

Weeks Bay (WKB) NERR Meteorological Metadata
January – December 2002
First submission: 04/01/03
Latest Update: **April 19, 2023**

I. Data Set & Research Descriptors

1) Principal investigator & contact persons:

Contact Persons:

L. G. Adams, Manager, Lgadams@dcnr.state.al.us
Scott Phipps, Research Coordinator, Sphipps@dcnr.state.al.us
Eric Brunden, Technician, ebrunden@yahoo.com

Address:

Weeks Bay NERR
11300 U.S. Hwy 98
Fairhope, AL 36532
ph: (334) 928-9792

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 Campbell SM716 memory module for long-term data storage. From January through September, Campbell PC208W software was used to automatically dial up the weather station via a Campbell Com200 modem and upload data at five-minute intervals. Real time data management (RTDM) software produced joint photographic experts group (JPEG) image files displaying weather conditions at time of collection. The JPEG image files are exported to a network server maintained by Faulkner Community College in Fairhope, AL. and are available for viewing using an Internet connection. Monthly, from October through December, the SM716 memory module was physically removed and brought into the Weeks Bay NERR laboratory and connected to a computer for data set download via the Campbell PC208W software program. This procedure was required as a result of telephone line damage incurred during tropical storm Isidore, September 26th.

At the end of the year monthly data files were compiled and the CDMO Weather Data Management Program (WDMP) was used to convert the files to an Access database. Data files for the months of November and December are unavailable (see section 12). The WDMP 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.

b) Data Collection Schedule

i) Data is collected in the following formats:

- 1) 15 minute data are instantaneous readings except for PAR and precipitation data that are totalized from 5 second samples sorted by date and time. (Arrays 150 and 151)
- 2) Hourly averages (Arrays 101 and 102) are calculated from 5 second samples sorted by date and time except for PAR and precipitation data that are hourly totals calculated from 15 minute totals (Arrays 105 and 106).
- 3) Daily average (arrays 241 and 242), maximum with time, and minimum with time (arrays 243 and 244) are calculated from 5 second samples sorted by date and time except for PAR and precipitation data which are 24 hour totals calculated from hourly totals (arrays 245 and 246).

ii) 15 minute sample point parameters: Date, Time, Air Temperature (°C), Relative Humidity (%), LiCor (PAR), Barometric Pressure (mb), Wind Speed (m/s), Wind Direction (Array 150); Rainfall (mm) (Array 151)

iii) Hourly average parameters: Date, Time, Air Temperature (°C), Relative Humidity (%), Barometric Pressure (mb) (Array 101); Wind Speed (m/s), Wind Direction, Wind Speed Maximum (Array 102)

iv) Hourly total parameters: LiCor (PAR) (Array 105); Rainfall (mm) (Array 106)

v) Daily Average parameters: Date, Time, Air Temperature (°C), Relative Humidity (%), Barometric Pressure (mb) (Array 241); Wind Speed (m/s), Wind Direction, Wind Direction Standard Deviation (using Yamartino's Algorithm) (Array 242)

vi) Daily Total parameter: LiCor (PAR) (Array 245); Rainfall (mm) (Array 246)

vii) Daily Maximum parameters: Date, Time, Air Temperature (°C), Time, Relative Humidity (%), Time, LiCor (PAR), Time, Barometric Pressure (mb), Time, Wind Speed (m/s), Time, Battery Voltage, Time (Array 243)

viii) Daily Minimum parameters: Date, Time, Air Temperature (°C), Time, Relative Humidity (%), Time, LiCor (PAR), Time, Barometric Pressure (mb), Time, Wind Speed (m/s), Time, Battery Voltage, Time (Array 244)

c) Error/Anomalous Data Criteria

Air Temp:

- 15 min sample greater than max for the day
- 15 min sample less than the min for the day
- 15 min sample greater than 3.0 °C from the previous 15 minutes
- Max and Min values not recorded for the day
- 1-hour average greater than 10% above the greatest 15 min sample recorded in the hour

Relative Humidity:

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

Rainfall:

- Precipitation greater than 5 mm in 15 minutes
- No precipitation for the month

Wind Speed:

- Wind speed greater than 30 m/s
- Wind speed less than 0.5 m/s

Wind Direction:

- Wind direction greater than 360 degrees
- Wind direction less than 0 degrees

Pressure:

- Pressure greater than 1040 mb or less than 980 mb
- Pressure changes greater than 5 mb per hour
- Max and Min values not recorded for the day
- 1-hour average greater than 10% above the greatest 15 min sample recorded in the hour

Time:

- 15-minute interval not recorded

For all data:

- Duplicate interval data

3) Research objectives:

The principle objective is to record long-term meteorological data for Weeks Bay in order to observe any environmental changes or trends over time. Samples were taken every 5 seconds and 15 minutes.

