



CUYAHOGA COUNTY SKYWARN 2017

Net Control/Liaison Operation Manual

CUYAHOGA COUNTY SKYWARN

NET CONTROL AND LIAISON OPERATION MANUAL

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About Skywarn

The effects of severe weather are felt every year by many Americans. To obtain critical weather information, NOAA's National Weather Service (NWS), part of the U.S. Department of Commerce, established Skywarn with partner organizations. Skywarn is a volunteer program with nearly 290,000 trained severe weather spotters. These volunteers help keep their local communities safe by providing timely and accurate reports of severe weather to the National Weather Service.

Although Skywarn spotters provide essential information for all types of weather hazards, the main responsibility of a Skywarn spotter is to identify and describe severe local storms. In the average year, 10,000 severe thunderstorms, 5,000 floods and more than 1,000 tornadoes occur across the United States. These events threatened lives and property.

Since the program started in 1971, the information provided by Skywarn spotters, coupled with Doppler radar technology, improved satellite and other data, have enabled NWS to issue more timely and accurate warnings for tornadoes, severe thunderstorms and flash floods.

Skywarn storm spotters are part of the ranks of citizens who form the Nation's first line of defense against severe weather. There can be no finer reward than to know that their efforts have given communities the precious gift of time—seconds and minutes that can help save lives.

The NWS staff at the Cleveland Forecast Office in Ohio, is responsible for issuing warnings for most of Northern Ohio and Northwest Pennsylvania. It is impossible to observe conditions in each of these regions simultaneously during a severe weather event. Skywarn volunteers become their eyes and ears helping to provide better weather watch and warning services to the public.

Skywarn reports are relayed from wherever you are (on the road, in your office, or at your home) you don't have to travel to any particular location. **It is important, however, to not jeopardize your own safety while participating in Skywarn.**

Amateur Radio Operators and Skywarn

Amateur Radio Operators have a special place in Skywarn. The Cleveland weather office has amateur radio equipment on site. A Skywarn Net run by the volunteer amateur radio net control operators there allow for reports from the field to be directly heard at the Weather Service.

Using amateur radio to relay reports to NWS increases speed and efficiency. It also allows reports to be submitted without relying on telephone lines or the internet which both may become unavailable during severe weather events.

There are 3 different nets that operate during severe weather events.

- Local County Nets
- District Nets
- NWS Backbone 6 Meter Net

Cleveland Skywarn Structure

The Cleveland weather office is responsible for a total of 30 counties covering Northern Ohio and Northwest Pennsylvania. These counties make up the county warning area (CWA).

In order to facilitate more effective radio communications, the CWA has been broken into 6 districts. Each district operates a District Net that accepts reports from the individual counties. Cuyahoga County is located within District 2. These District Nets then pass the reports directly to NWS Cleveland via a wide area 6 meter repeater system. If the District 2 net is unavailable, traffic should be passed directly into NWS Cleveland via telephone. Stations are not permitted to pass reports directly to NWS via the 6 meter system without prior approval from a member of the Cuyahoga County Skywarn Coordination Team.

Cuyahoga County Skywarn Structure

Cuyahoga County Skywarn operates under the authority of NWS Cleveland. The Warning Coordination Meteorologist (WCM) is in charge of the Skywarn program.

Within Cuyahoga County there is also a management structure. All decisions are made by a coordination team, with the ultimate decision maker being the Coordinator.

- **Coordinator** - Mat KC8NZJ
- **Assistant Coordinator** - Carl KB8VXE
- **Assistant Coordinator/NWS ops** – Dave KD8TWG

There are also additional positions within Cuyahoga County Skywarn.

- **Net Control Station (NCS)** – Responsible for activating and maintaining severe weather nets
- **Liaison** – Responsible for assisting the NCS with maintaining the net. Also responsible for collecting reports from the NCS to relay them to the District 2 net or directly to NWS if the District net is not available.

Prerequisite Requirements

Being an NCS or Liaison requires special skills and equipment. The following are some basic guidelines for participation. This list should not be considered all-inclusive. Special exceptions may be made per the discretion of the coordination team.

- At least 1 year experience as an Amateur Radio Operator.
- At least 1 year experience as a Skywarn Spotter.
- A base mounted radio operating off a power supply. Emergency power capable of operating for an extended period of time is an added advantage but not required. **Nets should not be operated using a hand held transceiver, regardless of power source, except in cases of emergency.**
- A mobile mounted transceiver, while not ideal, is acceptable if located in an area with excellent repeater coverage. However, this should be avoided whenever possible.
- An antenna with decent coverage to all Cuyahoga County Skywarn repeaters and District 2 repeaters. An outdoor antenna or attic mount antenna is preferred but not required if the present system allows solid repeater access.
- A computer with internet access for getting up to date warning text and Doppler RADAR (although paid services offer more products and detail, they are not required; RADAR and warning data is available free from the NWS website.)

