

SKYWARN Operations Manual

National Weather Service Office

Newport/Morehead City, North Carolina

I. INTRODUCTION AND ORGANIZATION

1.1 Purpose of This Manual

This manual is designed to be used as a reference guide for SKYWARN Emergency Amateur Radio Network operations in the area that comprises the County Warning Area (CWA) of the National Weather Service (NWS) Forecast Office in Newport, North Carolina. The manual and basic operations plan is based on a similar manual prepared by Daniel Gropper, SKYWARN Amateur Radio Operations Coordinator at the NWS office in Sterling, Virginia.

The Newport NWS office and the SKYWARN Emergency Network have an area of responsibility which includes 15 counties in central eastern North Carolina.

1.2 Purpose of SKYWARN

SKYWARN is the NWS national network of trained volunteer severe storm spotters. SKYWARN volunteers support their local community and government by providing the NWS with timely and accurate severe weather reports. These reports, when integrated with modern NWS technology, are used to issue timely and accurate warnings of impending dangerous weather conditions. In addition, working with emergency management officials, SKYWARN spotters can help provide their communities with advance warning of impending hazardous weather.

1.3 Role of Amateur Radio in SKYWARN

Amateur radio has been, and always will be, a vital link in the NWS warning system. Fortunately, in the Newport CWA there are a large number of trained SKYWARN spotters who are also amateur radio operators. Amateur radio operators possess many characteristics that make them ideal members of the SKYWARN team. It is the desire of the National Weather Service to utilize to the fullest possible extent all the technologies that amateur radio has to offer.

The SKYWARN Amateur Radio Station and all equipment is either donated by public-service minded amateurs or has been purchased by the National Weather Service. All equipment is maintained by amateur radio operators volunteering their time and expertise.

The close working relationship between the NWS and the amateur radio community provides many special benefits to each group. These benefits are highlighted in the following goals for the SKYWARN Emergency Network:

- 1. To provide the NWS with timely and accurate severe weather reports via amateur radio. This includes both incoming reports of severe weather per the NWS criteria and amateur radio operators making observations at specific locations in response to a NWS request.*
- 2. To create and maintain an organized communication network for passing critical severe weather traffic in a timely fashion to and from the NWS in the event that normal communications are interrupted. The NWS has lost normal communications in the past and it is likely that the SKYWARN Amateur Radio Net would be activated in future communications emergencies.*
- 3. To disseminate warnings, statements and other products issued by the NWS to the amateur radio community. Every attempt is made to disseminate all statements and warnings issued by the NWS over the SKYWARN Net to keep amateurs informed of developing situations and to practice for situations when normal communications channels fail.*
- 4. To organize and train amateur radio operators to prepare themselves and their families for disaster or emergency weather-related situations so that they may be available to assist in emergency net operations. This preparedness training is critical if the SKYWARN system is to be expected to operate reliably during true emergency situations.*
- 5. To maintain a spotter network that is transparent to jurisdictional and political boundaries and operates uniformly across the entire warning area. The net is independent, and is not directly affiliated with any club, group or organization.*

SKYWARN is not a club, but rather a public service organization dedicated to service to the National Weather Service and other local agencies during periods of severe weather. SKYWARN is open to all amateur radio operators, and is an independent group, not directly affiliated with ARES, RACES or any other club, group or organization.

SKYWARN consists of several key elements. The first of these elements is the NWS SKYWARN Program Manager and Focal Point. These individuals are NWS employees who are responsible for overseeing the operation of the network, for selecting and appointing key SKYWARN personnel, and for acting as contact points for the NWS among the amateur radio community. The Warning Coordination Meteorologist (WCM) serves as the Program Manager, and may appoint a SKYWARN Focal Point to perform day-to-day functions associated with the SKYWARN network.

Second is the SKYWARN Amateur Radio Operations Coordinator, along with his Assistant Coordinators organizing the operation of the entire SKYWARN amateur radio

network in accordance with the guidance and goals set forth by the National Weather Service. This volunteer position is appointed by the NWS SKYWARN Program Manager to ensure that the person chosen can work well with NWS personnel and to ensure stability in the position. The Coordinator must possess superior communication and coordination skills and should be readily available to the NWS, both for severe weather net activations and for consultation on amateur radio issues. The formal position description of the SKYWARN Amateur Radio Operations Coordinator is Appendix B to this manual.