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. Periodically, sensors on the weather station are inspected for damage or debris. If any is found, it is repaired and/or cleaned. The sensors and tower were obtained in the fall of 1996. However the sensors were not installed until the fall of 1998. Sensors have not been calibrated since. The barometric pressure sensor was new when deployed in August 2001. There were no other analyses done on the meteorological data at present.

5) Site location and character:

The Weeks Bay National Estuarine Research Reserve is located near the Gulf coast, southeast of the city of Fairhope, Alabama. Weeks Bay (30° 23' N, 87° 50' W) is a small, shallow, microtidal sub-estuary, located on the eastern shore of Mobile Bay in the northern Gulf of Mexico. The bay is nearly diamond shaped, and its longitudinal axis (3.4 km long) runs nearly north-south from the head, where the Fish River flows in, to the mouth, where water is exchanged with Mobile Bay. Its widest point (3.1 km) is located near the center of the estuary, where the Magnolia River discharges into eastern side of Weeks Bay. Average depth is 1.4 m, although there are two areas where depths are significantly greater. The first is in the mouth of the bay, where the average depth is 6 m; the second is about 100 m upstream of the mouth of the Fish River, where the average depth is 3.5 m. Tides are principally diurnal, and have a mean range of 0.4 m.

The Fish River drainage basin encompasses 14300 hectares and contributes approximately 73% to the total incoming freshwater flow with the Magnolia River supplying the rest. Mean combined discharge is 9 cubic meters per second; although freshets up to 4 times larger occur throughout the year. These characteristics result in a freshwater residence time of 13 days under average discharge conditions, with a range from 0.5 to 100 days. Salinity in Weeks Bay varies substantially both temporally and spatially. During periods of high flow in the river, salinity in the bay may be fresh from the head to the mouth, except in the deeper holes of the estuary that are not as easily flushed. However, during periods of low flow in the river, wind velocity and tidal stage are strong factors influencing salinity structure. Salinity greater than 25 ppt is infrequently observed in Weeks Bay and is usually restricted to the southern portion of the estuary near the mouth.

The weather station is located on a reserve owned pier (lat 30° 24.89'N, long 87° 49.56'W) just south of the highway 98 bridge, on the west side of the mouth of the Fish River. Wind sentry, tipping bucket rain gauge, temperature/RH probe, and barometric pressure sensor are mounted along an aluminum tower between 4.8 and 7.6 meters above water surface. LI-COR quantum sensor was not deployed until April 1, 2002. Approximately 100 meters upstream is an YSI datalogger deployment site for the continuous monitoring of water quality.

6) Data collection period:

Weather data was collected from January 1 through December 31, 2002. This is the second year that Weeks Bay NERR compiled weather data for the System Wide Monitoring Program.

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 Geological Survey of Alabama, in cooperation with the United States Geological Survey, maintains two rain gauges within the Weeks Bay watershed. One is located at the highway 98 Magnolia River overpass; the other is located at the highway 104 Fish River overpass.

The following researchers have directly requested and received meteorological data generated from the Weeks Bay weather station for use as either primary or ancillary information significant to their respective projects.

Mastioff, Gerald. Case Western Reserve University. Erosion and transport of fine

sediments from watersheds tributary to NERR estuaries.

Chin, Yu-Ping. Ohio State University. Distribution and phototransformation of non-point source agricultural pesticides in freshwater and marine NERR wetlands.

Caffrey, Jane. University of West Florida. Modeling estuarine ecosystem trophic status using continuous nitrate and water quality data.

Landers, Stephen. Troy State University. Environmental factors affecting the distribution and abundance of the benthic protozoological assemblages in Weeks Bay NERR.

Wilson, Chris. Case Western Reserve University. The movement of sediment and radionuclide through Weeks Bay NERR.

