

Delaware (DEL) NERR Meteorological Metadata

January 01, 2003 - December 31, 2003

Latest Update: **October 10, 2023**

I. Data Set & Research Descriptors

1) Principal investigator & contact persons:

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2) Entry verification

a) Data Input Procedures:

The 15-minute, 1-hour average, and 24-hour meteorological data were downloaded from each instrument on the weather station to a Campbell Scientific CR10X datalogger. The CDMO Data Logger Program (nerr303.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 computer to which the data was uploaded (every 15 minutes) via a short haul modem to a computer located at St. Jones Center for Estuarine Studies. The data was saved as a raw data file (SJ_RAW.dat) onto a separate hard drive and backed up onto Delaware Coastal Programs' (DCP) server.

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. Data after November 14, 2003 (318) 915 were QA/QC'd using Gemtek's EQWin program. EQwin

now replaces the WDMP as the NERR MET primary QA/QC program. All MET, WQ, and NUTS data are now archived in an EQwin database. SWMP weather data collected with CR10X program versions prior to version 4.0 were converted to the new format in order to merge the old data format (12 array output) with the new data format found in version 4.0 of the NERR_4.CSI (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.

Common errors noted in the monthly error reports were wind speeds below the 0.5 m/s criteria, temperature change of greater than 3 C in a 15 minute period, and precipitation difference of greater than 5mm in 15 minutes. All errors of these types were double checked with other data that could support such "anomalous" weather changes and noted in the sections that follow. Wind speeds below the 0.5 m/s criteria are common between 1900 and 0600 hours and are not individually checked. Both raw data files and Access databases were saved to the DCP server with daily tape back-up. Mike Mensinger conducted data management and QA/QC activities.

b) Data Collection Schedule (i-Vi prior to installation of the NERR_4.CSI program)

i) Data is collected in the following formats.

- (1) Sample data points are collected every 15 minutes.
- (2) Hourly averages are collected every 60 minutes.
- (3) Every 24 hours daily averages, maximums with time, and minimums with time.

ii) 15 minute sample point parameters:

Array 150: Date, Time, Air Temperature (c), Relative Humidity (%), LiCor (par),
Barometric Pressure (mb), Wind Speed (m/s), Wind Direction
Array 151: Rainfall (mm)

iii) Hourly average parameters: D

Array 101: Date, Time, Air Temperature (c), Relative Humidity (%), LiCor (par),
Barometric Pressure (mb)
Array 102: Date, Time, Wind Speed (m/s), Wind Direction, Wind Speed Maximum (m/s)

iv) Daily Averages parameters:

Array 241: Date, Time, Air Temperature (c), Relative Humidity (%), LiCor (par),
Barometric Pressure (mb)
Array 242: Date, Time, Wind Speed (m/s), Wind Direction, Wind Direction Standard
Deviation (using Yamartino's Algorithm)

v) Daily Maximum parameters:

Array 243: Date, Time, Air Temperature (c), Time, Relative Humidity (%), Time, LiCor
(par), Time, Barometric Pressure (mb), Time, Wind Speed (m/s), Time, Battery Voltage,
Time

vi) Daily Minimum parameters:

Array 244: Date, Time, Air Temperature (c), Time, Relative Humidity (%), Time, LiCor (par), Time, Barometric Pressure (mb), Time, Wind Speed (m/s), Time, Battery Voltage, Time

vii) With installation of the new NERR_4.CSI program on 11/14/03, the following parameters were output every 15 minutes, hourly and daily:

Year, Julian Date, Time, Average (c), Temperature Maximum Temperature (c), Maximum Temperature Time, Minimum Temperature (c), Minimum Temperature Time, Relative Humidity Average (%), Relative Humidity Max (%), Relative Humidity Max Time, Relative Humidity Min (%), Relative Humidity Min Time, Barometric Pressure Average (mb), Barometric Pressure Max (mb), Barometric Pressure Max Time, Barometric Pressure Min (mb), Barometric Pressure Min Time, Wind Speed Average (m/s) Wind Direction Average (degrees), Wind Speed Std Dev (m/s), Wind Speed Maximum (m/s), Wind Speed Maximum Time, Wind Speed Minimum (m/s), Wind Speed Minimum Time, Precipitation Total (mm), PAR Total (millimoles/M2), Voltage Average (volts), Total Radiation (Langleys/Minute), Cumulative Rainfall (mm)

c) Error/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
- Max and min temp recorded for the day
- 1-hour average not greater than 10% above the greatest 15 min sample recorded in the hour

Relative Humidity:

- Not changed by more than 25% from the previous 15 minutes
- Max and min humidity recorded for the day
- 1-hour average not greater than 10% above the greatest 15 min sample recorded in the hour

Rainfall:

- Precipitation not greater than 5 mm in 15 min
- No precipitation for the month

Wind Speed:

- Wind speed greater than 30 m/s
- Wind speed less than .5 m/s

Wind Direction:

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

Pressure:

- Pressure greater than 1040 mb or less than 980 mb
- Pressure changes greater than 5 mb per hour
- Maximum and minimum values recorded for the day

- 1-hour average not greater than 10% above the greatest 15 min sample recorded in the hour

Time:

- 15-minute interval recorded

For all data:

- Duplicate interval data

3) Research objectives:

The principal objective is to record long-term meteorological data for the Blackbird component of the Delaware National Estuarine Research Reserve in order to observe any environmental changes or trends over time. The data are also used for specific research studies relating to atmospheric deposition of nutrients and pesticides, and nutrient runoff influences from encroaching urbanization on estuarine systems.

4) Research methods:

The Campbell Scientific weatherstation 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. Prior to installation of the version 4.0 of the NERR_4.CSI program, an instantaneous sample is taken every 15 minutes and that data are stored in array 150. After the NERR_4.CSI program was installed on November 14, 2004 (318) 915, data were collected according to the schedule in section 2b.vi above. The CR10X datalogger can store over three weeks of data before it overwrites the data, in addition there is a storage module that stores in excess of a month of data for backup. The data are sent every 15 minutes to a computer for real-time display and storage. If the short haul modem link failed and data could not be automatically sent from the datalogger to the computer the data would be downloaded from the CR10X to a laptop computer following procedures in Part D. Section 4.5 of the CDMO Operations Manual. Periodically, sensors on the weatherstation 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 year.

5) Site location and character:

The Delaware National Estuarine Research Reserve is comprised of two component sites, the St. Jones River and Blackbird Creek components. Both components are located along the Delaware Bay Coast. The St. Jones River Component is located in central Kent County Delaware, east of the State capitol city, Dover. The Blackbird Creek component is located in the unincorporated area of Southern New Castle County. The meteorological station site, is located in the St. Jones DNERR component. It is located in a tidal marsh area with a wooded fringe area 100 m to the north, 75 m to east, 75 m to the west and 1+ km to south. The wooded area is of an approximate average height of 16 m.

Position: Latitude 39 degree 05' 20.05" N

Longitude 75 degree 26' 12.78" W

The unit is mounted on a 3-meter tower adjacent to the boardwalk that crosses the marsh. The elevations above the marsh surface are as follows; Barometric pressure - 2.2 m, temperature and relative humidity - 2.9 m, wind and PAR - 4.5 m, highest point on tower (lightning rod) - 4.9 m. The rain gauge is 2.4 m above the surface and 3 m south of the tower. The adjacent boardwalk is 1.1 m above the surface with a railing height of 1.0 m. A vegetative cover of *Spartina* spp. surrounds the area with an average height of 1 m. The tower and rain gauge are both 1 m east of the boardwalk. The weatherstation is located approximately 2 km from the water quality datasonde at Scotton Landing.

6) Data collection period:

The meteorological monitoring program was started in October 1997 at the DNERR and has been continuous through the present. The data collection format has followed NERRS protocol since standardized meteorological program development in November of 1998.

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:

The NERR Water Quality Monitoring Project also has four stations located at the DNERR. The principal objective of this study is to record long-term water quality data for St. Jones and Blackbird watersheds in order to observe any physical changes or trends in water quality over time. The Blackbird component represents a pristine site and the other three represent impacted sites. Measurements are taken every 30 minutes over roughly two-week collecting periods.

In addition atmospheric deposition of rainfall events is performed in the DNERR watersheds to monitor and characterize the nutrient input to the estuary from differing storm events and seasonally. One sampler is positioned in the St. Jones watershed and one is in the Blackbird watershed.

