



**NWS Wakefield SKYWARN
Amateur Radio Support Team
WX4AKQ Wakefield, VA**

SKYWARN NCO Training Manual 2011 Edition

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1: Introduction

1.1: The Net Control Operator

The SKYWARN Net Control Operator (NCO) serves perhaps the single most essential role in the entire SKYWARN program. The NCO is responsible for calling the SKYWARN nets, managing traffic flow during the net, collecting reports from Spotters, logging those reports, and sending certain reports to the National Weather Service. Without the NCO, there could be no amateur radio involvement in the SKYWARN program!

1.2: About This Training

This training manual is intended to provide you with a basic skill set required to serve as a SKYWARN NCO for the Wakefield, Virginia Weather Forecast Office (WFO). While many of the topics discussed here are portable to other SKYWARN programs around the country as well as to other EMCOMM organizations, the primary focus is on the Wakefield team and its operations.

After reviewing the materials here, you should have a basic understanding of the role of the SKYWARN NCO and you should have a good idea how to operate a SKYWARN net and effectively serve the National Weather Service as a SKYWARN NCO.

1.3: Training Prerequisites

There are a few assumptions that are being made about your experience and qualifications prior to working through this manual. For starters, we assume you have had at least Basic SKYWARN Spotter training within the last three years. Naturally, you must be a licensed amateur radio operator holding at least a Technician class license. Last but not least, you should have an interest in severe weather and emergency communications, otherwise you will probably be underwhelmed by your role in the SKYWARN program.

1.4: Supplemental Training – What's Not Covered Here

This manual does not cover the operation of the computer systems used in the collection or relaying of SKYWARN Spotter reports. These are covered in other training programs. Contact your Amateur Radio Coordinator for information on additional training requirements.

2: Before the Activation

2.1: Internal Forecasting & Communications

The SKYWARN team uses a number of official weather products from the National Weather Service and other agencies to assess the potential need for SKYWARN activations and amateur radio support, in many cases beginning several days prior to the onset of severe weather.

You don't need to have an understanding of all the products the National Weather Service publishes throughout the day. In most cases, being able to read the regular weather forecast and understand the issuance of a watch – what we call a WWA, for “Watch, Warning, or Advisory” – will give you some insight into the potential severe weather threats so that you can plan to serve as an NCO.

To make things easier, the SKYWARN Leadership Team – the Amateur Radio Coordinator, SKYWARN Program Manager, Area Managers, and others – keep an eye on the various NWS products for you and will condense all of the information into a product called a Risk Assessment Bulletin. The Risk Assessment will recap the expected severe weather threat as well as the specific times that SKYWARN and ham radio support may be needed. Once you join our team, you'll start getting these via e-mail.

It's important that you take a look over the Risk Assessment Bulletins – if nothing else, the “Amateur Radio Action Message” portion toward the bottom of the bulletin – to get an idea if and when we might need you to serve as a Net Controller.

2.2: When We Activate

In general we will activate for any widespread or high-impact weather event. There are specific criteria – called our Service Level Commitment, or SLC – which specify the types of event we will automatically activate for. There are different SLC's for daytime and overnight operations, and there's a separate SLC for the SKYWARN Radio Desk located inside the Wakefield WFO. You can find the current SLC inside the SKYWARN Operations Manual or ask your Area Manager.

Experience has shown us that the types of weather event described in the SLC are the most productive for us. That is, they tend to produce the highest levels of participation in our nets and generate the most reports. Put another way, they produce the “biggest bang for the buck” and by focusing on these types of events we minimize the dead air time and burnout that comes from over-activating.

However, as a trained SKYWARN NCO, you have the authority to start a SKYWARN net any time you think one is necessary, any time of the day or night. You don't need permission from anyone to do it. If weather conditions in your area are significant enough to warrant a net and you have the time to do it and can do it safely, then start a net! We have lots of forecasting mechanisms and activation triggers in place, but nobody knows better what's happening in your area than you do, and we recognize that by extending activation authority to our Net Controllers.