II. Physical Structure Descriptors

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

Li-Cor 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: Unknown

Wind Sentry

Model # 03001

Range: 0 - $50\ \text{m/s}$; 360° mechanical

Date of last calibration: unknown

Temperature and Relative Humidity

Model #: HMP35C

Operating Temperature: -20 to 60°C

Temperature Measurement Range: -35 to 50°C

Temperature Accuracy: $\pm 0.4\ ^{\circ}\text{C}$ over range of -24° to 48°C ; ± 0.9 over range of -38° to 53°

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

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

Date of Last calibration: Unknown

Barometric Sensor

Model # CS-105

Operating Range: Pressure : 600 to $1060\ \text{mb}$

Temperature: -40 to 60°C

Humidity: non-condensing

Accuracy: ± 0.5 to $6.0\ \text{mb}$ ($+20$ to 60°C)

Stability: $\pm 0.1\ \text{mb}$ per year

Date of Last calibration: new

Tipping Bucket Rain Gauge

Model #: TE 525
Range: 0.1 mm
Accuracy: 1.0% at <2"/hr
Date of Last calibration: unknown

10) Coded variable indicator and variable code definitions:

wb=Weeks Bay

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.

General:

Wind speeds of less than 0.5m/s in the entire data set are thought to be correct.
Erroneous and suspect data was replaced with code 55555, indicating to the Weather Data Management Program (WDMP) that the original values were altered by the technician.

LiCor Quantum Sensor (solar radiation) was not deployed and collecting accurate data until April 24, 2002 at 13:15, all solar radiation data prior to this was replace with code 55555.

Array 244 battery voltage minimums were not recorded for the year, thought to be due to a programming error. All battery voltage minimums were replaced with code 55555.

Explanations of additional data alterations for each month are found under "specifics"
See section 12 for information regarding missing data.

Specifics:

January 2002

The following data appear to be correct:

Array	Day	Date	Time	Error Message
150	17	17	1600	Air temp difference from 17 (17) 1600 (19.458) to 17 (17) 1615 (15.583) is greater than 3.0 degrees C

150 17 17 1600 Rel hum difference from 17 (17) 1600 (68.584) to 17 (17) 1615 (97.34) is greater than 25%

Original Li-Cor quantum sensor data for the dates and times listed below were replaced with code 55555. Original data was erroneous due to missing sensor.

Array	Day	Date	Time	Error Message
150	3	3	15	Technician changed 150 Array data at 3 (3) 15 to 31 (31) 2400
243	3	3	2400	Technician changed 243 Array data at 3 (3) 2400 to 31 (31) 2400
244	3	3	2400	Technician changed 244 Array data at 3 (3) 2400 to 31 (31) 2400

February 2002

The following data appear to be correct:

Array	Day	Date	Time	Error Message
150	1	32	600	Air temp difference from 1 (32) 600 (18.12) to 1 (32) 615 (14.888) is greater than 3.0 degrees C
150	19	50	845	Air temp difference from 19 (50) 845 (12.793) to 19 (50) 900 (17.976) is greater than 3.0 degrees C
150	20	51	745	Air temp difference from 20 (51) 745 (19.054) to 20 (51) 800 (14.985) is greater than 3.0 degrees C
150	21	52	1630	Rel hum difference from 21 (52) 1630 (37.741) to 21 (52) 1645 (82.118) is greater than 25%
151	20	51	800	Precip difference from 20 (51) 800 (10.922) to 20 (51) 815 (5.588) is greater than 5 mm

Original Li-Cor quantum sensor data for the dates and times listed below were replaced with code 55555. Original data was erroneous due to missing sensor.

Array	Day	Date	Time	Error Message
150	1	32	15	Technician changed 150 Array data at 1 (32) 15 to 28 (59) 2400
243	1	32	2400	Technician changed 243 Array data at 1 (32) 2400 to 28 (59) 2400

244	1	32	2400	Technician changed 244 Array data at 1 (32) 2400 to 28 (59) 2400
-----	---	----	------	--

Relative humidity data for the dates and times listed below were replaced with code 55555. Original data set contained spurious negative values, reason unknown.

