

New Hampshire Skywarn

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Purpose

This document provides information for SKYWARN network control operators and members within New Hampshire. The document is organized into the following sections:

Section I - Introduction to SKYWARN

Section II - Activation Procedure and Contact Personnel

Section III - Activation Levels

Section IV - Net Operations

Section V – Liaison with NWSFO Taunton

Appendix A – New Hampshire Frequency Plan

Appendix B – Reporting Criteria and Priorities

Appendix C – NWS WeatherRadio and SAME Codes for New Hampshire Counties

Appendix D - Suggested Equipment List for Net Control Operators

Appendix E - Tornado Classifications

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Appendix I - Change History

I Introduction to SKYWARN

The National Weather Service SKYWARN system's goal is for the public to report precise and dependable information to NWS weather meteorologists for the protection of life and property. For members of the public to achieve SKYWARN status, the National Weather Service Office's Warning Coordination Meteorologists offer training so that anyone can become trained in SKYWARN and assist the National Weather Service in its prime objective.

Amateur radio operators perform a unique service for the National Weather Service. With their mobile radio transmitters, technical knowledge, and NWS certified SKYWARN training, Amateur Radio SKYWARN weather observers activate SKYWARN or Severe Weather Emergency Nets, which in conjunction with the general public, provide the National Weather Service with validation of severe weather reports throughout the coverage area.

Despite the technological advances provided by Doppler Radar, the only way fully valid information of severe weather can be disseminated to the public, is through validation of the radar reports through ground based weather spotters. The general public can report this information via telephone or through public service officials. Amateur radio operators can report this information via telephone or by voice and packet transmissions.

The National Weather Service Forecast Offices in Taunton, Massachusetts and Gray, Maine can receive reports from weather spotters and public safety officials, and also from amateur radio operators via voice and packet communications. This allows NWS to take reports from the public even if telephone communications were to be interrupted.

II. Activation Procedure and Contact Personnel

The New Hampshire ARES SKYWARN Spotter Network for NWS Taunton or NWS Gray may be activated under the following conditions:

- Whenever a severe thunderstorm, tornado, hurricane, or flood watch is issued.
- Whenever a winter storm, blizzard, or high wind warning is issued

- If, in the lead forecaster's opinion there is a strong potential for severe weather

The network is activated by a phone call from the lead forecaster at either NWS office to the ARES SKYWARN Coordinator. The ARES SKYWARN Coordinator is:

Marc Slater
(H) 603-673-1674

(W): 603-878-5055
Cellular: 603-930-5757

Home Email: slater@mas.mv.com
Work Email: mslater@schange.com

The ARES SKYWARN Coordinator activating SKYWARN will:

- Phone the appropriate areas for which SKYWARN activation is required or will likely be required in the next few hours.
- Assist in any other way possible to expedite activation of the ARES/SKYWARN Network for the region.

The ARES SKYWARN Coordinator will contact the following personnel in each affected district in order to activate SKYWARN in New Hampshire:

Once notification has been received, that individual is expected to bring up a SKYWARN net and solicit weather reports from any stations on frequency, and relay those reports to the appropriate NWSFO. The Frequency Plan is provided in Appendix A.

Please note that if severe weather is observed, and no net is active, any amateur can activate the net to warn other amateurs, and begin collecting weather observations.

The list of Emergency Coordinators can be found at
http://www.ares.nhradio.org/attach_b.pdf

This net will relay reports to the appropriate NWSFO via the Spotter line, Packet, or via the NWS liaison frequencies. The amateur radio operator at the NWSFO amateur radio station may also check in and field reports from these weather nets. Appendix A contains the commonly used SKYWARN net and liaison frequencies.

III. Activation Levels

The level of activation, and the response of the amateur community, depends on the nature and severity of the weather event. Nets may be activated in stand-by mode, as an informal net, or as a formal, directed net.

The level of activation gives an indication of the severity of the impending weather and how wide spread the impact of the weather is expected to be. A Level III activation implies a more localized impact, and is the lowest level of activation. A Level I activation implies a more wide spread, more urgent response is required, and is the highest level of activation.