2.3: Volunteering for NCO Duty

When you join our team you'll be asked to furnish some information for the Team Roster which includes your contact e-mail address, phone number(s), and your basic availability. Please keep this information up to date as it provides your Area Manager a starting point for building a Net Control team for activations.

After you review a Risk Assessment Bulletin you should let your Area Manager know right away if you are available for Net Control duty. Send an e-mail, make a phone call, or call them on the radio. Let them know the specific times you will be available to run the net. Your Area Manager will use this information to schedule you for a time slot as NCO.

If an adequate number of NCO's don't volunteer in a relatively short period of time, Area Managers will begin contacting individual Net Controllers by telephone. There's no specific order in which NCO's are called, but in the interest of efficiency most Area Managers will go directly to those NCO's that have run nets most frequently. Don't take this as any sort of signal that you're not wanted or needed, because you are! You should volunteer for Net Control duty. If you feel like you're being passed over for some reason, talk it over with your Area Manager or the Amateur Radio Coordinator. You're an important part of the team, and you shouldn't feel left out of the fun.

2.4: Minimum Net Staffing

You won't be alone on the air.

As a standard policy we try to run our nets with two Net Controllers. The second is usually lurking in the background somewhere and only makes an appearance when the primary Net Controller needs help with something like calling in a report to the WFO or helping with the logging.

When you first get started as a Net Controller you might want to serve specifically as the backup NCO. Listen to the net and jump in to help when asked, backing up the primary NCO when things get busy. Pay attention to how the net is run and take some mental notes to prepare you for the first time you run the net.

Overnight nets are a different story, and will probably be run with just one Net Controller. These are also a great way to get started as an NCO. There usually aren't many reports to take and there's lots of opportunity for friendly chatter on the repeater. Things can be a lot more relaxed overnight. Plus, there's the added bonus that if you *do* happen to mess something up, there won't be many people listening!

2.5: Getting Ready to Go

You should put together your own set of SKYWARN supplies and keep them with you wherever you might serve as Net Control. A bright red binder makes an easy-to-find place to file copies of important paperwork. Keep a copy next to your radio at home, and maybe keep a set in the car so they're with you wherever you happen to be. At a minimum you should have printed copies of:

- A recent copy of the SKYWARN Team Roster.
- 15 to 20 copies of the paper log sheet.
- A SKYWARN frequency list for your area and surrounding areas.
- Current net scripts.

You can find all of these things on the SKYWARN Operations Portal web site. If you have trouble finding these documents, check with your Area Manager. You should also have a few pens or pencils handy, and maybe a few sheets of scratch paper for scribbling down notes. Make sure the phone number to the Wakefield WFO is programmed into your cell phone so you'll have it available if you need to phone in a report. It's 1-800-737-8624.

As always, your radio equipment should be kept in good working order. Perform some basic system checks well prior to the start of the activation. It's best to do these checks at least weekly if you're not already. Make sure your primary power supply works. Check your backup battery or other power source. Do audio checks to make sure you can hear and be heard. How about your backup radio? Do you even have a backup plan in case your radio stops working, your antenna blows over, or your power goes out?

3: Net Basics

3.1: Use Approved Frequencies

We have a specific set of frequencies utilized for SKYWARN operations. The repeaters have been chosen by the SKYWARN Leadership Team in consultation with the repeater trustees and have been determined to best suit the needs of the SKYWARN program. Most areas have exactly one primary SKYWARN repeater and one or more backup repeaters. The primary repeater should be used whenever possible.

If it becomes necessary to move a net to the backup repeater, you should work with your Area Manager to coordinate the move. Usually we will only move a net to a backup repeater if there's a major technical issue with the primary repeater. Simply having another net in progress on the primary repeater typically isn't a good reason to move SKYWARN operations elsewhere. We've found that we are able to work alongside other EMCOMM groups – such as ARES/RACES – and since our Spotters know to look there first, we should be on the primary repeater.

If none of the backup repeaters are available, the Area Manager will work with the Amateur Radio Coordinator if necessary to make arrangements to hold SKYWARN operations on another frequency.

