



CUMBERLAND COUNTY **AMATEUR RADIO EMERGENCY** **SERVICE/RADIO AMATEUR CIVIL** **EMERGENCY SERVICE**

WEATHER OBSERVERS GUIDE

A REFERENCE GUIDE FOR OBSERVING AND REPORTING WEATHER CONDITIONS

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Introduction

Part of our mission as ARES/RACES volunteers is observing and reporting weather conditions to the National Weather Service in Gray. This is part of the Skywarn program. It is highly recommended that all Cumberland County ARES/RACES members receive Skywarn Spotter Training from and be certified by the National Weather Service (NWS), but in leu of this training, this guide will provide the information necessary to report weather conditions to a Skywarn Weather Net, net control station.

SAFETY

SAFETY IS OF THE UTMOST IMPORTANCE AT ALL TIMES, IN ALL ACTIVITIES!

IF, AT ANY TIME, YOU FEEL THAT YOUR PERSONAL SAFETY IS JEOPARDIZED IN ANY WAY, LEAVE THE AREA, NOTIFY THE NET CONTROL STATION (NCS), ADVISE THEM OF YOUR ACTION AND EXPLAIN THE SITUATION.

BE SAFE IN ALL OF YOUR ACTIONS!

DO NOT TAKE CHANCES. AS A COMMUNICATOR, YOU ARE NOT “PAID” TO TAKE CHANCES!

ALWAYS ADVISE THE NCS OF ANY DANGEROUS SITUATION.

IF NECESSARY, ADVISE THE APPROPRIATE AUTHORITIES OF THE SITUATION.

IF DEPLOYED, ALWAYS EVALUATE THE SITUATION AROUND YOU. ALWAYS HAVE A WAY OUT. DON'T ALLOW YOURSELF TO BE TRAPPED. EVACUATE BEFORE THE SITUATION BECOMES DANGEROUS.

IN A WINTER SITUATION, DO NOT VENTURE OUT IN A BLINDING BLIZZARD OR IN EXTREME COLD WIND CHILLS TO TAKE SNOWFALL MEASUREMENTS IF YOUR HEALTH OR SAFETY IS AT RISK.

DURING SUMMERTIME PERIODS, REMEMBER, LIGHTNING IS THE NUMBER ONE WEATHER KILLER ANYWHERE IN THE U.S.. IF DANGEROUS WEATHER IS OCCURRING, PLEASE SEEK SHELTER FIRST AND THEN REPORT.

IT IS WISE DURING SEVERE WEATHER EVENTS IN THE SUMMER TO HAVE AN INDOOR ANTENNA AND A POWER SOURCE INDEPENDENT OF THE COMMERCIAL MAINS TO REPORT WEATHER OBSERVATIONS FROM YOUR HOME. BE SURE YOUR HOME EQUIPMENT IS WELL GROUNDED DURING SEVERE SUMMER WEATHER (LIGHTNING STORMS).

ALWAYS SEEK MEDICAL HELP WHEN YOU ARE INJURED IN ANY WAY. DO NOT 'SHAKE OFF' INJURIES.

BE PREPARED!

Dress for the occasion!

While observing weather conditions, always assume that you will be leaving your vehicle or home at one time or another.

Have clothes with you to fit the conditions (for example rain gear during severe weather, cold weather gear in the winter, etc.)

OBEY THE LAW!

Remember, we are volunteers with no actual public service authority.

- Obey all applicable traffic laws while on weather observer duty.**
- Obey all signs and warnings posted by public service agencies.**

- Obey all instructions of public service authorities.
- If there is a problem between an ARES volunteer and a public service official, obey the public service official and report the incident to the Net Control Station.
- It is a wise idea to carry your Cumberland County EMA identification card, your ARES identification card and a copy of your amateur radio license.

WHAT TO OBSERVE AND REPORT

WINTER WEATHER

Report snowfall when you have received the first 2 inches, then 6 inches, 10 inches, 15 inches, 20 inches, or any amount greater than the official National Weather Service forecast (this can be heard on NOAA Weather Radio (162.55 MHz)). At that time, if possible, we would also like to know the temperature, present weather, snowfall within the last 3 hours, and total snowfall thus far for the storm. After the storm is over, we'd like you to call in a storm summary report to the NCS, including the total snowfall and the time when winter storm criteria were met.

Report significant ice accumulations due to freezing rain. Include damage, if any. Warning criteria for freezing rain is a ½ inch accumulation of ice.

Report a change in precipitation type, such as snow changing to sleet or freezing rain; or rain mixing or changing to snow or sleet; etc.

Report the intensity of precipitation at the time of observation. Intensities for snow are:

Light – usually less than ½ inch per hour

Moderate – usually ½ to 1 inch per hour

Heavy – usually 1 inch or more per hour

Report wind related information such as strong winds that are causing damage (please specify the damage), causing considerable blowing or drifting of snow (estimate snow drifts if possible), or exceptionally cold wind chill readings.