II. Physical Structure Descriptors

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

LiCor Quantum Sensor

Model # LI190SB

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

Operating Temperature: -40 to 65°C

Sensitivity: typically $5\ \mu\text{A}$ per $1000\ \mu\text{moles s}^{-1}\text{ m}^{-2}$

Light spectrum wavelength: 400 to $700\ \text{nm}$

Date of last calibration: 8/15/2000 (installed new 12/20/2000)

12/19/02: Replaced with unit # (s/n Q22182, recalib 11/14/02)

Wind Monitor

Model # 05103

Range: 0 - $60\ \text{m/s}$; 360° mechanical

Date of last calibration: 4/5/1999 (installed new 12/20/2000)

12/19/02: Replaced with unit (s/n WM49558)

Temperature and Relative Humidity

Model #: HMP45C

Operating Temperature: -40 - $+60^{\circ}\text{C}$

Temperature Measurement Range: -40 - $+60^{\circ}\text{C}$

Temperature Accuracy: $\pm 0.2^{\circ}\text{C}$ @ 20°C

Relative Humidity Measurement Range: 0 - 100% non-condensing

RH Accuracy: $\pm 2\%$ RH (0 - 90%) and $\pm 3\%$ (90 - 100%)

Uncertainty of calibration: $\pm 1.2\%$ RH

Date of Last calibration: Unit 2 unknown (installed new 12/20/2000)

Unit 1 11/27/2001 (installed new 12/19/2001)

12/19/02: Replaced with unit #1 (s/n U1430039, recalib 10/09/02)

12/22/03: Replaced with unit #2 (s/n V2530002, recalib 11/03/03)

Barometric Sensor

Model # CS-105

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: 9/12/00 (installed new 12/20/2000)

12/19/02: Replaced with unit # (s/n R1630014, recalib 10/09/02)

Tipping Bucket Rain Gauge

Model #: TE 525

Range: 0.1 mm

Accuracy: 1.0% at < 2 "/hr

Date of Last calibration: field calibrated 12/20/00, 12/19/2001, 12/19/2002, 12/22/2003

10) Coded variable indicator and variable code definitions:

delsjmet=Saint Jones River

11) Data anomalies:

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: JulianD=Julian Date and CalD=Calendar Day

Wind speeds below the 0.5 m/s criteria are common between 1900 and 0900 hours and occurred throughout each month.

January 2003

The following data were changed in the database to read zero:

150 2 2 815 Wind direction is greater than 360 or less than 0 on 2 (2) 815 (-.09538)

150	14	14	1100	Wind direction is greater than 360 or less than 0 on 14 (14) 1100 (-.09545)
150	29	29	1530	Wind direction is greater than 360 or less than 0 on 29 (29) 1530 (-.09541)

For the following data, the values are so small that the greater than 10% flag is not a cause for suspicion:

101	31	31	700	Air temp average in 1 hour data (-.00925) is greater than 15 minute maximum (-.02017) by at least 10%
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February 2003

The following data appear correct, temp jump likely associated with shift in prevailing winds from East to South:

ArrayID	CalD	JulianD	Time	Error Message
150	4	35	515	Air temp difference from 4 (35) 515 (3.877) to 4 (35) 530 (7.6344) is greater than 3.0 degrees C

The following data appear to be correct and attributed to a front moving through the area:

ArrayID	CalD	JulianD	Time	Error Message
150	23	54	300	Air temp difference from 23 (54) 300 (3.0562) to 23 (54) 315 (10.378) is greater than 3.0 degrees C

The following data appear to be correct, wind speeds below the 0.5 m/s criteria are common between 1800 and 0900 hours:

ArrayID	CalD	JulianD	Time	Error Message
102	18	49	1800	Wind speed is less than 0.5 m/s from 18 (49) 1800 to 19 (50) 1000
102	20	51	1800	Wind speed is less than 0.5 m/s from 20 (51) 1800 to 21 (52) 900

The following data were changed in the raw files to read zero:

ArrayID	CalD	JulianD	Time	Error Message
150	10	41	145	Wind direction is greater than 360 or less than 0 on 10 (41) 145 (-.09544)
150	10	41	200	Wind direction is greater than 360 or less than 0 on 10 (41) 200 (-.09544)
150	10	41	215	Wind direction is greater than 360 or less than 0 on 10 (41) 215 (-.09544)
150	14	45	15	Wind direction is greater than 360 or less than 0 on 14 (45) 15 (-.09556)
150	16	47	900	Wind direction is greater than 360 or less than 0 on 16 (47) 900 (-.09553)
150	17	48	1330	Wind direction is greater than 360 or less than 0 on 17 (48) 1330

(-.09543)
150 22 53 1015 Wind direction is greater than 360 or less than 0 on 22 (53) 1015
(-.09538)
150 25 56 900 Wind direction is greater than 360 or less than 0 on 25 (56) 900
(-.09543)
150 28 59 615 Wind direction is greater than 360 or less than 0 on 28 (59) 615
(-.09543)

For the following data, the values are so small that the greater than 10% flag is not a cause for suspicion:

ArrayID	CalD	JulianD	Time	Error Message
101	7	38	1700	Air temp average in 1 hour data (.01385) is greater than 15 minute maximum (-.02018) by at least 10%

March 2003

The following data appear to be correct:

ArrayID	CalD	JulianD	Time	Error Message
150	26	85	1615	Air temp difference from 26 (85) 1615 (21.27) to 26 (85) 1630 (14.903) is greater than 3.0 degrees C
150	29	88	2030	Air temp difference from 29 (88) 2030 (17.21) to 29 (88) 2045 (13.457) is greater than 3.0 degrees C

The following data appear correct, associated with incoming rain event. Also follows increasing humidity trend from time of day.

ArrayID	CalD	JulianD	Time	Error Message
150	26	85	1615	Rel hum difference from 26 (85) 1615 (46.388) to 26 (85) 1630 (75.751) is greater than 25%

The following data were changed in the raw files to read zero:

ArrayID	CalD	JulianD	Time	Error Message
150	3	62	1630	Wind direction is greater than 360 or less than 0 on 3 (62) 1630 (-.09545)
150	6	65	2200	Wind direction is greater than 360 or less than 0 on 6 (65) 2200 (-.09545)
150	7	66	830	Wind direction is greater than 360 or less than 0 on 7 (66) 830 (-.09549)
150	10	69	500	Wind direction is greater than 360 or less than 0 on 10 (69) 500 (-.09552)
150	14	73	445	Wind direction is greater than 360 or less than 0 on 14 (73) 445 (-.09544)
150	24	83	500	Wind direction is greater than 360 or less than 0 on 24 (83) 500 (-.09538)

April 2003

The following data appear to be correct and attributed to a front moving into the area.

ArrayID	CalD	JulianD	Time	Error Message
150	2	92	1500	Air temp difference from 2 (92) 1500 (25.472) to 2 (92) 1515 (20.245) is greater than 3.0 degrees C
150	2	92	1515	Air temp difference from 2 (92) 1515 (20.245) to 2 (92) 1530 (24.868) is greater than 3.0 degrees C

The following data appear to be correct and attributed to a front and wind shift from NNE to ESE.

ArrayID	CalD	JulianD	Time	Error Message
150	16	106	2345	Air temp difference from 16 (106) 2345 (20.161) to 16 (106) 2400 (16.807) is greater than 3.0 degrees C

The following data appears correct, follows general decreasing temperature trend and likely associated with a front moving through the area.

