

Chesapeake Bay Virginia (CBV) NERR Meteorological Metadata
January - December 2001
Latest update: **January 30, 2023**

I. Data Set & Research Descriptors

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2) Entry verification

a) Data Input Procedures:

The 15-minute, 1-hour average, and 24-hour data were downloaded from each instrument on the weather station to a Campbell Scientific CR10X datalogger. The CDMO Data Logger Program (nerr.csi) was loaded into the CR10X and controls the sensors and data collection schedule (see 2b of the Entry Verification section for the data collection schedule). The CR10X then interfaced with the PC208W software supplied by Campbell Scientific. This software was located on a laptop computer to which the data was downloaded manually in the field. Data was downloaded monthly from a storage module located within the weather station.

Once an entire month of data was available, the CDMO Weather Data Management Program (WDMP) was used to convert the files to an Access database. This program was developed in Visual Basic to interface with the NERRS data collection schedule (see 2b of the Entry Verification section for the data collection schedule). The WDMP will automatically input and convert the monthly raw data file into an Access Database. There are three main steps the WDMP performs. First, it converts the comma delimited monthly raw data file into an Access Database. Secondly, it checks the data against a predetermined set of error criteria (see Part C of this section). Finally, it produces error and summary reports. Any anomalous data were investigated and are noted below in Anomalous Data section. Any data corrections that were performed are noted in the Data Correction section below.

Gemteck's EQwin version 5 and the CDMO developed Microsoft Excel EQWinFormat.xls macro now replaces the WDMP as the NERR MET database management program and primary QA/QC program.

The Centralized Data Management Office converted all SWMP weather data collected with CR10X program versions prior to version 4.0 which was distributed in October 2003. This was necessary in order to merge the old data format (12 array output) with the new data format found in version 4.0 (3 array output). The new format produces averages, maximums and minimums every fifteen minutes (array 15), every hour (array 60) and every day (array 144) for any sensors hooked up to the CR10X. Specifically, the 150 and 151 fifteen minute data were converted to the new 15 array; the hourly 101, 102, 105 and 106 data were converted to the new 60 array; and the daily 241, 242, 243, 244, 245 and 246 data were converted to the new 144 array. With the new format, the use of 55555's to code for deleted data and 11111's to code for missing data has been abandoned. Hence, all 55555's or 11111's contained in the SWMP weather data collected prior to Version 4.0 of the CR10X program were removed and left blank.

For data collection, the CR10X datalogger was programmed to collect data in the following formats:

- i) 15-minute data are collected instantaneously for Air Temperature (C), Relative Humidity (%), Barometric Pressure (mb), Wind Speed (m/s), and Wind Direction (degrees). 15-minute Precipitation (mm) and PAR (mmol/m²) data are totaled from 5-second readings, prior to NERR_4.CSI
- ii) 15-minute average, maximum and minimum data are averages of 5-second readings for Air Temperature (oC), Relative Humidity (%), Barometric Pressure (mb) and Wind Speed (m/s) with NERR_4.CSI.
- iii) Hourly average, maximum, and minimum data are averages of 5-second readings for Air Temperature (oC), Relative Humidity (%), Barometric Pressure (mb), Wind Speed (m/s), and Wind Direction (degrees). Hourly totals for PAR (mmol/m²) and Precipitation (mm) are totals of 15-minute readings.
- iv) Daily average, maximum and minimum data are averages of 5-second readings for Air Temperature (oC), Relative Humidity (%), Barometric Pressure (mb), Wind Speed (m/s), and Wind Direction (degrees). Daily totals for PAR (mmol/m²) and Precipitation (mm) are totals of 15-minute readings.

Data were stored on a Campbell Scientific storage module (SM192 or SM4M), which was retrieved monthly. The data were downloaded and pre-processed as described in Section 2. QA/QC of the data was conducted using either the WDMP or EQWin. WDMP error reports and EQWin queries were based on the following anomalous data criteria:

Air Temp:

- 15 min sample not greater than max for the day
- 15 min sample not less than the min for the day
- 15 min sample not greater than 3.0 C from the previous 15 minutes (WDMP only)
- Max and min temp recorded for the day (WDMP only)

- 1-hour average not greater than 10% above the greatest 15 min sample recorded in the hour (WDMP only)
- Sample not greater than 50 C or less than –30 C (EQWin only)

Relative Humidity:

