The Weather Eye

A Southern New England
Cooperative Weather Observer Newsletter

December 2019 ***Editor: Kimberly Buttrick***

TRAINING TOOLS

Following the awards section of this newsletter are a few training guides and helpful tools:

Coop Observing SOP
IV-ROCS Instructions
Present Weather Codes

We hope you find this helpful having them all in one place.

WE SAY GOODBYE

The following Coop Observers have retired after many years of recording climate at their stations. We truly appreciate their service and contributions to climate:

Thomas Ringuette
New Bedford Wastewater Treatment Facility
– New Bedford, MA
-retired October 1, 2019

John Flood
– Maynard, MA
-retired August 1, 2019

WE WELCOME

We welcome our newest Coop Observers who have stepped forward and are willing to be the daily eyes and ears for weather in their communities:

– No new welcomes for this issuance

WE RECOGNIZE

Thanks to all of you for your dedication and interest in weather data collection. Your daily efforts are much appreciated. Look ahead to view a number of fellow Coop Observers that have received length of service awards.

Individual Awards:

Stacey G. Swift
– North Foster, RI
-50 year Length of Service Award

John J. Bagdon, Jr.
– Sunderland, MA
-45 year Length of Service Award

Richard H.W. Tracy
– Groveland, MA
-35 year Length of Service Award

Raymond Ceres
Chief Operator at the Danvers Water Treatment Plant
– Middleton, MA
-35 year Length of Service Award

Henry Christle
Weather Observer at Logan International Airport
– Boston, MA
-25 year Length of Service Award

David Bergeron
Head Operator at Lowell Regional Water Utility
– Lowell, MA
-20 year Length of Service Award

Daniel Hoitt
Chief Observer at Logan International Airport
– Boston, MA
-20 year Length of Service Award

Edward McGann
Weather Observer at Logan International Airport
– Boston, MA
-15 year Length of Service Award

Jason McCarthy
Plant Manager at the Danvers Water Treatment Plant
– Middleton, MA
-15 year Length of Service Award

Peter Ho
Operator at the Town of Barnstable Water Pollution Control Division of the Department of Public Works
– Hyannis, MA
-15 year Length of Service Award

Brian Fortin
Former Operator at the Town of Barnstable Water Pollution Control Division of the Department of Public Works
– Hyannis, MA
-10 year Length of Service Award

William C. Mehr
Park Ranger with the U.S. Army Corps of Engineers
– Tully Lake, MA
-10 year Length of Service Award

Steven Mansfield
Civil Engineer 2 at the Department of Conservation and Recreation – Quabbin Section
– Belchertown, MA
-10 year Length of Service Award

Ann Kidd
– Hardwick, MA
-10 year Length of Service Award

Thomas Joyce
Chief Observer at the Worcester Regional Airport
– Worcester, MA
-10 year Length of Service Award

William Locke
Weather Observer at Logan International Airport
– Boston, MA
-10 year Length of Service Award

Dr. Joseph Nowicki
– Leverett, MA
-10 year Length of Service Award

Ronald Horwood
– East Sandwich, MA
-10 year Length of Service Award

Stacey G. Swift of North Foster, RI was the recipient of the Edward H. Stoll Award for 50 years of service as a Cooperative Weather Observer. This presitigous 50 year award is presented in honor of Edward H. Stoll (1886-1981) who was the Cooperative Weather Observer for over 76 years at Elwood, Nebraska (1905-1981). Mr. Stoll was the first to receive this prestigous Stoll Award, for 50 years of weather observing. Like Mr. Stoll, our own Mr. Swift has taken detailed weather observations for 50 years. A half a century of anything is quite a milestone to achieve and Mr. Swift has done so with meticulous quality. The North Foster climate book will forever have Mr. Swift's stamp of excellence. We give a huge thank you to Stacey Swift for his selfless dedication and faithful service to the NWS and our Nation for 50 years – and counting! And a special thanks to Stacey's wife, Marge (pictured left), for supporting her husband's passion and hobby for 50+ years. And on the topic of milestones, Marge and Stacey have been married for 58 years – and counting. Team Swift has commitment and longevity in all they do!

