Objectives

Welcome to Topic 11.

This topic will cover what you need in order to understand the basics of severe weather reporting programs and nets, including local or regional National Weather Service (NWS) SKYWARN® nets, and the wide-area Hurricane Watch Net (HWN).

Student Preparation required:

Review the Memorandum of Understanding (MOU) between the National Weather Service and the ARRL at www.arrl.org/files/file/Public%20Service/National%20Weather%20Service%20MOU.pdf and the Hurricane Watch Net's website at www.hwn.org.

SKYWARN®

The name SKYWARN®, like ARES®, is a registered name and cannot be used by other organizations (if you are using the name in a publication, you must include the registration mark after the name — SKYWARN®). The SKYWARN® program is sponsored by the National Weather Service. Like ARES, it is a program, and not a club or organization. Amateur Radio operators and other SKYWARN® volunteers report actual weather conditions in their own communities. These are sometimes called "ground truth" observations. Accurate information and rapid

communication during extreme weather situations have proven to be indispensable to the NWS. Amateur Radio SKYWARN® operations have become integral to many communities' disaster preparedness programs.

Unlike most Amateur Radio operators, SKYWARN® observers are a "first-response" group, invaluable to the success of an early storm-warning effort. Weather spotting is popular because the procedures are easy to learn and reports can be given from the relative safety and convenience of a home or vehicle.

This learning unit concentrates primarily on the Amateur Radio nets themselves. While some discussion of general spotting techniques is presented here, specific weather observation training for your area should be obtained locally from NWS.

To become a registered SKYWARN® volunteer, you must complete a short course of training in severe weather observation and reporting. Most courses are only a few hours long. Once completed, NWS personnel may assign you a spotter number and a toll-free number to call with your reports. Many amateurs are members and registered spotters, and they provide a valuable service to National Oceanic and Atmospheric Administration (NOAA) and local NWS offices around the country. If there is no active program in your area, you might wish to find out more about starting one in conjunction with your local ARES group. For more information on SKYWARN® training, contact your local NWS office or your local emergency management partner.

What Is Generally Reported

Reports on a severe-weather net are limited to specific critical weather observations, unless the NWS office requests other information. For this reason, amateurs without SKYWARN® training

should monitor the net and transmit only when they can offer needed help. If they *are* members, they should report as requested and as needed by their local leadership and NWS office, and using their assigned SKYWARN® spotter number. Many areas open a net for the collection of such severe-weather data.

Weather forecasters, depending on their geographical location, need specific types of data.

During the summer or thunderstorm season, SKYWARN® observers report:

- Tornadoes, funnel clouds, and wall clouds
- Hail — usually measured with a specific size
- Strong winds, usually 50 miles per hour or greater
- Flash flooding
- Heavy rain, with a sustained rate of 1 inch per hour or more
- Damage
- Adverse traffic and driving conditions affecting travel

During the winter, they report:

- High winds
- Heavy snowfall
- Freezing precipitation
- Sleet
- New snow accumulation of 2 or more inches per hour
- Damage caused by snow or ice

A four-step method of "What, Where, When, Details" can be used to describe severe weather that you see. For example:

1. What: Tornadoes, funnel clouds, heavy rain, etc.
2. Where: Give direction and distance from a well-known location; for example, "Three miles south of Newington Center, on Route 15."
3. When: Time of observation.
4. Details: Storm's direction, speed of travel, size, intensity, and destructiveness. Include any uncertainty as needed; e.g., "funnel cloud, but too far away to be certain if it is on the ground." Indicate if amounts are measured or estimated; i.e., wind gauge vs. visual estimate.

   Amateur Radio and the NWS Taunton SKYWARN® Program rev2
   https://www.youtube.com/watch?v=aCrPnwjiccg

Activation

SKYWARN® observers are usually aware that the potential for severe weather has been forecast. As conditions begin to deteriorate, they should monitor the primary net frequency and the NOAA All Hazards Weather Radio (NWR), a system of VHF FM radio transmitters operated nationwide by the NWS on seven channels between 162.400 and 162.550 MHz. The SKYWARN net may be formally activated upon the request of the local NWS office, or by net members if conditions warrant immediate action.

SKYWARN® Recognition Day (SRD)

SKYWARN® Recognition Day was developed in 1999 by the National Weather Service and ARRL. The first weekend in December of each year is reserved for SKYWARN® Recognition Day. This is a day that serves to celebrate the contributions to public safety and to the National Weather Service by Amateur Radio operators during threatening weather. On this day, SKYWARN® operators visit NWS offices and contact other radio operators around the world.

