite different from the more classic tornado. Scientists now group tornadoes and waterspouts into two categories: mesocyclone tornadoes and non-mesocyclone tornadoes.

Figure 2: Waterspout over Lake Winnipesaukee in New Hampshire on June 25, 2012. Photo by Tricia and Daniel Phaneuf.

Mesocyclone tornadoes are formed in the mature stages of supercell thunderstorms. These long-tracked and violent thunderstorms are responsible for the majority of severe weather reports. The environment which spawns them is characterized by strong instability through a deep layer of the atmosphere in combination with strong winds which vary in speed and direction at different heights. The strong instability (warm, moist air at the surface and colder air aloft) produces the thunderstorm, and the changing wind speed and direction allows the storm to rotate. As the updraft of the thunderstorm rotates, it can produce a funnel-shaped lowering in the cloud base. Once this funnel cloud touches the ground it is called a tornado. These tornadoes are responsible for the most death and destruction, with some of the fastest wind speeds on the face of the planet occurring within the strongest tornadoes. These tornadoes can last from a few minutes to more than an hour. They can tear a path of destruction more than one mile wide and up to 100 miles long.

Non-mesocyclone tornadoes, however, are not formed within supercell thunderstorms and are how most waterspouts are characterized. They are formed in an environment characterized by low level instability and weak wind speeds. In fact, it is common to find that non-mesocyclone tornadoes form in the developing stages of showers. There may not even be a thunderstorm present. Most often these tornadoes form along a weak boundary such as a sea/land breeze where winds blow toward each other. As the winds converge, the rising motion beneath the updraft of developing showers is enhanced, and the necessary rotation to create the

Waterspouts in New England (Continued)

tornado/waterspout is generated. Non-mesocyclone tornadoes are often much smaller and weaker than their more familiar counterparts. Their wind speeds rarely exceed 100 mph, placing them in the EF-0 to EF-1 range in tornado intensity. Their diameter can range from a few feet to 100 yards, and they normally move slowly. Non-mesocyclone tornadoes which occur over land are sometimes referred to as landspouts as they more closely resemble the waterspout than the traditional mesocyclone-generated tornado. While weaker than other tornadoes, waterspouts can still produce damage. Some have been known to overturn and sink boats.

Because non-mesocyclone tornadoes are formed in a more benign environment from rather innocuous-looking showers, they are much more difficult to predict. The cumulus clouds from which a waterspout can form may be only 9,000 – 15,000 feet high, while most thunderstorms have cloud tops higher than 30,000 feet. At locations far from a weather radar, the entire shower may occur beneath the radar beam and be invisible to forecasters! But even at very close ranges to a radar, the scale of the tornadic circulation is too small to detect. Forecasters must rely on valuable reports from witnesses and storm spotters in order to provide warning of these events.

Summer Weather Review

By Chris Kimble, Journeyman Forecaster

June started off cold and wet with more than 7 inches of rain falling in the first week of the month, and temperatures staying in the 50s and 60s. But the pattern would gradually shift to a warmer and drier one by the end of the month. June was the first month with below normal temperatures since June 2011. It was also the 5th wettest June in Portland.

The warm weather continued through much of the months of July and August, although there were no very hot periods. By the middle of August the area returned to another wet period, with more than 5 inches of rain falling in the second week of the month.

The hottest temperature of the summer in Portland was 93 degrees on June 20. Although there were no extremely hot periods (only 4 days reaching 90+), the summer was warm and humid on the whole. There were 42 days with highs greater than 80 degrees (roughly 8 days more than normal) and 52 days with lows 60 or above (about 18 days more than normal). It was also much wetter than normal, with the 19.15 inches of rain marking the 2nd wettest summer on record at Portland.

	HIGH	LOW	AVE	PRECIP	90+
June	71.2 (-2.0)	55.3 (+1.7)	63.3 (-0.1)	8.63 (+4.84)	1 (+0.3)
July	81.1 (+2.3)	61.5 (+2.1)	71.3 (+2.2)	4.31 (+0.70)	2 (+0.5)
August	79.8 (+2.1)	61.8 (+3.6)	70.8 (+2.8)	6.21 (+3.07)	1 (-0.1)
Summer 2012	77.4 (+0.8)	59.6 (+2.5)	68.5 (+1.6)	19.15 (+8.61)	4 (+0.7)

Table 1: Summer 2012 climate statistics for Portland.

River Forecast Center – Forecasting High Water

By Margaret Curtis, Meteorologist Intern

As a newsletter reader, you are familiar with many of the jobs we do here at the Weather Forecast Office (WFO) in Gray, ME. There are many other offices and centers around the country which partner with WFO Gray, ME to ensure that residents of New Hampshire and western Maine get the most relevant and up-to-date information. One of these is the Northeast River Forecast Center in Taunton, MA. The NERFC is one of 13 River Forecast centers which provide river forecasts for the United States. The NERFC serves all of New England as well as New York. As a part of the National Weather Service, the NERFC's primary mission is to protect life and property by providing advanced notice of high water and flooding conditions on the Northeast's waterways. Additionally NERFC forecasts are used by recreational paddlers and dam operators to assist in managing the rivers for all users.