John J. Bagdon, Jr. of Sunderland, MA was the recipient of the Dick Hagemeyer Award for 45 years of service as a Cooperative Weather Observer. This presitigous 45 year award is presented in honor of Dick Hagemeyer (1924-2001), whose career in NOAA spanned 51 years, the last 20 as Director, Pacific Region. Early in his career, Mr. Hagemeyer served as Cooperative Program Manager and was an ardent supporter of the Cooperative Observer Program. Kudos to John Bagdon for his selfless dedication and faithful service to the NWS and our Nation for 45 years John plans to make it to his 50th year of observing. No doubt John will reach and exceed his goal! And for that our climate community salutes and thanks John!

Donald F. Ives of Worthington, MA receives a 25 year Length of Service Award.
Thank you to Donald for a quarter of a century of observing!

Thanks to all of You!

CONTACT INFORMATION

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COOP WEATHER OBSERVING
STANDARD OPERATING PROCEDURES

(Last updated: December 23, 2019)

WHAT IS THE DAILY WEATHER OBSERVATION AT A COOP SITE?

The weather observation is conducted daily at a specified time – 7 days a week, 365 days a year. It is a snapshot of the weather over the past 24 hours at the Coop station. The weather elements observed are:

- Temperature (maximum, minimum, current) – measured in whole degrees Fahrenheit
- Rainfall (which includes melted winter time precipitation) – measured in hundredths of an inch
- Snowfall – measured in tenths of an inch
- Snow depth – measured to the nearest whole number

These elements are recorded on a National Weather Service Form B-91. Below is an example of a digitized Form B-91 from Foxboro, MA during the month of February 2015:

STATION (Climatological): Foxboro — (River Station, if different) — MONTH: Feb 2015
STATE: MA — COUNTY: Norfolk — RIVER:
TIME (local) OF OBSERVATION RIVER — TEMPERATURE: 07:30 — PRECIPITATION: 07:30 — STANDARD TIME IN USE:
TYPE OF RIVER GAGE — ELEVATION OF RIVER GAGE ZERO — FLOOD STAGE — NORMAL POOL STAGE

WS FORM B-91 (03-09) — U.S. DEPARTMENT OF COMMERCE, NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION, NATIONAL WEATHER SERVICE

RECORD OF RIVER AND CLIMATOLOGICAL OBSERVATIONS

DATE	TEMPERATURE: 24 HRS ENDING AT OBSERVATION MAX	MIN	AT OBSN	PRECIPITATION: 24 HR AMOUNTS: Rain, melted snow, etc. (in and hundredths)	Snow, ice pellets, hail (ins and tenths)	AT OB: Snow, ice pellets, hail lost on ground (in)	Draw a straight line (------) through hours precipitation was observed, and a wavy line (~~~~~) through hours precipitation probably occurred unobserved (A.M. 1 2 3 4 5 6 7 8 9 10 11 NOON P.M. 1 2 3 4 5 6 7 8 9 10 11)	WEATHER (Observation Day) Mark 'X' for all types occurring each day: Fog	Ice pellets	Glaze	Thunder	Hail	Damaging winds	Time of occurrence if different from above	RIVER STAGE: Condition	Gage reading at ___ AM	Tendency	REMARKS (SPECIAL OBSERVATIONS, ETC.)
1	21	8	15	0.00	0.0	18											
2	31	14	15	0.42	5.0	21											
3	30	4	5	0.83	10.0	25											0.20 H2O but too low.
4	22	5	20	0.00	0.0	18											
5	38	M	33	T	T	18											
6	33	1	4	0.09	2.0	18											
7	21	4	21	0.00	0.0	18											
8	27	21	27	0.26	2.0	20											
9	30	12	15	0.33	4.0	22											
10	18	13	16	0.57	8.0	29											
11	29	13	18	T	T	28											
12	20	5	14	T	T	28											
13	29	5	5	T	T	28											
14	18	-7	0	0.00	0.0	23											
15	25	-1	18	0.52	11.0	30											
16	19	-2	5	0.15	3.5	29											
17	19	5	10	0.00	0.0	26											
18	21	8	9	0.04	1.5	26											
19	29	8	20	0.08	2.0	27											
20	26	1	3	0.00	0.0	26											
21	16	-5	9	0.00	0.0	25											
22	33	9	33	0.44	1.5	26											
23	40	10	24	0.00	0.0	25											
24	24	-6	-3	0.00	0.0	25											
25	18	-3	4	0.07	2.0	27											
26	34	4	17	0.00	0.0	26											
27	21	0	9	T	T	26											
28	27	0	3	0.00	0.0	25											
29																	
30																	
31																	
	25.7	4.7	SUM	3.80	52.5		CHECK BAR (for wire weight) NORMAL CHECK BAR										
							READING / DATE										