Activation Criteria

NCS and Liaison Stations are not authorized to activate nets unless given prior authorization by a member of the coordination team. There are guidelines that should be followed when deciding if circumstances warrant activating a net. A member of the coordination team must approve any exceptions to the rules below. When acting as a Net Control station please use the Skywarn call of **WX8CUY** in place of your regular FCC callsign during the net. You may optionally open and close the net using your regular callsign if you wish, but this is not legally required.

- Directed Net Criteria
 - NWS Issues a Severe Thunderstorm or Tornado WARNING for Cuyahoga County.
 - Formal request from NWS forecasters that a net be activated.
- Standby Weather Watch Guidelines
 - There is an active Severe Thunderstorm or Tornado warning for an adjacent county AND the storm or system that prompted the warning is expected to continue into Cuyahoga County within approximately 15 minutes or less.
 - There is an active Severe Thunderstorm or Tornado Watch and severe weather is expected to occur within approximately 15 minutes or less.
 - A warning for Cuyahoga County has just expired and additional storms are expected shortly.

Activating A Directed Net or Standby Weather Watch

Prior to activating the net you should attempt to obtain the following items.

- Appropriate Script (See Appendix A)
- Text of the current warning if one has been issued
- Understanding of the current weather situation

Once you are ready to activate the net, simply follow the instructions included with the script. It is important to remember that the NCS must relay information about the current weather situation to the spotters in the field as well as take reports from the spotters. Once the net is activated it is also important to establish a Liaison whenever possible. The liaison will forward reports to NWS via the district net or via telephone if the district net is not operating.

Taking Reports

One of the most important responsibilities you have as an NCS is getting useful and accurate reports. Many times, spotters will call in reports that lack enough information to make them useful to NWS forecasters. Additionally, many reports will not be of a severe nature that require them to be forwarded to NWS. As the NCS, it will be your job to compile the reports and make sure that you get all the required information for each report. It is recommended that the “NWS Weather Reports” form be used to ensure all info is obtained (see Appendix B). The following information should accompany every report:

- Location (City name and distance/direction from nearest major city) or distance from two major interstates (1 mile north or I-271 and I-480). NWS forecasters will likely not have timely access to maps showing individual street names.
- Time of occurrence (get an actual time, not “current report” as it won’t be “current” by the time it gets to NWS)
- Duration (how long the event lasted for)
- Wind Speed - measured or estimated?
- Hail Size – related in inches or coin size. Do NOT say “marble.” “Pea Size” is acceptable.
- Flooding – depth of water? Is the area prone to flooding?
- Storm Damage – size of tree or limbs down, is/was the tree healthy? Broken or uprooted?
- Rainfall – measurement and duration “.5 inches in the last 30 minutes” NO ESTIMATED RAINFALL REPORTS, estimates should be given in terms of visibility “visibility of about 50 feet”.
- Wall Cloud – Rotating? Direction of travel?
- Tornado or Funnel cloud – Debris? Direction of travel?

As the NCS it is YOUR JOB to make sure you ask all the appropriate follow up questions to ensure a COMPLETE report.

Once the report is taken, the Liaison should relay it to the district net or call NWS via telephone if the district net is not operating. When relaying multiple reports at once, be sure to give life-threatening reports like tornados or funnel clouds priority.

Radio Etiquette

When operating as an NCS or Liaison, it is important to operate efficiently and professionally. There are many different people monitoring our nets including local government agencies and the news media. There have been times during active events where scanners broadcasting our nets have been heard in the background during TV newscasts. Additionally, it is important to operate properly in order to maximize the effectiveness of the net. Below are some guidelines that should be adhered to.

- Limit your transmissions to no more than 30 seconds at a time.
- **Remember PTT means Push Then Talk.** Many of the repeaters utilized for Skywarn nets utilize remote inputs. It takes time for your radio to transmit, then for the remote input to begin transmitting, then for the repeater to begin transmitting. Avoid “fast keying” by pressing the PTT, pause for a second, and then begin speaking.
- Do not allow idle chatter during a directed severe weather net (this includes NCSs). Use 442.125 for side conversations related to coordination.
- **Do not use codes or jargon**, speak in clear, plain language.
- Always use the proper phonetic alphabet when necessary.
- **Speak clearly without rushing.** Think before you speak, do not “think” while the mic is keyed. If you have to say “Umm”, “Err”, “let me see”, say BREAK and take your finger off the PTT button. This gives other stations that may have urgent traffic the opportunity to pass it.