In most cases, the level of activation and the status of the SKYWARN net is set at the discretion of the local ARES SKYWARN operator.

SUMMERTIME ACTIVATIONS:

Level III: While severe weather is not expected at a widespread level, some scattered thunderstorms may approach and reach severe levels in a given time period. SKYWARN activation in various local areas may be necessary in case a Severe Thunderstorm or Special Marine Warning is issued for a localized area (one or two counties.). Net control operators will initiate a stand-by net and escalate the status of the SKYWARN net as the situation dictates. This is the lowest level of activation.

Level II: The potential exists for severe weather over a widespread area. A Weather Watch Issuance (Severe Thunderstorm, Tornado, Flood, Hurricane Watch) requires Stand-By Activation of SKYWARN. This means that NCS's and contact people should be near a amateur radio and monitor the situation as it develops. Particularly with Severe Thunderstorm, Tornado and Flood Watches, amateur operators should prepare for possible severe weather within a few hours of the Watch issuance and have a SKYWARN net standing by on frequency in case severe weather warrants a directed net later.

Level I: When Severe Thunderstorm, Special Marine, Tornado, Flood or Hurricane Warnings have been issued for the specified area, a directed net should be instituted. Particularly in Severe Thunderstorm, Tornado, and Flood Warnings, a directed net should be instituted immediately after the warning is issued. In a hurricane warning, the net can remain in stand-by mode until the first feeder bands of the hurricane reach the coast, then the status of the net can be escalated to a directed net. This is the highest level of activation.

WINTERTIME ACTIVATIONS:

Level II: For Winter Weather Advisories, hourly or bi-hourly activation's for Snowfall Reports, Road Conditions and any type of damage can be forwarded.

Also, location of the snow/ice/rain line can be forwarded, as it is difficult to detect on radar. Final reports on snowfall or after a changeover to rain can be forwarded.

Level I: If Blizzard Warnings, High Wind Warnings, Coastal Flood Warnings, Winter Storm and Flood Warnings are issued for the region, this will require at least hourly activation of SKYWARN, and perhaps formal directed net mode if reports of damage and weather warrant. Snowfall, rainfall, and damage reports as well as the rain/ice/snow line should be reported.

Appendix C describes prioritization and what to report.

IV. Net Operations

As stated previously, the primary purpose of the SKYWARN program is to assist the National Weather Service in gathering information to make an accurate prediction. SKYWARN operators should update the amateur community of the situation, and maintain the status of the net in line with the current weather situation.

The flow of the net is generally:

- announce the net
- take check ins
- designate net control operators for secondary SKYWARN frequencies and alternate net controls
- allow stations with announcements to transmit their information
- ask for reports of severe weather on a regular basis
- relay reports of severe weather to the appropriate NWSFO

The SKYWARN net control operator should contact the appropriate Emergency Coordinator for the area, by one of the methods listed in Section II.

The SKYWARN net control operator should start a log. This log need not show every single contact, but it should show the following:

- Time of Activation.
- When Watches and Warnings were sent out.

- Time, frequency, location (by city and county), and call signs and names of stations reporting severe weather that will be used in NWSFO statements
- Weather observations per the following format:
 - Time of report (in local 24hr format)
 - Callsign of reporting station
 - Temperature
 - Skycover (overcast, mostly cloudy, partly cloudy, clear)
 - Wind direction
 - Wind speed
 - Wind gust
 - Barometer (and rising or falling)
 - Type of precipitation currently falling (if any)
 - Total precip for the storm
 - Moisture content
 - Any additional notes from that station
- Time of deactivation.
- Any other significant events that occurred relating to SKYWARN.

The net control station should identify themselves and the net every 10 minutes. Ask for any reports of severe weather, and for any further check ins. Reannounce the purpose of the net at least every 30 minutes.