The object is for amateur stations to exchange information with as many National Weather Service Stations as possible on the 80-, 40-, 20-, 15-, 10-, and 6-meter bands, as well as the 2- and 70-centimeter bands, local repeaters, and VoIP modes such as EchoLink. Contacts via repeaters are permitted. For more information on SKYWARN Recognition Day: https://www.weather.gov/crh/skywarnrecognition

Operating the Weather Net

The format and operation of weather nets will vary from area to area and should be designed to meet local needs. In areas with specific hazards, such as in “tornado alley,” the net may be formal and well disciplined. In other areas with less sudden dangerous weather, the net may be less formal and may not even have an NCS operator. When it is a directed net, the NCS maintains control over traffic being passed to NWS, and may organize a liaison with other area repeaters. Often wide-area, high-level repeater systems will work best due to their coverage. Also, many ARES organizations designate an EC or AEC assigned to the NWS, who becomes an NCS during activation. Many of them also become Weather Net Managers.

The Net Manager or NCS should designate one or more alternate frequencies in anticipation of an overload or the loss of a repeater, or if the net needs to split to handle different tasks or regions. If a disaster should occur during a severe-weather net, the net may take on disaster-relief operations in addition to tracking the progress of the storm. If the traffic on the net increases substantially, a separate net should be set up to handle relief operations to ensure that critical information gets through in a timely fashion. At least one station should be assigned as a liaison to monitor both nets and relay any critical messages or information between nets.

At the National Weather Service: In some areas, a permanent or temporary amateur station is operated from the local NWS office. In other areas, an off-site station relays information to the local NWS office via telephone, fax, or e-mail. In either case, this station receives, collates, and organizes the information being sent to NWS and passes it on to the forecasters as quickly as possible.

NWS personnel may request that a handheld radio or scanner be placed at the severe-weather desk. In such cases, they need to be aware of which frequencies are to be monitored so that they may receive the most accurate and up-to-date information in real time. This arrangement allows them to monitor incoming traffic directly. Nevertheless, all traffic should be written on report forms and passed quickly to the forecasters.

Ham Radio at the National Hurricane Center (WX4NHC)

https://www.youtube.com/watch?v=MBKGmpH72JQ

Hurricane Watch Net (HWN)

The Hurricane Watch Net serves as eyes and ears for the National Weather Service in the Caribbean, the Gulf of Mexico, and along the US Atlantic and Pacific coasts. Net members relay official weather bulletins to those monitoring the net in affected areas, and field observation reports back to NWS — primarily to the hurricane forecasters in the National Hurricane Center, which has an on-site Amateur Radio station, WX4NHC. It also serves as a backup communication link between NWS forecast offices, National Specialized Centers, critical EOCs, and other disaster relief efforts.

HWN differs from SKYWARN in two important ways. First, its volunteers are exclusively Amateur Radio operators. Second, its operations are primarily on HF-SSB rather than VHF or UHF-FM.

The primary functions of the HWN are to:

1. Disseminate hurricane advisory information to marine interests, Caribbean island nations, Emergency Operations Centers, maritime mobile amateur stations, and other interests for the Atlantic and Eastern Pacific as released by the National Hurricane Center in Miami, Florida.

2. Obtain ground-level weather observations and damage reports from reporting stations and observers who are not part of the routine network for the National Weather Service or the World Meteorological Organization, and forward them quickly and accurately to the National Hurricane Center.

3. Function as a backup wide-area communication link for the National Hurricane Center,

Emergency Operation Centers, the National Weather Service, and other vital interests involved in the protection of life and property before, during, and after hurricane events.

4. Relay initial assessments of hurricane damage to the National Hurricane Center. Damage assessments come in about roads, power outages, structural damage, phone and communication problems, and of course, reports on the number of injuries and deaths. These non-weather report items are usually relayed to the appropriate agencies via other nets in operation on 20, 40, and 80 meters, or by the crew at WX4NHC to agencies that stay in regular contact with the National Hurricane Center.

Membership in the net is not restricted to stations in hurricane areas. Amateur Radio operators outside hurricane-prone areas can participate as relays or net control stations. The net has an urgent need for stations in the Midwest and on the West Coast as propagation shifts westward. The net also has a need for stations that are available during the workday in all areas.

If you live in a hurricane-prone area, and your amateur license class will not allow operation on the 20-meter band, you can still participate in the system. The National Hurricane Center monitors the APRS (Automatic Packet Reporting System) packet reporting system. You can submit your information manually via APRS, or better yet, connect a weather station to your packet station for automatic reporting. In some areas, local FM nets relay observations to NWS through HF operators on the HWN net.