While WFO Gray, ME forecasts for a variety of weather elements the NERFC focuses on the water cycle. NERFC provides forecasts of precipitation amounts. During the winter months, the amount of snow on the ground is also monitored by NERFC in conjunction with the hydrologists at individual offices. While the spring melt is often the busiest time of year for river forecasters, heavy rains can create high water levels at any time of year (such as Hurricane Irene last year). The NERFC helps provide a more accurate forecast for river levels.

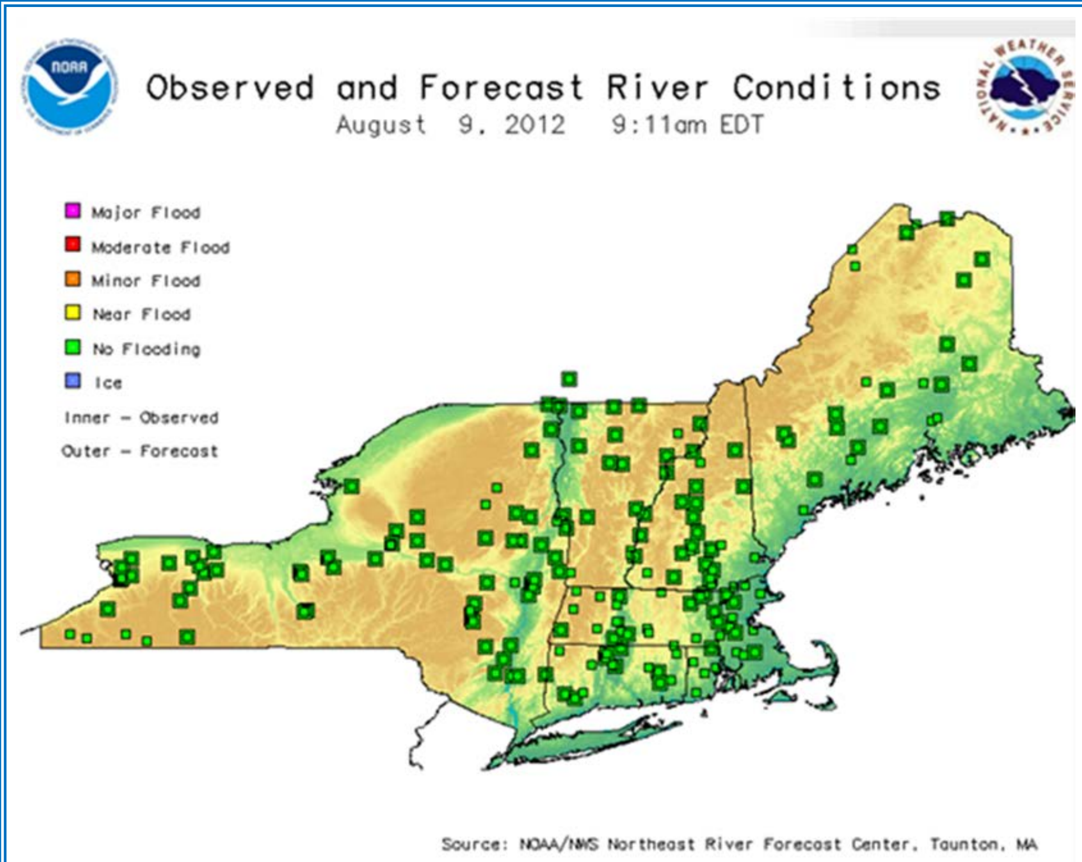

Figure 3: Forecast Points located on major rivers in the Northeast.

CoCoRaHS Corner – Rainfall Measurement

By Stacie Hanes, Senior Forecaster

The Community Collaborative Rain, Hail, and Snow Network (CoCoRaHS) is a volunteer network of observers who provide valuable information about the weather from their backyards. The reports of rain, hail, and snow are used by the NWS and many other organizations in research, forecasts, and warnings. You can be a CoCoRaHS observer! Just go to www.cocorahs.org to sign up. This topic of this CoCoRaHS Corner is rainfall measurement.

It is important to be accurate when reading your rain gauge because scientists, engineers, and many other professionals will use your data in weather models and research. Therefore, it's imperative to be clear on how to read your gauge.

There are three parts to a standard 4-inch rain gauge which you should be using for your daily measurements. They include the 4-inch overflow tube (the outer tube), the measuring tube (the inner tube), and the funnel. The funnel directs the rain into the inner tube which allows observers to report rainfall to the nearest 0.01" (one hundredth of an inch). If your total rainfall has reached the 0.30" line, you have a total of three tenths of an inch of rain, or 30 hundredths. Halfway between 0.30" and 0.40" would be 0.35". The measuring tube will hold a total of an inch of rain when full.