Finally, when National Weather Service meteorologists issue weather statements, watches and warnings, if time allows, the operator should read the statement as written by the NWS forecaster. No changes or deletions should be made. If there is not enough time to read the statement, be sure to give a clear and concise summary on watches, warnings and reports to the weather spotters,

so they can guide their roving spotters to next “hot spots” of severe weather, and react to changing weather situations.

All reports of damage meeting the strong or severe criteria of severe weather should be logged. NWS meteorologists will use this information in their Local Storm Report or Other Public Products report and later in the printed publication called Storm Data. See Appendix C for reporting criteria.

V Liaison with NWSFO Taunton MA and Gray ME

This section describes the methods with which the SKYWARN net control operator and other amateur radio weather spotters can interface with National Weather in times of severe weather.

- The NWS spotter line. (Should not be given over the air.) In general, only those who have received NWS training and have received a spotter card and number have the hot line number. Net control operators should also have the hot line number in order to be able to relay reports of severe weather directly to NWS Taunton, especially if the operator at NWS cannot be raised on any of the liaison frequencies. Contact the SKYWARN Liaison listed in Section II to obtain the hot line number.
 - Call the NWS at the toll-free number.
 - Identify yourself with your Spotter ID # and your name.
 - BRIEFLY describe WHAT was observed; and WHEN & WHERE it was observed.
 - If you cannot reach NWS and you consider your report to be life-threatening, call your local police or fire department, explain who you are, and ask that they relay the report to the NWS.
-
- The net control operator at NWS Taunton may monitor area weather nets from time to time. Liaison frequencies are listed in Appendix A. The net control operator running the SKYWARN net should listen on one or more of the liaison frequencies, announce themselves from time to time, and call the NWS Taunton operator if needed to pass along reports of severe weather
 - In the case where the NWS Taunton operator checks into the active SKYWARN net, the net control operator should pass along any reports of severe weather on behalf of the net.
 - If the status of the net is stand-by or informal, the net control operator should identify themselves and append /SKYWARN to their call, and then attempt to relay any formal reports to the NWS operator to avoid wasting time.

NWS prefers that weather observations be passed as tactical messages. If a weather observation is being relayed through the Amateur system, it may be formatted as NTS traffic as follows:

1 R KB1DFE 9 BROOKLINE NH 15-OCT-02

JERRY BLANCHARD K1BBQ

BT

0700EDT KA1VGM SURRY NH 55F OVERCAST

NE45/55/ESTIMATED 29.5FALLING

RAIN/3.5

MARC KB1DFE

BT

KEY:

- TIME OF OBSERVATION: 0700EDT
- OBSERVER: KA1VGM
- LOCATION: SURRY NH
- TEMPERATURE: 55F
- SKYCOVER: OVERCAST (or CLEAR or BROKEN)
- WINDS/GUSTS: WINDS AT 45 MPH FROM THE NORTH EAST, GUSTING 55 MPH and
wind conditions are ESTIMATED - PRESSURE: 29.5 INCHES AND FALLING
- PRECIPITATION: RAINING (or HAIL or THUNDERSTORM), STORM
TOTAL 3.5
INCHES

Up to date hard copy of NWS bulletins are available from the following Internet locations:

- National SKYWARN page - <http://www.skywarn.org/weather.htm>
- NWS site - <http://iwin.nws.noaa.gov/iwin/nationalwarnings.html>
- Weather.com - <http://www.weather.com/> and type your zip code into the appropriate box
- Another NWS link - <http://tgsv5.nws.noaa.gov/er/box/>

Appendix A: New Hampshire SKYWARN Frequencies

This section lists the frequencies that may be used during SKYWARN activation in New Hampshire.