SUMMER WEATHER

A tornado or funnel cloud

A thunderstorm with high winds. Try to estimate wind speed (Beaufort Wind Scale) if you do not have wind measuring equipment.

Hail of any size. Try to measure the diameters of the largest hailstones.

Damage of any kind. Be specific on the damage and the cause of the damage (such as wind, hail, or lightning).

Flooding of any kind.

Persistent heavy rain. Report amount if you have a rain gauge.

NET PROCEDURES AND REPORTING

- **ALWAYS CHECK INTO A NET BEFORE BEGINNING YOUR WEATHER OBSERVATION AND REPORTING**
 - Check into the net with your call sign, name and location
 - Advise the Net Control Station (NCS) that you are available for weather observation and reporting or that you have a weather observation/condition report
 - Be as precise as possible in your observations. Do not use vague terms (example: 'marble size hail', 'marbles' come in many sizes))
 - Listen closely to what the NCS is asking for. For example, if the NCS is asking for stations with 'pea' size hail, don't break in with a report of sunny weather in your area.
 - Follow the instructions of the NCS
- **KEEP THE NCS UPDATED ON YOUR STATUS**
 - If you must leave the net, advise the NCS as to the time you are leaving and for how long
 - Advise the NCS when you return
 - Respond to roll calls
 - Always advise the NCS if you encounter a dangerous situation

DO NOT HESITATE TO DECLARE AN EMERGENCY IF THE SITUATION WARRANTS!

SUGGESTED REPORT OUTLINE

- Your call (tactical or FCC) and location

- Give your weather observer report from the reporting criteria in the preceding section. Be as precise as possible.
- Other data, as needed

NWS WEATHER INFORMATION

HOW TO MEASURE SNOWFALL

Use a ruler or yardstick, measure snowfall depths in a number of locations (generally between 6 and 10) by placing the ruler vertically into the snow so that the end rests on the ground (or on the crust of any previous snow cover). Take the average of the readings as your official snow depth. If any previous snowfall has not crusted, be sure to account for the previous depth when determining the new snowfall. One way to simplify this procedure is to measure new snowfall on a surface that has been cleared of previous snowfall, such as a driveway, sidewalk, or snow board. Be sure to take your measurements away from buildings and trees which could affect snowfall measurements. For example, trees will collect snowfall causing low readings underneath them; or snow could blow off a roof onto the ground creating erroneously high readings.

When snow has drifted, try to take measurements in representative areas. Try to avoid measuring areas of extreme amounts, either drifts or bare spots.

BEAUFORT WIND SCALE

<u>Wind speed (mph)</u>	<u>Description of wind</u>	<u>Specifications for use on land</u>
Less than 1	Calm	Smoke rises vertically
1 – 3	Light air	Direction of wind shown by smoke drift, but not by wind vanes
4 – 7	Light breeze	Wind felt on face; leaves rustle; ordinary vane moved by wind
8 – 12	Gentle breeze	Leaves and trigs in constant motion; wind extends light flag
13 – 18	Moderate breeze	Raises dust and loose paper; small branches are moved
19 – 24	Fresh breeze	Small trees in leaf begin to sway; crested wavelets form on inland waters
25 – 31	Strong breeze	Large branches in motion; whistling heard in telegraph wires; umbrellas used with difficulty
32 – 38	Moderate gale	Whole trees in motion; inconvenience felt when walking against wind
39 – 46	Fresh gale	Breaks twigs off trees; generally impedes progress
47 – 54	Strong gale	Slight structural damage occurs (chimney pots and slate removed)
55 – 63	Whole gale	Seldom experienced inland; trees uprooted; considerable structural damage occurs
64 – 72	Storm	Very rarely experienced, accompanied by widespread damage
73 and above	Hurricane	On the Beaufort scale this actually includes the top six ranges of wind speed (up to 136 mph)