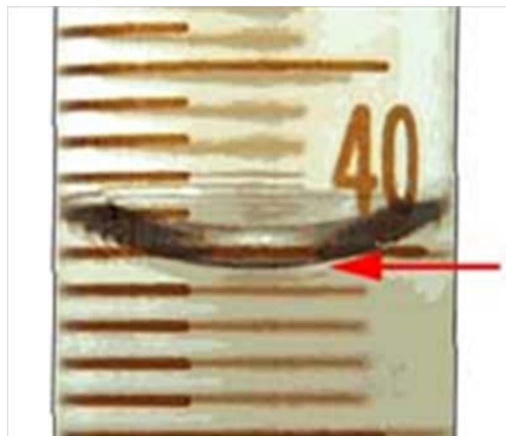

Figure 4: A meniscus. There is 0.40 inches of rain in the tube.

As water fills the measuring tube, a curved surface called the meniscus is formed by the water's tension with the sides of the tube. Always take your measurements at the base of the meniscus (see Figure 4).

If it rains more than an inch, the excess will spill into the overflow tube. If water is in the overflow tube, follow these steps to take the measurement. Measure the rain in the measuring (inner) tube first, record it, and empty it. Now pour some of the water from the overflow tube into the measuring tube being careful not to spill any, record it, and empty it. Keep doing this until the overflow tube is empty. Now add up the totals.

Now, what do you do when you just have a few drops of moisture from dew or fog, but no rain fell? Do not report it as precipitation. Just report 0.00". It is important to report zeroes as well as non-zero rainfall reports, as more and more climatologists are studying drought patterns. So, remember to keep those reports coming and have fun!

NWS Meteorologists Assist in a Controlled Burn

By Margaret Curtis, Meteorologist Intern

On Friday August 24th, 2012, the Maine Department of Forestry (MEDOF), in conjunction with the Maine Department of Inland Fisheries and Wildlife (MEIFW), conducted a controlled burn of 25 acres in Fryeburg, ME. The burn was located just south of the Eastern Slopes Regional Airport and encompassed a pine barren habitat within the Brownfield Bog Wildlife Management area. The goal of the burn was to promote habitat growth for endangered species. John Leavitt of the department of Forestry invited Stacie Hanes and Margaret Curtis of the National Weather Service to take part in the burn. The Fryeburg Fire Department, U.S. Forest Service Androscoggin District office, and several others participated in the burn.

Weather observations were taken by the NWS meteorologists every 30 minutes. A sling psychrometer, kestrel wind meter, and charts were used to calculate relative humidity, fine fuel moisture, and the probability of ignition.

Figure 5: A firefighter helps control the burn area near Fryeburg, Maine.

While on site at the fire, the meteorologists learned how small changes in the humidity have a large impact on the fire community (the relative humidity had to drop below 60% to start the fire). The importance of mixing height and the timing of the inversion breaking was also clearly seen on the fire. The south portion of the fire was lit just before noon, and the flame lengths remained small and progressed a bit slower. The second portion of the fire was lit around 3 PM after the atmosphere was well mixed. This resulted in larger flame heights, more rapid fire growth and a towering smoke column, and demonstrated the importance of accurate fire weather forecasts.

The largest challenge was the very calm wind conditions (even Mount Washington reported calm winds!). Because of this, the fire largely created its own inflow wind field. While the wind was rarely above 3 mph, it varied in direction quite a bit. Although the burn site was less than a mile from the airport, the observed conditions were often quite different at the fire than at the airport.

WFO Gray provides forecasts and weather briefings to many fire agencies across Maine and New Hampshire. An on-site forecaster provided valuable information for the fire and the office.

Fall is in the Air

By Margaret Curtis, Meteorologist Intern

Farmington, ME	Sep 17
Jackman, ME	Sep 17
Rangeley, ME	Sep 17
Bridgton, ME	Sep 26
Sanford, ME	Sep 30
Belfast, ME	Oct 6
Portland, ME	Oct 6
Augusta, ME	Oct 8
Colebrook, NH	Sep 7
Grafton, NH	Sep 8
Plymouth, NH	Sep 16
Lancaster, NH	Sep 17
Concord, NH	Sep 21
Durham, NH	Sep 24
Hanover, NH	Oct 4
Lakeport, NH	Oct 4

Table 2: Average first freeze dates in autumn (1981-2010).

The fall is always a busy time for gardeners as we try to harvest our remaining plants, mulch, and prepare beds for over-wintering. In many parts of the region, the first frost is all too quickly approaching. The average first freeze date in northern New England varies from the middle of October along the coast to as early as the second week of September in sheltered locations in the mountains. A freeze sometimes occurs as early as August in inland areas and the middle of September near the coast. The table on this page displays the average first freeze for several locations.

To assist gardeners and commercial growers, the NWS has several products issued during the growing season (before the first killing freeze in fall and after the average last freeze in spring):

Frost Advisory is issued when temperatures are expected to fall between 33F-36F with calm and clear conditions that may result in frost formation.

Freeze Warning is issued when temperatures are expected to drop below 32F. When possible, a Freeze Warning is preceded by a Freeze Watch.

For questions, comments, or suggestions contact us at GYX-Newsletter@noaa.gov

Photo by Mike Cempa