Identifier	Frequency	PL	Location
Primary liaison frequency to NWS Taunton	443.350	110.9	Pack Monadnock NH
Secondary liaison frequency to NWS Taunton	53.310	71.9	Mt. Wachusett MA
Primary liaison to NWS Gray	53.190	203.5 141.3	Pack Modnadnock Mt Washington
Granite State FM Traffic Net	146.940		Concord NH, daily at 20:30 local
Granite State Phone Traffic Net	3942 kHz		LSB 3942 kHz, 6:30 PM Daily LSB 3945 kHz, 9:30 AM Sunday
Primary APRS	144.390		
Weather Preparedness Net	7231.5 kHz or 3993.5 kHz		LSB Sunday 9:30 am

Appendix B: Reporting Criteria and Priorities

Please report whenever you observe the following:

- **Tornadoes or funnel clouds** (be very wary of look-alikes; watch for rotation)
- **Wall clouds**, especially if they are rotating
- **Hail** (Be specific with regard to size; DO NOT report MARBLE size, see the section on Estimating Hail Size)
- **Winds** (40 mph or greater; specify whether estimated or recorded)
 - large branches downed (specify diameter of branch)
 - Trees/power lines downed
 - Structural damage to buildings (roof, windows, etc.)
- **Rainfall**
 - 1 inch or greater in an hour (NOT a 1"/hr. rate for 10 minutes)
 - 2 inches or greater storm total
- **Flooding**
 - Streams/Rivers -- also, when nearing bankfull
 - Coastal
 - Street (when more than the usual poor drainage puddles)
- **Winter Weather**
 - Precipitation type change (rain to sleet/freezing rain/snow, when the change has "taken hold")
 - Thunder, when accompanied by snow
 - 1/3" radial ice accretion (from twig outward; not circumference)
- **New Snowfall**
 - First 2 inches; every 2-3 inches thereafter
 - 1 inch per hour or greater
 - If less than 2 inches total, give final total only
 - Give final total (don't leave us hanging with a partial report)
 - Report any snow/sleet/freezing rain if not in NWS forecast!

Appendix C: National Weather Service WeatherRadio and SAME Codes for Counties in New Hampshire

SAME stands for Specific Area Message Encoding.

When an NWS office broadcasts an urgent audio message (warning, watch, or non-weather emergency) it also creates and broadcasts a digital SAME code (that may be heard as a very brief static burst, depending on the characteristics of the receiver). This SAME code contains the type of message, county(s) affected, and expiration time of the message.

An appropriately programmed NWR SAME receiver will then turn on for that message, with the listener hearing the 1050 Hz warning alarm tone as an attention signal, followed by the broadcast message.

At the end of the broadcast message, listeners will hear a brief digital end-of-message static burst followed by a resumption of the NWR broadcast cycle.

COUNTY	SAME #	NWR TRANSMITTER	FREQ.	CALL	WATTS
Belknap	033001	Concord NH	162.400	WXJ40	330
Carroll	033003	Concord NH	162.400	WXJ40	330
Carroll	033003	Falmouth ME	162.550	KDO95	500
Carroll	033003	Mt. Washington NH	162.500	KZZ41	300
Cheshire	033005	Worcester MA	162.550	WXL93	500
Cheshire	033005	Concord NH	162.400	WXJ40	330
Cheshire	033005	Windsor VT	162.475	WXM44	400
Cheshire	033005	Marlboro VT	162.425	WXM68	300
Coos	033007	Mt. Washington NH	162.500	KZZ41	300
Coos	033007	Burke Mountain VT	162.425	WWG50	1000
Grafton	033009	Concord NH	162.400	WXJ40	330
Grafton	033009	Windsor VT	162.475	WXM44	400
Grafton	033009	Mt. Washington NH	162.500	KZZ41	300
Grafton	033009	Burke Mountain VT	162.425	WWG50	1000
Hillsborough	033011	Worcester MA	162.550	WXL93	500
Hillsborough	033011	Concord NH	162.400	WXJ40	330
Merrimack	033013	Concord NH	162.400	WXJ40	330
Rockingham	033015	Concord NH	162.400	WXJ40	330
Rockingham	033015	Portsmouth NH	162.450	KZZ40	300
Strafford	033017	Concord NH	162.400	WXJ40	330
Strafford	033017	Falmouth NH	162.550	KDO95	500
Sullivan	033019	Concord NH	162.400	WXJ40	330
Sullivan	033019	Windsor VT	162.475	WXM44	400
Sullivan	033019	Marlboro VT	162.425	WXM68	300

Appendix D - Suggested Equipment List for Net Control Operators

In order to maintain a minimum level of preparedness for SKYWARN activations, here is a suggested list of equipment that net control operators might keep on hand in anticipation of being called to activate a SKYWARN net.