- Not changed by more than 25% from the previous 15 minutes (WDMP only)
- Max and min humidity recorded for the day (WDMP only)
- 1-hour average not greater than 10% above the greatest 15 min sample recorded in the hour (WDMP only)
- Sample not greater than 100% or less than 0% (EQWin only)

Pressure:

- Pressure not greater than 1040 mb or less than 980 mb (WDMP only)
- Pressure changes greater than 5 mb per hour (WDMP only)
- Maximum and minimum values recorded for the day (WDMP only)
- 1-hour average not greater than 10% above the greatest 15 min sample recorded in the hour (WDMP only)
- Sample not greater than 1060 mb or less than 900 mb (EQWin only)

Wind Speed:

- Wind speed not greater than 65 m/s or less than 0.5 m/s (WDMP only)
- Wind speed not greater than 30 m/s (EQWin only)
- Wind speed not less than 0.5 m/s for 12 consecutive hours (EQWin only)

Wind Direction:

- Wind direction not greater than 360 degrees or less than 0 degrees

Rainfall:

- Precipitation not greater than 5 mm in 15 min
- No precipitation for the month (WDMP only)

Photosynthetically Active Radiation (PAR):

- Sample not greater than 5000 mmol/m² or less than –0.5 mmol/m²

Time:

- 15-minute interval recorded

For all data:

- No duplicate data

3) Research objectives:

The principal objective is to record long-term meteorological data within the York River

watershed in order to observe any environmental changes or trends over time. Samples were taken every 5 seconds and 15 minutes over roughly one-week collecting intervals.

4) Research methods:

The Campbell Scientific weather station samples every 5 seconds to produce both hourly and daily averages of those measurements of air temperature, relative humidity, barometric pressure, rainfall, wind speed and wind direction. An instantaneous sample is taken every 15 minutes and that data is stored in array 150. A one-month sampling interval was chosen so that the storage module would not run out of room and overwrite data. Periodically, sensors on the weather station are inspected for damage or debris. If any is found, it is repaired and/or cleaned. Sensors are removed and sent back to Campbell Scientific for calibration at minimum of every two years.

5) Site location and character:

Taskinas Creek (TC) Component:

The Chesapeake Bay NERRS of Virginia maintains a long-term water quality-monitoring program, and stream gauge station at Taskinas creek station. The Taskinas Creek station is located in the transitional zone of the York River tributary in the York River State Park.

The Chesapeake Bay National Estuarine Research Reserve in Virginia is located on the York River, a tributary of the Chesapeake Bay. The weather station is located at York River State Park that borders the York River and includes the Taskinas Creek tributary. The bordering river is 50 km long, 38 kilometers from the mouth of the river, and it 2.25 kilometer wide near the weather station, and. The weather station is located (37°24' 50.79850" N, 76°42' 44.51934" W) on a bluff (11m elevation) 60m from the York River in a manicured lawn area of the park. No trees or other major structures within a 35m radius of weather station. The stream gauge located 2km NW (288 degree of weather station and the water quality station located 200m (298 degree) of weather station. The weather station has a landscape fence around it to keep visitors of the park away from the weather station. All the instruments, the Wind Sentry, Temperature and Humidity sensor, Barometric Sensor, and LiCor Sensor all located on the approximately 3.5 m aluminum tower following the descriptions outlined in the CDMO Manual V 4.0. The Tipping Bucket Rain gauge is located within 2m of the tower. The sensors were wired to the CR10X following the protocol in the CDMO Manual.

6) Data collection period:

Weather data has been collected at the Taskinas Creek since 1996. The current weather station has been operational since 1996. Data was collected for the entire year in 2001. Data was lost from January 8th 1200 to May 16th 615 EST.

7) Distribution

According to the Ocean and Coastal Resource Management Data Dissemination Policy for the NERRS System-wide Monitoring Program,

NOAA/ERD retains the right to analyze, synthesize and publish summaries of the NERRS System-wide Monitoring Program data. The PI retains the right to be fully credited for having collected and processed the data. Following academic courtesy standards, the PI and NERR site where the data were collected will be contacted and fully acknowledged in any subsequent publications in which any part of the data are used. Manuscripts resulting from the NOAA/OCRM supported research that are produced for publication in open literature, including refereed scientific journals, will acknowledge that the research was conducted under an award from the Estuarine Reserves Division, Office of Ocean and Coastal Resource Management, National Ocean Service, National Oceanic and Atmospheric Administration. The data set enclosed within this package/transmission is only as good as the quality assurance/quality control procedures outlined by the enclosed metadata reporting statement. The user bears all responsibility for its subsequent use/misuse in any further analyses or comparisons. The Federal government does not assume liability to the Recipient or third persons, nor will the Federal government reimburse or indemnify the Recipient for its liability due to any losses resulting in any way from the use of this data.