Another important part of SKYWARN is the Responder. Responders are selected by the SKYWARN Coordinator and are responsible for manning the SKYWARN amateur radio station at the NWS when SKYWARN is activated. Responders may also serve as Net Control Stations for SKYWARN nets.

1.4 SKYWARN's Relationship to ARRL/ARES/RACES

Amateur Radio's participation in the NWS SKYWARN program is formally acknowledged and encouraged in a Memorandum of Understanding (MOU) between the American Radio Relay League (ARRL) and the NWS. This agreement states that the ARRL will encourage its local volunteer groups operating as the Amateur Radio Emergency Services (ARES) to provide the NWS with spotters and communicators as needed by the NWS during severe weather.

The Radio Amateur Civil Emergency Service (RACES) is a government supported organization made up of amateur radio operators registered with state, county or local offices of emergency management. In many parts of the Southeast, these amateurs are also ARES members. In fact, most counties in the area have combined ARES/RACES units for support during emergency situations.

Many natural disasters in the Southeast are the direct result of severe weather and/or are exacerbated by severe weather. Accordingly, the NWS may utilize the SKYWARN amateur radio operators not only to obtain and disseminate severe weather observations and warnings, but also to maintain close coordination with emergency management agencies throughout the CWA.

The NWS SKYWARN Emergency Network will coordinate closely with, and seek cooperation from all ARES and RACES groups in the area. The net will not, however, bear the name of, or be directly tied to either ARES or RACES. The net is independent, open to all amateur radio operators in the area. The only requirement is a valid FCC amateur radio license.

1.5 Role of SKYWARN Net Control

The Net Control Station (NCS) is the most critical position in any SKYWARN activation. It is a role that challenges all of an amateur radio operator's communications and technical skills. It is also an extremely responsible position in that the safety of lives

and property may rest on the amateur's skills. Although this role is challenging, with proper training and experience, it can also be extremely rewarding when a net is run effectively.

(In this manual, the terms "Net Control Station" and "Responder" are used, sometimes interchangeably. During most SKYWARN activations, it is desirable to have the person running the net, the net control station, located at a place other than the NWS office. Responders are those trained individuals who are physically located at the NWS office during SKYWARN nets).

It is the purpose of this manual to provide a framework for SKYWARN net operations. While consistency of procedures from net to net is important, no two SKYWARN activations will be exactly the same. Therefore, the net control operator has the authority and responsibility to do everything necessary, within FCC rules, to ensure that the SKYWARN mission is performed to the fullest possible extent.

It is essential that all SKYWARN net control operators and responders be familiar with the operation of the NWS amateur radio station, as well as NWS procedures, to be able to do an effective job. This familiarity is best achieved through frequent, comprehensive responder/NCS training provided by the Coordinator and the NWS. This training, covering all aspects of net management, NWS severe weather operations and equipment operation is mandatory for operators who will be acting as a NCS and/or a Responder.

II. NET ACTIVATION PROCEDURES

2.1 NWS Decision to Activate SKYWARN

The NWS activates the SKYWARN Emergency Network under the following conditions:

1. *A tornado or severe thunderstorm watch is issued that includes one or more counties in the NWS Newport County Warning Area (CWA).*
2. *Severe weather is occurring, or is expected to develop, within the Newport CWA. (This does not usually apply to isolated, short-lived storms).*
3. *A hurricane or tropical storm watch/warning is issued that includes one or more counties in the NWS Newport CWA.*
4. *A communications emergency exists at the NWS, such that amateur radio might be used to contact and coordinate with other NWS offices, emergency management agencies, etc.*
5. *A major winter storm is imminent, or is expected to affect the area. (Net activations for winter storms are extremely rare, but are included in the operations plan since spotters can be a great help during adverse winter weather).*

2.2 Activation Time Frames and Requested Staffing

Most of the time, SKYWARN will be activated when a tornado or severe thunderstorm watch is issued for any counties in the Newport CWA. The lead time in such situations will range from zero (0) to six (6) hours. Thunderstorms may develop and intensify rapidly and often create life-threatening situations. Responders are always requested to staff the NWS amateur radio station during severe thunderstorm or tornado watches, as well as during other fast-moving and rapidly-changing weather situations. The SKYWARN net may remain activated for as many as twelve hours or more, depending on the coverage and severity of the weather situation.