- This document
- Paper and writing instruments, including log sheets
- Ear phones
- Flash lights
- Battery operated lamp
- Extra batteries
- Indoor antennas for 2M and 70cm (and possibly 6M)
- Transceivers (hand held or base) for 2M and 70cm (and possibly 6M)
- Weather radio or scanner tuned to the appropriate NWS WeatherRadio
- Alternate power sources for transceivers, scanners, receivers, and lamps

Appendix E - Tornado Classifications

The Fujita or F-Scale applies to the strength of tornadoes, and runs from F0 to F5.

- F0 and F1, or minor tornadoes have wind speeds on the order of 110 mph. Winds of this speed will peel back roof shingles, and push moving automobiles off the road.
- F2 and F3, or moderate tornadoes have wind speeds between 113 and 205 mph. Winds of this strength will tear off roofs and walls, snap large trees, and lift cars off the ground.

- F4 and F5, or severe tornadoes have winds between 206 and 318 mph. A tornado of this type will level a well constructed house, blow structures a distance off of their foundations, and sweep the ground clear of debris.

Appendix F - Hurricane Classifications

The Saffir/Simpson scale is used to classify the damage potential of a tropical cyclone. Storms of this nature fall into categories ranked from 1 to 5.

- A Category 1, or minimal hurricane, has winds between 74 and 95 mph.
- A Category 2, or moderate hurricane, has winds between 96 and 110 mph.
- A Category 3, or extensive hurricane, has winds between 111 and 130 mph.
- A Category 4, or extreme hurricane, has winds between 131 and 155 mph.
- A Category 5, or catastrophic hurricane, has winds greater than 155 mph.

Appendix G - Estimating Windspeeds

The Beaufort scale of wind speeds was originally developed for estimating winds at sea, but has been adapted for use on land. The scale runs from Beaufort Force 0...calm, to Force 12...Hurricane or wind speeds greater than 74 mph.

Here is a simplified guide to estimating winds.

- If large tree limbs are in motion and the wind whistles through wires...winds are between 25 and 30 mph.
- When whole trees are in motion and it is difficult to walk against the wind...winds are between 30 and 40 mph.
- When twigs break off trees or the wind generally impedes you from walking...and slight structural damage is done to chimneys or shingles...estimate winds between 40 and 55 mph. Start reporting to NWS if winds reach this level!

- If the winds are causing widespread damage to roofs and antennas; and shallow rooted trees are pushed over...the winds are between 55 and 70 mph.
- If roofs begin to peel off; windows are broken; small trailers are moved or overturned; or moving vehicles are pushed off the road...estimate the winds over 70 mph. Winds of this speed can occur from downburst or straightline winds in any thunderstorm, tornadoes, and hurricanes.

Appendix H - Estimating Hail Size

The following are the hail sizes that the national weather service equates with various terminology,

Description	What to report	Severity
Pea	1/4 inch	not severe
Marble	1/2 inch	not severe
Mothball	1/2 inch	not severe
Dime	3/4 inch	severe
Penny	3/4 inch	severe
Nickel	7/8 inch	severe
Quarter	1 inch	severe
Half dollar	1 1/4 inches	severe
Walnut	1 1/2 inches	severe
Ping pong ball	1 1/2 inches	severe
Golf ball	1 3/4 inches	severe
Hen egg	2 inches	severe
Tennis ball	2 1/2 inches	severe
Baseball	2 3/4 inches	severe
Tea cup	3 inches	severe
Grapefruit	4 inches	severe
Softball	4 1/2 inches	severe

Appendix I - Change History

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