Array	Day	Date	Time	Error Message
150	25	56	1600	Technician changed 150 Array data at 25 (56) 1600 to 26 (57) 1215

101	25	56	1600	Technician changed 101 Array data from 25 (56) 1600 to 26 (57) 1200
-----	----	----	------	---

Maintenance was performed on the temp/rhum sensor from February 25 1545 through February 26 1230, resulting in the output of -99999 for air temperature for the following dates and times:

Array	
150	February 25 1545 through February 26 1045
101	February 25 1600 through February 26 1100
241	February 25 at 2400
244	February 25 at 2400

Erroneous readings for relative humidity and temperature data were recorded due to sensor maintenance and were deleted for the dates and times listed below:

Array	Day	Date	Time	Error Message
150	25	56	1245	Technician changed relative humidity data in 150 Array data from 25 (56) 1245 to 26 (57) 1230

101	25	56	1600	Technician changed relative humidity data in 101 Array data from 25 (56) 1600 to 26 (57) 1200
-----	----	----	------	---

150	26	57	1100	Technician changed temperature data in 150 Array data from 26 (57) 1100 to 26 (57) 1230
-----	----	----	------	--

101	26	57	1200	Technician changed temperature data in 101 Array data at 26 (57) 1200
-----	----	----	------	---

244	25	56	2400	Technician changed relative humidity data in 241 array at 25 (56) 2400
-----	----	----	------	--

March 2002

The following data appear to be correct:

Array	Day	Date	Time	Error Message
150	12	71	1215	Air temp difference from 12 (71) 1215 (20.07) to 12 (71) 1230 (15.513) is greater than 3.0 degrees C

150	5	64	830	Rel hum difference from 5 (64) 830 (76.59) to 5 (64) 845 (46.126) is greater than 25%
-----	---	----	-----	---

151	12	71	1230	Precip difference from 12 (71) 1230 (7.366) to 12 (71) 1245 (1.524) is greater than 5 mm
-----	----	----	------	--

151	26	85	1045	Precip difference from 26 (85) 1045 (6.858) to 26 (85) 1100 (1.27) is greater than 5 mm
-----	----	----	------	---

Original Li-Cor quantum sensor data for the dates and times listed below were replaced with code 55555. Original data was erroneous due to missing sensor.

Array	Day	Date	Time	Error Message
150	1	60	15	Technician changed 150 Array data from 1 (60) 15 to 31 (90) 615

150	31	90	1100	Technician changed 150 Array data from 31 (90) 1100 to 31 (90) 1300
-----	----	----	------	---

243	1	60	2400	Technician changed 243 Array data from 1 (60) 2400 to 30 (89) 2400
-----	---	----	------	--

244	1	60	2400	Technician changed 244 Array data from 1 (60) 2400 to 30 (89) 2400
-----	---	----	------	--

Although not reported by the WDMP, wind direction data in array 150 on March 22 @ 745 below were converted to zero. Original data erroneously reported as negative value (-.09535), reason unknown.

April 2002
None

May 2002
The following data appear to be correct:

Array	Day	Date	Time	Error Message
150	13	133	1730	Air temp difference from 13 (133) 1730 (27.538) to 13 (133) 1745 (24.456) is greater than 3.0 degrees C

June 2002

The following data appear to be correct:

Array	Day	Date	Time	Error Message
150	14	165	1530	Air temp difference from 14 (165) 1530 (28.53) to 14 (165) 1545 (23.306) is greater than 3.0 degrees C
150	20	171	1145	Air temp difference from 20 (171) 1145 (29.213) to 20 (171) 1200 (26.198) is greater than 3.0 degrees C
150	21	172	1230	Air temp difference from 21 (172) 1230 (27.605) to 21 (172) 1245 (22.982) is greater than 3.0 degrees C
150	21	172	1445	Air temp difference from 21 (172) 1445 (27.412) to 21 (172) 1500 (24.261) is greater than 3.0 degrees C
150	26	177	1730	Air temp difference from 26 (177) 1730 (26.332) to 26 (177) 1745 (23.25) is greater than 3.0 degrees C
150	4	155	1200	Rel hum difference from 4 (155) 1200 (72.88) to 4 (155) 1215 (47.562) is greater than 25%
151	27	178	2245	Precip difference from 27 (178) 2245 (1.27) to 27 (178) 2300 (8.382) is greater than 5 mm

July 2002

The following data appear to be correct

Array	Day	Date	Time	Error Message
150	1	182	1730	Air temp difference from 1 (182) 1730 (29.603) to 1 (182) 1745 (24.847) is greater than 3.0 degrees C
150	3	184	2000	Air temp difference from 3 (184) 2000 (29.274) to 3 (184) 2015 (25.189) is greater than 3.0 degrees C
150	7	188	2045	Air temp difference from 7 (188) 2045 (26.871) to 7 (188) 2100 (22.786) is greater than 3.0 degrees C
150	24	205	1500	Air temp difference from 24(205) 1500 (29.067) to 24 (205) 1515 (23.976) is greater than 3.0 degrees C

Rain data for the dates and times listed below were replaced with 55555. Vandalism at weather station resulting in severed tipping bucket cable.