CONDITION OF RIVER AT GAGE

A. Obstructed by rough ice
B. Frozen, but open at gage
C. Upper surface smooth ice
D. Ice gorge above gage
E. Ice gorge below gage
F. Shore ice
G. Floating ice
H. Pool stage

OBSERVER: Closed by WFO BOX (wfobox) on 25 Mar 2015 03:06PM

SUPERVISING OFFICE: BOX Taunton — STATION INDEX NO.: 19-2913-02

EQUIPMENT USED TO REPORT THE DAILY WEATHER
and
PROCEDURES ON HOW TO TAKE THESE MEASUREMENTS

Temperature:

1) Electronic Maximum/Minimum Temperature System (MMTS)

The MMTS consists of a sensor on a pole with a coaxial cable connected from the sensor to a Nimbus readout display. The Nimbus always displays the current temperature.

Pictured left is a sensor on a galvanized pole. Pictured below is a Nimbus readout display which always displays the current temperature.

Procedures for observing temperature using the MMTS:

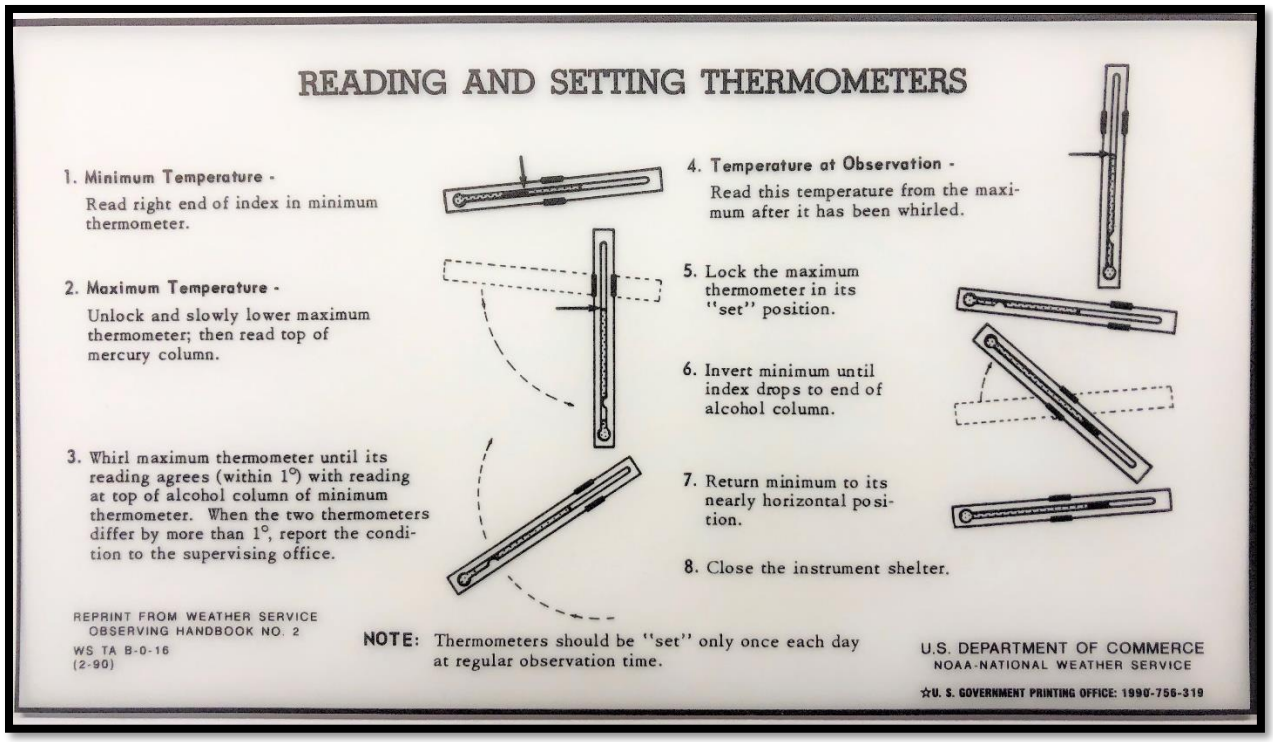
The Nimbus unit remembers the highest and lowest temperature for the period since it was last reset. **To determine the maximum and minimum readings, push the Recall button to the right of the display and hold it.** The display will alternate between the highest temperature and the lowest temperature since last reset. Once the high and low are noted, as well as the current temperature, reset the display. **To reset the display, push the Clear button and wait for about 6 seconds until "E2E.2" is displayed.** "E2E.2" signals the unit has been reset. If you were to press the recall button right after you have reset the unit, both the maximum and minimum temperature readings should be the same.