NERR weather data and metadata can be obtained from the Research Coordinator at the individual NERR site (please see Section 1 Principal investigators and contact persons), from the Data Manager at the Centralized Data Management Office (please see personnel directory under the general information link on the CDMO home page) and online at the CDMO home page <http://cdmo.baruch.sc.edu>. Data are available in text format and Access data tables.

8) Associated researchers and projects:

Taskinas Creek watershed is a site of limited impact due to development or recreational use. There is a water quality station and a stream gauge station at this site. This site is being developed as a control site for watershed work in the area.

II. Physical Structure Descriptors

9) Sensor specifications, operating range, accuracy, date of last calibration

CSI LiCor Quantum Sensor

Model # LI190SB

Stability: $<\pm 2\%$ change over 1 yr

Operating Temperature: -40 to 65°C
Sensitivity: typically 5 μA per 1000 $\mu\text{moles s}^{-1} \text{ m}^{-2}$
Light spectrum wavelength: 400 to 700 nm
Date of last calibration: 8/2000 installed 1/2001

CSI Wind Sentry
Model # 03001-5, #03301-5
Range: 0-50 m/s; 360° mechanical
Date of last calibration: 12/2000 installed 1/2001

CSI Temperature and Relative Humidity
Model #: HM45C
Operating Temperature: -40-+60°C
Temperature Measurement Range: -40-+60°C
Temperature Accuracy: ± 0.2 °C @ 20°C
Relative Humidity Measurement Range: 0-100% non-condensing
RH Accuracy: +/-2% RH (0-90%) and +/-3%(90-100%)
Uncertainty of calibration: $\pm 1.2\%$ RH
Date of Last calibration: 10/2000 installed 1/2001

CSI Barometric Sensor
Model #PTB101B
Operating Range: Pressure – 600-1060 mb
Temperature: -40-+60C
Humidity: non-condensing
Accuracy: ± 0.5 to 6.0 mb (+20-60C)
Stability: ± 0.1 mb per year
Date of Last calibration: 7/2000 installed 1/2001

Fluid Isolation Technology Tipping Bucket Rain Gauge
Model #: RG-2000-C
Range: 0.1 mm
Accuracy: 1.0% at <14"/hr
Date of Last calibration: 1/2001

10) Coded variable indicator and variable code definitions:

Sampling station:	Sampling site code:	Station code:
Taskinas Creek	TC	cbvtcmet

11) Data anomalies/Data corrections:

Arrays:

During 2022 all pre-2007 weather data were revisited by the CDMO. Historically those datasets included 15 minute, hourly (60), and daily data arrays (144). As directed by the NERRS Data Management Committee, the CDMO removed the hourly and daily data arrays leaving only the 15 minute data to make the entire NERRS SWMP weather dataset consistent in its reporting. All references to the 60 and 144 arrays were left in the metadata document as they may still provide valuable information, but users should be aware that they are largely no longer relevant. The updated datasets were uploaded to the database and made available through the various data applications at www.nerrsdata.org/get/landing.cfm throughout the fall of 2022.

*Please note that both Julian Day and Calendar Day are recorded and indicated as follows in the documentation below: JulD=Julian Day and CalD=Calendar Day.

January 2001 TC

The barometric pressure data was deleted since the sensor was not operational.

Array	CalD	JulD	Time	Error Message
101	1	1	100	Technician changed pressure in 101 Array data from 1 (1) 100 to 8 (8) 1100
150	1	1	15	Technician changed pressure in 150 Array data from 1 (1) 15 to 8 (8) 1145
241	1	1	2400	Technician changed pressure in 241 Array from 1 (1) 2400 to 7 (7) 2400
243	1	1	2400	Technician changed pressure in 243 Array data from 1 (1) 2400 to 7 (7) 2400
244	1	1	2400	Technician changed pressure in 244 Array data from 1 (1) 2400 to 7 (7) 2400

The following data appear to be correct:

Array	CalD	JulD	Time	Error Message
102	3	3	1700	Wind speed is less than 0.5 m/s from 3 (3) 1700 to 4 (4) 1200
102	4	4	1600	Wind speed is less than 0.5 m/s from 4 (4) 1600 to 5 (5) 700