ArrayID	CalD	JulianD	Time	Error Message
150	25	115	1245	Air temp difference from 25 (115) 1245 (16.271) to 25 (115) 1300 (21.502) is greater than 3.0 degrees C

May 2003

The following data appear correct and attributed to a front moving through the area:

ArrayID	CalD	JulianD	Time	Error Message
150	2	122	1045	Air temp difference from 2 (122) 1045 (25.483) to 2 (122) 1100 (21.998) is greater than 3.0 degrees C
150	8	128	1615	Air temp difference from 8 (128) 1615 (19.593) to 8 (128) 1630 (16.108) is greater than 3.0 degrees C

The following data appear correct, Wind shifted from east to south/southwest during this time:

ArrayID	CalD	JulianD	Time	Error Message
150	1	121	1300	Air temp difference from 1 (121) 1300 (23.128) to 1 (121) 1315 (26.277) is greater than 3.0 degrees C

The following data appear to be correct, intense period of rain which tapered off:

ArrayID	CalD	JulianD	Time	Error Message
151	2	122	2100	Precip difference from 2 (122) 2100 (6.604) to 2 (122) 2115 (.508) is greater than 5 mm

June 2003

The following data appear correct and likely associated with distinct wind shift from SW to NNW:

ArrayID	CalD	JulianD	Time	Error Message
150	12	163	1845	Air temp difference from 12 (163) 1845 (26.81) to 12 (163) 1900 (22.657) is greater than 3.0 degrees C

The following data appear correct and attributed to a front moving through the area:

ArrayID	CalD	JulianD	Time	Error Message
150	27	178	1630	Air temp difference from 27 (178) 1630 (30.26) to 27 (178) 1645 (25.777) is greater than 3.0 degrees C

The following data appear correct and attributed with convective storms:

ArrayID	CalD	JulianD	Time	Error Message
151	7	158	1700	Precip difference from 7 (158) 1700 (7.112) to 7 (158) 1715 (1.27) is greater than 5 mm
151	13	164	1745	Precip difference from 13 (164) 1745 (6.858) to 13 (164) 1800 (1.27) is greater than 5 mm

The following data appear to be correct, wind speeds below the 0.5 m/s criteria are common between 1800 and 0900 hours:

ArrayID	CalD	JulianD	Time	Error Message
102	24	175	1900	Wind speed is less than 0.5 m/s from 24 (175) 1900 to 25 (176) 700

The following data were changed in the raw files to read zero:

ArrayID	CalD	JulianD	Time	Error Message
150	25	176	1145	Wind direction is greater than 360 or less than 0 on 25 (176) 1145 (-.09513)

July 2003

The following data appear correct and are likely associated with a front moving through the area:

ArrayID	CalD	JulianD	Time	Error Message
150	22	203	1615	Air temp difference from 22 (203) 1615 (30.273) to 22 (203) 1630 (27.057) is greater than 3.0 degrees C

The following data appear correct and attributed with convective storms:

ArrayID	CalD	JulianD	Time	Error Message
151	2	183	1600	Precip difference from 2 (183) 1600 (.254) to 2 (183) 1615 (5.588) is greater than 5 mm
151	3	184	100	Precip difference from 3 (184) 100 (7.874) to 3 (184) 115 (1.524) is greater than 5 mm
151	9	190	2115	Precip difference from 9 (190) 2115 (.254) to 9 (190) 2130 (6.604) is greater than 5 mm
151	9	190	2130	Precip difference from 9 (190) 2130 (6.604) to 9 (190) 2145 (.762) is greater than 5 mm

The following data were changed in the raw files to read zero:

ArrayID	CalD	JulianD	Time	Error Message
150	1	182	30	Wind direction is greater than 360 or less than 0 on 1 (182) 30 (-.09522)
150	28	209	445	Wind direction is greater than 360 or less than 0 on 28 (209) 445 (-.09519)
150	31	212	530	Wind direction is greater than 360 or less than 0 on 31 (212) 530 (-.09522)
150	6	187	1115	Wind direction is greater than 360 or less than 0 on 6 (187) 1115 (-.09513)
150	17	198	1400	Wind direction is greater than 360 or less than 0 on 17 (198) 1400 (-.09514)

August 2003

The following data appear correct and are likely associated with fronts moving through the area:

ArrayID	CalD	JulianD	Time	Error Message
150	3	215	1300	Air temp difference from 3 (215) 1300 (31.278) to 3 (215) 1315 (27.995) is greater than 3.0 degrees C
150	16	228	1530	Air temp difference from 16 (228) 1530 (25.664) to 16 (228) 1545 (20.777) is greater than 3.0 degrees C
150	26	238	1700	Air temp difference from 26 (238) 1700 (28.062) to 26 (238) 1715 (24.447) is greater than 3.0 degrees C
150	30	242	1615	Air temp difference from 30 (242) 1615 (30.792) to 30 (242) 1630 (25.305) is greater than 3.0 degrees C

The following data appear correct and attributed with convective storms:

ArrayID	CalD	JulianD	Time	Error Message
151	5	217	1200	Precip difference from 5 (217) 1200 (5.08) to 5 (217) 1215 (12.446) is greater than 5 mm

The following data were changed in the raw files to read zero:

ArrayID	CalD	JulianD	Time	Error Message
150	14	226	1630	Wind direction is greater than 360 or less than 0 on 14 (226) 1630 (-.09511)
150	15	227	1030	Wind direction is greater than 360 or less than 0 on 15 (227) 1030 (-.09513)
150	15	227	1730	Wind direction is greater than 360 or less than 0 on 15 (227) 1730 (-.09511)
150	24	236	1330	Wind direction is greater than 360 or less than 0 on 24 (236) 1330 (-.09519)
150	31	243	630	Wind direction is greater than 360 or less than 0 on 31 (243) 630 (-.09524)

September 2003

The following data appear correct and are likely associated with a front moving through the area:

ArrayID	CalD	JulianD	Time	Error Message
150	23	266	630	Air temp difference from 23 (266) 630 (22.546) to 23 (266) 645 (18.123) is greater than 3.0 degrees C

The following data appear correct and attributed with convective storms:

ArrayID	CalD	JulianD	Time	Error Message
151	1	244	2145	Precip difference from 1 (244) 2145 (.254) to 1 (244) 2200 (10.16) is greater than 5 mm
151	1	244	2200	Precip difference from 1 (244) 2200 (10.16) to 1 (244) 2215 (.762) is greater than 5 mm
151	27	270	1400	Precip difference from 27 (270) 1400 (.254) to 27 (270) 1415 (9.398) is greater than 5 mm

The following data appear to be correct, wind speeds below the 0.5 m/s criteria are common between 1800 and 0900 hours:

ArrayID	CalD	JulianD	Time	Error Message
102	6	249	1800	Wind speed is less than 0.5 m/s from 6 (249) 1800 to 7 (250) 700
102	19	262	2000	Wind speed is less than 0.5 m/s from 19 (262) 2000 to 20 (263) 800
102	23	266	1800	Wind speed is less than 0.5 m/s from 23 (266) 1800 to 24 (267) 700

The following data were changed in the raw files to read zero:

ArrayID	CalD	JulianD	Time	Error Message
150	2	245	2315	Wind direction is greater than 360 or less than 0 on 2 (245) 2315 (-.09522)
150	7	250	1715	Wind direction is greater than 360 or less than 0 on 7 (250) 1715 (-.09516)

150	8	251	2330	Wind direction is greater than 360 or less than 0 on 8 (251) 2330 (-.09522)
150	16	259	1945	Wind direction is greater than 360 or less than 0 on 16 (259) 1945 (-.09524)
150	17	260	1445	Wind direction is greater than 360 or less than 0 on 17 (260) 1445 (-.09516)

October 2003

The following data appear correct and are likely associated with a front moving through the area as indicated by the rapidly declining barometric pressure values during these two time periods:

ArrayID	CalD	JulianD	Time	Error Message
150	14	287	2230	Air temp difference from 14 (287) 2230 (18.552) to 14 (287) 2245 (14.661) is greater than 3.0 degrees C
150	27	300	1515	Air temp difference from 27 (300) 1515 (20.352) to 27 (300) 1530 (14.518) is greater than 3.0 degrees C

The following data appear to be correct, wind speeds below the 0.5 m/s criteria are common between 1800 and 0900 hours:

ArrayID	CalD	JulianD	Time	Error Message
102	5	278	1900	Wind speed is less than 0.5 m/s from 5 (278) 1900 to 6 (279) 700
102	8	281	1900	Wind speed is less than 0.5 m/s from 8 (281) 1900 to 9 (282) 900
102	13	286	1800	Wind speed is less than 0.5 m/s from 13 (286) 1800 to 14 (287) 800
102	24	297	1800	Wind speed is less than 0.5 m/s from 24 (297) 1800 to 25 (298) 800
102	30	303	1800	Wind speed is less than 0.5 m/s from 30 (303) 1800 to 31 (304) 600

The following data were changed in the raw files to read zero:

ArrayID	CalD	JulianD	Time	Error Message
150	11	284	830	Wind direction is greater than 360 or less than 0 on 11 (284) 830 (-.09527)
150	11	284	1100	Wind direction is greater than 360 or less than 0 on 11 (284) 1100 (-.09523)

November 2003

The following data appear to be correct, wind speeds below the 0.5 m/s criteria are common between 1800 and 0900 hours:

ArrayID	CalD	JulianD	Time	Error Message
102	1	305	1900	Wind speed is less than 0.5 m/s from 1 (305) 1900 to 2 (306) 700
102	9	313	1800	Wind speed is less than 0.5 m/s from 9 (313) 1800 to 10 (314) 800
102	10	314	1900	Wind speed is less than 0.5 m/s from 10 (314) 1900 to 11 (315) 700

The following data appear correct as the values only exceed 1040 by .1 to .2 milibars which is an insignificant amount.