2) Liquid in glass (LIG) thermometers

The LIG thermometers are housed in a Cotton Region Shelter (CRS), pictured below left, which provides a shaded, well-ventilated area for maximum and minimum thermometers used to acquire daily temperature extremes.

Pictured below right shows the thermometers inside the CRS which are attached to what is called a Townsend Support. The minimum thermometer is a long tubular glass filled with alcohol whereas the maximum thermometer is made of a long tubular glass filled with mercury. The minimum thermometer is mounted on the above bracket and is sloped slightly down to the left while the maximum thermometer is mounted on the lower bracket and is sloped slightly up to the left.

Procedures for observing temperature using LIG thermometers:



READING AND SETTING THERMOMETERS

1. **Minimum Temperature -**
   Read right end of index in minimum thermometer.

2. **Maximum Temperature -**
   Unlock and slowly lower maximum thermometer; then read top of mercury column.

3. Whirl maximum thermometer until its reading agrees (within 1°) with reading at top of alcohol column of minimum thermometer. When the two thermometers differ by more than 1°, report the condition to the supervising office.

4. **Temperature at Observation -**
   Read this temperature from the maximum after it has been whirled.

5. Lock the maximum thermometer in its "set" position.

6. Invert minimum until index drops to end of alcohol column.

7. Return minimum to its nearly horizontal position.

8. Close the instrument shelter.

REPRINT FROM WEATHER SERVICE OBSERVING HANDBOOK NO. 2
WS TA B-0-16
(2-90)

NOTE: Thermometers should be "set" only once each day at regular observation time.

U.S. DEPARTMENT OF COMMERCE
NOAA-NATIONAL WEATHER SERVICE

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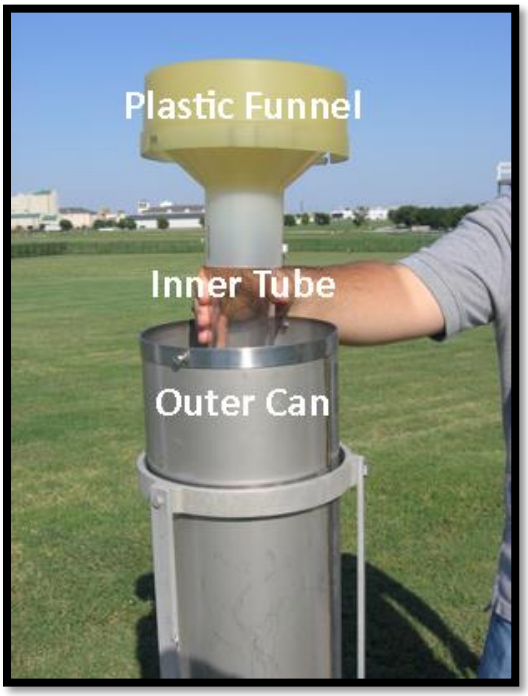
Rainfall: 8 inch Standard Rain Gauge (SRG)
(The diameter of the can is 8-inches - thus the name.)

The SRG consists of an overflow can (aka outer can), inner tube, funnel, precipitation stick and tripod.



Pictured left is the SRG seated in the tripod.

Pictured below is a precipitation stick with numbers hatched in hundredths of an inch.

Procedures for measuring rainfall:

Use the precipitation stick to measure rainfall collected in the SRG. You measure and report precipitation amounts in hundredths of an inch. Rainfall falls into the funnel and is funneled down into the inner tube. The precipitation stick is used like a dipstick and placed into the funnel, down into the inner tube. Any rainfall in the inner tube will darken the stick, which is hatched in hundredths of an inch, so that when you pull the stick out you'll be able to measure how much rain fell.