During long-lead severe weather events such as winter storms, SKYWARN may be activated when a warning is issued. Lead time may be anywhere from zero (0) to twelve (12) hours. Requests to staff the NWS amateur radio station will depend on the forecaster's assessment of the nature of the storm, the utility of the spotter's reports in the situation and the potential of the storm to cause widespread communications outages. Long-term events could cause SKYWARN to be activated for extended periods of time, although this type of activation is extremely rare.

2.3 NWS SKYWARN Net Activation Steps

Once the NWS makes the decision to activate SKYWARN, the following steps are taken by the forecasters:

1. *The Forecaster-In-Charge will call the Amateur Radio Operations Coordinator, or his designate to request activation of the SKYWARN Emergency Net.*
2. *The forecaster will brief the SKYWARN Amateur Radio Coordinator, or his designate on the following:*
 - a. *The reason for activation (watch, valid time)*
 - b. *The affected areas*
 - c. *Expected onset of severe weather in the CWA*

The Coordinator will make the determination, based on timing and affected areas, on whether to dispatch Responders to the NWS office. This determination is based, in part, on the areas of the CWA to be affected and the availability of spotters in those areas, and on the expected onset of severe weather in the CWA.

2.4 SKYWARN Amateur Radio Coordinator Activation Procedures

Once the NWS has notified the Coordinator of the need to activate SKYWARN, the Coordinator will take the following steps:

1. *Depending on the aerial coverage and expected onset of severe weather, Responders should be dispatched to the NWS office. Normally, two or three*

Responders are necessary for net operations. Ideally, they should be rotated every 3 to 4 hours. There should not be more than 3 Responders in the NWS office at any one time.

2. *If necessary, the SKYWARN Amateur Radio Coordinator may elect to bring up the net IMMEDIATELY from a remote site such as a house or a car.*
3. *The Coordinator should monitor the net and periodically check with NWS Responders to track the progress of the severe weather event and to make staffing adjustments, as needed.*

2.4.1 Net Control Operator Personnel List

The SKYWARN Amateur Radio Coordinator will prepare and continually update a list of NWS Responders/NCSs who are qualified to run the SKYWARN net. The goal is to have enough NCSs/Responders on the list to provide adequate coverage any time of day, any day of the week. The SKYWARN Amateur Radio Coordinator must be able to contact Responders at any time and therefore should have the Responder's home phone, work phone and, if available, cell, fax or pager numbers.

THE NET WILL BE ACTIVATED AS NEEDED, 24 HOURS A DAY, 365 DAYS A YEAR.

III. RESPONDER/NET CONTROL OPERATOR PROCEDURES

3.1 Behavioral Rules

3.1.1 Do Not Bring Guests With You

The NWS office is *NOT* the place for guests or sightseers during SKYWARN activations. The NWS operations area is not large and is filled with expensive and delicate equipment. Please *DO NOT* bring people to the NWS who will distract you or the NWS from doing the best possible job. The NWS would be pleased to give your family a tour of the office during quiet weather and upon prior arrangement.

3.1.2 NWS Forecast Office Operating Conditions

When SKYWARN is activated, NWS personnel are usually operating under high tension in a critical weather mode. Forecasters and other staff members are under intense pressure. This means:

1. *Any distractions or interruptions of NWS or SKYWARN operations may mean the loss of life and/or property.*
2. *Sensitive information such as reports of severe damage or deaths, or injuries may be openly discussed, and such information should NOT be repeated by SKYWARN volunteers outside the NWS.*

3. *NO MORE THAN ONE (1) SKYWARN volunteer should be in the operations area at any one time. The area is very cramped during severe weather and traffic through this area should be kept to an absolute minimum. Ideally, one Responder should attempt to position himself as close to the radar/warning position as possible without getting in the way of forecasters.*

3.1.3 No More Than Two (2) Volunteers at the NWS Amateur Radio Station at One Time

No more than two (2) SKYWARN volunteers should be in the forecast office at one time. If, for some reason, there are more than two volunteers at the NWS, please take shifts. Off-duty amateurs may monitor the net from their cars in the parking lot. Feel free to establish a simplex radio link to the SKYWARN Amateur Radio Station.