Array	Day	Date	Time	Error Message
151	3	184	2130	Technician changed 151 Array from 3 (184) 2130 to 3 (184) 2145

151	4	185	1915	Technician changed 151 Array from 4 (185) 1915 to 4 (185) 1945
151	5	186	1430	Technician changed 151 Array at 5 (186) 1430
151	5	186	1715	Technician changed 151 Array from 5 (186) 1715 to 5 (186) 1730
151	7	188	2115	Technician changed 151 Array at 7 (188) 2115
151	25	206	1145	Technician changed 151 Array at 25 (206) 1145

August 2002

The following data appear to be correct:

Array	Day	Date	Time	Error Message
150	19	231	1730	Air temp difference from 19(231) 1730 (30.801) to 19 (231) 1745 (27.451) is greater than 3.0 degrees C
150	29	241	1630	Air temp difference from 29(241) 1630 (29.872) to 29 (241)1645 (26.388) is greater than 3.0 degrees C
150	30	242	1615	Air temp difference from 30(242) 1615 (27.006) to 30 (242) 1630 (23.857) is greater than 3.0 degrees C
151	2	214	1645	Precip difference from 2(214) 1645 (.508) to 2 (214) 1700 (6.604) is greater than 5 mm
151	2	214	1700	Precip difference from 2 (214) 1700 (6.604) to 2 (214) 1715 (.508) is greater than 5 mm
151	5	217	300	Precip difference from 5 (217) 300 (1.016) to 5 (217) 315 (6.35) is greater than 5 mm
151	5	217	415	Precip difference from 5 (217) 415 (5.588) to 5 (217) 430 (.254) is greater than 5 mm
151	21	233	1515	Precip difference from 21 (233) 1515 (7.874) to 21 (233) 1530 (.762) is greater than 5 mm
151	23	235	1400	Precip difference from 23 (235) 1400 (2.54) to 23 (235) 1415 (17.018) is greater than 5 mm
151	23	235	1415	Precip difference from 23 (235) 1415 (17.018) to 23 (235) 1430 (5.334) is greater than 5 mm

September 2002

The strongest effects of tropical storm Isidore occurred on September 25 and 26. Stronger than normal winds, increased rainfall, cloudy skies (low LiCor readings), slightly cooler temperatures and a drop in barometric pressure accompanied the storm front.

The following data appear to be correct:

Array	Day	Date	Time	Error Message
150	6	249	1545	Air temp difference from 6(249) 1545 (30.072) to 6 (249) 1600 (25.986) is greater than 3.0 degrees C
150	22	265	1515	Air temp difference from 22(265) 1515 (26.676) to 22 (265) 1530 (23.258) is greater than 3.0 degrees C
151	7	250	1400	Precip difference from 7 (250) 1400 (3.048) to 7 (250) 1415 (8.89) is greater than 5 mm
151	7	250	1415	Precip difference from 7 (250) 1415 (8.89) to 7 (250) 1430 (1.778) is greater than 5 mm
151	22	265	1300	Precip difference from 22 (265) 1300 (5.842) to 22 (265) 1315 (.508) is greater than 5 mm
151	22	265	1615	Precip difference from 22 (265) 1615 (4.064) to 22 (265) 1630 (10.414) is greater than 5 mm
151	22	265	1645	Precip difference from 22 (265) 1645 (8.382) to 22 (265) 1700 (2.54) is greater than 5 mm
151	24	267	1630	Precip difference from 24 (267) 1630 (8.128) to 24 (267) 1645 (1.016) is greater than 5 mm
151	25	268	1130	Precip difference from 25 (268) 1130 (1.524) to 25 (268) 1145 (7.62) is greater than 5 mm
151	25	268	1145	Precip difference from 25 (268) 1145 (7.62) to 25 (268) 1200 (2.54) is greater than 5 mm
151	25	268	1945	Precip difference from 25 (268) 1945 (6.096) to 25 (268) 2000 (13.97) is greater than 5 mm
151	25	268	2000	Precip difference from 25 (268) 2000 (13.97) to 25 (268) 2015 (4.826) is greater than 5 mm
102	17	260	2100	Wind speed is less than 0.5 m/s from 17 (260) 2100 to 18 (261) 900

October 2002

The following data appear to be correct:

Array	Day	Date	Time	Error Message
150	29	302	1100	Air temp difference from 29 (302) 1100 (26.224) to 29 (302) 1115 (22) is greater than 3.0 degrees C

November 2002

none

December 2002

none

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.