The inner tube is 20 inches high and can collect up to 2.00 inches of water. Any rainfall that occurs that is more than 2.00 inches will overflow into the outer can - thus the name "overflow can." If you ever measure exactly 2.00 inches of rain from the SRG at the time of your observation, check the overflow can to see if additional rainfall collected there. If there is additional rainfall in the overflow can, pour this into the inner tube then measure with the precipitation stick. This additional amount is added to your initial measurement of 2.00 inches. While the inner tube can hold up to 2.00 inches of water, the overflow can has the capacity to hold 20.00 inches of water.

Pictured left is an observer measuring rainfall from the SRG.

Snowfall: *Snow Stick*

Snowfall is measured using a snow stick (pictured below left) with numbers hatched in tenths of an inch. An observer (pictured below right) is using a snow stick to measure new snowfall.

Procedures for measuring snowfall:

Use the snow stick to measure snowfall. The snow stick is hatched in tenths of an inch which is how you measure and report new snowfall. Before the onset of snow, ensure you have a cleared area where snowfall can accumulate and be measured, such as on a snow board. Measure new snow on your 16" by 24" snow board (pictured right).

To measure 24 hour snowfall:

Step 1: Place your snowboard in a large open area away from any obstructions. Be sure to mark its location, for example, with a flag.

Step 2: After a 24 hour period measure the frozen precipitation on top of the snowboard. Report an estimate if you believe some of the snow on your snowboard melted before observation time.

Step 3: Clear the snowboard, then reset your snowboard on top of the freshly fallen frozen precipitation near your original snowboard placement location.

BEWARE: Of issues of melting and settling. Measure frozen precipitation immediately after the end of an event, if possible.

WHAT IF…

1. It only flurried and there was no measurable accumulation?

Report T (trace) for liquid and T for snowfall. If no snow is on the ground, then report zero for snow depth. If only a T of snow is on the ground, then report a T for snow depth.

2. Frozen precipitation fell but it was blown off the snowboard?

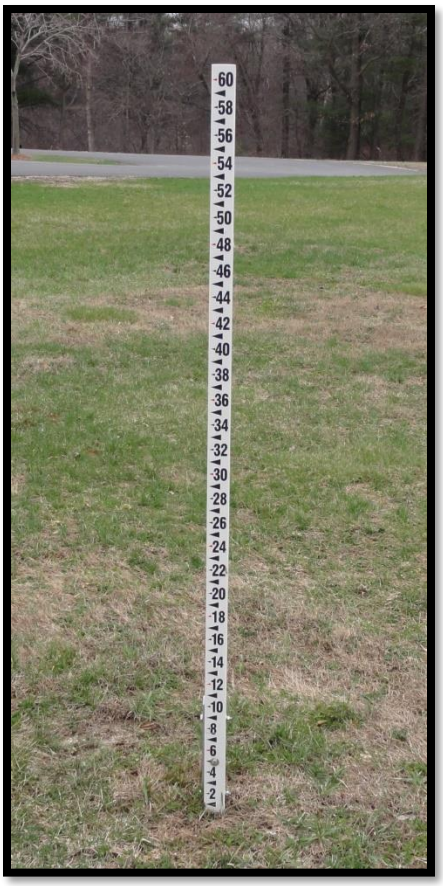
Measure an average representative snow depth around your observation site and subtract the previous day snow depth. For example, you had 5.2" of snow on the ground yesterday, and now you have 7.4", thus your snowfall would be 2.2" and your snow depth would be 7".

3. Frozen precipitation fell earlier but all of it melted by observation time?

Do your best to measure frozen precipitation after it has stopped falling. If no snow is on the ground, then report zero for snow depth.

Snow depth: *5 FT Snow Stake*

A 5 FT snow stake is helpful in winter to determine the amount of snow remaining on the ground – also known as "snow depth." The snow stake, pictured right, has numbers on it hatched in whole inches.



Procedures for measuring snow depth:

You report snow depth to the nearest whole inch. Snow depth is the accumulated snow from previous snow storms. You can use the 5 FT snow stake as a helpful tool but it is also good to sample the surrounding snow pack with your 40 inch snow stick and average the measurements to the nearest whole inch.

Liquid measure of the snowfall or wintry mix (rain, freezing rain, sleet and/or snow):

In the winter time the SRG becomes a snow gauge. The measuring tube and funnel are removed, allowing wintry precipitation to fall directly into the overflow can.