3.1.4 How To Volunteer for Net Control Duty

Responders should *NOT* go directly to the NWS office or call the NWS office at the first sign of severe weather. To be an effective and well-coordinated system, we must follow protocol:

1. *NWS determines the need for SKYWARN activation and notifies the Coordinator or his designate.*
2. *The Coordinator will then contact Responders, as needed to man the NWS station.*
3. *In the event that severe weather develops suddenly, and no formal net has been activated, Responders should monitor appropriate SKYWARN frequencies and relay severe weather reports to the NWS via telephone. The Coordinator should be notified immediately, if possible, in such a situation.*
4. *Responders may contact the Coordinator to inform him of their availability during a quiet time in net operations. Do not be insulted if your services are not needed at that time. As the situation evolves, staffing needs may also change.*

3.1.5 Interaction With The Forecasters

The forecaster who briefs the Responder upon arrival at the NWS will likely be the contact person until the NWS shift changes. Please follow instructions on how and when to pass information to the forecasters. If the information is **CRITICAL**, bring this information to the forecaster's attention **IMMEDIATELY**. Otherwise, you will need to gauge the situation as to whether the information is important enough to bring to the forecaster's immediate attention or if it can wait a few minutes. It is a delicate balance to make this critical part of net operation successful and it must be handled with discretion, tact and diplomacy by the Responder.

3.1.6 Accepting Severe Weather Reports

The National Weather Service has established guidelines and criteria for determining whether a certain storm is severe. These guidelines are included in this manual in Appendix F. It is important to learn these guidelines so that you can easily decide which of the many reports received actually constitute severe weather. Reports of damage or actual weather events that meet the criteria for a severe storm should be passed on to forecasters as soon as possible.

Every net activation will be different, and from time to time, the NCS may need to limit the types of reports that are taken over the net or hold certain severe weather reports that otherwise meet the reporting criteria. This situation usually occurs when widespread or extremely dangerous severe thunderstorms and/or tornadoes are occurring. The Responder/NCS must be able to determine, through interaction with forecasters, which reports are the most critical and which ones can be held. Remember, however, that ALL reports meeting the NWS criteria should be logged and saved.

Often, spotters will report events that do not meet the criteria set forth by the NWS for severe weather. And while this can be extremely frustrating to the net control station, the NCS should be as courteous as possible to the report giver. Explain to him/her the nature of the reports you are looking for and make note of their location, as you may need to contact him/her again if severe weather moves into their area.

It is critical that ALL reports received during SKYWARN activation be logged by the NCS/Responder. This includes reports received via VHF, UHF, HF or through other means (EMA). The following information should be included in every report:

1. *What is occurring/what happened?*
 - a. *Tornado, wall cloud, funnel cloud*
 - b. *Hail (MUST INCLUDE SIZE!)*
 - c. *Damaging winds (MUST ESTIMATE WIND SPEED!)*
 - d. *Flooding (other than minor street flooding)*
 - e. *Wind or hail damage*
 - f. *Other significant weather and/or damage*
2. *The exact location of the event in reference to well-known towns, landmarks, intersections, etc.*
3. *The exact time the event occurred.*
4. *If it's a second/third hand report, the source of the original report, along with all pertinent information (1-3 above).*

This information, along with any other details, should be logged and should be provided to forecasters as soon as possible.

3.2 Operating Rules

3.2.1 Access to NWS

Responders should park in the employee area parking lot. Please do not park in spaces marked "Government Vehicles Only." Use the front entrance to gain entry to the NWS office. This door is locked at times. To gain entry, push the white button next to the door and a buzzer will sound inside.

3.2.2 Briefing Upon Arrival at the NWS

Upon arrival at the NWS, immediately identify yourself to a forecaster or other staff member as a SKYWARN amateur radio operator and ask a forecaster for a briefing on the severe weather situation. You should try to get the following information from the forecaster:

- 1. Where the storms are located and in which direction they are moving*
- 2. Characteristics and history of the storm(s), i.e., hail, damaging winds, tornadoes, etc.*
- 3. What geographic locations are of primary concern to the forecasters*
- 4. The latest statements, watches and warnings to be read over the net.*

3.2.3 Use of Tactical Callsigns

The Responder/NCS physically located at the NWS office will use the tactical callsign "Newport Weather."