Net Controllers should adhere to the published frequency plan unless directed by their Area Manager or the Amateur Radio Coordinator to make changes. Frequency changes only confuse Spotters and use of repeaters for which SKYWARN is not specifically authorized may disrupt other EMCOMM teams' plans or upset the repeater trustees.

3.2: Use Scripts

When you first start out as a SKYWARN NCO, you'll want to use our Net Scripts to help you run the net. You don't have to read them word-for-word, and once you get the net going you'll develop your own flow and can toss the scripts aside. The important things to remember are that you need to be periodically calling for check-ins and that you must provide a recap of the severe weather threats every 10 to 15 minutes.

If you don't like the wording of our official scripts, you are free to develop your own, as long as they meet the fundamental criteria required for a SKYWARN net. There's a section in the SKYWARN Operations Manual that talks about this, so it would be a good idea to check there for information first.

3.3: Be Friendly

Serving as a Net Controller is a serious job. You're collecting information on behalf of a US Government agency... information that plays a direct role in improving forecast accuracy and issuing or canceling warnings that save lives and protect property. That's a big responsibility, but it doesn't mean you need to have a serious tone or unfriendly attitude during your nets. Keep things light. Call your Spotters by name if you know it. It's okay to have a quick back-and-forth exchange if time (and weather conditions) permit. This type of behavior is encouraged, and it consistently brings out more Spotter participation in our nets.

If you're not feeling chatty, that's okay, too. Just be courteous and extend a sincere “thank you” to each station that calls in a report and encourage them to check in with us in the future.

3.4: Be Professional

Remember that to our Spotters, you *are* the National Weather Service. Many Spotters won't know the difference between Joe Hamm sitting at home taking reports in his underwear and a degreed forecaster sitting behind the microphone of a radio inside the forecast office! You are the “voice” of the National

Weather Service to our Spotters and you must maintain a professional disposition on the radio at all times.

3.5: Be Safe

If you're talking in to a microphone connected to a lightning rod high in the tree tops, it might not be a good idea to be on the air when a storm is nearby. Remember that if you can hear thunder, you (and your antenna) are close enough to be struck by lightning. Don't rely on radar: use your ears!

Back in 2009, the Wakefield WFO issued a rare Special Weather Statement based on lightning – which as you'll recall from your Spotter training class *isn't* one of the criteria for a severe thunderstorm. In this particular storm, lightning was occurring *many miles* ahead of the thunderstorms. The lightning strikes were numerous and intense. Lightning strikes and thunder were heard in the Stratford Hills community in south Richmond a full 40 miles ahead of the approaching thunderstorms! This same storm sparked many structure fires nearly an hour before the associated rain ever arrived. It also struck the Wakefield WFO, doing damage to computers, telephones, and amateur radio equipment, and knocking the Wakefield radar out of service for weeks!

Severe weather has crept up on our Net Controllers before.

Also in 2009 one of our Net Controllers was participating in a SKYWARN Net in Area 5 when a tornado struck her Chesapeake neighborhood, doing damage to her home. As a SKYWARN Net Controller you're in a unique situation of having access to a wealth of real-time weather data, but you must be able to comprehend this information and make smart decisions about when to abandon the net and look out for yourself. Our Net Controller did just that and escaped without any physical harm.

In October 2010 our Amateur Radio Coordinator was running a SKYWARN net from his workplace in Mechanicsville as a long-track EF1 tornado approached the area. He was in contact with a Spotter less than a mile away who was observing the storm. The SKYWARN net was taken off the air for several minutes while customers and employees were moved to safety in the store's bathroom. Once the storm passed, the net resumed and continued to take reports of the tornado for another hour as it moved into King & Queen County.

BOTTOM LINE: IF YOU FIND YOURSELF IN THE PATH OF A TORNADO OR OTHERWISE FEEL THREATENED BY WEATHER, DROP THE MICROPHONE AND TAKE SHELTER IMMEDIATELY. YOUR BACKUP NET CONTROLLER WILL TAKE OVER, OR THE NET WILL WAIT. DO NOT JEOPARDIZE YOUR SAFETY FOR SKYWARN. YOU CANNOT BE REPLACED.