Procedures for measuring the liquid content of wintry precipitation:

Have an empty spare overflow can at the ready. At the time of observation, if there is snow (or a wintry mix) in the overflow can, swap it out with the empty one and bring the one containing snow indoors. Place the snow filled can near a radiator thus allowing the contents to melt. Once melted, pour the contents into the inner tube. Using the precipitation stick, measure the liquid amount of the wintry precipitation that fell. The liquid is measured like rainfall, in hundredths of an inch.

Pictured above left is the SRG ready for winter time precipitation as the inner tube and funnel have been removed and placed inside. Pictured above right are the tools needed for snow operations. There is the empty spare overflow can for swapping out. There is the inner tube, funnel and precipitation stick for measuring the melted wintry precipitation. And finally there is the snow stick for measuring snowfall and snow depth.

To melt and measure quickly:

Step 1: Using your inner tube, pour hot tap water into the tube and measure the amount with your precipitation stick.

Step 2: Add the measured amount of hot water to the contents of your overflow can to melt the wintry precipitation. Slosh around and ensure all frozen precipitation is melted.

Step 3: Pour the melted liquid contents of the overflow can back into the inner tube. You can use your funnel to aid in the pouring.

Step 4: Using your precipitation stick, measure the new liquid amount in the inner tube and then subtract the pre-measured added hot water amount to get the true liquid amount for the past 24 hours.

WHAT IF…

Freshly fallen frozen precipitation was blown out of the overflow can, or wind was too strong for a sufficient catch?

Obtain a substitute sample of snow on the ground where the depth you believe to be representative of the amount that fell in the past 24 hours up until observation. Be sure to melt the sample and obtain the liquid amount.

PROCEDURES ON WHAT TO DO WHEN YOU MISS OBSERVATIONS

If you miss a day, or a couple of days, of observing you can do a multi-day report. A multi-day report is specifically for precipitation but you can add value to your climate record by doing the same for temperature. A multi-day report is similar to a 24-hour observation, except that the measurements reflect what occurred over days.

For temperature in a multi-day report, you are measuring the maximum and minimum temperature since the last re-set. For precipitation in a multi-day report, you are measuring what all accumulated in the rain gauge – be it rainfall in the inner tube or wintry precipitation in the overflow can – since last measured.

Upon your return, report at your normal time and report the maximum temperature, minimum temperature, current temperature, amount of liquid rainfall or wintry melt (even if zero), and snow remaining on the ground if any. For snowfall, you'd report M (for missing) upon your return. For the missing days of observing, you would put M (for missing) in the temperature, precipitation, snowfall and snow depth fields.

The number of days in a multi-day report is the number of days you missed, plus the day you report. So for example, if you miss a weekend of observing, your Monday report would be a 3-day multi-day report. That's the 2 days you missed, counting Saturday plus Sunday, plus the day you report on Monday equals 3.

If you report through WxCoder, use the drop down menu after precipitation to note how many days of accumulation your precipitation report represents. Also, note this in remarks so anyone looking at your B91 form can clearly see an observation is a multi-day report.

IV-ROCS

INTERACTIVE VOICE – REMOTE OBSERVING COLLECTION SYSTEM

Instruction Booklet

1) **IV-ROCS number: 1-877-266-7627 (1-877-COOP-OBS)**

For all the fields that follow, the IV-ROCS female voice will repeat your entry afterwhich you will be prompted with:

If this is correct press "1"
To re-enter press "2"

2) **Enter your 6 Digit Station Identifier: xx xxxx**

If you have already filed a report today, you will be prompted:

a) To file a correction to today's report press "1"

b) To file a special event report press "2"

3) **Enter your observation time in military time. Example: 0700**

4) **Temperature Reporting**

a) Enter temperature at time of observation followed by the # key.

b) Enter Maximum temperature for the observing period followed by the # key.

c) Enter Minimum temperature for the observing period followed by the # key.

Examples of how to enter temperatures in IV-ROCS

Temperature	**What to enter into IV-ROCS**
105	1 0 5 #
95	9 5 #
15	1 5 #
5	5 #
0	0 #
-3	* 3 #
-12	* 1 2 #
Missing	#

5) Precipitation Reporting

a) Enter the precipitation amount to the nearest hundredth followed by the # key.