Weak Stations

There will often be times when a station attempting to check in is too weak to copy. During a Directed Severe Weather Net, every attempt should be made to copy the station in case they have emergency traffic. You should begin by asking the station to change location or increase power while you also attempt to copy via the input frequency. If that does not work, ask for any other stations able to copy via the input frequency. However, if after several attempts the station can still not be copied advise the station to try again later and move on. During a practice net, good practice is usually to allow the station to try a couple times but then move on if no copy is made.

Intentional Interference (Bozo/Lid)

Occasionally you will begin receiving interference from a station who is maliciously intending to disrupt net operations. It is extremely important that you DO NOT acknowledge the interference in ANY WAY. Pretend that it is not happening and make the offender think that their radio is broken.

Interfering stations are fed by reaction, if you give them no reaction or acknowledgement you will be taking away a significant part of their fun. Document the date and time of the occurrence as well as any details (type of interference, comment made, background noises, etc.) You should also see if you are able to copy the offender on the input, note the signal strength and document this as well. At the conclusion of the net, forward all this information to a member of the coordination team IMMEDIATELY. The coordination team member will then alert the appropriate personnel.

Repeater Failure

In the event of a VHF repeater failure, the net should be moved to the secondary VHF repeater. (See appendix A). In the event that the secondary VHF repeater fails, the net should be moved to the UHF repeater. In the event that the UHF repeater fails, the net should be moved to the VHF Simplex Frequency. Any time a repeater is vacated due to failure, someone should be designated to stay on the repeater periodically transmitting on the output frequency to notify other stations that the net has been moved. The person assigned to this task should have a decent base station with an outdoor elevated antenna.

Warning Text Information

It is vitally important that the NCS have access to the full text of products issued by NWS. This text needs to be put out over the air in timely intervals (approximately every 5-10 minutes), to keep spotters in the field abreast of the current situation. Text of Watches, Warnings and Statements can be found online at the NWS website. Since links change often they are not listed here. Speak to a member of the coordination team if you are unable to find an online source for product text. It is important that you get your information DIRECTLY FROM NWS, not from private sources like The Weather Channel or other privately owned web sites. Getting information directly from NWS is the only way to ensure its accuracy.

RADAR Information

RADAR data can be obtained free of charge directly from NWS. Access to current weather RADAR data is almost a necessity for an NCS; it is useful for giving your spotters a better picture of the situation, as well as being helpful for validation of reports. There are many free and paid services that provide weather radar data; they all process and display their data differently. For standardization and to avoid confusion, it is suggested you use only the NWS NEXRAD data available at: radar.weather.gov. Your main tools will be the Composite and Base Reflectivity images and loops from CLE. The regional RADAR mosaic is also good for getting an idea of approaching storms. The NCS should also attempt to get a basic understanding of how to interpret RADAR images and products; there are many online tutorials available. Do not disseminate RADAR information over the air other than indicating where the strongest returns are. For example, "the strongest part of the storm is currently over Parma and moving to the east." Whenever possible, stay away from using weather jargon or indicating intensity in terms of dBZ. Keep in mind that even the most current NEXRAD data is not "live". Each NEXRAD

volume scan takes approximately 6 minutes when in severe weather mode. When you add in time to process and upload images to the web and then access them, the data may be 10 minutes or more old. The weather may have moved significantly during this time, so take that into account. Always note the time at the top of the radar product and refresh as necessary to ensure you are viewing the most current data. If you do choose to use a paid service, we suggest services such as Gibson Ridge, Radarscope, or Weather Tap

Practice Net

The weekly practice net takes place from March to September each Wednesday at 8:30 local time. Everyone is asked to please get involved in the weekly practice net rotation. Stations conducting the weekly practice net should have copies of the script on hand, as well as the ability to record all check-ins and traffic. An Excel spreadsheet will be provided in the downloads section of the website. All checkins should be logged using this document. When acting as NCS for a weekly practice net, please use WX8CUY in place of your normal FCC callsign.

All net activity should be recorded and sent to the net manager via e-mail at the conclusion of each net using the provided Excel spreadsheet. This record should at least include the following information:

- Name
- Callsign
- Location
- Name and Callsign of NCS
- Date of net
- Start and stop times of net

After each weekly practice net, there is an option to hold a simplex net on 146.475. It is important that the NCS have an outdoor antenna with some elevation (push up pole, tower, roof mount, etc.) in order to effectively operate this portion of the net. If the NCS is using a mobile mounted radio or has an indoor antenna that is only capable of hitting repeaters, another NCS should be standing by to run the simplex net, or the simplex net should be skipped. Alternatively, a second brief net can be operated on 442.125 instead.