4: Calling the Net

4.1: Securing Access to the Frequency

Before calling a SKYWARN Net, you need to check to make sure the frequency isn't already in use. Just because you listen for a couple of minutes and don't hear an active conversation doesn't mean another Net Controller from another group isn't sitting on the sidelines waiting for traffic for his own net. You should announce "This is SKYWARN Net Control, is this frequency in use?" Repeat the call once or twice and if no response is heard, proceed to call the net.

If another net is in progress, check with your Area Manager for guidance on how to proceed. In most cases we can successfully operate alongside the other net on the same frequency, but sometimes the decision will be made to move the net to another frequency. Don't try to work out these arrangements on your own. If your Area Manager can't be reached right away, call another Area Manager or the Amateur Radio Coordinator. If that doesn't work, make an executive decision to move SKYWARN operations to a designated backup repeater. Be sure to notify the Net Controller of the other net that SKYWARN is normally active on this repeater but is moving to an alternate frequency. Provide the frequency and ask that Spotters looking for SKYWARN be directed to the backup repeater.

If you come across a non-net conversation in progress and it doesn't seem like it'll be ending anytime soon, use good operating practice to break into the conversation. Simply announce your call sign between transmissions and wait to be recognized. Identify as "SKYWARN Net Control" and let the stations know that a SKYWARN net needs to activate on that frequency and ask if you may use the frequency. Remember that nobody "owns" a frequency – the stations using the frequency are well within their rights to continue using it for their own purposes and are under no obligation to yield to SKYWARN. Ask nicely and most stations will give up the frequency without question.

4.2: Taking Check-Ins

As part of calling any net, you should call for stations wishing to check in to the net. You need to know which stations have traffic for SKYWARN and which ones are simply "out there" so be sure to ask stations to indicate if they have any specific traffic for SKYWARN. You want to make sure you handle those stations with traffic first.

When getting check-ins you should get the call sign, first name, location, and direction of travel (if mobile). Make a note of these on a piece of paper or on the online check-in tracking system.

It's clear why we get check-ins from stations with traffic: so we can call on them and take those reports. However, many seasoned SKYWARN Net Controllers don't see a point to taking check-ins from stations that don't have traffic. The reason is simple: so we can call on them when we need reports from their area!

If a net runs kind of long, it may be a good idea to periodically do a "roll call" and see which stations are still checked in. Run down the list of prior check-ins one at a time and see if the stations are still out there and if they would like to remain checked in.

4.3: Recapping the Severe Weather Threat

It's important that the flow of information on our nets go two ways. First and foremost we're here to collect reports of severe weather from Spotters and relay those reports to the National Weather Service. We also have an informal obligation to keep our Spotters and the rest of the amateur radio community apprised of the severe weather situation.

Our computer systems provide you with a nearly real-time feed of severe weather products from the National Weather Service. In most cases these are pushed directly to your e-mail, so you should have that

open while running a net. There are a number of third-party software packages available to keep track of current watches and warnings, too. You can use any of these to provide periodic recaps of the severe weather threat.

When going over the active watches and warnings, *do not* read them verbatim. Boil it down to a few sentences. A full tornado warning product can take three or four minutes to read over the air. Rather than read the whole thing, you could just say “there is a tornado warning for eastern City of Richmond and southeastern Hanover County until 5:15 PM.” Instead of reading the full text of a watch, you could say “a Severe Thunderstorm Watch is in effect for most of central and eastern Virginia until 8 PM this evening.” You should be specific with warnings, less so with watches.

If you're comfortable (and good at) reading radar, participants in our nets always appreciate knowing how they are *personally* going to be impacted. You might specifically call a station in Mechanicsville and say, “it looks like you're in the path of some very heavy rain, maybe some hail, in about the next 5 to 10 minutes; be alert and check in with me with any hail or damage reports once it has passed.” You'll get the gratitude of the station you called on and they will be much more likely to participate in our nets in the future!