February 2001 TC

No Data

March 2001 TC

No Data

April 2001 TC

No Data

May 2001 TC

The following data appear to be correct:

Array	CalD	JulD	Time	Error Message
151	26	146	1115	Precip difference from 26 (146) 1115 (6.35) to 26 (146) 1130 (.762) is greater than 5 mm

June 2001 TC

The following data appear to be correct:

Array	CalD	JulD	Time	Error Message
102	7	158	1500	Wind speed is less than 0.5 m/s from 7 (158) 1500 to 8 (159) 700
102	14	165	1800	Wind speed is less than 0.5 m/s from 14 (165) 1800 to 15 (166) 1000
102	29	180	1800	Wind speed is less than 0.5 m/s from 29 (180) 1800 to 30 (181) 600

July 2001 TC

The following data appear to be correct:

Array	CalD	JulD	Time	Error Message
150	11	192	1330	Air temp difference from 11 (192) 1330 (33.907) to 11 (192) 1345 (30.44) is greater than 3.0 degrees C
150	24	205	1415	Air temp difference from 24 (205) 1415 (30.779) to 24 (205) 1430 (25.714) is greater than 3.0 degrees C
150	24	205	1615	Air temp difference from 24 (205) 1615 (29.933) to 24 (205) 1630 (25.733) is greater than 3.0 degrees C
151	29	210	2100	Precip difference from 29 (210) 2100 (2.286) to 29 (210) 2115 (43.942) is greater than 5 mm

The following negative wind direction was converted to zero:

Array	CalD	JulD	Time	Error Message
150	6	187	345	Wind direction is greater than 360 or less than 0 on 6 (187) 345 (-.09475)

August 2001 TC

The following data appear to be correct:

Array	CalD	JulD	Time	Error Message
150	10	222	1515	Air temp difference from 10 (222) 1515 (35.895) to 10 (222) 1530 (30.098) is greater than 3.0 degrees C
150	11	223	1345	Air temp difference from 11 (223) 1345 (31.314) to 11 (223) 1400 (28.048) is greater than 3.0 degrees C
150	11	223	1400	Air temp difference from 11 (223) 1400 (28.048) to 11 (223) 1415 (24.923) is greater than 3.0 degrees C
150	17	229	1600	Air temp difference from 17 (229) 1600 (29.6) to 17 (229) 1615 (26.27) is greater than 3.0 degrees C
151	11	223	1415	Precip difference from 11 (223) 1415 (6.35) to 11 (223) 1430 (1.016) is greater than 5 mm

151	11	223	2100	Precip difference from 11 (223) 2100 (6.604) to 11 (223) 2115 (.762)
is greater than 5 mm				
151	12	224	2145	Precip difference from 12 (224) 2145 (3.302) to 12 (224) 2200 (11.684)
is greater than 5 mm				
151	12	224	2215	Precip difference from 12 (224) 2215 (8.128) to 12 (224) 2230 (2.794)
is greater than 5 mm				
102	4	216	1900	Wind speed is less than 0.5 m/s from 4 (216) 1900 to 5 (217) 800
102	6	218	1700	Wind speed is less than 0.5 m/s from 6 (218) 1700 to 7 (219) 600
102	14	226	1900	Wind speed is less than 0.5 m/s from 14 (226) 1900 to 15 (227) 700
102	15	227	1200	Wind speed is less than 0.5 m/s from 15 (227) 1200 to 15 (227) 2400
102	18	230	400	Wind speed is less than 0.5 m/s from 18 (230) 400 to 18 (230) 1600
102	22	234	1300	Wind speed is less than 0.5 m/s from 22 (234) 1300 to 23 (235) 700

September 2001 TC

The following data appear to be correct:

Array	CalD	JulD	Time	Error Message
150	24	267	1500	Air temp difference from 24 (267) 1500 (24.944) to 24 (267) 1515 (21.483)
is greater than 3.0 degrees C				
151	21	264	215	Precip difference from 21 (264) 215 (.254) to 21 (264) 230 (11.684)
is greater than 5 mm				
151	21	264	230	Precip difference from 21 (264) 230 (11.684) to 21 (264) 245 (4.064)
is greater than 5 mm				
151	24	267	1515	Precip difference from 24 (267) 1515 (6.604) to 24 (267) 1530 (1.524)
is greater than 5 mm				
102	3	246	1900	Wind speed is less than 0.5 m/s from 3 (246) 1900 to 4 (247) 700

October 2001 TC

The following data appear to be correct:

Array	CalD	JulD	Time	Error Message
150	6	279	1045	Air temp difference from 6 (279) 1045 (20.059) to 6 (279) 1100 (16.055)
is greater than 3.0 degrees C				
102	10	283	1700	Wind speed is less than 0.5 m/s from 10 (283) 1700 to 11 (284) 500
102	22	295	1700	Wind speed is less than 0.5 m/s from 22 (295) 1700 to 23 (296) 500

It is possible there was a problem with the CR10X on this day and time that would have caused the CR10X to reset,

resulting in 5 second data loss, however there is no documentation of what might have happened. Therefore the

following data may be suspect.