Activation: The Hurricane Watch Net activates for all hurricanes that are a threat to land in the Atlantic and Eastern Pacific oceans. The net will normally activate when a hurricane is moving toward land at a range of 300 miles. On occasion, it may activate for tropical storms, or at any time when requested by the National Hurricane Center.

Before checking into the net, listen long enough to determine the nature and immediacy of events. If the storm is still hours from any serious impact, the net control will provide a window of opportunity to check in. If a hurricane is within an hour of landfall, check in *only* if you are in the affected area and can assist with a specific relay or supply information of immediate value to the net or National Hurricane Center.

Net Operations: The Hurricane Watch Net, and WX4NHC at the National Hurricane Center in Miami, are staffed entirely by volunteers. HWN is a 24-hour Net or until their services are no longer required, using 14.325 by day and 7.268 by night and both frequencies may be used simultaneously. We all know hurricanes can and do make landfall at night and while net operations are normally conducted on 14.325 MHz USB, and 7.268 MHz, night time operations may require a shift to 80 meters or when band conditions warrant.

Safety Concerns for All Weather Net Stations

As an Amateur Radio operator providing communications in the path of a dangerous storm, you need to be concerned for your own safety. Under no circumstances should you place yourself in physical danger in order to gather or report information. Remember, if your area is under an evacuation order, it is too dangerous for you as well. Antennas and supports should be placed so that winds will not carry them into power lines. Stations should be located as far from potential flood, flash flood, or storm surge areas, and as close to an escape route as possible. If setting up a portable station, choose buildings that were specifically designed to withstand storm winds. Stay away from unprotected windows, and make sure that you have more than one downwind emergency exit should a fallen tree or other debris block the main exit. Park vehicles downwind from buildings and structures to protect them from flying debris. Bring adequate supplies that allow you to remain in place for an extended time should evacuation or resupply not be possible.

VoIP Modes

Radio amateurs using Voice over Internet Protocol (VoIP) modes such as EchoLink (www.echolink.org/) and IRLP (www.irlp.net/) are also supporting forecasters tracking hurricanes.

The EchoLink and IRLP partnerships created for hurricanes and severe weather have seen upwards of 100 VoIP connections during storm emergencies, many of which represent repeaters and conference rooms with many people listening.

The VoIP-WX Net (www.voipwx.net/) also has a large number of Technician-class operators who were not able to report via HF in the past. The HWN operates on 14.325 MHz — beyond the reach of operators lacking at least a General-class Amateur Radio license. Those connecting via VoIP modes often do so using VHF/UHF radios on battery power via an IRLP or EchoLink-equipped repeater.

For additional information, visit the WX4NHC website: http://w4ehw.fiu.edu/

Weather Net Operating Tips

For nets spanning more than one time zone, use UTC time in all reports, not local time. If you are not sure of the correct UTC time, use local time and be sure to notify the net control that you are using it.

If you are going to give a damage, injury, or casualty report, and it is not based on your own personal observation, be prepared to provide the time, the name of the person providing it, their call sign or official position, if any, and if possible, a telephone number and address or

other means of contact so it can be confirmed later. Also be keenly aware that sensitive information should *not* be broadcast over general nets and must be kept to more secure modes such as telephone, fax, or direct delivery, if possible. This will avoid release of proper names and sensitive information to those who might be listening and not directly involved with disaster efforts.

Use "push-to-talk" — not VOX. Background noise in the room, from the storm, and from other radios may cause VOX to key your transmitter without you noticing and disrupt the net. Also, use headphones if possible at on-site locations to ensure that you receive accurate information without disruption from such background noise.

Review

The NWS SKYWARN® program and the Hurricane Watch Net make up the bulk of Amateur Radio weather nets. Both use Amateur Radio to relay real-time "ground-truth" weather information to the appropriate National Weather Service office. Amateurs participating in either type of net should take care not to expose themselves to dangerous weather conditions.

Recommended Activities

1. Determine if there are any weather nets operating in your state. For any such nets, and the Hurricane Watch Net, list the details of operation including:

    - Sponsoring or partners
    - Qualifications for participating in the net
    - Next scheduled training event
    - Key contact personnel
    - Frequencies employed
    - Procedure(s) for activating the net

2. Suppose that you are placed in charge of training SKYWARN participants in your area. What information would be critical for your participants to know?