Specifics:

January 2002

The data for the dates and time below is missing, reason unknown:

Array	Day	Date	Time	Error Message
150	1	1	15	Missing 150 Array data (15 minute data) from 1 (1) 15 to 2 (2) 2400
101	1	1	100	Missing 101 Array data (Hourly Averages) from 1 (1) 100 to 2 (2) 2400
102	1	1	100	Missing 102 Array data (Hourly Average Wind Parameters) from 1 (1) 100 to 2 (2) 2400
241	1	1	2400	Missing 241 Array (Daily Averages) from 1 (1) 100 to 2 (2) 2400
242	1	1	2400	Missing 242 Array (Daily Average Wind Parameters)

from 1 (1) 100 to 2 (2) 2400

243 1 1 2400 Missing 243 Array (Daily Max/Time Values) from
1 (1) 100 to 2 (2) 2400

244 1 1 2400 Missing 244 Array (Daily Min/Time Values) from
1 (1) 100 to 2 (2) 2400

February 2002
None

March 2002

All data for the dates and times listed below is missing from the record due
to internal battery failure:

Array ID	Date	Day	Time	Error message
150	31	90	630	Missing 150 Array data (15 minute data) from 31 (90) 630 to 31 (90) 1045

150	31	90	1315	Missing 150 Array data (15 minute data) from 31 (90) 1315 to 31 (90) 2400
-----	----	----	------	--

101	31	90	700	Missing 101 Array data (Hourly Averages) from 31 (90) 700 to 31 (90) 1000
-----	----	----	-----	--

101	31	90	1400	Missing 101 Array data (Hourly Averages) from 31 (90) 1400 to 31 (90) 2400
-----	----	----	------	---

102	31	90	700	Missing 102 Array data (Hourly Average Wind Parameters) from 31 (90) 700 to 31 (90) 1000
-----	----	----	-----	---

102	31	90	1400	Missing 102 Array data (Hourly Average Wind Parameters) from 31 (90) 1400 to 31 (90) 2400
-----	----	----	------	--

241	31	90	2400	Missing 241 data (Daily Averages) at 31 (90) 2400
-----	----	----	------	--

242	31	90	2400	Missing 242 data (Daily Averages) at 31 (90) 2400
-----	----	----	------	--

243	31	90	2400	Missing 243 data (Daily Averages) at 31 (90) 2400
-----	----	----	------	--

244	31	90	2400	Missing 244 data (Daily Averages) at 31 (90) 2400
-----	----	----	------	--

April 2002

All data for the dates and times listed below is missing from the record due

to internal battery failure:

Array	Day	Date	Time	Error Message
150	1	91	15	Missing 150 Array data (15 minute data) from 1 (91)
150	15	105	1630	15 to 15 (105) 1630
150	15	105	1730	Missing 150 Array (15 minute data)
150	16	106	845	Missing 150 Array data (15 minute data) from 16 (106)
150	16	106	1330	845 to 16 (106) 1330
150	24	114	1215	Missing 150 Array data (15 minute data) from 24 (114)
150	24	114	1300	1215 to 24 (114) 1300
101	1	91	100	Missing 101 Array data (Hourly Averages) from 1 (91)
101	15	105	1600	100 to 15 (105) 1600
101	16	106	900	Missing 101 Array data (Hourly Averages) from 16 (106)
101	16	106	1300	900 to 16 (106) 1300
101	24	114	1300	Missing 101 Array (Hourly Averages)
102	1	91	100	Missing 102 Array data (Hourly Average Wind Parameters)
102	15	105	1600	from 1 (91) 100 to 15 (105) 1600
102	16	106	900	Missing 102 Array data (Hourly Average Wind Parameters)
102	16	106	1300	from 16 (106) 900 to 16 (106) 1300
102	24	114	1300	Missing 102 Array (Hourly Average Wind Parameters)
241	1	91	2400	Missing 241 data (Daily Averages) from 1 (91) 2400 to
241	14	104	2400	14 (104) 2400
242	1	91	2400	Missing 242 data (Daily Average Wind Parameters)
242	14	104	2400	from 1 (91) 2400 to 14 (104) 2400
243	1	91	2400	Missing 243 data (Daily Max/Time Values) from 1 (91)
243	14	104	2400	2400 to 14 (104) 2400
244	1	91	2400	Missing 244 data (Daily Min/Time Values) from 1 (91)
244	14	104	2400	2400 to 14 (104) 2400