101	29	302	300	Air temp average in 1 hour data (.88044) is greater than 15 minute maximum (.77675) by at least 10%
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November 2001 TC

The following data appear to be correct:

Array	CalD	JulD	Time	Error Message
150	16	320	2300	Air temp difference from 16 (320) 2300 (9.5575) to 16 (320) 2315 (13.164) is greater than 3.0 degrees C
150	23	327	830	Air temp difference from 23 (327) 830 (4.3182) to 23 (327) 845 (7.3262) is greater than 3.0 degrees C
150	23	327	845	Air temp difference from 23 (327) 845 (7.3262) to 23 (327) 900 (10.396) is greater than 3.0 degrees C

The following negative wind direction was converted to zero:

Array	CalD	JulD	Time	Error Message
150	21	325	1315	Wind direction is greater than 360 or less than 0 on 21 (325) 1315 (-.0948)

December 2001 TC

The following data appear to be correct:

Array	CalD	JulD	Time	Error Message
150	16	350	830	Air temp difference from 16 (350) 830 (1.853) to 16 (350) 845 (5.1238) is greater than 3.0 degrees C
150	24	358	245	Air temp difference from 24 (358) 245 (15.674) to 24 (358) 300 (11.535) is greater than 3.0 degrees C

The following negative wind direction was converted to zero:

Array	CalD	JulD	Time	Error Message
150	16	350	1200	Wind direction is greater than 360 or less than 0 on 16 (350) 1200 (-.09483)
150	18	352	1915	Wind direction is greater than 360 or less than 0 on 18 (352) 1915 (-.09484)

12) Missing data:

Arrays:

During 2022 all pre-2007 weather data were revisited by the CDMO. Historically those datasets included 15 minute, hourly (60), and daily data arrays (144). As directed by the NERRS Data Management Committee, the CDMO removed the hourly and daily data arrays leaving only the 15 minute data to make the entire NERRS SWMP weather dataset consistent in its reporting. All references to the 60 and 144 arrays were left in the metadata document as they may still provide valuable information, but users should be aware that they are largely no longer relevant. The updated datasets were uploaded to the database and made available through the various data applications at www.nerrsdata.org/get/landing.cfm throughout the fall of 2022.

January 2001 TC

Data lost from Jan 8 1200 to Jan 31 2345 due to improper backup.

Array	CalD	JulD	Time	Error Message
150	8	8	1200	Missing 150 Array data (15 minute data) from 8 (8) 1200 to 31 (31) 2400

101	8	8	1200	Missing 101 Array data (Hourly Averages) from 8 (8) 1200 to 31 (31) 2400
102	8	8	1200	Missing 102 Array data (Hourly Average Wind Parameters) from 8 (8) 1200 to 31 (31) 2400
241	8	8	2400	Missing 241 data (Daily Averages) from 8 (8) 2400 to 31 (31) 2400
242	8	8	2400	Missing 242 data (Daily Average Wind Parameters) from 8 (8) 2400 to 31 (31) 2400
243	8	8	2400	Missing 243 data (Daily Max/Time Values) from 8 (8) 2400 to 31 (31) 2400
244	8	8	2400	Missing 244 data (Daily Min/Time Values) from 8 (8) 2400 to 31 (31) 2400

February 2001 TC

Data lost from Feb 1 to Feb 28 due to improper backup.

March 2001 TC

Data lost from March 1 to March 31 due to improper backup.

April 2001 TC

Data lost from April 1 to April 30 due to improper backup.

May 2001 TC

Data lost from May 1 to May 15 1045 due to improper backup.