4.4: Keep it Informal

The majority of SKYWARN nets are handled as what we call informal nets. There's a Net Controller and check-ins are taken, but the repeater remains open for regular amateur radio use. Stations are encouraged to continue using the repeater for their routine traffic but are urged to keep individual transmissions short and leave breaks between each transmission to allow SKYWARN traffic to be passed. Stations do not need to request permission to make contact with another station, but they often will make the request anyway.

Why do we insist on informal nets? First, our repeater trustees don't want us (or any EMCOMM group) needlessly monopolizing the repeater. If there's traffic to be passed or warnings to announce, we should do it, but if we're not actively using the repeater, their philosophy (and ours) is that the repeater should be kept open for routine, non-SKYWARN traffic. Second, most of the time there is absolutely no reason to go with a directed net. We don't often handle such an exorbitant amount of traffic to warrant locking down the frequency with a directed net.

4.5: Going Directed

Directed nets give us a tighter control over the radio traffic by requiring that all transmissions be at the direction of Net Control. The repeater is considered “closed” to non-SKYWARN traffic.

There are exactly two circumstances in which we will start a directed net. The most common trigger is a tornado warning. Any time there is an active tornado warning within the repeater's coverage area, the frequency should be locked down for SKYWARN traffic only. An announcement making the switch might sound something like “a tornado warning has just been issued for the storm over Caroline County, so at this time Net Control is shifting into a directed net and requests that all non-emergency traffic please be held for the duration of this warning.”

Locking down the frequency during a tornado warning ensures that we can quickly get reports associated with the tornado warning, and also means that emergency traffic related to the tornado – whether or not the traffic is related to SKYWARN – can be passed efficiently. It may be necessary to handle general emergency traffic including requests for emergency aid which need to be relayed to 911.

The decision to take a non-emergency SKYWARN report during a directed net is entirely up to you as the Net Controller. Most Net Controllers will still handle any SKYWARN reports during an active tornado warning, regardless of whether those reports are associated with the storm that triggered the tornado warning. Net Control should occasionally announce something like “any stations with emergency traffic at any time announce break between transmissions to be immediately recognized.”

The other trigger that will throw us into a directed net is simply having too much traffic to handle otherwise.

So far, the only times we have run into this are during major snow events when everyone comes out of the woodwork wanting to report their measurements. Calling a directed net emphasizes the need for traffic control and brings out a little different mentality in the stations that are participating which may minimize the extraneous chatter that might otherwise take place.

5: Taking Reports

5.1: We Take (and Log) Everything

Our Net Scripts are designed to remind Spotters what sort of reports we are looking for by providing a list of the reporting criteria for that particular event. Invariably you will have a station call in with a report that doesn't meet the criteria. You are required to take all reports received and you must log them in the official net logs. Your job as the Net Controller is to filter out the reports that do not meet the reporting criteria and keep those from going to the National Weather Service, but you must still maintain a record of every report received.

5.2: Elements of a Good Report

A good report has four key elements:

- Description of the event, including any quantitative measurements or estimates.
- Location – as exact as possible, coordinates if available.
- Time – as precise as possible, estimates OK for past events.
- Identification – who filed the report (call sign, Spotter ID, contact number, etc).

We need to get as detailed a description of the event as possible, with as accurate a time and location as possible, along with identifying information that allow us to get back in touch with the Spotter if necessary.

Here are two reports. Which one is better?

1. "I am at the intersection of Route 360 and Route 30 in King William County and I see a large rotating wall cloud approaching from the west. The tree line is pretty high so I can't tell if there is a tornado on the ground, but leaves are falling from the sky overhead. My Spotter ID is VHVR024."
2. "There is a tornado near the ground in Central Garage."

Report #1 is obviously the superior report. It clearly conveys exactly what is being seen, where it's happening, when (right now), and it identifies the Spotter. Report #2 would only be marginally helpful, since it's not clear (a funnel cloud only becomes a tornado when it reaches the ground, so a tornado can't be "near the ground") and someone at the WFO might be unfamiliar with the village of Central Garage. The major intersection provided in report #1 would be helpful.