May 2002

None

June 2002

None

July 2002

Rainfall data missing due to vandalism at weather station site. Rain gauge cable severed. See section 13 for additional rainfall data.

Data for the following dates and times is missing, reason unknown:

Array	Day	Date	Time	Error Message
150	3	184	1215	Missing 150 Array data (15 minute data) from 3 (184) 1215 to 3 (184) 1245

August 2002

None

September 2002

The strongest effects of tropical storm Isidore occurred on February 25 and 26. Stronger than normal winds, increased rainfall, cloudy skies (low LiCor readings), slightly cooler temperatures and a drop in barometric pressure accompanied the storm front.

Rainfall data from 26th (Day 269) 0415 to 30th (Day 273) 2400 missing due to tipping bucket cable damage incurred during tropical storm Isidore. See section 13 for additional rainfall data.

October 2002

Rainfall data (array 151) for entire month missing due to previous damage to tipping bucket cable caused by tropical storm Isidore.

Data for the dates and times listed below are missing due to attempts to repair physical damage to weather station or to perform post repair checks.

Array	Day	Date	Time	Error Message
150	17	290	845	Missing 150 Array data (15 minute data) from 17 (290) 845 to 17 (290) 1945

150	18	291	1100	Missing 150 Array data (15 minute data) from 18 (291) 1100 to 18 (291) 1830
-----	----	-----	------	---

101	17	290	900	Missing 101 Array data (Hourly Averages) from 17 (290) 900 to 17 (290) 1900
-----	----	-----	-----	---

101	18	291	1100	Missing 101 Array data (Hourly Averages) from 18 (291) 1100 to 18 (291) 1800
-----	----	-----	------	--

102 17 290 900 Missing 102 Array data (Hourly Average Wind Parameters) from 17 (290) 900 to 17 (290) 1900

102 18 291 1100 Missing 102 Array data (Hourly Average Wind Parameters) from 18 (291) 1100 to 18 (291) 1800

November 2002

All data for this month missing and/or not reported due to multiple difficulties. Technician attempted to download data from storage module but was unsuccessful. Storage module was inadvertently taken out of ring mode and only previously downloaded data was found. Additionally, power wire from the external solar recharge battery was disconnected from the memory module, causing internal battery failure.

December 2002

All data for this month missing and/or not reported due to multiple difficulties. Reinstallation of battery cable to storage module resulted in all data starting at day 1. Also data appeared erroneous with multiple "nonsense" values being reported. LiCor instrument not produce data, sent to manufacturer for repair and recalibration. All data was treated as corrupt and deleted. Tipping bucket cable was repaired.

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.

During the 2023 updates to precipitation data it was determined that all precipitation data from October 2002 through the end of the year, December 31, 2002, should be removed as the metadata remarks for missing data state that the rain gauge was damaged September 26, 2002 during tropical storm Isidore. In addition, there are no precipitation in the archived monthly file for October 2002. Also, all data for November and December were removed based on metadata remarks that the data were missing. There are no archived monthly files for either of those months for 2002.

The strongest effects of tropical storm Isidore occurred on September 25 and 26. Stronger than normal winds, increased rainfall, cloudy skies (low LiCor readings), slightly cooler temperatures and a drop in barometric pressure accompanied the storm front.

Daily rainfall from USGS gauge at Fish River at highway 104.