Observed Rainfall	What to enter into IV-ROCS
Trace	*
Zero	0 #
0.02	0 2 #
0.25	2 5 #
1.25	1 2 5 #
Missing	#

6) Precipitation Type Codes

The IV-ROCS female voice will ask you to report a precipitation type if you entered a precipitation amount of a Trace of more. You can report as many precipitation types as needed. The precipitation types and codes are:

To Report	Enter
Rain	1
Freezing Rain	2
Drizzle	3
Freezing Drizzle	4
Snow	5
Snow Pellets	6
Snow Grains	7
Ice Pellets	8
Hail	9

Do you have another precipitation type to enter? **Press 1 – yes**
Press 2 – no

a) If you entered snow or any other frozen precipitation type,
Enter the amount of new snowfall to the nearest tenth of an inch followed by the # key.

Observed New Snowfall	**What to enter into IV-ROCS**
Trace	*
Zero	0 #
0.2	2 #
2.5	2 5 #
12.5	1 2 5 #
Missing	#

b) Enter the amount of snow on the ground to the nearest whole inch followed by the # key.

Observed Snow on Ground	**What to enter into IV-ROCS**
Trace	*
Zero on Ground	0 #
2	2 #
12	1 2 #
Missing	#

7) Observation Period Weather Readings:

a) If you will be reporting Observation Period Weather for this filing, press "1."

b) To skip Observation Period Weather reporting and continue with filing the remainder of your report, press "2."

To Report	**Enter**
Fog	1
Ice Pellets	2
Glaze (ice)	3
Thunderstorm	4
Hail	5
Damaging Winds	6

8) Thank you for completing your National Weather Service data collection report.

a) If you wish to have a National Weather Service representative call you press "1."

b) To leave a voicemail press "2." Otherwise, hang up now.

If you have any questions, best to call NWS Boston/Norton directly at: 508-622-3260

Present Weather Codes

Fog and Haze

04 – Visibility reduced by smoke
05 – Haze
10 – Light Fog (Visibility ½ mile or more)
11 – Shallow fog in patches
45 – Dense fog, sky not visible
48 – Light fog deposing rime ice, sky visible
49 – Dense fog deposing rime ice, sky not visible

Fair Weather

01 – Clear
02 – Partly Cloudy
03 – Cloudy

Thunderstorms

13 – Lightning visible, no thunder heard
15 – Thunder and lightning observer from distant storm, but no precipitation at station
17 – Thunder but no lightning or precipitation
19 – Funnel cloud seen near station
20 – Tornado seen in vicinity of station
21 – Rotating wall cloud seen in vicinity of station
89 – Light hail shower
90 – Moderate to heavy hail shower
91 – Thunderstorm, Light rain
92 – Thunderstorm, Moderate / heavy rain
93 – Thunderstorm, Light snow
94 – Thunderstorm, moderate, heavy snow
96 – Light to moderate thunderstorm with hail
99 – Heavy thunderstorm with hail

Thunderstorm Intensity Scale

T1 –Light, no damage
T2 –Moderate, isolated damage
T3 –Strong, Light damage
T4 –Severe, Moderate damage
T5 –Catastrophic, Widespread heavy damage

Blizzard

36 – Light or moderate drifting snow
37 – Heavy drifting snow
38 – Light or moderate blowing snow
39 – Heavy blowing snow (Visibility < ¼ mile)

Liquid Precipitation

51 – Light drizzle
53 – Moderate drizzle
55 – Heavy drizzle
58 – Light drizzle and rain
61 – Light rain
63 – Moderate rain
65 – Heavy rain
59 – Moderate or heavy drizzle and rain
80 – Light rain shower
81 – Mod / Hvy Rain shower
82 – Violent rain shower

Frozen Precipitation

71 – Light snow
73 – Moderate snow
75 – Heavy snow
76 – Ice prisms (with or without fog)
77 – Snow grains
79 – Ice pellets (sleet)
88 – Moderate or heavy snow pellets falling as showers
68 – Light rain and drizzle and snow
83 – Light showers of mixed rain / snow
84 – Moderate or heavy showers of mixed rain and snow
85 – Light snow showers
86 – Moderate or heavy snow showers
87 – Light snow pellets falling as showers
69 – Mod. or heavy rain or drizzle and snow

Freezing Precipitation

56 – Light freezing drizzle
57 – Moderate or heavy freezing drizzle
66 – Light freezing rain
67 – Moderate or heavy freezing rain