ArrayID	CalD	JulianD	Time	Error Message
150	9	313	945	Pressure is greater than 1040 or less than 980 on 9 (313) 945 (1040.1)
150	9	313	1000	Pressure is greater than 1040 or less than 980 on 9 (313) 1000 (1040.1)
150	9	313	1015	Pressure is greater than 1040 or less than 980 on 9 (313) 1015 (1040.2)
150	9	313	1030	Pressure is greater than 1040 or less than 980 on 9 (313) 1030 (1040.2)
150	9	313	1045	Pressure is greater than 1040 or less than 980 on 9 (313) 1045 (1040.1)
150	9	313	1100	Pressure is greater than 1040 or less than 980 on 9 (313) 1100 (1040.1)

The following PAR data are small negative values ranging from -0002.6 to -0000.1 and should be read as zero. The small negative values were changed to zero in the dataset.

Array	CalD	JulianD	Time
15	11/14/2003	318	17:30
15	11/14/2003	318	17:45
60	11/14/2003	318	18:00
15	11/14/2003	318	18:00
15	11/14/2003	318	18:15
15	11/14/2003	318	18:30
15	11/14/2003	318	18:45
60	11/14/2003	318	19:00
15	11/14/2003	318	19:00
15	11/14/2003	318	19:15
15	11/14/2003	318	19:30
15	11/14/2003	318	19:45
60	11/14/2003	318	20:00
15	11/14/2003	318	20:00
15	11/14/2003	318	20:15
15	11/14/2003	318	20:30
15	11/14/2003	318	20:45
60	11/14/2003	318	21:00
15	11/14/2003	318	21:00
15	11/14/2003	318	21:15
15	11/14/2003	318	21:30
15	11/14/2003	318	21:45
60	11/14/2003	318	22:00
15	11/14/2003	318	22:00
15	11/14/2003	318	22:15
15	11/14/2003	318	22:30
15	11/14/2003	318	22:45

60	11/14/2003	318	23:00
15	11/14/2003	318	23:00
15	11/14/2003	318	23:15
15	11/14/2003	318	23:30
15	11/14/2003	318	23:45
15	11/15/2003	319	00:15
15	11/15/2003	319	00:30
15	11/15/2003	319	00:45
60	11/15/2003	319	01:00
15	11/15/2003	319	01:00
15	11/15/2003	319	01:15
15	11/15/2003	319	01:30
15	11/15/2003	319	01:45
60	11/15/2003	319	02:00
15	11/15/2003	319	02:00
15	11/15/2003	319	02:15
15	11/15/2003	319	02:30
15	11/15/2003	319	02:45
60	11/15/2003	319	03:00
15	11/15/2003	319	03:00
15	11/15/2003	319	03:15
15	11/15/2003	319	03:30
15	11/15/2003	319	03:45
60	11/15/2003	319	04:00
15	11/15/2003	319	04:00
15	11/15/2003	319	04:15
15	11/15/2003	319	04:30
15	11/15/2003	319	04:45
60	11/15/2003	319	05:00
15	11/15/2003	319	05:00
15	11/15/2003	319	05:15
15	11/15/2003	319	05:30
15	11/15/2003	319	05:45
60	11/15/2003	319	06:00
15	11/15/2003	319	06:00
15	11/15/2003	319	06:15
15	11/15/2003	319	18:15
15	11/15/2003	319	18:30
15	11/15/2003	319	18:45
60	11/15/2003	319	19:00
15	11/15/2003	319	19:00
15	11/15/2003	319	19:15
15	11/15/2003	319	19:30
15	11/15/2003	319	19:45
60	11/15/2003	319	20:00
15	11/15/2003	319	20:00
15	11/15/2003	319	20:15
15	11/15/2003	319	20:30

15	11/15/2003	319	20:45
60	11/15/2003	319	21:00
15	11/15/2003	319	21:00
15	11/15/2003	319	21:15
15	11/15/2003	319	21:30
15	11/15/2003	319	21:45
60	11/15/2003	319	22:00
15	11/15/2003	319	22:00
60	11/15/2003	319	00:00
15	11/15/2003	319	00:00
60	11/16/2003	320	03:00
60	11/17/2003	321	05:00
15	11/17/2003	321	05:30
15	11/17/2003	321	05:45
60	11/17/2003	321	06:00
15	11/17/2003	321	06:00
15	11/17/2003	321	06:15
15	11/17/2003	321	06:30
15	11/17/2003	321	19:45
60	11/17/2003	321	20:00
15	11/17/2003	321	20:00
15	11/17/2003	321	20:15
15	11/17/2003	321	20:30
15	11/17/2003	321	20:45
60	11/17/2003	321	21:00
15	11/17/2003	321	21:00
15	11/17/2003	321	21:15
15	11/17/2003	321	21:30
15	11/17/2003	321	21:45
60	11/17/2003	321	22:00
15	11/17/2003	321	22:00
15	11/17/2003	321	22:15
15	11/17/2003	321	22:30
15	11/17/2003	321	22:45
60	11/17/2003	321	23:00
15	11/17/2003	321	23:00
15	11/17/2003	321	23:15
15	11/17/2003	321	23:30
15	11/17/2003	321	23:45
15	11/18/2003	322	00:15
15	11/18/2003	322	00:30
15	11/18/2003	322	00:45
60	11/18/2003	322	01:00
15	11/18/2003	322	01:00
15	11/18/2003	322	01:15
15	11/18/2003	322	01:30
15	11/18/2003	322	01:45
60	11/18/2003	322	02:00

15	11/18/2003	322	02:00
15	11/18/2003	322	02:15
15	11/18/2003	322	02:30
15	11/18/2003	322	02:45
60	11/18/2003	322	03:00
15	11/18/2003	322	03:00
15	11/18/2003	322	03:15
15	11/18/2003	322	03:30
15	11/18/2003	322	03:45
60	11/18/2003	322	04:00
15	11/18/2003	322	04:00
15	11/18/2003	322	04:15
15	11/18/2003	322	04:30
15	11/18/2003	322	04:45
60	11/18/2003	322	05:00
15	11/18/2003	322	05:00
15	11/18/2003	322	05:15
15	11/18/2003	322	05:30
15	11/18/2003	322	05:45
60	11/18/2003	322	06:00
15	11/18/2003	322	06:00
15	11/18/2003	322	06:15
15	11/18/2003	322	06:30
60	11/18/2003	322	00:00
15	11/18/2003	322	00:00
15	11/20/2003	324	19:30
15	11/20/2003	324	19:45
60	11/20/2003	324	20:00
15	11/20/2003	324	20:00
15	11/20/2003	324	20:15
15	11/20/2003	324	20:30
15	11/20/2003	324	20:45
60	11/20/2003	324	21:00
15	11/20/2003	324	21:00
15	11/20/2003	324	21:15
15	11/20/2003	324	21:30
15	11/20/2003	324	21:45
60	11/20/2003	324	22:00
15	11/20/2003	324	22:00
15	11/20/2003	324	22:15
15	11/20/2003	324	22:30
15	11/20/2003	324	22:45
60	11/20/2003	324	23:00
15	11/20/2003	324	23:00
15	11/20/2003	324	23:15
15	11/20/2003	324	23:30
60	11/21/2003	325	01:00
15	11/21/2003	325	17:15