Wind Chill Chart



		Temperature (°F)																		
		Calm	40	35	30	25	20	15	10	5	0	-5	-10	-15	-20	-25	-30	-35	-40	-45
Wind (mph)	5	36	31	25	19	13	7	1	-5	-11	-16	-22	-28	-34	-40	-46	-52	-57	-63	
	10	34	27	21	15	9	3	-4	-10	-16	-22	-28	-35	-41	-47	-53	-59	-66	-72	
	15	32	25	19	13	6	0	-7	-13	-19	-26	-32	-39	-45	-51	-58	-64	-71	-77	
	20	30	24	17	11	4	-2	-9	-15	-22	-29	-35	-42	-48	-55	-61	-68	-74	-81	
	25	29	23	16	9	3	-4	-11	-17	-24	-31	-37	-44	-51	-58	-64	-71	-78	-84	
	30	28	22	15	8	1	-5	-12	-19	-26	-33	-39	-46	-53	-60	-67	-73	-80	-87	
	35	28	21	14	7	0	-7	-14	-21	-27	-34	-41	-48	-55	-62	-69	-76	-82	-89	
	40	27	20	13	6	-1	-8	-15	-22	-29	-36	-43	-50	-57	-64	-71	-78	-84	-91	
	45	26	19	12	5	-2	-9	-16	-23	-30	-37	-44	-51	-58	-65	-72	-79	-86	-93	
	50	26	19	12	4	-3	-10	-17	-24	-31	-38	-45	-52	-60	-67	-74	-81	-88	-95	
	55	25	18	11	4	-3	-11	-18	-25	-32	-39	-46	-54	-61	-68	-75	-82	-89	-97	
	60	25	17	10	3	-4	-11	-19	-26	-33	-40	-48	-55	-62	-69	-76	-84	-91	-98	

Frostbite Times



30 minutes



10 minutes



5 minutes

$$\text{Wind Chill (°F)} = 35.74 + 0.6215T - 35.75(V^{0.16}) + 0.4275T(V^{0.16})$$

Where, T= Air Temperature (°F) V= Wind Speed (mph)

Effective 11/01/01

CRITERIA USED BY NWS FOR A SEVERE THUNDERSTORM

Damaging winds of 50 knots (58 mph) *or* greater or hail $\frac{3}{4}$ inch in diameter or greater *or* a tornado

SEVERE WEATHER GUIDELINES

EXAMPLES OF SEVERE WEATHER EVENTS

Tornado

- **Tornado on the ground (any credible report)**
- **Any water spout that moves onshore**
- **Any waterspout that originated as a tornado onshore**

Severe Thunderstorm – Wind

- **Measured convective gusts of 50 knots (58 mph) or more**
- **Estimated convective gusts of 50 knots (58 mph) or more from reliable sources (such as EMA, law enforcement, trained spotters, etc.).**
- **Trees blown down or uprooted (must be more than one)**
- **Large limbs or branches blown down (more than one)**
- **Power lines blown down**

- **Permanent signs blown down**
- **Roof damage from the wind (large area of roofing material removed)**
- **Windows broken by wind**
- **Structural damage to businesses, house, barn, shed, circus tent, etc.**
- **Radio tower or large antenna blown down**
- **Home TV antennas blown down (more than one)**
- **Campers heavily damaged or destroyed**
- **Mobile home damage**

Severe Thunderstorm – Hail

- **Hail $\frac{3}{4}$ inch in diameter at the surface...or aloft (report pireps).**
- **Windows or windshields broken by hail (assume $\frac{3}{4}$ inch or greater)**
- **Roofs or house siding damaged by hail (assume $\frac{3}{4}$ inch or greater)**
- **Hail the size of a dime or greater (or any other object that has an estimated diameter of $\frac{3}{4}$ inch or greater). See succeeding chart for details on estimating hail size**

EXAMPLES THAT ARE – NOT – SEVERE WEATHER EVENTS

Tornado

- Tornado indicated by radar
- Tornado-like winds (no sighting of a tornado)
- Funnel cloud, possible funnel cloud, unconfirmed funnel cloud

Severe Thunderstorm – Wind

- Measured convective gusts less than 50 knots (58 mph)
- Estimated convective gusts less than 50 knots that are obvious guesses from unreliable sources
- Wind of 50 to 60 mph (this averages out to 55 mph...less than the 58 mph severe weather threshold)
- Tree damage (non-specific)
- Limbs or branches blown down (no size given)
- “Wind damage”, “damaging winds”, “high winds”, “strong winds” are all non-specific terms
- Wind damage to crops
- Power lines downed by lightning or another non-wind event.
- Minor structural damage (not specified)

Severe Thunderstorm – Hail

- Hail smaller than $\frac{3}{4}$ inch in diameter

- “Large hail” – no size given
- Hail damage to crops
- Hail damage as “marble size”, “mothball size”, etc. are all considered less than $\frac{3}{4}$ inch in diameter

ESTIMATING HAIL SIZE

<u>Size</u>	<u>Diameter (in inches)</u>	<u>Size</u>	<u>Diameter (in inches)</u>
Penny/Dime	$\frac{3}{4}$	Tennis ball	$2\frac{1}{2}$
Nickel/Quarter	1	Baseball	$2\frac{3}{4}$
Anthony dollar/half dollar	$1\frac{1}{4}$	Tea cup	3
Walnut	$1\frac{1}{2}$	Grapefruit	4
Golf ball	$1\frac{3}{4}$	Softball	$4\frac{1}{2}$
Hen egg	2		

Cumberland County ARES/RACES