Many reports will start off much like report #2 did but can be developed into a much more complete and useful report by asking a few quick questions.

5.3: Identifying Bad Reports and Building Better Reports

Spotters give us some great reports. They also give us some hilariously bad reports. The bad reports usually aren't intentional and are rarely malicious. You should be able to readily identify the "el toro poo poo" that comes across the radio and we have procedures in place for dealing with that which we'll get to in a few minutes. You also need to know how to deal with the less-than-usable reports that come from some un[der]educated Spotters.

Take a look at these reports and decide for yourself if it's a good report or a bad report. If you think it's a bad report, what would you do to try to salvage it and turn it into something usable?

1. "I see a tornado headed straight for my house! I gotta go!"
2. "The road's blocked right where Luck's Farm used to be."

3. "We've got marble-size hail here. I'm about two miles from the old fire tower."
4. "The wind's blowing a good 50 or 60 MPH."
5. "We have about two inches of snow here."
6. "Got lots of dark clouds off to the west."
7. "It's raining awful hard here."

For each of these reports, you might ask:

1. If another station knows where the station is located or where the tornado might be (we're not going to ask that someone in the path of a tornado stay on the air to give us this information!)
2. Where was Luck's Farm? Address? Cross-street? What's blocking the road? Trees? Power lines? How big are the trees? Were they snapped or uprooted? Are there injuries? Do we need to notify law enforcement?
3. Marbles come in many different sizes, can you estimate the size? Dime size? Nickel? Quarter? What's your exact location (address or cross-street)?
4. Are the winds causing any damage like downed trees or tree limbs or any structural damage?
5. Is that snow depth on hard surfaces or grassy areas? Can you take a measurement? How are the roads? When did the snow start? How much snow did you get in the last hour? Can you check back in with us in an hour or when you get another inch?
6. Do you see any rotation in the clouds or debris in the air?
7. Are you noticing any significant ponding of water or any flooding? Do you have a rain gauge?

When you take reports, we need to know if any quantitative information is a measurement or an estimate. Estimated figures can be way off base, so it's important to distinguish between the two. Listen for keywords like "about" or other audible cues that the Spotter is taking a guess. Hail size comparisons to coins, fruits, or other objects are inherently estimates. We don't like estimated wind speeds – they are way wrong 99% of the time! If the Spotter has an anemometer and can give us a measured speed, we'll take that, otherwise we want to focus on the effects of the wind. Are tree limbs or branches coming down? Are shingles blowing off houses? Those are significant, reportable events.

Before you wrap up your contact with any Spotter, ask yourself "is this the best report I can get?" Are there any unanswered questions? It's a lot easier to get every possible detail on the initial contact than it is to try to get back in touch with a Spotter later to get more details.

5.4: Handling Suspicious or Fraudulent Reports

The SKYWARN report logging methods (electronic and paper) both provide a mechanism for identifying a suspicious report. We identify these reports as being "flagged" and it's a simple cue to the receiving end that we believe something is wrong with the report. Does the report simply not fit the situation? Do you have some reason to believe the report is false or intentionally malicious? If so, "flag" the report in the logs.

Our electronic logging system will highlight the flag for NWS employees automatically. If you are relaying a report over the air, it is important to state simply that the report is flagged. Do not go into details over the air. If you are calling the report in to the WFO by telephone, you may use plain language with the NWS employees to communicate the concern.

An example of conveying this flag when relayed over the air from a local net to WX4AKQ might sound something like, "Report from AB4CD, received 17:10 hours, flagged, location I-95 1 mile south of Ashland, reporting a tornado on the ground." It's simple and inconspicuous.

Never make an accusation about the integrity of a Spotter's report over the radio. Be sure to ask

appropriate probing questions to try to gain an understanding of what's being reported and see if there is any valid data in the report, but do not do it in such a way as to criticize the Spotter or accuse the Spotter of wrongdoing over the air.

The Amateur Radio Coordinator will review all flagged reports after the activation concludes and will work with the SKYWARN Program Manager to resolve any recurring issues with report integrity from a Spotter.