15	11/21/2003	325	17:30
15	11/21/2003	325	17:45
60	11/21/2003	325	18:00
15	11/21/2003	325	21:30
15	11/21/2003	325	21:45
60	11/21/2003	325	22:00
15	11/21/2003	325	22:00
15	11/21/2003	325	22:15
15	11/21/2003	325	22:30
15	11/21/2003	325	22:45
60	11/21/2003	325	23:00
15	11/21/2003	325	23:00
15	11/21/2003	325	23:15
15	11/21/2003	325	23:30
15	11/21/2003	325	23:45
60	11/21/2003	325	00:00
15	11/22/2003	326	00:15
15	11/22/2003	326	00:30
15	11/22/2003	326	00:45
60	11/22/2003	326	01:00
15	11/22/2003	326	01:00
15	11/22/2003	326	01:15
15	11/22/2003	326	01:30
15	11/22/2003	326	01:45
60	11/22/2003	326	02:00
15	11/22/2003	326	02:00
15	11/22/2003	326	02:15
15	11/22/2003	326	02:30
15	11/22/2003	326	02:45
60	11/22/2003	326	03:00
15	11/22/2003	326	03:00
15	11/22/2003	326	03:15
15	11/22/2003	326	03:30
15	11/22/2003	326	03:45
60	11/22/2003	326	04:00
15	11/22/2003	326	04:00
15	11/22/2003	326	04:15
15	11/22/2003	326	04:30
15	11/22/2003	326	04:45
60	11/22/2003	326	05:00
15	11/22/2003	326	05:00
15	11/22/2003	326	06:15
60	11/22/2003	326	20:00
15	11/22/2003	326	20:00
15	11/22/2003	326	20:15
15	11/22/2003	326	20:30
15	11/22/2003	326	20:45
60	11/22/2003	326	21:00

15	11/22/2003	326	21:00
15	11/22/2003	326	21:15
15	11/22/2003	326	21:30
15	11/22/2003	326	21:45
60	11/22/2003	326	22:00
15	11/22/2003	326	22:00
15	11/22/2003	326	22:15
15	11/22/2003	326	22:30
15	11/22/2003	326	22:45
60	11/22/2003	326	23:00
15	11/22/2003	326	23:00
15	11/22/2003	326	23:15
15	11/22/2003	326	23:30
15	11/22/2003	326	23:45
60	11/22/2003	326	00:00
15	11/22/2003	326	00:00
15	11/23/2003	327	00:15
15	11/23/2003	327	00:30
15	11/23/2003	327	00:45
60	11/23/2003	327	01:00
15	11/23/2003	327	01:00
15	11/23/2003	327	01:15
15	11/23/2003	327	01:30
15	11/23/2003	327	01:45
60	11/23/2003	327	02:00
15	11/23/2003	327	02:00
15	11/23/2003	327	02:15
15	11/23/2003	327	02:30
15	11/23/2003	327	02:45
60	11/23/2003	327	03:00
15	11/23/2003	327	03:00
15	11/23/2003	327	03:15
15	11/23/2003	327	03:30
15	11/23/2003	327	03:45
60	11/23/2003	327	04:00
15	11/23/2003	327	04:00
15	11/23/2003	327	04:15
15	11/23/2003	327	04:30
15	11/23/2003	327	04:45
60	11/23/2003	327	05:00
15	11/23/2003	327	05:00
15	11/23/2003	327	05:15
15	11/23/2003	327	05:30
15	11/23/2003	327	05:45
60	11/23/2003	327	06:00
15	11/23/2003	327	06:00
15	11/23/2003	327	06:15
15	11/23/2003	327	06:30

60	11/23/2003	327	00:00
15	11/23/2003	327	00:00
15	11/24/2003	328	00:45
60	11/24/2003	328	01:00
15	11/24/2003	328	01:00
15	11/24/2003	328	01:15
15	11/24/2003	328	01:30
15	11/24/2003	328	01:45
60	11/24/2003	328	02:00
15	11/24/2003	328	23:15
15	11/24/2003	328	23:30
15	11/24/2003	328	23:45
15	11/25/2003	329	00:15
15	11/25/2003	329	00:30
15	11/25/2003	329	00:45
60	11/25/2003	329	01:00
15	11/25/2003	329	01:00
15	11/25/2003	329	01:15
15	11/25/2003	329	01:30
15	11/25/2003	329	01:45
60	11/25/2003	329	02:00
15	11/25/2003	329	02:00
15	11/25/2003	329	02:15
15	11/25/2003	329	02:30
15	11/25/2003	329	02:45
60	11/25/2003	329	03:00
15	11/25/2003	329	03:00
15	11/25/2003	329	03:15
60	11/25/2003	329	04:00
15	11/25/2003	329	17:15
15	11/25/2003	329	17:30
15	11/25/2003	329	17:45
60	11/25/2003	329	18:00
15	11/25/2003	329	18:00
15	11/25/2003	329	18:15
60	11/25/2003	329	19:00
15	11/25/2003	329	22:45
60	11/25/2003	329	23:00
15	11/25/2003	329	23:15
60	11/25/2003	329	00:00
15	11/25/2003	329	00:00
15	11/26/2003	330	00:30
15	11/26/2003	330	00:45
60	11/26/2003	330	01:00
15	11/26/2003	330	01:15
15	11/26/2003	330	01:45
60	11/26/2003	330	02:00
15	11/26/2003	330	02:00

60	11/26/2003	330	03:00
60	11/26/2003	330	05:00
60	11/26/2003	330	06:00
15	11/26/2003	330	06:00
15	11/26/2003	330	18:15
15	11/26/2003	330	18:30
15	11/26/2003	330	18:45
60	11/26/2003	330	19:00
15	11/26/2003	330	19:00
15	11/26/2003	330	19:15
15	11/26/2003	330	19:30
15	11/26/2003	330	19:45
60	11/26/2003	330	20:00
15	11/26/2003	330	20:00
15	11/26/2003	330	20:15
15	11/26/2003	330	20:30
15	11/26/2003	330	20:45
60	11/26/2003	330	21:00
15	11/26/2003	330	21:00
15	11/26/2003	330	21:15
15	11/26/2003	330	21:30
15	11/26/2003	330	21:45
60	11/26/2003	330	22:00
15	11/26/2003	330	22:00
15	11/26/2003	330	22:15
15	11/26/2003	330	22:30
15	11/26/2003	330	22:45
60	11/26/2003	330	23:00
15	11/26/2003	330	23:00
15	11/26/2003	330	23:15
15	11/26/2003	330	23:30
15	11/26/2003	330	23:45
60	11/26/2003	330	00:00
15	11/26/2003	330	00:00
15	11/27/2003	331	00:15
60	11/27/2003	331	01:00
60	11/27/2003	331	00:00
15	11/27/2003	331	00:00
15	11/28/2003	332	23:15
15	11/28/2003	332	23:30
15	11/28/2003	332	23:45
15	11/29/2003	333	00:15
15	11/29/2003	333	00:30
15	11/29/2003	333	00:45
60	11/29/2003	333	01:00
15	11/29/2003	333	01:00
15	11/29/2003	333	01:15
15	11/29/2003	333	01:30

15	11/29/2003	333	01:45
60	11/29/2003	333	02:00
15	11/29/2003	333	02:00
60	11/29/2003	333	03:00
60	11/29/2003	333	04:00
15	11/29/2003	333	04:00
15	11/29/2003	333	04:15
15	11/29/2003	333	04:30
60	11/29/2003	333	05:00
15	11/29/2003	333	17:30
15	11/29/2003	333	17:45
60	11/29/2003	333	18:00
60	11/29/2003	333	19:00
60	11/29/2003	333	00:00
15	11/29/2003	333	00:00
15	11/30/2003	334	17:15
15	11/30/2003	334	17:30
15	11/30/2003	334	17:45
60	11/30/2003	334	18:00
15	11/30/2003	334	18:00
15	11/30/2003	334	18:15
60	11/30/2003	334	19:00
60	11/30/2003	334	23:00
15	11/30/2003	334	23:00
15	11/30/2003	334	23:15
15	11/30/2003	334	23:30
15	11/30/2003	334	23:45
60	12/01/2003	335	00:00
15	12/01/2003	335	00:00

December 2003

The following PAR data were changed in the raw files from small negative values ranging from -0002.6 to -0000.1 to read zero

Array	CalD	JuilanD	Time
15	12/01/2003	335	00:15
15	12/01/2003	335	00:45
60	12/01/2003	335	01:00
15	12/01/2003	335	01:00
15	12/01/2003	335	01:15
15	12/01/2003	335	01:30
15	12/01/2003	335	01:45
60	12/01/2003	335	02:00
15	12/01/2003	335	02:00
15	12/01/2003	335	02:15
15	12/01/2003	335	02:30