3.2.4 NCS/Responder Operations and Procedures

- 1. Make sure the radio is set on the proper net frequency.*
- 2. Make sure you have enough pencils, pens, paper, severe weather reporting forms and any other material you need before the net gets underway.*
- 3. Inform the NCS (if the NCS is located at a location other than the NWS) that you have arrived and provide the net with any updated information (statements and/or warnings) that you have.*
- 4. At least two operators are necessary for the net to run smoothly. One operator should maintain radio contact with the primary NCS, and with any other nets, as necessary, while the second operator logs ALL reports and information received over the net. A third operator may be needed for HF radio operations.*

5. *Since the amateur radio station is located in the main operations area of the NWS office, Responders should try to keep the volume of the radios and voices down so as to avoid disturbing the NWS staff.*
6. *One operator should maintain contact with forecasters to a) provide the latest reports and to b) keep up with the latest statements, warnings and areas of concern. It might be helpful to have one operator stationed near the radar/warning computer (but out of the main traffic area) and communicating with the other operator(s) via a simplex frequency. This will eliminate unnecessary movement around the office.*

3.3 Closing the SKYWARN Net

When the threat of severe weather has ended for the area, a forecaster will indicate to the NWS Responder that the net may be secured. At that time, the SKYWARN volunteer should perform the following net shutdown steps:

1. *Ask for any additional reports of severe weather.*
2. *Upon hearing no further reports of severe weather, the NCS should thank the repeater licensee and the amateur radio community.*
3. *The NCS should inform anyone listening on the net that any further reports of severe weather should be telephoned to the NWS.*
4. *Every attempt should be made to contact and thank any other nets for their participation and to inform them of the closing of the primary SKYWARN net.*
5. *The station MUST be left in a clean condition, ready for the next activation. This includes returning the radio to the primary SKYWARN net frequency.*
6. *Please staple all reports and severe weather log sheets together and leave them on the amateur radio desk before leaving.*

3.4 Remote Net Control/Relaying Local Net Reports

There may be times when Responders are not dispatched to the NWS office. This may be the case when severe weather is only expected to affect a small part of the CWA, or when the threat of severe weather is unclear. At other times, severe weather may develop so rapidly that the NWS cannot give SKYWARN volunteers enough lead time to get to the office.

In any of the above situations, the SKYWARN net may be run from a remote location. The SKYWARN Amateur Radio Coordinator will coordinate the activation of a remote net and arrange for a Remote NCS to call the net. The Coordinator will also brief him on the weather situation and the needs of the NWS.

If Responders are dispatched to the NWS, they should inform the Remote NCS when they arrive and arrange for reports to be passed directly to the NWS office through the net.

3.5 Switching Net to Alternate Repeaters

It may become necessary to switch the net to alternate frequencies for technical or other reasons. The Coordinator or NCS should:

- 1. Verify the net has permission to use the alternate repeater (permission may be obtained over the radio, if necessary)*
- 2. Assign a station to remain on the initial frequency (simplex, if necessary) to inform stations of the frequency change, and*
- 3. Thank all repeater groups and licensees for the use of the repeater.*

IV. LOCAL NET PROCEDURES

4.1 Local SKYWARN Nets

The primary SKYWARN repeaters DO NOT cover the entire Newport CWA. It is important to remember that despite the existence of local net, amateur radio operators who can access the primary NWS net should attempt to do so directly. The local net's primary responsibility is to relay traffic for those stations who cannot access the NWS repeater directly.

Local nets may be formal or informal nets that gather severe weather reports and other information for the NWS and other local agencies. The local nets interact with the primary NWS net so that critical severe weather information can be passed back and forth between the NWS and local officials.

4.2 Handling Localized Severe Weather Events

When a localized threat of severe weather exists, individual local nets may be activated, while the primary NWS SKYWARN net is not. In this type of situation, local NCSs and officials should relay reports directly to the NWS, using the restricted telephone numbers provided. Please protect the integrity of these unlisted phone numbers and don't allow them to be used for any but emergency purposes.