Array	CalD	JulD	Time	Error Message
150	1	121	15	Missing 150 Array data (15 minute data) from 1 (121) 15 to 15 (135) 1045
101	1	121	100	Missing 101 Array data (Hourly Averages) from 1 (121) 100 to 15 (135) 1000
102	1	121	100	Missing 102 Array data (Hourly Average Wind Parameters) from 1 (121) 100 to 15 (135) 1000
241	1	121	2400	Missing 241 data (Daily Averages) from 1 (121) 2400 to 15 (135) 2400
242	1	121	2400	Missing 242 data (Daily Average Wind Parameters) from 1 (121) 2400 to 15 (135) 2400
243	1	121	2400	Missing 243 data (Daily Max/Time Values) from 1 (121) 2400 to 15 (135) 2400
244	1	121	2400	Missing 244 data (Daily Min/Time Values) from 1 (121) 2400 to 15 (135) 2400

Suspicious data deleted on May 15 1630 through May 16 0600 due to breaks in data collection. Data was properly collected starting on May16 615 EST.

Array	CalD	JulD	Time	Error Message
150	15	135	1630	Missing 150 Array data (15 minute data) from 15 (135) 1630 to 16 (136) 600
101	15	135	1700	Missing 101 Array data (Hourly Averages) from 15 (135) 1700 to 16 (136) 600
102	15	135	1700	Missing 102 Array data (Hourly Average Wind Parameters) from 15 (135) 1700 to 16 (136) 600

June 2001 TC
None

July 2001 TC
None

August 2001 TC
None

September 2001 TC
None

October 2001 TC
None

November 2001 TC
None

December 2001 TC
None

13) Other Remarks/notes

Arrays:

During 2022 all pre-2007 weather data were revisited by the CDMO. Historically those datasets included 15 minute, hourly (60), and daily data arrays (144). As directed by the NERRS Data Management Committee, the CDMO removed the hourly and daily data arrays leaving only the 15 minute data to make the entire NERRS SWMP weather dataset consistent in its reporting. All references to the 60 and 144 arrays were left in the metadata document as they may still provide valuable information, but users should be aware that they are largely no longer relevant. The updated datasets were uploaded to the database and made available through the various data applications at www.nerrsdata.org/get/landing.cfm throughout the fall of 2022.

Precipitation:

During the initial years of NERRS SWMP weather data collection the CR10X programming was inconsistent in how precipitation values were recorded. For most reserves, zeros were not recorded when rainfall had not occurred between 2001-2003, instead no rainfall was represented by a blank cell. The CDMO verified which datasets were impacted by this issue for the 2001-2006 datasets and inserted zeros when the metadata

indicated that no precipitation occurred and data were not missing for other reasons. In some cases, zero values for precipitation data were evaluated and removed where the metadata confirmed that no rainfall should have been in the dataset. The pre-2007 data did not go through a thorough QAQC process again at that time (in addition to previous QAQC); however, if discrepancies were noticed between what was documented in the metadata and what was in the dataset, additional updates may have been made. The updated datasets were uploaded to the database and made available through the various data applications at www.nerrsdata.org/get/landing.cfm throughout early 2023.

Rain Events:

January

Date	RainAmount (mm)
8	1.524
Monthly Total	1.5

May

Date	RainAmount (mm)
15	.254
16	16 .254
18	.508
19	5.588
20	.254
21	3.556
22	1.270
25	25.654
26	26.416
28	.254
29	3.556
Monthly Total	67.6

June

Date	RainAmount (mm)
1	13.970
2	.508
5	21.844
6	5.588
7	.508
15	10.160
16	28.448
Monthly Total	81.0

July

Date	RainAmount (mm)
------	-----------------

1	5.080
8	8.890
18	1.016
24	3.556
25	.508
26	.254
29	51.816
30	2.540

Monthly Total 73.7

August

Date	Rainamount (mm)
------	-----------------

10	3.048
11	29.972
12	39.370
13	15.240
14	.254
17	5.080
18	8.128
19	.254
23	1.778
25	.254
27	5.588
31	6.350

Monthly Total 115.3

September

Date	RainAmount (mm)
------	-----------------

1	3.556
10	4.826
14	.254
20	.254
21	18.796
22	.254
24	29.718
25	3.556

Monthly Total 61.2

October

Date	Rainamount (mm)
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6	8.890
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14	11.176
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16	.254
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24	.254
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Monthly Total 20.6

November

Date	Rainamount (mm)
------	-----------------

19	.254
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24	4.826
----	-------

25	1.524
----	-------

29	.254
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Monthly Total 6.9

December

Date	RainAmount (mm)
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4	.254
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9	1.016
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10	1.016
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11	14.224
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17	7.112
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18	9.398
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24	15.494
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Monthly Total 48.5