15	12/01/2003	335	02:45
60	12/01/2003	335	03:00
15	12/01/2003	335	03:00
15	12/01/2003	335	03:15
15	12/01/2003	335	03:30
15	12/01/2003	335	03:45
60	12/01/2003	335	04:00
60	12/01/2003	335	05:00
60	12/01/2003	335	06:00
15	12/01/2003	335	06:30
60	12/01/2003	335	19:00
15	12/01/2003	335	19:00
15	12/01/2003	335	19:15
15	12/01/2003	335	19:30
15	12/01/2003	335	19:45
60	12/01/2003	335	20:00
15	12/01/2003	335	20:00
15	12/01/2003	335	20:15
15	12/01/2003	335	20:30
15	12/01/2003	335	20:45
60	12/01/2003	335	21:00
15	12/01/2003	335	21:00
15	12/01/2003	335	21:15
15	12/01/2003	335	21:30
15	12/01/2003	335	21:45
60	12/01/2003	335	22:00
15	12/01/2003	335	22:00
60	12/02/2003	336	01:00
15	12/02/2003	336	17:15
15	12/02/2003	336	17:30
15	12/02/2003	336	17:45
60	12/02/2003	336	18:00
15	12/02/2003	336	18:00
15	12/02/2003	336	18:15
15	12/02/2003	336	18:30
15	12/02/2003	336	18:45
60	12/02/2003	336	19:00
15	12/02/2003	336	19:00
15	12/03/2003	337	00:30
15	12/03/2003	337	00:45
60	12/03/2003	337	01:00
15	12/03/2003	337	01:00
15	12/03/2003	337	01:15
15	12/03/2003	337	01:30
15	12/03/2003	337	01:45
60	12/03/2003	337	02:00
15	12/03/2003	337	02:00
15	12/03/2003	337	02:15

15	12/03/2003	337	02:30
15	12/03/2003	337	02:45
60	12/03/2003	337	03:00
15	12/03/2003	337	03:00
15	12/03/2003	337	03:15
15	12/03/2003	337	03:30
15	12/03/2003	337	03:45
60	12/03/2003	337	04:00
15	12/03/2003	337	04:00
15	12/03/2003	337	04:15
15	12/03/2003	337	04:30
15	12/03/2003	337	04:45
60	12/03/2003	337	05:00
15	12/03/2003	337	05:00
15	12/03/2003	337	05:15
15	12/03/2003	337	05:30
15	12/03/2003	337	05:45
60	12/03/2003	337	06:00
15	12/03/2003	337	06:00
15	12/03/2003	337	06:15
15	12/03/2003	337	06:30
15	12/03/2003	337	19:30
15	12/03/2003	337	19:45
60	12/03/2003	337	20:00
15	12/03/2003	337	20:00
15	12/03/2003	337	20:15
15	12/03/2003	337	20:30
15	12/03/2003	337	20:45
60	12/03/2003	337	21:00
15	12/03/2003	337	21:00
15	12/03/2003	337	21:15
15	12/03/2003	337	21:30
15	12/03/2003	337	21:45
60	12/03/2003	337	22:00
15	12/03/2003	337	22:00
15	12/03/2003	337	22:15
15	12/03/2003	337	22:30
15	12/03/2003	337	22:45
60	12/03/2003	337	23:00
15	12/03/2003	337	23:00
15	12/03/2003	337	23:15
15	12/03/2003	337	23:30
15	12/03/2003	337	23:45
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15	12/19/2003	353	21:15
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15	12/19/2003	353	22:45
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15	12/19/2003	353	23:45
60	12/20/2003	354	00:00
15	12/20/2003	354	00:00
15	12/20/2003	354	00:15
15	12/20/2003	354	00:30
15	12/20/2003	354	00:45
60	12/20/2003	354	01:00
15	12/20/2003	354	01:00
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15	12/20/2003	354	01:30
15	12/20/2003	354	01:45
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15	12/20/2003	354	02:15
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15	12/20/2003	354	03:15
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15	12/20/2003	354	03:45

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15	12/20/2003	354	19:45
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15	12/27/2003	361	21:15
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15	12/27/2003	361	23:15
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15	12/28/2003	362	01:15
15	12/28/2003	362	01:30
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15	12/28/2003	362	02:00
15	12/28/2003	362	02:15
15	12/28/2003	362	02:30
15	12/28/2003	362	02:45
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15	12/28/2003	362	04:45
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60	12/28/2003	362	18:00
15	12/28/2003	362	20:30
15	12/28/2003	362	20:45
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15	12/28/2003	362	21:00

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15	12/28/2003	362	21:45
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15	12/28/2003	362	22:15
15	12/28/2003	362	22:30
15	12/28/2003	362	22:45
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15	12/28/2003	362	23:00
15	12/28/2003	362	23:15
15	12/28/2003	362	23:30
15	12/28/2003	362	23:45
60	12/29/2003	363	00:00
15	12/29/2003	363	00:00
15	12/29/2003	363	00:15
15	12/29/2003	363	00:30
15	12/29/2003	363	00:45
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15	12/29/2003	363	03:15
15	12/29/2003	363	03:30
15	12/29/2003	363	03:45
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15	12/29/2003	363	04:00
15	12/29/2003	363	04:15
15	12/29/2003	363	04:30
15	12/29/2003	363	04:45
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15	12/29/2003	363	05:00
15	12/29/2003	363	05:15
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15	12/29/2003	363	05:45
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15	12/29/2003	363	06:00
15	12/29/2003	363	06:15
15	12/29/2003	363	06:30
15	12/29/2003	363	06:45

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15	12/29/2003	363	07:00
15	12/29/2003	363	17:30
15	12/29/2003	363	17:45
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15	12/29/2003	363	18:00
15	12/29/2003	363	18:15
15	12/29/2003	363	18:30
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15	12/29/2003	363	19:00
15	12/29/2003	363	19:15
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15	12/30/2003	364	02:00
15	12/30/2003	364	02:15
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60	12/30/2003	364	07:00
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15	12/30/2003	364	17:45
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15	12/30/2003	364	18:15
15	12/30/2003	364	18:30
15	12/30/2003	364	18:45
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15	12/30/2003	364	19:00
15	12/30/2003	364	19:15
15	12/30/2003	364	19:30
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15	12/30/2003	364	22:00
15	12/30/2003	364	22:15
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15	12/30/2003	364	22:45
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15	12/30/2003	364	23:15
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15	12/30/2003	364	23:45
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15	12/31/2003	365	01:00
15	12/31/2003	365	01:15
15	12/31/2003	365	01:30
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15	12/31/2003	365	02:45
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15	12/31/2003	365	03:15
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15	12/31/2003	365	04:15
15	12/31/2003	365	04:45
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60	12/31/2003	365	06:00
15	12/31/2003	365	06:00
15	12/31/2003	365	06:15
15	12/31/2003	365	06:45
60	12/31/2003	365	07:00
15	12/31/2003	365	17:30
15	12/31/2003	365	17:45
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15	12/31/2003	365	18:00

15	12/31/2003	365	18:15
15	12/31/2003	365	18:30
60	12/31/2003	365	19:00

Average humidity values exceed 100% on the following dates/times. The values remain unchanged as none exceeded the +/- 3% accuracy of the sensor:

Station	Date	J Date	Time	Array	Humidity Value
delsjmet	12/28/2003	362	22:15	15	101
delsjmet	12/28/2003	362	22:30	15	101
delsjmet	12/28/2003	362	22:45	15	101
delsjmet	12/28/2003	362	23:00	15	101
delsjmet	12/28/2003	362	23:00	60	101
delsjmet	12/28/2003	362	23:15	15	101
delsjmet	12/28/2003	362	23:30	15	101
delsjmet	12/28/2003	362	23:45	15	101
delsjmet	12/29/2003	363	00:00	15	101
delsjmet	12/29/2003	363	00:00	60	101
delsjmet	12/29/2003	363	00:15	15	101
delsjmet	12/29/2003	363	00:30	15	101
delsjmet	12/29/2003	363	00:45	15	101
delsjmet	12/29/2003	363	01:00	15	101
delsjmet	12/29/2003	363	01:00	60	101
delsjmet	12/29/2003	363	01:15	15	101
delsjmet	12/29/2003	363	01:30	15	101
delsjmet	12/29/2003	363	01:45	15	102
delsjmet	12/29/2003	363	02:00	15	101
delsjmet	12/29/2003	363	02:00	60	101
delsjmet	12/29/2003	363	02:15	15	101
delsjmet	12/29/2003	363	02:30	15	101
delsjmet	12/29/2003	363	02:45	15	101
delsjmet	12/29/2003	363	03:00	15	101
delsjmet	12/29/2003	363	03:00	60	101
delsjmet	12/29/2003	363	03:15	15	101
delsjmet	12/29/2003	363	03:30	15	101
delsjmet	12/29/2003	363	03:45	15	101
delsjmet	12/29/2003	363	04:00	15	101
delsjmet	12/29/2003	363	04:00	60	101
delsjmet	12/29/2003	363	04:15	15	101
delsjmet	12/29/2003	363	04:30	15	102
delsjmet	12/29/2003	363	04:45	15	102
delsjmet	12/29/2003	363	05:00	15	101
delsjmet	12/29/2003	363	05:00	60	102
delsjmet	12/29/2003	363	05:15	15	101
delsjmet	12/29/2003	363	05:30	15	102
delsjmet	12/29/2003	363	05:45	15	102
delsjmet	12/29/2003	363	06:00	15	102
delsjmet	12/29/2003	363	06:00	60	102