6: Logging Reports

6.1: Electronic Logging

The majority of reports you receive will be logged directly into our electronic logging system. This Internet-based system maintains a permanent record of all reports received into the SKYWARN ham radio communications network and is able to automatically relay reports to the WFO via both Internet e-mail and Winlink 2000.

If Internet access is available where you are running the net, electronic logging should be used.

6.2: Manual Logging

If no Internet access is available, your reports should be logged on paper. A PDF version of paper log sheets is available on the SKYWARN Operations Portal web site and these should be printed in adequate quantities well in advance of any SKYWARN activation. Keep copies of the paper log sheets at each location from which you might serve as Net Control.

Upon restoration of Internet access, all information from the paper logs must be entered into the permanent records via the electronic log system. Enter the reports as you always would but be sure to indicate that the report has already been handled so another copy isn't needlessly sent to the National Weather Service. Your Area Manager can help you with this process. You may also be able to mail or fax your log sheets to the Area Manager or Amateur Radio Coordinator for processing.

7: Relaying Reports to NWS

7.1: Electronic Relays

The majority of the reports you collect will be entered into our electronic logging system. As part of the logging process you will specify whether or not each report should be automatically transmitted to the National Weather Service. Spotter reports meeting the reporting criteria for the weather event should be sent electronically whenever possible. This is the most efficient means of communicating *most* reports to the National Weather Service.

Our policy under agreement with the National Weather Service is that urgent reports will also be called in by telephone directly to an NWS employee immediately upon receipt. Urgent reports typically are limited to tornadoes, funnel clouds, waterspouts, significant wind damage, or any injuries or death directly attributed to weather.

In the event of a communications outage at the WFO, reports will need to be relayed by some other means.

7.2: Relays via WX4AKQ

If the SKYWARN Radio Desk is staffed with a Responder, WX4AKQ can take your report via the repeater, another VHF or UHF frequency, HF, or packet. As long as you have Internet access at your location, our electronic log system will give you the option to automatically send a copy of all reports to WX4AKQ via packet. These reports are sent over the Winlink 2000 radio messaging system. This is by far the quickest and easiest way to relay messages to the WFO via amateur radio.

If you are without Internet access, or if the packet system at the WFO is unavailable for some reason, you will need to relay your reports to WX4AKQ or the WFO over a voice communication channel. This could be by telephone or radio. If phone service is available at the WFO, it makes the most sense to triage your reports and send the most important ones by telephone directly to the SKYWARN Spotter Hotline. There is little sense in trying to get them to WX4AKQ first. Lower-priority reports can be sent to WX4AKQ by radio if requested by the Responder at the WFO. If no telephone service is available, WX4AKQ will communicate the type of reports needed and the subset of your reports meeting those criteria should be relayed to WX4AKQ.

In some cases, the WX4AKQ Responder will camp out on your frequency and will copy reports directly.

7.3: Other Relays

If you have a packet station and access to Winlink 2000 but do not have a working Internet connection, you can type up your reports and send them directly to SMTP:AKQ-Report@NOAA.gov. If telephone service is available, you can call them in to the SKYWARN Spotter Hotline.

7.4: Relaying to Other Offices

Our electronic log system is capable of communicating directly with all of our neighboring NWS offices – Raleigh, NC; Mt. Holly, NJ; Sterling, VA; Blacksburg, VA; and Newport/Morehead City, NC. Simply route the report to the appropriate office when specifying the message handling.

If you are relaying reports manually via Winlink 2000, you can either e-mail the office directly if you know the appropriate e-mail address, or send the message to WX4AKQ and request that it be forwarded to the appropriate office.

You can also call the SKYWARN Spotter Hotline. Let the NWS employee know that you are a ham radio

Net Controller for Wakefield and you have a report for another office. The NWS employee can relay the message for you, or may provide you with the appropriate phone number to dial directly.