Conclusion

Serving Cuyahoga County Skywarn as a Net Control or Liaison can be a very fun and rewarding experience, however it can also be stressful at times. Proper training is a must. If at any time you are unsure about any policies or procedures, please contact a member of the coordination team immediately.

We hope you have found this manual informative. Thanks again for volunteering for Skywarn!

Appendix A, Frequencies

County	Primary	Secondary	Other	Other
CUYAHOGA	146.760/R 110.9	146.880/R 110.9	442.125/R 82.5	146.475 110.9 Simplex
LORAIN	146.625/R 110.9			
MEDINA	147.030/R 141.3	147.030/R 88.5	147.030/R 131.8	
SUMMIT	147.270/R 110.9	145.170/R 110.9		
GEAUGA	146.940/R 110.9	147.015/R 110.9		
LAKE	147.210/R 110.9	444.650/R 131.8	147.255/R 110.9	
NWS BACKBONE <i>MONITOR ONLY</i>	52.680			
CUYAHOGA ARES	145.410/R 110.9	147.480 Simplex		
DISTRICT 2 NET	145.230/R 110.9	147.150/R 110.9		

Appendix B, Directed Net Script

DIRECTED SEVERE WEATHER NET

A Directed Severe Weather Net shall be in effect whenever the following conditions exist:

1. NWS has requested it.
2. Severe Weather Warnings (not Watches) exist for Cuyahoga County

WX8CUY with tones (enter severe weather mode tone let, repeater drop) Attention all stations on frequency, this is WX8CUY, Net Control for Cuyahoga County Skywarn. At (time AM/PM or hrs), the National Weather Service in Cleveland has issued a, _____ Warning for Cuyahoga County effective until (time AM/PM or hrs). Any station with priority or emergency traffic only; please call now.

Handle all priority or emergency traffic first. Wait about 45 seconds after handling all of the traffic and then read the following.

This is WX8CUY, Net Control for Cuyahoga county Skywarn. (Now read full text of warning and cities in the path of the storm.)

This is a DIRECTED NET and all traffic will pass through Net Control. We are currently looking for reports of tornadoes, funnel clouds, wall clouds, winds in excess of 50 miles per hour, hail, flooding in progress and storm damage. Any station with reports of this nature, please call now.

Take reports as they come in.

Establish a net liaison and have the liaison contact the District 2 net on 145.230 PL110.9. If District 2 is not present and there is no Liaison station on the air phone the reports in to NWS at **1-800-262-9683. This number is not to be redistributed.**

If no reports are coming in, the NCS may take check-ins. It is up to the NCS to make the decision on whether or not to take check-ins. If you do decide to take check-ins, take ~3 at a time. Rapidly acknowledge the stations when they call. After you take the 3 check-ins, check again for severe weather traffic that may need to be passed. If there is no traffic, reevaluate the current situation and decide whether or not you should continue to take check-ins.

This is WX8CUY, Net Control for Cuyahoga County Skywarn. At this time, the Net will accept check-ins 3 at a time. Any stations wishing to check-in please call with your callsign and location only.

After allowing a series of stations to check in, be sure to acknowledge each one. Re-announce the warning about every 10 minutes. If needed check with your Liaison about every 20 minutes for updates. Keep your spotters informed. Be flexible as to the nature of the reports you accept depending on the severity and proximity of the weather situation. For example, do not ask for check-ins when there are many reports of storm damage coming into the net. You should be aware of what the approaching storm system has done as it has moved across the state. This information is available by monitoring the District 2 Net, NWS Backbone Net, or NOAA Weather Radio.

Appendix B (continued)

If severe conditions are developing or already exist, STICK TO THE LIST and DO NOT TAKE CHECKINS! The location of the gust front is not as important as tracking a funnel cloud or tornado.

Keep in mind that a tornado moving at 30 miles per hour will cover one-half mile of linear distance for each 60 seconds that you have the microphone keyed. In most locations in Cuyahoga County, this can mean 30 to 50 damaged or destroyed homes (depending on lot frontage), and lives at risk for each one.

MAKE YOUR TRANSMISSIONS SHORT, SWEET AND TO THE POINT. A GOOD EXAMPLE TO FOLLOW IS IF IT CAN'T BE SAID IN LESS THAN 10 SECONDS, IT SHOULDN'T BE SAID. Once the storm passes and severe conditions have subsided, at your discretion you may become more flexible as to what reports you accept, or when to begin taking check-ins again.