V. DESCRIPTION OF THE SKYWARN AMATEUR RADIO STATION WX4MHX

The SKYWARN Amateur Radio Station WX4MHX consists of three radios. The primary radio is the Kenwood TM-733 dualbander. A list of the preset 2-meter

frequencies is cubicle wall directly to the right. The second is the Icom IC-706 MK II HF transceiver, used for medium and long-distance communications. The third is the Icom IC-V8000 is a 2-meter radio connected to a directional beam antenna pointed directly at the Columbia NC repeater in Tyrrell County. Instructions on the operation of all equipment in the SKYWARN amateur radio station can be found in separate manuals kept on the shelf above and to the left of the radios.

VI. TRAINING

6.1 Types of Training Offered by the NWS

The National Weather Service conducts spotter training for any interested group or organization anywhere in the Newport CWA. There are two classes: 1) Basic/Refresher training – for those new to storm spotting or those who want to review severe weather spotting techniques; and 2) Advanced training – for those who have attended a Basic class in the past year and who want to learn about more advanced storm spotting techniques and topics.

VII. TROPICAL STORM/HURRICANE WATCH and/or WARNING

7.1. SKYWARN Operations

SKYWARN will be activated when a hurricane or tropical storm is anticipated to strike anywhere in the Newport forecast area. The SKYWARN amateur radio net may be activated anytime a hurricane or tropical storm threatens the east coast. In an event such as Hurricane Andrew, the Hydrometeorological Prediction Center (HPC) in Camp Springs MD acts as the backup hurricane center to the NWS's Tropical Prediction Center (TPC) in Coral Gables FL.

SKYWARN may be asked to help support HPC and NWS with amateur radio communications. SKYWARN amateur radio support may also be requested to assist with backup communications to other NWS offices threatened by hurricanes or tropical storms, such as Wilmington NC (ILM) or Wakefield VA (AKQ), and to assist in gathering severe weather and damage reports from areas impacted by the storm where normal communications are inoperative.

In such situations, HF will most likely be required. It may be necessary to plan staffing for many 24-hour periods. If there is a possibility of a hurricane or tropical storm passing within 100 miles of the CWA, net control volunteers need to arrive at NWS Newport prepared for a long stay in the event roads are closed. Volunteers should also be certain that their family is prepared before departing to the NWS.

It is important to coordinate with local ARES and RACES groups.

7.2. Coordination with Hurricane Watch Net

Contact should be made with the Hurricane Watch Net (HWN) to coordinate operations. They may need to use the SKYWARN amateur radio station to relay ground truth (actual observations) reports into the NWS system.

The Hurricane Watch Net operates in cooperation with the Tropical Prediction Center in much the same manner that SKYWARN operates with the Newport NC forecast office.

7.3. Purpose of the Hurricane Watch Net

- A. Disseminate tropical storm/hurricane advisory information to marine interests, Caribbean Island nations, emergency operating centers (EOCs) and other interests for the Atlantic and Eastern Pacific as promulgated by the TPC in Coral Gables FL.*
- B. Obtain weather information for the NWS from reporting stations who are not part of the routine network of the World Meteorological Organization (WMO) and forward the information to the TPC.*
- C. Function as a backup communications link for the TPC, EOCs and NWS and other vital interests involved in the protection of life and property before, during and after hurricane/tropical storm events.*
- D. Relay initial damage assessments to the TPC.*

HWN operations normally commence anytime a hurricane/tropical storm is within 350 nautical miles of an inhabited land mass and will continue in operation until the storm is no longer a threat. The net DOES NOT handle health and welfare type communication.

Operation will normally take place on the 20-meter band on 14.325 MHz. However, the operation may shift frequency at the request of stations in the hurricane affected area or to take advantage of shifting propagation conditions.

Priority is given to those stations representing the NWS and emergency management organizations. The net control volunteer of the SKYWARN station should identify that they are located at the NWS Newport NC office when checking in to the HWN.

The Dade County FL Amateur Radio Public Service Corps operates station WX4NHC located in the forecast office of the TPC. Most traffic is passed to this station via the HWN or through a landline computer link to NWS Southern Region. If these links are not available, SKYWARN may be asked to pass the information via NWS facilities located in the forecast office.