delsjmet	12/29/2003	363	06:15	15	102
delsjmet	12/29/2003	363	06:30	15	102
delsjmet	12/29/2003	363	06:45	15	102
delsjmet	12/29/2003	363	07:00	15	102
delsjmet	12/29/2003	363	07:00	60	102
delsjmet	12/29/2003	363	07:15	15	102
delsjmet	12/29/2003	363	07:30	15	102
delsjmet	12/29/2003	363	07:45	15	102
delsjmet	12/29/2003	363	08:00	15	102
delsjmet	12/29/2003	363	08:00	60	102
delsjmet	12/29/2003	363	08:15	15	101
delsjmet	12/29/2003	363	08:30	15	101
delsjmet	12/29/2003	363	08:45	15	101
delsjmet	12/29/2003	363	09:00	60	101

Maximum relative humidity values exceed 100% on the following dates/times. The values remain unchanged as none exceeded the +/- 3% accuracy of the sensor:

Station	Date	J Date	Time	RHMax	Array
delsjmet	12/24/2003	358	05:30	101	15
delsjmet	12/24/2003	358	05:45	101	15
delsjmet	12/24/2003	358	06:00	101	60
delsjmet	12/24/2003	358	10:15	101	15
delsjmet	12/24/2003	358	10:30	101	15
delsjmet	12/24/2003	358	11:00	101	60
delsjmet	12/25/2003	359	00:00	101	144
delsjmet	12/28/2003	362	21:00	101	60
delsjmet	12/28/2003	362	21:00	101	15
delsjmet	12/28/2003	362	21:15	101	15
delsjmet	12/28/2003	362	21:45	101	15
delsjmet	12/28/2003	362	22:00	101	60
delsjmet	12/28/2003	362	22:00	101	15
delsjmet	12/28/2003	362	22:15	101	15
delsjmet	12/28/2003	362	22:30	101	15
delsjmet	12/28/2003	362	22:45	101	15
delsjmet	12/28/2003	362	23:00	101	60
delsjmet	12/28/2003	362	23:00	101	15
delsjmet	12/28/2003	362	23:15	101	15
delsjmet	12/28/2003	362	23:30	101	15
delsjmet	12/28/2003	362	23:45	101	15
delsjmet	12/29/2003	363	00:00	102	60
delsjmet	12/29/2003	363	00:00	102	15
delsjmet	12/29/2003	363	00:00	102	144
delsjmet	12/29/2003	363	00:15	101	15
delsjmet	12/29/2003	363	00:30	101	15
delsjmet	12/29/2003	363	00:45	101	15
delsjmet	12/29/2003	363	01:00	101	60
delsjmet	12/29/2003	363	01:00	101	15

delsjmet	12/29/2003	363	01:15	102	15
delsjmet	12/29/2003	363	01:30	102	15
delsjmet	12/29/2003	363	01:45	102	15
delsjmet	12/29/2003	363	02:00	102	15
delsjmet	12/29/2003	363	02:00	102	60
delsjmet	12/29/2003	363	02:15	102	15
delsjmet	12/29/2003	363	02:30	102	15
delsjmet	12/29/2003	363	02:45	102	15
delsjmet	12/29/2003	363	03:00	102	60
delsjmet	12/29/2003	363	03:00	102	15
delsjmet	12/29/2003	363	03:15	102	15
delsjmet	12/29/2003	363	03:30	102	15
delsjmet	12/29/2003	363	03:45	102	15
delsjmet	12/29/2003	363	04:00	101	15
delsjmet	12/29/2003	363	04:00	102	60
delsjmet	12/29/2003	363	04:15	102	15
delsjmet	12/29/2003	363	04:30	102	15
delsjmet	12/29/2003	363	04:45	102	15
delsjmet	12/29/2003	363	05:00	102	15
delsjmet	12/29/2003	363	05:00	102	60
delsjmet	12/29/2003	363	05:15	102	15
delsjmet	12/29/2003	363	05:30	102	15
delsjmet	12/29/2003	363	05:45	102	15
delsjmet	12/29/2003	363	06:00	102	15
delsjmet	12/29/2003	363	06:00	102	60
delsjmet	12/29/2003	363	06:15	102	15
delsjmet	12/29/2003	363	06:30	102	15
delsjmet	12/29/2003	363	06:45	102	15
delsjmet	12/29/2003	363	07:00	102	15
delsjmet	12/29/2003	363	07:00	102	60
delsjmet	12/29/2003	363	07:15	102	15
delsjmet	12/29/2003	363	07:30	102	15
delsjmet	12/29/2003	363	07:45	102	15
delsjmet	12/29/2003	363	08:00	102	15
delsjmet	12/29/2003	363	08:00	102	60
delsjmet	12/29/2003	363	08:15	102	15
delsjmet	12/29/2003	363	08:30	102	15
delsjmet	12/29/2003	363	08:45	101	15
delsjmet	12/29/2003	363	09:00	102	60
delsjmet	12/30/2003	364	00:00	102	144

Minimum relative humidity values exceed 100% on the following dates/times. The values remain unchanged as none exceeded the +/- 3% accuracy of the sensor:

Station	Date	J Date	Time	RHMin	Array
delsjmet	12/28/2003	362	23:45	101	15
delsjmet	12/28/2003	362	23:30	101	15
delsjmet	12/28/2003	362	23:00	101	15

delsjmet	12/29/2003	363	06:30	102	15
delsjmet	12/29/2003	363	07:45	102	15
delsjmet	12/29/2003	363	07:15	102	15
delsjmet	12/29/2003	363	05:45	101	15
delsjmet	12/29/2003	363	07:00	101	15
delsjmet	12/29/2003	363	04:30	101	15
delsjmet	12/29/2003	363	04:45	101	15
delsjmet	12/29/2003	363	05:30	101	15
delsjmet	12/29/2003	363	06:00	101	15
delsjmet	12/29/2003	363	06:15	101	15
delsjmet	12/29/2003	363	06:45	101	15
delsjmet	12/29/2003	363	07:00	101	60
delsjmet	12/29/2003	363	07:30	101	15
delsjmet	12/29/2003	363	08:00	101	15
delsjmet	12/29/2003	363	08:00	101	60
delsjmet	12/29/2003	363	05:00	101	15
delsjmet	12/29/2003	363	01:45	101	15
delsjmet	12/29/2003	363	02:30	101	15
delsjmet	12/29/2003	363	03:30	101	15
delsjmet	12/29/2003	363	05:15	101	15
delsjmet	12/29/2003	363	06:00	101	60
delsjmet	12/29/2003	363	02:45	101	15
delsjmet	12/29/2003	363	04:15	101	15
delsjmet	12/29/2003	363	05:00	101	60
delsjmet	12/29/2003	363	02:15	101	15
delsjmet	12/29/2003	363	03:00	101	15
delsjmet	12/29/2003	363	03:00	101	60
delsjmet	12/29/2003	363	03:15	101	15
delsjmet	12/29/2003	363	03:45	101	15
delsjmet	12/29/2003	363	01:00	101	15
delsjmet	12/29/2003	363	01:15	101	15
delsjmet	12/29/2003	363	02:00	101	15
delsjmet	12/29/2003	363	04:00	101	15
delsjmet	12/29/2003	363	04:00	101	60
delsjmet	12/29/2003	363	08:30	101	15
delsjmet	12/29/2003	363	00:30	101	15
delsjmet	12/29/2003	363	08:15	101	15
delsjmet	12/29/2003	363	01:30	101	15
delsjmet	12/29/2003	363	02:00	101	60
delsjmet	12/29/2003	363	00:15	101	15
delsjmet	12/29/2003	363	00:00	101	15

12) Deleted 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.