STANDING DOWN THE NET

Before standing down the net:

1. Check for any reports of significant weather or weather-related damage.
2. Have your Local Liaison contact District 2 and make sure that there is no further need to maintain local Net Operations.

Close contact with District 2 by formally signing out on the air with the Local Liaison.

Close the Net by saying:

This is WX8CUY, Net Control for Cuyahoga County Skywarn. At this time we are standing down the Net. (Explain the current weather situation). I would like to take this opportunity to thank everyone that participated in the Net. Cuyahoga County Skywarn would also like to thank LEARA and the 442.125 group for the use of their repeaters. For more information or to contact Cuyahoga County Skywarn, visit our website at ccsckywarn.org. This is WX8CUY and this net is now closed. All stations please standby for change over. WX8CUY with tones (enter normal mode tones)

NOTE: If conditions that require a Directed Severe Weather Net have dissipated or have passed, but such conditions are expected to return within one hour. Net Control should stand down the Directed Severe Weather Net to a Standby Weather Watch.

STANDBY WEATHER WATCH MODE

WX8CUY with tones (enter standby mode tone) Attention all stations on frequency, this is WX8CUY, for Cuyahoga County Skywarn. At (time AM/PM), the National Weather Service (Fill in the situation, explain watches and warnings).

We are currently in a Standby Weather Watch. The repeater is open for use, but please keep your transmissions short and allow the repeater to drop carrier in between transmissions. If a station calls, please give them the repeater right away; they may have weather traffic to pass. Thank you for your cooperation. This is WX8CUY, for Cuyahoga County Skywarn.

Repeat the above not more than once every 15 minutes, unless someone asks. Answer questions as needed.

NOTE: This is NOT a directed net, but it is the responsibility of the net control to monitor the frequency and maintain net discipline. During a Standby Weather Watch you are a "Skywarn Representative". If possible, monitor, or have a liaison monitor the NOAA Weather Radio, the District 2 Net, and/or the NWS Backbone net so that you are aware of what is going on in the outlying areas. Be prepared to distribute that information if needed. A Standby Weather Watch should be in effect anytime there are threatening weather conditions in counties adjacent to Cuyahoga and when the direction of movement of the threatening weather is expected to cause the weather to move into Cuyahoga County. By convention, a Standby Weather Watch shall be in effect if threatening weather is expected to affect Cuyahoga County within approximately 15 minutes.

This is a good time to establish your Local Liaison to the District 2 Net if needed. Additionally, liaisons with neighboring Local Skywarn nets may be established if needed.

Appendix D, Estimating Wind Speed

Estimating Wind Speeds with Visual Clues			
Beaufort number	Description	Speed	Visual Clues and Damage Effects
0	Calm	Calm	Calm wind. Smoke rises vertically with little if any drift.
1	Light Air	1 to 3 mph	Direction of wind shown by smoke drift, not by wind vanes. Little if any movement with flags. Wind barely moves tree leaves.
2	Light Breeze	4 to 7 mph	Wind felt on face. Leaves rustle and small twigs move. Ordinary wind vanes move.
3	Gentle Breeze	8 to 12 mph	Leaves and small twigs in constant motion. Wind blows up dry leaves from the ground. Flags are extended out.
4	Moderate Breeze	13 to 18 mph	Wind moves small branches. Wind raises dust and loose paper from the ground and drives them along.
5	Fresh Breeze	19 to 24 mph	Large branches and small trees in leaf begin to sway. Crested wavelets form on inland lakes and large rivers.
6	Strong Breeze	25 to 31 mph	Large branches in continuous motion. Whistling sounds heard in overhead or nearby power and telephone lines. Umbrellas used with difficulty.
7	Near Gale	32 to 38 mph	Whole trees in motion. Inconvenience felt when walking against the wind.
8	Gale	39 to 46 mph	Wind breaks twigs and small branches. Wind generally impedes walking.
9	Strong Gale	47 to 54 mph	Structural damage occurs, such as chimney covers, roofing tiles blown off, and television antennas damaged. Ground is littered with many small twigs and broken branches.
10	Whole Gale	55 to 63 mph	Considerable structural damage occurs, especially on roofs. Small trees may be blown over and uprooted.
11	Storm Force	64 to 75 mph	Widespread damage occurs. Larger trees blown over and uprooted.
12	Hurricane Force	over 75 mph	Severe and extensive damage. Roofs can be peeled off. Windows broken. Trees uprooted. RVs and small mobile homes overturned. Moving automobiles can be pushed off the roadways.

Source: National Weather Service Portland. <http://weather.gov/portland>

Amateur Radio Operations