DATE	Jan 2002 2002	Feb 2002	Mar 2002	Apr 2002	May 2002	June 2002	July 2002	Aug 2002	Sep 2002	Oct 2002	Nov 2002	Dec
1	16.5	2	21	0	0	0	27	0	0	0.25	0	0
2	6	0	15	0	0	0	0	3	0.5	0	0.25	0
3	0	0	0	1.5	0	0	2.25	0	0	10	1.5	0
4	0	0	0	0	0	0	30.75	10	0	16	2.75	0.5
5	69.5	6	0	0	0	0	13.75	16.25	0	0	45.75	
	16.75											
6	0	25.5	0	0	0	0.5	0	0	0	0	0.25	0
7	1	3.5	0	0	0	0	10.75	14.5	12.5	0	0	0
8	0	0	0	17.25	0	0	1.75	0	0	0	0	0
9	0	0	0	17.25	0	1.5	0	0	0	3.5	0	0
10	0	0	0	0	0	0	0	0	0	0.75	0	
	27.25											
11	0	0	0	0	0	0	10.5	0	0	0	38.5	0
12	10	0	26.25	9.25	0	0	11	0	0	0	29.75	
	21.25											
13	0.25	0	0	0.25	7	0	28.5	29.75	22.75	0	0	
	0.25											
14	12.75	0	0	3.75	0	10.75	1	0	23.5	65.25	0	0
15	0.25	0	0	0	0	0.25	0	0	0	10.5	9.5	0
16	0	0	0.25	0	0	0.25	0	2.5	0	0	4.75	0
17	0	0	0	0	14.75	0	0	0	0.5	0	0	0
18	0	0	0	0	8.5	0	0	0	0	0	0	0
19	9.75	0	0	0	0	37.5	0	0.25	18.75	0	0	14
20	0	24.5	7.25	0	0	0	0	0	0.25	0	5.75	0
21	0	0	1.75	0	0	0	13.25	2.75	0	0	0.25	0
22	0.25	0	0	0	0	0	0.75	22	81.5	0	0	0
23	0.25	0	0	0	0	0	0	9	0.25	0.75	0	4.5

24	2.25	0	0	0	0	0	28.5	0	44	0.25	0	
	34.25											
25	1.25	0	0	0	0	0	40.5	2.5	144.75	3	0	
	0											
26	0	0	28	0	0	3.5	4.5	0	32	8.75	0	0
27	5	0	0	0	0	33.75	0.75	0	0	6.5	0	0
28	0	0	0	0.25	0	0.25	0.25	0	0	0	0	0
29	0	0	0	0	40	1.75	19.75	7.5	0	23	0	0
30	0	0	0	0	20.25	31.5	3.75	0	7.75	0	5.5	0
31	0	0	20.75	99.5	0	0	0	9	0	0	0	43
Total	135	61.5	120.25	149	90.5	121.5	249.25	129	389	148.5	144.5	161.75

Rain Events recorded by weather station:

Note: monthly totals are not available for months that data was missing due to maintenance.

January

Date RainAmount (mm)

3 3.048
5 1.524
6 5.588
7 1.016
8 11.176
10 .254
12 2.540
13 .254
14 13.716
15 .254
17 .254
19 4.826
22 .254
24 .508
25 7.366
27 10.922

February

Date RainAmount (mm)

1 .508
5 1.016
6 22.352
7 5.588
9 .254
12 .254
17 .254
20 20.066
21 .254
22 .254

25 .254

"Monthly Total"51.1

March

Date	RainAmount (mm)
1	17.526
2	23.114
8	.254
9	.254
12	16.764
14	.254
21	1.270
25	.254
26	21.336

April

Date	RainAmount (mm)
16	.254
18	.254

May

Date	RainAmount (mm)
13	4.826
17	14.224
18	5.588
30	24.130

"Monthly Total"48.8

June

Date	RainAmount (mm)
8	.762
9	1.016
14	10.922
19	8.128
20	1.524
21	9.398
22	1.016
23	4.318
24	4.826
25	1.270
26	9.652
27	19.558
28	.254

30 .508

"Monthly Total"73.2

July

Date RainAmount (mm)

none due to vandalism where rain guage cable was severed.

August

Date Rainamount (mm)

1 .508

2 8.382

4 12.446

5 30.988

6 3.810

11 3.810

16 .508

18 3.556

21 8.890

22 3.048

23 25.146

25 4.318

30 2.286

31 3.302

"Monthly Total"111.0

September

Rainfall data from 26-30 missing due to damage to rain guage from tropical storm Isidore.

Date RainAmount (mm)

1 .254

2 .508

6 2.794

7 50.292

13 9.906

14 43.434

21 7.112

22 38.354

24 45.720

25 149.098

26 10.160

October

Rainfall data missing for entire month due to damage to rain guage from tropical storm Isidore.