August:

The average wind speed, average wind direction and standard wind direction data were deleted from the daily array (144) on 8/16/04 00:00 (which is the end of day readings for 8/15/04) due to missing hourly wind values on 8/15/2004 2100 in array 60.

The following data loss for all parameters occurred at the time of the new NERR program upload on November 14, 2003. Values were removed for the following:

ArrayID CalD JulianD Time
 15 14 318 1100 Missing Array 15 data (15 min. data for the following parameters: min/max temp & time, min/max relative humidity & time, min/max barometric pressure & time, min/max wind speed & time, min/max wind direction & time, wind direction standard deviation, wind speed, and total PAR.

60 14 318 1100 Missing Array 60 (Hourly Averages except total precipitation)
 144 15 319 0000 Missing Array 144 (Daily Averages except min wind speed and total precipitation)

The following wind speed data were removed. Values are nonsensically high and coincide with the upload of the new MET program:

STNCODE	SMPDATE	USRCODES	SMPLETIME	CLASS	WSpd
delsjmet	11/14/2003	318	11:00	15	47.2
delsjmet	11/14/2003	318	11:15	15	43
delsjmet	11/14/2003	318	11:30	15	41.2
delsjmet	11/14/2003	318	11:45	15	37.2
delsjmet	11/14/2003	318	12:00	15	42.2
delsjmet	11/14/2003	318	12:00	60	40.9

The following maximum wind data and times were removed. Values are nonsensically high and coincide with the upload of the new MET program:

STNCODE	SMPDATE	USRCODES	SMPLETIME	CLASS	MaxWSpd
delsjmet	11/14/2003	318	11:15	15	76.9
delsjmet	11/14/2003	318	11:30	15	83.9
delsjmet	11/14/2003	318	11:45	15	83.3

delsjmet	11/14/2003	318	12:00	15	69.7
delsjmet	11/14/2003	318	12:00	60	83.9

The following minimum wind data and times were removed. Values are nonsensically high and coincide with the upload of the new MET program:

STNCODE	SMPLDATE	USRCODES	SMPLTIME	CLASS	MinWSpd
delsjmet	11/14/2003	318	11:15	15	17.3
delsjmet	11/14/2003	318	11:30	15	19
delsjmet	11/14/2003	318	11:45	15	12.2
delsjmet	11/14/2003	318	12:00	15	15.2
delsjmet	11/14/2003	318	12:00	60	12.2

13) 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 <http://www.nerrsdata.org/get/landing.cfm> throughout the fall of 2022.

August:

Average wind direction and wind speed data were missing from the hourly (array 60) data for an unknown reason.
See the Deleted Data section for more information.

The following error message was generated due to partial monthly data being run through the WDMP due to the upload of the new NERR MET program which changed the data format, thus eliminating the use of the WDMP:

ArrayID	CalD	JulianD	Time	Error Message
150	14	318	915	Missing 150 Array data (15 minute data) from 14 (318) 915 to 30 (334) 2400
101	14	318	1000	Missing 101 Array data (Hourly Averages) from 14 (318) 1000 to 30 (334) 2400
102	14	318	1000	Missing 102 Array data (Hourly Average Wind Parameters) from 14 (318) 1000 to 30 (334) 2300

241	14	318	2400	Missing 241 data (Daily Averages) from 14 (318) 2400 to 29 (333) 2400
242	14	318	2400	Missing 242 data (Daily Average Wind Parameters) from 14 (318) 2400 to 29 (333) 2400
243	14	318	2400	Missing 243 data (Daily Max/Time Values) from 14 (318) 2400 to 29 (333) 2400
244	14	318	2400	Missing 244 data (Daily Min/Time Values) from 14 (318) 2400 to 29 (333) 2400

The correct information regarding missing data are as follows: Missing 150 array data from November 14, 2004 (318) 915-1045, 101/102 data from 1000 to 1100, and daily averages.

December:

Data loss on 12/23/2003 from 09:45-10:00, possibly due to download related error

14) Other Remarks/notes:

On 10/10/2023 this dataset was updated to include embedded QAQC flags for anomalous/suspect data. System-wide monitoring data beginning in 2007 were processed to allow for QAQC flags and codes to be embedded in the data files rather than detailed in the metadata alone (as in the anomalous/suspect, deleted, and missing data sections above). Prior to 2007, rejected data were deleted from the dataset so they are unavailable to be used at all, but suspect data were only noted in the metadata document. Suspect data flags <1> were embedded retroactively in order to allow suspect data to be easily identified and filtered from the dataset if desired for analysis and reporting purposes. No other flags or codes were embedded in the dataset and users should still refer to the detailed explanations above for more information.

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.

a) LiCor:

Prior to the installation of the new NERR_4.CSI program on 11/14/2003, all values less than 0 were altered in the raw data to read 0. These values may indicate an incorrect multiplier, calibration problems, or a sensor malfunction. Because these values are changed in the raw data, we cannot confirm that they are all valid points.

b) Relative Humidity:

Prior to the installation of the new NERR_4.CSI program on 11/14/2003, all values over 100% were altered in the raw data to read 100%. These values may indicate an supersaturated air, calibration problems, or a sensor malfunction. Because these values are changed in the raw data, we cannot confirm that they are all valid points.

c) 2003 Daily, Monthly, and Annual Precipitation Totals

January Precipitation Totals (mm)

01	12.700
02	2.032
03	8.128
05	.254
06	1.270
08	1.270
29	1.524
30	.254
31	.508

Monthly Total (mm): 27.94

February Precipitation Totals (mm)

01	9.906
04	8.382
07	1.524
09	7.620
10	3.048
15	1.524
18	.254
19	14.224
20	.762
21	7.874
22	39.116
23	6.858
27	1.270
28	7.112

Monthly Total (mm): 109.474

March Precipitation Totals (mm)

2	9.906
3	.254
5	5.588
6	10.922
13	1.270
16	9.398
17	12.192
20	15.748
21	4.318
22	.254
26	6.604
28	1.778
29	13.208
30	4.572

Monthly Total (mm): 96.012

April Precipitation Totals (mm)

5	1.016
7	20.828
9	26.670
10	3.556
11	29.972
12	6.096
18	8.636
21	1.524
22	.508
25	4.318
26	2.286

Monthly Total (mm): 105.41

May Precipitation Totals (mm)

2	10.160
5	.508
6	1.016
7	4.318
8	.762
9	3.810
10	1.778
11	.762
16	48.768
18	.508

21	8.382
22	1.778
23	9.144
24	.508
25	20.066
26	32.004
27	2.032
28	5.588
29	1.016
31	4.318

Monthly Total (mm): 157.226

June Precipitation Totals (mm)

3	8.636
4	11.938
5	9.398
7	55.372
9	.508
11	6.350
12	7.874
13	16.764
17	10.160
18	24.384
19	10.414
20	35.814
21	19.304
27	3.048

Monthly Total (mm): 219.964

July Precipitation Totals (mm)

1	.762
2	22.606
3	41.910
5	1.016
6	4.572
9	11.684
10	8.636
12	1.778
13	7.112
14	15.240
18	.254
22	8.636
23	2.540
24	4.572

28	23.114
29	6.350
30	.762

Monthly Total (mm): 161.544

August Precipitation Totals (mm)

2	.508
3	2.794
4	5.080
5	35.560
6	7.874
7	16.764
9	.254
10	6.350
12	5.842
13	.254
16	15.494
17	3.302
22	.508
26	1.270
29	5.842
30	6.604

Monthly Total (mm): 114.3

September Precipitation Totals (mm)

1	11.430
2	.508
3	6.858
4	8.128
7	.254
12	10.414
13	6.858
14	.762
15	1.778
18	21.590
19	4.318
23	28.448
25	.254
27	9.652
28	.762

Monthly Total (mm): 112.014

October Precipitation Totals (mm)

9	.254
11	.254
12	1.270
14	15.494
15	2.032
17	1.524
22	3.302
25	.254
26	1.524
27	24.638
28	7.366
29	25.908
31	.254

Monthly Total (mm): 84.074

November Precipitation Totals (mm)

4	0.254
5	22.86
6	27.178
12	18.034
13	.254
18	.254
19	33.528
20	5.334
23	0.254
24	3.556
28	14.224

Monthly Total (mm): 125.73

December Precipitation Totals (mm)

5	29.21
7	0.508
8	1.524
9	1.27
10	3.048
11	31.496
15	26.67
18	8.636
25	33.782
30	0.508
31	1.778

Monthly Total (mm): 138.43

2003 Annual Total (mm): 1452.118