8: Net Challenges

8.1: Loss of Repeater

Most SKYWARN repeaters have a layer of backup power to keep them on the air for a short while during power failures. Many of these repeaters may reduce their output power while running on emergency power, and this will adversely affect coverage into fringe areas. Some repeaters sound a special tone, use a different courtesy tone, or make a periodic announcement to indicate the use of emergency power.

Net Controllers should check with their Area Manager for guidance on how to identify and respond to these situations. Since most repeaters rely on batteries – not a generator – for emergency power, SKYWARN nets will shift into a low traffic mode, minimizing transmissions on the repeater and taking only the most severe reports.

If a repeater goes off the air due to loss of power or any other technical difficulty, the net should immediately be moved to the backup repeater. One Net Controller should stay behind to monitor for the return of the repeater. Someone should monitor the repeater's input for calls as well, if sufficient resources exist to do so.

The first priority in maintaining continuity of operations following the loss of a repeater is to ensure the net gets on the air on another frequency in a timely manner. Notification of SKYWARN leadership about a change in frequency is secondary.

8.2: Loss of Link System

In some areas a linking technology like Echolink, IRLP, or an RF link system is used to bridge multiple repeaters together. How the loss of a link is handled will depend on the nature of the severe weather event and the link itself. As a general rule:

1. If the link system was bridging together repeaters in multiple SKYWARN areas, for example, Richmond and Smithfield, a backup Net Controller should have been monitoring in each area and should be able to resume the net in the area that was severed from the link.
2. If the link system was bridging together multiple repeaters within the same SKYWARN area, for example, two repeaters within Richmond, the net should continue on the primary SKYWARN repeater. If the coverage benefit of the second repeater is needed, a second net controller should monitor that repeater to collect reports.

In all cases, the Area Manager should be consulted to make the final decision on how to handle this situation.

8.3: Loss of Internet Connectivity

Loss of Internet connectivity should not adversely impact our ability to serve the National Weather Service. We have sufficient procedures in place to deal with the loss of connectivity at the local level, at the WFO, and a total loss of connectivity at multiple points in our communication network.

Reports are typically logged and relayed electronically in the interest of efficiency. If the sender and/or receiver are without Internet access, an alternate relay method must be used. See section 7 of this manual for information on the various ways reports can be relayed, and pay attention to section 6.2 for instructions on the use of paper log sheets.

8.4: Malicious Interference

For whatever reason, malicious interference occasionally creeps into SKYWARN activities. When this happens, don't take the interference personally. Just remember that somewhere out there, a village is missing its idiot. Don't acknowledge the actions of the interfering station – to do so is only going to provide motivation for them to continue.

A commonly proposed solution is to move the net to another frequency. This is not a good idea. The SKYWARN net should not be moved to another frequency on account of malicious interference because the interfering party can change frequencies just as easily as we can and will likely follow the net to the new location. Furthermore, changing frequencies only confuses Spotters who are accustomed to looking for us on our designated primary repeater and can disrupt the communication plans of other EMCOMM organizations with whom we share frequencies.

If possible, make a note of any identifying characteristics of the interfering signal, and note any patterns to the abusive behavior. If an audio recording device is available, use it to capture samples of the interference. When possible, notify your Area Manager that the activity has occurred. Your Area Manager can escalate the matter, and the team is able to take advantage of resources within the National Weather Service to deal with interference to government operations.

8.5: Conflicts with Other Nets

Sections 3.1 and 4.1 talk about dealing with situations in which SKYWARN needs to go on the air on a frequency already being used for other activities. Become familiar with the ideas discussed in those sections and be sure to consult your Area Manager for guidance if any of these situations arise.

You may also encounter a situation in which another net needs to go on the air while SKYWARN is already on the air. Quickly and professionally work with the other net's controller to allow both nets to work alongside one another. Something as simple as requesting that stations call for a specific net control (“SKYWARN Net Control” vs. “ARES Net Control”) and agreeing to consult each other for access to the frequency prior to making calls (as any station participating in any directed net would do) would go a long way to ensuring both nets can operate on their preferred frequencies with a minimal disruption.

As always, your Area Manager is the best resource for working out these conflicts and you should consult your Area Manager anytime these kinds of scenarios come up.